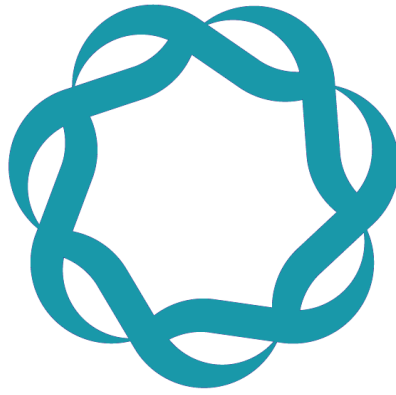




SRNT 2024

EDINBURGH, SCOTLAND
MARCH 20 - 23

Abstracts



SRNT

The peer-review process for SRNT's Annual Meeting entails review by Society members of abstract submissions. Criteria for acceptance/rejection are based upon methodological rigor and not the funding resource or research findings.

The views expressed by conference presenters are the authors' own and do not necessarily represent that of SRNT.



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2024 SYMPOSIA



SYM1

BEYOND MENTHOL: EXPANDING THE DEFINITION OF HARM TO INCLUDE SYNTHETIC COOLING AGENTS USED IN E-CIGARETTE AND TOBACCO PRODUCTS

Alayna Pauline Tackett, MS, PhD. The Ohio State University.

The draft menthol ban reflects a combined regulatory focus on banning menthol and characterizing flavors, e.g., those that impart a cooling sensation, which is critical to the reduction of tobacco-related death and disease. In this symposium, we will present recent findings from a series of investigations on the cooling effects of menthol and synthetic cooling agents from in-vitro assessment to human laboratory studies in a variety of nicotine and tobacco products (i.e., combustible cigarettes, e-cigarettes, and oral nicotine pouches). First, Ayomipo Adeniji will present data on the transferability of menthol and WS-3 synthetic cooling agent from different combustible tobacco products to the smoke. Next, Dr. Sven Jordt will provide data on the assessment of TRPM8 cold-receptor activation by synthetic cooling agents in new "cool-non-menthol" cigarettes introduced in California in January 2023 compared to menthol cigarettes. Dr. Hanno Erythropel will present data on synthetic cooling agents used in new, non-medicinal oral nicotine pouch products marketed as "flavor ban approved." Finally, Dr. Alayna Tackett will present data on e-cigarette characteristics, spirometry, and puffing topography among adult users of synthetic cooling and menthol-flavored e-cigarette products. Together, this symposium examines data from a variety of populations (adults, young adults, menthol cigarette and e-cigarette users), nicotine/tobacco products (combustible, oral, and e-cigarettes), and study designs (in-vitro, chemistry, human laboratory). The overarching goal is to highlight the prevalence and use of synthetic cooling agents by the tobacco industry and to engage with the tobacco regulatory science community in a discussion on how synthetic cooling agents may serve as a menthol replacement or enhancer. Dr. Cristine Delnevo will serve as the chair and Prof. Marielle Brinkman will conclude the session with a discussion of overall preliminary findings on the behavioral correlates, chemistry, pharmacology, and toxicology of synthetic cooling agents and how such findings might inform regulatory and tobacco control efforts.

SYM1-1

THE COOLING POWER OF COOL, NON-MENTHOL CIGARETTES COMPARED TO MENTHOL CIGARETTES AND CIGARS

Ayomipo Adeniji, Clark W. Wilson, Clint Fleshman, Theodore L. Wagener, Marielle C. Brinkman, Alayna P. Tackett, Ahmad El Hellani. The Ohio State University.

Introduction: In 2022, California passed a law to prohibit the sale of flavored tobacco products including menthol cigarettes and cigars. Simultaneously, the tobacco industry, namely RJ Reynolds, introduced cigarettes with synthetic cooling agents (WS-3 and WS-23) that mimic the cooling effects of menthol to the market. These newly introduced cool, non-menthol cigarettes constitute a pathway for the industry to circumvent the menthol ban and target menthol smokers looking for alternatives. We are interested in assessing the cooling power of these cigarettes compared to their menthol counterparts. **Methods:** Cool, non-menthol cigarettes were purchased from California while non-menthol and menthol cigarettes of the same brand and pack size were bought from Ohio and Georgia. To better understand cooling additives in the current market, we included menthol and unflavored filtered little cigars and cigarettes from Marlboro with Ice and Bold Ice monikers (all bought in Ohio). We developed an analytical method to analyze nicotine, menthol, WS-3, and WS-23 in the tobacco filler and from mainstream total particulate matter (TPM). To quantify the same analytes in smoke, we conducted machine smoking according to the WHO Intense puffing regimen collected the mainstream TPM on filter pads, chemically extracted the filter pads, and quantified the extract using GC-MS. **Results:** We detected WS-3 in California cigarettes only, while WS-23 was not detected in the tobacco filler of any product. When normalized to nicotine content, California cigarettes contained a similar or higher level of cool-inducing chemicals compared to menthol cigarettes. The fraction of these chemicals that is transferred to mainstream smoke, or the "cooling power" of the cool, non-menthol cigarettes was also similar or higher than menthol cigarettes. **Conclusions:** Our data showed that cool, non-menthol cigarettes could have a similar or greater cooling power compared to their menthol counterparts. **Statement of Relevance to CTP Regulatory Authorities:** Our data show that cigarettes with cooling power similar to or greater than menthol cigarettes risk voiding any potential public health gains stemming from the California flavor ban, or even a federal ban, should the industry distribute these cigarettes more widely.

FUNDING: State; Academic Institution

SYM1-2

SYNTHETIC COOLING AGENT AND SWEET FLAVORS IN "NON-MENTHOL" CIGARETTES MARKETING IN RESPONSE TO U.S. STATE-LEVEL MENTHOL CIGARETTE BANS

Sven-Eric Jordt¹, Hanno C. Erythropel², Paul T. Anastas², Stephanie S. O'Malley², Suchitra Krishnan-Sarin², Julie B. Zimmerman², Sairam V. Jabba¹. ¹Duke University School of Medicine, ²Yale University School of Medicine.

Significance: Banning menthol cigarettes is one of the key strategies to promote smoking cessation and reduce health disparities in the United States. The State of Massachusetts banned menthol cigarettes in 2020, while the State of California banned menthol cigarettes in December 2022. Subsequently, the tobacco industry replaced mentholated brands in California and Massachusetts, introducing several look-alike "non-menthol" cigarette products. Here, we hypothesized that tobacco companies replaced menthol with synthetic cooling agents, to create menthol's cooling effect in "non-menthol" cigarettes. Similar to menthol, these agents activate TRPM8-Cold/menthol receptor in sensory neurons innervating the airways. **Methods:** "Non-menthol" cigarettes were purchased in convenience stores in the U.S. states of California and Massachusetts. Calcium-microfluorimetry in HEK293t cells expressing TRPM8-Cold/menthol receptors was used to determine whether extracts from "non-menthol" cigarettes produce sensory cooling effects, compared to standard menthol cigarettes. Gas-chromatography/mass-spectrometry was used to detect flavor chemicals, including synthetic cooling agents, in the components of "non-menthol" cigarettes, including crushable filter capsules (if present). **Results:** Extracts from several "non-menthol" cigarettes activated cold/menthol receptors at higher dilutions and with stronger efficacies than menthol cigarettes. Chemical analysis detected the synthetic cooling agent, WS-3, in several "non-menthol" cigarette brands. Crushable capsules in "non-menthol" varieties contained no coolants but included popular "sweet" flavor chemicals such as vanillin and ethyl vanillin. **Conclusions:** Tobacco companies have added WS-3 to California-marketed "non-menthol" cigarettes, a synthetic cooling agent that creates a cooling sensation similar to menthol but lacks menthol's characteristic "minty" odor. The measured WS-3 content is sufficient to elicit cooling sensations in people who smoke, similar to menthol. Sweet flavorants are added to filter capsules in crush "non-menthol" cigarettes, likely to appeal to youth beginning to smoke.

FUNDING: Federal

SYM1-3

SYNTHETIC COOLING AGENT IN ORAL NICOTINE POUCH PRODUCTS MARKETING AS "FLAVOR-BAN APPROVED"

Hanno C. Erythropel¹, Sairam V. Jabba², Paul T. Anastas¹, Stephanie S. O'Malley¹, Suchitra Krishnan-Sarin¹, Julie B. Zimmerman¹, Sven-Eric Jordt². ¹Yale University School of Medicine, ²Duke University School of Medicine.

Background: US sales of oral nicotine pouches (ONPs) have rapidly increased, with cool/mint-flavored ONPs being the most popular flavor category. Restrictions on sales of flavored tobacco products have either been implemented or proposed by several US states and localities. Zyn, the most popular ONP brand, is marketing Zyn Chill and Zyn Smooth as "Flavor-Ban Approved" or "Unflavored", probably to evade flavor bans and increase product appeal. At present it is unclear whether these ONPs are indeed free of flavor additives that can impart pleasant sensations such as cooling, however, product naming, advertising and user reports suggest that these products are flavored. **Methods:** Sensory cooling and irritant activities of "Flavor-Ban Approved" Zyn ONPs, Chill and Smooth, along with minty varieties (Cool Mint, Peppermint, Spearmint, Menthol), were analyzed by Ca²⁺-microfluorimetry in HEK293t cells expressing the cold/menthol (TRPM8) or menthol/irritant receptor (TRPA1). Flavor chemical content of these ONPs was analyzed by Gas-Chromatography/Mass-Spectrometry. **Results:** Zyn Chill ONP extracts robustly activated TRPM8, with much higher efficacy (39-53% higher) than the mint-flavored ONPs. In contrast, mint-flavored ONP extracts elicited stronger TRPA1 irritant receptor responses than Chill extracts. Chemical analysis demonstrated that Chill exclusively contained WS-3, an odorless synthetic cooling agent, as flavor additive, while mint-flavored ONPs contained a combination of WS-3 and minty flavorants. **Conclusions:** A Zyn ONP product marketed as "Flavor-Ban Approved" or "Unflavored" is not free of flavorants, but contains a synthetic cooling agent, proving that the manufacturer's advertising is misleading. Synthetic coolants can provide a robust cooling sensation with reduced sensory irritancy, thereby increasing product appeal and use.

FUNDING: Federal



SYM1-4

SYNTHETIC COOLING AGENTS AND MENTHOL IN E-CIGARETTES: EXAMINING SPIROMETRY AND DIFFERENCES IN USER TOPOGRAPHY

Alayna P. Tackett, Alice Hinton, Ahmad El Hellani, Megan Roberts, Ruth Sloan, Toral Mehta, Marielle C. Brinkman, Theodore L. Wagener. The Ohio State University.

Significance: Synthetic cooling agents are found in a variety of e-cigarette products, often nominally identified with terms like “ice” or “chill”. This study examined differences in spirometry (pre-post vaping) and user topography among young adult current e-cigarette users. **Methods:** Young adults (aged 18-25; N = 96) who were current e-cigarette users (weekly use for more than or equal to 3 months) completed a cross-sectional clinical trial. Participants completed questionnaires assessing nicotine dependence (Hooked on Nicotine Checklist), vaping preferences (flavor, device type), spirometry (pre-post vaping) and an ad libitum vaping session to collect puffing topography parameters (using participants own device; puff duration (sec), and total puff volume (mL)). **Results:** Participants began vaping between ages 15 – 18 years (71.8%; Mage = 18.4 years; SD = 2.2 years), and had been using e-cigarettes for 3.1 years (SD = 1.8 years). Users reported moderate dependence (M = 5.4, SD = 3.4), used on 26.7 days in the past 30-days (SD = 5.9 days), preferred disposable devices (46.9%) or prefilled cartridges (38.5%), and 60% (n = 51) vaped “ice” variant products (e.g., Blue Razz Ice). Post-vaping spirometry was reduced for FEV1 and %FEV1/FVC (p=0.048 and p=0.004, respectively). Users of “ice”/menthol products had significantly lower post-vaping FEV6 (p = .04) as compared to non-“ice”/menthol users after adjusting for pre-measurement, BMI, and total puff volume. Significant differences were observed for topography, “ice”/menthol flavors versus non-cooling flavors resulted in greater puff duration (3.42 vs. 2.84 seconds, respectively; p=0.004). **Conclusions:** Synthetic cooling agents in e-cigarettes may increase the palatability of e-cigarette aerosol resulting in users taking longer puffs and experiencing greater airflow obstruction as indicated by post-vaping reduced FEV6 values. Synthetic cooling agents may serve as a menthol replacement or enhancer, and may offset the efforts in reducing young people’s use of e-cigarettes.

FUNDING: Nonprofit grant funding entity

SYM2

THINKING OUTSIDE THE BOX TO REDUCE HEALTH INEQUITIES IN PRENATAL TOBACCO EXPOSURE

Natacha De Genna, PhD. University of Pittsburgh.

Although prenatal tobacco use is decreasing, inequities continue to increase. Rates of use have decreased more slowly among vulnerable populations, including poor and minoritized individuals, and individuals with mental illness. Universal public health campaigns and “off the shelf” tobacco cessation interventions may not be effective for pregnant people from minoritized groups; alternative solutions are urgently needed to redress inequities in prenatal tobacco use. This symposium includes 5 papers synthesizing across international regions (Netherlands, US, Israel), disciplines (pre-clinical, clinical, public health/epidemiology) and methods (observational, ehealth, epigenetics). Three papers examine co-use of tobacco and cannabis during pregnancy. Dr. Sharma will present data from a nationally representative US sample, the Population Assessment of Tobacco and Health (PATH) Study, finding that pregnant people who co-use tobacco and cannabis were more likely to use tobacco during and after pregnancy. Dr. De Genna examines tobacco and cannabis co-use among very young pregnant people, demonstrating higher risk for prenatal tobacco use among those identifying as bisexual and those with more depressive symptoms. Dr. Spindel presents a novel non-human primate model, revealing prenatal exposure to nicotine and THC resulted in differential effects on infant lung development. Both prenatal THC and nicotine were associated with persistent, altered DNA methylation highlighting the importance of epigenetic mechanisms. Three papers examined novel factors associated with tobacco cessation and relapse. Dr. Bar-Zeev will highlight the importance of going beyond the influence of partner smoking to examine the context of partner smoking (e.g., contact with partner, partner who is unemployed) to enhance postpartum relapse prevention. Then, Dr. Huizink will present a novel e-health intervention with heart-rate variability feedback, demonstrating a dose-response effect of this novel intervention on smoking cessation in a lower income sample, especially for pregnant people who were highly motivated to quit. Finally, Dr. Spindel has examined supplemental vitamin C to mitigate the effects of prenatal nicotine exposure on fetal lung development and child wheeze in non-human primate and emerging human models. Chairs Stroud and De Genna will synthesize across findings, disciplines, and methods to highlight novel approaches to reducing inequities in prenatal tobacco use and exposure.

SYM2-1

NICOTINE AND CANNABIS USE DURING PREGNANCY AMONG YOUNG PREGNANT BISEXUAL PEOPLE

Natacha M. De Genna, Lidush Goldschmidt, Gale A. Richardson. University of Pittsburgh.

Significance. Prenatal exposure to both nicotine and cannabis is associated with worse birth outcomes than either nicotine or cannabis exposure. Younger age at pregnancy and prior history of substance use predict co-use of nicotine and cannabis during pregnancy. Both early pregnancy and substance use are more prevalent among bisexual people. However, no studies have examined prenatal co-use of nicotine and cannabis as a function of sexual orientation, considering other correlates of bisexual experiences and prenatal substance use. Here we describe the prevalence and correlates of nicotine, cannabis, and their co-use in a prenatal cohort of young people, the YoungMoms (YM) study. **Methods.** YM participants (N = 411, mean = 19 years, 23% bisexual, 77% Black/Biracial) were recruited primarily in the first trimester (mean = 10 weeks) from prenatal clinics in Pittsburgh, PA. Participants completed a tablet or online survey assessing demographics, substance use, and psychosocial factors related to substance use. Clinical urine samples provided to OB staff were also screened for cotinine and THC. These data were combined with self-reported nicotine and cannabis use to create variables for prenatal tobacco, cannabis, single use of either, and co-use of both. **Results.** The prevalence of tobacco only (15% vs 10%), cannabis only (20% vs 11%), and co-use (32% vs 26%) was higher among bisexual YM participants compared to those who did not identify as bisexual. Fewer bisexual participants abstained from cannabis and nicotine (33% vs 53%) compared to those who were not bisexual. In a nominal logistic regression controlling for race, depressive symptoms, social support, and history of intimate partner violence, bisexual identity significantly differentiated between no use and the use of cannabis or tobacco (adjusted Odds Ratio = 2.37), but not between no use and co-use. Depressive symptoms differentiated between no use and co-use (adjusted Odds Ratio = 1.04). **Conclusions.** Previous studies have documented higher rates of tobacco use and cannabis use among young bisexual people assigned female at birth compared to those who do not identify as bisexual. This study adds to the nascent literature on prenatal tobacco and cannabis use among sexual minority people, highlighting the risk of these substances among young, pregnant bisexual people and the role of depressive symptoms for prenatal co-use.

FUNDING: Federal

SYM2-2

USE AND CO-USE OF TOBACCO AND CANNABIS BEFORE, DURING, AND AFTER PREGNANCY: A LONGITUDINAL ANALYSIS OF WAVES 1-5 OF THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY

Eva Sharma¹, Jessica M. Powers², Sarah F. Maloney², Laura R. Stroud². ¹Westat, ²Brown University.

Significance: Use of tobacco and cannabis in pregnancy is highly contraindicated and independent use of either substance is an established predictor of adverse health outcomes for both mother and fetus. Co-use of tobacco and cannabis may be prevalent in pregnancy, potentially leading to additional adverse health outcomes. Utilizing a national sample of women followed prospectively before, during, and after pregnancy, this study tested whether pre-pregnancy co-use of tobacco and cannabis (vs. tobacco-only use and cannabis-only use) was associated with greater likelihood of continuing to use tobacco and/or cannabis during pregnancy and postpartum. **Method:** Data were drawn from Waves 1-5 (2013-2019) of the Population Assessment of Tobacco and Health (PATH) Study. Pre-pregnancy, pregnancy, and postpartum data was captured and stacked over three intervals (Waves 1 to 3, 2 to 4, and 3 to 5). Participants were N = 686 U.S. women (72% white, 46% age 25-34) who were currently pregnant during the middle wave of an interval. Rates of past 30-day tobacco-only use, cannabis-only use, and tobacco + cannabis co-use at all three time points were examined. Generalized estimating equations (GEE) were utilized which covaried for relevant sociodemographic characteristics. **Results:** GEE models demonstrated that pregnant women who reported pre-pregnancy tobacco and cannabis co-use (vs. tobacco-only or cannabis-only use) were more likely to continue to use tobacco and/or cannabis during pregnancy and postpartum (ps < .05). Among women who endorsed pre-pregnancy co-use and continued to use tobacco and/or cannabis in pregnancy, about half transitioned to tobacco-only use (45.16%). **Conclusion:** Pre-pregnancy tobacco use and co-use of tobacco/cannabis are associated with greater likelihood of using tobacco and/or cannabis in pregnancy, and that half of individuals who reported co-use of cannabis and tobacco prior to pregnancy transition to tobacco-only use while pregnant. Findings underscore the need for further clinical



and empirical focus on dynamic patterns of use/co-use of tobacco and cannabis across the perinatal period, including cessation interventions to reduce tobacco and cannabis use in pregnancy and protect against relapse in postpartum.

FUNDING: Federal; Other

SYM2-3

IMPACT OF PRENATAL TOBACCO AND CANNABIS CO-USE ON INFANT LUNG DEVELOPMENT AND RESPIRATORY HEALTH AND POTENTIAL INTERVENTIONS

Eliot R. Spindel¹, Lyndsey E. Shorey-Kendrick¹, B. Adam Crosland², Cindy T. McEvoy², Jamie O. Lo². ¹OR National Primate Research Center, ²Oregon Health and Science University.

Maternal cigarette smoking during pregnancy alters fetal lung development, and leads to lifelong decreases in offspring lung function and increased risk of childhood respiratory illnesses and asthma. Although maternal cigarette smoking during pregnancy has decreased, its prevalence of use remains high worldwide. Conversely cannabis use in pregnancy has risen in the last two decades, in part due to changes in legalization, and in some US states the rate of maternal cannabis use exceeds tobacco use. Most concerning is the high rate of tobacco and cannabis co-use during pregnancy. There is limited knowledge regarding their combined effect on fetal health, especially lung development. Our objective was to determine the direct and independent effects of cannabis and tobacco on fetal lung development. To overcome confounding and the limitations of human studies, including polysubstance use, we leveraged non-human primate (NHP) models of prenatal nicotine exposure and prenatal delta-9-tetrahydrocannabinol (THC) edible consumption. Prenatal nicotine exposure in NHP recapitulated the reported effects of prenatal tobacco use on lung development in human infants, including significantly decreased expiratory flows with only small effects on lung volumes. In contrast, prenatal THC exposure caused significant decreases in offspring lung volumes with only small effects on expiratory flows, suggesting that prenatal nicotine and THC are affecting different aspects of lung development and may therefore have additive adverse effects on lung development. Notably, both prenatal THC and nicotine were associated with persistent, altered DNA methylation and RNA expression, suggesting the potential underlying role of epigenetic mechanisms. Because abstaining from prenatal tobacco and cannabis products is difficult given their addictive properties and associated risk factors including socioeconomic disadvantages, the development of therapeutic interventions is a high priority to reduce offspring morbidity. We have recently reported that supplemental vitamin C (500 mg daily) given to pregnant smokers mitigates many of the adverse effects of prenatal tobacco exposure on fetal lung development and offspring lung function and wheeze at 5 years of age; most likely acting through antioxidant mechanisms. Since THC has also been reported to affect oxidant pathways, there is potential for vitamin C supplementation to also ameliorate some of the effects of prenatal cannabis use.

FUNDING: Federal

SYM2-4

FACTORS ASSOCIATED WITH POST-PARTUM SMOKING RELAPSE AMONG ISRAELI WOMEN

Yael Bar Zeev, Carmel-Fink Geulah, Abu-Ahmed Wissam. The Hebrew University of Jerusalem.

Background: The majority of pregnant women who quit smoking relapse within 6 months postpartum. Socio-economic status and having a partner who smokes are known risk factors. Objective: This study explored factors associated with postpartum smoking relapse amongst Israeli women. Methods: An online cross-sectional survey, among women who had self-reported successfully quitting smoking anytime from 3 months prior to pregnancy up until birth. Data collected included socio-demographic characteristics (e.g. age, education, employment status and family status), pregnancy-related characteristics (e.g. antenatal class attendance and multiparity), smoking history, smoking environment and knowledge regarding smoking harms during pregnancy. Specifically for the smoking environment, we assessed whether the woman's partner smokes or not, and if he smokes, whether this is done in the pregnant woman's presence or not. A multivariate logistic regression was conducted to explore factors that were associated with post-partum relapse. Results: Of n=591 respondents, 57.36% (n=339) reported relapsing post-partum. Almost two-thirds (60.3%, n=305) of participants have partners who smoke, half of these (48.5%, n=148/305) do not smoke in the women's presence. Compared to women with a non-smoking partner, women whose partners smoked in their presence were more likely to relapse (aOR 2.30, 95% CI: 1.18-4.48); women whose partners smoked but not in their presence were not more likely to relapse (aOR 0.74,

95% CI 0.40-1.37). Being unemployed but able to work (aOR 4.00, 95% CI 1.07-14.9), and intention at delivery to remain abstinent for a set amount of time (aOR 2.48, 95% CI: 1.16-5.28), compared to intention to remain abstinent for good, were also found to have a higher odd of relapsing. Conclusion: This study highlights that whether the partner smokes in the presence of the pregnant woman or not might be an important factor for post-partum relapse. Interventions should consider focusing on creating smoke free homes and involving the partner to not smoke in the presence of the pregnant woman to prevent post-partum relapse.

FUNDING: Academic Institution

SYM2-5

LEVERAGING A STRESS MANAGEMENT E-HEALTH INTERVENTION FOR TOBACCO CESSATION IN PREGNANCY

Anja C. Huizink¹, Willeke van Dijk¹, Wieke de Vente², Matthijs Blankers², Mirjam Oosterman¹. ¹Vrije Universiteit Amsterdam, ²University of Amsterdam.

Background: Smoking and stress during pregnancy are associated with adverse health effects for both women and their (unborn) child. Effective interventions are needed to support pregnant women to quit smoking and reduce stress. The aims of our study were (1) to test the effectiveness of an 8-week eHealth intervention, including a personalized-stop-smoking plan and heart-rate variability biofeedback as stress management technique, in reducing stress and smoking in comparison to a control condition; (2) to examine whether stress reduction mediated the expected intervention effect on smoking behavior; (3) to test motivation to quit as moderator; (4) to investigate a dose-response effect of program usage; and (5) to investigate differences in birth outcomes and infant negative affectivity at three months. Methods: Pregnant women were included if they were over 18 years of age, less than 28 weeks pregnant at recruitment, and currently smoking. In total, 156 consenting participants (mostly with low-moderate educational level) were randomly assigned to the intervention or active control condition. Smoking behavior (yes/no, frequency, and quantity) and perceived stress were collected via online questionnaires at pre-intervention (baseline; t0), post-intervention (t1; 8 weeks after t0) and follow up at two weeks (t2) and three months (t3) after birth. Women reported on birth outcomes (birth weight, gestational age at birth, 1- and 5-minute Apgar scores, complications) at t2, and on their infant's negative affectivity at t3. Results: Smoking and stress reduced equally over the 8-week period for both conditions. The intervention effect on smoking was not mediated by stress reduction. Motivation to quit was found to moderate the intervention effect (smoking frequency and quantity) and a dose-response effect on smoking and stress reduction was found for program usage. No differences were found in birth outcomes and negative affectivity of children in each of the conditions. Conclusion: Program usage and motivation to quit are important for smoking reduction in pregnant women. To improve birth and infant outcomes, stress- and smoking reduction earlier in pregnancy might be needed. Further research is advised to examine how the eHealth intervention could be improved to increase treatment fidelity and effectiveness.

FUNDING: Federal

SYM3

ELECTRONIC CIGARETTES FOR HARM REDUCTION IN CHRONIC ADULT SMOKERS WITH SEVERE MENTAL ILLNESS

Joelle Ferron. Geisel School of Medicine at Dartmouth.

Though effects of long-term use may be unclear for decades, e-cigarette (ecig) aerosol contains lower levels of toxicants and carcinogens compared to cigarettes. Recent studies and literature reviews have concluded that ecigs are less harmful than combustible cigarettes, and have provided evidence that large reductions in smoking (e.g., >50%, moving from heavy to light) are associated with significant decreases in risk of all cancers, especially lung cancer and pulmonary disease. There is also a growing body of evidence that ecig use is associated with more reduction in smoking than nicotine replacement therapy (NRT), and significant reductions in toxins in the body, even for dual users. This symposium includes a multi-national group of four panelists who will present new clinical trial results that advance the current state of research and inform the field of tobacco harm reduction, particularly for smokers with mental illness (MI), recognized by the CDC as an at-risk, health disparity population. Two panelists will describe findings from secondary analyses of data from an RCT comparing 8 weeks of ecig provision to assessments only, in smokers with MI. One (Santos) will report on an innovative assessment of the relationship between trajectories of ecig initiation and cigarette reduction during the switching process. The other (Ferron) will report on an investigation of predictors of successful ecig substitution. The third panelist (Caponnetto) will describe the protocol for a novel study in Italy to compare the safety,

appeal, and impact on cessation between different strengths of disposable ecigs in a large group of smokers with schizophrenia. The fourth panelist (Pratt) will present data from a large observational study in which smokers with MI and/or a substance use disorder were offered cessation counseling and their choice of 7 pharmacotherapies. The discussant (Ahluwalia) is a population and public health scientist at Brown University and Deputy Director of a large NIH funded COBRE (Center for Addiction and Disease Risk Exacerbation) whose primary research focuses on nicotine addiction and smoking cessation in African-American smokers. The broader focus of his research in the area of health disparities, racism, and minority health, coupled with his global efforts to address tobacco smoking will ensure that the symposium stimulates lively discussion of the role that ecigs may play in tobacco harm reduction efforts in the US and abroad.

SYM3-1

USE AND APPEAL OF ELECTRONIC CIGARETTES COMPARED TO STANDARD SMOKING CESSATION TREATMENT IN A NATURALISTIC, LONGITUDINAL STUDY OF SMOKERS WITH MENTAL ILLNESS AND/OR SUBSTANCE USE DISORDER

Sarah Pratt. The Geisel School of Medicine at Dartmouth.

Significance: Though people with mental illness (MI) and substance use disorders (SUD) are aware of the harms of smoking, interested in cessation, and try often to quit, smoking rates are 2-4 times higher than the general population, largely due to biological, psychological, and socioeconomic factors increasing their likelihood of smoking initiation and addiction and decreasing their likelihood of cessation. Alternative approaches that challenge current smoking cessation treatment paradigms need to be considered. **Methods:** We conducted a pre-post observational study to test a new tobacco harm reduction approach. Participants were adults with MI and/or SUD in 3 sites who had smoked for at least 2 years, had a saliva methylation score of ≥ 68 to indicate recent frequent smoking, expressed a desire to make changes in their smoking behavior. Initially, participants in 2 sites were offered 6 months of weekly counseling from trained cessation counselors and could choose from 7 free pharmacological "aids" (nicotine gum, patch, and/or lozenge; disposable electronic cigarettes (ecigs); snus; varenicline; and bupropion). In the last year of the study, we added the 3rd site and offered a choice between cessation counseling + aids or the "SWITCH IT" program (free ecigs plus 8-10 weekly sessions of behavioral support for switching). Consented participants were assessed at baseline, monthly for 6 months, and at 12-months. In addition to cessation and harm reduction outcomes, we examined use and appeal of the aids to inform the design of tobacco harm reduction approaches. **Results:** We enrolled 270 participants (mean age=49; 57% nonwhite; 64% male). In the RI site (n=61), 86% chose to receive SWITCH IT v. cessation counseling. Across all sites, and among all aids, use was as follows: ecigs (85%), any NRT (56%), snus (7%), and varenicline (8%). Only 5 people used bupropion. The mean number of weeks that each aid was used was: 11 (ecigs), 7 (patch), 6 (gum), 5 (lozenge), 4 (varenicline), and 3 (snus). In a longitudinal regression model, ecigs were used significantly more than all other aids ($p < .001$). **Conclusions:** Given a choice, people with MI and/or SUD are significantly more likely to use ecigs and receive support for switching compared to standard cessation treatments. Given its high appeal, this product should be considered as a routine component of tobacco harm reduction strategies in the US, similar to European public health approaches.

FUNDING: Academic Institution; Tobacco Industry

SYM3-2

A 12-MONTH RANDOMISED, DOUBLE-BLIND, CONTROLLED, MULTICENTRE TRIAL COMPARING CHANGES IN CIGARETTE CONSUMPTION AFTER SWITCHING TO HIGH OR LOW NICOTINE STRENGTH E-CIGARETTES IN SMOKERS WITH SCHIZOPHRENIA SPECTRUM DISORDERS: PROTOCOL FOR THE GENESIS TRIAL

Pasquale Caponnetto. University of Catania.

Background: Smoking prevalence among people with schizophrenia spectrum disorders is 2-4 times higher than in the general population; thus, this group of smokers has significantly higher rates of morbidity and mortality from smoking-related diseases. Progress in reducing smoking prevalence in people with schizophrenia has been very slow compared to the general population. Consequently, there is a pressing need for alternative and more effective approaches to prevent or reduce morbidity and mortality in smokers with schizophrenia spectrum disorders. **Methods:** A volunteer population of 258 adult smokers with a schizophrenia spectrum disorder will be recruited for the GENESIS study, a 12-month, randomized, double-blind, smoking cessation trial comparing the effectiveness, safety and subjective evaluation of 5% versus 1.5% nicotine e-cigarette. The primary endpoint of this study will be the proportion of study

participants who achieve continuous abstinence, defined as self-report of no smoking from week 4 to week 24 and exhaled carbon monoxide of ≤ 7 ppm. These participants will be referred to as "quitters". The differences in continuous variables between the two groups for normally distributed data will be evaluated using one-way analysis of variance (ANOVA). The differences between the two groups for non-normally distributed data will be evaluated by the Mann-Whitney U test. Correlations between study variables under evaluation will be assessed by Spearman r correlation. To analyze differences in frequency distribution of categorical variables, we will use Chi-square tests with Yates correction or the Fisher exact test. All statistical tests will be two-tailed and considered to be statistically significant at a p value < 0.05 . The consistency of effects for pre-specified subgroups will be assessed using tests for heterogeneity. Subgroups will be based on age, sex, education, level of nicotine dependence. **Discussion:** This will be the first multicenter randomized trial directly comparing high (JUUL 5% nicotine) with low nicotine strength devices (JUUL 1.5% nicotine) in terms of reduction in cigarette consumption, adoption rates, product acceptability, tolerability, and tobacco harm reduction potential. This knowledge can contribute to a better understanding of e-cigarette with high nicotine content as a pragmatic and much less harmful alternative to tobacco smoking with the possibility of significant health gains in smokers with schizophrenia spectrum disorders.

FUNDING: E-cigarette/Alternative nicotine products Industry

SYM3-3

NOVEL EVALUATION OF THE RELATIONSHIP BETWEEN TRAJECTORIES OF E-CIGARETTE INITIATION AND CIGARETTE REDUCTION WHILE SWITCHING FOR HARM REDUCTION

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Significance: Toxicological evidence indicates that e-cigarettes (e-cigs) are less harmful compared to cigarettes; however, their potential short and medium term public health benefits depend on the degree to which they are substituted for most or all cigarettes. Published e-cig switching trials have mostly focused on reductions in carbon monoxide and other biomarkers of harm among those assigned to switch from cigarettes to e-cigs over 4-8 weeks. Research has not closely examined the relationship between the unique trajectories of e-cig uptake and cigarette reduction over time. We examined the association between trajectories of e-cig and cigarette use in the e-cig provision arm of our recently published clinical trial. **Methods:** Participants in our trial were cigarette smokers with severe mental illness not interested in quitting who either received disposable e-cigs for 8 weeks and assessments at baseline, and weeks 2, 4, 6, and 8, or assessments only. Using the data on the e-cig provision group, we developed a dual process growth model to test the association between increases in e-cig use and concurrent decreases in cigarettes. **Results:** Mean age was 45.9 years, and 42.7% smoked ≥ 20 cigarettes per day (CPD) at baseline. Almost all correlated change in product use occurred from baseline to week 2. For the average smoker (mean=19 CPD), week 2 cigarette frequency decreased by 0.39 (95% CI -0.56, -0.22) cigarettes for each additional e-cig (vaping) session. There was effect modification ($p = 0.033$), such that baseline lighter smokers (< 20 CPD) had no significant decrease in week 2 cigarette frequency, regardless of their e-cig frequency, while heavy smokers (mean=38 CPD) switched products on a nearly one-to-one basis. **Conclusions:** The assessment-only group in our trial demonstrated very little change in cigarette use. Because smoking is very consistent within persons, observation-only groups in e-cig trials may be unnecessary. Instead, e-cig substitution trials could mimic cancer treatment trials, in which the most effective known substitution product is compared with other potentially lower harm products to determine which is most strongly associated with product switching. In this study, most switching occurred early, and heavier smokers substituted e-cigs for cigarettes more fully. These findings open the door to short-term trials comparing lower harm products on the extent to which they promote switching, with greater focus on heavier smokers.

FUNDING: Federal

SYM3-4

WHAT PREDICTS HARM REDUCTION IN ADULTS WITH SEVERE MENTAL ILLNESS PROVIDED E-CIGARETTES?

Joelle Ferron. Geisel School of Medicine at Dartmouth.

Significance: Adult smokers with severe mental illness (SMI) are more likely to smoke and smoke more cigarettes than adults in the general population. Rates of smoking remain high in this population, even though rates of smoking in the general population have reduced over the last 50 years – providing a disparate health burden for this vulnerable population. Electronic cigarettes (ecigs) are acceptable and usable by adults with SMI. Further, evidence suggests that exposure to the toxins and carcinogens from combustible cigarettes are more harmful than the limited toxins from ecigs. In this



study, NNAL (tobacco-specific carcinogen metabolite, 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol) was measured through urinalysis to verify reduction in cigarettes. First, we examine the proportion of reduction in the NNAL biomarker from baseline to 4 and 8 weeks and then relate this to reduction in smoking and increase in ecig use. Second, we explore predictors of the proportion change in NNAL. Methods: Participants were cigarette smokers with severe mental illness not interested in quitting who received disposable e-cigs for 8 weeks and NNAL assessments at baseline, 4, and 8 weeks. Using the data on the e-cig provision group, we use negative binomial models to predict change. Results: In 120 daily smokers who were provided ecigs, the average proportion of NNAL reduced by 14% (SD=48%) at 4 weeks and 13% (SD=57%) at 8 weeks. The self-reported number of cigarettes smoked per day reduced by 58% (SD=41%) at 4 weeks and by 50% (SD=43%) at 8 weeks. As for ecig use, increase in use is equivalent to ecig use at 4 and 8 weeks, which averaged 16 sessions per day (SD=11) at 4 weeks and 14 sessions per day at 8 weeks (SD=13). Positive attitudes about using ecigs at baseline were the strongest predictors of NNAL reduction. Conclusions: The ecig provision group in our trial reduced their NNAL significantly over the 8 weeks of the trial. The study also validates the use of the Timeline Follow-back for self-report of cigarettes per day, as there was a reduction in cigarettes from baseline to 4 weeks and an attenuated change at 8 weeks. Additionally, beliefs that ecigs were less harmful, more acceptable, and a viable choice for reduction predicted greater proportion of NNAL reduction. These findings provide evidence that attitudes towards ecigs are important to successful switching and thus should be targeted for interventions.

FUNDING: Federal

SYM4

THE IMPACT OF A NICOTINE REDUCTION STANDARD ON SMOKING BEHAVIOR, ALTERNATIVE NICOTINE PRODUCT USE, POLICY PERCEPTIONS, AND COMPENSATORY SMOKING

Rachel L. Denlinger-Apte, PhD, MPH. Wake Forest School of Medicine.

A low nicotine product standard for cigarettes and other combusted tobacco is a pending public health policy in New Zealand and under consideration in the United States. In this symposium, we will present research on how a nicotine reduction standard (NRS) for cigarettes affects smoking and other nicotine and tobacco use behavior as well as perceptions of the NRS itself. The research presented will cover several priority populations and uses numerous methodologies including clinical trials, in-depth interviews, laboratory experiments, and machine-learning. First, Dr. Hatsukami will present on nicotine and tobacco product purchasing patterns during a 12-week, open-label trial that randomly assigned adults who smoke to very low nicotine cigarettes (VLNCs), mimicking a NRS, or normal nicotine cigarettes (NNCs) in the context of an experimental marketplace that sought to reflect the real world by including e-cigarettes, oral nicotine products, and medicinal nicotine. Dr. Carroll will present on an equity-centered, secondary analysis of the 12-week trial. Her presentation will focus on whether there is a moderating role of two key social determinants of health (self-identified race and educational attainment) on the outcomes of cigarettes per day, smoke-free days, biomarkers of harmful exposure, and alcoholic drinks per day. Dr. Denlinger-Apte will present mixed-methods findings from the 12-week trial on product purchasing decisions, experiences using VLNCs and/or alternative nicotine products during the trial, and perceptions of and support for an NRS. Dr. Cassidy will present on a lab study during which adolescents who smoke chose between earning puffs of research cigarettes (VLNCs or NNCs), puffs of e-cigarettes (varying in nicotine concentration and flavor), or abstaining. Dr. Koopmeiners will present a machine-learning analysis of nine clinical trials to address the concern of compensatory smoking (e.g., increases in the number of cigarettes smoked per day and/or toxicant exposure) in response to an NRS and which populations, if any, are at greater risk for compensatory smoking. Finally, Mr. Zeller will place the findings in context of the global policy landscape and identify research and implementation gaps. In summary, this symposium will add to the current science on an NRS and is expected to be of broad interest to SRNT.

SYM4-1

REACTIONS TO VERY LOW NICOTINE CIGARETTES, ALTERNATIVE NICOTINE PRODUCTS, AND PROPOSED NICOTINE REDUCTION REGULATION AFTER COMPLETING A 12-WEEK, OPEN-LABEL TRIAL: A MIXED METHODS ANALYSIS

Rachel L. Denlinger-Apte¹, Emily Harwood¹, Aylin Aguilar¹, Qing Cao², Allison Chandler¹, Eric Donny¹, Xianghua Luo², Bailey Robinson¹, Ashley Strahley¹, Lori Strayer², Kimberly Wiseman¹, Dorothy Hatsukami², Eric Donny¹. ¹Wake Forest University School of Medicine, ²University of Minnesota.

Significance: We recently conducted a 12-week, open-label, randomized trial of very low nicotine cigarettes (VLNCs) or normal nicotine cigarettes (NNCs) within the context of an experimental marketplace that included e-cigarettes, medicinal nicotine, and other non-combusted products. Here, we explore participant experiences during the trial to better understand how smokers perceive VLNCs and other products as well as their opinions about a nicotine reduction policy after experiencing a simulated policy environment. Methods: We conducted follow-up interviews with a subset of participants (n=24 VLNC, n=16 NNC) who completed the trial. We examined the following topics: (1) product purchasing decisions from the experimental marketplace; (2) experiences using VLNCs and/or other nicotine products during the trial; (3) and perceptions of and support for a nicotine reduction policy. Interviews were audio-recorded, transcribed verbatim, double-coded, and analyzed using reflexive thematic analysis. We also assessed policy support in a survey administered to participants who completed the Week 12 visit (N=339). Results: Many interviewees reported little interest in trying other products and purchased research cigarettes due to familiarity. Some VLNC and NNC interviewees said their interest in cutting down or quitting smoking influenced them to buy medicinal nicotine or e-cigarettes. Several interviewees said they initially purchased VLNCs but switched to or dual used e-cigarettes due to VLNC dissatisfaction. Most interviewees reported disliking the taste of the VLNCs. Many interviewees thought a nicotine reduction policy would help people quit or reduce future addictions, which bolster the survey findings that 65% of the trial sample (61% VLNC, 69% NNC) would support a nicotine reduction policy if it made quitting easier and 68% (63% VLNC, 73% NNC) would support the policy if it prevented youth initiation. Conclusions: In an open-label trial, support for a nicotine reduction policy was high and during interviews many participants correctly understood the policy purpose, which is encouraging. Yet, VLNC dissatisfaction was common. Although some interviewees reported use of medicinal nicotine or e-cigarettes, others were not interested in trying other products. Thus, during policy implementation, it will be critical to emphasize policy benefits and encourage cessation to minimize the likelihood that smokers who are dissatisfied with VLNCs switch to illicit market NNCs.

FUNDING: Federal

SYM4-2

MODELING THE IMPACT OF E-CIGARETTE CHARACTERISTICS ON YOUTH CHOICE TO SMOKE IN THE CONTEXT OF A NICOTINE REDUCTION POLICY

Rachel N. Cassidy¹, Jennifer W. Tidey¹, Rachel Denlinger-Apte², Patricia Cioe¹, Dorothy K. Hatsukami³, Christine Moulding¹, Mariel Bello¹, Robert Swift¹, Eric C. Donny², Suzanne M. Colby⁴. ¹Brown University School of Public Health, ²Wake Forest University School of Medicine, ³University of Minnesota, ⁴Brown University School of Medicine.

A national nicotine reduction standard (NRS) could reduce the public health toll of smoking in the U.S. However, reducing nicotine in cigarettes may lead to changes in the use of other tobacco products, especially among young people who use e-cigarettes at disproportionately high rates. Smoking outcomes may depend on the characteristics of available e-cigarettes under an NRS for cigarettes. We evaluated the impact of cigarette nicotine content, e-cigarette nicotine concentration, and e-cigarette flavors on choices to use cigarettes or e-cigarettes, or abstain from both, in a sample of young people who smoke cigarettes. Participants were aged 15-20 years old (N=80, M age=18.8) and reported smoking daily and vaping nicotine at least twice in their lifetime. Nicotine content in cigarettes (Very Low Nicotine Content; VLNC or Normal Nicotine Content; NNC) was manipulated between-subjects. In the first session, only the assigned cigarette was available, to assess preference in the absence of e-cigarettes. E-cigarette nicotine concentration (3 vs 18 mg/ml) and flavor (tobacco vs non-tobacco [e.g., mango]) were manipulated within-subjects across sessions, during which participants were asked to make choices between puffs of a cigarette or an e-cigarette following overnight abstinence. Outcomes included number of choices to smoke, vape, and/or abstain in each session. When only cigarettes were available, there were no differences between VLNC and NNC cigarettes on the number of cigarette puffs taken, despite subjective ratings of VLNC cigarettes being significantly lower than for NNC cigarettes (ps<.05). When e-cigarettes were concurrently available with cigarettes, the number of cigarette puffs taken was lower in the VLNC group than in the NNC group Beta= -3.5, p<.001). Non-tobacco flavors and lower nicotine content in concurrently available e-cigarettes were also associated with fewer choices to smoke (Beta= -1.3, p<.001 and Beta=1.8, p<.001, respectively). E-cigarette availability reduced choices to smoke VLNC cigarettes, and e-cigarettes with lower nicotine and non-tobacco flavors led to the fewest choices to smoke. However, VLNC cigarettes alone, without an e-cigarette alternative, did not reduce the number of puffs taken relative to NNC cigarettes. Regulators should consider that new product standards occur in the context of a complex tobacco marketplace, and the availability and characteristics of other products can moderate the impact of an NRS.

FUNDING: Federal

SYM4-3

MINIMAL EVIDENCE OF COMPENSATORY SMOKING DURING CLINICAL TRIALS OF VERY LOW NICOTINE CONTENT CIGARETTES: A MACHINE-LEARNING APPROACH

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Background: In completed trials, participants randomized to smoke very low nicotine content (VLNC) cigarettes, on average, exhibited reduced cigarette use and biomarkers of exposure. Although the current VLNC cigarette literature indicates minimal evidence of compensatory smoking (e.g., increases in the number of cigarettes smoked per day and/or toxicant exposure), it is important to determine if any subgroups compensate to a greater degree to ensure a nicotine reduction policy will not exacerbate tobacco-related health inequities. Machine learning techniques provide powerful tools for identifying subgroups of the population for which compensation might be more prevalent. **Methods:** We analyzed data from nine randomized trials comparing participants assigned to receive VLNC (0.4 mg/g SPECTRUM) cigarettes to participants assigned to normal nicotine content (NNC) cigarettes (15.8 mg/g SPECTRUM). Primary outcomes were total cigarettes per day (CPD) and exhaled carbon monoxide levels (CO), measured between 3- and 8-weeks post randomization. Individual treatment effects (ITEs; CPD if a participant were randomized to NNC cigarettes minus CPD if a participant were randomized to VLNC cigarettes) were estimated using SuperLearner, implemented using logistic regression with a LASSO penalty and random forests. Fitted values were used to estimate the proportion of the population that would have increased CPD or CO if randomized to VLNC vs. NNC cigarettes. A permutation test was used to detect subgroups that systematically exhibited compensation. Secondary analyses examined participants with biochemically verified adherence to smoking only VLNC cigarettes. **Results:** We included 2396 participants in our analysis. The ITEs range from a 30 CPD decrease to a 2 CPD increase when randomized to VLNC cigarettes with an average decrease of 5.9 CPD; it is estimated that only 0.42% of the population would smoke more when assigned to VLNC cigarettes. When restricting the analyses to adherent participants, only 0.92% of the population would smoke more when assigned to VLNC cigarettes. Similar results were observed for CO. No subgroups were identified that consistently showed compensatory smoking. **Discussion:** Our results suggest that only a very small proportion of the population would increase their smoking if given VLNC cigarettes. These findings indicate that a nicotine reduction policy is unlikely to result in compensatory smoking across different subgroups of people who smoke.

FUNDING: Federal

SYM4-4

A HEALTH EQUITY CENTERED EVALUATION OF A RANDOMIZED CONTROLLED TRIAL OF VERY LOW NICOTINE CONTENT CIGARETTES IN ADULTS WHO SMOKE DAILY

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Background: While the net public health impact of a nicotine reduction standard (NRS) in cigarettes is anticipated to be ground-breaking, it is less clear if the impact of an NRS on social groups at higher risk for tobacco-related disease and death will be similar to the impact on those at lower risk. **Methods:** A controlled trial randomized adults who smoke to an experimental marketplace (EMP) containing very low nicotine content (VLNC; 0.4 mg nicotine/g tobacco) or normal nicotine content (NNC; 15.8 mg/g) study cigarettes for 12 weeks. Each participant's EMP also included non-combustible nicotine and tobacco products. Secondary data analyses were conducted within strata of lower and higher risk for tobacco-related disease, self-identified race (Black [n=99], White [n=282]) and education (high school or less [n=104], more than high school [n=334]), and focused on the following outcomes: smoke-free days, cigarettes per day (CPD), and biomarkers of tobacco smoke exposure (CEMA, total NNAL). **Results:** In Black and White participants, VLNC vs. NNC cigarettes resulted in greater smoke-free days (adjusted rate ratios: 17.41 for Black participants [p<.001] and 5.17 for White participants [p<.001]), greater differences in CPD (adjusted mean differences: -5.75 [p<.001] and -6.97 [p<.001]) and greater percent reductions of NNAL (adjusted geometric mean

ratios: 0.40 [p<.01] and 0.41 [p<.001]) and CEMA (adjusted geometric mean ratios: 0.46 [p<.05] and 0.51 [p<.001]). In participants with lower and higher education, VLNC vs. NNC cigarettes resulted in greater smoke-free days (adjusted rate ratios: 6.35 for lower education [p<.05] and 4.79 for higher education [p<.001]), greater differences in CPD (adjusted mean differences: -5.25 [p<.01] and -6.70 [p<.001]) and greater percent reductions of NNAL (adjusted geometric mean ratios: 0.53 [p<.05] and 0.40 [p<.001]). For the outcome CEMA, VLNC cigarettes resulted in a greater percent reduction for those with higher education (adjusted geometric mean ratios: 0.41 [p<.001]), but not for those with lower education (adjusted geometric mean ratios: 0.77 [p=.36]). There was no strong evidence for differential benefits of VLNCs across the studied groups. **Conclusion:** The results suggest that the low and higher risk groups for tobacco-related disease and death studied herein will benefit from an NRS. Future studies should consider identifying challenges and facilitators within these groups associated with the implementation of an NRS.

FUNDING: Federal

SYM4-5

PATTERNS OF NON-COMBUSTED NICOTINE DELIVERY SYSTEM USE IN AN EXPERIMENTAL MARKETPLACE WITH VERY LOW VS. NORMAL NICOTINE CONTENT CIGARETTES

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Background: A recently completed multi-site parallel arm, non-blinded 12-week clinical trial randomized people who smoke (PWS) to an experimental marketplace that contained very low nicotine content (VLNC) cigarette vs. normal nicotine content (NNC) cigarettes with access to non-combusted alternative nicotine delivery systems (ANDS, e.g., oral tobacco, e-cigarettes, medicinal nicotine). The study showed significant reductions in daily cigarette consumption in the VLNC vs. NNC condition and a greater uptake of non-combusted ANDS among those assigned to the VLNC cigarettes. This presentation describes the patterns of ANDS use. **Methods:** Secondary analysis of the data from the randomized clinical trial (VLNC n=220, NNC n=218) of PWS who predominantly had no plans to quit smoking. **Results:** A significantly higher rate of dual combusted tobacco and non-combusted ANDS use was observed in VLNC vs. NNC condition during the initial weeks (59.1% vs. 44.5%, p=0.002) that subsided at the end of intervention to levels that were similar to the NNC condition (39.1% vs. 34.4%, p=0.31). There was a significantly greater uptake of exclusive use of ANDS in the VLNC vs. NNC condition at the end of the intervention (16% vs. 4%, respectively, p<0.0001), with about 74% of the ANDS users in the VLNC condition using e-cigarettes solely. ANDS use accounted for 83% of those who achieved abstinence in the VLNC condition. Dual users and exclusive non-combusted ANDS users vs. exclusive combusted tobacco users in the VLNC condition reported greater number of smoke-free days during intervention (p=0.049 and p<0.001, respectively); those who exclusively used non-combusted ANDS also experienced greater reduced exposure biomarkers (ps<0.0001). Within the VLNC condition at the end of intervention, ANDS users (n=121) vs. exclusive combusted tobacco users (n=92) had higher levels of education (p=0.005), shorter duration of daily smoking (p=0.007) and prior non-combusted ANDS product use (p<0.001). Exclusive ANDS users (n=35) vs. dual users (n=86) were younger (p=0.025), less dependent (p=0.007), smoking fewer cigarettes (p=0.002) with shorter duration of daily smoking (p=0.009). **Conclusion and implication:** If a nicotine product standard is implemented on combusted products, the availability of non-combusted ANDS, particularly e-cigarettes, may help cigarette smokers to abstain from cigarettes. Examining approaches to help more dependent PWS quit smoking will be important.

FUNDING: Federal

SYM5

REDUCING TOBACCO-RELATED DISPARITIES THROUGH COMMUNITY-ENGAGED INTERVENTION RESEARCH METHODS IN PRIORITY POPULATIONS

Jin Kim-Mozeleski. Case Western Reserve University.

In the U.S., tobacco use continues to be disproportionately high among priority populations, based on sociodemographic characteristics. Effective, community-engaged interventions that are tailored to the unique needs of priority populations are needed



to promote health equity. In this symposium, the speakers will present research that addresses ongoing disparities in tobacco use related to youth vaping, smoking cessation, and secondhand smoke exposure. Each speaker will highlight partnering with community-based organizations, community health workers, and/or community members to center the needs of priority populations as part of intervention development or delivery. Specifically, Dr. Marcia Tan (University of Chicago) will present community-engaged research to adapt a tobacco cessation curriculum for community health workers to promote workforce development. Dr. Andy Tan (University of Pennsylvania) will present a mixed methods vaping prevention messaging intervention development project with sexual and gender minority youth. Dr. Dina Jones (University of Arkansas for Medical Sciences) will present findings from a community-based intervention that aimed to increase the implementation of smokefree home policies among Black/African American women caregivers residing in low resource, rural communities. Dr. Jin Kim-Mozeleski (Case Western Reserve University) will present the process and findings from a novel smoking cessation intervention pilot study addressing food insecurity and smoking cessation in tandem among low-income adults experiencing social needs, in partnership with a county hospital system. The discussant, Dr. Melissa Little (University of Virginia), will summarize and provide additional insights on the value of community-engaged research methods and interventions to reduce tobacco use and promote health equity.

SYM5-1

ENGAGING SEXUAL AND GENDER DIVERSE YOUTH AS PARTNERS IN FORMATIVE RESEARCH AND CO-CREATING ANTI-VAPING SOCIAL MEDIA MESSAGES TO PREVENT VAPING INITIATION IN PROJECT SMART

Andy Tan. University of Pennsylvania.

Significance: Sexual and gender diverse youth (SGD) report higher rates of ever trying vaping and currently vaping compared with non-SGD youth. have been tailored for SGD youth. Project SMART aims to design and evaluate social media anti-vaping messages intended for SGD youth ages 13-18 to prevent vaping initiation using a mixed-methods youth-engaged research approach. **Method:** We conducted a sequential mixed-methods research study including a beliefs elicitation survey (n=252), focus groups and in-depth interviews (n=34), online discrete choice experiment (DCE) and perceived message effectiveness (PME) rating survey (n=240). We partnered with SGD youth from 4 youth organizations as advisors to obtain input on the protocol, message designs, and findings. We engaged two SGD youth media interns to create SGD-tailored and control non-tailored social media messages that would be utilized for an experiment to evaluate the effectiveness of tailoring. **Results:** We identified 5 key categories of beliefs from the elicitation survey that SGD youth associated most frequently with youth vaping: 1) mental health benefits and consequences, 2) physical health consequences, 3) nicotine addiction, 4) social reasons and costs, and 5) financial costs. In focus groups and interviews, SGD youth perceived existing anti-vaping campaigns as ineffective for their group and provided input on ways to tailor health messaging for SGD youth on social media. The DCE analysis found that tailoring using SGD identity cues was the most important feature within images that appeal to SGD youth. The PME rating analysis found that images with higher levels of SGD identity cues (vs. no cue), images portraying two individuals or a group (vs. individuals), and captions addressing mental health, physical health, and nicotine addiction related to vaping (vs. financial and social) had higher perceived effectiveness scores. Open-ended comments indicated youth's preference for positive and empowering messages. We engaged with youth advisors to interpret formative research results and refine social media messages designed by SGD youth media interns. **Discussion:** Engaging SGD youth as partners is important to center the voices, lived experiences, and expertise of SGD youth in understanding salient vaping-related beliefs, informing what forms of cultural tailoring to use in anti-vaping messages, and creating anti-vaping social media messages that are culturally responsive and appealing.

FUNDING: Federal

SYM5-2

EXAMINING THE EFFECTIVENESS OF A TOBACCO CESSATION TRAINING CURRICULUM ADAPTED FOR COMMUNITY HEALTH WORKERS: RESULTS FROM A PILOT COMMUNITY-ENGAGED STUDY

Marcia M. Tan. University of Chicago.

Significance: Disparities in access to tobacco cessation remain among disadvantaged communities despite overall declines in smoking rates. Community health workers (CHWs), a workforce that serves as a bridge between communities and the healthcare system, have a unique role in expanding reach to those with poor access. We used a community-engaged, iterative approach to understand how to build capacity in CHWs

in order to better provide brief tobacco cessation counseling, as well as link patients to resources. The aim of the current study was to assess the effectiveness of an adapted tobacco cessation curriculum specifically tailored to CHWs. **Methods:** Using results from a mixed methods needs assessment, we developed the Community Health Allies Nicotine Guidance Education (C.H.A.N.G.E.) training for CHWs, an adaptation of an evidence-based WHO tobacco cessation curriculum. We piloted the training with CHWs (N=15) working in a local community based organization and enrolled in a CHW program in a community college. Participants completed a 10-item tobacco knowledge questionnaire and a readiness ruler (0-10) to assess motivation, confidence and readiness to deliver tobacco cessation brief counseling and motivational interviewing (M.I.). Paired samples t-tests were conducted to assess changes in CHW outcomes post receiving the training. Implementation outcomes were also assessed post training using the Acceptability of Intervention Measure, Intervention Appropriateness Measure, and the Feasibility of Intervention (ranges: 4-20). **Results:** CHWs were a majority women (93%) and worked in their current role for an average of 3.15 years. Baseline knowledge was low [M=3.46(1.36)], but significantly increased post-training [M=6.8(1.52); p<.0001]. There was a significant, positive change in motivation (p<.05), readiness (p<.001), and confidence in tobacco treatment (p<.01) and M.I. (p<.01). **Results** showed high acceptability [M=19.13(1.14)], appropriateness [M=18.87(2.35)], and feasibility [M=19.13(1.64)] of implementing C.H.A.N.G.E. **Conclusion:** We developed an education resource for CHWs to use to intervene with their clients who use tobacco to address the poor fit of existing trainings for CHWs. We have illustrated that a training adapted to the CHW experience increases tobacco cessation knowledge, confidence, and readiness among CHW. Adequately training CHWs has the potential to promote tobacco cessation and transform healthcare delivery among communities with low SES.

FUNDING: Federal; Academic Institution; Nonprofit grant funding entity

SYM5-3

FRESH: OUTCOMES OF A SMALL-SCALE RANDOMIZED CONTROLLED TRIAL TESTING AN INTERVENTION DESIGNED TO INCREASE SMOKE-FREE RULES IN THE HOME AMONG BLACK/AFRICAN AMERICAN WOMEN WHO SMOKE AND RESIDE IN LOW-RESOURCE, RURAL COMMUNITIES

Dina Jones. University of Arkansas for Medical Sciences.

Significance: In the US, secondhand smoke exposure is disproportionately high among children, Black/African American people, and people living in poverty or rural areas and these groups are less likely to ban smoking in the home. Voluntary smoke-free home rules significantly reduce secondhand smoke exposure, but few interventions have been tailored for people with these intersecting backgrounds. The Families Rising to Enforce Smoke-free Homes (FRESH) Study is a small scale randomized controlled trial of an intervention that aimed to increase comprehensive smokefree home rules among Black/African American women caregivers who smoke cigarettes or cigars and reside in low resource, rural counties in Arkansas (clinical trial #NCT03476837). **Methods:** Participants (N=181) were randomized to the treatment (n=88) or control group (n=93). Using a community health worker model, participants in the treatment group received 3 doses of motivational counseling, tobacco exposure feedback, and educational materials over 6 months. Participants in the control group received educational materials. Surveys at baseline, 1, 3, 6, and 12-month follow-up assessed the primary outcome, a comprehensive smokefree home rule (defined as a ban on use of cigarettes, cigars, hookah, IQOS, pipes, and e-cigarettes anywhere inside the home). Bivariate and generalized estimating equation analyses compared the prevalence of comprehensive and tobacco product-specific smokefree home rules by treatment group using a complete case analysis (n=163) at 12-month follow-up. Intention to treat analyses will also be presented. **Results:** At baseline, 25% of all participants reported a comprehensive smokefree home rule. In adjusted analyses, no difference was found in comprehensive smokefree home rule status by treatment group at 12-month follow-up or over time (treatment: 38.8% vs. control: 36.1%, p=.90; aOR: 1.21 [95% CI: 0.48, 3.03]). However, participants in the treatment group were more likely to have a partial or complete ban on cigarette smoking (aOR: 1.58 [95% CI: 1.01, 2.47]) and e-cigarette use (aOR: 1.72 [95% CI: 1.10, 2.70]) in the home than have no ban over time. **Conclusion:** Interventions that utilize a community health worker model can successfully increase the implementation of smokefree home rules among hard-to-reach groups. Community-based interventions may address the longstanding disparities in secondhand smoke exposure among socially and economically disadvantaged groups.

FUNDING: Federal

SYM5-4

A PILOT RANDOMIZED TRIAL TO ADDRESS FOOD INSECURITY AND PROMOTE SMOKING CESSATION AMONG LOW-INCOME ADULTS

Jin Kim-Mozeleski. Case Western Reserve University.

In the U.S., smoking prevalence is high among low-income adults who have unmet social needs, such as food insecurity. Food insecurity is a barrier to smoking cessation, yet studies have not investigated the impact of addressing food insecurity as a potential strategy to promote smoking cessation among low-income adults who smoke. In this study, we developed a novel intervention called Food for SucCess (Food Security for Successful Smoking Cessation) to address smoking cessation and food insecurity in tandem, and we assessed its feasibility, acceptability, and preliminary outcomes. In partnership with The MetroHealth System, a safety-net system (Cleveland, Ohio, USA), we enrolled participants who screened at risk for food insecurity, and reported smoking daily, and were ready to quit. All participants received support from a community health worker across the 3-month, fully-remote intervention, through monthly telephone calls for referrals and check-ins for smoking cessation and food access resources. In addition, participants randomized to the intervention group received an economic intervention intended to reduce the hardship of food insecurity during the smoking cessation process, equivalent to the cost of 1 week of groceries/month for 3 months (or \$80/month for 3 months). We randomized 55 participants (mean age=51; 73% female; 44% Black/African American; 55% severe food insecurity) who were smoking on average 13 cigarettes/day. The trial was feasible and acceptable based on 3-month retention rates (80%) and end-of-study qualitative feedback (91% would recommend the study to others). At 3 months, using complete-case analysis, participants in the intervention vs. control group reported a longer length of abstinence from smoking (19 days vs. 9 days) and had a higher proportion of serious quit attempts (88% vs. 63%). Smoking cessation was estimated to be 24% in the intervention group vs. 11% in the control group, and all quantitative findings were consistent when using intent-to-treat analysis. As smoking continues to be disproportionately concentrated among population groups experiencing socioeconomic and other forms of disadvantage, it is critical that smoking cessation services address social needs that are barriers to smoking cessation to promote health equity. Results from this pilot study suggest the importance of attending to social needs, particularly food insecurity, as a strategy to promote smoking cessation among low-income adults who smoke.

FUNDING: Federal

SYM6

"THEY LITERALLY GO HAND-IN-HAND": EMERGING PUBLIC HEALTH THREAT AND TREATMENTS FOR SMOKING CESSATION AND OTHER SUBSTANCE USE

Sterling Marshall McPherson, PhD. Washington State University.

This symposium was inspired by a workshop (Paris, November 2022) organized by the U.S. National Cancer Institute (NCI) and the French National Cancer Institute (INCa) to further develop this as a high priority research focus area. It will focus on tobacco and co-use of other substances (i.e., alcohol, cannabis, and opioids) in the domains of clinical, public health and policy research. The co-use of tobacco and other substances magnifies health risks for more than 200 diseases, including dozens of cancers. The prevalence of tobacco smoking among those with a substance use disorder remains stubbornly high (i.e., 25-75%). Focused study of tobacco and other substance co-use is of paramount importance because these groups almost uniformly experience severe, intersecting health inequities. The overall goals of this symposium are to characterize differences among those who are co-using across countries with varying policies and social service contexts; understand relevant behavioral and contextual factors; and highlight opportunities for intervention development and deployment. First, Dr. McClure will present data on US adults who use combustible tobacco and cannabis and evaluate the co-use using behavioral economics. The relationship between substances, as determined through behavioral economic models, may help to identify sub-groups and tailor treatments accordingly. Second, Dr. Cook will present data from a Boston area healthcare system focused on the experience of individuals who smoke cigarettes, have an opioid use disorder, and are in the criminal legal systems. Experiencing both untreated cigarette smoking and an opioid use disorder often leads to severely worse outcomes. Third, Dr. Miguel will present on trajectories of alcohol and tobacco co-use with data from the Amsterdam growth and health longitudinal study. While cigarette smoking and alcohol co-use has been documented in several populations, the sub-groups of co-use is less well understood but could help target emerging therapeutics. Finally, Dr. McPherson will present on the relationship between alcohol and smoking, and such associations with chronic pain among a sample of twins to characterize our understanding of how co-use is associated with chronic pain based on one's unique

environment, shared environment, and shared genetics. Dr. Rigotti will provide an overview of symposium findings and discuss directives for co-use surveillance, policy, and therapeutic developments.

SYM6-1

UNDERSTANDING THE INTERSECTION OF SMOKING AND OPIOID USE IN THE CRIMINAL LEGAL SYSTEM: AN EXPLORATION OF MERGED ELECTRONIC HEALTH RECORDS, POLICE AND JAIL DATA

Benjamin Cook. Harvard University.

U.S. smoking rates among those with opioid use disorder (OUD) have persisted over the last decade at rates near 90%. The healthcare system cannot be the only venue for reaching these individuals given that less than 10% of individuals in the community diagnosed with OUD receive any treatment. Another potential venue for smoking cessation programs is the criminal legal setting, as individuals living with OUD are at high risk for criminal legal involvement and incarceration. Data (2016-2021) includes patients' electronic health record and insurance claims data from Cambridge Health Alliance (a large safety net provider) merged to call and arrest data at the Cambridge Police Department, Middlesex County Sheriff's jail data, and individual- and community-level social determinants of health data. We compared the population living with OUD vs. the general population on rates of criminal legal involvement and incarceration. We compared smoking rates and smoking cessation treatment (counseling and medications) among those with OUD by criminal legal involvement (arrest and incarceration) using unadjusted and adjusted regression models. Covariates include comorbid mental, substance use, and physical health diagnoses, age, race, ethnicity, language, insurance status, and area variables. We hypothesize that individuals with OUD will more likely be involved with the criminal legal system. We hypothesize that incarcerated and arrested individuals with OUD will have higher rates of smoking and lower rates of smoking cessation treatment than their counterparts without criminal legal involvement. Preliminary results identified that individuals with OUD had 4.6 times greater odds of being arrested than the general population and, among those arrested, 3.75 times greater odds of being incarcerated. Smoking cigarettes in the last year was significantly associated with OUD, arrest, and incarceration. Early analyses support the hypotheses that individuals with OUD are more likely to smoke, to be arrested, and to be incarcerated. Future analyses will characterize the treatment and smoking rates among those with OUD with and without interaction with the criminal legal system. These data suggest that individuals with OUD involved with the criminal legal system have a significant unmet need for cessation treatment. Implications are that combined smoking cessation and OUD treatment in criminal legal settings can reduce smoking in this high-risk group.

FUNDING: Unfunded

SYM6-2

DIFFERENT PATTERNS OF ALCOHOL AND SMOKING CO-USE TRAJECTORIES FROM YOUTH TO ADULTHOOD ACROSS BIOLOGICAL SEX: DATA FROM THE AMSTERDAM GROWTH AND HEALTH LONGITUDINAL STUDY

André Miguel¹, Sierra Colletto¹, Crystal Smith¹, Trynke Hoekstra², Sterling Marshall McPherson¹. ¹Washington State University Elson S. Floyd College of Medicine, ²Vrije Universiteit Amsterdam.

Roughly 60-70% of tobacco smokers binge drink or frequently consume dangerous amounts of alcohol, and over 75% of people with an AUD are smokers. Co-addiction to these substances is the leading cause of morbidity and mortality worldwide, including significantly increased risk of several types of cancer. Tobacco and alcohol co-use often start at young adulthood, yet specific patterns of co-use over time have yet to be explored. The aim of this study was to examine whether there are statistically significant sub-groups of tobacco and alcohol co-use over time. Using data from the Amsterdam growth and health longitudinal study (n=196; 54% female), we estimated finite growth mixture models (1-6 class models) to uncover statistically significant sub-groups of change among individuals based on their pattern of alcohol and tobacco co-use across an 11-year period (ages 21 to 32). The final and best fitting solution was a 3-class sub-group model with excellent entropy for the classes (0.98): Class 1 (82%) demonstrated an average of 90.14 grams/month of tobacco consumption at age 21 and 177.98 grams/month of alcohol with a decreasing slope of -10.70 grams/month and -9.75 grams/month, respectively, through age 32; Class 2 (5%) demonstrated an average of 289.80 grams/month of tobacco consumption at age 21 and 275.11 grams/month of alcohol with a decreasing slope of -13.10 grams/month and -12.21 grams/month, respectively, through age 32; Class 3 (13%) demonstrated an average of 280.92 grams/month of tobacco consumption at age 21 and 231.52 grams/month of alcohol with a decreasing



slope of -23.96 grams/month and -10.63 grams/month, respectively, through age 32. At age 21, smoking was significantly associated with alcohol use (covariance = 684.78, $p < 0.05$), and change in alcohol use from ages 21 to 32 was associated use of alcohol at age 21 (covariance = 684.78, $p < 0.05$) and change in smoking over time (covariance = 684.78, $p < 0.05$). Lastly, females demonstrated less alcohol consumption at age 21 with ($\beta = -65.47$, $p < 0.05$) a slightly more rapid decline over time ($\beta = 4.66$, $p < 0.05$). Our findings add to the existing evidence on the strong relationship between alcohol and tobacco co-use among young adulthood. The three classes identified may represent distinct sub-groups with unique co-use behavior patterns. A better understanding of these subgroups may help to improve alcohol and tobacco use disorder prevention efforts aimed at young adults.

FUNDING: Unfunded

SYM6-3

UNPACKING THE RELATIONSHIP BETWEEN CANNABIS USE AND SMOKING: CONSIDERATIONS FOR TREATMENT DEVELOPMENT

Erin A. McClure¹, Hailey K. Traxler², Bethany R. Raiff³, Rachel L. Tomko¹, Mikhail N. Koffernaus¹. ¹Medical University of South Carolina, ²University of Kentucky, ³Rowan University.

The co-use of tobacco and cannabis products is prevalent globally, appears to be increasing among adults in the United States (US), and has been shown to adversely affect treatment and other clinical outcomes. However, there are currently no recommended treatment strategies for tobacco-cannabis co-use, nor are there tailored treatment strategies for tobacco cessation among those who use cannabis. To inform tailored treatment approaches to address the co-use of tobacco and cannabis, there is a need to evaluate how impactful cannabis co-use may be on tobacco cessation and which individuals who co-use experience greater difficulty achieving and maintaining abstinence. Behavioral economics provides a framework with which to study an individual's dual substance use patterns and is ideally suited for evaluating the underlying relationship between tobacco and cannabis use. The current study evaluated demand for either cigarettes or cannabis through hypothetical purchase tasks among adults who were co-using both substances. To evaluate the treatment implications of co-use, participants were asked to imagine they were in withdrawal from each substance when completing tasks to mimic demand changes during a quit attempt. Adults using both cigarettes (daily) and cannabis in the past month were recruited from Amazon Mechanical Turk for a one-time, cross-sectional survey (N=94; ages 18+; 47% female; 89% White). Participants completed hypothetical purchase tasks for cigarettes and cannabis, with task order randomized. Alpha was determined, which is a demand metric of valuation that indicates sensitivity of consumption to price constraints. Results found that hypothetical (imagined) tobacco withdrawal increased the value (less demand elasticity; lower alpha value) for both cigarettes and cannabis. Hypothetical (imagined) cannabis withdrawal only significantly increased the value of cannabis and did not change the value of cigarettes. These preliminary results indicate a relationship between tobacco and cannabis that affects demand (abuse liability), particularly during periods of abstinence-induced withdrawal, suggesting the need to further elucidate this type of relationship and verify it with non-hypothetical abstinence and withdrawal states. Behavioral economics may be used to identify for whom cannabis and tobacco function as substitutes and to tailor treatment approaches accordingly.

FUNDING: Unfunded

SYM6-4

CIGARETTE SMOKING, ALCOHOL AND CO-USE AND THEIR ASSOCIATIONS WITH CHRONIC PAIN: A WASHINGTON STATE TWIN REGISTRY INVESTIGATION

Sterling Marshall McPherson, Luke Hall, Andre Miguel, Crystal Lederhos Smith. Washington State University Elson S. Floyd College of Medicine.

A recent U.S. study found 42% of people experiencing chronic pain also smoke cigarettes. People who smoke also had twice the odds of previous year chronic pain. While both nicotine and alcohol demonstrate antinociceptive effects, findings on the association between alcohol use and chronic pain is mixed, with some studies reported increased use and others reporting decreased use. Importantly, roughly 60-70% of tobacco smokers frequently consume dangerous amounts of alcohol. Untangling these relationships is important to understand their relationships with chronic pain. Twin analyses allow us to begin to parse out the additive genetic (A), shared environment (C), and unique (E) environment influences. The current study aimed 1) to characterize the relationships between alcohol, tobacco, and co-use with chronic pain in between-twin and within-twin models, and 2) to better understand the role of A, C and E components for alcohol,

tobacco, and co-use, and how such components are associated with chronic pain components. We surveyed people from the Washington State Twin Registry (N=1,632) in a cross-sectional sample of twins reared together. We asked participants about demographics, health status, chronic pain, pain interference and substance use. The sample (mean age=52 years, 63% biological female, 70% monozygotic) in both the between-twin and within-twin models (controlling for age and biological sex), examining alcohol, tobacco, and co-use as predictors of chronic pain, each was not significantly ($p > 0.05$) associated with chronic pain, except for alcohol use (OR=0.81, $p < 0.05$) in the within-twin model. Notably, depression (average OR=1.13) and age (average OR=1.03) was significantly ($p < 0.05$) associated with chronic pain in all models. Alcohol, tobacco, co-use, and chronic pain univariate variance components ($p < 0.05$) were the following, respectively: A=50.7% & E=62.8%; C=29.0% & E=71.0%; C=17.8% & E=82.2%; and C=37.2% & E=62.8%. In the bivariate co-use and chronic pain model, the E ($b=0.04$, $p < 0.05$) and C ($b=0.06$, $p < 0.05$) components were associated with one another. Among twins, alcohol use was associated with lower odds of chronic pain. In the bivariate model, co-use was associated with chronic pain (C and E components), but the effects were modest. This research is one step toward understanding this relationship, but it is more useful for directing future areas of research including the potential moderating or moderating effect of depression.

FUNDING: Unfunded; State

SYM7

HEALTH EFFECTS OF E-CIGARETTES OR VAPING PRODUCTS: EVIDENCE UPDATE AND DEVELOPMENT OF RESEARCH AND PRACTICE GUIDELINES

Sherald Sanchez. University of Toronto.

E-cigarettes represent one of the most urgent research priorities in the field of nicotine and tobacco. In particular, there is a need to accelerate understanding of the health consequences of using nicotine e-cigarettes or vaping. The purpose of this symposium is to provide the most up-to-date estimates of vaping health risks both in absolute terms and relative to smoking. We will present findings from two recent systematic reviews (Kundu, Sanchez); describe the process of applying these findings in the development of evidence-based guidelines (Kouzoukas); and finally, consider the quality and limitations of existing studies and propose an international standard to guide ongoing and future research in this area (McNeill). Knowledge gained from this symposium will help the research community generate timely research questions to produce high quality evidence that will impact clinical and policy recommendations.

SYM7-1

HEALTH EFFECTS OF E-CIGARETTES OR VAPING PRODUCTS: AN UMBRELLA REVIEW WITH A COMPARATIVE ANALYSIS OF FINDINGS REPORTED IN SYSTEMATIC REVIEWS

Sherald Sanchez¹, Kyran Sachdeva², Siddharth Seth², Bayley Levy¹, Michael Chaiton³, Robert Schwartz¹. ¹University of Toronto, ²Queen's University, ³Centre for Addiction and Mental Health.

Significance: Understanding the health effects of e-cigarettes or vaping products is a critical research priority with numerous implications for practice and policy. Systematic reviews are essential tools for providing reliable estimates of these health effects. However, to date, findings from published systematic reviews focused on this question have been mixed and sometimes contradictory. The purpose of this umbrella review was to summarize the breadth of health effects associated with e-cigarettes and to explore potential sources of variability in the interpretation of findings reported in systematic reviews. Methods: Six electronic databases were searched to identify systematic reviews published between January 2018 and January 2023. The review protocol was pre-specified and followed the PRISMA guideline. Quality assessment was conducted using the AMSTAR 2 tool. Study selection and data extraction were performed by two independent reviewers. A narrative synthesis of the findings was developed integrating a thematic analysis of the conclusions and recommendations presented in each systematic review. Searches will be updated in December 2023. Results: Of the 2,100 studies identified in the searches, 61 systematic reviews were included, including 11 general reviews examining more than one health outcome. The included reviews presented evidence on 13 health domains: cardiovascular health, respiratory health, cancer, mental health (including e-cigarette dependence), oral and dental health, maternal and child health, sleep health, bone health, otolaryngology, weight gain, adolescent health, biomarkers, and toxicity. Reviews were given a rating of high (n=4), moderate (n=11), low (n=10), and critically low (n=36). Using thematic analysis, four key themes were identified as potential sources of variability in the interpretation of findings: review parameters, con-



textualization of findings (i.e., absolute versus relative risk), role of conflicts of interest in reporting findings, and methodological limitations. Conclusions: Evidence on the health effects of e-cigarettes or vaping products is constantly evolving, as demonstrated in the number of systematic reviews published on this topic within a three-year period. To maximize the utility of systematic reviews, special attention should be paid to the quality and characteristics of each review, common methodological limitations, and the role of conflicts of interest in the reporting of findings.

FUNDING: Federal

SYM7-2

A SYSTEMATIC REVIEW OF CANCER, RESPIRATORY, AND CARDIOVASCULAR HEALTH EFFECTS OF E-CIGARETTE USE (UPDATE SINCE THE KCL REVIEW)

Anasua Kundu¹, Nada Abu-Zarour¹, Anna Feore¹, Megan Sutton Kundu¹, Kyran Sachdeva², Karolina Urbanovich¹, Robert Schwartz¹, Michael Chaiton³. ¹University of Toronto, ²Queen's University, ³Centre for Addiction and Mental Health.

Significance: With the emergence of new research and findings, there is a need to conduct an updated review on the health risks of e-cigarette use. We aimed to update the findings of the King's College London 2022 review on the cancer, respiratory, and cardiovascular health risk of e-cigarette use in different populations. **Methods:** Six databases were searched for original studies examining cancer, respiratory, and cardiovascular health effects from exposure to nicotine e-cigarettes in either humans, cells, or animals. We limited our search to papers published since July 2021, because literature up to this period were included in the KCL review. We excluded non-peer reviewed literature, qualitative studies, and studies evaluating effects of exposure to cannabis vapour or heated tobacco products. Data on exposure to e-cigarettes was documented as acute (one-off exposure to 7 days), short- to medium term (8 days to 12 months), and long-term (more than 12 months) exposure. Different risk of bias tools tailored for different study designs were used for assessing quality of included studies. Sub-group analyses were conducted based on age, sex, gender, sexual orientation, race, ethnicity, and socioeconomic status. **Results:** We found a total of 146 articles assessing cancer (n=13), respiratory (n=87), and cardiovascular (n=51) health risk from e-cigarette exposure. Overall, available evidence did not suggest increased risk of developing lung cancer following long-term e-cigarette exposure among non or never smokers, but there was some evidence of DNA damage and cancer risk biomarkers indicating probable risk of any type of cancer. Acute exposure to e-cigarette might not cause any significant changes in lung function, however, there was significant evidence of increased self-reported respiratory symptoms among never smokers and dual users following long-term exposure. We found significant evidence of increase in heart rate and blood pressure and mixed evidence of effect on endothelial function following acute exposure to e-cigarette. However, long-term exposure was not associated with increased risk of self-reported adverse cardiovascular disease outcomes. We did not find any age or sex-based differences in either of these effects from e-cigarette exposure. **Conclusions:** Findings from this review add to our existing knowledge on the health effects of nicotine e-cigarettes and guide planning of recommendations and policy changes related to e-cigarette use.

FUNDING: Federal

SYM7-3

AN INTERNATIONAL STANDARD FOR VAPING HEALTH RISKS RESEARCH

Ann McNeill. King's College London.

Significance: The authors of the recent evidence review on the health risks of nicotine vaping assessing biomarkers of exposure and potential harm (McNeill et al, 2023) identified that the overall risk of bias summaries from included papers indicated common methodological limitations. Additionally, the heterogeneity of key study aspects limited the number of meta-analyses (and the number of studies included in meta-analyses). This paper summarises the issues and proposes a common standard for future vaping health risks research. **Methods:** By examining risk of bias statements and methodological heterogeneity of studies included in McNeill et al (2022), suggestions were made for standardisation for future research which were then discussed with authors of other similar reviews and key experts. **Results:** The standard recommends: (1) Having common terminology and including full descriptions of vaping products involved in studies; (2) Examining absolute health risks of vaping and relative risks in relation to tobacco smoking; (3) Including appropriate and well-defined user groups (e.g. people who exclusively vape with a certain minimum frequency) to help isolate health risks of vaping more quickly and increase confidence in findings compared to when groups

are ill-defined or overlapping. (4) Including participants for whom health impacts of vaping may manifest quicker than others (e.g. in switching studies, people with existing smoking-related disease). (5) Using appropriate exposure criteria for vaping and smoking (e.g. frequency, heaviness and longer-term duration of use) - in switching studies, time since quitting will affect biomarkers of exposure (given different half-lives) and smoking history will affect biomarkers of potential harm; (6) Including biochemical verification or taking into account protocol violators; (7) Identifying a core set of biomarkers taking into account environmental exposure and consideration of sensitivity, reliability and clinical relevance and should include vaping specific biomarkers; (8) Utilising study designs and adequate sample sizes to enable causal inferences where possible; (9) Assessing and acknowledging the impact of confounders; (10) Using open science principles to increase transparency and replicability. **Conclusions:** Agreeing an international standard for methodological criteria for vaping health risks research would improve the scope for synthesis, and potentially consensus, in this controversial field.

FUNDING: Unfunded

SYM7-4

PROJECT VECTOR—DEVELOPMENT OF EVIDENCE-BASED RECOMMENDATIONS ON THE HEALTH EFFECTS OF E-CIGARETTE USE RELATED TO CANCER, CARDIOVASCULAR, RESPIRATORY, AND MENTAL HEALTH OUTCOMES

Erika Kouzoukas, Intrepid Lab, Peter Selby. Centre for Addiction and Mental Health.

Significance: As the prevalence of e-cigarette use continues to increase rapidly, especially among youth and young adults, there is a need for a greater understanding of the harm-benefit ratio of using e-cigarettes or vaping products at both the individual and population levels. The Vaping and Electronic Cigarette Toxicity Overview and Recommendations (Project VECTOR) project, led by the INTREPID Lab at the Centre for Addiction and Mental Health (CAMH), aimed to develop evidence-based recommendations on the absolute and relative health outcomes of e-cigarette use, with a specific focus on the health effects related to cancer, cardiovascular, respiratory, and mental health outcomes. These recommendations are intended to be used by both healthcare practitioners and people who use e-cigarettes to help guide the decision-making process around e-cigarette use. **Methods:** The recommendations are based on the findings from a series of systematic reviews conducted by the Ontario Tobacco Research Unit (OTRU). On June 1 and 2, Project VECTOR held a two-day Panel meeting in Toronto, Canada, attended by subject matter experts and people with lived experience. The recommendation development process employed a consensus-based methodology to draft and vote on the content and strength of the recommendation, as well as the quality of evidence. **Results:** The two-day Panel meeting brought together over 20 subject matter experts from Canada, United States, Australia, and United Kingdom. Expertise relevant to e-cigarettes ranged from bench sciences to policymaking, as well as research adolescent medicine and research with equity-deserving groups, particularly Black and Indigenous populations. The meeting resulted in 10-15 recommendations that will be finalized with additional considerations for knowledge translation and end-user uptake. A recommendation was developed by the Panel for each of the core health effects, namely cancer, cardiovascular health, respiratory health, and mental health. **Conclusions:** With funding from Health Canada, Project VECTOR utilized research findings in the development of evidence-based recommendations for the use of e-cigarettes or vaping products. While the goal of the project is to develop e-cigarette-specific recommendations for a Canadian context, the methodology utilized can be broadly applied to other international settings.

FUNDING: Federal

SYM8

STOPPING THE HIJACK: UNCOVERING NICOTINE'S ACTIONS IN THE BRAIN TO GUIDE THERAPEUTIC DEVELOPMENT FOR CESSATION

Valeria Lallai. UCL.

Nicotine exerts complex actions in the brain via the nicotinic acetylcholine receptors, thereby modulating numerous downstream signaling mechanisms that result in both immediate and long-term effects on brain circuit function. In this regard, a more complete understanding of nicotine's complex actions is necessary to drive informed drug discovery for tobacco/nicotine cessation therapeutics. This symposium will discuss groundbreaking research that delves deep into the intricate interplay between nicotine and brain function. The talks will examine nicotine's actions at the cellular and synaptic level across brain regions, effects at varying stages of the addiction continuum, co-exposure with other drugs of abuse or flavor constituents, and sex and developmental considerations. Dr. Ostroumov will begin by revealing a crucial link between nicotine-in-



duced downregulation of the chloride transporter KCC2 and a reduction in synaptic inhibition of ventral tegmental area GABA neurons. Second, Nathan A. Olszewski will then discuss his research examining the consequences of nicotine self-administration on the neurophysiological responses of neurons in the medial habenula. Third, Malia Bautista will discuss a role for the nicotinic allosteric modulator, lynx2, in regulating nicotine relapse behaviors, with a focus on prefrontal cortex expression. Next, Dr. Mariella De Biasi will explore the interplay between adolescent nicotine exposure, altered dopamine responses, and increased morphine consumption in adulthood. Finally, Dr. Deniz Bagdas will discuss the intricate relationship between nicotine use behaviors and the impact of flavor additives, highlighting distinct effects between the sexes. As discussant, Dr. Christie Fowler will integrate this comprehensive view of cutting-edge nicotine addiction research with implications for future targeted interventions for tobacco/nicotine cessation, which will be in consideration of the intricate interplay of the various factors mediating nicotine's short- and long-term effects in the brain. This Symposium is sponsored by the SRNT Basic Science Network.

SYM8-1

NICOTINE-INDUCED INHIBITORY PLASTICITY SHAPES MIDBRAIN NETWORK DYNAMICS AND REWARD-RELATED BEHAVIOR

Alexey Ostroumov. Georgetown University Medical Center, Washington, DC.

The development of nicotine addiction arises in part from pathological usurpation of neuronal mechanisms that under normal conditions mediate reward-related associative learning. The gap in our knowledge, however, is the neuronal mechanisms underlying nicotine-induced aberrant learning. Drug-associated maladaptive learning results in part from long-lasting changes in the synaptic connectivity within the mesolimbic reward circuitry, which is primarily comprised of the ventral tegmental area (VTA) and the nucleus accumbens. Our findings in VTA GABA neurons characterize a circuit-specific inhibitory synaptic plasticity contributing to the emergence of reward-related behaviors. In rats, experimenter-induced nicotine injections and volitional nicotine self-administration enhance VTA GABA neuron activity via long-lasting downregulation of chloride transporter KCC2, which maintains low intracellular chloride concentrations in neurons. Given that low intracellular chloride underlies the inhibitory action of GABA_A receptor activation, KCC2 hypofunction decreases GABAergic synaptic inhibition or even paradoxically causes excitation of VTA GABA neurons. At the circuit level, KCC2 downregulation selectively impairs mutual reciprocal inhibition, increasing the instances of synchronized firing between individual GABA neurons. The synchronized activity in GABA network occurs at millisecond precision and is observed in ex vivo midbrain slice preparation and in awake freely-moving animals. Midbrain GABA neurons are the major inhibitors of dopamine signaling, yet we show that synchronized VTA GABA neuron activation can potentiate phasic dopamine neuron firing. Importantly, KCC2 downregulation and inhibitory network synchronization impact exclusively lateral VTA dopamine neurons projecting to the nucleus accumbens lateral shell, which is known to regulate responses to cues that predict reward. Accordingly, our behavioral studies indicate that experience-induced midbrain KCC2 downregulation facilitates learning of cue-reward associations. Thus, an emerging model is that nicotine-induced KCC2 downregulation increases midbrain GABA network synchronization, which, in turn, increases behaviorally-relevant dopamine signaling and thereby accelerates nicotine-induced aberrant learning. Overall, our work suggests that KCC2 downregulation in VTA GABA neurons represent a novel therapeutic target to prevent and alleviate nicotine-induced addictive behaviors.

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SYM8-2

NICOTINE SELF-ADMINISTRATION DIFFERENTIALLY MODULATES VENTRAL TEGMENTAL AND MEDIAL HABENULAR NEURONAL EXCITABILITY

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Background: Over 23 million people in the USA are dependent on nicotine and ~75% wish to quit with only around 7% are successful. Cessation remains low and relapse remains high because nicotine is highly reinforcing but also produces strong withdrawal symptoms upon abstinence. Dopamine signaling, which is a major player in nicotine reinforcement, stems from the ventral tegmental area (VTA). Withdrawal symptoms are known to be regulated by the interpeduncular nucleus (IPN) which receives projections from the medial habenula (MHb). Our goal is to understand the relationships between varying levels of nicotine self-administration and subsequent VTA and MHb neuronal activity. We hypothesized that increased nicotine vapor self-administration will lead to increased VTA neuronal excitation and decreased MHb excitation. Methods: Using male

and female C57BL/6J mice, we employed an e-Vape® self-administration (EVSA) at a concentration of 6 or 60 mg/mL nicotine (with or without menthol). Mice were trained on fixed ratio 1 (FR1) and FR3. After EVSA, neuronal excitability of the VTA and MHb were measured via brain slice electrophysiology. We examined Rheobase (minimum current necessary to elicit an action potential) and maximum spikes per step to examine intrinsic excitability. These values were correlated to FR3 score (average active FR3 nose pokes) to determine how reinforcement-related behavior is linked to excitability of VTA dopamine or medial MHb neurons. Results: In the VTA, we observed that intrinsic excitability does not correlate to reinforcement-related behavior, but instead correlates to active and inactive nose poke distinction in males only. In the MHb, we first observe an increase in inherent excitability in male neurons as compared to females. Next, in the MHb we observed contrasting FR3/excitability correlations between males and females via linear regression. In males, we found a direct correlation between reinforcement-related behavior increases and MHb neuron excitability with 6 mg/mL nicotine + menthol but an inverse correlation with a high dose of nicotine ± menthol. Comparatively, in females, we show only a direct correlation between FR3 score and MHb excitability with 60 mg/mL nicotine + menthol. Conclusions: These results suggest that the MHb may sex-specifically control the amount of nicotine-related self-administration while the VTA may be critical in the learning process of self-administration behavior.

FUNDING: Federal

SYM8-3

LYNX2 PROTEINS EXPRESSED IN THE CORTEX AFFECT NICOTINE SEEKING FOLLOWING NICOTINE ABSTINENCE

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Nicotine dependence continues to affect millions of individuals in the United States and results in severe adverse health consequences. Thus, nicotine dependence remains to be the leading cause of preventable death and disease. Very few individuals are successful in nicotine cessation each year, thereby highlighting the mild efficacy of currently available therapeutics targeting nicotine cessation. Of interest, endogenous allosteric modulators acting on the nicotinic acetylcholine receptor (nAChR) have emerged as a novel target of interest for drug development. Lynx2 is a negative allosteric modulator of the nAChR and have been shown to significantly decrease nAChR activity in the presence of an agonist, impacting downstream nAChR-mediated behaviors. In this study, we assessed for nicotine seeking behavior after abstinence in subjects treated with viral mediated knockdown of lynx2 or a scrambled vector in the cortex. Our data suggest that knockdown of lynx2 in the cortex altered nicotine-relapse related behaviors in comparison to mice treated with the scrambled vector. Together, these findings demonstrate that lynx2 proteins expressed in the cortex play a significant role in nicotine-relapse related behaviors. This work is supported by funding from the Tobacco-Related Disease Research Program (TRDRP T32DT5202 to MB, TRDRP T32IR4866 CDF, and TRDRP T31IR1767 CDF)

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SYM8-4

THE EFFECTS OF NICOTINE AND OPIOID CO-USE ON DOPAMINERGIC ACTIVITY IN THE VTA

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The opioid epidemic persists as a leading public health concern of the 21st century. It has been paralleled by a rise in e-cigarette use among adolescents, which may be of particular concern as adolescent drug use is hypothesized to increase risk for drug addiction later in life. A specific connection between nicotine and opioid use is also apparent in adulthood as most people using opioids—prescription or illicit—also report using nicotine products. Preclinical studies have used varied experimental strategies to probe the neural mechanisms underlying this co-dependence. The ventral tegmental area (VTA) is a critical component of the mesolimbic dopamine system (the canonical “reward pathway”) with abundant nicotinic and opioid receptor expression. VTA dopamine is critical to the development of phenomena such as cross-tolerance and cross-sensitization between nicotine and opioids. We used translationally relevant models of drug dependence—oral opioid consumption and nicotine vapor—to study the effects of adolescent nicotine exposure followed by morphine and nicotine co-exposure in adulthood. We used fiber photometry/calcium imaging over the course of the co-exposure to examine dopamine neuron activity in the VTA, which may underlie

behavioral effects of concurrent nicotine/opioids. We show that chronic exposure to nicotine vapor beginning in adolescence alters the shape of the dopamine neuron response to acute nicotine puffs. Additionally, in the same drug co-exposure paradigm, animals exposed to nicotine vapor during adolescence consume more morphine in adulthood than animals exposed to vehicle vapor. Moreover, morphine intake modifies the neural response to nicotine, resulting in an increase in dopamine neuron activity following a nicotine vapor puff. Understanding the neural circuitry underlying nicotine and opioid interactions will be critical for identifying future therapeutic targets. This work was supported by T32GM008076 to KRW and NIH DA044205 and DA049545 to MDB.

FUNDING: Federal

SYM8-5

THE DIFFERENTIAL EFFECTS OF SEX ON NICOTINE USE BEHAVIORS: NICOTINE CHOICE, INTAKE, SEEKING, AND WITHDRAWAL

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Significance: While biological, psychological, and social factors can contribute to variations in nicotine use patterns between males and females, new alternative tobacco products (vaping devices and smokeless tobacco), nicotine forms (tobacco-derived and non-tobacco nicotine), and flavor additives have introduced additional complexities to the existing differential effects of sex on nicotine use behaviors. Here, we investigated sex differences in nicotine use behaviors, focusing on administration route, nicotine content and source, and flavors. **Methods:** We employed male and female Sprague Dawley rats throughout the study. For oral nicotine choice behavior studies, we utilized a two-bottle free-choice test. For nicotine intake and nicotine-seeking studies, we employed operant intravenous, intraoral, and vapor self-administration paradigms. Vapor passive exposure was used for nicotine withdrawal studies, and the taste reactivity test was used for assessing nicotine's orosensory properties. In specific experiments, we also examined different nicotine forms (tobacco-derived S-nicotine, non-tobacco S- and R-nicotine) and flavor additives (saccharin, benzaldehyde, vanillin, menthol). We compared sensitivity to nicotine intake and seeking between females and males. We also examined nicotine withdrawal after exposing female and male rats to different nicotine forms. Furthermore, we assessed the impact of flavors on nicotine's orosensory and reinforcing properties in both females and males. **Results:** We found complex interactions between sex and nicotine use behaviors in different contexts. Females were more sensitive to the rewarding and orosensory effects of nicotine and its concentrations. Moreover, different flavor additives resulted different sex differences, e.g. vanilla resulted higher nicotine intake in females but saccharin increased nicotine intake in males. When animals were exposed to nicotine via tobacco or synthetic sources, females showed more physical symptoms of withdrawal. Additionally, the magnitude of withdrawal signs also differed between nicotine sources. **Conclusion:** Sex can influence patterns of nicotine use in various ways including nicotine content, source, administration route, and flavors. Therefore, understanding sex differences as a biological factor is crucial for tailoring cessation programs and public health interventions to effectively address the specific needs of both sexes.

FUNDING: Federal

SYM9

TOBACCO USE CHARACTERISTICS AND MORBIDITY AMONG OLDER ADULTS: HEALTH EQUITY, HARM PERCEPTIONS, AND POLYSUBSTANCE USE

Betha Kleykamp. University of Maryland School of Medicine.

Background: Globally, the older adult population (60+) is expected to double within the next 30 years, and in some countries, older adults are the only age group that has not seen a decline in smoking for at least 10 years. Research on older adults who smoke cigarettes is limited, even though this age group faces the most significant risk of tobacco-related mortality and morbidity. Smoking into older age is also more likely among individuals historically minoritized due to race, socioeconomic status, and mental health conditions. For these reasons, aging and tobacco use remains a long-standing health equity issue deserving of attention in research and policy. **Specific Aims:** The primary aim of this symposium is to educate and promote discussion about older adults that use tobacco. Three presentations relying on national-level survey and treatment clinic data will address 1) social determinants of health, 2) co-use of other substances (e.g., alcohol, cannabis, and opioids including fentanyl), and 3) comorbidity burden. Given the broad focus of this symposium, it will be of interest to clinical researchers, healthcare providers, and health policy organizations that seek to learn about tobacco-related disparities among older adults. **Conclusions:** This symposium will utilize a health

equity lens to highlight the unique health considerations of being an older adult who uses tobacco which often involves decades of exposure to the harms of smoking. Our presentations will advocate for efforts to support this population in reaching their highest level of health, including increased representation in research, treatment, and policy.

SYM9-1

UNDERSTANDING "DON'T KNOW" RESPONSES ABOUT COMPARATIVE HARMS OF CIGARETTES AND E-CIGARETTES

Jessica Kulak. University of Buffalo.

INTRODUCTION: Smoking prevalence for the older adult population has remained relatively unchanged compared to other age cohorts. The use of electronic cigarettes has been associated with smoking cessation although misinformation on risks remains. In cancer research, participant characteristics of "don't know" responses are associated with populations affected by health disparities, making them vulnerable to poor health outcomes. The analysis of "don't know" responses on the comparative risks of e-cigarettes and combustibles could serve as a critical indicator for targeted educational interventions. **METHODS:** Self-reported, nationally representative data from the Health Information National Trends Survey 2022 cycle (HINTS 6) were used (n=5,835). Multivariable logistic regression analyses examined associations between sociodemographic characteristics and "don't know" responses to the question, "Compared to smoking cigarettes, would you say that using e-cigarettes that contain nicotine is...?" Response options ranged from much less harmful to much more harmful and included the option to select "I don't know." Analyses were conducted with jackknife estimation using sampling weights to provide population representative estimates. **RESULTS:** Approximately 47% of older adults (aged 65 years and older) indicated they "don't know" how the harm of cigarettes compares to e-cigarettes. In comparison, 25% of younger adults (18-34) indicated "don't know." In adjusted models, middle aged and older adults (compared to 18-34 year-olds), non-Hispanic black, Hispanic, and non-Hispanic other race (compared to non-Hispanic white), and adults finding it difficult to live on their present income (compared to those living comfortably) had significantly higher odds of selecting a "don't know" response (p < 0.05). Adults with some college or a college degree, females, and current cigarette smokers had significantly lower odds of selecting a "don't know" response (p < 0.05). **CONCLUSIONS:** There were important demographic and socioeconomic differences in adults who indicate that they "don't know" the differences in harms related to combustible and electronic cigarettes. The prevalence of "don't know" responses was greater in populations commonly affected by health disparities. Differences in relative risk perceptions could negatively influence the adoption of lower-risk nicotine products (e.g., e-cigarettes instead of combustible cigarettes), further disenfranchising these populations.

FUNDING: Unfunded; Other

SYM9-2

PREVALENCE AND SOCIODEMOGRAPHIC CHARACTERISTICS OF TOBACCO & CANNABIS CO-USE AMONG UNITED STATES (U.S.) OLDER ADULTS

Margaret C. Fahey. Medical University of South Carolina.

Older adults are disproportionately impacted by tobacco morbidity and mortality and are the only age group with stagnant cigarette smoking rates for the past 15 years. Concurrently, the prevalence of cannabis use in older adults has risen exponentially. Less is known about recent national prevalence rates of tobacco and cannabis co-use in older age, as well as sociodemographic characteristics associated with co-use (vs. tobacco only use). Among US adults 50+ years from the 2015-2019 National Surveys on Drug Use and Health (N=43,963), we estimated the prevalence of any lifetime and current (i.e., past month) tobacco or cannabis use, and tobacco & cannabis co-use by age group (50-64 vs. 65 years). For adults aged 50-64 years, 70.2% reported lifetime tobacco use, 54.5% lifetime cannabis use, and 48.8% both lifetime tobacco and cannabis use. In the past month, 20.7% used tobacco-only, 3.2% used cannabis-only and 3.5% used both tobacco and cannabis. For adults 65+ years, 65.9% reported lifetime tobacco use, 27.2% lifetime cannabis use, and 24.2% both lifetime tobacco and cannabis use. In the past month, 10.6% used tobacco-only, 1.6% used cannabis-only, and 0.8% used both tobacco and cannabis. Among U.S. adults (50+ years) who reported any lifetime tobacco or cannabis use (N=17,045), multinomial logistic models estimated the likelihood of current co-use vs. tobacco-only use by sociodemographic characteristics (age group, sex, race/ethnicity, education, marital status, self-rated health, self-reported mental illness, urbanicity, income, employment, veteran status). In adjusted models, the likelihood of co-use (vs. tobacco-only use) was significantly (p<.05) associated with younger age (50-64 years vs. 65+), male sex (vs. female), Black/African American race/



ethnicity (vs. White), having never married (vs. married), reporting fair/poor health (vs. excellent/good health), reporting past year mental illness (vs. none), living in a nonmetro area (vs. large metro), and having a lower household income (< \$50,000). For US older adults, the current prevalence of tobacco and cannabis co-use was comparable to the rate of cannabis use but lower than tobacco use. Notably, co-use (vs. tobacco-only) was associated with several sociodemographic characteristics, as well as poorer mental and physical health in older adults. It will be increasingly important to understand how co-using cannabis impacts tobacco cessation and health disparities in older adulthood.

FUNDING: Unfunded; Federal

SYM9-3

TOBACCO AND OTHER SUBSTANCE USE CHARACTERISTICS AMONG OLDER ADULTS IN ADDICTION TREATMENT

Betha A. Kleykamp. University of Maryland School of Medicine.

Introduction: Older adults are a growing segment of the addiction treatment population. Few studies have examined tobacco use characteristics in this age group. This secondary analysis compares tobacco and substance use characteristics of younger (19-34 years) and older (55+) patients seeking methadone treatment for opioid use disorder in an urban, low-threshold opioid treatment clinic. **Method:** Patients (n=75; 39 young, 36 older) were enrolled in a community-based clinic in Baltimore, Maryland (2017 and 2020). Demographics, tobacco/substance use, and opioid treatment characteristics were examined as a function of age using independent t-tests ($p < 0.05$). **Results:** Most patients were male (70%), had < high school/GED (79%), and earned < \$15,000/year (84%). Older patients were more likely to identify as Black/African American (86%) than younger (42%). Nearly all patients currently smoked cigarettes (93%), while ever or current use of e-cigarettes, hookah, or cigars was low for both (<1%). Older adults drank alcohol significantly more days over the past 14 compared to younger (2.3 vs. 0.7) but had fewer smoking days (13.5 vs. 12) (t 's=-1.891 and 1.790, $ps < 0.05$). Although not significant, past 14-day cocaine use was more common among older adults, and marijuana use was more common among younger adults. Older adults also had lower ratings on the subjective opiate withdrawal scale (23 vs. 30; $t=1.745$, $p=0.43$) and longer treatment retention at 6 months (152.7 vs 102.5 days; $t=2.703$, $p=.005$). On average, older adults sought addiction treatment over 20 years later than the younger cohort (48 vs 26 years; $t=-10.74$, $p90\%$) for both age groups, while other tobacco product use was rare. These findings suggest that the likelihood of smoking did not decrease as age increases in addiction treatment. There is a need for pragmatic and timely approaches to addressing tobacco use among adults in addiction treatment, including older adults.

FUNDING: Unfunded; Academic Institution; Other

SYM10

NOT SO SWEET: TOXICITY OF SUGARS IN CIGARETTE TOBACCO

Irina Stepanov. University of Minnesota.

Sugars, which are naturally present in the tobacco plant and are also introduced as additives during manufacturing of cigarettes, contribute to a broad range of harmful effects including toxicity (due to pyrolytic decomposition when a cigarette burns), addictiveness, and palatability. Our symposium will present and discuss recent findings on the impact of sugars in cigarette tobacco on cigarette smoke toxicity, as assessed by the chemical profile of cigarette smoke and biomarkers of exposure in persons who smoke. Prior research by tobacco industry will be also presented and discussed. Dr. Visser will present results of a study in which isotope-labeled sugars were added to cigarette tobacco to specifically identify volatile toxicants in smoke that are derived from the pyrolysis of sugars vs other tobacco components. Dr. Stepanov will present data on sugar content in tobacco filler of commercial cigarettes purchased at two time-points and the relationship of sugar content with the smoke chemical profile. Dr. Carroll will discuss findings from a study that used biomarker data from Wave 1 of PATH Study to investigate associations of biomarkers of exposure in persons who smoke with sugar levels in tobacco of their usual brand cigarettes. Ms. Hansen will discuss finding from the examination of the tobacco industry documents that deal with sugars in cigarette tobacco and their potential contribution to cigarette smoke toxicity. Dr. Hatsukami will moderate the discussion panel with Drs. Reinske Talhout, Geoffrey Fong, and David Ashley. The panel will discuss the public health impact of sugars in cigarettes, the strength of evidence for adding sugars to the FDA harmful and potentially harmful constituent (HPHC) list, and the potential implications of a sugar product standard for cigarettes.

SYM10-1

CHARACTERIZING THE IMPACT OF ADDED SUGARS IN TOBACCO FILLER ON THE CHEMICAL COMPOSITION OF CIGARETTE MAINSTREAM SMOKE BY USING [13C]-LABELED SUGARS

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Significance: The sugar content of tobacco in cigarettes is considered to be an important factor affecting the appeal and toxicity of cigarettes. Manufacturers control the sugar content by tobacco blending and processing techniques as well as by adding sugars, and it is therefore an aspect of cigarette product design that can be regulated. In this study, we provide direct evidence that sugars contribute to the formation of sweet/caramel flavors as well as harmful components in cigarette smoke, including furans and aldehydes. **Method:** [13C]-isotope labeled sugars (fructose, glucose, sucrose, and a mixture of these three) were added to eight different brands of commercial cigarettes, in three different concentrations (approximately 2%, 5% or 10% w/w). Brands were selected to represent different sugar levels and characteristics (length, filter ventilation, menthol, manufacturer). Cigarettes were subsequently machine-smoked (using ISO and WHO Intense regimes) to generate mainstream smoke samples. A variety of different chemical analyses was performed to study the contribution of added sugars to volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), aldehydes, tobacco-specific nitrosamines (TSNAs) and nicotine in smoke. **Results:** Non-targeted GC-MS analyses of volatile organic compounds revealed six furans and one compound of unknown chemical identity that are directly formed from the decomposition reactions of sugars, as evidenced by the incorporation of 13C in these compounds. Under the conditions tested, up to 22% of the 2,5-dimethylfuran in the smoke was 13C labeled. Furthermore, using LC-MS/MS, four out of the five aldehydes examined were shown to form in part as a result of sugar decomposition reactions. The fraction of aldehydes that became 13C labeled as a result of the sugar addition was much smaller (up to 2%), than that of 2,5-dimethylfuran, however. No evidence for the direct formation of PAHs was found, but the addition of sugars was nevertheless found to impact the levels of PAHs, TSNAs and nicotine, presumably by altering the burning process of the cigarettes. **Conclusion:** Added sugars to cigarette tobacco contribute to furans and aldehydes in smoke, and may increase the concentrations of other harmful and appealing components. Policy makers should consider regulation of sugar levels in tobacco products.

FUNDING: Federal

SYM10-2

ASSOCIATIONS BETWEEN ADDED SUGAR IN U.S. CIGARETTES AND BIOMARKERS OF HARMFUL EXPOSURE IN ADULTS WHO SMOKE

Dana Mowls Carroll, Xianghua Luo, Katrina Yershova, Dorothy K. Hatsukami, Irina Stepanov. University of Minnesota.

Background: Sugars in cigarettes occur naturally and are also added to the tobacco blend by manufacturers. Prior research has found that sugar decomposition during cigarette smoking contributes to toxicant levels, which calls into question whether added sugars in cigarettes should be regulated. The goal of this study was to examine the cross-sectional relationships between levels of sucrose (representative of added sugars) in cigarette tobacco and urinary biomarkers of aldehydes, other volatile organic compounds (VOCs), and a polycyclic aromatic hydrocarbon (PAH) in adults who smoke. **Methods:** Data on sucrose as well as fructose and glucose (representative of naturally-occurring sugars) levels in cigarettes purchased in 2015-2016 were merged with the 2013-2014 Population Assessment of Tobacco Use and Health Study and restricted to adults who smoked daily, had a usual cigarette brand/sub-brand, and did not regularly use other tobacco (N=1,411). Multivariable linear regression models were used to estimate relationships between sucrose, based on tertiles, and thirteen urinary creatinine standardized biomarkers with adjustment for the sum of fructose and glucose and several potential confounders (age, sex, race, body mass index, menthol brand, filter ventilation, smoking dose [urinary total nicotine equivalents]). **Results:** Sucrose tertile cutpoints were <13.0 mg/g (T1), 13.0-26.3 mg/g (T2), and >26.3 mg/g tobacco (T3). In adjusted analyses, sucrose was significantly associated with 3-HPMA, a biomarker for the aldehyde acrolein (T1 geometric mean: 5.42 nmol/mg, T2: 5.87 nmol/mg, T3: 6.23 nmol/mg; $p=0.0478$), SPMA, a biomarker for the VOC benzene (T1: 3.82 nmol/mg, T2: 4.28 nmol/mg, T3: 4.74 nmol/mg; $p=0.0246$), GAMA, a biomarker for the VOC acrylamide (T1: 0.073 nmol/mg, T2: 0.084 nmol/mg, T3: 0.074 nmol/mg; $p=0.0297$), and 1-HOP, a biomarker for the PAH pyrene (T1: 1.43 pmol/mg, T2: 1.68 pmol/mg, T3: 1.62 pmol/mg; $p=0.0449$). All other biomarkers of aldehydes and volatile organic compounds that were analyzed did not significantly differ by sucrose tertile. **Conclusions:** Biomarkers were either significantly lower in the first tertile of sucrose (<13 mg/g) or did not

significantly differ by tertile of sucrose. To inform whether a limit on sucrose and other added sugars should be considered for the protection of public health, future studies should investigate relationships between added sugars and biomarkers of effect and the impact of limiting sugars in cigarettes.

FUNDING: Federal

SYM10-3

TOBACCO INDUSTRY RESEARCH ON THE CONTRIBUTION OF SUGARS TO SMOKE TOXICITY

Eleanore Hansen, Irina Stepanov. University of Minnesota.

Background: Sugars in cigarette tobacco play an important role in the sensory appeal and palatability of cigarette smoke by reducing harshness and contributing desirable flavor compounds. Academic research indicates that sugars in tobacco also contribute to smoke toxicity as the result of their pyrolytic decomposition. However, publications by industry researchers have been mostly dismissive of this concern, and sugars remain the most widely used additives to cigarette tobacco. An understanding of the scope and the quality of the tobacco industry's internal research into the potential harmful effects of sugars in cigarettes may contribute to assessing the strength of evidence for or against the potential regulation of these constituents in cigarette tobacco. **Methods:** We searched the University of California San Francisco Truth Tobacco Industry Documents Library to explore the extent of the tobacco industry's internal research into sugars as tobacco additives and their contribution to cigarette smoke toxicity. We employed a snowball search strategy, searching initial pre-determined keywords and expanding the search with additional keywords that emerged as we reviewed relevant documents. **Findings:** Searches revealed 207 documents, with dates ranging from 1950 to 2012. Of these, 151 dealt with the effect of sugar pyrolysis on smoke composition, while just 69 directly focused on the effects on smoke toxicity. Among those documents that addressed the fate of sugars during smoking, most concluded that there is no meaningful contribution to the toxicity of the smoke. However, five more recent documents suggest a relationship between added sugars and increased levels of various harmful smoke constituents, namely furans and certain aldehydes. Thirty-six documents dealt with in-vitro and/or in-vivo toxicity tests, mostly employing a limited set of toxicity outcomes. Many in-vivo documents were repetitive drafts of the same study of sub-chronic toxicity testing. **Conclusions:** The tobacco industry's interest in sugars as additives to cigarette tobacco has primarily been focused on sensory appeal. Limited studies have been carried out on the contribution sugars to cigarette smoke toxicity, and those that exist can be at times not sufficiently rigorous. It is important that the U.S. FDA relies on academic research in determining whether sugars in cigarettes should be regulated.

FUNDING: Federal

SYM10-4

ASSOCIATION BETWEEN SUGAR LEVELS IN CIGARETTE TOBACCO AND THE CHEMICAL PROFILE OF SMOKE OF POPULAR COMMERCIAL US CIGARETTE BRANDS

Irina Stepanov, Eleanore Hansen, Katrina Yerushova, Xianghua Luo. University of Minnesota.

Significance: Sugar levels in cigarette tobacco filler play an important role in the sensory appeal and palatability of cigarette smoke, and may also contribute to its toxicity. We examined the levels of sugars in the tobacco filler of popular U.S. cigarettes, changes in sugar levels over time, and their associations with cigarette characteristics and levels of a panel harmful constituents in cigarette smoke. **Methods:** Cigarette brands/sub-brands reported as usual cigarettes smoked by Wave 1 of the Population Assessment of Tobacco and Health (PATH) Study were purchased at the time of Wave 1 and in 2021. Three packs of each cigarette variety were available, each purchased from a different retailer. Sugars (fructose, glucose, and sucrose), nicotine, and tobacco-specific nitrosamines (TSNA) were analyzed in cigarette tobacco and in smoke, after smoking the cigarettes by Canadian Intense smoking regimen. Cigarette smoke was also analyzed for a panel of volatile organic compounds. **Results:** In Spearman correlation analyses, total sugar level (the sum of glucose, fructose, and sucrose) was positively correlated with all measured constituents in cigarette smoke expressed per milligram of nicotine ($r = 0.36 - 0.72$; $p < 0.05$ for all correlations), except for acetone. These associations were primarily driven by the associations of sucrose with the constituents. Univariate regression analysis and multivariable analyses further confirmed these results for sucrose and indicated a negative association between sucrose and cigarette physical parameters (filler weight, TPM, puff count). Mean sugar levels were not significantly different between mentholated and non-mentholated cigarettes and by cigarette length, although the variance in fructose and glucose was significantly lower in men-

thol cigarettes than non-menthol cigarettes. When we treated menthol as a potential effect modifier, significant interactions between menthol and sugars were observed for per-nicotine yields of several smoke constituents. **Conclusions:** Sucrose, which is representative of added sugars to cigarette tobacco, was most variable across cigarette brands/sub-brands and within the same brands over time. Levels of sucrose in cigarette tobacco are also consistently associated with a range of toxicants and carcinogens in cigarette smoke, and are potentially related to cigarette physical characteristics. A ban on added sugars in cigarette filler may be beneficial for protecting public health.

FUNDING: Federal

SYM11

EXAMINING NICOTINE/TOBACCO AND CANNABIS CO-USE THROUGH THE LENS OF PRIORITY POPULATIONS: SPECIAL CONSIDERATIONS TO PROMOTE TAILORED TREATMENT APPROACHES

Rachel Rabin, PhD. McGill University.

Consumption of nicotine and tobacco products (NTP) and cannabis products are common, and their combined use ("co-use") is growing in popularity. Approximately 20% of those with NTP use report daily cannabis use and 60-80% of those with daily cannabis use report NTP use. Co-use is a growing public health concern given that the adverse effects associated with each substance alone (e.g., psychiatric, psychosocial, and medical consequences) may be exacerbated when co-used with the other substance. Indeed, research has shifted away from examining the use of tobacco and cannabis using a siloed approach, yet subgroups that may be disproportionately affected and/or affected to a greater degree by co-use (i.e., priority populations) warrant further investigation. Our symposium will address this topic by presenting on relevant aspects of co-use as it applies to key priority groups. In the first talk, Dr. Jacobus will present data on the effects of NTP and cannabis co-use on neuromaturation processes and behavior in an ongoing study of adolescents and young adults. Following, Dr. Weinberger will share data on the demographic correlates and co-use patterns in a sample of primarily Black and Latino/a adults with human immune deficiency virus (HIV). The third speaker, Dr. George, will present evidence supporting the strong link between NTP and cannabis use in people with psychosis. Finally, Dr. McClure's presentation will highlight sex differences as it relates to co-use and considerations for future research. The session will end with a discussion from Dr. Rabin who will address co-use and the abovementioned priority groups from a treatment perspective. She will emphasize the importance of adopting an intersectionality framework to achieve better therapeutic outcomes in people with co-use. Because these subgroups may be particularly sensitive to the effects of both substances and in turn may have greater difficulty quitting and maintaining long-term abstinence, developing tailored interventions that address the specific needs of priority populations (e.g., adolescents and young adults, people with HIV, and psychosis, and women) may render the most favorable outcomes. Promising therapeutic targets and non-pharmacological approaches currently under investigation will be discussed in relation to these priority populations. This knowledge will help optimize preventative and intervention strategies for this prevalent and growing phenomenon in these priority populations.

SYM11-1

NICOTINE AND CANNABIS CO-USE INFLUENCES ON ADOLESCENT AND YOUNG ADULT NEURAL AND BEHAVIORAL HEALTH

Joanna Jacobus, Natasha Wade, Neal Doran, Laura Hatz, Alexander Wallace, Kelly Courtney. University of California San Diego.

Preclinical evidence suggests a functional interaction between nicotine and delta-9-tetrahydrocannabinol (THC) in the brain that may enhance susceptibility to problematic substance use patterns. Yet, the distinctive effects of combined nicotine and tobacco product (NTP) and cannabis use on neuromaturation brain changes is unknown in adolescent and young adult (AYA) populations. The study uses cutting-edge neuroimaging techniques (diffusion tensor imaging, pseudo-continuous arterial spin labeling), cognitive testing, and mental health assessments to understand the unique and combined effects of NTP and cannabis use on AYA neural health and behavior. Participants, ages 16-22, were recruited from San Diego County (N=225) and classified as NTP-naïve and/or cannabis naïve (n=50), NTP user (n=40), cannabis user (n=60), or co-user (n=75) based on six-month use history. Brain imaging and self-report measures probed functional and structural brain integrity along with affect, addiction severity, and motivations for substance use. Cross-sectional analysis of covariance was used to explore between-group differences; whole-brain voxelwise analysis examined differences in brain metrics. Behavioral findings suggest that initiation of nicotine use prior to cannabis use increases risk for greater co-use over time, and e-cigarette with combustible product



use is associated with greater substance use severity. Among males, anxiety symptoms increased the odds of categorization as a co-user, while physical activity was protective in females ($p < .05$). Brain imaging and neurocognitive findings suggest NTP users show greater inflammation in white matter tissue, however, among cannabis users, we observe altered blood flow and poorer structural tissue quality with more cannabis that is not present among co-users ($p < .01$). Notably, both nicotine and cannabis exert independent, yet deleterious, effects on learning and memory performance ($p < .05$). Preliminary findings suggest unique behavioral, cognitive, and brain integrity phenotypes related to single use as compared to co-use in AYAs. Broadly, NTP use is associated with poorer structural and functional brain integrity, however this is less consistently observed among co-users. Future prospective work will continue to understand how changing co-use patterns and trajectories of use influence health outcomes into young adulthood to better understand modifiable risk factors for prevention and intervention strategies.

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SYM11-2

UNDERSTANDING CANNABIS AND TOBACCO INTERACTIONS IN PEOPLE WITH PSYCHOSIS

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Background: Cannabis and tobacco co-use is highly prevalent in people with schizophrenia and other psychotic disorders. However, mechanisms which underlie this association are not clear. We conducted two preliminary secondary analyses of cannabis/tobacco interactions in people with schizophrenia, undergoing: 1) a study of 28 days of cannabis abstinence in people with schizophrenia who were tobacco co-users; 2) a preliminary study of active versus sham repetitive transcranial magnetic stimulation (rTMS) to treat cannabis use in co-users of tobacco with schizophrenia. **Methods:** In Study 1, a total of $n=19$ people with cannabis use disorder (CUD) and co-occurring schizophrenia and $n=20$ people with CUD only underwent 28 days of biochemically-verified cannabis abstinence using contingent reinforcement. In Study 2, $N=19$ treatment-seeking patients with schizophrenia and CUD were randomly assigned to active ($n=9$) or sham ($n=10$) rTMS and weekly cannabis and tobacco use were determined over a 4-week treatment study. **Results:** In Study 1, 28 days of cannabis abstinence was associated with a transient increase in tobacco use in people with schizophrenia over a 1 week period, but was associated with persistent reductions in tobacco use in people with CUD only. In Study 2, sham rTMS was associated with increases in tobacco use while active rTMS prevented the increase in tobacco use in the control condition. **Conclusions:** Our preliminary studies of cannabis and tobacco interactions in schizophrenia using two distinct experimental models suggest a differential linkage between cannabis and tobacco use in CUD in the presence and absence of schizophrenia. These results may have implications for the differential treatment of cannabis/tobacco co-morbidity in the presence or absence of psychotic disorders.

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SYM11-3

CIGARETTE AND CANNABIS CO-USE IN A SAMPLE OF PEOPLE WITH HIV: PREVALENCE AND CORRELATES

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Significance: In epidemiologic and community studies, cigarette and cannabis co-use is associated with greater negative consequences and cannabis use is associated with lower odds of smoking cessation. People with HIV (PWH) have a much higher cigarette use prevalence than other adults and preliminary evidence suggests poorer cessation outcomes associated with cannabis use; however, little is known about cigarette and cannabis co-use among PWH. This study examined demographic, cigarette-related, and substance use variables by cannabis use status in a sample of PWH with current cigarette use. **Methods:** PWH in the Bronx, New York completed a survey assessing demographics, cigarette use and cigarette-related variables (e.g., cigarettes smoked per day, days of smoking per week, cigarette dependence), current cannabis use (yes, no), and use of other substances (e.g., alcohol). Data recruitment occurred so that the sample was evenly distributed between cigarette use versus no current cigarette use (50% each) and between males and females (50% each). The prevalence of cannabis use for PWH with versus without smoking was assessed using a chi-square analysis. Differences in demographics, smoking variables, and substance use variables for PWH with cigarette use who did versus did not report cannabis use were assessed using chi-

square and t-test analyses. **Results:** Among the full sample of 285 PWH, more people with versus without cigarette use reported current cannabis use (31.9% versus 19.3%, chi-square=5.89, $p=0.015$). Among the one hundred forty PWH with current cigarette use ($M\ age=49.70$, $SD=10.54$; 50.7% male, 54.3% Black race, 50% Latino/a ethnicity), participants reported smoking cigarettes an average of 5.89 days per week ($SD=1.84$) and 7.69 cigarettes per day ($SD=7.17$). Among PWH with cigarette use, cannabis use was associated with younger age ($p<0.001$), female gender ($p=0.007$), non-heterosexual sexual orientation ($p=0.014$), and current alcohol use ($p<0.001$). There were no differences in other demographics (e.g., race, ethnicity, marital status) or cigarette variables (e.g., cigarette dependence, quit motivation) by cannabis use status. **Conclusions:** PWH who use cigarette and cannabis differ in demographics and substance use behaviors from PWH who use cigarettes alone. These findings will be discussed in relation to implications for clinical work with PWH who use cigarettes and with regard to reducing tobacco-related health disparities for PWH.

FUNDING: Federal; Academic Institution

SYM11-4

CONSIDERING THE ROLE OF SEX DIFFERENCES IN TOBACCO-CANNABIS CO-USE PATTERNS AND TREATMENT OUTCOMES

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While sex differences have been characterized for the prevalence, etiology, and treatment of tobacco and cannabis in isolation, little work has focused on the role of sex differences in tobacco-cannabis co-use. Indeed, many studies of tobacco-cannabis co-use have been majority male given historically greater rates of cannabis use in men. However, that trend is changing and the difference in cannabis use prevalence between men and women is narrowing. This presentation will introduce considerations pertaining to sex differences in tobacco and cannabis co-use, as illustrated by results from two randomized controlled trials (RCTs). First, in an RCT testing varenicline versus placebo for youth tobacco cessation (ages 14-21; $N=157$; 40% female), we compared participants who co-used cannabis (68% of the sample) to participants who did not co-use cannabis (tobacco only). Tobacco-only participants had double the probability of any tobacco abstinence during treatment (7-day point prevalence abstinence) ($RR=2.0$ 95% CI, 1.1-3.6; $p=.021$) and participant sex (male vs. female) modified the relationship between cannabis use and tobacco abstinence during treatment (cannabis use $\times$ sex, $p=.022$), such that cannabis co-use adversely affected tobacco cessation among males ($RR = 3.6$ [1.9-6.6]; $p<.001$) but not for females ($RR=0.9$ [0.4-2.1]; $p=.77$). Second, similar analyses were conducted as part of an adult RCT testing N-acetylcysteine (NAC) versus placebo for tobacco abstinence (ages 23-64; $N=114$; 51% female, 28% co-using cannabis). Results did not demonstrate any main effects of sex or cannabis use on 3-day abstinence immediately following the target quit date ($RR=1.6$ [0.9-2.7], $p=.08$; $RR=0.9$ [0.5-1.5], $p=.59$, respectively) or Week 8 end-of-treatment (EOT) abstinence ($RR=0.4$ [0.1-1.5], $p=.19$; $RR=0.7$ [0.2-3.0], $p=.60$, respectively), nor were the interaction of sex and co-use status significant for 3-day abstinence ($RR=1.4$ [0.4-5.0], $p=.63$) or Week 8 EOT abstinence ($RR=0.2$ [0.0-2.8], $p=.26$). Across two tobacco treatment trials among youth and adults, results suggest that sex differences may play a role in the adverse impact of cannabis co-use on tobacco outcomes among youth but not among adults. These results highlight the importance of considering sex differences in the study of tobacco-cannabis co-use, as well as considering potential differences across the lifespan.

FUNDING: Federal

SYM12

HEALTH INEQUITIES AMONG YOUTH AND YOUNG ADULTS WHO USE MULTIPLE TOBACCO PRODUCTS AT THE POPULATION LEVEL

Maria Parker. Indiana University.

This Health Equity Network-sponsored symposium focuses on health disparities that affect youth and young adults with polytobacco use. Polytobacco use—the most common use pattern among young people—is associated with established use later in adulthood and greater nicotine dependence, negative effects on the developing brain, alcohol and cannabis co-use, and tobacco-related morbidity than single product use. Therefore, it is critical to identify populations at risk for polytobacco use to prevent exacerbation of existing tobacco health disparities. This symposium examines the sociodemographic trends and psychosocial predictors of polytobacco use among youth and young adults to inform more equitable cessation and prevention efforts and tobacco control related to polytobacco use. Dr. Nancy Fleischer will report on challenges and opportunities with monitoring polytobacco use among young people. Multiple data from the last decade highlight important health inequities due to polytobacco



use and harmful product combinations by race/ethnicity, sex, gender, sexual identity, socioeconomic status, and age. Dr. Juhan (John) Lee will present data on the relative risk of polytobacco use among sexual minority compared to heterosexual youth from the 2022 National Youth Tobacco Survey. His findings highlight the high prevalence of polytobacco use among sexual minority youth with findings appropriate for prevention efforts, tobacco regulation, and policies. Dr. Wura Jacobs will compare social, mental, and structural correlates of polytobacco use by nativity among Black young adults from a web-based survey. This work shows differences in mental health factors as determinants of polytobacco use among both US-born and immigrant Black young adults. Last, Ms. Julia West will present findings from a narrative review of 54 studies on psychosocial predictors of polytobacco use among young people. This presentation outlines the risk for polytobacco use across age, race/ethnicity, socioeconomic status, gender, sex, sexual identity, perceptions, social norms, exposure to tobacco advertising, and mental health symptoms. Dr. Andy Tan (discussant) will summarize findings in the context of the current state of intersectionality-focused tobacco research and lead a discussion between the audience and presenters on the implications and future directions for this emergent and common tobacco use pattern.

SYM12-1

CHALLENGES AND OPPORTUNITIES WITH MONITORING POLYTOBACCO USE AND ASSOCIATED HEALTH DISPARITIES

Nancy L. Fleischer. University of Michigan.

Polytobacco use, defined as the use of multiple tobacco products, is an evolving tobacco use pattern that affects addiction and health. Trends in polytobacco use over time are dynamic and differ by age, sex, sexual orientation identity, gender minority identity, race and ethnicity, and socioeconomic status, with implications for health equity. This presentation will rely on data between 2012-2021 from multiple tobacco use surveillance systems, including the Monitoring the Future Study, the National Youth Tobacco Survey, the Population Assessment of Tobacco and Health Study, the Tobacco Use Supplement to the Current Population Survey, and the National Health Interview Survey to (1) summarize recent trends in polytobacco use disparities, (2) examine potential health consequences of polytobacco use, and (3) discuss challenges and opportunities in polytobacco and health disparities research. We will reflect on challenges with measurement, including which products to include and how to incorporate measures of frequency and intensity, as well as health outcomes research. Opportunities include enriching cohort studies with improved polytobacco use measurement, oversampling minoritized populations to enhance researchers' ability to monitor disparate health impacts of polytobacco use, and finding a balance between understanding novel products and products with the most severe health consequences when measuring polytobacco use. Continued monitoring of disparate patterns of polytobacco use and associated health consequences can lead to improved policies to diminish health inequities due to tobacco use.

FUNDING: Federal

SYM12-2

POLYTOBACCO USE BY SEXUAL MINORITY YOUTH: RESULTS FROM THE 2022 NATIONAL YOUTH TOBACCO SURVEY

Juhan Lee. Yale University.

Background: Polytobacco use among youth is particularly concerning due to exposure to high levels of nicotine and chemicals. While the fact that sexual minority youth are more likely to use each tobacco product such as cigarettes and e-cigarettes, less known is polytobacco use status by sexual minority youth. We aimed to use US national dataset and determine the polytobacco use status by sexual minority youth. Methods: We used the 2022 National Youth Tobacco Survey (NYTS), which was collected by CDC. The outcome was the number of used tobacco products in the past 30 days, categorized as 'none (0)', 'mono (1 product)', and 'poly tobacco use (2 or more tobacco products)'. The exposure was sexual identities, categorized as 'heterosexual (straight)', 'gay/lesbian', 'bisexual' and 'unsure' about their sexual identities. We conducted a multivariable multinomial logistic regression on the number of current tobacco product use by sexual identity, adjusting for sex (boys, girls), school level (middle, high), race (non-Hispanic Black, Hispanic, non-Hispanic others), family tobacco use (none, any), peer tobacco use (none, any) and internalizing tendencies (no, yes). Results: Among total respondents in 2022 NYTS (N=25435), 4.5% (weighted; unweighted n=1146) reported 'gay/lesbian', 11.8% (n=3002) for 'bisexual' and 9.9% (n=2547) for 'unsure' about their sexual identity. Of the total, 3.0% (n=867) reported 'one tobacco product use in the past 30 days' and 1.9% (n=578) reported 'two or more tobacco product use in the past 30 days'. Compared to heterosexual peers, gay/lesbian were more likely to report mono tobacco use (aRRR=2.08, 95% CI=1.41, 3.05) and poly tobacco use (aRRR=3.00, 95%

CI= 1.56, 5.76). Bisexuals were also more likely to report poly tobacco use (aRRR=1.61, 95% CI=1.01, 2.55) than heterosexual peers. Conclusions: This study highlights the higher polytobacco use status among sexual minority youth than heterosexual peers. This preliminary evidence will inform tobacco prevention strategies, such as tobacco regulatory policies and prevention interventions in households, schools, and clinics, directed at sexual minority youth.

FUNDING: Federal

SYM12-3

POLYTOBACCO USE AMONG BLACK YOUNG ADULTS IN THE US: AN EXAMINATION OF NATIVITY DIFFERENCES IN SOCIAL, MENTAL, AND STRUCTURAL CORRELATES

Wura Jacobs. Indiana University - Bloomington.

Significance. Polytobacco use during young adulthood can lead to increased risk for nicotine dependence, addiction, and other health consequences. Particularly among Black individuals who continue to experience a heavier burden of tobacco use and negative health outcomes, polytobacco use among this at-risk population is concerning. This study examined the social, mental, financial, and structural stressors associated with tobacco use among Black young adults in the US, and to determine whether there were differences by nativity status. Methods. Data are from 479 Black young adults in the US (18-25 years) recruited as part of a web-based pilot study (US-born=300, immigrant=179). Participants self-reported past six-month tobacco product use, past 12-month experience of racist events, discrimination including in medical settings, major depressive episode (MDE), anxiety, and food insecurity. Three logistic regression models examined associations of the potential stressors with polytobacco use, while adjusting for demographics. One model assessed these associations among all Black young adults living in the US, and the second and third models assessed these associations while stratifying participants by their nativity status (US-born versus immigrant). Results. Overall, 53% of participants were female with a mean age of 22 years (SD=2.03). More than 54% had some college education or higher. In the overall model, stress from experiencing racist events (aOR=1.03, 95% CI=1.02, 1.05) and food insecurity (aOR=1.24, 95% CI=1.24, 2.39) increased odds of polytobacco use. In models stratified by nativity status, stress from experiencing racist events (aOR=1.02, 95% CI=1.01, 1.04; aOR=1.07, 95% CI=1.03, 1.22) and food insecurity (aOR=1.57, 95% CI=1.06, 2.32; aOR=2.73, 95% CI=1.27, 5.87) increased polytobacco use odds among both US-born and immigrant Black young adults, respectively. However, MDE was associated with an increased odds of polytobacco use (aOR=1.04, 95% CI=1.01, 1.07) among US-born Black young adults but with reduced the odds of polytobacco use among immigrant Black young adults (aOR=0.92, 95% CI=0.86, 0.99). Conclusion. This preliminary work demonstrates similarities in social and structural factors and identifies differences in mental health factors as determinants of polytobacco use among both US-born and immigrant Black young adults living in the US. Tobacco-control interventions tailored to the diversity of the Black population is critically needed.

FUNDING: Federal; Academic Institution

SYM12-4

WHO USES MULTIPLE TOBACCO PRODUCTS? PSYCHOSOCIAL CHARACTERISTICS UNIQUE TO ADOLESCENT AND YOUNG ADULT POLYTOBACCO USERS

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SIGNIFICANCE: Polytobacco use is associated with greater nicotine addiction and health risks than single product use. This narrative review aims to identify the unique psychosocial characteristics of individuals who use polytobacco that could be targeted for prevention. METHODS: 54 studies from 2007–2023 were identified through PubMed searches of: dual, polytobacco, poly tobacco, poly-tobacco and multiple tobacco products. Publications assessing sociodemographic, social, and psychological characteristics of adolescents and young adults (AYA) unique to polytobacco use compared to single product use were included. Social factors included peer influence, peer tobacco use, tobacco advertising receptivity and exposure, and familial tobacco use. Studies examining psychological predictors focused on tobacco-related cognitions (i.e., attitudes, perceptions, and social norms) and psychiatric symptomatology (i.e., internalizing and externalizing symptoms). RESULTS: AYA who use polytobacco tend to be lesbian, gay, bisexual, or queer (LGBQ) and non-Hispanic white or Hispanic, younger, male, and less educated than those with no use or single product use. Early studies (2016-2018) comparing demographic correlates among AYA with polytobacco vs. single product use signaled higher prevalence among non-Hispanic black and so-



cioeconomically disadvantaged AYA. Studies with more recent data (2021-2023) are mixed about these differences. AYA who use polytobacco have higher prevalence of binge drinking, alcohol, and cannabis use, as well as more internalizing and externalizing symptoms compared to AYA with single product use. The few articles examining harm and addiction perceptions and social norms in AYA with polytobacco vs. single use found mixed results across studies. However, AYA polytobacco use is associated with higher tobacco advertising exposure and receptivity and peer tobacco use than single product use. **CONCLUSIONS:** Younger, male, less educated, non-Hispanic white, Hispanic, and LGBTQ AYA have higher prevalence of polytobacco use than their counterparts. AYA polytobacco use is associated with high rates of peer use, mental health symptoms, polysubstance use, and exposure to tobacco advertising. High prevalence of multiple product use and polysubstance use signals the need to shift focus from single products to poly product use. Psychiatric symptoms and polysubstance use may be particularly salient message targets given their strong associations with polytobacco use.

FUNDING: Federal

SYM13

APPLICATION OF DISCRETE CHOICE EXPERIMENTS (DCEs) FOR DEVELOPMENT OF TOBACCO PREVENTION AND CESSATION INTERVENTIONS

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Stated-preference data on tobacco users' preferences using discrete choice experiments (DCEs) can help clarify the multifaceted nature of tobacco use and advance intervention development. In DCEs, individuals choose from a series of alternative products or services with different attributes, so the independent, relative, and interactive effects of these attributes on individuals' preferences can be assessed. Application of DCEs to tobacco prevention and cessation research can be especially useful for intervention development by evaluating which intervention components are most salient and relevant among tobacco users. This symposium includes four sessions that utilize DCEs in the context of anti-tobacco intervention development and evaluation. The first presentation (Nair) detailed the development and testing of a human-centered design proof of concept chatbot for smokers ambivalent to quitting. Results showed that the chatbot was usable and acceptable. To our knowledge, this is the first study utilizing conjoint analysis to develop a human centered designed chatbot for smokers not actively contemplating quitting. The second presentation (Jenssen) used a DCE to develop and identify messages to optimize initiation of tobacco cessation treatment for parent smokers who accompany their children for outpatient pediatric care. An EHR-based system was developed to deliver these messages to patients and help them quit smoking. The performance of this system was assessed in clinical practice. The third presentation (Ntansah) used a DCE to explore which message attributes were most effective for communicating about a low nicotine standard policy for cigars to people who use little cigars and cigarillos. This study provides insight into specific types of message content that promote positive attitudes towards the policy, increase perceptions of harm, and motivation to quit. The fourth presentation (Pluta) evaluated anti-vaping social media messages to reduce vaping initiation among sexual and gender minority (SGM) youth. A DCE was used to assess SGM youths' preferences related to the level of message tailoring towards SGM youth and number of people shown in the accompanying image. These findings provide insight into components that may increase the efficacy of preventative anti-vaping social media campaigns for SGM youth. This symposium explores the innovative application of DCEs to tobacco prevention and cessation interventions across diverse populations.

SYM13-1

EVALUATING TAILORED ANTI-VAPING SOCIAL MEDIA MESSAGES TO REDUCE VAPING INITIATION AMONG SEXUAL AND GENDER MINORITY YOUTH

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Significance: Sexual and gender minority (SGM) youth are at high risk for vaping. SGM youth prefer anti-tobacco interventions that are relatable and inclusive. Less is known about how to tailor anti-vaping campaigns for SGM youth most effectively. In this study, we assessed SGM youth's preferences for attributes of tailored anti-vaping social

media messages. **Methods:** Participants (n=240) were SGM-identifying US youth, ages 13-18 years, recruited mostly on Instagram. Participants completed a discrete choice experiment online (i.e., 10 choice sets, 3 images each, 36 image pool). Images varied on two attributes: 1) tailoring to SGM youth (3 levels: none, low, high) and 2) number of people in the image (3 levels: 1, 2, or 3+ people). Participants responded to 4 prompts for each choice set by selecting an image (i.e., "Which of these images: 1) do you like the most; 2) like the least; 3) is most likely to catch your attention; 4) will you be most likely to repost or share?"). We assessed importance scores for each attribute level, and utility scores, using choice-based conjoint analysis (hierarchical Bayesian estimation) in Sawtooth Software, which indicate the likelihood that images with varying levels of attributes would be selected. **Results:** Across all prompts, mean importance for tailoring was 63.8% (range= 61.3-66.6) and 34.9% (range= 33.4-36.4) for number of people. Main effects indicated that images with high and none levels of tailoring were most and least preferred, respectively. Images with 2 (vs. 1) people were most (vs. least) preferred. Interaction effects indicated that the most preferred images were: 2 people and high tailoring, 3+ people and no tailoring, and 3+ people and low tailoring. Images least likely to be preferred contained 3+ people and high tailoring, 2 people and no tailoring, and 2 people with low tailoring. **Conclusions:** Tailoring anti-vaping messaging for SGM youth may increase the likelihood that youth will notice, engage with, and share the content with peers. SGM youth most preferred images with 2 people and high tailoring, while images with 3+ people and high tailoring were least preferred. Highly tailored 2-person images may have been perceived as couples and more representative of the SGM community. Images with 3+ people and high tailoring may have been perceived as rainbow-washing. These findings provide insight into components that may increase the efficacy of preventative anti-vaping social media campaigns for SGM youth.

FUNDING: Federal

SYM13-2

DEVELOPMENT OF A HUMAN-CENTERED DESIGN CONVERSATIONAL AGENT (CHATBOT) FOR SMOKERS AMBIVALENT ABOUT QUITTING SMOKING USING CONJOINT ANALYSIS

Uma Nair, Karah Greene, Jerome T. Galea. University of South Florida.

Background: Less than a third of people who contemplate quitting smoking use evidence-based cessation strategies indicating barriers to access and uptake of existing interventions. Moreover, little to no resources exist for individuals who are not actively intending to quit (ambivalent smokers). Conversational agents, or chatbots, are easy-to-use scalable approaches for smoking behavior change. Chatbots can provide motivational and behavioral prompts to move ambivalent smokers along the quit continuum and connect them to evidence-based resources when they are ready to quit. Existing studies on chatbots for smoking are few, target participants intending to quit, and none elicit and incorporate end user preferences during intervention development. The purpose of our study was to develop a human-centered design proof-of-concept chatbot for ambivalent smokers using conjoint analysis (CJA). **Methods:** The study was completed in two phases. In Phase 1, n=300 ambivalent smokers completed a one-time cross-sectional survey that assessed user preferences for the proposed prototype using a discrete choice experiment. CJA was utilized to identify key attributes which was programmed into the chatbot prototype. In phase 2, n=20 ambivalent smokers were recruited to engage with the prototype for a 2-week period. Acceptability and usability were assessed. **Results:** CJA identified five primary attributes/participant preferences for the chatbot: tracking number of cigarettes per day, receiving quit-tips, tracking money saved, self-monitoring mood, and daily cravings to smoke. These were programmed for Phase 2 testing. After the 2-week chatbot interaction period (Phase 2), participants liked the CJA selected attributes; 71.2% liked the cigarette self-monitoring feature, 67% liked tracking money, and 62% liked daily tips to reduce smoking, and 81% used the chatbot to connect to quit smoking resources. The chatbot was rated high on usability (71%: easy to operate; 81%: easy to connect to and use the chatbot). Over 70% said they would recommend the chatbot to their friends and family. **Discussion:** Our proof-of-concept chatbot prototype showed based on CJA principles was usable and acceptable. Ours is the first study utilizing this innovative methodology to program a chatbot for smokers not actively contemplating quitting. Next steps include refining our chatbot prototype with enhanced participant elicited preferences and efficacy testing in a larger scale trial.

FUNDING: Academic Institution

SYM13-3

TAILORED MESSAGING AND DECISION SUPPORTS TO HELP PARENTS QUIT SMOKING IN PEDIATRIC SETTINGS

Brian Janssen. University of Pennsylvania School of Medicine, Children's Hospital of Philadelphia.

Secondhand smoke exposure affects more than 40% of the US pediatric population and exacerbates and/or increases the risk of disease morbidity and mortality. By helping parents quit smoking, pediatricians protect children and families from the harms of tobacco. Pediatricians are uniquely positioned to intervene but appropriate treatments are delivered to parent smokers less than 3% of the time. Major barriers to wider adoption include lack of understanding of effective pediatrician-parent communication regarding tobacco cessation treatment and mechanisms to systematize, consistently deliver, and scale effective interventions. This session describes the creation and evaluation of a novel intervention to directly address these barriers: a clinical decision support (CDS) tool embedded within the electronic health record (EHR), for tobacco treatment in the pediatric setting, grounded in behavioral economics and developed using a combination of discrete choice experiments (CDE) and rigorous informatics design methods. The research approach included 3 phases: developing theory-based messages that engage parents in tobacco cessation treatment, identifying effective methods for delivering these messages using a CDS system, and measuring the impact of the system in clinical practice. Phase 1: development of messages that motivate parents to quit smoking. Using a discrete choice experiment, we describe the development and identification of carefully framed messages using a theory-based approach in order to optimize initiation of tobacco cessation treatment for parent smokers who accompany their children for outpatient pediatric care. Phase 2: development of an EHR-based systems to deliver these messages to parents and to help them engage in treatment to quit smoking. We developed a clinical decision support (CDS) system by using human-centered design (HCD) that identifies parents who smoke, provides motivational messages to quit smoking (informed by behavioral science), and supports delivery of evidence-based tobacco treatment. Finally, phase 3: evaluate the system in practice. We assessed the performance of this system in clinical practice, including receipt of motivational messages and tobacco use treatment acceptance rates. These research effort provides a model for development of smoking cessation interventions ultimately targeted at vulnerable populations and could be scaled for broad population impact.

FUNDING: Federal

SYM13-4

ASSESSING THE IMPACT OF MESSAGES ABOUT REDUCED NICOTINE CIGARS PRODUCTS AMONG LITTLE CIGAR AND CIGARILLO USERS: A DISCRETE CHOICE EXPERIMENT

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Significance: The US Food and Drug Administration plans to pursue a low nicotine standard for cigarettes, yet this exclusive focus on cigarettes may drive people to use other combusted products, thus undermining the policy's effectiveness. If the policy is expanded to include other combustible products like cigars, effective messages are needed to communicate about the policy to people who use those products. Methods: We conducted a discrete choice experiment (DCE) with people from four groups with the highest cigar use prevalence: non-Latinx African American males and females, and non-Latinx White males and females. Participants (n=1722) were aged 18-44 years and smoked little cigars or cigarillos (LCCs). The DCE design systematically varied seven message attributes about reduced nicotine (RNC) cigars (presence or absence of information about: source information, remaining chemicals, continued harm, numeric reduction of nicotine (95%), reduced addictiveness, increased quitting efficacy, reduced enjoyment). Participants viewed 20 choice sets, each containing four messages, and were randomized to evaluate two of the three outcomes we assessed: affect towards the policy, perceived harms of LCCs, and motivation to quit smoking LCCs. Results: All message attributes except RNC LCCs being less enjoyable had a significant impact on the three outcomes. Message attributes about source, harm, addictiveness, and quitting efficacy increased positive attitude towards the policy, increased perception of harm, and increased motivation to quit smoking LCCs. Messages with information about chemicals and nicotine reduction decreased positive attitude towards the policy, harm perceptions, and motivation to quit smoking LCCs. Information about the reduced addictiveness of RNC LCCs followed by quitting efficacy were consistently the most influential message attributes on affect, perceived harms, and motivation to quit. Conclusions: This study suggests that RNC messages about LCCs that mention the reduced addictiveness and greater self-efficacy to quit smoking LCCs will promote positive attitudes towards the policy, increase perceptions of harm and motivation to

quit. Although reduced addictiveness was consistently the most influential message attribute across outcomes, it may be important to also remind the public RNC LCCs are as harmful as regular LCCs.

FUNDING: Federal

SYM13-5

HOW HARMFUL DO DIFFERENT RACIAL AND ETHNIC GROUPS PERCEIVE TOBACCO PRODUCTS THAT SPAN A CONTINUUM OF HARM?

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Significance: National survey data reveals a significant gap in the public's understanding of the varying harms associated with different tobacco products. In a proliferating market, it is important to understand harm perceptions between different racial and ethnic groups to gain a comprehensive understanding of how individuals equate harm and ultimately encourage cessation of the most harmful products. Methods: An online sample (n=829) of U.S adult smokers and non-smokers completed a Maximum Difference task designed to reveal the perceived harm of 18 different nicotine and tobacco products encompassing a spectrum of risk. In this orthogonally balanced discrete-choice task, participants were asked to select the most and least harmful product. We estimated probability scaled relative harm perception scores using a multinomial logit hierarchical Bayesian analysis. We ran linear regressions for each product to explore relative harm perception score differences by race/ethnicity controlling for smoking status, age, and sex. Results: Overall, cigarettes had the highest probability of being perceived as the most harmful product (11.1%), followed by cigarillos (7.31%), little cigars (5.47%), e-cigarettes with traditional nicotine salts (4.26%) and IQOS (2.04%). Nicotine lozenges (0.14%) were perceived as the least harmful product. There were distinct variations by race and ethnicity for perceived harm. Relative to the comparator group of non-Hispanic white individuals, non-Hispanic black individuals perceived snuff, plug tobacco, snus, IQOS and nicotine gum as more harmful and perceived cigarillos, roll your own (RYO), little cigars, clove cigarettes and bidis as less harmful. Hispanic individuals perceived snus, IQOS, and e-cigarettes as more harmful and RYO, little cigars, clove cigarettes and bidis as less harmful relative to the non-Hispanic white individuals. Relative to the comparator group, Asian individuals uniquely perceived plug tobacco as the most harmful product instead of cigarettes; and perceived little cigars, clove cigarettes and bidis as less harmful and Indigenous and mixed-race individuals perceived snus as more harmful and perceived clove cigarettes and bidis as less harmful. Conclusion: We observed notable differences between current evidence and relative harm perceptions particularly for products like smokeless tobacco and IQOS. Communication campaigns should focus on correcting these relative harm misperceptions especially among racial and ethnic groups with noted high use of specific combustible tobacco products.

FUNDING: Federal; Academic Institution

SYM14

ENHANCED SURVEILLANCE; FINDING THE PATH FROM SIGNAL IDENTIFICATION TO PUBLIC HEALTH ACTION

Priscilla Callahan-Lyon.

The commercial tobacco and nicotine marketplace is increasingly diverse and new products are regularly introduced to the marketplace. The public health impact of new products depends on the risks of those products and the populations that use them. With the continuously evolving marketplace, government and non-government entities are constantly working to identify the next popular product and focus regulatory efforts, research, educational campaigns, and therapeutic interventions on the at-risk populations to optimize public health impact. This panel will describe novel surveillance methods and provide examples of how they can be used to identify early signals for new tobacco products that are, or may become, the next popular product. Dr. Cristine Delnevo will provide an overview of the recently created Center for Rapid Surveillance of Tobacco (CRST), including why this type of surveillance is critical to keeping up with the tobacco marketplace. Ms. Marynak will discuss e-cigarette retail sales data and how these data demonstrated increasing sales of particular e-cigarette brands which helped inform action. Dr. Mario Navarro will discuss how CTP utilizes internet search volume metrics to detect emerging brands in the e-cigarette marketplace and corroborates these findings with cross-sectional survey data collected at multiple time points. Dr. Xin Xu will discuss how CTP's Evaluation Branch triangulates multiple non-traditional rapidly available data sources to improve understanding of the U.S. tobacco marketplace and



identify early signals for emerging products. Ms. Nicole Tashakkori will discuss how FDA has used information from the National Poison Data System to support actions. Dr. Annice Kim will discuss the use of publicly available social media data to develop age prediction algorithms and identify relevant tobacco-related conversations among youth and young adult populations that can provide insight into the evolving tobacco marketplace. Ms. Catherine Osborn will explain web scraping, discussing how it was used to identify shifts in cigarillo marketing. Dr. Matthew Farrelly will respond to the presentations by discussing how these data can be synthesized and leveraged to inform policy and practice. Additional discussion will focus on ways to make these data more available and enable those in the field to build on what we and others learn.

SYM14-1

MODERNIZING SURVEILLANCE: THE CENTER FOR RAPID SURVEILLANCE OF TOBACCO

Christine Delnevo. Rutgers Institute for Nicotine and Tobacco Studies.

Introduction: The 2009 Tobacco Control Act gave the FDA authority to regulate tobacco products to protect public health but initially extended only to cigarettes and smokeless tobacco. By the time other products were deemed under FDA authority in 2016, the tobacco landscape had changed dramatically, making modern tobacco surveillance increasingly complex. The cigarette-centric tobacco surveillance systems in the US have been slow to respond to these changes. **Methods:** The NIH/FDA funded Center for Rapid Surveillance of Tobacco (CRST) seeks to ameliorate gaps in the current systems. Dr. Cristine Delnevo will provide an overview of CRST. This includes a detailed overview of CRST's conceptual framework for rapid surveillance which draws upon a traditional public health surveillance perspective as well as FDA's Sentinel Initiative. She will present strategies for tobacco surveillance signal generation, refinement and evaluation which focuses on tobacco product marketing, the tobacco product marketplace, and changes in tobacco product use behaviors. Additionally, Delnevo will present a variety of data sources for rapid surveillance and signal analysis with consideration of their unique strengths and weaknesses. Lastly, she will highlight key gaps remaining in tobacco surveillance measurement. **Conclusion:** Rapid assessment and response to changes in the tobacco market are essential to informing and evaluating FDA's current and pending regulatory actions, including proposed product standards, pending marketing authorizations, and the modified risk tobacco products (MRTPs) pathway. The CRST will establish a new paradigm of tobacco surveillance, serve as a resource on surveillance methods and measures, support evolutions in traditional surveillance measures, and meaningfully advance the field of tobacco regulatory science.

FUNDING: Federal

SYM14-2

CASE STUDY: TIMELY AND RELEVANT REPORTING OF E-CIGARETTE SALES DATA CAN INFORM REGULATORY EFFORTS

Kristy Marynak. Centers for Disease Control and Prevention.

Significance: Retail sales data are a source of near real-time information about the changing e-cigarette market that can inform policy evaluation and implementation. This case study will present an example from the U.S. of sales data that rapidly informed regulatory efforts. **Methods:** E-cigarette retail sales data are licensed from IRI, which include Universal Product Code sales from brick-and-mortar retailers only; sales from online retailers and tobacco specialty stores, including vape shops, were not available. Data are coded by flavor, device type, and brand, and reported in scientific publications and as quarterly, publicly accessible data briefs. **Results:** E-cigarette unit sales increased by 46.6 percent during January 2020–December 2022. After January 2020, sales of mint and other flavored prefilled cartridges ceased, and disposable e-cigarettes in fruit, sweet, and other flavors increased. During the 4-week period ending December 25, 2022, the top five brands were Vuse, JUUL, Elf Bar, NJOY, and Breeze Smoke. The number of brands increased 46.2 percent during the study period from 184 to 269. These data helped inform public health actions. **Conclusions:** The e-cigarette landscape and use patterns rapidly shift in response to market changes, policy interventions, and other factors. Analysis and reporting of timely and relevant sales data, including on e-cigarette products that appeal to youth, can inform implementation and enforcement of youth prevention efforts.

FUNDING: Federal; Nonprofit grant funding entity

SYM14-3

USING GOOGLE TRENDS TO SURVEIL THE E-CIGARETTE PRODUCT LANDSCAPE, A CASE STUDY OF ELF BAR

Mario Antonio Navarro. United States Food and Drug Administration.

Background: The tobacco product landscape is rapidly changing in terms of product use, particularly with e-cigarettes, and thus changes in the marketplace may not be immediately tracked through traditional survey research. Digital tobacco surveillance, using passively collected data, is ideally positioned to monitor rapid changes in the e-cigarette brand landscape because it utilizes unobtrusive forms of near real-time, or frequently updated, data. By coordinating digital surveillance data with traditional forms of data, such as survey and behavioral data, researchers might be able to validate these signals. **Aim:** To descriptively compare e-cigarette brand data from two surveillance approaches, digital (Google Trends) and survey, and to demonstrate the utility of using this digital approach to detect an up and coming brand (i.e., Elf Bar). **Methods:** We monitored Google Trends data, which provides standardized measures of search volume (0-100) of key terms searched on Google. E-cigarette brand searches were conducted from January 1, 2022, to February 1, 2023. Overlapping this time frame, we also collected four waves of a repeated cross-sectional survey (approximately 1500 youth (12-17) and young adult (18-24) participants/per wave). We focused on e-cigarette brand used among current e-cigarette users and e-cigarette brand awareness among all participants using an open-ended item. **Results:** Using Google Trends, we were able to retrieve related search terms commonly associated with popular e-cigarette brand search terms and detected the novel brand Elf Bar. Elf Bar's Google Trends score showed that search interest consistently grew beginning in January 2022. By June 2022, Elf Bar reached a Google Trends score of nearly 80, surpassing popular brands like Juul and Vuse. Survey data showed an increase in self-reported awareness and current use of Elf Bar between survey waves collected in August-September 2022 and January-February 2023. In the August-September 2022 data, only 1 percent of participants reported Elf Bar brand awareness and 1 percent current users reported use. By January-February 2023 data, 23 percent of the sample reported Elf Bar awareness, and 16 percent of current users mentioned Elf Bar use. **Conclusions:** These findings show that using non-traditional digital data sources such as Google Trends may provide timely insights into current market patterns. These insights can help direct focus and questions in more traditional surveys.

FUNDING: No external funding reported

SYM14-4

MONITORING US TOBACCO MARKETPLACE: NON-TRADITIONAL DATA SOURCES AND ENHANCED SURVEILLANCE

Xin Xu. United States Food and Drug Administration.

The commercial tobacco and nicotine marketplace is large, complex, and has recently experienced rapid changes; increasingly diverse and new products are frequently introduced and marketed across different channels. For CTP to effectively regulate the swiftly changing U.S. tobacco marketplace, the Center needs comprehensive knowledge and understanding of tobacco products, including product availability, product characteristics, emerging sales trends, and industry marketing strategies. In addition to more traditional data sources such as population-based surveys and contextual data, triangulating data across multiple non-traditional rapidly available resources, such as market intelligence (e.g., tobacco market intelligence reports), sales, advertising, social media, and web analytics, can provide information that is more timely and more granular. This information can enhance tobacco product surveillance and improve understanding of emerging products and trends. This presentation will start with a brief overview of non-traditional rapidly available data sources monitored by CTP's Office of Science and then will demonstrate how market intelligence and sales data can be used as complementary sources to address certain limitations of retail scanner data and to provide an enhanced landscape of U.S. tobacco marketplace. By combining the information from these non-traditional data sources, it is possible to see the differences between vaping products sold from traditional retail channels (e.g., grocery stores, drug stores, convenience stores) and those from tobacco specialty stores. This will be followed by featuring a study that has triangulated multiple non-traditional data sources, including advertising, retail sales, social media, and web traffic data, to retrospectively illustrate potential signals of interest in and uptake of a specific disposable brand in the context of selected key events such as FDA's enforcement prioritization of unauthorized cartridge-based ENDS with flavors other than tobacco or menthol. The findings of this study exemplify the benefits of tracking non-traditional data resources that are publicly and commercially available to provide scalable, rapid signal detection of emerging trends.

Collectively, these case studies demonstrate that multiple complementary non-traditional rapidly available data sources can be an important part of a multi-component enhanced tobacco product surveillance program.

FUNDING: No external funding reported

SYM14-5

REPORTS OF E-CIGARETTE EXPOSURE AND ASSOCIATED CHARACTERISTICS TO U.S. POISON CENTERS – APRIL 1, 2022–MARCH 31, 2023

Nicole Tashakkori. FDA Center for Tobacco Products.

Introduction: E-cigarette associated cases reported to U.S. poison centers have fluctuated during the past decade, increasing during 2010–2014 and decreasing during 2015–2017. During 2017–2018, the number of e-cigarette exposure cases increased by 25 percent, and in 2018 nearly two thirds of cases occurred among children under age 5. Methods: National Poison Data System (NPDS) is a repository of cases reported to U.S. poison centers that are recorded by specially trained and certified health care professionals. Information on exposure cases in NPDS is recorded based on generic codes (a required general identification code for a substance or group of products) and product codes (product-specific codes, often by brand; these are not required upon case intake). Cases involving e-cigarettes were identified using generic codes; brands were identified using product codes. E-cigarette exposure cases were examined by age group, exposure route, level of care provided, medical outcome, and product brand. A 12-month period of NPDS data (April 1, 2022–March 31, 2023) was analyzed to understand the number and characteristics of e-cigarette exposure cases in the U.S. Analyses will be extended to include the most recent data when available. Results: During April 1, 2022–March 31, 2023, a total of 7,043 e-cigarette exposure cases were reported. Over 87 percent of these cases were children under 5 years of age. Inhalation or nasal and ingestion or oral exposure routes were most common. Very few e-cigarette exposure cases resulted in hospital admission and 8.3 percent required treatment at a health care facility. A major effect was experienced in 0.2 percent of exposure cases and a moderate effect in 1.9 percent of cases. Approximately one half of reported cases resulted in either a minor effect or no reported effect; 50.9 percent of cases were not followed. Among the 4.9 percent cases with brand information, the most reported brand was Elf Bar. Over 90 percent of Elf Bar exposures were among children under age 5. Conclusions: The number of reported U.S. e-cigarette exposure cases during this 12-month period is approximately double the number reported in 2018, with most cases occurring among children under 5 years old. Increasing public awareness of the potential for e-cigarettes to cause poisoning exposure and continued surveillance are important for informing regulatory action and preventing future events, particularly among young children.

FUNDING: No external funding reported

SYM14-6

MONITORING SOCIAL MEDIA DATA FOR EMERGING ISSUES: TOWARDS A COMPUTATIONAL AUDIENCE SEGMENTATION APPROACH

Annic Kim. RTI International.

In 2023, an estimated 4.9 billion people used social media world-wide. The vast volume of information that is shared daily on social media platforms has created a rich data source for understanding industry and consumer behavior. Tobacco control researchers have increasingly leveraged social media data to track wide range of issues including identifying emerging tobacco products and how they are marketed, consumer perceptions of tobacco products, and consumer reactions and behavioral responses to tobacco regulatory policies and changes in the tobacco marketplace. Studies using social media data typically analyze a cross-sectional sample of relevant posts and focus on what is being said, with little attention to who is saying it. Social media insights can be more actionable if analyses are segmented by audience types. This presentation will provide an overview of a body of research conducted by RTI to develop computational approaches to identifying different user types posting about tobacco topics on social media. We will discuss our approach to developing age prediction algorithms that predict the likelihood that a social media user on Reddit and X (formerly Twitter) is a youth or young adult based on their user profile and linguistic patterns. We will then discuss how these age prediction algorithms have been applied to understand exposure to ENDS brand marketing and emerging tobacco brands of interest among youth and young adults. We will conclude with a discussion on the future of social media research in an increasingly privatized environment with more restricted data access.

FUNDING: Other

SYM14-7

INNOVATIVE TECHNOLOGY FOR AUTOMATING SURVEILLANCE OF WEB-BASED FLAVORED TOBACCO MARKETING

Catherine Osborn. Case Western Reserve University.

Introduction: The U.S. FDA has proposed and stated intent to finalize a rule restricting flavors other than tobacco in cigar products in 2023. This will include cigarillos which make up 90 percent of the cigar market share. The tobacco industry has shown evidence of shifting toward concept flavors, or flavored products that are nominally unflavored. There is a pressing need to develop surveillance tools to capture ways in which the industry is shifting. Methods: Between October 2022 and June 2023, web scrapers were developed to extract product images, names, and descriptors from seven leading cigarillo brand websites and two secondary cigarillo retail websites. These web scrapers were timed to run one time per week to extract data from websites and highlight when new products emerge, products discontinue, or when product descriptions or as marketing images change. Results: Web scrapers extracted information on 212 individual flavors with 366 unique product descriptions. While many brands rolled out a number of new flavors, both characterizing and concept, one leading brand created a full line of 8 new concept flavors in their "California Range," which mirror package colors and imagery as well as use similar product descriptors used in characterizing flavors in their "National Range." Others adapted products removing the word "sweet" from several nominally unflavored product descriptions. Conclusion: Web scraping methods and technology are an effective way to surveil online product marketing and highlight emergent trends in marketing that result from a shifting policy landscape.

FUNDING: Federal

SYM15

AN UPDATE FROM FDA'S CENTER FOR TOBACCO PRODUCTS: WHERE WE'VE BEEN AND WHERE WE'RE GOING

Brian King, PhD, MPH, Director of the FDA's Center for Tobacco Products.

During this session, the Director of FDA's Center for Tobacco Products, will discuss updates on the center's research activities and key programmatic areas, including recent and upcoming regulations and guidances; progress on the review of premarket tobacco product applications; recent compliance and enforcement activities; and public communication and education activities. Dr. King will also provide an overview of the center's new strategic plan, released December 2023, which outlines the center's programmatic and workforce initiatives for the next five years. The session will conclude with a panel comprised of leadership from across the Center – including from the Offices of Science, Regulations, Compliance and Enforcement, and Health Communications and Education – who will be available to field questions from the audience.

SYM16

ASSESSING THE IMPACT OF RETAILER ENVIRONMENT POLICIES ON HEALTH EQUITY: APPROACHES AND OUTCOMES ACROSS FOUR COUNTRIES

Amy K. Ferketich. The Ohio State University.

Tobacco control policies are largely responsible for the decline in smoking rates in many countries. Despite their effectiveness at the population level, they can sometimes do little to reduce income, racial/ethnic, or place-based disparities that are observed globally. Depending on the policy and its implementation, disparities may also be exacerbated. Thus, it is important to assess how policies may impact disparities. In this symposium, the speakers will focus on policies aimed at the tobacco retailer environment and examine their potential impacts for health equity. Taking a policy life course approach, the talks from an international panel of speakers will range from purely simulation studies that model potential impacts on health equity to an evaluation of an actual policy. Valerio Restocchi will present an agent-based model that accounts for how social interactions and economics influence tobacco use patterns among youth. This approach allows for various tobacco control policies to be examined simultaneously. Jamie Pearce will present results from a comprehensive assessment of tobacco licensing fees in Scotland. Using simulation, his group found that while this is a promising policy, care needs to be taken in order for health equity to be improved. Michael Chaiton will present results from models that explore the potential impact of a 95% reduction in tobacco retailer outlets in Canada on smoking and health outcomes among various groups. Results suggested that a reduction alone will not achieve the goal of 5% smoking prevalence by 2040 but the policy could achieve equity. Megan Roberts will present data from Ohio



(in the US) that demonstrates an overall decline in tobacco retailer density between 2017 and 2022. While the rate of decline was higher in low-income urban areas, rural disparities persisted. In contrast, communities with licensing restrictions experienced equitable declines. Finally, Mirte Kuipers will present results from an evaluation of tobacco product display ban in the Netherlands. Results suggest that youth on educational tracks preparing them for vocational careers experienced greater declines in exposure to tobacco product displays than their peers preparing for academic careers; thus, educational disparities were reduced following implementation of this policy. Finally, Peter Craigmile will compare and contrast the different modeling strategies that can be used to learn about tobacco retailer-focused tobacco control policies.

SYM16-1

COMPLEX INTERVENTIONS CAN REDUCE SMOKING LEVELS AND HEALTH INEQUALITIES AMONG ADOLESCENTS

Valerio Restocchi. University of Edinburgh.

Tobacco control policies have a significant impact on health equity, but they can sometimes lead to unexpected outcomes. To develop interventions that do not exacerbate inequalities, we need models that can capture the full complexity of the system. To achieve this, we introduce an agent-based model that mimics how young people influence each other when it comes to tobacco use. This study dives into the connections between tobacco control policies, health results, and equity. Our model considers various factors that affect whether young people start using tobacco and how that behavior spreads among them. We bring together psychological, economic, and environmental factors to create a comprehensive view of what drives smoking habits. The strength of our model lies in its reliability. We carefully checked how well it mirrors real-life tobacco use patterns by comparing it with real-world data, and show that our model captures the complex mix of personal tendencies, social ties, and outside influences, making it a trustworthy tool for analysis. Importantly, our research goes beyond just running simulations. We highlight how this model can guide policymakers in making smart choices for interventions. By testing different policy combinations, including price increments, availability reduction, and raising the legal age to 21, we identify strategies that could lower smoking rates and health inequalities at the same time. Our model's flexibility in testing various intervention scenarios equips policymakers with useful insights to create well-rounded strategies that promote public health and equity. In conclusion, our agent-based model can become a key ally in shaping effective tobacco control policies to improve health and equity among adolescents. Its ability to understand the complex dynamics of how young people influence each other makes it a powerful tool for valuable analyses and practical insights. As we continue working towards better tobacco control policies worldwide, this research showcases the importance of using appropriate models to create a healthier and fairer society.

FUNDING: Federal; Nonprofit grant funding entity

SYM16-2

MODELLING GEOGRAPHICAL INEQUITIES IN THE FINANCIAL IMPACTS OF DIFFERENT FORMS OF TOBACCO LICENSE FEES ON SMALL RETAILERS IN SCOTLAND

Jamie Pearce. University of Edinburgh.

Objective: Retailer-licensing fees are a promising avenue to regulate tobacco availability, but they face strong opposition from retailers and the tobacco industry, who argue significant financial impacts. This study compares the impacts of different forms of tobacco license schemes on retailer's profits in Scotland. Methods: We estimated gross profits from tobacco sales in 179 convenience stores across Scotland using 1,099,697 electronic point-of-sale records from 16 weeks between 2019 and 2022. We estimated different fees using universal, volumetric and separate urban-rural schemes. We identified the point at which 50% of retailers would no longer make a gross profit on tobacco sales for each scheme and modelled the financial impact of 10 incremental fee levels. The financial impact was assessed based on changes in retailer's tobacco gross profits. Differences by retailer's neighborhood deprivation and urban/rural status were examined. Results: The gross profit from tobacco per convenience store averaged £15,859/year. Profits were 2.29 and 1.59 times higher among retailers in urban and high-deprivation areas respectively, because sales volumes were higher. Tobacco gross profit decreased proportionally with increasing fee levels. Universal and urban-rural fees had greater gross profit reductions in rural and/or less deprived areas, where profits were lower, compared to volumetric fees. Conclusion: The introduction of tobacco license fees offers a potential opportunity for reducing the availability of

tobacco retailers. The likely impact of a tobacco license fee is sensitive to the type of license scheme implemented, the level at which fees are set and the retailer's location in relation to neighborhood deprivation and rurality.

FUNDING: Federal; Nonprofit grant funding entity

SYM16-3

MODELLING THE HEALTH EQUITY IMPACT OF A 95% REDUCTION IN THE NUMBER OF TOBACCO RETAIL OUTLETS IN CANADA

Michael Chaiton. University of Toronto.

Introduction: A key driver of health inequity for tobacco smoking is variation in proximity to tobacco. The purpose of this study is to estimate the health gains and health inequality (income and immigration status) reductions of a 95% reduction in number of tobacco retail outlets in Canada. Methods: Simulation modelling: a Markov model to estimate future yearly smoking and vaping prevalence (for business-as-usual [BAU] and intervention scenarios) linked to a proportional multistate life table model with 16 tobacco-related diseases to estimate future morbidity and mortality rates, and health adjusted life years (HALYs). Trends in prevalence by sex, income, and immigration status from 2001-2021 were used to calculate BAU scenario. Canadian population alive in 2021 will be simulated over the rest of their lifespan comparing results with and without a 95% reduction in tobacco retail outlets in 2023. Effect size of tobacco retail reduction was the average of previous work modelling increased travel time and reported expectations for changes in smoking behaviour to estimate a one time increase in net cessation of 19.4% (95% UI 12.9% to 26.9%) based on modelling from New Zealand. Future smoking prevalence, deaths averted and HALYs by sex, immigration status and income in 2021 were assessed. Percent reduction in health equity all-cause mortality rate difference in 2040 under interventions was compared to business as usual (BAU). Results The reduction of tobacco retail outlets varied in outcome across health equity groups and was estimated to reduce adult smoking prevalence down to a range of from 17.3% in 2040 for low income, immigrant males, to 2.7% for immigrant females based on proportion modelling from New Zealand. The 5% smoking prevalence target was forecast to not be achieved by 2040 for all groups except for immigrant females. The HALY gains for the combined package (compared to BAU) over the population's remaining lifespan was estimated to be 1,940,000 (95%UI: 1,430,000 to 2,380,000; 3% discount rate). Conclusion A 95% retail outlet reduction on its own, is unlikely to achieve a 5% smoking prevalence for any groups until at least 2040 but can improve health equity.

FUNDING: Nonprofit grant funding entity

SYM16-4

TOBACCO RETAILER DENSITY DISPARITIES: MODELING THE EQUITY OF CHANGES OVER TIME AND EVALUATING THE OUTCOME OF TOBACCO RETAILER LICENSING POLICIES

Megan E. Roberts. The Ohio State University.

Introduction: A growing body of research indicates that disparities in tobacco retailer density (TRD) are related to disparities in tobacco use. It is important to continue monitoring how these TRD disparities change over time, especially given recent growth in retailer-focused tobacco control policies (e.g., tobacco retailer licensing), as well as economic events that may have impacted retailer closures and turnover (e.g., the fallout of COVID-19). The purpose of this project was to assess changes in TRD disparities for various communities over the last five years. In addition, we sought to explore how these changes varied as a function of local tobacco control policies. Methods: In both 2017 and 2022, we geocoded all tobacco retailers in Ohio (United States), and used Census-derived information to categorize neighborhoods based on their demographic characteristics. With these data, we calculated cross-sectional TRD disparities, then estimated changes in TRD between 2017 and 2022. Analyses used negative binomial models adapted to account for spatial association across tracts and temporal dependence over years. A generalized estimating equation (GEE) approach was used to fit these statistical models. Results: Tobacco retailer numbers in Ohio declined from 11,458 in 2017 to 11,346 in 2022 (a 0.98% reduction). For both years, TRD was greater in tracts with high (vs. low) poverty, in tracts with high (vs. low) prevalence of African American or Hispanic individuals, and in tracts that were rural (vs. urban or suburban). TRD declined the most for high-poverty urban areas and areas with a high prevalence of racial and ethnic minority individuals; thus TRD disparities were attenuated (but not eliminated) for these communities. In contrast, there was no indication that TRD was declining equitably for rural areas. There was some evidence of an equitable decline in TRD in locations with tobacco retailer licensing policies. Conclusions: TRD declined for Ohio overall, although the rate of decline was greater for some populations than

others. In particular, there was no indication that TRD is declining in rural areas of the state. Findings indicate the need for state and local-level tobacco control policies—such as tobacco retailer licensing—that will improve equity and reduce health disparities.

FUNDING: Federal

SYM16-5

REDUCTION IN EDUCATIONAL DIFFERENCES IN ADOLESCENTS' EXPOSURE TO TOBACCO IN THE RETAIL ENVIRONMENT FOLLOWING A TOBACCO PRODUCT DISPLAY BAN

Mirte Kuipers. Amsterdam University Medical Centers.

Background: Educational track, determining for a large part individuals' career prospects, are strongly associated with smoking prevalence. Among 17-year-olds in the Netherlands, 33% smoke in educational tracks that prepare for vocational careers versus 16% in tracks for academic careers. Exposure to tobacco products in the retail environment have been associated with smoking initiation in adolescents. Tobacco control policies such as a product display ban have been implemented in order to decrease exposure to tobacco in the retail environment. This study aims to evaluate the change in tobacco outlet exposure after display ban implementation in the Netherlands and how educational differences in exposure changed. **Methods:** We included 489 observations (285 pre, 204 post-ban) of 356 13-17 year-old non-smokers living in four Dutch cities. Ordinal Generalized Linear Mixed Models quantified post vs. pre-ban changes in self-reported exposure to tobacco products in shops (in 5 categories ranging from never to every time), controlling for age, gender, educational track (academic vs. vocational), and smoking of friends. Pre- and post-ban educational differences and interaction were tested (display ban implementation x educational track). **Results:** Display ban implementation was associated with a significant decrease in exposure (OR=0.63, 95%CI=0.47-0.85). Pre-ban, 61.2% of adolescents in vocational tracks reported seeing tobacco products usually or every time they visited a shop, compared with 50.5% in academic tracks. (OR=1.59, 95%CI=0.88-2.87). Post-ban the apparent difference disappeared, with 46.2% vs. 46.7% (OR=1.00, 95%CI=0.53-1.89; p for interaction=0.057), suggesting a larger decrease in exposure among adolescents in vocational education. **Conclusion:** With the implementation of the display ban, self-reported exposure to tobacco products in the retail environment decreased, and this decrease may have been larger among adolescents in vocational educational tracks, potentially contributing to a reduction in educational differences in tobacco product exposure.

FUNDING: Nonprofit grant funding entity

SYM17

PIONEERING DIGITAL INTERVENTIONS TO ENGAGE YOUTH IN VAPING CESSATION TREATMENT

Elizabeth Klein. The Ohio State University.

The prevalence of teen and young adult vaping remains high. Despite a clear call for evidence-based treatments, few have been developed and data are lacking on how to reach and engage young vulnerable populations. In 2020 the American Heart Association awarded \$20M to US researchers to "End Nicotine Addiction in Children and Teens (ENACT)" and escalate development of vaping cessation tools for youth aged 15-24. Given the addictive potential of vaping, interventions should reach, motivate, and engage youth while also providing coping skills and attenuation of withdrawal symptoms. In this symposium, we describe cutting edge treatment approaches developed with ENACT funding. Belinda Borrelli will describe the development and pilot testing of a virtual reality (VR) school-based immersive gaming intervention to help teens avoid or stop vaping. The intervention was iteratively co-developed with teens via a series of focus groups and playtesting sessions and pilot-tested in 3 schools. Challenges, lessons learned, and success stories will be highlighted. Katrina Vickerman will describe the RISE study, a randomized trial of 509 young adult exclusive vapers, investigating the effects of nicotine replacement (NRT) and an innovative mHealth program (combining text messaging and streaming media) on vaping cessation in the context of quitline vaping cessation coaching. Social media recruitment methods, coaching engagement, cessation rates and next steps will be discussed. Suchitra Krishnan-Sarin will describe the development and testing of Kick-Nic®, an interactive vaping cessation app that teaches cognitive behavioral therapy (CBT) skills with rich media, peer modeling and personalized quit plans. Youth feedback via qualitative interviews and pilot testing will be discussed. Dr. Krishnan-Sarin will also discuss her pilot study of a virtual CBT e-cigarette cessation intervention where 99 youth aged 14-20 were randomized to either receive incentives for attendance or for abstinence. Preliminary results, abstinence rates and next steps

will be presented. As the symposium discussant, Carla Berg will summarize the main points, including reaching and treating underserved teens and young adults, the creative and engaging aspects of the proposed treatments, and the potential challenges ahead.

SYM17-1

A QUITLINE-BASED YOUNG ADULT VAPING CESSATION TRIAL EXAMINING THE IMPACTS OF NRT AND MHEALTH COMPONENTS

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SIGNIFICANCE: Broad-reaching, effective e-cigarette (EC) cessation interventions are critically needed for vapers seeking help with quitting vaping, especially interventions that can be updated as the vaping landscape changes and have the infrastructure for sustained treatment provision. **METHODS:** Using social media, we recruited 508 18–24 year-old exclusive, regular (20+ days out of the last 30) EC users interested in quitting. All participants were offered 2 cessation coaching calls and needed to complete the first call to fully enroll in the study. Participants were randomized to one of 4 groups in the 2x2 design: nicotine replacement therapy (NRT) (8 weeks vs. none) and/or mHealth intervention (yes vs. no). The mHealth program functioned as a stand-alone text program and had links to TikTok-style videos, animations, quizzes, and podcasts. The primary outcome was self-reported 7-day point prevalence (7dpp) vaping abstinence at the 3 month follow-up. **RESULTS:** Participants were 71% female, 31% non-white, 78% daily vapers and most reported high (72%) nicotine dependence. Most (63%) completed their second coaching call, and the majority (74.3%) completed the 3-month survey. Intent to treat 7dpp abstinence rates (missing data assumed vaping) were 39% for Calls only, 43% for Calls+mHealth, 48% for Calls+NRT, and 48% for Calls+NRT+mHealth. 81% in the NRT groups and 19% in the non-NRT groups self-reported use of NRT during follow-up. 94% in the mHealth groups responded to 1+ texts with 12 responses on average (SD=12). Overall quit rates were higher than anticipated, reducing our power to identify significant differences for each factor. Although there were no statistically significant differences for NRT (p=0.12) or the mHealth components (p=0.65) when delivered with coaching calls, the addition of NRT contributed a clinically meaningful increase in quit rates. **CONCLUSION:** Quit rates were higher than anticipated; these rates may be due to all groups receiving cessation coaching. Quit rates among those who only received 2 calls were double that of quit rates in published text-based only vaping cessation interventions. Given the appeal of digital only interventions among YAs, and the promising results across all our study conditions, especially among those receiving NRT, our findings support future research to examine the independent effects of coaching calls, NRT and mHealth in a sufficiently powered randomized control trial.

FUNDING: Nonprofit grant funding entity

SYM17-2

EXAMINING THE USE OF A VIRTUAL, YOUTH-FOCUSED, E-CIGARETTE CESSATION INTERVENTION COMBINING IN-PERSON CBT WITH ABSTINENCE-CONTINGENT INCENTIVES

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Aim: Rates of use of e-cigarettes among youth are high, and many who use e-cigarettes regularly want to quit using these devices. Yet there are few empirically validated, youth-focused interventions. We conducted a virtual randomized controlled trial for youth e-cigarette cessation that provided Cognitive Behavioral Therapy (CBT) in combination with incentives that were contingent or non-contingent on abstinence. **Methods:** Youth (aged 13-20) who wanted to quit using e-cigarettes and used e-cigarettes regularly (at least 4 days/week; urine cotinine levels > 200 ng/ml) were recruited from local schools in CT and online social media (Snapchat, Instagram, Facebook, TikTok) to participate in a 6-week virtual cessation trial. All participants received 6 remote weekly CBT sessions which started one week prior to their quit date. CBT content was derived from a youth-focused CBT manual and provided by therapists who were trained and supervised weekly. Starting on quit day participants also used an online program (NuRelm, Inc.) to provide salivary cotinine tests every other day for the 1st 2 weeks, then 2x per week for the final 2 weeks, and were randomized to receive incentives that were contingent (salivary cotinine < 30ng/ml) or non-contingent (providing salivary samples) on abstinence. Follow up appointments were conducted at one, three, six, and twelve months after end of the treatment period. The primary outcome was 7-day point-prevalence abstinence at the end of treatment (EOT at six weeks of treatment) based on self-reports and verified biochemically (saliva cotinine < 30 ng/ml). **Results:**



99 participants (47 M, 50 F, 2 non-binary; M=17.6 years old; using e-cigarettes on 6.8 + 0.5 days/week, with a baseline urine cotinine level of M=1348.2+1075.1 ng/mL) were randomized. Randomized starters (n= 92) completed 64% of the required 12 salivary cotinine tests, 83% of the 6 CBT sessions, and 76% provided end of treatment (EOT) outcomes. Biochemically confirmed self-reports of abstinence at EOT are at 38%; results by treatment group will also be presented. To date, 80%, 83%, 88% and 69% of participants have completed one, three, six and twelve month follow up appointments, respectively. Conclusion: Virtual interventions combining CBT and incentives are feasible and effective at reducing e-cigarette use among youth.

FUNDING: Nonprofit grant funding entity

SYM17-3

VIRTUAL REALITY FOR PREVENTION AND CESSATION OF NICOTINE VAPING IN YOUTH

Belinda Borrelli, Daniel Weinstein, Kathleen A. Koval, Kaitlyn A. Konieczny, Lisa Quintiliani, Romano Endrighi. Boston University.

Virtual reality (VR), a computer-generated simulation where one interacts within an artificial, immersive 3D environment, may promote vaping prevention and cessation among teens; it has the 'cool' factor to compete with vapes and provides an engaging way to deliver skills. Our aim is to develop and test a school-based VR program to help high-schoolers avoid or quit vaping. In Phase 1, we used mixed methods to assess methods of vaping cessation and plan intervention content. Survey data (n=185) revealed that 81% had tried to quit >=1 time in their lives. Although 78% of current vapers previously tried to quit unassisted, they were interested in trying evidenced-based methods in the future: only 10% previously used counseling, 3.8% previously used tablet medications and 21% previously used nicotine replacement to stop vaping, but 29.9%, 28.8% and 44% respectively indicated interest in trying these methods in the future. Data from 10 focus groups revealed 4 themes for intervention development: program tone (e.g., avoid teen slang), intervention targets (sadness, anxiety, boredom), structure (tailoring, story, gamification), and content (finding new activities, developing coping strategies). In Phase 2, focus groups were conducted to gather teen preferences on VR genre, content, style, storyline, and games. Interactivity, immersion, a variety of mechanics and experiences, and having an overall story were important themes. In Phase 3, we play-tested prototypes with teens, followed by questionnaires and structured interviews about their experiences. Teens provided feedback on the characters, navigation, aesthetics, environments, and gameplay. In Phase 4, we partnered with three schools to test the game during health classes. Classes will be randomized to receive the VR program vs. assessment only. Outcome measures are satisfaction, feasibility, tolerability, and initial efficacy. The challenges in each phase include co-designing the program with teens in the context of their fast-moving culture; harmonization of different opinions regarding intervention content (which often varied by developmental stage and gender); working with a VR software development company, and human subjects approval. Our study had several successes as well, including ability to pivot based on teen feedback; the high demand from high schools to be part of our project; inclusion of a home-based component to transfer skills to real life, and positive feedback from teens about gameplay.

FUNDING: Nonprofit grant funding entity

SYM17-4

KICK-NIC®: A YOUTH-FOCUSED SMARTPHONE APP TO PROVIDE CBT FOR E-CIGARETTE CESSATION.

Suchitra Krishnan-Sarin, Melissa Gordon, Tami Frankforter, Krysten Bold, Grace Kong. Yale University School of Medicine.

Aim: Youth e-cigarette use is common and there are few interventions to help youth quit. We describe the development and initial testing of a youth-focused smartphone app designed to teach Cognitive Behavioral Therapy (CBT) skills to help youth stop using e-cigarettes. Methods: Focus group evidence (60 youth, 13-20 years old) was used to develop a youth-focused CBT manual for e-cigarette cessation. Qualitative interviews (10 youth who used e-cigarettes) were used to adapt the CBT content into a media-rich app format. Qualitative interviews with youth (n=15) who used the app, and who had recently received in-person CBT based on the CBT manual, examined feasibility and preference. An open label pilot with 10 youth who want to stop using e-cigarettes is testing the feasibility and initial efficacy of the app, when used with text messages and reminders to motivate engagement. Results: Focus groups identified e-cigarette specific content related to reasons for use and quitting, barriers to quitting, and quitting experiences. Qualitative interviews helped with the selection of peer characters, moderators and scripts for the app. The final Kick-Nic® app uses seven digital modules that teach CBT skills such as coping with cravings and withdrawal symptoms, e-cigarette

use refusal, mood management, decision making, and coping with lapses through a) educational narrations provided by moderators, b) role-modeling exercises by peers, and c) animations, quizzes, and other interactive exercises, d) personalized quit tips, plans, and calendar to track vape-free days. Qualitative feedback from 15 youth who used the app indicated that 1) the video vignettes and personalized components were well liked, 2) the length of the modules and time for completion was reasonable, 4) the videos were clear and easily viewed, and 4) the app was a good way to quit vaping and would be recommended to a friend. When queried about comparisons to in-person CBT, participants did not have a clear preference for the delivery format (6 liked in-person, 6 liked the app, 3 liked both equally). Results from the ongoing open-label pilot will be presented. Conclusion: The Kick-Nic® app, developed using rigorous, iterative feedback from youth utilizes a youth-focused, media-rich, interactive format to teach CBT skills to assist with e-cigarette cessation.

FUNDING: Nonprofit grant funding entity

SYM18

COMMUNITY-ENGAGED APPROACHES TO TAILORING TOBACCO CESSATION TREATMENT IN AMERICAN INDIAN AND ALASKA NATIVE PEOPLES

Katrina Claw, PhD. University of Colorado Anschutz Medical Campus.

Improving smoking cessation success among American Indian and Alaska Native (AIAN) peoples is a critical public health goal. Some AI peoples have used traditional tobacco prior to the introduction of commercial tobacco for ceremonial and medicinal purposes. Yet there has been a shift towards commercial tobacco use, in part due to increasing accessibility of commercial tobacco and targeted advertising, and now AIANs have the highest rates of cigarette smoking in the United States and elevated rates of tobacco-related morbidity and mortality. Social, cultural, ethical, and genetic factors are important considerations for successful smoking cessation efforts among AIAN peoples. To ensure that diverse perspectives are included and realize the promise of tailored therapies for tobacco dependence, research and authentic engagement with AIAN tribes and communities is needed. Dr. Claw will describe genetic influences on nicotine metabolism in AI peoples and implications for smoking cessation treatment. Ms. Davies will describe prevalence of smoking and community cessation efforts in an AI population and community perspectives on using pharmacogenetic approaches. Dr. Carroll, and community partners Mr. Pickner and Dr. Stately, will present on asset-based findings from a qualitative study on how to culturally-tailor a smoking cessation resource for AI peoples. Then, Mr. Pickner and Dr. Stately will describe AI peoples' perceptions of and preferences for various pharmacological approaches to cessation, using qualitative and quantitative methods. Drs. Claw and Carroll will chair the session and moderate Q&A with the panel following the presentations. Importantly, community partners from the various studies will be included as part of the session and panel discussion.

SYM18-1

USING NICOTINE METABOLISM TO TAILOR TOBACCO CESSATION TREATMENT IN AMERICAN INDIAN AND ALASKA NATIVE PEOPLE

Katrina G. Claw. University of Colorado Anschutz Medical Campus.

American Indian and Alaska Native (AIAN) people have the highest tobacco use rates in the United States, with 48.4% of AIAN adults vs. 29.2% of white adults reporting smoking in 2012. Smoking is associated with a wide range of chronic disease, including cancer, respiratory, and cardiovascular diseases (CVD). AIAN have higher rates of tobacco-related disease and death compared to other populations. Nicotine, the primary addictive substance in cigarettes, is metabolized predominantly by the enzyme cytochrome P450 2A6 (CYP2A6). Differences in CYP2A6 genotype have been associated with variation in nicotine metabolism, smoking cessation, and lung cancer risk in various populations, with the highest nicotine metabolite ratio (NMR), a biomarker of nicotine metabolism comparing 3-hydroxycotinine to cotinine metabolites, found in AIAN people. Previously, we have shown that CYP2A6 genotype is associated with the biomarker NMR in AN smokers and have identified novel and varied frequencies of common CYP2A6 functional variants. However, inter-ethnic variability of nicotine metabolism exists and may be related to novel genetic loci that contribute to variation in nicotine metabolism. Associations between genome-wide variation, nicotine metabolism, and tobacco-related morbidity and mortality in AI remain understudied. We identify novel genetic influences on nicotine metabolism in AI smokers from a cohort of 12 AI tribes using a genome-wide approach and examine the associations with the nicotine metabolite ratio in AI people. Our central hypothesis is that novel genetic loci and variants are associated with NMR in AI smokers. We predict that rapid metabolizers of nicotine will have unique genotypes and epigenetic markers and that this will correlate with more difficulty quitting smoking

and increased tobacco-related disease risk. Our long-term goal is to use a personalized medicine approach prior to the selection of pharmacotherapy for smoking cessation to improve long-term smoking quit rates in AIAN people who smoke.

FUNDING: Federal

SYM18-2

TOBACCO CESSATION AND PHARMACOGENOMICS RESEARCH WITH AMERICAN INDIAN PEOPLE

Madeline L. Davies. University of Montana.

Significance: Pharmacogenetics (PGx) can be used to tailor treatments to improve health care outcomes and decrease adverse events. Our research focuses on using PGx to personalize treatments for tobacco cessation for American Indian and Alaska Native (AIAN) participants. Nicotine is metabolized by the drug-metabolizing enzyme CYP2A6 and genetic variation in the CYP2A6 gene predicts nicotine exposure and successful cessation. Unfortunately, little is known about variability in nicotine metabolism and CYP2A6 genetic variation in AIAN populations. We aim to improve equitable access to PGx for underserved populations by evaluating perceptions of PGx-guided tobacco cessation for participants of the Confederated Salish and Kootenai Tribes (CSKT) on the Flathead Reservation in Montana. **Methods:** We use community-based participatory research to engage stakeholders at the CSKT including a community advisory board, healthcare providers at the CSKT Tribal Health, and tribal leadership within the CSKT Tribal Council. Through a mixed-methods survey, we assessed participant demographics, current and historical tobacco usage, perspectives on tobacco cessation, PGx knowledge, and perceptions of using PGx to guide tobacco cessation. We facilitated participation through snowball sampling, collaborative co-recruitment efforts, and dissemination of surveys online and in-person. **Results:** We assessed the CSKT community's interest in PGx implementation, potential concerns with PGx implementation research, and identified cultural considerations. Responses reflect a strong interest in using PGx to inform tobacco cessation. Participants also emphasized the significance of ceremonial tobacco as a pivotal part of AIAN culture. Potential barriers to implementation included a lack of knowledge of PGx amongst participants, concerns with returning results to participants in the community, and concerns with storing participant biospecimens. **Conclusion:** Our research will give CSKT Tribal Health providers a useful tool to tailor tobacco cessation in the CSKT community. Significant advances in utilizing genetic variation to guide tobacco cessation will expand the application of PGx; however, it is important to understand the unique considerations for the CSKT community. Our long-term goal is to expand access to PGx research for underserved and tribal populations.

FUNDING: Federal

SYM18-3

AMERICAN INDIAN PERSONS' PERSPECTIVES ON VARIOUS PHARMACOLOGICAL APPROACHES TO SMOKING CESSATION

Dana Mowls Carroll. University of Minnesota.

BACKGROUND: Increasing smoking cessation success among American Indian (AI) persons is a critical public health goal. In this study, qualitative and quantitative methods identified perceptions of and preferences for various approaches to cessation among AI persons. **METHODS:** During 2022, interviews were conducted with AI persons interested in quitting smoking (N=46). The discussion started with questions on quitting without any aid ("cold turkey") and included "What do you think or what have you heard about the cold turkey approach to quitting smoking?" and "How likely would you be to use the "cold turkey" approach to quitting smoking on a scale from very unlikely to very likely?" Questions were repeated for the following: 1) nicotine patches, gum, and lozenges (NRT); 2) prescription cessation medications; 3) plant-based medications; 4) personalized medicine approach; 5) e-cigarettes, and 6) a nicotine reduction standard (NRS) resulting in all cigarettes having 95% less nicotine. Due to the NRS being a policy, intent to use was not ascertained, but rather "How well do you think this approach would work for you to quit smoking?" **RESULTS:** Plant-based medications resulted in the greatest proportion of participants stating they would be likely to use (75%), then NRT (70%), personalized medicine (66%), and cold turkey (56%). Plant-based medications were viewed as holistic, natural, less likely to cause side effects, and aligned with AI cultures. Regarding NRT, many participants talked about positive word-of-mouth, but noted concerns about whether NRT works, price, and side effects. Regarding, personalized medicine, many indicated curiosity, but some noted it would delay treatment, was too extreme to share a biological sample, and/or were concerned about side effects. The most common themes for cold turkey were its drug-free nature and cost savings and some noted it does not address cravings. Regarding the NRS, the majority of participants were supportive, although some were concerned with compensatory

smoking and wondering what else would remain in the cigarettes, and 67% responded that an NRS would "likely" help them quit. Only 38% and 42% of participants reported that they would be "likely" to use e-cigarettes and prescription medications, respectively, to quit. **CONCLUSIONS:** The results can inform tribal, national, and state public health programming and communication efforts to increase smoking cessation among AI persons and move the needle on health equity.

FUNDING: Federal

SYM18-4

AMERICAN INDIAN PERSPECTIVES ON CULTURALLY ALIGNING A DIGITAL SMOKING CESSATION RESOURCE

Wyatt Pickner. American Indian Cancer Foundation.

BACKGROUND: Innovative smoking cessation approaches that overcome barriers such as traveling to program site or that require the staff and infrastructure for sustaining are likely needed to improve smoking quit rates among American Indian (AI) peoples in the U.S. In this study, qualitative methods identified recommendations from AI peoples to guide alignment of an evidence-based smoking cessation smartphone app (i.e., the National Cancer Institute's QuitGuide) to the culture and needs of AI persons. **METHODS:** Semi-structured interviews were conducted with AI adults who smoke (n=40) and with public health professionals (n=6). Questions included: "The app asks if something triggered you to slip and lists several options. What options were you expecting to see on this list?" as well as how to make the app more engaging such as "What would make the app more helpful for AI peoples, like you, who want to quit smoking?". Constant comparative techniques were used to develop codes and themes. **RESULTS:** Loss, grief, and not accessing traditional tobacco were put forward as smoking triggers to be addressed in the app. Features that help users connect with and learn about AI cultures and promote healing, such as encouraging traditional tobacco use, being in community, embracing Native spirituality, and participating in cultural crafting were recommended. Some noted the need to motivate AI peoples to think about legacy and ability to care for younger generations and Indigenizing the app with Native imagery. **CONCLUSIONS:** Themes pointed towards promotion of strengths-based factors, such as healing, cultural connectedness and traditional tobacco use, in the app. Results will be used to culturally align a smartphone app for smoking cessation among AI peoples and may be insightful for other tribal, federal, and state public health efforts aimed at advancing health equity for AI peoples.

FUNDING: Federal

SYM19

PROGRESS, GAPS, AND CHALLENGES TO POLICY ADOPTION AND IMPLEMENTATION OF THE WORLD HEALTH ORGANIZATION (WHO) FRAMEWORK CONVENTION ON TOBACCO CONTROL (FCTC) IN THE WHO AFRICAN REGION

Caroline Fuss, MPH. Campaign for Tobacco Free Kids.

The African Region (AFRO) currently has the lowest smoking prevalence of all WHO regions. However, increasing rates of tobacco use and rapid population growth in AFRO is predicted to result in the largest prevalence increase of tobacco smoking by 2030 (based on 2010 prevalence) compared to all WHO regions. Key factors contributing to the projected increase include multinational tobacco companies' aggressive marketing, investment, interference, and emerging tobacco and nicotine products launches in AFRO. To combat tobacco use globally, the WHO FCTC and its Implementing Guidelines set standards and provide a legal framework for parties to regulate the marketing, distribution, and sale of tobacco products. Of the 47 countries in AFRO, 44 are party to the WHO FCTC, yet adoption of policies in accordance with the WHO FCTC is varied, and their implementation and enforcement even more so. Countries like Mauritius—one of four countries globally, and the first country in AFRO, to reach best-practice levels of MPOWER, as measured by the WHO's 2023 Report on the Global Tobacco Epidemic—set the gold standard for tobacco control policy in the region. However, as of December 2022, less than half of countries in AFRO had adopted best-practice policies for key MPOWER measures, including: 12/47 countries with comprehensive smoke-free policies; 15/47 with comprehensive health warning label (HWLs) policies; and 22/47 with comprehensive ban on tobacco advertising, promotion, and sponsorship (TAPS) policies. This symposium will cover progress, gaps, facilitators/barriers, and challenges in tobacco control policy adoption and implementation in AFRO, and will include: an overview on adoption of the main tobacco control policies in AFRO; a case-study on the adoption of Ethiopia's comprehensive tobacco control law and identification of barriers/facilitators to adoption; an overview of TAPS observed in South Africa at points-



of-sale located near primary and secondary schools; a mixed methods study exploring young adults' exposure to advertising, and promotion of e-cigarettes in South Africa; a qualitative analysis of national bans on menthol cigarettes and the policy processes, barriers/facilitators to adoption, and lessons learned in Ethiopia, Nigeria, Senegal, and Uganda; and a comparative secondary analysis of best-practice HWL policies in AFRO that ranks countries and sub-regions based on HWL features, and documents progress in adoption of HWL policies.

SYM19-1

EXAMINING ADOPTION AND IMPLEMENTATION OF MENTHOL CIGARETTE BANS IN FOUR AFRICAN COUNTRIES

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Significance: Four African countries were among the first globally to adopt and implement a national ban on menthol cigarettes. Ethiopia was the first (2015), followed by Senegal (2017), Uganda (2019), and Nigeria (2020). However, little is known about what facilitated adoption and how these policies are being implemented. This study examined adoption and implementation (including compliance procedures) of menthol cigarette bans in Ethiopia, Nigeria, Senegal, and Uganda. **Methods:** One author (CK) conducted semi-structured interviews with stakeholders from non-governmental organisations with expertise/involvement in their country's menthol cigarette ban (Ethiopia n=1, Nigeria n=1, Senegal n=1, and Uganda n=2). Participants were asked about policy processes, any barriers and facilitators, and lessons learned. Using inductive thematic analysis, relevant concepts and themes were developed. Transcripts were coded using NVivo. The interviews and analysis were guided by theoretical concepts from implementation science and policy analysis frameworks. **Results:** The definition of 'flavour' varied by country—'characterising flavour' (Ethiopia, Nigeria), 'any aromatic agent or characteristic aromatic agent' (Senegal), and 'flavoured' (Uganda). Key factors that were perceived by stakeholders to influence both policy adoption and implementation included: partnerships and relationships from multiple sectors, dedicated technical assistance and capacity building, political will, civil society mobilisation, role of research evidence, diverse policy champions, the media, and tobacco industry interference. Compliance procedures primarily entailed market surveillance, including monitoring of industry-submitted ingredients data, and manufacturer and retailer spot checks. Laboratory testing of products was reported to not be carried out due to the lack of infrastructure and/or capacity. Participants highlighted the importance of training policymakers and the media to prepare for industry counterarguments, having policy champions within both civil society and government, and having comprehensive legislation with clear definitions. **Conclusions:** The experiences of Ethiopia, Nigeria, Senegal, and Uganda in adopting and implementing a national menthol cigarette ban policy can support other countries, particularly other low- and middle-income countries in taking measures to ban products known to facilitate smoking initiation and progression to regular tobacco use.

FUNDING: Academic Institution

SYM19-2

TOBACCO ADVERTISING, PROMOTION AND SPONSORSHIP AND PRODUCT AND FLAVOR AVAILABILITY AT POINTS-OF-SALE NEAR PRIMARY AND SECONDARY SCHOOLS IN SOUTH AFRICA

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Significance: South Africa (SA) is a Party to the WHO Framework Convention on Tobacco Control (FCTC) but its current national tobacco control law does not fulfill its obligations under the treaty (tobacco advertising, promotion and sponsorship [TAPS] bans are not comprehensive and do not apply to emerging tobacco and nicotine products like e-cigarettes). South Africa's Tobacco Products and Electronic Delivery Systems Control Bill aims to align SA with its obligations under the WHO FCTC and is currently being discussed in parliamentary public hearings. The goal of this study was to assess availability of products, TAPS, and flavor availability observed at points-of-sale (POS) near schools in SA. **Methods:** Data collectors observed all POS selling at least 1 tobacco or nicotine product within a 300 meter radius of pre-identified primary and secondary schools in SA. Following a 3-day data collection training, data collectors completed an

electronic survey form (questions included product availability, presence of TAPS, etc.). Data collection was completed from Jan.-Feb. 2023, and took place in 6 cities located in 3 provinces in SA (Cape Town, Durban, Johannesburg, Pietermaritzburg, Pretoria, Stellenbosch). Data collectors worked in pairs and collected data around ~50 schools per city; data was collected at 409 POS. **Results:** Products observed included: snuff (observed at 37.7% POS), hookah (30.3%), e-cigarettes (24.9%), cut tobacco for hand-rolled cigarettes (20.3%), cigars (18.6%), pipe tobacco (14.7%), snus (7.1%) heated tobacco (15.9%), oral nicotine pouches (ONPs) (5.9%). Tobacco and/or nicotine products were displayed at the eye level of a child in 68.2% of the POS observed, near candy/sweets at 53.6%, and part of a branded display at 50.6%. Marketing tactics for tobacco and/or nicotine products included: illuminated displays (24.5% of POS observed), posters (15.7%), billboards (2.9%), and LCD screens (2.7%). Flavored cigarettes were observed at 68.2% of the POS observed; fruit was the most observed flavor for ONPs and menthol for heated tobacco and e-cigarettes. **Conclusions:** South Africa's Tobacco Products and Electronic Delivery Systems Control Bill should be adopted to close TAPS loopholes in the current law, extend regulatory authority to the Ministry of Health to adopt flavor restrictions and/or bans, regulate emerging products like e-cigarettes and ONPs as tobacco products, and prohibit the sale of these products in certain locations (near schools).

FUNDING: Nonprofit grant funding entity

SYM19-3

POLITICAL WILL AND SUSTAINED HEALTH ADVOCACY EFFORTS: ETHIOPIA'S COLLABORATIVE EFFORTS TO ADOPT AND IMPLEMENT A STRONG TOBACCO CONTROL LAW

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Significance: To understand how Ethiopia adopted and implemented a WHO Framework Convention on Tobacco Control (FCTC) based tobacco control law. **Methods:** We analyzed publicly available documents including news media articles, advocacy reports, and government documents. We triangulated these findings by interviewing 12 key stakeholders. We applied the Policy Dystopia Model to analyze key industry and health advocacy actions and arguments. **Results:** In 2017, the Ethiopian government with the support of local and international health advocates, introduced a FCTC-based bill. Key industry opposition included attempting to participate in the drafting process, bringing tobacco farmers to testify in parliament, and signing a voluntary illicit trade agreement with government while arguing the bill would harm businesses, violate international treaties, and increase illicit trade. Key health advocacy support included providing legal advice for drafting the bill, participating in media advocacy to build public awareness, educating policymakers on the effects of smoking, and highlighting industry deceptive tactics. These efforts led to the Ethiopian government adopting a FCTC-based law in 2019 that establishes 100% smoke-free environments, bans tobacco advertising, mandates large pictorial health warning labels (HWLs), among others. Implementation of smoke-free environments and pictorial HWLs have been strong but a lack of financial and human resources and structural capacity limitations at the state and local level have limited implementation and enforcement efforts. **Conclusion:** Strong local health advocacy efforts supported by international technical and financial assistance can help establish strong FCTC-based tobacco control laws. More resources and state capacity efforts are needed to strengthen implementation efforts.

FUNDING: Nonprofit grant funding entity

SYM19-4

MARKETING, ADVERTISING AND PROMOTION OF ELECTRONIC CIGARETTES DURING A REGULATORY VACUUM IN SOUTH AFRICA

Catherine O. Egbe¹, Siphesihle Gwambe, Lungile Mavundla, Philile Makunga, Ngokwana Rachamose, Mukhethwa Londani. South African Medical Research Council.

Significance: Article 13 of the WHO Framework Convention on Tobacco Control (FCTC) and its implementing Guidelines require parties to adopt and enforce a comprehensive ban on tobacco advertising, promotion and sponsorship (TAPS). The WHO has determined that countries should ensure their tobacco control laws also regulate all forms of emerging tobacco and nicotine products like e-cigarettes. This guidance is consistent with obligations of the WHO FCTC and its Conference of the Parties (COP) decision on e-cigarettes. Currently, South Africa's (SA) tobacco control law does not cover TAPS bans for e-cigarettes. This study explored young adults' exposure to marketing, advertisement, and promotion of e-cigarettes. **Methodology:** This mixed methods study included a cross-sectional survey with a nationally representative sample of



2953 undergraduate students (aged 18-24) from 15 public universities located in all 9 provinces in SA, and 17 qualitative interviews with students who use e-cigarettes from 3 public universities located in 3 metro provinces in SA. Survey data were analyzed using STATA v.17. Interviews were transcribed and analyzed using thematic analysis with NVivo 14. Results: About 74% (n=2130) of students reported noticing marketing, advertisement, or promotion of e-cigarettes in the last 30 days. Three themes emerged from the qualitative phase of the study: location of e-cigarette shops, advertising and promotional practices, and participants' perception about regulation of e-cigarettes in SA. Exposure to advertising and promotion of e-cigarettes occurred through billboards, posters around university campuses, social media, at points-of-sale in grocery shops, and at kiosks and retail shops in shopping malls. Participants also mentioned being offered samples of e-cigarettes to try. Most of these marketing activities are banned for tobacco products in SA. On their perception about the regulation of e-cigarettes, participants expressed worry over the easy accessibility of e-cigarettes especially to minors, lack of age verification, and lack of information about the harms these products could cause. Conclusion: Young adults in SA are experiencing high levels of exposure to marketing, advertisement, and promotion of e-cigarettes. South Africa's Tobacco Products and Electronic Delivery Systems Control Bill should be adopted to align itself with the WHO FCTC, its Guidelines for implementation, and the WHO FCTC COP decision on e-cigarettes.

FUNDING: Nonprofit grant funding entity

SYM19-5

TOBACCO PACKAGING AND LABELING POLICIES IN THE WHO AFRICAN REGION: PROGRESS 15 YEARS AFTER ADOPTION OF THE WHO FRAMEWORK CONVENTION ON TOBACCO CONTROL ARTICLE 11 IMPLEMENTATION GUIDELINES

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Significance: Tobacco users in the WHO African Region (AFRO) are increasing; the WHO projects the number of adult smokers to increase by 3 million by 2025. Tobacco packaging and labeling policies aligned with the WHO FCTC Article 11 are proven to reduce tobacco consumption. We evaluated tobacco packaging and labeling policies based on Article 11 of the WHO FCTC and its Implementation Guidelines in AFRO as of June 2023. We identified trends, successes, and gaps in tobacco product packaging and labeling policies and provide recommendations to further align countries' policies with WHO FCTC Article 11 and its Guidelines. Methods: We reviewed tobacco packaging and labeling policies adopted in AFRO from the Campaign for Tobacco-Free Kids' International Legal Consortium's Tobacco Control Laws database. We assessed policies based on Article 11 of the WHO FCTC and its Guidelines by examining 3 sub-policy areas: health warning labels (HWLs), descriptive constituents and emissions information, and misleading packaging and labeling. We developed a scoring system to rank packaging and labeling policies among all sub-regions and countries in AFRO and documented progress in HWL policy adoption from 1985-2023. Results: Of the 47 countries, 39 have adopted national laws. A majority have adopted pictorial HWLs (25); 34 require HWLs to be printed on the front and back of smoked tobacco packaging and 12 countries require 70% coverage of the principal display area. Benin and Mauritius have the largest HWLs in the region (90%). Thirty-one countries have banned misleading brand descriptors, and 26 have banned figures, colors, and other signs on packaging. Cote d'Ivoire and Mauritius are the only countries that have adopted standardized packaging. The East African sub-region scored highest for best-practice HWL policies, followed by Western, Northern, Central, and Southern sub-regions. Mauritius, Ghana, Mauritania, Chad, and Namibia scored the highest in each sub-region, respectively. Before approval of the WHO FCTC Article 11 Implementation Guidelines (Nov. 2008), 23 countries adopted text-only HWLs, whereas 24 adopted pictorial HWLs following their release. Conclusion: Several AFRO countries have adopted tobacco packaging and labeling policies that align with WHO FCTC Article 11 Guidelines. Increased efforts should be directed toward the Southern sub-region to improve national HWL policies, as well as increase dissemination of standardized packaging throughout AFRO.

FUNDING: Nonprofit grant funding entity

SYM20

EXPLORING THE INFLUENCE OF NICOTINE FLUX AND NICOTINE FORM ON SUBJECTIVE, BEHAVIORAL, AND PHYSIOLOGICAL EFFECTS OF ELECTRONIC CIGARETTE USERS

Soha Talih. American University of Beirut.

Factors that affect chemosensory cues can influence user puffing behavior, nicotine delivery, and thus, dependence on electronic nicotine delivery systems (ENDS). These factors include nicotine flux, the rate at which ENDS emit nicotine (in µg/sec), and nicotine form (protonated or freebase). Because ENDS are popular among youth, especially pod-system ENDS that generally contain protonated nicotine liquids and emit a relatively high nicotine flux, understanding how these factors influence chemosensory cues, patterns of use, and nicotine delivery can help regulators design strategies that use flux and form to limit the use of ENDS among youth and to provide an alternative for smokers. In this symposium, we present data from a comprehensive set of studies aimed at assessing the influence of nicotine form and flux on chemosensory cues and nicotine delivery from ENDS. Drs. Shihadeh and Talih will chair this session and provide opening remarks to set the context for the panel. Ms. Bono will present data on the influence of increasing nicotine flux with protonated nicotine on taste and harshness and the potential for abuse evaluated through a progressive ratio task. Dr. Talih will present data on the influence of nicotine form and flux on puffing topography and mouth-level exposure to nicotine - an indicator of nicotine delivery. Shifting the focus to pharmacokinetics, Ms. McKinney will present findings on the influence of nicotine flux and form on the rate of nicotine delivery to the blood, a determinant for nicotine dependence. Additionally, Mr. Mysirlidis will bridge the pharmacokinetics with subjective measures, exploring the connection between nicotine delivery characteristics and perceived harshness. Dr. El-Hourani will subsequently offer a theoretical explanation of the previous findings and will describe predictors of throat harshness from ENDS by using a physics-based mathematical model that predicts nicotine deposition in the throat region. Finally, Dr. Shihadeh will discuss the implications of the findings for potential future regulatory strategies that revolve around nicotine flux and nicotine form.

SYM20-1

EFFECT OF NICOTINE FORM AND NICOTINE FLUX ON PUFFING TOPOGRAPHY AND MOUTH-LEVEL EXPOSURE TO NICOTINE FROM ELECTRONIC NICOTINE DELIVERY SYSTEMS

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Nicotine form (freebase/protonated) and nicotine flux, the rate at which nicotine is emitted, are two factors that can affect the dose of nicotine inhaled by users of electronic nicotine delivery systems (ENDS) because they can influence puffing behavior. Nicotine dose per puff is also directly proportional to nicotine flux (i.e., dose=nicotine flux*puff duration). This study examines the effect of nicotine form and flux on puffing parameters and mouth-level nicotine exposure. Thirty-two dual ENDS and combustible cigarette users (target enrollment: N=130) completed five visits that differed by nicotine form (freebase or protonated) and nicotine flux (14 or 35µg/sec); a zero-nicotine condition was a negative control. Participants used a Subox Mini C ENDS, powered at 20W, during a 10-puff directed bout (B1) followed by a one-hour ad libitum bout (B2). Puffing parameters and mouth-level exposure to nicotine were assessed using the American University of Beirut REALTIME instrument. Linear mixed models were used to examine the associations of nicotine form and flux with puffing parameters, liquid consumed, and mouth-level exposure to nicotine. Relative to protonated nicotine, freebase nicotine was associated with lower puffing time, lower flow rate in B1, lower liquid consumption, and lower mouth-level nicotine exposure. Increasing nicotine flux from 14 to 35µg/sec was associated with lower puffing time in both bouts, as well as lower liquid consumption. Increasing nicotine flux was associated with higher mouth-level nicotine exposure in B1 only. ENDS with protonated nicotine may enhance nicotine exposure by promoting longer puffing and thus greater dose delivered. Policymakers interested in controlling ENDS user nicotine exposure may consider puff duration limits for ENDS devices and/or regulating the amount of protonated nicotine in ENDS liquids.

FUNDING: Federal

SYM20-2

EFFECTS OF PUFF TOPOGRAPHY, NICOTINE PROTONATION, LIQUID COMPOSITION, AND ELECTRICAL POWER ON AIRWAY NICOTINE ABSORPTION AND PERCEIVED HARSHNESS OF ENDS: MATHEMATICAL MODEL VS CLINICAL DATA

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For decades, the tobacco industry has manipulated the sensory characteristics of tobacco products including the degree of harshness experienced at the back of the throat. Commonly referred to as "throat hit", this harshness derives from absorption of gas-phase nicotine by the sensory nerves. Over time, users learn to associate throat hit with the positive psychological effects of nicotine, making throat hit a secondary reinforcer for smoking. On the other hand, throat hit can make products aversive to nicotine naïve users and can mediate inhalation patterns. In recent years, ENDS manufacturers have increased nicotine content and lowered the freebase nicotine fraction of their products, making products that can deliver a high nicotine dose with relatively low harshness. In this study we developed a simplified computational model of the heat and mass transfer processes for a nicotine-containing aerosol generated by an ENDS device of given power and liquid composition flowing through the mouth and throat. Simulations showed that nicotine vapor absorption in the upper airways was driven by changes in the gas phase concentration and mass transfer coefficient of nicotine along the airway. These changes are the net outcome of various competing parameters that vary with ENDS power, liquid composition, and user puffing behavior. We compared computed nicotine absorption in the throat to reported subjective effects from previous clinical studies conducted by our group. Across various ENDS configurations, we found that computed nicotine absorption in the upper airways strongly predicted subjective harshness scores ($r=0.62$; $p<0.00001$). This finding indicates the feasibility of mathematically predicting throat hit from device and liquid characteristics, and facilitates making ENDS throat hit a regulatory target, e.g., to reduce product appeal to prospective nicotine naïve users.

FUNDING: Federal

SYM20-3

INFLUENCE OF NICOTINE FLUX ON ELECTRONIC NICOTINE DELIVERY SYSTEM ABUSE LIABILITY AMONG PEOPLE WHO SMOKE CIGARETTES

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Product standards that seek to limit the abuse liability of electronic nicotine delivery systems (ENDS) may focus on nicotine flux (i.e., nicotine emitted per second). In this clinical laboratory study, we examined the influence of nicotine flux on ENDS abuse liability among a sample of people who smoke cigarettes. Participants were adults who smoked cigarettes ($n=32$). Across five clinical laboratory sessions, participants evaluated four unflavored, protonated nicotine ENDS differing in nicotine flux and own-brand (OB) cigarettes. To manipulate nicotine flux, ENDS wattage (30W) and puff duration (2s) were kept constant while nicotine content varied (0µg/s [no flux], 36µg/s [low flux], 90µg/s [cigarette-like flux], 180µg/s [high flux]). Outcomes included behavioral measures of abuse liability (progressive ratio task and cross-price purchase task) and subjective effects (Minnesota Nicotine Withdrawal Scale and Direct Effects of Vaping Questionnaire items measured on 0-100 visual analog and sensation intensity and liking items measured on labeled magnitude scales, one-hour post-sampling). Differences between conditions were assessed with linear mixed models. In the progressive ratio task, participants worked for significantly more puffs of the no flux (mean 7.7 [standard deviation 3.5]) and low flux (7.9 [3.4]) ENDS than the high flux ENDS (6.3 [4.4]). All four ENDS fluxes would serve as substitutes for OB cigarettes, but the substitution effect was stronger for no flux compared to high flux ENDS ($p<0.05$). Post-use cigarette cravings and urges to smoke a cigarette were lowest in the high flux ENDS. However, high flux ENDS were associated with lower ratings of 'tastes good' and 'pleasant' than other ENDS, and were associated with the highest ratings of harshness/irritancy and throat hit of any condition. High nicotine flux ENDS appear to have lower abuse liability than OB cigarettes, no flux ENDS, and low flux ENDS, with fewer puffs, reduced substitution potential, worst taste, and increased harshness. However, the high flux ENDS reduced cigarette cravings similarly to OB cigarettes. ENDS product standards that seek to encourage transitioning from cigarettes must balance nicotine delivery, withdrawal

relief, and aversiveness associated with high nicotine flux. Looking ahead, future studies should integrate abuse liability assessments with monitored naturalistic use to better understand how nicotine flux of ENDS influences substitution among cigarette smokers.

FUNDING: Federal

SYM20-4

INVESTIGATING THE INFLUENCE OF NICOTINE FLUX AND NICOTINE FORM ON E-CIGARETTE USERS FOLLOWING ACUTE VAPING: PART 1 - NICOTINE DELIVERY

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Nicotine flux, the rate at which a tobacco product emits nicotine, is a potentially powerful regulatory tool. Flux represents the potential speed at which nicotine can reach the brain and it can be predicted mathematically. However, empirical evidence linking flux to blood nicotine delivery doesn't exist. This study addresses this knowledge gap, specifically for e-cigarettes (EC). In this study, participants used a Subox Mini C EC, powered at 20W and filled with 30/70 PG/VG liquid, during two lab visits that differed by nicotine form (protonated/freebase). During each visit, participants drew three 3-second puffs with four randomly ordered nicotine fluxes (9, 18, 27, and 35 µg/sec). Puff duration was fixed using the American University of Beirut LabVape instrument. Arterial blood samples were drawn at baseline, 5, 15, and 25 seconds after each puff, and 60 seconds after the last puff. These samples were processed for serum nicotine level, and nicotine pharmacokinetics were analyzed. Eight participants completed a total of 11 lab sessions (target enrollment: $n = 15$). The average delta Cmax from baseline for protonated nicotine was 4.6 (SD = 1.3) ng/ml for the lowest flux and 28.1 (SD = 10.2) ng/mL for the highest flux, and 2.5 (1.2) ng/mL and 6.1 (3.9) ng/mL for freebase nicotine. The average Tmax was similar in the highest flux conditions for both forms (120 seconds) and varied somewhat across the lowest flux conditions (79-140 seconds). Within participants, higher flux reliably led to higher nicotine delivery after vaping protonated e-liquids, but not freebase e-liquids. This study is the first to investigate the influence of nicotine flux and form on arterial blood nicotine delivery from EC. The preliminary data suggest that increasing nicotine flux results in higher nicotine delivery to EC users when using protonated e-liquids, but not consistently for freebase e-liquids. For a given flux administered within participants, protonated e-liquids deliver nicotine to the blood faster and in higher amounts after 3 puffs as compared with freebase e-liquids. Nicotine flux and e-liquid pH are important determinants of nicotine delivery from e-cigarettes.

FUNDING: Federal

SYM20-5

INVESTIGATING THE INFLUENCE OF NICOTINE FLUX AND NICOTINE FORM ON E-CIGARETTE USERS FOLLOWING ACUTE VAPING: PART 2 - SUBJECTIVE EFFECTS

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Background: Nicotine flux is the rate at which a tobacco product emits nicotine. Nicotine form refers to either protonated or free-base nicotine. Both flux and form may have an impact on subjective effects and in turn, can affect nicotine delivery and the addictive potential of e-cigarettes (EC). We sought to understand how nicotine flux and form relate to subjective effects and nicotine delivery in human EC users. Methods: Participants used a Subox Mini C EC, powered at 20W and filled with 30/70 PG/VG liquid, during two lab visits that differed by nicotine form (protonated/freebase). During each visit, participants drew three 3-second puffs with four randomly ordered nicotine fluxes (9, 18, 27, and 35 µg/sec). Puff duration was fixed using the American University of Beirut LabVape instrument. Arterial blood samples were drawn at baseline; 5, 15, and 25 seconds after each puff; and 60 seconds after the last puff. Samples were processed for serum nicotine level. Subjective effects were measured using the drug effects questionnaire and modified e-cigarette specific effects questionnaire. Results: Eight (8) participants completed a total of 11 lab sessions (target enrollment: $n = 15$). Mean (SD) harshness (1-7; lowest to highest) was 5.6 (1.0) in high flux/freebase, 3.6 (1.1) in high flux/protonated, 3.3 (1.0) in low flux/free-base, and 2.6 (1.5) in low flux/protonat-

ed. In the high flux conditions, liking (0-100; most disliked to most liked) was higher in protonated [70 (22)] compared with free base [28 (40)]. In the low flux conditions, liking was similar in protonated [26 (36)] and freebase conditions [27(36)]. For the highest flux, the correlation between Cmax and harshness varied markedly by nicotine form (freebase: $r = -0.41$; protonated: $r = 0.79$). This same reverse correlation pattern was noted when examining the relationship between Cmax and harshness in the lowest flux condition (freebase: $r = -0.30$; protonated: $r = 0.32$). Conclusions: Nicotine flux and form are important determinants of subjective effects and nicotine delivery from EC. At high flux, freebase nicotine was perceived as harsher than protonated nicotine. The correlational relationships between nicotine delivery and harshness in free-base and protonated e-liquids were reversed, suggesting that harshness may be an important mechanism limiting nicotine delivery from freebase e-liquids but not protonated e-liquids across the fluxes administered.

FUNDING: Federal

SYM21

ADVANCES IN NEUROMODULATION RESEARCH INTO CIGARETTE SMOKING AND CESSATION

Nicole Petersen. University of California.

This symposium brings together a collection of studies that explore the innovative application of transcranial magnetic stimulation (TMS) as a potential intervention for Tobacco Use Disorder. While each study has distinct objectives and methodologies, they collectively shed light on shared themes and unique approaches in utilizing TMS for addressing nicotine dependence. All studies underscore the central role of modulating specific neural circuits in the treatment of substance use disorders. TMS serves as a promising tool to target and influence these circuits, offering a novel approach to disrupt addictive behaviors. The symposium highlights the importance of tailoring TMS interventions to the specific needs of the population under investigation. A common thread across the studies is the exploration of cognitive processes and craving in the context of addiction. TMS interventions are examined for their potential to modulate these factors, thereby impacting substance use behaviors. The symposium features studies that employ a comprehensive assessment of outcomes, ranging from smoking behavior and craving to cognitive skill acquisition and participant burden. These varied assessments provide a holistic view of the effects and potential limitations of TMS interventions. In converging on the theme of neural circuit modulation while embracing diverse methodologies, this symposium reflects a dynamic landscape of TMS research for substance use disorders. These studies collectively emphasize the potential of TMS as a targeted and adaptable intervention strategy, offering avenues for future exploration, optimization, and expansion of TMS protocols in the realm of addiction treatment.

SYM21-1

ADVANCES IN NEUROMODULATION RESEARCH INTO CIGARETTE SMOKING AND CESSATION

Nicole Petersen. Semel Institute, UCLA.

This symposium brings together a collection of studies that explore the innovative application of transcranial magnetic stimulation (TMS) as a potential intervention for Tobacco Use Disorder. While each study has distinct objectives and methodologies, they collectively shed light on shared themes and unique approaches in utilizing TMS for addressing nicotine dependence. All studies underscore the central role of modulating specific psychological mechanisms and/or neural circuits in the treatment of substance use disorders. TMS serves as a promising tool to target and influence these mechanisms of change, offering a novel approach to disrupt addictive behaviors. The symposium highlights the importance of tailoring TMS interventions to the specific needs of the population under investigation by exploring treatments in unique and underserved populations, including individuals with comorbid opiate use disorder and (separately) individuals with schizophrenia. A common thread across the studies is the exploration of cognitive processes and craving in the context of addiction. TMS interventions are examined for their potential to modulate these factors, thereby impacting substance use behaviors. The symposium features studies that employ a comprehensive assessment of outcomes, ranging from smoking behavior and craving to cognitive skill acquisition and participant burden. These varied assessments provide a high-level view of the effects and potential limitations of TMS interventions. In converging on the theme of neural circuit modulation while embracing diverse methodologies, this symposium reflects a dynamic landscape of TMS research for substance use disorders. These studies

collectively emphasize the potential of TMS as a targeted and adaptable intervention strategy, offering avenues for future exploration, optimization, and expansion of TMS protocols in the realm of addiction treatment.

FUNDING: No external funding reported

SYM21-2

EFFECTS OF TMS TO MEDIAL PREFRONTAL CORTEX ON CIGARETTE SMOKING CESSATION:

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Significance: Transcranial magnetic stimulation (TMS) modulates brain circuits and has shown promise for the treatment of tobacco use disorder. Most previous investigations have targeted the dorsolateral prefrontal cortex. However, the medial prefrontal cortex (mPFC) connects with a brain network that extends into the insula and anterior cingulate cortex, which has been implicated in tobacco addiction and smoking cessation. We conducted a randomized, controlled trial on the effects of TMS to the mPFC for smoking cessation. Methods: Participants ($n = 38$) were adults who smoked at least 10 cigarettes per day (CPD) and wanted to quit smoking. Participants were randomized to active or sham TMS (2:1 ratio), delivered using a figure 8 coil over the mPFC (EEG site AFz). The TMS sequence was intermittent theta burst stimulation delivered at 110% resting motor threshold. Participants received 2 sessions of 600 pulses (interrupted by a 15 min rest period) per day, for 10 days (spread across 3-4 weeks). In addition, participants received TMS at 4 weekly follow-up sessions. Participants were asked to make a quit attempt on the 6th TMS session. Generalized estimating equations analyzed the effects of time, TMS group, and the time x group interaction on CPD, urine cotinine, smoking urges, tobacco withdrawal symptoms, and nicotine severity across time. Results: Active and sham groups did not differ in terms of sex, race, ethnicity, age, years of education, or the number of completed sessions. CPD decreased over time ($\beta = -0.12$, $p = 0.015$), but group and time x group effects were not significant. The active TMS group trended towards higher cotinine levels ($\beta = 739.14$, $p = 0.095$), but time and time x group effects were not significant. Smoking urges decreased over time ($\beta = -0.16$, $p = 0.002$), and the active TMS group trended towards greater smoking urges ($\beta = 5.81$, $p = 0.058$), but time x group was not significant. There were no significant effects on tobacco withdrawal or nicotine severity. Four people in the active group and 2 in the sham group had quit smoking by the end of their participation period (7-day point prevalence). Conclusions: While the small sample may have precluded significant effects on smoking-related outcomes, this study is part of a growing field on the use of TMS for substance use disorders and provides useful information regarding TMS sequence and targeting.

FUNDING: Federal

SYM21-3

A SCHIZOPHRENIA-SPECIFIC, NETWORK-TARGETED NEUROMODULATION INTERVENTION AFFECTS CRAVING IN INDIVIDUALS WITH SCHIZOPHRENIA AND NICOTINE DEPENDENCE

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Significance: The prevalence of tobacco use in schizophrenia (SZ) is 3-times that of the general population. Yet, treatments for nicotine dependence are significantly less effective for SZ and do not target SZ-specific pathophysiology. We sought to identify and test a neuromodulation intervention on a SZ-specific circuit of nicotine dependence. Methods: This study consisted of 3 phases: Network Discovery, Network Validation, and Network-Targeted Intervention. In Network Discovery, we used a data-driven, multi-variate pattern analysis of whole-connectome data from 35 smokers (18 SZ, 17 controls) to identify the strongest links between daily cigarette use and functional connectivity. In Network Validation, 24 participants (12 SZ, 12 control) participated in a placebo-controlled crossover study of nicotine patch with fMRI. Based on Network Discovery results, we correlated Default Mode Network (DMN) connectivity change with nicotine patch dose. In Network-Targeted Intervention, 10 people with SZ and nicotine dependence participated in a crossover study of DMN-targeted repetitive transcranial magnetic stimulation (rTMS) with fMRI and craving assessment immediately before and after each rTMS session. rTMS was targeted to the left parietal node of an individual-specific DMN map for 3 sessions: intermittent theta burst stimulation (iTBS), continuous theta burst stimulation (cTBS), sham. We compared craving change between each rTMS type using a mixed ANOVA. Results: In Network Discovery, the strongest ($p < .001$) correlate between functional connectivity and daily cigarette use was driven by individual variation in DMN topography specific to SZ. With higher cigarette use in SZ, the DMN was pathologically expanded. In Network Validation, nicotine administration reversed DMN hyperconnectivity in SZ in a dose-dependent relationship ($R = -0.50$, $p < .05$). In Net-



work-Targeted Intervention, we observed a treatment x time relationship ($p=.017$) where craving was increased by iTBS but not by cTBS or sham. Conclusions: We identified a SZ-specific network of nicotine dependence, validated the effect of acute nicotine on that network, then applied a neuromodulation intervention to that network that affected craving in SZ. This is the first evidence for a circuit-based intervention for substance use in SZ that was empirically derived, unique to SZ, and affected clinical outcomes.

FUNDING: Federal; Academic Institution; Nonprofit grant funding entity

SYM21-4

ACCELERATED THETA BURST STIMULATION TO MODULATE CIGARETTE CRAVING AND CIGARETTE-CUE ATTENTIONAL BIAS IN PEOPLE WITH OPIOID USE DISORDER WHO SMOKE

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Background. People with opioid use disorder (OUD) smoke at four times the rate in the general population. Smoking in OUD leads to premature mortality, decreased quality of life and poor response to smoking cessation strategies. Hence there is a pertinent need for novel adjunct therapies to address smoking in OUD. Neuromodulation is a suitable adjunct treatment modality, especially since deep TMS is FDA approved for smoking cessation in people without OUD. Although there have been TMS studies that decreased cigarette craving and smoking cessation in people without other comorbid substance use disorders, there have been no TMS studies in people with OUD. Unlike routine TMS paradigms, theta burst stimulation is an efficient TMS paradigm that is optimal for inducing neuroplasticity in brain circuits as shown by multiple landmark studies in major depressive disorder (MDD). Cigarette craving and cigarette-cue attentional bias are suitable proximal outcome measures that can reliably predict smoking relapse. Hence, we performed a human laboratory study to compare effects of intermittent theta burst stimulation (iTBS) and sham iTBS on cigarette craving and cigarette-cue attentional bias. Methods. We recruited a total of 13 participants with OUD who smoke and randomized them to receive iTBS or sham iTBS. We performed a stress paradigm at baseline to increase cigarette craving and cigarette cue attentional bias. Participants received four sessions of iTBS or sham iTBS in a single day at intervals of 50 minutes between sessions. Cigarette craving and cigarette-cue attentional bias were measured at baseline, after the first session and after four sessions. Participants also had resting state functional MRI (fMRI) performed at baseline and after four sessions. Results. $N=7$ participants received iTBS and $n=6$ participants received sham iTBS. In a linear mixed effects regression model, there was significant association between cigarette craving and receiving four sessions of iTBS compared to sham iTBS ($t=2.2$, $p=0.003$). There was also a significant association between cigarette-cue attentional bias and receiving iTBS sessions compared to sham iTBS ($t=1.1$, $p=0.02$). iTBS also showed significantly decreased functional connectivity between the right anterior division of the supramarginal gyrus and right insula compared to sham iTBS ($t = 2.6$, $p=0.005$). Conclusion. An accelerated iTBS regimen could offer provide therapeutic benefit in people with OUD who smoke.

FUNDING: Federal; Academic Institution

SYM21-5

RTMS DOSING PARAMETERS FOR LONG-TERM SMOKING CESSATION

Christine E. Sheffer. Roswell Park Cancer Institute.

High-frequency repetitive Transcranial Magnetic Stimulation (rTMS) is an emerging treatment for long-term smoking cessation. rTMS can reduce delay discounting (DD) and improve cognitive function, linked to smoking cessation. This project had 2 therapeutic targets, DD and cognitive skill acquisition, and 1 target behavior, cigarette consumption. We used a fully crossed 3x2 randomized double-blinded factorial design with 2 factors, Duration (8, 12, or 16 days of stimulation) and Intensity (1 or 2 sessions per day). rTMS (20Hz; 900 pulses; 110% MT) was delivered to the left dorsolateral prefrontal cortex a max of 4 days per wk (1 or 2 sessions per day). The day before the 1st rTMS session was the Quit Day. Participants read psychoeducational booklets during rTMS sessions. DD tasks (\$100 and \$1,000), the Cognitive Behavioral Skills Questionnaire (CBSQ), and the Perceived Research Burden Assessment (PeRBA) were administered at baseline and during the 4, 8, 12, 18, and 24-week outcome assessments. Timeline Follow Back was used to collect daily cigarette use every 2 wks. We hypothesized that increasing the Duration and Intensity of rTMS would decrease DD rates, enhance the acquisition of cognitive skills, and increase latency to relapse, but would also increase the research burden. GEE was used to examine DD, CBSQ, and PeRBA. Cramer's Φ^2 was used to effect size ($F2 \sim 0.01$ = small, ~ 0.09 = medium, >0.25 = large). Relative risk (RR) of relapse was examined with CPH. Participants ($n=23$) mean age 50 yrs, were 70% female, 70% White.

Increasing Duration showed large effect sizes for DD ($\$100$: $\eta^2=16.0$, $p<.001$, $F2=.696$; $\$1,000$: $\eta^2=19.0$, $p<.001$, $F2=.827$). Increasing Intensity showed small-medium effect sizes on DD ($\$100$: $\eta^2=1.2$, $p=.28$, $F2=.051$; $\$1,000$: $\eta^2=2.2$, $p=.14$, $F2=.094$). Increasing Duration and Intensity showed medium effects sizes on the CBTSQ scores (Duration: $\eta^2=4.0$, $p=.133$, $F2=.175$; Intensity: $\eta^2=2.9$, $p=.101$, $F2=.125$). Increasing Duration and Intensity showed small-medium effect sizes on PeRBA scores (Duration: $\eta^2=1.9$, $p=.383$, $F2=.084$; Intensity: $\eta^2=.901$, $p=.343$, $F2=.039$). Increasing Duration reduced the RR of relapse [HR 0.29 (0.09, 1.00); $p = 0.049$], but increasing Intensity did not [HR 0.53 (0.17, 1.66); $p = 0.28$]. Preliminary findings indicate that 16 sessions of 20Hz rTMS over 4 wks has a greater impact on the therapeutic targets and on cigarette smoking than 8 sessions, but also has a small-medium impact on participant burden.

FUNDING: Federal

SYM21-6

RAPID SHIFT OF SALIENCE NETWORK PREDICTS A BETTER OUTCOME TO REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION FOR SMOKING CESSATION: A COMBINING CUE-TASK AND RESTING STATE MRI STUDY

Xingbao Li. Dept. of Psychiatry, Medical University of South Carolina, Charleston.

Background: Repetitive transcranial magnetic stimulation (rTMS) can reduce cue-elicited craving, decrease cigarette consumption, and increase the abstinence rate in tobacco use disorders (TUDs). Functional magnetic resonance imaging (fMRI) can be used to identify therapeutic targets and evaluate the effect of rTMS for smoking cessation networks. Methods: Smoking cue exposure task-fMRI (T-fMRI) and resting-state fMRI (RS-fMRI) scans were acquired before and after the 10 sessions of active or sham rTMS (10 Hz, 3000 pulses per session) to the left dorsal lateral prefrontal cortex (DLPFC) in 42 treatment-seeking smokers (≈ 10 cigarettes per day). The whole brain activity and four networks (default model networks-DMN, central executive network-CEN; salience network-SN; and reward network-RN) were compared between prior before and after 10 sessions of rTMS, and between active and sham rTMS. Results: Whole brain analyses showed that the rTMS treatment increased brain activity in the dorsal anterior cingulate cortex (dACC) and DLPFC, but decreased brain activity in the bilateral medial orbitofrontal cortex (mOFC). Network analyses indicated a higher salience connectivity in task-fMRI and a lower salience connectivity in Resting-state MRI predict a better outcome of TMS treatment for smoking cessation. It also indicated a lower executive control connectivity in task-fMRI and a higher reward connectivity in Resting-state fMRI predicted a better outcome. Conclusions: By increasing the brain activity in the dACC, insula prefrontal cortex and decreasing brain activity in the mOFC, 10 sessions of rTMS significantly reduced cigarette consumption. Fast shift from resting-state to task connectivity in salience network predict a better outcome of TMS treatment for smoking cessation. A lower executive control connectivity and a higher reward resting state also predict the better outcome of rTMS.

FUNDING: Federal

SYM21-7

DIFFERENTIATING RESPONDERS AND NON-RESPONDERS TO REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION IN PEOPLE WITH TOBACCO USE DISORDER

Michael Apostol. UCLA.

Repetitive transcranial magnetic stimulation (rTMS) is a novel, recently FDA-approved smoking cessation treatment. Our group previously replicated findings that single-session rTMS to the left dorsolateral prefrontal cortex (dlPFC) led to a significant reduction in cigarette craving symptoms during a period of abstinence; however, not all individuals experienced reductions in craving. The goal of the current study was to identify how people who experienced reductions in cigarette craving following rTMS to left dlPFC differ from those who did not. Participants ($N = 48$) were adults ages 18 - 45 who met DSM-5 criteria for Tobacco Use Disorder. Single-session rTMS (10 Hz, 100% of motor threshold, 3000 pulses) treatments were performed targeting left dlPFC. Participants completed a craving scale (Shiffman-Jarvik Withdrawal Scale - Craving Subscale) before and after rTMS. Treatment responders were defined as participants with craving scores that were reduced after rTMS to dlPFC ($N = 27$), whereas nonresponders were individuals whose scores remained the same or increased ($N = 21$). We predicted that responders and nonresponders would have significantly different nicotine dependence levels, heaviness of smoking, subclinical depression/anxiety symptoms, and ages (all nondirectional). Mixed-effects linear models were computed with the hypothesized variables as outcome variables, responder/nonresponder status as a fixed effect,

and participants as random effects. There were no significant differences for the hypothesized variables, all p s > .05. Next, exploratory variables were investigated using confidence intervals and effect sizes. Pre-rTMS craving in responders ($M = 5.30$; 95% CI: 4.75 - 5.84) was higher than nonresponders ($M = 3.68$; 95% CI: 2.82 - 4.53), Cohen's $d = 1.06$ (large effect size), and pre-rTMS expired carbon monoxide (CO) was higher in responders ($M = 7.04$; 95% CI: 5.18 - 8.90) than nonresponders ($M = 4.36$; 95% CI: 3.21 - 5.61), Cohen's $d = 0.69$ (moderate effect size). Although none of the hypothesized variables differed significantly between responders versus nonresponders, the exploratory results suggested that responders to rTMS displayed higher abstinence-induced craving and expired CO. This study was a step towards understanding how individual differences relate to the efficacy of non-invasive neuromodulation, which may help personalize treatments. The study was preregistered at osf.io/m58rs. This work was supported by NIDA grant R00DA045749 to NP.

FUNDING: Federal

SYM22

ACHIEVING EQUITABLE HEALTH OUTCOMES FOR PEOPLE LIVING WITH HIV WHO USE TOBACCO: INNOVATIVE APPROACHES TO OPTIMIZE EFFECTIVENESS AND IMPLEMENTATION OF TOBACCO USE TREATMENT IN THE CONTEXT OF HIV CARE IN LOW- AND MIDDLE-INCOME COUNTRIES

Reet Kapur, BDS, MPH. New York University.

Tobacco use is a leading cause of death among people living with HIV/AIDS (PWH). Smoking prevalence is 2-3 times that of HIV-negative counterparts, threatening gains in long-term survival, especially in low- and middle-income countries (LMICs) where the burden of both HIV/AIDS and tobacco use is increasingly concentrated. Yet, evidence to guide the care of PWH who smoke is lacking in low resources settings. To fill this gap, the National Institutes of Health has prioritized funding to accelerate the development of effective tobacco cessation interventions tailored to PWH living in LMICs. This symposium presents findings from five trials conducted in four LMICs that describe innovative approaches to designing, adapting, testing and implementing stakeholder-driven and context-specific tobacco cessation interventions. Dr. Gina Kruse will describe application of the Cultural Accommodation Model of Substance Abuse Treatment to shift a SMS intervention to Whatsapp, based on communication patterns in India. Dr. Bogadi Loabile will demonstrate a system for documenting modifications during efficacy and effectiveness trials to identify implementation strategies earlier in the translational research timeline to speed the rate at which EBIs are disseminated, scaled, and sustained in LMICs. Dr. Stella Bialous will describe a process for adapting a telemedicine tobacco cessation intervention in Kenya. Dr. Donna Shelley will share findings from a RCT studying the effectiveness and implementation of a proactive Quitline referral system in HIV clinics in Vietnam. Dr. Seth Himelhoch will present findings from a randomized, factorial design trial in Kenya that is testing the efficacy of bupropion and the Positively Smoke Free counseling intervention. Dr. Mark Parascandola will serve as discussant to integrate the findings and suggest implications for promoting health equity for PWH who smoke through research, practice, and policy conducted in LMICs. This symposium highlights the commitment of these projects to health equity in research by showcasing methods for adapting interventions to the socio-cultural context of LMICs to increase feasibility and effectiveness of interventions aimed at combating the HIV-tobacco burden among PWH in a range of global contexts and to generate evidence for tobacco cessation interventions targeted to PWH.

SYM22-1

ADAPTATION OF THE POSITIVELY SMOKE FREE-MOBILE PROGRAM FOR A TOBACCO CESSATION INTERVENTION COMBINING DIGITAL SUPPORT PLUS VARENICLINE FOR PEOPLE WITH HIV (PWH) IN INDIA

Gina R. Kruse. University of Colorado.

Significance: Digital behavioral interventions show promise as a tool to help people living with HIV (PWH) to quit smoking. We adapted the Positively Smoke Free-Mobile, developed and tested in the USA, to meet the needs of PWH in Chennai, India. Methods: The Cultural Accommodation Model of Substance Abuse Treatment guided the adaptation. In Stage 1 (Information sources) we incorporated information from literature, stakeholders and experts in the field and the research team. In Stage 2 (Accommodation practices), the planned program design and draft content was reviewed by counselors and providers. In Stage 3 (Initial testing), the resulting prototype was translated and pilot-tested with patient focus groups to generate final program recommendations. Results: In Stage 1 our health communications team shifted the message delivery mode from SMS to

WhatsApp, based on communication patterns in Chennai. Program video scripts were divided into short segments to reflect the prevalence of short video media. Review of patient data ($n=12$ interviews; $n=154$ surveys) generated edits to promote cessation of smokeless products (32% who smoke also use smokeless). Interviews with providers ($n=3$) and counselors ($n=4$) informed modifications to align with local practice (e.g., emphasis on family as motive for healthy behaviors). In Stage 2, providers', and counselors' ($n=7$) review of draft content generated lists of local smoke-free settings to reference (e.g., temples, tea stalls). Our development team worked with local professionals on media creation and translation to capture cultural context and vernacular. In Stage 3, (3 focus groups; $n=22$ patients) patients reported positive views of the prototypes. They recommended adding messages about meditation and self-kindness, tips for dealing with cravings in the moment and coping with stress. Focus groups also yielded recommendations about video backdrop and length, allowing participants to choose message timing, offering support after messages end, importance of emphasizing risk of HIV disclosure during consent, and the need for future interventions to reach non-literate patients. Recommendations were incorporated into program content or on-boarding procedures. Conclusion: Guided by an Adaptation framework, the project is incorporating stakeholder preferences that reflect socio-cultural norms to increase relevance and engagement in treatment and reduce disparities in health outcomes among PWH who smoke.

FUNDING: Federal; Academic Institution

SYM22-2

VIEWS ON TOBACCO USE AND CESSATION OF PEOPLE LIVING WITH HIV WHO USE TOBACCO IN KISUMU, KENYA

Stella Aguinaga Bialous. University of San Francisco.

Significance: Kenya is addressing the dual burden of the HIV and tobacco epidemics, with tobacco use higher among people living with HIV (PWH) than the general population. The 2017 Ministry of Health's clinical practice guidelines for tobacco dependence treatment, and 2018 National Guidelines for HIV treatment recommend the inclusion of tobacco cessation as part of HIV care. Yet, these guidelines are not widely implemented. This qualitative study assessed the views of cessation of PWH in Kisumu, Kenya as part of developing messages to implement the guidelines. Methods: Four focus groups discussions (FGD) with 28 PWH who use tobacco and receiving care in Kisumu County (3 FGD with 22 men and one with 6 women). FGD were recorded, translated from Dholuo to English, transcribed and uploaded to Dedoose. Thematic analysis assessed PWH 1) Thoughts on Quitting; 2) Perceived need for cessation support; 3) Preferred messages. IRB approval was obtained in Kenya and the United States. Results: Most participants expressed a desire to quit, few have made quit attempts, and relapse was common (e.g. "I have never managed to quit despite the efforts to do so over a period of time...") No one indicated receiving support in quitting beyond an occasional advice from a health provider. Results: Participants indicated that they would like both counseling and medication to quit, although few knew that medication for cessation existed, and were concerned with the costs (e.g. "If we can get this medicine free of charge like the one we are taking now, it would be very good for us, but if we would be buying it, then we will still be looking for match boxes to light cigarettes.") There were mixed feelings about cessation support through quitline or texts, including whether there was a cost associated with the services (e.g. "Sometimes you may not even have airtime to even talk with that person who wants to do for you counseling..."; "Message is good and phone call because maybe you were given information and ... forgot."). The preferred emphasis on counseling were savings and health benefits for PWH. Conclusion: PWH who use tobacco in Kenya are willing to try to quit. Messages on the link between HIV and tobacco, as well as potential savings related to cessation should be emphasized in counseling. Airtime and cost of medication remain barriers to cessation. These data were used to develop a health professional training program and messages used in a randomized cluster trial under way.

FUNDING: Federal

SYM22-3

TRACKING CLINICAL TRIAL MODIFICATIONS DURING A COMPARATIVE EFFECTIVENESS TOBACCO CESSATION STUDY FOR SMOKERS WITH HIV IN BOTSWANA: SHOWCASING AN ELECTRONIC DATABASE TO HELP IDENTIFY POTENTIAL IMPLEMENTATION STRATEGIES

Bogadi Loabile. University of Pennsylvania.

Significance: To address widespread gaps between the availability of evidence-based interventions (EBIs) and their provision and use, implementation science provides methods, models, and frameworks to identify implementation strategies to increase adoption and sustainment of EBIs. Typically, research to identify implementation strategies occurs in the latter phases of clinical research, which can delay efforts to shrink practice gaps. Recently, scholars have called for the use of systematic tracking methods during efficacy and effectiveness trials to identify implementation strategies earlier in the translational research timeline to speed the rate at which EBIs are scaled, disseminated, and sustained. **Methods:** In an ongoing comparative effectiveness smoking cessation trial for persons with HIV in Botswana, we are using established reporting guidelines and taxonomies of implementation strategies to track, identify, describe, and assess for impact modifications in clinical trial operations that may guide subsequent implementation of the intervention determined to be most effective. We created in REDCap a survey and database; project managers classified trial modifications using the ERIC taxonomy and operationalized each modification according to who delivered it, the context, dose, and targets of the modification, when the modification occurred, and modification outcome. **Results:** In 3 years, we identified 48 trial modifications; classification agreement was 80%; 11 modifications (23%) were classified as adapt and tailor to context (e.g., transitioning sessions to telephone, using destigmatizing language about smoking), 9 were classified as develop stakeholder relationships (e.g., meeting with facility managers, using facility staff to promote engagement), 12 were classified as train and educate stakeholders (e.g., instructing sites on how to refer patients, investigators providing feedback to sites), and 8 were classified as engaging consumers (e.g., media to promote the trial, developing recruitment materials for patients). Almost all modifications were implemented by study staff, project managers, or senior leaders at the collaborating clinics; 56% of modifications occurred once and almost all were focused on research or clinic staff. **Conclusion:** Modifications enabled achieving trial accrual milestones and >75% session completion rates. We will demonstrate this system of documenting trial modifications that can be disseminated to the research community.

FUNDING: Federal

SYM22-4

ADAPTING AND IMPLEMENTING A PROACTIVE QUITLINE REFERRAL SYSTEM IN HIV CLINICS IN VIETNAM: OPTIMIZING REACH AND EFFECTIVENESS

Donna Shelley. New York University School of Global Public Health.

Significance: The prevalence of tobacco use among people living with HIV (PWH) is 2-3 times that of HIV-negative counterparts, threatening gains in long-term survival, especially in low-and middle-income countries (LMICs). We are conducting a trial comparing the effectiveness of cessation interventions among PWH receiving care in HIV outpatient (OPCs) clinics in Vietnam. Here we describe the adaptation and effectiveness of strategies for implementing a proactive national Quitline referral system in HIV clinics. **Methods:** We adapted a Quitline referral system to the HIV OPC context and patient population. All current cigarette and dual users (Cigarette/waterpipe) received brief counseling. With consent, contact information was transmitted to the Quitline. They proactively initiated their protocol (up to 10 calls). We used the referral form and Quitline data to track reach (% eligible patients referred and who received at least one call) and fidelity (percent of calls completed and call time). We assessed 6-month CO confirmed smoking abstinence and conducted interviews with 24 health care workers (HCWs) and 9 patients. We use descriptive statistics to assess reach and fidelity, bivariate analysis to examine quit rates by number of calls completed and used rapid qualitative analysis for qualitative data. **Results:** Eighty-seven of the 100 patients participated in at least one proactive Quitline session; 57% completed >5 calls and 18.6% completed all 10 calls. The average call duration decreased from the first to 10th call (20.5 vs 4.19 mins). Patients who completed >5 calls were more likely to quit using tobacco (19.6%) compared with those who completed 0-5 calls (6.9%). Interviews with Quitline staff and leadership suggest advantages to a proactive approach vs reactive in terms of staffing needs. HCWs reported that patients were receptive to referrals and that referrals were feasible to integrate into a routine visit. Patients found the Quitline's advice helpful in navigating social situations related to smoking and intended to recommend it to friends. **Conclusion:** A proactive referral system was feasible to implement in HIV OPCs. Providing a greater number of sessions may be an important determinant of Quitline effectiveness in this population. Increasing access to effective smoking cessation treatment is a priority and can be achieved by leveraging existing HIV care infrastructure to link PWH with smoking cessation services like national Quitlines in LMICs.

FUNDING: Federal

SYM22-5

A RANDOMIZED, PLACEBO-CONTROLLED TRIAL OF BUPROPION +/- INTENSIVE, INDIVIDUAL CESSATION COUNSELING FOR PWH WHO SMOKE CIGARETTES IN NAIROBI, KENYA

Seth S. Himelhoch. University of Kentucky, Dept. of Psychiatry.

Significance: Worldwide estimates suggest that people with HIV (PWH) smoke at much higher rates than the general population. To what degree smoking cessation interventions are efficacious among PWH in lower-middle income countries (LMIC) is not clear. **Methods:** Our study used a randomized, 2x2 factorial design (randomization allocation of 1:1:1:1) to evaluate the effects, individually and in combination, of bupropion vs. visually-identical placebo, and an intensive, 8-session, one-on-one behavioral cessation therapy that had been culturally-tailored for the Kenyan audience, Positively Smoke Free (PSF), vs. standard of care (SOC) among PWH who smoke. The primary outcome was 7-day point prevalence abstinence (PPA) (confirmed by exhaled carbon monoxide<7ppm) at 36-weeks, employing an ITT, missing=still smoking strategy. The study was conducted from June 2020-August 2023 in Nairobi, Kenya. **Results:** Three hundred participants were enrolled into the study (100% of the accrual target), 294 submitted baseline data, and 269 (91.5%) were retained through the 36-week visit. Most participants were men (71.4%) who were moderately dependent on nicotine (FTND: (Mean± SD), 4.5±2.3). Nearly all were taking antiretroviral medication (99.7%). Mean # of PSF sessions attended was 7.8±0.9 out of 8, and 138/146 (94.5%) completed all 8 sessions. The 36-week abstinence rate in those who received bupropion was 31.3% vs 13.3% in those who received placebo, OR=2.96 (1.64-5.32, P<0.001). The 36-week abstinence rate in those who received PSF cessation counseling was 29.4% vs. 14.9% in those who received SOC, OR=2.39 (1.34-4.25, P=0.003). The 36-week abstinence rate in those who received combined PSF+bupropion was 38.9% vs. 6.6% in those who received SOC+placebo, OR=9.04 (3.25-25.1, P<0.001). In a logistic regression model, both bupropion (AOR=4.39 [1.52-12.6], P=0.006) and PSF (AOR=3.61 [1.24-10.5], P=0.019) remained significantly associated with the 36-week abstinence outcome. The interaction term of bupropion*PSF was not significantly associated with 36-week abstinence. **Conclusion:** Both bupropion and PSF cessation counseling were effective in promoting biochemically confirmed abstinence at 36-weeks in PWH in Kenya. This LMIC urban setting proved to be an excellent environment to complete a factorial design trial of pharmacologic and behavioral cessation treatment with full enrollment, >91% retention to final study visit, and outstanding adherence to the counseling intervention.

FUNDING: Federal

SYM23

DEVELOPING AND TESTING THE EFFECTIVENESS OF NON-CIGARETTE TOBACCO WARNINGS AMONG YOUTH AND YOUNG ADULTS: RESEARCH AND POLICY IMPLICATIONS

Jennifer C. Ross. Boston University School of Public Health.

As cigarette smoking rates continue to decline in the U.S., the use of other tobacco/nicotine products remains a priority, including little cigars, cigarillos, waterpipe, and e-cigarettes. Cigarette warnings have been widely studied across the globe and are an effective public health communication intervention to reduce use; however, less research has focused on warnings for non-cigarette tobacco/nicotine products. Much of what we know about the effectiveness of warnings is with adults, but warnings may also be effective at deterring youth initiation and discouraging use among young adults. In the U.S., the Food and Drug Administration (FDA) mandated new warnings to go on all tobacco/nicotine products, with content variation across products. Although pictorial warnings were mandated for cigarettes, no such proposals were made for other products. This symposium provides data about the development, testing, and effects of warnings among priority populations of youth and young adults. First, Dr. Ranney will present findings from a national sample of youth to test the perceived effectiveness of text vs. pictorial warnings for little cigars and cigarillos, as well as differences in warning size on packaging. Next, Dr. Niederdeppe will present findings from a set of studies synthesizing the development and testing of broad sets of warnings on e-cigarette advertising aimed at deterring youth and young adult e-cigarette use. Dr. Sutfin will then present findings from three nationally representative studies of young adults to develop and then test the relative effectiveness of text vs. pictorial warnings for waterpipe tobacco. Last, Dr. Cornacchione Ross will present data utilizing a behavioral economics approach to assess how different cigarillo warning formats (pictorial, FDA text only, Surgeon General text only) impact cigarillo demand, and highlight differences between racial identities. Finally, the discussant, Mr. Berman, will summarize the emerging science and legal challenges to warnings for tobacco/nicotine products (in the U.S. and globally) and will make suggestions for future research directions to support evidence-based and legally-sound regulatory decision-making. This symposium will provide an overview of

the diverse approaches being used to develop and test stronger warnings for a variety of non-cigarette tobacco products with a focus on youth and young adult populations, which can inform rulemaking and implementation in the U.S. and beyond.

SYM23-1

PERCEIVED EFFECTIVENESS OF PICTORIAL VS TEXT CIGAR WARNINGS AMONG YOUTH IN THE UNITED STATES

Leah M. Ranney. UNC-Chapel Hill.

Significance: The US Food and Drug Administration (FDA) proposed that rotating health warnings be displayed on cigar packages to communicate information about health risks. However, legal challenges have impeded the implementation because of lack of evidence on the impact of these warnings on target populations. In this study, we tested the perceived message effectiveness (PME) of new pictorial cigar warnings among youth using or susceptible to using cigars, assessing warning type and warning size. **Methods:** Participants were a sample of 506 US youth (ages 15-20) recruited April-June 2023 from an online panel. Eligible participants were ages 15-20 and reported ever or current (past 30 day) use of little cigars or cigarillos (LCCs) or were classified as susceptible to using LCCs. We conducted a 2X2 between-subjects experiment in which youth were randomized to one of four experimental conditions manipulating the warnings by type (text-only or pictorial) and size (30% or 50% of the package). Youth viewed the six proposed FDA cigar warnings on a cigarillo package, one at a time, per their randomly assigned condition (e.g., FDA text-only warnings at 30% size, new pictorial warnings at 30% size, etc.). Warnings were presented on a mock cigarillo foil 2 pack with a fictitious brand, and the warnings were placed on the bottom portion of the packaging. We assessed PME after participants viewed each warning. We conducted a mixed effect linear regression model, examining main effects of warning type and size and interactions between type and size. **Results:** The majority were men or boy (56.1), white (59.3%) and heterosexual (67.8%). Past 30-day LCC use was 32%, ever LCC use was 20.6%, and 47.4% were classified as susceptible. Pictorial warnings significantly increased PME ($p < 0.05$) compared with text-only warnings. No significant impact of occurred with warning size, and no interaction occurred between warning type and warning size. **Conclusions:** These findings are the first to demonstrate that pictorial cigar warnings are perceived as more effective than text-only cigar warnings among youth. Pictorial cigar warnings may help reduce cigar use among youth by discouraging future or continued use, consistent with research on cigarette warnings. These findings can also support regulatory decision-making for implementing strengthened cigar warnings. Future research is need to more fully examine optimal cigar warning sizes.

FUNDING: Federal

SYM23-2

MANAGING A POLICY PARADOX? RESPONSES TO TEXTUAL WARNING LABELS ON E-CIGARETTE ADVERTISEMENTS AMONG U.S. NATIONAL SAMPLES OF YOUTH AND ADULT TOBACCO PRODUCT USERS

Jeff Niederdeppe. Cornell University.

Current use and potential future uptake of e-cigarettes among youth remains a public health problem in the U.S., even as current smokers of combustible cigarettes could benefit from switching completely to e-cigarettes. The U.S. Food and Drug Administration may consider stronger warning messages, but warnings that discourage youth from use may also deter cigarette smokers from switching. This study developed concepts for warning label messages using a series of focus groups with youth and adults. We then tested ten pre-registered hypotheses on effects of warning messages with national samples of youth (both users and non-users of tobacco) and adult tobacco product users. NORC augmented their AmeriSpeak Teen Panel with Lucid's nonprobability opt-in panel to recruit 1,217 youth (ages 14-17) and concurrently recruited 1,639 adult (ages 18+) tobacco product users (split between smokers, vapers, and dual users of these products, with a large subsample of young adults) from their AmeriSpeak Panel to participate in a web-based survey experiment. We randomly assigned respondents to view one of five warning label conditions and respond to post-test measures of their e-cigarette risk beliefs, willingness to use e-cigarettes, and (among smokers and vapers) considerations to quit these products. Warning messages about the harms of e-cigarette use for youth brain development shifted beliefs about these harms among all groups but did not reduce youth willingness to use these products or increase quit considerations among vapers. Warning messages that described chemical constituents of vaping products and the harms of these chemicals increased awareness of e-cigarette risks among both youth and young adult tobacco product users and increased e-cigarette quit considerations among adult vapers. When combined with messages suggesting

equivalence between cigarettes and e-cigarettes, chemical plus harm messages reduced adult smoker beliefs that switching to e-cigarettes will have health benefits. Messages emphasizing e-cigarette chemical constituents and their harms hold promise for reducing youth interest in e-cigarettes and promoting interest in quitting vaping among current adult vapers, but these messages should avoid drawing parallels to cigarettes

FUNDING: Federal

SYM23-3

DEVELOPMENT AND TESTING OF TEXT AND PICTORIAL HEALTH WARNINGS FOR WATERPIPE TOBACCO

Erin L. Sutfin. Wake Forest University School of Medicine.

Waterpipe tobacco is the only combustible product for which the FDA requires just a single text warning. Stronger warnings that cover more harms could contribute to reductions in waterpipe smoking. We conducted three studies to develop and test text and pictorial warnings for waterpipe tobacco. First, we developed 30 harm statements based on an extensive literature review and expert feedback. Next, a national convenience sample of 912 young adults rated the statements on perceived message effectiveness, cognitive elaboration, and self-reported learning. Harm statements were rated similarly, so we selected six harm statements covering a range of health harms to develop into pictorial warnings. We then identified three images to pair with each harm statement and conducted a second national convenience sample study of 905 young adults to determine which image was the best match for each harm statement. Finally, we conducted a between-subjects experiment among a nationally-representative sample of 1,215 young adult past-year waterpipe users and susceptible non-users, recruited from NORC's AmeriSpeak Panel. Mean age was 25 years, 56% identified as White, 22.3% Black/African American, and 6.9% Asian. Participants were randomly assigned to view six waterpipe tobacco packages with text warnings, six with pictorial warnings, or a package without a warning. Exposure to text or pictorial warnings resulted in significantly lower behavioral intentions to smoke waterpipe, lower product appeal (pictorial only), and a lower likelihood of trying the product (pictorial only) ($p < 0.05$). Exposure to warnings also led to higher knowledge of harms, outcome expectancies (pictorial only), and thinking the product is harmful compared to control ($p < 0.01$). Compared to text-only warnings, those exposed to pictorial warnings reported lower product appeal and likelihood of trying the product; higher quit intentions, outcome expectancies, worry about harms, and thinking the product is harmful ($p < 0.05$). Exposing young adults to waterpipe packages with warnings led to greater knowledge, lower behavioral intentions to smoke waterpipe, and lower product appeal compared to packages without warnings. This study is directly relevant to FDA regulation as it demonstrates the potential of health warnings – especially pictorial warnings – to convey the range of health harms caused by smoking waterpipe tobacco to young adults.

FUNDING: Federal

SYM23-4

THE EFFECTS OF PICTORIAL VS. TEXT-ONLY CIGARILLO WARNINGS ON DEMAND FOR CIGARILLOS AMONG A NATIONAL SAMPLE OF U.S. YOUNG ADULTS WHO SMOKE CIGARILLOS

Jennifer J. Cornacchione Ross. Boston University School of Public Health.

Background: Research has demonstrated the superiority of pictorial over text-only cigarette warnings, yet the effectiveness of pictorial warnings for cigarillos is less studied. A behavioral economics approach to study potential warning policies can help us understand how they may impact consumer behavior. **Methods:** Data were collected from a national sample of US young adults (ages 21-35) who reported weekly cigarillo smoking in the past month. Participants were randomized to one of three experimental conditions: pictorial, FDA proposed text-only (larger than status quo + new statements), and status quo Surgeon General text-only cigarillo warnings. Participants completed a hypothetical Experimental Tobacco Marketplace to assess how cigarillo warnings impacted cigarillo demand; the price of cigarillos increased across 6 shopping trips to generate a demand curve. We ran regressions with condition predicting demand for each of the five demand indices: intensity, Omax, Pmax, breakpoint, and alpha. We also assessed demand by racial identity (Black/African American [B/AA] vs. other) and blunt use (never vs. any). **Results:** Participants (N=1296) were 54.3% female, 47.2% B/AA, and 10.4% Hispanic, with a mean age of 29 (SD=4.2). The mean number of cigarillos purchased for each of the study conditions at the lowest price (intensity) was 6.6 (pictorial), 6.2 (FDA text-only), and 6.3 (Surgeon General text-only). There were no significant effects of condition on any demand outcomes ($ps > .05$). Blunting status (never vs. any) was a significant predictor of greater Omax (i.e., maximum amount spent, $p < .001$) and lower alpha (i.e., lower sensitivity to price, $p = .003$), indicating greater demand for cigarillos in



this group. B/AA participants also had significantly greater intensity, Omax, breakpoint (i.e., price when purchase no cigarillos), and lower alpha ($p < .01$). Conclusions: Although no significant effects of warning condition were observed, the significant relationships between blunting status may indicate that this population, who often remove some or all tobacco from the product, may perceive that cigarillos warnings do not apply to their non-standard product use. Given the greater demand for cigarillos among B/AA participants, cigarillo harms may be disproportionately concentrated in this population; further research into effective warnings about the harms of cigarillos for all users is needed.

FUNDING: Federal

SYM23-5

DEVELOPING ENDS-SPECIFIC PICTORIAL HEALTH WARNING LABELS: A DELPHI STUDY AMONG A TOBACCO CONTROL EXPERT PANEL

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Introduction: In 2022, our team started a project aimed at developing and testing pictorial health warning labels (PHWLs) for electronic nicotine delivery systems (ENDS). We first conducted an umbrella review to summarize the evidence about ENDS' safety and risk profile. Based on the results, we developed 24 ENDS-specific PHWLs corresponding to three themes: ENDS toxicity, ENDS health risks, and ENDS-specific harm. This study reports on the second step of the PHWLs' development, in which we used a Delphi approach with a panel of tobacco control experts to improve the HWLs and reach a consensus on a set of 12 ENDS-specific HWLs, which will be used in subsequent testing with ENDS users. **Methods:** We conducted a three-round online Delphi study among 60 experts (mean age [SD] = 45.41 [10.49] years; 55% female) between 15 June 2022 and 12 April 2023. The panel was balanced in expertise areas and points of view (opponents and proponents for ENDS). In the first round, experts provided suggestions for improvement (i.e., content, design), rated PHWLs on attractiveness, relevance to evidence, and effectiveness in changing harm perception and motivation to quit ENDS, and ranked the PHWLs based on overall effectiveness in each theme. In the second and third rounds, experts viewed the PHWLs ordered according to the previous round results shown against their ranking and were asked to re-rank them. Levels of agreement between participants were assessed using interquartile deviations, and the rank between the tied PHWLs was based on the median. **Results:** Overall, 78.3% of experts completed all three rounds. For improvement, experts recommended using short text with clear and affirmative phrases, improving the quality of the picture, and avoiding those showing faces. PHWLs in theme 1, ENDS toxicity, were rated the highest for relevance to evidence and effectiveness in changing harm perception and motivation to quit ($P < 0.05$ for all). PHWLs in theme 2, ENDS health effects, rated better for attractiveness. However, experts' agreement on the top 12 PHWLs was the highest for PHWLs in theme 3, ENDS-specific harms. The top selected 12 PHWLs pertained to lung damage, dual use of ENDS and cigarettes, nicotine addiction among youth, anti-ENDS industry sentiment, and toxicity. **Conclusion:** This study generated 24 evidence-based ENDS-specific PHWLs developed by a panel of experts in tobacco control. PHWLs in themes 1, "toxicity," and 3, "specific harm," are promising.

FUNDING: Federal

SYM24

DISPOSABLE VAPES: EXAMINING PREVALENCE IN GREAT BRITAIN, TOXICOLOGY, YOUTHS' VIEWS, AND PACKAGING

Katherine A. East, BSc, MSc, PhD. King's College London.

The vaping (e-cigarette) market has rapidly evolved since 2021 with the introduction of novel disposables, such as Elf Bars and Puff Bars. While vaping is less harmful than smoking, vaping products should not be used by youth or never smokers. Despite policy measures to reduce youth access to nicotine products (e.g., in the UK the minimum legal age of sale is 18 years), there are concerns that novel disposable vapes are particularly appealing and accessible to youth. Disposables come available in a range of flavours and colours, are convenient to use, are widely available across retailers, and are often advertised at the point of sale. This symposium discusses disposable vapes in detail, including their prevalence, reasons for use, toxicity, appeal to youth, and packaging. First, Harry Tattan-Birch will provide an update on use of disposable vapes among $n=68,360$ adults (aged =18 years) adults in Great Britain, with a focus on rising use among young adults. Second, Katherine East will present data on use of Elf Bars specifically, among

$n=1,355$ youth and young adults, including demographics, dependence indicators, and reasons for use. Third, Esther Omaiye will discuss the chemical constituents and toxicity of Puff Bars compared with JUUL, with a focus on synthetic coolants, examined using gas chromatography/mass spectrometry and cell imaging. Fourth, Marissa Smith will present data from focus groups of 82 youth in Scotland about the characteristics of disposable vapes which most appeal to them. Fifth, Matilda Nottage will present data on content analyses of the packaging of 50 disposable vapes in England, Canada, and the US, and discuss regulatory compliance and implications for policy. Lion Shahab will act as chair, and discussant to summarise the findings. There will be a Q&A with opportunities to discuss the findings in detail and implications for policies and future research.

SYM24-1

ASSOCIATION OF RISING DISPOSABLE E-CIGARETTE USE AMONG YOUNG ADULTS WITH TRENDS IN VAPING AND SMOKING PREVALENCE: A POPULATION STUDY IN GREAT BRITAIN, 2020-2023

Harry Tattan-Birch. University College London.

BACKGROUND: Since 2021, the popularity of disposable e-cigarettes has been growing rapidly among young adults in Great Britain. This study aims to understand how smoking and vaping prevalence have changed since the introduction of these products. **METHODS:** Data from 68,360 adults (aged =18 years) came from the Smoking Toolkit Study, a representative telephone survey of the population in Great Britain (England, Scotland, Wales). We examined how the prevalence of current (i) inhaled nicotine use, (ii) smoking, and (iii) vaping changed following the start of the rapid growth of disposable vaping in May 2021 (until May 2023). Analyses were stratified by age (18-24 years, 25-44 years, 45+ years). Weighted estimates, adjusted odds ratios (AORs), and 95% confidence intervals (95%CI) were obtained from logistic regression including time as a continuous predictor, including covariate terms for gender, social grade, alcohol consumption, nation, and seasonality. To investigate disparities in trends across socioeconomic position, we repeated analyses stratified by occupational social grade (ABC1 versus C2D1). **RESULTS:** The percentage of 18-24-year-olds using disposable e-cigarettes rose from 0.4% in May 2021 to 15.3% in May 2023 (yearly AOR=3.9, 95%CI=2.8-5.4). Increases were less pronounced among 25-44 (0.5% to 7.4%; AOR=3.9, 95%CI=2.9-5.4) and 45+ year-olds (0.1% to 2.1%; AOR=5.1 95%CI=3.3-8.2). Among 18-24-year-olds, inhaled nicotine use rose from 27.1% to 34.9% over this period (AOR=1.21, 95%CI=1.04-1.40), vaping rose from 10.4% to 27.9% (AOR=1.86, 95%CI=1.52-2.26), while smoking went from 24.3% to 20.5% (AOR=0.89, 95%CI=0.75-1.05). Among older age groups, there were smaller increases in vaping and little change in inhaled nicotine use or smoking. Similar trends were found for people from both advantaged and disadvantaged social grades. **CONCLUSIONS:** The growing popularity of disposable e-cigarettes in Great Britain has contributed to a rise in inhaled nicotine use and vaping among young adults, while smoking has remained stable or declined slightly in this age group. Changes were smaller in older age groups, where disposable e-cigarette use was less common.

FUNDING: Nonprofit grant funding entity

SYM24-2

DEMOGRAPHICS, DEPENDENCE INDICATORS, AND REASONS FOR USE OF 'ELF BAR' AMONG YOUTH AND YOUNG ADULTS WHO VAPE IN ENGLAND

Katherine East. King's College London.

BACKGROUND: Elf Bar is currently the leading brand of disposable vape in Great Britain. Little is known about who uses Elf Bar, levels of dependence, or reasons for use over other brands. **METHODS:** Data were from $N=1,355$ 16- to 29-year-olds in England who had vaped in the past 30 days, from the 2022 ITC Youth Tobacco and Vaping Survey. Logistic regressions were used to test associations between currently using Elf Bar most often (vs. other brands) and sociodemographics (age group, sex, race/ethnicity, current or returning student, perceived family affluence), smoking status, owning a vaping device, dependence indicators (last time vaped, urges to vape, time to first vape, E-cigarette Dependence Scale), and reasons for brand choice. Cross-sectional post-stratification sample weights were applied, with 16-19-year-olds ($N=1,077$) weighted separately from the 20-29-year-olds ($N=278$) and weights rescaled to account for their different sample sizes. **RESULTS:** Among youth and young adults who vaped in the past 30 days, 48.4% ($n=732$) reported Elf Bar as the brand they used most often. Using Elf Bar over other brands was more common among respondents who were age 18-19 or 20-29 (60.1% or 47.4%, respectively, vs. 40.7% 16-17), female (55.2% vs. 41.5% male), identified as white (53.1% vs. 30.9% any other/mixed race/ethnicity), did not own a vaping device (66.7% vs. 44.4% who did) and vaped 5-8 hours after waking (62.7% vs. 36.8% within 5 minutes) (all $p=.044$). Most of the sample who vaped but had never smoked used Elf



Bar (64.3%) although use did not significantly differ from those who currently (45.4%) or formerly (42.3%) smoked or had experimented (48.7%) with smoking (all $p=.060$). There was little evidence that use of Elf Bar differed with perceived family affluence ($p>.05$). Popular reasons for choosing Elf Bar over other brands were better flavour/taste (47.5%), less expensive (28.7%), easier to get (26.1%), smoother to inhale (24.0%), and more popular among friends (23.1%) while 'better for quitting smoking' (10.1%) was the least frequently selected. CONCLUSIONS: Elf Bar was used by around half of 16- to 29-year-olds who vaped in England in August 2022 and was popular among those who had never smoked. Elf Bar was often chosen over other brands for flavour/taste and accessibility. Policies should focus on reducing appeal and access to underage youth.

FUNDING: Federal; State; Nonprofit grant funding entity

SYM24-3

CHEMICAL CONSTITUENTS AND TOXICOLOGY OF DISPOSABLE E-CIGARETTES

Esther Omaiye. University of California Riverside.

BACKGROUND: Restrictions on the sale of JUUL™ e-cigarettes (ECs) caused a rapid migration of users to disposable ECs. The study objectives were to compare solvents, nicotine, flavor chemicals, synthetic coolants (WS-3 and WS-23), and acids in disposable Puff ECs and JUUL™ pods, assess the cytotoxicity of Puff EC fluids and synthetic coolants, and perform risk assessments of coolants and carcinogens. METHODS: Chemicals were identified and quantified by gas chromatography/mass spectrometry. Cytotoxic fluids were identified using methyl tetrazolium, neutral red uptake, and lactose dehydrogenase assays. The effects of EC fluids and synthetic coolants on cell dynamics were analyzed using live-cell imaging. The risk analysis of the synthetic coolants and pulegone, a carcinogen, was performed using the Margin of Exposure (MOE). RESULTS: Sixteen dominant flavor chemicals ($>1\text{mg/mL}$) were present in 16 Puff ECs evaluated. The concentrations of WS-3 (range=1.5-16.4mg/mL) and WS-23 (range=0.8-45.1mg/mL), were higher in Puff ECs than JUUL™ (WS 23 only: range=0.03-0.11 mg/mL). WS-23 was cytotoxic in the MTT assay at concentrations 90 times lower than those in Puff fluids, induced similar cytotoxic responses. ECs containing one or both coolants inhibited cell growth in live cell imaging assays. Nicotine, WS-3, WS-23, and ethyl maltol significantly contributed to cytotoxicity. The risk for harm ($\text{MOE}<100$) was greater for Puff than JUUL™ and greater for WS-23 than WS-3. The risk for cancer ($\text{MOE}<10,000$) was greater for mint than menthol-flavored products and greater for Puff than JUUL™. CONCLUSIONS: While both Puff and JUUL™ products produced adverse effects in bioassays, the increased toxicity of Puff fluids was attributable to higher concentrations of synthetic coolants. The elevated levels of WS-23 and pulegone in Puff products may present a greater health risk to EC users than JUUL™. The restriction of JUUL™ flavors may have inadvertently caused a migration of users to a potentially more harmful product (Puff). The elevated levels of WS-23 in Puff products may present a health risk and require regulation. Cancer risk may be reduced in ECs by using pure menthol rather than mint oil to produce minty-flavored e-cigarette products. As more data on EC constituents and their health effects becomes readily available, continuous enforcement of current regulatory efforts, such as restricting youth access and establishing regulations on permissible constituents, is recommended.

FUNDING: Federal; Academic Institution

SYM24-4

YOUTHS' VIEWS AND EXPERIMENTATION WITH DISPOSABLE E-CIGARETTES: A UK FOCUS GROUP STUDY

Marissa Smith. University of Glasgow.

BACKGROUND: Most adolescents regularly use visual-based social media daily and as such it represents a potential source of influence. Disposable e-cigarettes are widely promoted on the internet, and user-generated content and influencer marketing on social media represents an important potential avenue for encouraging youths to experiment with the products. In this study, we explored young people's, engagement with and responses to, social media marketing of disposable e-cigarettes. METHODS: Twenty focus groups were conducted between March and May 2022, with 82 youths aged 11-16 living in the Central belt of Scotland. Youths were asked about smoking and vaping behaviours, social media use, vaping advertisement exposure, and were shown illustrative examples of typical social media content (e.g., images and videos) which were used to stimulate discussion about different messages, presentations, and contextual features. Focus groups were audio recorded, transcribed verbatim, and coded using thematic analysis. RESULTS: Young people considered that disposable e-cigarettes portrayed on social media were often glamorised as 'cool', 'fashionable', and enticing by social media influencers and viewed as a modern lifestyle 'accessory'. Youths stated

that disposable e-cigarettes were designed in a way to target youths and the brightly coloured devices and range of flavourings encouraged youths to want to try the products, particularly sweet flavourings. Participants typically viewed disposable e-cigarettes as less harmful than traditional cigarettes but noted the uncertainty of ingredients in disposable e-cigarettes. CONCLUSIONS: Young people distinguish between e-cigarettes with varying characteristics and social perceptions of users. Given the high level of youth's engagement with social media, these findings provide worrying evidence that disposable e-cigarettes are attractive to youths. Our study suggests the growing need for policymakers to work together to develop and implement comprehensive policies and strategies to prevent youth uptake of vaping.

FUNDING: Nonprofit grant funding entity

SYM24-5

REGULATORY COMPLIANCE OF PACKAGING OF DISPOSABLE VAPING PRODUCTS IN ENGLAND, CANADA, AND THE US

Matilda Nottage. King's College London.

BACKGROUND: Packaging may play a role in the recent popularity of disposable vaping products. This study aims to assess the extent to which packaging of popular disposable vapes comply with Tobacco and Related Products Regulations (TRPR 2016) in England, federal regulations in Canada and the US, and mandatory health warnings across all three countries. METHODS: A content analysis of the packaging of 50 disposable vapes was conducted between February 2022 and August 2023 using a codebook (<https://doi.org/10.31234/osf.io/bh3mp>). Products were sampled from online and brick-and-mortar retailers in England, Canada, and the US, selecting popular products based on youth and adult survey data and indications from retailers. Packaging elements of vapes were compared across all countries for the country-specific regulatory requirements. RESULTS: The mandated health warning was present on all disposable vape packs, but some were non compliant with formatting requirements, including 11 of 17 from the US, 4 of 17 from England and 1 of 16 from Canada. Claims about health benefits, financial promotions, or sustainability, which are prohibited in England, were not identified on any products. While also prohibited by the TRPR, claims about sensory perceptions and references to 'natural' flavours were identified in England (on 2 and 13 products, respectively), Canada (6 and 1) and the US (5 and 10). All packages from Canada ($n=16$) and the US ($n=17$), and most from England ($n=15$ and $n=14$, respectively) included an ingredients list and e liquid quantity. E-liquid batch numbers were common in England ($n=14$) and Canada ($n=14$) but less so in the US ($n=8$). TRPR-mandated indication of nicotine per dose was present on most products from England ($n=14$) but none from Canada or the US; similarly, use/storage instructions were common in England ($n=15$) but not in Canada ($n=0$) or the US ($n=4$). In line with TRPR, all products sampled in England featured tamper-evident and child-resistant packaging, indications of nicotine strength and the manufacturer's contact details. CONCLUSIONS: Federal regulations in Canada and the US were limited to health warnings at the time of study; while all products had warnings, compliance with formatting guidelines was lower for those from the US. Compliance was high in England for TRPR packaging requirements for health warnings, tamper evident and child-resistant elements.

FUNDING: Nonprofit grant funding entity

SYM25

ADVANCING HEALTH EQUITY BY IMPROVING TREATMENT RESPONSE: IMPLICATIONS FOR RESEARCH AND PRACTICE

Lisa Sanderson Cox, PhD. University of Kansas School of Medicine.

After decades of progress, rates of quitting have stalled among racial/ethnic minority and socioeconomically disadvantaged smokers despite high motivation to quit and more past-year attempts. To advance health equity, research and clinical efforts must continue to advance treatment for those facing greatest disadvantage. Using data from three randomized clinical trials in Black adult socioeconomically disadvantaged smokers and data from a Cochrane review investigating smoking cessation interventions that work best, poorest or equivalently in different socioeconomic groups, this symposium will assist clinicians in identifying individuals at increased risk for poor treatment response and provide tangible recommendations for designing treatments better suited to racial/ethnic minority and lower socioeconomic groups. The first presentation evaluates two randomized clinical trials (RCT) to examine predictors of smoking abstinence among Black adult smokers who received varenicline; health insurance, home ownership, and too a lesser extent, perceived stress were factors placing individuals at risk for poor treatment response. The second presentation uses data from an RCT of Black adult smokers to identify patients likely to respond successfully to using the nicotine patch – a minimal, relatively low-cost intervention – and those who require more intensive or

alternative intervention. The final presentation shares findings from a Cochrane review synthesizing complex differences in the effectiveness of individual-level smoking cessation interventions by socioeconomic indicators and discusses intervention elements that support cessation. Engaging discussion will focus on enhancing interventions and clinical decision making to increase abstinence success with the goal of reducing health inequalities.

SYM25-1

PREDICTING RESPONSE TO VARENICLINE IN BLACK AMERICAN ADULTS: GUIDING CLINICAL DECISION MAKING TO ADVANCE HEALTH EQUITY

Lisa Sanderson Cox¹, Nicole L. Nollen¹, Alexandra R. Brown¹, Eleanor L.S. Leavens¹, Neal L. Benowitz², Jasjit S. Ahluwalia³, Matthew S. Mayo¹. ¹University of Kansas School of Medicine, ²University of California San Francisco, ³Brown University.

Background: Varenicline effectively increases smoking abstinence in Black adults, providing a major tool to combat tobacco-related health disparities. Clinical decision making may be improved by identification of individual characteristics associated with treatment response. **Aim:** To identify baseline characteristics predictive of smoking abstinence among Black adults following varenicline treatment. **Methods:** The Kick It at Swope (KIS) and Quit2Live (Q2L) clinical trials treat Black adults who smoke. Data from participants receiving 12-weeks varenicline in two clinical trials (KIS-IV, n=300; Q2L, n=224) were analyzed to identify baseline predictors of biochemically confirmed 7-day point prevalence smoking abstinence at Week 12 (end of treatment) using chi-square tests, two sample t-tests, and logistic regression analyses. **Results:** Black adult daily smokers, 51% female, had mean age 47.84 (12.0) years, used 12.7 (6.4) cigarettes per day (cpd), 87.0% smoked menthol, and 79.0% smoked within 30 minutes of waking. At Week 12, 18.3% of participants were confirmed abstinent. Best subsets logistic regression identified a 5-factor model demonstrating significantly greater abstinence among participants who reported having health insurance (OR = 2.59, 95% CI = 1.53-4.41, p < 0.001), owning their home (OR = 2.44, 95% CI = 1.43-4.19, p < 0.001), and among female participants (OR = 1.88, 95% CI = 1.16-3.05, p < 0.01), and lower abstinence among participants reporting greater baseline cpd (OR = 0.94, 95% CI = 0.90-0.98, p < 0.01) and greater perceived stress (OR = 0.90, 95% CI = 0.83-0.98, p < 0.05). Ad hoc analyses examining socioeconomic advantages of owning a home and having health insurance found 42.6% abstinence among the 11.6% of our sample who had both advantages, 18.4% abstinence among the 52.9% of our sample who had only one advantage, and only 10.2% abstinence among the 35.5% of our sample who had neither advantage. **Conclusions:** Varenicline promotes abstinence in Black adults and should be considered for all eligible smokers; because achieving abstinence remains challenging, clinicians need to consider adjuvant intervention, particularly for those with increased risk of poorer treatment response. Findings indicate those with socioeconomic adversity have substantial risk for continued smoking and require additional support. To advance health equity, research and clinical efforts must continue to advance treatment for those facing greatest disadvantage.

FUNDING: Federal

SYM25-2

FACTORS ASSOCIATED WITH EARLY TREATMENT RESPONSE IN BLACK ADULTS RECEIVING PHARMACOTHERAPY FOR SMOKING CESSATION: IMPLICATIONS FOR CLINICAL DECISION-MAKING

Eleanor Ladd Schneider Leavens¹, Matthew S. Mayo¹, Alexandra R. Brown¹, Lisa Sanderson Cox¹, Edward Ellerbeck¹, Jasjit S. Ahluwalia², Nicole L. Nollen¹. ¹University of Kansas Medical Center, ²Brown University.

Introduction: Smokers who achieve abstinence in the first few weeks of treatment have significantly greater odds of maintaining abstinence. Despite potential clinical utility, there is limited information on what factors are associated with early treatment response (ETR). **Methods:** Secondary analysis of an open-label randomized trial among Black adults who smoke daily and were interested in quitting smoking. Participants were randomized to standard treatment (7 sessions of counseling + nicotine patch) or adaptive treatment (included up to two pharmacotherapy adaptations [Varenicline; Bupropion + patch]). Adaptations occurred at weeks 2 and 6 for individuals not responsive to pharmacotherapy, based on biochemically confirmed smoking status with CO=5 ppm indicating treatment response. Regardless of treatment, participants received 18 weeks of pharmacotherapy with long-term follow-up at week 26 (biochemically confirmed abstinence with anatabine and anabasine =2ng/mL). Baseline assessment included demographics, socioeconomic status, smoking history, psychosocial, and biological characteristics. Logistic regression, including treatment, assessed the association

between ETR (CO-verified abstinence at week 2) and abstinence at week 26. Multiple logistic regression using best subset variable selection determined predictors of ETR. **Results:** ETR was predictive of abstinence at week 26 (OR=3.6, 95, p<.001), highlighting the importance of ETR. In best subset multivariable analyses, three factors were retained in the final model predicting ETR: smoking fewer CPD, non-use of other tobacco products, and lower baseline cotinine (ps<.01). **Discussion:** Participants who stopped smoking using nicotine patch therapy in the first 2 weeks of treatment had a 3.6 greater odds of achieving abstinence at week 26 compared to participants who continued smoking in early treatment. Early responders smoked fewer cigarettes per day, reported non-use of other tobacco products, and had lower cotinine at baseline. Findings can be used to advance health equity and inform clinical decision-making by identifying patients likely to respond successfully to nicotine patch – a minimal, relatively low-cost intervention – and those who may benefit from more intensive or alternative intervention.

FUNDING: Federal

SYM25-3

A COMPLEX EVIDENCE SYNTHESIS INVESTIGATING THE EFFECT OF INDIVIDUAL-LEVEL SMOKING CESSATION INTERVENTIONS ON SOCIOECONOMIC INEQUALITIES IN TOBACCO SMOKING

Annika Theodoulou¹, Nicola Lindson², Thomas R. Fanshawe³, James Thomas², Nicole L. Nollen⁴, Jasjit S. Ahluwalia⁵, Eleanor L.S. Leavens⁴, Jamie Hartman-Boyce³. ¹Nuffield Primary Care Health Sciences, Univ Oxford, ²University College London, ³University of Oxford, ⁴University of Kansas Medical Center, ⁵Brown University.

Significance: People from lower socioeconomic (SE) groups are more likely to smoke and less likely to achieve abstinence, making smoking a leading driver of health inequalities. Contextual factors affecting subpopulations may moderate the efficacy of a smoking cessation (SC) intervention, thus, the same intervention may perform differently across socioeconomically diverse groups. Historically, this has been challenging to quantify and synthesize. We present methods of a complex evidence synthesis investigating differences in the effectiveness of SC interventions by SE indicators (SEI), to estimate the intervention impact on health inequalities due to tobacco use. We also consider ways in which trialists measure SEI in SC trials, and make recommendations for best practice. **Method:** We searched the CDSR for Cochrane reviews on tobacco and/or smoking. We screened these reviews for RCTs on any individual-level SC intervention compared to no treatment, placebo, or other SC intervention in adults smoking combustible cigarettes. Studies must have investigated the interaction between any SEI and treatment on SC at =6mths. The search was run in Nov 2022 and supplemented by an AI search. Study eligibility, extraction of data for analyses and risk of bias assessments were conducted in duplicate. Synthesis is taking on several forms, including association direction plots, and calculating and pooling ratios of odds ratios. We created categories for intervention impact on health inequality, to which each study is assigned. We also extracted data on study elements designed to support lower SE groups. **Results:** Our search and screen found 56 eligible reviews, from which 3895 papers were screened at full-text, and 99 studies included. Over 800 trialists were contacted for information with greater than anticipated response rates. Most studies did not have numeric data but did report information that allowed us to categorize the intervention impact on health inequalities. The presentation will include an overview of these results, and methodological considerations for primary studies and syntheses in this area. **Conclusion:** This review illustrates systematic and novel methods for a complex evidence synthesis investigating health inequalities in tobacco smoking. It highlights areas where reporting could be improved in primary studies, including providing count data for SC within SE subgroups, and reporting all interactions tested for in planned and post-hoc analyses.

FUNDING: Nonprofit grant funding entity; Other

SYM26

1 + 1 = 3: UNDERSTANDING THE IMPACTS OF NICOTINE IN POLYSUBSTANCE USE

Melissa Herman.

Nicotine use that occurs in conjunction or in parallel with other substances (co-use or polysubstance use) is becoming increasingly prevalent in both young people and adults. The most common forms of polysubstance use include nicotine/THC and nicotine/alcohol, however, nicotine use also occurs in conjunction with dietary components, including a high fat diet. Despite the increasing prevalence, the impact of nicotine polysubstance use and the comparative effects of nicotine co-used with other substances remains an understudied area. Pre-clinical studies examining nicotine polysubstance-induced neurobiological changes in defined brain regions are critical for understanding the mechanisms associated with nicotine polysubstance exposure and subsequent reward-



and/or stress-related behaviors. This symposium brings together a diverse group of pre-clinical scientists to present their work on the neurobiological effects of nicotine polysubstance use in rodent models. Dr. Valeria Lallai will present data on the effects of prenatal exposure to nicotine and THC vapor, specifically examining the impact of co-exposure on nicotinic receptor alterations within both the placenta and fetal brain and potential sex-based differences in offspring development across various stages (adolescence and adulthood). Iman Aziz from Dr. Jibran Khokhar's laboratory will present new work on vaporized nicotine/THC co-exposure in adolescence, focusing on sex-specific alterations in reward- and anxiety-related behavior and brain connectivity in adulthood. Dr. Anna Lee will present data examining nicotine and alcohol co-use, highlighting the involvement of cholinergic signaling at nicotinic acetylcholine receptors in the brainstem and midbrain using mouse models of consumption, aversion and withdrawal. Samuel Tetteh-Quarshie from Brandon Henderson's lab will present new data on the interaction between nicotine use and high fat diet consumption, and the consequences of this co-exposure on metabolic markers, neuronal function in the ventral tegmental area and prefrontal cortex, and on self-administration of electronic nicotine vapor. Dr. Melissa Herman will present data on sex differences in nicotine vapor and alcohol co-exposure and the impact of co-use on metabolism, neuronal activation, and voluntary drinking behavior in male and female mice. Lastly, Dr. Meredith Addicott will be providing a summary of the talks and her perspective on the field as a discussant.

SYM26-1

GENERATION E-CIG: UNVEILING THE DUAL IMPACT OF PRENATAL NICOTINE VAPE AND EDIBLE THC ON BRAIN DEVELOPMENT

Valeria Lallai. UCI.

The rise in concurrent nicotine and THC usage among expectant mothers is influenced by the prevalent availability of e-cigarettes promoted as a 'safer' alternative and the growing accessibility of THC edibles. Nicotine and cannabinoids influence dopaminergic signaling operating through distinct receptors in overlapping cellular groups, this interaction suggests potential diverse consequences from their combined consumption. The complex interplay between these substances during prenatal development raises inquiries about their cumulative influence on embryonic growth, neurodevelopment, and overall well-being. To mimic human patterns, female Wistar rats were pre-exposed before mating and then given daily nicotine vape and oral THC throughout pregnancy. Maternal blood samples were collected to quantify nicotine and cannabinoid metabolites, ensuring accurate drug exposure assessment. On gestational day (GD) 18, placental tissue and fetal brains were collected for RT-qPCR analysis on mRNA expression of nicotinic subunits, cannabinoid receptors (nAChRs and CBR), dopamine receptors and transporters (D3 and DAT), and sex-specific markers. In a separate group, mothers gave birth and offspring were sacrificed on post-natal day (PND) 21 or PND 72, allowing assessment for the same mRNA. Moreover, tissues were used to localize receptors, studying distributions and prenatal paradigm effects, with RNAscope. Our findings initially confirmed the presence of cotinine, nicotine's principal metabolite, and THC in the maternal blood, placenta, and fetal brain. The results also divulged a remarkably specific distribution of nAChRs across various layers of the rat placenta. Intriguingly, a downregulation of alpha7 subunit mRNA was observed for single drug exposures, and a pronounced alteration in beta2 and DAT mRNAs were evident at G18 for all groups exposed to either a single drug or both drugs during pregnancy. RNA scope analysis demonstrated a distinctive distribution of CBR, predominantly located within the junctional zone and decidua, while being notably absent in the labyrinth zone. By unveiling the intricate relationship between maternal e-cigarette usage, drug exposure, and developmental outcomes in rats, this research possesses the potential to bolster public health strategies and interventions, thereby fostering healthier outcomes for generations to come.

FUNDING: Federal; State

SYM26-2

IMPACT OF VAPORIZED NICOTINE AND CANNABIS CO-USE IN ADOLESCENCE ON SEX-SPECIFIC BEHAVIORAL AND NEURAL EFFECTS IN ADULTHOOD

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Introduction: Adolescents are vaping nicotine and cannabis at high rates in North America. In adolescence, the brain undergoes a critical period of development where it is vulnerable to effects of substances including nicotine and (THC), the main psy-

choactive cannabinoid in cannabis. Here, we examined whether adolescent co-exposure to vaporized nicotine and THC or cannabis flower would impact reward- and anxiety-related behaviors in adult male and female rats during adulthood. Methods: Four groups of male and female Sprague Dawley rats (n = 8/group/sex) starting on post-natal day (PND) 28 received once-daily passive administration of either vaporized propylene glycol vehicle, nicotine, THC, or combined THC and nicotine for 14 days. The cannabinoid tetrad test measured locomotion, hypothermia, tail-flick analgesia, and catalepsy to assess behavioural outcomes of adolescent THC exposure. In adulthood, rats underwent behavioural tasks including locomotor reactivity to a novel environment, and Pavlovian conditioned approach (PCA) testing. PCA scores were used to evaluate the performance of rats as sign-trackers or goal-trackers, where sign-tracking has been associated with vulnerability to addiction. In the subsequent study, rats were exposed to either vaporized nicotine STLH pods, cannabis flower, a combination of nicotine and cannabis, or an air and vaporized STLH pod vehicle. Rats underwent the same behavioral tasks as the first study. Neural correlates of the behavioural changes are being explored via preclinical fMRI. Results: In adulthood, female rats exposed to vaporized nicotine and THC in combination during adolescence exhibited altered anxiety-related behavior via increased time in the center zone when placed in a novel environment. Male rats exposed to nicotine and THC displayed altered reward-related behavior in adulthood via enhanced levels of sign-tracking behavior. In the subsequent study, female rats exposed to nicotine and cannabis displayed altered reward-related behavior in adulthood through their hyperactivity in a novel environment. Males exposed to either nicotine or cannabis displayed altered reward-related behavior in adulthood via early opposing levels of sign-tracking behavior. Conclusions: These studies demonstrate that co-exposure to vaporized nicotine and THC or cannabis during adolescence in male and female rats differentially produces long-term changes in reward- and anxiety-related behaviors.

FUNDING: Federal

SYM26-3

INSIGHTS INTO ALCOHOL AND NICOTINE CO-USE: NICOTINIC CHOLINERGIC MECHANISMS IN MODELS OF ALCOHOL USE DISORDER

Anna M. Lee. University of Minnesota.

Nicotine and alcohol co-use is highly prevalent and nicotine and alcohol use disorders share common molecular mechanisms. One common molecular mechanism is the involvement of nicotinic acetylcholine receptors (nAChRs), which are the target of nicotine and modulate the effects of alcohol. Here we present new data on the expression and upregulation of nAChRs after alcohol administration and withdrawal in pre-clinical mouse models. For passive alcohol administration, adult male and female C57BL/6J mice were administered saline, 2, or 4 g/kg i.p. alcohol for 1, 5, or 15 days. We observed a significant increase in activated cholinergic neurons in the brainstem mesopontine tegmentum in males but not in female mice. There was also an increase in alpha6, alpha4 and beta2 nAChR subunit transcript expression in cholinergic neurons of the brainstem after chronic alcohol administration measured by fluorescent in situ hybridization. For alcohol withdrawal, male C57BL/6J mice were administered alcohol (2.5 g/kg i.p.) or saline, both paired with alcohol dehydrogenase inhibitor 4-methylpyrazole (9 mg/kg ip) for 9 days. Behavioral markers of anxiety and alcohol withdrawal were measured at 24 hours and 7 days after the last injection. Alcohol-treated mice showed increased withdrawal and anxiety-like phenotypes at 24 hours withdrawal compared with saline-treated mice. Total somatic withdrawal signs and chewing behaviors were increased in alcohol-treated animals compared with controls (both p<0.05). In alcohol-treated mice, there was a significant increase in the number of buried marbles by the alcohol-treated mice at 24 hours and 7 days withdrawal in a marble burying test, a measure of compulsive-like behavior, and a 20% decrease (p=0.048) in open area time in an elevated-zero maze, indicating increased anxiety-like behavior. nAChR subunit transcripts in the ventral tegmental area were probed using fluorescent in situ hybridization and we found an increase in alpha6 nAChR subunit expression in the VTA at 7 hours and 24 hours of withdrawal. Our data suggests that alcohol administration and withdrawal activates brainstem cholinergic neurons and increases the expression of nAChR subunits in the brain, providing new data on the cholinergic involvement of alcohol and new insight into the molecular mechanisms underlying nicotine and alcohol co-use.

FUNDING: Federal

SYM26-4

HIGH-FAT DIET CONSUMPTION ALTERS NICOTINE SELF-ADMINISTRATION IN MALE AND FEMALE MICE BY IMPACTING VTA DOPAMINE NEURON PHYSIOLOGY AND BASAL METABOLIC MARKERS

Samuel Tetteh-Quarshie. Marshall University.

Background: The relationship between obesity and nicotine dependence has been loosely studied even though nicotine has long been associated with weight loss and appetite suppression. However, the increasing incidence of tobacco- and obesity-related deaths in the last decade makes it clinically relevant to understand potential mechanisms modulating diet-induced obesity and nicotine dependence. Therefore, our objective was to investigate if high-fat diet (HFD) impacts nicotine intake and in parallel examine potential changes in neuronal function and basal metabolic markers. **Methods:** Adult male and female mice were used in nicotine e-vape® self-administration (EVSA) assays after being maintained on either a low-fat diet (LFD) or a HFD for 6 weeks. Here, mice were trained to self-administer 6 mg/mL nicotine with 15 mg/mL menthol on a fixed-ratio 1 (FR1), FR3, and a progressive ratio schedule. Weekly body weight and amount of food consumed were recorded. After the last EVSA schedule, plasma glucose, insulin, leptin levels were examined using an ELISA assay. Brains were extracted for slice electrophysiology to examine changes in the intrinsic excitability of ventral tegmental area (VTA) dopamine (DA) neurons and prelimbic medial prefrontal cortex (mPFC) cells. **Results:** Compared to the LFD group, mice assigned to HFD exhibited enhanced nicotine EVSA during low-effort responding (FR1 session) and nicotine reinforcement (FR3 session) tasks. Conversely, HFD-assigned mice exposed to nicotine exhibited a significant increase in body weight, and plasma leptin levels, with a sex-specific decrease in VTA DA cell bodies. Overall, mice assigned to HFD and nicotine e-vape exhibited higher rheobase with a significant reduction in VTA DA neuron firing frequency. Finally, HFD-fed mice exposed to eVape exhibited a significant decrease in rheobase in mPFC cells. **Conclusions:** The behavioral data gathered from our experiment suggest that HFD consumption alters nicotine intake and this may be due to changes in VTA DA neuron function and basal metabolic markers.

FUNDING: Federal; Academic Institution

SYM26-5

NICOTINE VAPOR AND ALCOHOL CO-EXPOSURE PRODUCES SEX-SPECIFIC CHANGES IN METABOLISM, BRAIN ACTIVITY, AND BEHAVIOR

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Rationale: The combined use of electronically vaporized nicotine and alcohol drinking is increasing in prevalence, particularly in younger populations. However, the effects of nicotine/alcohol co-exposure on metabolic, neuronal, and behavioral processes remains unclear. **Objectives:** Determine the effects of electronic nicotine vapor and alcohol co-exposure on metabolism, neuronal activity in drug-associated brain regions, and on behaviors associated with both nicotine and alcohol exposure. **Methods:** Female and male C57Bl6/j mice were exposed to electronic nicotine vapor [3-6% (30-60 mg/mL) nicotine freebase in 1:1 polyethylene glycol (PG)/vegetable glycerol (VG)] alone or in combination with ethanol vapor for 3h sessions (3 sec vapes, 10min interval between vapes). Behavioral testing occurred after vapor exposure and serum and/or brains were collected for metabolic analysis and immunohistochemical analysis of neuronal activity in the central amygdala (CeA) and ventral tegmental area (VTA). **Results:** Nicotine vapor exposure acutely increased intermittent access two bottle choice (IA-2BC) alcohol drinking in males but not in females but produced no persistent changes in alcohol drinking. Chronic nicotine vapor and alcohol drinking increased locomotor activity in both males and females, and an anxiolytic effect was seen in males. Locomotor activity and anxiolytic effects remained elevated in male but not female mice in abstinence from nicotine vapor. After repeated nicotine vapor exposure, binge drinking (Drinking in the Dark, DID) levels decreased in both females and males but subsequently increased to control levels following a prolonged binge drinking period. Both nicotine vapor and ethanol drinking trended towards increased cFos expression in CeA, however there were no significant differences in CeA cFos expression between groups. In contrast, increased cFos expression in the VTA of nicotine/water drinking females was lost in the nicotine/alcohol drinking group. In males there were no significant differences in cFos expression in the VTA. Simultaneous nicotine and alcohol vapor exposure reduced blood alcohol levels (BALs) in females but resulted in higher BALs in males as compared to females. **Conclusions:** These findings illustrate how combined nicotine vapor/

alcohol exposure dysregulates metabolic systems, brain region activity and behavior in a sex-specific manner, potentially complicating diagnosis and treatment of this form of polydrug exposure.

FUNDING: Federal

SYM27

THE AVAILABILITY AND MARKETING OF NICOTINE PRODUCTS IN LATIN AMERICA

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The range of available nicotine-containing products has increased in the last 15 years. However, cigarettes continue to account for most global sales. Even though cigarette sales are in decline, this does not apply to all cigarette types. For instance, capsule cigarettes, which have one or more flavour-changing capsules in the filter, have experienced remarkable global growth. This is especially the case in Latin America, where they account for more than 40% of market share in some countries. These products have captured very limited academic interest however. Another tobacco product which has failed to garner much interest outside of Europe, North America and Australia is rolling (or roll-your-own) tobacco. While rolling tobacco is particularly popular in Europe, increased sales are reported in most other regions. In contrast, heated tobacco products (HTP) and e-cigarettes have received considerable academic attention, but this has been concentrated within high-income countries with less attention in other regions. REMoving the MArketing Power of cigarettes (REMAP) is a multi-method project, involving three interlinked studies in four middle-income Latin American countries (Argentina, Guatemala, Mexico and Peru). The first study, conducted between April and July 2023, used a bespoke codebook to explore the availability and marketing of tobacco (including flavour cigarettes, rolling tobacco, and HTPs) and nicotine products (e-cigarettes) at retail points of sale. Mariel Palacios will begin the session by presenting findings on the marketing of traditional flavour cigarettes and flavour capsule cigarettes at points of sale. As single cigarettes offer young people an inexpensive route into smoking and continued use, allied to the lack of data on the extent of single stick sales in Latin America, Eva Chaname will then discuss the proportion of points of sale selling single cigarettes, the number of different brands, and the lowest price these are sold for. Emilia Elicabe will subsequently talk about the presence of rolling tobacco and accessories (e.g. filters and rolling papers) and how these are promoted. Finally, Gustavo Davila will discuss the sale and advertising of HTPs and e-cigarettes across the four countries.

SYM27-1

THE MARKETING OF FLAVOUR CIGARETTES AT POINTS-OF-SALE IN FOUR LATIN AMERICAN COUNTRIES.

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Introduction: Sales of flavour cigarettes in Latin America have grown rapidly in the last decade, especially in Argentina, Guatemala, Mexico and Peru, primarily due to the introduction of cigarettes with one or more rupturable flavour-changing capsules in the filter. Little is known about how capsule (and indeed traditional flavour) cigarettes are marketed in this region however. Given the increased importance of the point of sale as a marketing channel for tobacco companies, as a growing number of countries in Latin America have banned tobacco marketing in traditional media, we explored how flavour cigarettes are being promoted at the point of sale. **Methods:** Between April and July 2023 we collected data from tobacco-selling points of sale (POS) around schools in Argentina, Guatemala, Mexico, and Peru. School neighbourhoods were randomly selected based on socioeconomic status, and a walking protocol based on the 'Tobacco Packaging Surveillance System' (TPackSS) followed. The objective was to visit 500 POS in each country, with a final sample of 2081 POS. Descriptive data on the marketing of flavour cigarettes at POS is presented. **Results:** The display of cigarette packs was the most common form of advertising across the four countries (52.7%), with 46.0% of these displays showing traditional flavour cigarettes (ranging from 17.9% in Argentina to 83.7% in Peru) and 92.0% capsule cigarettes (ranging from 86.3% in Peru to 98.4% in Guatemala). Single sticks were visible in 37.1% of the POS. Among the single sticks sold, 33.9% included traditional flavour cigarettes (ranging from 4.9% in Argentina to 70.4% in Peru) and 90.3% capsule cigarettes (ranging from 55.6% in Argentina to 98.3% in Guatemala). Posters were displayed in 17.8% of the POS, with 87.8% of all posters observed featuring flavour cigarettes. Most (93.5%) POS with posters displayed at least one poster for flavour cigarettes (ranging from 76.8% in Argentina to 98.8% in Peru). Other less common types of marketing were stickers (0.6%), bespoke displays (0.3%), and promotional items (0.3%). **Conclusions:** Despite regulatory differences between

the four countries, advertising of flavour cigarettes at POS was prevalent. Research exploring the impact of this advertising on youth perceptions and use of traditional flavour and capsule cigarettes is needed.

FUNDING: Other

SYM27-2

ILLEGAL RETAIL SALES OF SINGLE CIGARETTES IN FOUR LATIN AMERICAN COUNTRIES

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Introduction: In many Latin American countries the sale of single cigarettes, which is a potential route into smoking, is banned. However, evidence of enforcement is scarce. As such, we explored how common the sale of individual cigarettes is at points of sale in four Latin American countries. **Methods:** Between April and July 2023, we visited 2,081 retail points of sale located around randomly selected schools in four cities in four Latin American countries (Argentina, Guatemala, Mexico, and Peru). The routes selected in each location followed the 'Tobacco Packaging Surveillance System' (TPackSS) methodology. Individual cigarettes were purchased at each point of sale, if it was possible to do so. **Findings:** For the total sample, single cigarettes could be observed at 37.0% of points of sale, ranging from 14.5% in Peru to 91.1% in Guatemala. We found that 24.4% of the points of sale had at least three different brands displayed as single cigarettes, ranging from 4.7% in Argentina to 65.4% in Guatemala. A total of 1602 individual cigarettes were purchased in 57.2% of the outlets surveyed, ranging from 235 single cigarettes in Guatemala to 565 in Peru. The lowest prices of individual cigarettes at the time of purchase ranged from 0.03 US dollars in Argentina to 0.13 US dollars in Guatemala. **Conclusions:** It is clear that the sale of individual cigarettes, in direct violation of the laws in each of the four countries, is a common practice. The availability of individual cigarettes, and the low price that these sell for, will increase the risk of trial and continued use among children and young people. Enforcement of these bans is essential in order to better safeguard young people from this temptation.

FUNDING: Other

SYM27-3

THE PRESENCE AND MARKETING OF ROLL-YOUR-OWN TOBACCO IN ARGENTINA, GUATEMALA, MEXICO, AND PERU

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Introduction: Roll-your-own (RYO) tobacco consumption is highest in Europe and the US, but increased sales are reported in other regions, including Latin America. However, we are unaware of any research that has explored the availability and promotion of RYO tobacco and accessories in Latin America, and if this differs by neighbourhood socioeconomic status (SES). **Methods:** This cross-sectional study involved an observation of 2081 Points of Sale (POS) across four cities in four Latin American countries (Argentina, Guatemala, Mexico, Peru) from April to July 2023. In each city, schools were randomly selected and stratified according to neighbourhood SES, with all POS located in pre-established routes around the schools observed. A codebook was developed from past research to assess tobacco product availability and marketing. **Results:** The sale of RYO tobacco was almost exclusively observed in Argentina, with only one retail point in Guatemala offering this product and none in Mexico and Peru. As such, the analysis focuses only on the sale and promotion of RYO tobacco and accessories in the four cities in Argentina (Córdoba, Quilmes, San Salvador de Jujuy, Santa Rosa). RYO tobacco was observed in 21.5% (n=110) of the POS. Among these, 47.7% (n=52) sold flavoured RYO tobacco. In 70.6% (n=77) of the POS packs of RYO tobacco were placed near the cash register, in 63.3% (n=69) near candy and/or toys, and in 30.3% (n=33) within a brand-sponsored display. Advertising for RYO tobacco was uncommon, observed at only 1.8% (n=2) of the POS. Accessories (rolling papers, filters) for RYO tobacco were visible in 25.2% (n=129) of the POS. Among these, 14.0% (n=18) offered flavoured RYO tobacco accessories, 69.0% (n=89) had them located near the cash register and 32.6% (n=42) within a brand-sponsored display. We found a statistically significant association between SES and the availability of both RYO tobacco and accessories (p<0.05). Only 10.9% (n=12) of the POS offering RYO tobacco were situated in low SES neighbourhoods, 46.4% (n=51) in medium SES areas, and 42.7% (n=47) in high SES areas. Similarly, only 14.7% (n=19) of POS offering RYO tobacco accessories were located in low SES areas, with 45.0% (n=58) in medium SES areas and 40.3% (n=52) in

high SES areas. **Conclusions:** The study allows an insight into RYO tobacco penetration in several Latin American countries. RYO tobacco and accessories were only commonly sold in Argentina, principally in high and medium SES areas.

FUNDING: Other

SYM27-4

ELECTRONIC CIGARETTES AND HEATED TOBACCO PRODUCTS AVAILABILITY AND ADVERTISING AT POINTS OF SALE IN FOUR LATIN AMERICAN COUNTRIES

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Introduction: Regulation of electronic cigarettes (e-cigarettes) and heated tobacco products (HTPs) varies across Latin America. For instance, they are banned in Mexico and Argentina, regulated in Perú, and unregulated in Guatemala. However, in these four countries little is known about the availability and advertising of e-cigarettes and HTPs. **Methods:** Four cities were selected in each of these four countries. Neighbourhoods were randomly selected based on socioeconomic status (SES). We used the 'Tobacco Pack Surveillance System' (TPackSS) protocol to assess product availability, brands, placement, and POS advertising. In each neighbourhood, a school was used as the starting point and a predefined route was followed to collect data from gas stations, convenience stores, supermarkets, informal vendors, and kiosks. **Results:** A total of 2081 POS were visited. Few retail outlets sold e-cigarettes (1.5%), which were only found in Guatemala (5.4%) and Perú (1.0%). Similarly, few sold HTPs (2.4%), which were found in Guatemala (4.5%), Mexico (4.4%), and Perú (1.7%). Both products were mostly available in gas stations and convenience stores. All e-cigarettes and 36.7% of HTPs were located less than 50 cm of the cash register, with most e-cigarettes (87.5%) and 53.0% of HTPs placed less than 50 cm of confectionary. Posters, inside the store, were the most common POS advertising found. E-cigarettes and HTPs displays were found in 78.1% and 69.4% of POS, respectively. **Conclusions:** E-cigarettes and HTPs are not widely available at POS in these four countries. This provides an important baseline for future research. The findings suggest that the ban on these products in Argentina and Mexico is being adhered to, although less so in Mexico as HTPs were observed in almost one in twenty POS. Where these products are available, POS advertising is not frequent, yet product placement, posters, and displays are common. Continued monitoring of these products at POS, which have high visibility to young people, is warranted.

FUNDING: Other

SYM28

BIOMARKERS OF TOBACCO EXPOSURE AND POTENTIAL HARM AMONG YOUTH AND ADULTS WHO USE ENDS: WAVES 1-5 (2013-2019) OF THE PATH STUDY

Kristin Harknes.

This research will examine the toxicant exposure among youth and adults who use ENDS and may or may not use other tobacco products; these findings will provide the most recent biomarker data from the PATH Study to support CTP's regulatory authority over tobacco products for the protection of public health.

SYM28-1

BIOMARKERS OF TOBACCO EXPOSURE AND POTENTIAL HARM AMONG YOUTH AND ADULTS WHO USE ENDS: WAVES 1-5 (2013-2019) OF THE PATH STUDY

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Biomarkers of tobacco exposure can be used to evaluate tobacco product toxicity and characteristics, including their potential to cause dependence, morbidity, and mortality in those who use them. Research on the toxicity of electronic nicotine delivery systems (ENDS) use has largely found that ENDS use results in more exposure to substances including nicotine, NNAL (a carcinogenic tobacco specific nitrosamine), and acrylonitrile (a volatile organic compound respiratory toxicant) compared to non-use, but less



exposure than conventional cigarette use or dual use. This symposium will present an introduction on the Population Assessment of Tobacco and Health (PATH) Study biospecimens and biomarkers, as well as analyses from five studies utilizing PATH Study data from 2013-2019; these studies use cross-sectional and longitudinal biomarker of exposure and potential harm data from youth and adults who use ENDS exclusively or with cigarettes or other tobacco products. The PATH Study is a nationally representative, longitudinal cohort study of approximately 46,000 youth (ages 12-17) and adults (ages 18+) with a subset of respondents who provided biospecimens that were analyzed for biomarkers of tobacco exposure (e.g., cotinine, total nicotine equivalents, tobacco specific nitrosamines, volatile organic compounds, etc.) and biomarkers of potential harm (e.g., biomarkers of inflammation, such as high sensitivity C-Reactive Protein, and Interleukin-6). This symposium will use all waves of PATH Study biomarker data currently available (Wave 1 [2013/2014] - Wave 5 [2018/2019]). Specifically, this symposium will highlight research that examines: (1) Perceived nicotine content among youth and young adults who currently use ENDS (2018/2019); (2) Tobacco use characteristics associated with nicotine exposure among youth and young adults who use ENDS alone or with cigarettes (2018/2019); (3) Biomarkers of exposure by ENDS device type among adults who exclusively use ENDS (2018/2019); (4) Characteristics that impact changes in nicotine exposure among adults who use ENDS alone or with cigarettes (2013-2019); (5) Relationship between biomarkers of exposure and biomarkers of potential harm among adults who use tobacco, including ENDS (2013/2014). Dr. David Ashley will serve as Symposium Discussant to summarize the PATH Study research presented as well as implications for tobacco research in the U.S. and internationally.

FUNDING: Federal

SYM29

A GLOBAL PERSPECTIVE ON THE EVOLUTION OF THE NICOTINE MARKET: POLICIES, PRODUCTS, AND POPULATIONS

Shannon Gravely, PhD. University of Waterloo (ITC Project).

Over the last two decades comprehensive commercial tobacco control measures have been implemented to significantly reduce smoking prevalence; however, smoking prevalence still remains at 20% across the globe and over 8 million deaths from smoking occur annually. More recently, some cigarette manufacturers and other corporations began developing alternative nicotine delivery systems (ANDS) that do not involve the combustion of tobacco, including nicotine vaping products (NVPs, also known as e-cigarettes), heated tobacco products (HTPs), and oral nicotine products. Evolving over time, some of these products deliver nicotine at levels comparable to cigarettes and may serve as effective substitutes for people who smoke. However, the potential population health benefits of ANDS have been hotly debated with some governments embracing ANDS, particularly NVPs, as a viable alternative to cigarettes, while others have rejected these products—primarily due to the substantial increase among people who do not smoke and by youth—making legal access difficult. The International Tobacco Control (ITC) Project is uniquely placed to contribute to understanding of the interplay of ANDS and cigarettes owing to its harmonized surveys across multiple countries. This symposium will draw together evidence among youth and adults on the evolving nicotine marketplace, by presenting data across seven ITC countries (Australia, Canada, England, US, New Zealand, South Korea, Japan). Maciej Goniewicz will present a descriptive overview of differences between cigarettes, NVPs, and HTPs across four countries (AU, CA, EN, US). Geoffrey Fong will present a summary across all seven countries of (a) tobacco/nicotine product policies, (2) ever and regular use of NVPs/HTPs, and whether adults are using these products to help with quitting smoking. David Hammond will present on trends in use of nicotine products among youth (aged 16-19) in Canada, England, and the US, to identify emergent product use and evaluate natural experiments in tobacco and vaping policies. Janine Nip will present on current use of NVPs and HTPs among adults who currently smoke or formerly smoked in New Zealand and whether they used NVP/HTPs at their last attempt to quit smoking. David Levy will present on impact of NVP policies on cigarette and NVP use patterns based on simulation models in four countries (AU, CA, EN, US) with very different NVP policies. David Ashley will serve as the Discussant.

SYM29-1

MONITORING TOBACCO AND NICOTINE PRODUCT PREFERENCE AND DESIGN CHANGES

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Significance: The dynamic tobacco marketplace necessitates an 'early warning' system, across countries and time, for the identification and characterization of emerging tobacco/nicotine products that warrant further attention. Identifying products gaining or likely to gain significant market share and characterizing their nicotine delivery properties can inform the potential development of the market. **Methods:** We integrated data from ITC surveys, social media rapid scans (e.g., Twitter), and sales data (ISI) to identify brands with upward and downward trends over time. Within a subset of brands, we conducted reverse engineering and chemical analyses to identify product characteristics that may drive product uptake and use, including nicotine content, additives (e.g., flavors, cooling agents), and design elements (e.g., adjustability). **Results:** Examining 2 years of Twitter and sales data, we showed correlations ranging from 0.46 to 0.88 between Twitter mentions and sales for Juul, Elfbar, Hyde, and Puff Bar. As Puff Bar gained rapid popularity among youth, we examined design and showed substantial differences in battery (350 v 280 mAh) and tank design, flavoring content (24 vs 12 compounds), and nicotine (43 vs 12 mg/ml) between genuine and counterfeit products. Elfbar nicotine concentration (5% vs 2%) and capacity (5000 vs 600 puffs) differed substantially in the US and UK markets: we found significantly higher levels of synthetic coolant WS-23 in the US vs. UK Elfbar products. Consistent with the laws in Canada and Australia at the time of product purchase, nicotine was not detected in any of the e-liquids. US liquids had a mean nicotine concentration of 16.2mg/mL, and English liquids had a mean concentration of 11.9mg/mL (below UK's 20mg/mL limit). **Conclusions:** The tobacco marketplace continues to evolve. Social media and sales data tracking are congruent, providing initial validation of using social media to identify emerging trends more quickly. Products sharing common brand names differ across markets owing to regulatory requirements. Product composition, particularly with respect to nicotine and flavoring, varies by country, likely reflecting both marketplace preferences and country-specific regulations. Active surveillance of the tobacco marketplace can support further research.

FUNDING: Federal; Nonprofit grant funding entity

SYM29-2

TRENDS IN USE OF NICOTINE VAPING PRODUCTS AND HEATED TOBACCO PRODUCTS AMONG ADULTS WHO REGULARLY SMOKE CIGARETTES IN 7 COUNTRIES: FINDINGS FROM INTERNATIONAL TOBACCO CONTROL (ITC) SURVEYS

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Significance: We examined trends in: (1) ever and regular use of nicotine vaping products (NVPs) and heated tobacco products (HTPs) among adults who regularly smoke, (2) using NVPs/HTPs to quit smoking in 7 countries with differing regulatory approaches. **Methods:** Data were from two waves of ITC Surveys among adults who regularly smoke in Australia (AU—2016,2022), Canada (CA—2016,2022), England (EN—2016,2022), Japan (JP—2018,2021), New Zealand (NZ—2021,2022), Republic of Korea (KR—2020,2021), the US (2016,2022). Weighted GEEs estimated trends in ever use (even once), regular use (≥ weekly) of NVPs/HTPs, and whether a reason for NVP/HTP use was to quit smoking. **Results:** Between waves, ever use of NVPs increased in AU (45.9%–66.4%), JP (14.8%–31.0%) (all p < .001) and NZ (76.8%–81.4%, p = .01); declined in US (68.4%–62.2%, p < .01), and did not change in CA (61.5%–62.3%, p = .7), EN (62.5%–64.5%, p = .4) or KR (31.9%–28.6%, p = .06). Regular use increased in AU (2.7%–6.4%), CA (10.2%–14.2%), EN (8.3%–17.3%), JP (2.6%–7.6%) (all p < .001) and NZ (28.5%–34.1%, p = .02), and did not change in KR (3.6%–4.0%, p = .4) or US (11.4%–10.9%, p = .7). Using NVPs to quit smoking declined in AU (90.2%–78.3%, p = .02), CA (82.6%–73.4%, p = .002), EN (83.0%–75.9%, p = .01), NZ (49.4%–37.2%, p = .01), and US (83.8%–66.0%, p = .001), and did not change in KR (62.4%–56.0%, p = .4). Ever use of HTPs increased in AU (3.5%–6.9%, p = .02), CA (6.4%–18.7%, p < .001), EN (4.6%–15.1%, p < .001), JP (32.2%–99.7%, p < .001), NZ (15.4%–20.1%, p = .02), and US (5.0%–10.1%, p < .001), and did not change in KR (39.8%–37.2%, p = .2). Regular use of HTPs increased in AU (0.3%–1.4%, p = .02), CA (1.0%–4.8%, p < .001), EN (1.5%–4.6%, p < .001), JP (6.8%–37.0%, p < .001), and US (0.7%–2.4%, p < .01), declined in NZ (7.9%–4.3%, p = .01), and did not change in KR (10.1%–9.4%, p = .3). Using HTPs to quit smoking increased in KR (35.9%–52.0%, p < .001), declined in CA (87.4%–54.4%), and JP (54.9%–38.6%) (both p = .1). **Conclusion:** In all countries except JP and KR (leading HTP markets), ever/regular use of NVPs was higher than HTPs, with higher increased ever use of HTPs. Regular NVP and HTP use increased in 5 of 7 countries. Using NVPs to

quit smoking decreased in 6 of 7 countries; using HTPs to quit smoking increased in KR but decreased in JP, an interesting divergence in those two leading HTP countries. Regular use and use of NVP/HTPs to quit smoking did not vary in ways suggested by regulatory approaches.

FUNDING: Federal; State

SYM29-3

TRENDS IN THE USE OF NICOTINE PRODUCTS AMONG YOUTH IN CANADA, ENGLAND, AND THE UNITED STATES BETWEEN 2017 AND 2023: FINDINGS FROM THE ITC YOUTH & YOUNG ADULT TOBACCO AND VAPING SURVEY

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Significance: Preventing uptake among youth remains a central objective of tobacco control policy. The nicotine market continues to expand, with a wide array of vaping products, heated-tobacco products, and oral nicotine pouches now widely available. This study compares trends in use of nicotine products across countries to identify emergent product use and to evaluate natural experiments in tobacco and vaping policies. **Methods:** National repeat cross-sectional online surveys were conducted with youth aged 16–19 from 2017 to 2023 (N=117,967) in Canada, England, and the US as part of the ITC Youth & Young Adult Tobacco and Vaping Survey. Logistic regression models assessed time trends and country differences in the use of 10 individual product categories (cigarettes, e-cigarettes, cigarillos/little cigars, cigars, bidis, waterpipe/shisha, smokeless tobacco, nicotine pouches, heated tobacco, and NRT), as well as the use of 'any' nicotine product, 'any' combusted product, and 'any' non-combusted product. **Results:** Between 2017 and 2022, modest increases were observed in the prevalence of youth using 'any' nicotine product in Canada (18.5% to 22.3%) and the US (18.9% to 20.7%), with larger increases observed in England (21.8% to 36.3%). Combusted product use decreased in Canada (14.7% to 11.8%) and the US (14.7% to 8.6%), whereas non-combusted product use increased (Canada: 9.4% to 17.9%, US: 12.4% to 17.4%). In England, increased use of both combusted products (18.8% to 24.9%) and non-combusted products (9.4% to 26.3%) was observed, most notably between 2021 and 2022. Trends in non-combusted product use were largely driven by vaping, which followed a similar pattern across the three countries: substantial increases between 2017 and early 2020, a decrease in 2020 during the initial COVID-19 pandemic period, followed by a rebound in 2021–2022, with the largest post-pandemic increases observed in England. Trends through 2023 will be presented, as well as trends in individual products. The influence of national-level policies on product trends will also be discussed, including flavour restrictions and nicotine limits on vaping products. **Conclusion:** Between 2017 and 2023, there have been differences in the trends of nicotine product use among youth in Canada, England, and the US, both in terms of individual product types, as well as combusted versus non-combusted products.

FUNDING: Federal

SYM29-4

A MODELING APPROACH TO GAUGING POLICIES TOWARDS NICOTINE VAPING PRODUCTS: ESTIMATES OF IMPACT IN FOUR COUNTRIES FROM TWO MODELS

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Significance: Multiple studies present simulation models to gauge the public health impact of nicotine vaping product use. Most models gauge the potential impact rather than the actual impact of NVP use. We review two sets of models that examine past NVP use in four countries with different approaches: Australia, Canada, England and the US. **Methods:** We present two sets of models and describe the basic approach and structure of both sets. We consider SimSmoke models for Canada, England, and the US, which gauge the impact of policies using an implicit method of deriving the impact by comparing model projections inferred from past cigarette use and future cigarette-oriented policies to actual changes in cigarette use in the period after NVPs became more widespread. We then consider the Smoking and Vaping Model (SAVM) for Australia and Canada, which explicitly models the impact of NVPs through cigarette and NVP

initiation and cessation and product switching. **Results:** The SimSmoke model for the US, which had relatively lax NVP policies, shows major impacts on reduced cigarette use confined largely to young adults. The SimSmoke model for England, a country with relaxed policies towards NVPs and with smoking cessation treatment policies that incorporate NVPs, shows substantial public health impacts through reduced cigarette use over a broad range of ages. The SimSmoke model for Canada shows increased impact of NVP use on cigarette use after NVP policies were relaxed, but the impacts were largely confined to young adults. The SAVM for Canada also shows that, under relatively strict policies, NVPs had relatively minor health impacts, but the impact substantially increased when NVP restrictions were relaxed. The SAVM for Australia, a country with relatively strict policies towards both cigarette and NVP use, projects that cigarette use can be substantially reduced and lives can be saved by relaxing policies towards NVP use. **Conclusions:** Additional models are needed that explicitly gauge the impact of past policies on cigarette and NVP use and which are validated against actual trends in use of both products. This type of approach not only provides evidence regarding the effectiveness of past policies, but also provides a firmer basis for considering the potential impact of future changes in NVP policies. It will also be important to consider the interactive effects between cigarette-oriented and NVP-oriented policies.

FUNDING: Federal; Nonprofit grant funding entity

SYM29-5

USE OF NICOTINE VAPING PRODUCTS AND HEATED TOBACCO PRODUCTS AMONG PEOPLE WHO SMOKE OR HAVE RECENTLY QUIT SMOKING IN AOTEAROA NEW ZEALAND: FINDINGS FROM THE 2022 ITC NEW ZEALAND (EASE) SURVEY

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Significance: Aotearoa New Zealand has a goal to reduce smoking prevalence to <5%. To help achieve this goal, from 2024 the government will implement world-leading endgame measures, including mandated denicotinisation of cigarettes and substantial retail outlet reductions. Nicotine vaping products (NVPs) and heated tobacco products (HTPs) could be an adjunct to endgame measures by providing an alternative for people trying to stop smoking. We analyzed data from the 2022 International Tobacco Control New Zealand (ITC NZ; EASE) Survey to describe NVP and HTP use among people who smoke or who recently stopped smoking. **Methods:** Data came from 1478 participants (698 who smoke daily, 342 who smoke less than daily, and 438 who had quit smoking in the last 2 years), including 597 Maori (indigenous) of Aotearoa New Zealand and 314 Pacific peoples. Data were weighted to represent the national population of people who smoke or recently quit smoking. We asked participants whether they used NVPs or HTPs at least monthly ('current use') or daily. Those who had recently stopped or attempted to stop smoking in the past 2 years were asked whether they used NVPs or HTPs in their most recent quit attempt. 'Don't know' and 'Refused' responses were excluded. **Results:** Among people who smoke, current NVP use was 45.1% (95%CI: 41.3–49.0%) with 26.5% (95%CI: 23.3–30.0%) using NVPs daily; current HTP use was 6.0% (95%CI: 4.6–7.8%), with 2.1% (95%CI: 1.3–3.4%) using HTPs daily. Among people who had recently stopped smoking, current NVP use was 53.8% (95%CI: 47.3–60.1%), with 46.5% using NVPs daily; current and daily HTP use was <1%. Among people who had attempted to stop smoking in the past 2 years, 59.2% used NVPs (95%CI: 53.5–64.7%) and 8.6% used HTPs (95%CI: 6.2–11.8%) in their most recent quit attempt. Among people who had stopped smoking in the last 2 years, 65.4% used NVPs (95%CI: 57.8–72.3%) and 1.9% used HTPs (95%CI: 0.7–5.8%) during their last (successful) quit attempt. **Conclusion:** Prevalence of NVP use was high among both people who smoke and who have recently stopped smoking. NVPs were frequently used in quit attempts, including in their successful quit attempt by nearly two-thirds of people who had recently stopped smoking. HTP use and use in quit attempts was much less common. The findings are consistent with NVPs (but not HTPs) being a significant means of stopping smoking in Aotearoa New Zealand in the period prior to the implementation of key endgame measures.

FUNDING: Federal; State



SYM30

ORAL NICOTINE POUCHES AND SMOKELESS TOBACCO: ABUSE LIABILITY AND REGULATION

Ce Shang¹. The Ohio State University.

The sales of oral nicotine pouches (ONPs), a less harmful alternative to cigarettes and smokeless tobacco (SLT), have grown exponentially in recent years. By 2022, the prevalence of ONP and SLT use among US high school students was 1.6% and 1.4%, respectively—comparable to cigarette smoking at 2%. ONPs hold significant potential as harm reduction substitutes for more toxic tobacco products, especially traditional SLT products with similar use topography. This potential is especially relevant for tobacco control in Appalachian and rural areas, where SLT use is disparately high. This symposium will enrich comprehension of SLT and ONP use through four empirical studies rooted in a socio-ecological framework. The first study was a clinical trial of 15 adult moist snuff users to discern the characteristics of ONPs that best facilitate transitioning from moist snuff (SLT) to ONPs. Nicotine delivery, withdrawal relief, and product appeal were compared among low and high free-base nicotine ONPs relative to moist snuff. The results showed comparable nicotine delivery and withdrawal relief between ONPs and moist snuff, though ONPs held lower appeal. The second study engaged 300 Ohio adults to measure their exposure to ONP marketing. Appalachia residents showed a higher likelihood of reporting point-of-sale ONP marketing compared to non-Appalachian counterparts, implying that marketing influencing ONP appeal, uptake, and public health outcomes might be targeted to Appalachian residents. The third study delved into the effectiveness of SLT excise taxes over time, influenced by the evolving marketplace that features relatively new entrants like e-cigarettes and ONPs. Results indicated that reforming SLT tax structures could enhance their efficacy in raising prices, with manufacturers adjusting tax-to-price ratios as new products emerged. Building on this, the fourth and final study investigated the impact of SLT excise taxes on youth SLT use from 2007 to 2021, employing quasi-experimental methods. Findings indicated that a 10% increase in SLT excise taxes correlated with a 6% reduction in high school student SLT use. These effects were primarily pronounced among male, White, and residents in non-Appalachian states. In summary, this symposium synthesizes crucial research on SLT and ONP use. It underscores the challenges of promoting transitions from SLTs to ONPs, regulating targeted marketing, and employing taxation to reduce youth SLT use and its related disparities.

SYM30-1

SMOKELESS TOBACCO EXCISE TAX PASS-THROUGH TO PRICES

Ce Shang¹, Yanyun He², Qian Yang². ¹The Ohio State University College of Medicine, ²The Ohio State University Center for Tobacco Research.

Significance: 1.6% of US high school students reported using smokeless tobacco in 2022, comparable to cigarette smoking (2%). SLT use can pose significant health risks to humans, including a higher incidence of oral, pharyngeal, and esophageal cancer. Therefore, increasing excise taxes on SLTs may be an effective policy to prevent and reduce SLT use. However, research is lacking on how excise taxes on SLTs and on other popular substances (e.g., cigarettes, e-cigarettes, and beer) may impact SLT use among US high school students (own- and cross-tax elasticities of SLT demand). Methods: We used nationally representative cross-sectional Youth Risk Behavior Surveillance System (YRBSS) surveys from 2007-2021 to estimate the own- and cross-tax elasticities of SLT use among US youth. We first standardized SLT taxes for chewing tobacco, moist snuff, dry snuff, and snus and computed sales-weighted average SLT taxes. Next, we implemented a logit regression model controlling for the state- and year-fixed effects to assess how youth SLT use responds to excise taxes on SLTs, cigarettes, e-cigarettes, and beer. Results: A 10% increase in SLT excise taxes is associated with a 6% ($p < 0.01$) reduction in SLT use among US youth (i.e., an own-tax elasticity of -0.60). This result is primarily driven by males, Whites, and populations living in non-Appalachian states. Cigarette smoking is found to be a substitute for SLT use - a 10% increase in cigarette taxes is associated with a 12% increase in SLT use (a cross-tax elasticity of 1.19; $p < 0.01$). E-cigarette use and beer drinking are found to be complements to SLT use. A 10% increase in e-cigarette or beer taxes is associated with a 0.5% and 2.3% reduction in SLT use, respectively (i.e., cross-tax elasticity of -0.05 and -0.23, respectively). Conclusion: Increasing SLT excise taxes is effective in reducing SLT use among youth. Given that e-cigarettes and beer are economic complements of SLT, increasing excise taxes on these products will reduce SLT use. Given that cigarettes and SLT are economic substitutes, increasing cigarette taxes may have an unintended effect of increasing SLT use among youth.

FUNDING: Academic Institution

SYM30-2

THE EFFECT OF SMOKELESS TOBACCO (SLT) EXCISE TAXES ON SLT USE AMONG YOUTH

Yanyun He¹, Hojin Park¹, Kai-Wen Cheng², Qian Yang¹, Ce Shang³. ¹The Ohio State University Center for Tobacco Research, ²Governors State University, ³The Ohio State University College of Medicine.

Significance: 1.6% of US high school students reported using smokeless tobacco in 2022, comparable to cigarette smoking (2%). SLT use can pose significant health risks to humans, including a higher incidence of oral, pharyngeal, and esophageal cancer. Therefore, increasing excise taxes on SLTs may be an effective policy to prevent and reduce SLT use. However, research is lacking on how excise taxes on SLTs and on other popular substances (e.g., cigarettes, e-cigarettes, and beer) may impact SLT use among US high school students (own- and cross-tax elasticities of SLT demand). Methods: We used nationally representative cross-sectional Youth Risk Behavior Surveillance System (YRBSS) surveys from 2007-2021 to estimate the own- and cross-tax elasticities of SLT use among US youth. We first standardized SLT taxes for chewing tobacco, moist snuff, dry snuff, and snus and computed sales-weighted average SLT taxes. Next, we implemented a logit regression model controlling for the state- and year-fixed effects to assess how youth SLT use responds to excise taxes on SLTs, cigarettes, e-cigarettes, and beer. Results: A 10% increase in SLT excise taxes is associated with a 6% ($p < 0.01$) reduction in SLT use among US youth (i.e., an own-tax elasticity of -0.60). This result is primarily driven by males, Whites, and populations living in non-Appalachian states. Cigarette smoking is found to be a substitute for SLT use - a 10% increase in cigarette taxes is associated with a 12% increase in SLT use (a cross-tax elasticity of 1.19; $p < 0.01$). E-cigarette use and beer drinking are found to be complements to SLT use. A 10% increase in e-cigarette or beer taxes is associated with a 0.5% and 2.3% reduction in SLT use, respectively (i.e., cross-tax elasticity of -0.05 and -0.23, respectively). Conclusion: Increasing SLT excise taxes is effective in reducing SLT use among youth. Given that e-cigarettes and beer are economic complements of SLT, increasing excise taxes on these products will reduce SLT use. Given that cigarettes and SLT are economic substitutes, increasing cigarette taxes may have an unintended effect of increasing SLT use among youth.

FUNDING: Academic Institution

SYM30-3

EVALUATING THE ROLE OF FREE-BASE NICOTINE IN THE ABUSE LIABILITY OF ORAL NICOTINE POUCHES VS. MOIST SNUFF: A RANDOMIZED CROSS-OVER CLINICAL TRIAL

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Significance. Oral nicotine pouches (ONPs) have a lower toxicant burden than moist snuff and are particularly popular among adults who use moist snuff in the United States. ONPs are sold in a wide range of free-base nicotine (FBN) fractions, which affects nicotine delivery: higher fractions of FBN facilitate faster transport of nicotine across the oral mucosa. To determine the characteristics of ONPs that best support switching from moist snuff to ONPs, we compared nicotine delivery, withdrawal relief, and product appeal of ONPs with low vs. high FBN fractions relative to moist snuff. Methods. In a single-blind randomized crossover study, N=15 adults who use moist snuff used a (1) low FBN ONP (Rogue peppermint, 27.4% FBN), (2) high FBN ONP (Zyn peppermint, 70.2% FBN), and (3) 2g of usual brand moist snuff for 30 minutes in separate visits. ONPs had similar total nicotine concentration/pouch (Rogue: 5.1mg; Zyn: 5.0mg). Plasma nicotine and self-reported withdrawal symptoms were assessed at t=0, 5, 15, 30, 60, and 90 minutes. Product appeal was assessed after use. We tested associations between product and dependent variables using linear mixed effects regression models and used Holm's procedure to adjust for multiple comparisons. Results. Participants were 43-years-old on average (86.7% male). From t=5 to t=60 minutes, plasma nicotine delivery was greater for the high FBN ONP than the low FBN ONP ($p < 0.001$), but neither ONP's nicotine delivery differed significantly from usual brand moist snuff. Maximum plasma nicotine concentration occurred at t=30 minutes for each product (low FBN ONP: 5.5 ng/mL, high FBN ONP: 12.5 ng/mL, moist snuff: 9.8 ng/mL; $p = 0.003$). We identified no differences in self-reported withdrawal relief but several differences in appeal across products. Both ONPs were rated as less satisfying ($p < 0.01$) and enjoyable ($p < 0.001$) than usual brand moist snuff. Relative to usual brand moist snuff, participants were less interested ($p < 0.001$) and willing ($p < 0.001$) in using either ONP again. We identified no differences in product appeal between study ONPs. Conclusions. Both ONPs delivered nicotine and relieved withdrawal symptoms



similar to participants' usual brand moist snuff, but ONPs were generally rated as less appealing than moist snuff. Consideration of other ONP characteristics could clarify which characteristics would increase appeal of ONPs for people who use moist snuff.

FUNDING: Federal; Academic Institution

SYM30-4

DIFFERENCES IN EXPOSURE TO ORAL NICOTINE POUCH MARKETING IN APPALACHIA

Lauren Long¹, Mahmood Alalwan¹, Brittney L. Keller-Hamilton², Ce Shang², Megan E. Roberts³, Theodore L. Wagener², Darren Mays². ¹The Ohio State University Center for Tobacco Research, ²The Ohio State University College of Medicine, ³The Ohio State University College of Public Health.

Significance: Appalachia is disproportionately impacted by tobacco use and is targeted by tobacco industry marketing that appeals to Appalachian culture. Oral nicotine pouches (ONPs) are gaining popularity and marketed as alternatives to cigarettes and smokeless tobacco (ST), but little is known about exposure to their marketing, particularly in areas like Appalachia with entrenched tobacco use disparities. We examined geographic differences in exposure to ONP marketing in Appalachian and non-Appalachian Ohio. **Methods:** In 2021, we recruited adult tobacco (cigarettes, ST, dual cigarette/ST) users and nonusers (≥ 21 yrs, $n=300$) to complete a survey online capturing sociodemographics, ONP awareness and use, and ONP marketing exposure. We assessed sources of marketing exposure in the past 12 months, including point of sale (e.g., gas stations), billboards, newspapers/magazines, radio, television, events (e.g., fairs, sporting events), nightclubs/bars/concerts, and online (websites, social media). This secondary analysis examined differences in marketing exposure by Appalachian residence, tobacco user status, and ONP trial. **Results:** Participants resided in 75 (of 88 total) Ohio counties, of which 24 were Appalachian counties. The most frequently reported sources of marketing exposure were point of sale (50.3%) and online (29.0%). Participants in Appalachia were more likely to report exposure at point-of-sale than those in non-Appalachia (63.9% vs. 46.1%, $p=0.012$), and this was significant in multivariable analyses adjusting for sociodemographics (OR = 2.07, 95% CI = 1.13, 3.86). Participants who had tried ONPs were more likely than those who had not ($p's < .05$) to report exposure at point of sale (78.4% Appalachia, 70.1% non-Appalachia) and online (37.8% Appalachia, 36.8% non-Appalachia). For point-of-sale marketing, prevalence of exposure was higher for Appalachian v. non-Appalachian participants across all levels of tobacco use status (no tobacco use 53.8% v. 26.2%, cigarette smoking 41.7% v. 26.8%, ST use 75.8% v. 65.9%, dual use 64.3% v. 55.9%). **Conclusion:** Differences in ONP marketing exposure may represent targeted marketing by the tobacco industry and warrant further research to understand how these differences impact ONP appeal, uptake, and public health outcomes in Appalachia. ONP marketing and features remain potential targets for regulatory approaches to these novel products.

FUNDING: Federal; Academic Institution



SRNT₂₀₂₄

PODIUM PRESENTATION 1



PAPER SESSION 1: CO-USE AND TRANSITIONS BETWEEN PRODUCTS AND SUBSTANCES

PPS1-1

PRODUCTS AND PATTERNS THROUGH WHICH ADOLESCENTS, YOUNG ADULTS, AND ADULTS INITIATE CO-USE OF TOBACCO AND CANNABIS

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Significance: Recent research indicates that a high percentage of people who use tobacco also use cannabis. However, relatively few studies have examined the temporal sequencing through which individuals first initiate co-use of tobacco and cannabis products, leaving it unclear how, when, and with which products individuals begin co-use. This study examines the specific products and patterns through which adolescents, young adults, and adults initiate co-use of tobacco and cannabis. **Methods:** Study data were from a large, cross-sectional survey (N = 6,131, ages 13-40 years old) in which participants reported ever- and past-30-day-use of 18 different nicotine and cannabis products, and the order in which they first tried these products. We first calculated the percentage of participants who had used both tobacco and cannabis products in the past 30 days. Among people who co-used tobacco and cannabis in the past 30 days, we examined (a) whether tobacco or cannabis was used first, (b) which specific tobacco or cannabis product (e.g., nicotine e-cigarette, smoked marijuana) was the first to be used, and (c) and the most common subsequent tobacco or cannabis product used. **Results:** Over one-third (38.6%) of all participants had used tobacco and cannabis within the past 30 days. By comparison, only 11.8% and 6.8% of all participants had used only tobacco or only cannabis in the past 30 days, respectively. Among people reporting past-30-day co-use, 71.4% initiated with tobacco and 28.6% initiated with cannabis. Among participants who had initiated co-use with tobacco, 58.8% initiated with e-cigarettes and 22.8% initiated with cigarettes. Among participants who initiated co-use with cannabis, 44.0% initiated by smoking cannabis, 24.5% by vaping THC, and 16.6% by vaping CBD. Among people reporting past-30-day co-use who initiated with disposable nicotine e-cigarettes (the most common tobacco or cannabis product), 58.3% reported vaping THC as the next product they used. **Conclusions:** A high percentage of participants reported co-use of tobacco and cannabis in the past 30 days, with many initiating with nicotine e-cigarettes and then transitioning to vaping THC. Policy and prevention programs designed to reduce nicotine e-cigarette use may benefit from including components to mitigate the risk of transitioning to co-use with cannabis products, particularly vaping THC.

FUNDING: Federal; Academic Institution; Other

PPS1-2

ASSOCIATION BETWEEN CANNABIS USE AND DISCONTINUED NICOTINE USE PERSISTENCE AMONG ADOLESCENTS

Dae Hee Han, Alyssa Harlow, Rob McConnell, Jessica Barrington-Trimis, Adam Leventhal. University of Southern California, Los Angeles, CA, USA.

Significance The extent to which cannabis use inhibits nicotine cessation/discontinuation among adolescents is unclear. This prospective study examined association of different modes of cannabis use with subsequent discontinuation of nicotine use among adolescents. **Methods** This study used longitudinal data from an adolescent cohort (aged 14-17 years) from southern California surveyed at baseline and an approximately one-year follow-up during 2022-2023. The analyses included adolescents who used any nicotine products in the past 6 months at baseline (N=308). We calculated prevalence of past 6-month discontinued nicotine product use at follow-up by past 6-month cannabis type used (smoking, vaping, tetrahydrocannabinol [THC] food/drink, cannabidiol [CBD] or hemp products, and any cannabis products) at baseline among three mutually non-exclusive groups: those who used (1) e-cigarettes, (2) combustible tobacco, and (3) any nicotine products. Separate multivariable logistic regression models tested associations of baseline cannabis type used with discontinued use of nicotine products. **Results** Those who used any cannabis products at baseline (vs. non-users) reported lower rates of discontinued use of any nicotine products (35.6% vs. 63.1%), e-cigarettes (34.4% vs. 67.7%), and combustible tobacco (57.6% vs. 80.8%) at follow-up. Baseline

any cannabis smoking, cannabis vaping, and THC food/drink use were associated with lower odds of discontinued use of e-cigarettes (odds ratio[OR] range: 0.29-0.38) and any nicotine products (OR range: 0.40-0.53) after adjusting for baseline sociodemographic characteristics, mental health symptoms, and other substance use behaviors. Cannabis vaping at baseline was linked to a reduced likelihood of discontinuation of combustible tobacco use at follow-up (OR=0.24, 95% CI=0.08-0.67). Results revealed non-significant associations of baseline CBD/hemp product use with all study outcomes. **Conclusion** Use of cannabis products may inhibit cessation of nicotine products among adolescents. Long-term patterns of emerging cannabis use, such as CBD, among adolescents who are interested in quitting nicotine use should be monitored.

FUNDING: Federal

PPS1-3

POST-TRIAL SURVEYS FROM TWO PHASE 3 (ORCA-2 AND ORCA-3) TRIALS OF CYTISINICLINE IN ADULT SMOKERS

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Significance: The Phase 3 ORCA-2 and ORCA-3 clinical trials evaluated efficacy and safety of 3 mg cytisinicline dosed 3x daily (TID) for 6 or 12 weeks compared to placebo in adult smokers. In total, 1066 and 535 subjects received cytisinicline and placebo respectively. A voluntary post-trial survey was offered to all participants to gain insight into their experience with cytisinicline. **Methods:** Following database lock and unblinding of each study, participants were provided their individual treatment assignment and were asked to complete a 15-minute online survey. Study Subject ID number was used to link the information provided by participants to their assigned study treatment and outcome for smoking cessation. **Results:** A total of 82 participants responded to the survey with 67 receiving cytisinicline. Of the 67 respondents that received cytisinicline for either 6 or 12 weeks (46/67; 69%) quit smoking completely, (15/67; 22%) reduced smoking by more than half, (5/67; 7%) reduced smoking by less than half, and one did not quit or reduce their smoking at all (1/67; 1%). Nearly all respondents receiving cytisinicline during the trial who were successful in quitting or reducing smoking believed the medication was a contributing factor, primarily due to fewer cravings (57/66; 86%) and more manageable treatment side effects (49/66; 74%). The major benefits cited by these respondents were overall improvements in health (44/66; 67%), improved finances (40/66; 61%), and feelings that other people were no longer judging or discriminating against them for smoking (31/66; 47%). Nearly all respondents that received cytisinicline during their trial participation said they would recommend cytisinicline to a friend or family member to help them quit smoking (65/67; 97%). For respondents who received cytisinicline and did not completely quit, most (18/21; 86%) said they would consider using cytisinicline in the future if it is FDA approved. **Conclusions:** Although participation in the voluntary post-trial survey was limited and responses were biased towards participants who had received cytisinicline and quit or reduced smoking, the majority of respondents believe cytisinicline was beneficial in stopping/reducing smoking, would recommend it to others, and would use it if needed in the future if FDA approved. These findings further support the potential of cytisinicline as an important smoking cessation therapy.

FUNDING: Pharmaceutical Industry

PPS1-4

TRANSITIONS IN CIGARETTE AND ENDS USE IN THE PATH STUDY: A MULTISTATE TRANSITION MODEL ANALYSIS OF ADULTS IN 2017-2019 VS 2019-2021

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Significance. The landscape of electronic nicotine delivery systems (ENDS) has changed dramatically since 2019, particularly with the rise of pods and disposables, the EVALI outbreak, and the COVID pandemic. We analyzed patterns of initiation, cessation, and transitions between cigarettes, ENDS, and dual use before and after 2019. **Methods.** Using the Population Assessment of Tobacco and Health (PATH) Study, we applied a multistate transition model to 28,061 adults in Waves 4-5 (2017-2019) and 24,573 adults in Waves 5-6 (2019-2021), estimating transition rates for initiation, cessation, and product transitions for the two periods separately. **Results.** Cigarette initiation among adults who never used either product decreased, but ENDS initiation did not significantly change. Persistence of ENDS-only use remained high, with 78.2% (95%CI: 76.0%, 80.4%) and 75.6% (95%CI: 73.7%, 77.7%) still using ENDS only after 1 year in



2017-2019 and 2019-2021 respectively. However, persistence of dual use decreased from 63.8% (95%CI: 59.9%, 67.6%) to 53.8% (95%CI: 49.6%, 57.9%) per year, with the fraction of adults switching to ENDS-only use increasing from 9.5% (95%CI: 7.3%, 11.7%) to 16.5% (95%CI: 13.4%, 19.6) per year. These patterns were qualitatively similar across adult age groups. There was no change in cigarette discontinuation among cigarette-only users. There was a significant increase in the rate of switching from cigarette-only use to dual use among young adults (ages 18-24) only; young adults who only used cigarettes became more likely to transition to dual use, with the fraction increasing from 10.2% (95%CI: 8.3%, 12.0%) to 16.9% (95%CI: 13.2%, 20.5%) per year. **Conclusions.** Persistence of ENDS use among adults remained high in 2019-2021, but a larger fraction of dual users transitioned to ENDS-only use compared to 2017-2019. Young adults who smoked cigarettes only became more likely to switch to dual use in 2019-2021.

FUNDING: Federal

PPS1-5

TRANSITIONS AND PATTERNS IN CONCURRENT USE OF CIGARETTES AND ENDS: AN INTENSIVE LONGITUDINAL STUDY OF ADULT SMOKERS FOLLOWING ENDS INITIATION

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Significance: There is a knowledge gap in the short- and long-term tobacco use patterns of adult smokers following initiation of electronic nicotine delivery systems (ENDS). This longitudinal study describes the concurrent use transitions of adult smokers following ENDS initiation. **Method:** From December 2020 - October 2021, US adult smokers who had newly (re-)initiated ENDS use within the past month (n = 303) were recruited nationally to participate in a one-year online study consisting of weekly surveys for three months followed by three quarterly surveys. At each survey, current ENDS use, current smoking status, and frequency of use were assessed to define their concurrent use state: neither vaping nor smoking, vaping only, predominantly vaping, equal dual use, predominantly smoking, and only smoking. **Results:** Within 30 days of initiating ENDS, 1.65% had returned to only smoking, 40.26% were mostly smoking, 26.07% were equal dual use, 17.49% were mostly vaping, 14.52% were exclusively vaping, and 0% were not using either product. However, within the first 3 months, there was considerable instability in concurrent use state (70.30% with 1-2, 28.71% with 3-4, and 0.99% with 5+ transitions). At 12-months, 34.90% were smoking exclusively, 16.47% were mostly smoking, 6.27% were equal dual use, 10.20% were mostly vaping, 19.61% were exclusively vaping, and 12.55% were using neither product. However, 29.05% had transitioned to a different state at the final 12-month survey. Despite considerable instability throughout the year follow-up, initial concurrent use states appear somewhat predictive of trajectories and 12-month outcomes. **Conclusion:** Many smokers who initiate ENDS shift between concurrent use states for several months or longer. Additional research with intensive and long-term assessments is needed to understand these transitions and their policy- and health equity-relevant drivers (e.g., product characteristics, use experiences, perceptions and affect, product availability).

FUNDING: Federal

PPS1-6

USE OF HEATED TOBACCO PRODUCTS IN PEOPLE WHO SMOKE OR RECENTLY QUIT SMOKING IN AOTEAROA NEW ZEALAND: FINDINGS FROM THE 2022 ITC NEW ZEALAND (EASE) SURVEY.

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Significance: Daily smoking prevalence is 8% in Aotearoa New Zealand and higher among Māori (20%) and Pacific peoples (18%). Heated tobacco products (HTPs) could be an important alternative source of nicotine for people trying to stop smoking, particularly as the New Zealand Government will shortly introduce mandated denicotinisation of cigarettes and substantial retail outlet reductions. We analysed data from the 2022 International Tobacco Control New Zealand (ITC NZ; EASE) Survey to describe patterns of HTP use among people who smoke or who recently quit smoking. **Methods:** We used data from 1478 participants (698 who smoke daily, 342 who smoke less than daily, and 438 who had quit smoking in the last 2 years), including 597 Māori (indigenous population of Aotearoa New Zealand) and 314 Pacific peoples. Data were weighted to

represent the national profile of people who smoke or recently quit smoking. We asked participants whether they currently used HTPs at least monthly or daily. Participants who had quit smoking or who had attempted to quit in the past 2 years were asked whether they had used HTPs to help them quit. "Don't know" and "Refused" responses were excluded. Current HTP use was defined as at least monthly use. **Results:** 6.0% (95% CI 4.6-7.8%) of participants who smoked currently used HTPs (n=69), with 2.1% (95% CI 1.3-3.4%) using them daily (n=22). Daily HTP use was most common in people who smoked daily and planned to quit smoking, at 4.4% (95%CI 2.6-7.3). Daily HTP use was less than 1% in people who smoked daily without a plan to quit, people who smoked less than daily, and people who had quit smoking. In participants who had tried to quit smoking in the past 2 years, 5.8% (95%CI 4.3-8.0%) reported that they used HTPs in their most recent quit attempt. **Conclusion:** HTP use and use in quit attempts was much lower than electronic cigarette (vape) use among participants in the same survey, which, for example, found that 45% of people who smoked and 54% of people that had recently stopped smoking were currently vaping. HTPs are not currently a significant means of stopping smoking in Aotearoa New Zealand.

FUNDING: Federal; State; Academic Institution



PAPER SESSION 2: CUTTING-EDGE METHODS TO ADVANCE NICOTINE AND TOBACCO RESEARCH

PPS2-1

VALIDATION OF ECIGTRACKER™, A SMARTPHONE APP TO REMOTELY QUANTIFY THE NICOTINE CONTENT AND CONSUMPTION OF ELECTRONIC NICOTINE DELIVERY SYSTEM LIQUIDS

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Significance. Electronic Nicotine Delivery Systems (ENDS) contain a heater that aerosolizes liquid that is inhaled. ENDS liquids usually contain nicotine, and nicotine content varies among liquids. Remotely and accurately quantifying the nicotine content of liquids and liquid intake is difficult. eCigTracker™ is a smartphone app that aims to accurately quantify device settings (e.g., watts), liquid properties (e.g., nicotine content), and liquid intake/exposure. It relies on validated image analysis methods adapted from the dietary assessment literature. Briefly, users capture images of their device and its settings with the app, and the app transmits these images to researchers who record the model and its settings. To quantify liquid intake, users capture images of their liquid pod/bottle at the start and end of an observation period and when they switch liquids or require a new pod/bottle. The app transmits these images to trained raters who estimate the amount of liquid 1) at the start and 2) at the end of the observation period and when a new pod/bottle is used. These values are subtracted to estimate liquid intake. The purpose of this laboratory-based study was to test the accuracy of eCigTracker at identifying the nicotine content of liquids and estimating liquid intake. **Methods.** Participants captured images of their device and, to mimic liquid intake over time, two pods/bottles; one was full and the other had random amounts of liquid discarded. These images were analyzed by blinded raters to 1) identify the liquid and its nicotine content and 2) estimate the amount of liquid in each image to measure liquid intake. The criterion variables were the nicotine content from the packaging and directly weighed liquid intake. Dependent t-tests evaluated differences between raters' estimates and the criterion measures. **Results.** Fifty participants [54% women; 82% White; Mean (SD) age, 34.1 (12.6) years] were enrolled and used eCigTracker in the laboratory. Nicotine content [Mean (SEM)] identified by raters from eCigTracker images [20.6 (2.9) mg/ml] did not differ from actual content [20.0 (3.1) mg/ml], $t(49)=0.50$, $p=0.62$ (3.0% mean error). Estimated liquid intake also did not differ between eCigTracker image ratings [21.5 (3.5) ml] and weighed intake [22.2 (3.6) ml], $t(49)=-1.08$, $p=0.28$ (-3.2% mean error). **Conclusions.** eCigTracker accurately identifies ENDS liquid nicotine content and simulated liquid intake in a laboratory with little user burden. eCigTracker offers a low-burden method to quantify ENDS use remotely and in free-living conditions. Pending free-living satisfaction and usability data, eCigTracker could facilitate large-scale assessment and intervention efforts.

FUNDING: Federal

PPS2-2

COMPARING TOPOGRAPHY MEASURES OBTAINED FROM VIDEO RECORDINGS OF VIRTUAL VS. LABORATORY SMOKING SESSIONS

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Significance: The ability to assess smoking topography—an important measure of how consumers use tobacco products—outside of a laboratory environment has significant implications for conducting behavioral tobacco studies. We previously validated a method of assessing topography via recording and scoring videos of participant smoking sessions, finding that video-observed topography measures were similar to those obtained by a commercial topography device, the gold standard. In this study, we used this approach to record and score videos taken by participants during virtual sessions and compare obtained topography measures to those from laboratory smoking sessions. **Methods:** Thirty adult daily non-menthol cigarette users (63.33% male, 83.33% White, mean age = 41.63 [SD = 13.38], mean cigarettes/day = 13.43 [SD = 6.53]) completed a 30-day experimental period during which they smoked a total of six study cigarettes across three in-person laboratory sessions and three virtual sessions. Staff recorded videos of the laboratory sessions while participants recorded videos of their virtual

sessions. We calculated intraclass correlation coefficients (ICCs) for total puffs taken, total duration, and total interpuff interval (IPI) measures within session type, then used repeated measures analysis of variance (RM-ANOVA) to examine the effect of setting and assessment number on these outcomes. **Results:** There was good-to-excellent agreement within session type (average ICCs for lab topography estimates ranged from .88 to .94; virtual estimates ranged from .90 to .91). RM-ANOVAs found significant effects of setting across all outcomes (p 's < .05). On average, participants took 1 more puff (SE = 0.41), had 3.24 seconds longer total puffing duration (SE = 1.21), and 35.70 seconds shorter cumulative IPI (SE = 9.93) during virtual compared to laboratory sessions. There were no effects of assessment number and no interactive effects of setting x assessment number on any outcomes. **Conclusions:** Video-observed estimates of topography collected during virtual sessions differ from those collected in laboratory. Given high agreement for estimates within-session, observed differences likely reflect actual differences in smoking behavior based on setting. Findings suggest the utility of collecting topography data virtually, which could increase participation in behavioral tobacco trials as well as allow for more naturalistic measurement of topography across other tobacco products.

FUNDING: Federal

PPS2-3

YOUNG USERS TITRATE THEIR NICOTINE INTAKE FROM NICOTINE SALT E-CIGARETTES TO OBTAIN CIGARETTE-LIKE LEVELS

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Background. Electronic cigarette (EC) use is highly prevalent among youth in the US with more than 3 million users among middle and high school students in 2022. EC users show nicotine dependence symptoms similar to combustible cigarette users. For this observational study, we assessed EC use behavior, device characteristics, nicotine intake, and abuse liability of ECs among young adults. **Methods.** We recorded the puffing topography of participants (N=75; age 21-24 years) using their ECs in an ad-lib laboratory vaping session (30 min). We then purchased their devices and e-liquids and generated emissions by programming a vaping machine with each participant's average puff volume, duration, and frequency. Total aerosol matter (TAM) was collected on filters that were chemically extracted to quantify nicotine yield. **Results.** Nicotine yield was highly correlated with the amount of aerosol generated ($R^2 = 0.8749$), corroborating previous empirical and modeling studies. During the ad-lib session, taking 4-43 puffs from their ECs (95% were nicotine salt devices), users were exposed to a range of nicotine doses (0.5-5.5 mg/session) equivalent to combustible cigarettes (~1-3 mg/cigarette). Nicotine yield was weakly correlated with total puff volume ($R^2 = 0.4428$) across brands but highly correlated within brand/device type (e.g., for JUUL $R^2 = 0.7830$); total puff volume is a measure that encompasses all puffing parameters (i.e., puff count, duration, and volume). **Conclusion.** The majority of young adult EC users used nicotine salt devices and were exposed to addictive levels of nicotine that were determined by their puffing behaviors. **Regulatory Implication:** This project provides evidence that young adult use of nicotine salt ECs results in nicotine intake that meets or exceeds that of combustible cigarettes.

FUNDING: Nonprofit grant funding entity

PPS2-4

DEVELOPMENT OF THE NOVEL ORAL TOBACCO PURCHASE TASK

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Significance: Oral nicotine pouches (ONPs; small, white pouches containing nicotine but no tobacco leaf) entered the US market in 2016. Because ONPs contain fewer toxicants than the traditional smokeless tobacco product moist snuff, switching to ONPs would be supported if they are similar in abuse liability to moist snuff. Our goal was to develop an oral tobacco purchase task (OTPT) to compare ONPs to moist snuff. **Methods:** The cigarette purchase task (CPT) is a widely accepted way of assessing demand for cigarettes. However, translating the CPT to an OTPT is not straightforward, as loose moist snuff does not come in standardized serving sizes (i.e., there is greater variability in sizes of one "pinch" of moist snuff than one cigarette). We reviewed the literature to determine best practices for the CPT and translated those practices to develop an OTPT for use in a human laboratory clinical trial assessing the abuse liability of two brands of



ONPs vs. moist snuff. Participants completed the OTPT after sampling each product for 30 minutes. **Results:** The OTPT was developed to accommodate ONPs and moist snuff, with N=27 participants reporting how many ONPs or pinches of 2g of moist snuff they would purchase at escalating prices. Participants were a mean age of 43 years and 92.6% were male; all participants self-identified as white, non-Hispanic. Following established CPT framework, we used a 17-item pricing scale with anchor points of free (\$0.00), the median product price, and 100x the median product price. We calculated the median price of 2g of moist snuff by taking a weighted average for the price per 2g of the top three brands of long cut moist snuff according to US market share (\$0.32). We calculated the median price of one ONP by averaging the prices per pouch of the two ONPs sampled by participants in the clinical trial (\$0.29). As both median values were near \$0.30, a common price scale was used across products with \$0.30 as the median price, and 100x the median product price of \$30. After sampling one product per visit, participants reported how many pouches (ONP visits) or 2g pinches (moist snuff visit) they would purchase at each price. We calculated the mean (SD, range) number of products participants would purchase at each anchor point. For ONPs, at \$0.00 participants would purchase 15.8 (16.4, 0-80), at \$0.30 would purchase 8.8 (6.7, 0-24), and at \$30 would purchase 0.1 (0.3, 0-2) ONPs. For 2g pinches of moist snuff, at \$0.00 participants would purchase 10.5 (11.4, 1-50), at \$0.30 would purchase 8.2 (7.4, 1-25), and at \$30 would purchase 0.1 (0.3, 0-1) pinches. **Conclusion:** The OTPT facilitated direct comparisons of quantity of products theoretically purchased at each anchor point across oral tobacco products. Future refinement of the OTPT should consider different sampling sizes of moist snuff, variability in ONP pouch size and concentration, and the instrument's utility in predicting long-term switching outcomes.

FUNDING: Nonprofit grant funding entity

PPS2-5

USE OF IMAGES TO ASSESS AWARENESS AND USE OF EMERGING NICOTINE POUCH PRODUCTS: RESULTS FROM A RANDOMIZED SURVEY EXPERIMENT

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Nicotine pouches (NPs) are oral spit-free products that contain nicotine but no tobacco leaf. NPs resemble smokeless tobacco (SLT) products in shape and packaging but are also similar to medicinal nicotine replacement therapy (NRT) in formulation and marketing. Given the similarities among NP, SLT, and NRT products, there is potential for misclassification when assessing their use and standardized questions for measuring NP use are lacking. Survey science suggests that use of images can improve question accuracy, but the extent to which this is true for NP measures is unknown. We embedded a randomized experiment in a February 2023 survey of Amazon Mechanical Turk (mTurk) workers ages 18 to 45. All respondents viewed a description of NPs ("The next few questions are about a new group of nicotine products - tobacco-free nicotine pouches. Many of these come in pouches and packages that look like snus or other smokeless tobacco, but they are white and do not contain any tobacco in them. They do contain nicotine. Some brands include Zyn, Velo, On!, and Rogue.") and were asked if they had ever seen or heard of them before the survey. We randomized half of respondents to also see an image of nicotine pouches with the question while the other half saw text only. In both conditions, those who endorsed awareness were subsequently asked about use and brands tried. We calculated prevalence of NP awareness and use and used chi-square tests to assess differences by survey arm. Respondents (N=2530) were 56.1% female, 67.2% non-Hispanic White, 81.7% straight or heterosexual, 63.8% employed for wages, and 87.5% with at least some college education; demographics were similar across survey conditions. Respondents in the image condition (n=1230) were more likely than those in the text-only condition (n=1300) to report awareness (40.6 vs 31.5%, $P < .001$) and ever use (7.2 vs 5.2%, $P = .044$); current use did not significantly differ across groups (2.4 vs 1.7%, $P = .19$). Among those reporting NP use, 5.9% in the text-only condition, compared to 0% in the image condition, listed a SLT brand as one they tried, suggesting they were misclassified by the text-only question. Inclusion of product imagery can improve NP measurement accuracy in surveys and text-only measures may misestimate prevalence of NP awareness and use. Additional research on other aspects of NP measures (e.g., text wording) are needed to develop best practices for measuring NP behaviors.

FUNDING: No external funding reported

PPS2-6

MACHINE LEARNING APPROACH TO EXAMINE THE INTERSECTIONAL ASSOCIATION OF SOCIAL IDENTITIES AND CIRCUMSTANCE WITH CURRENT CIGARETTE SMOKING AMONG US ADULTS

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Background: It is known that several social identity and circumstances are known to be independently associated with adult cigarette smoking in the US. Intersectionality theory posits that combinations of multiple marginalized identity and circumstances cannot be understood by examining each of them independently. However, little is known about how the intersections of social identities and circumstances exacerbate disparities in cigarette smoking. **Methods:** Data were from the 1992-2019 Tobacco Use Supplement to Current Population Survey (TUS-CPS; n=1,496,458). Respondents self-reported current cigarette smoking status (every-day and some days vs. not at all). Thirteen demographics, social identities and circumstances measured in CPS were included. Analyses were stratified by race/ethnicity. Boosting statistical learning algorithm was applied to the 1992-2015 data to generate variable importance scores (VIS). Models were then pruned based on VIS without significantly reducing area under the receiver operating characteristic curve (AUC) computed using the 2018-2019 data. Weighted logistic regression models including 3-way interactions between all variables in the pruned models were used to calculate the predicted marginal probability of current cigarette smoking by combinations of demographics. **Results:** Prevalence of current cigarette smoking varied by combinations of social identities and circumstances within each race/ethnicity. E.g., among American Indian/Alaskan Native individuals, 73% of those 31-45 years old, living in the Midwest, with their spouse absent reported current cigarette smoking, while only 7% among those with a bachelor's degree, annual household income of US\$75,000 or higher, and living in the South reported the behavior. Among Black individuals, 50% of 31-45 years old male individuals born in Puerto Rico or other US territories reported current cigarette smoking, while 1% of female foreign-born naturalized US citizens who did not report income reported the behavior. **Conclusion:** Prevalence of current cigarette smoking varies greatly by intersections of social identities and circumstances. Using a machine learning approach assists the identification of subpopulations with high prevalence of cigarette smoking, which allows for development and delivery of tailored interventions.

FUNDING: Federal

PAPER SESSION 3: DIGITAL INTERVENTIONS FOR TOBACCO CESSATION

PPS3-1

SMARTPHONE APPLICATIONS TO SUPPORT TOBACCO CESSATION: A SYSTEMATIC REVIEW AND META-ANALYSES

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Background: Smartphone apps hold great potential for increasing the effectiveness of tobacco quit attempts by providing behavioural support that can be accessed at any time or place at a relatively low cost compared to face-to-face counselling, or as an adjunct to other behavioural or pharmacological quit support. However, concerns have been raised about the low level of evidence to support the numerous tobacco cessation smartphone apps that are available. We aimed to synthesise the evidence for smartphone apps for supporting tobacco cessation. **Methods:** We conducted a systematic review with meta-analyses of Randomised Controlled Trials (RCTs) of tobacco cessation smartphone apps among people aged 15 and over who use tobacco. A comprehensive search of seven databases was completed in June 2022 and an updated search in July 2023. The primary outcome was sustained tobacco abstinence, self-reported and/or biochemically validated, of at least 6 months. Secondary outcomes included point-prevalence abstinence, sustained abstinence of less than 6 months. Random effects meta-analysis was conducted where sufficiently combinable RCTs with outcomes at 6 months or later follow-ups. Risk of bias assessment and GRADE assessment of the certainty of evidence was completed. **Results:** From 2,226 studies, 45 RCTs met inclusion criteria. There was substantial variability between studies in setting, methodology, intervention, participants, comparators, and outcomes measured. The outcomes of four random effects meta-analyses found low certainty evidence that smartphone apps are ineffective compared to minimal interventions, such as usual care or a brochure (8 RCTs, 5,424 participants) (RR=0.93, 95% CI 0.79-1.09, $p=0.4158$); low certainty evidence from two trials that smartphone apps do not provide an incremental benefit to counselling interventions (RR=0.99, 95% CI 0.59-1.67, $p=0.9695$); low certainty evidence from 8 trials (10,235 participants) of an overall benefit of smartphone apps that have more features or functionality than a control app with fewer features or functionality (RR=1.33, 95% CI 1.01-1.74, $p=0.0411$); and moderate certainty evidence from five trials (1798 participants) of an incremental benefit of adding a smartphone app to pharmacotherapy (RR=1.28, 95% CI 1.12-1.47, $p<0.001$). **Conclusion:** There is emerging evidence that smartphone apps may provide an additional benefit to use of pharmacotherapy for tobacco cessation and that apps with more features and functionality are more effective than more basic apps, but the evidence does not currently support smartphone apps for tobacco cessation compared to minimal tobacco cessation interventions or as an adjunct to counselling support.

FUNDING: Federal; Academic Institution; Nonprofit grant funding entity

PPS3-2

A RANDOMIZED CONTROLLED TRIAL OF LARGE LANGUAGE MODEL-CREATED TOBACCO TREATMENT MESSAGES EVALUATED BY TOBACCO TREATMENT SPECIALISTS

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Background: Creation of message libraries for mobile health interventions is resource intensive. Large language models (LLMs) could be used to generate intervention messages, but rigorous evaluation of LLM-generated messages is necessary to ensure message quality prior to their use. **Methods:** This study: 1) identified effective model parameters for LLMs, 2) used selected model parameters to create tobacco cessation messages via 6 distinct LLMs (e.g., BLOOM, OPT, and GPT models of varying sizes), and 3) employed 7 tobacco treatment specialists (TTS) to compare LLM-generated and

human expert written messages. Human expert written messages (N=900) were used as training and validation data for the LLMs. A random selection of 100 messages from each of the 6 best-performing LLM libraries and human expert message library (N=700) were evaluated by 7 TTS. Each TTS evaluated 100 messages (14-15 from each library). ANOVA, with multiple comparison post-hoc analysis (i.e., Dunnett's Test), was used to compare LLM-generated and human expert written messages on perceived message quality, credibility, accuracy, and persuasiveness. All measures were scored on a 1-10 scale with higher scores reflecting greater agreement. **Results:** A robust set of model parameters was selected based on an initial linguistic analysis of the 900 human expert written messages. These model parameters were applied to LLMs to generate a total of 28,122 tobacco treatment messages, which were compared with human-generated messages on critical linguistic features. Evaluation of LLM and human expert written messages by TTS indicated that ChatGPT LLM had the highest mean scores on measures of message quality, credibility, accuracy, and persuasiveness. ChatGPT significantly outperformed human expert messages on message quality (M=7.46, SD =2.22 vs. M=6.47, SD=2.59, $p = .04$) and performed equally well as human expert messages on credibility, accuracy, and persuasiveness. Human expert messages descriptively scored second highest in evaluation scores across all measures and had significantly greater mean scores than 3/5 LLM conditions (all p 's < .002). **Conclusion:** Findings from this novel study indicate that ChatGPT has the potential to efficiently create tobacco treatment messages that are similar to those created by human experts, whereas other LLMs were inferior. This innovative study is the first to use trained TTS to evaluate tobacco cessation messages developed by LLMs.

FUNDING: State

PPS3-3

BEHAVIORAL ACTIVATION MHEALTH APP FOR SMOKING CESSATION: A RANDOMIZED CONTROLLED PILOT TRIAL

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Significance: Behavioral activation (BA) is a novel addition to standard smoking cessation interventions that can address depressive symptoms as a barrier to quitting. The purpose of this study was to develop and preliminarily test the Actify! mobile health application (mHealth app) for smoking cessation, based on BA protocols for smoking cessation and other substance use. **Methods:** We conducted a pilot randomized controlled trial (n=242) comparing Actify! with QuitGuide, the National Cancer Institute's (NCI) app for smoking cessation, on acceptability (user satisfaction, number of app openings), smoking abstinence, and mechanisms of change (change in behavioral activation and depressive symptoms). Outcomes were assessed at 8 weeks and 6 months post-randomization. Results are presented descriptively due to the pilot nature of the study, which wasn't powered for comparison of intervention outcomes. **Results:** The target sample size was achieved via social media recruitment (averaging 61 randomized/month), with 81% and 82% retention at 8-week and 6-month follow-ups, respectively. User satisfaction was numerically higher in the "Actify!" arm across all satisfaction items (e.g., 91.1% in Actify! vs. 83% in QuitGuide were satisfied overall). Number of app openings was high and similar across arms (M=34.3 openings over 8 weeks in both arms). On the primary abstinence outcome of self-reported 30-day point prevalence abstinence (PPA) at 8 weeks, quit rates were 12.6% for Actify! vs. 7.3% for QuitGuide. Differences in 30-day PPA continued through 6 months (18.5% for Actify! vs. 12.2% for QuitGuide). Rates of biochemically-verified 30-day PPA were also numerically higher in the Actify! arm at 8 weeks (8.4% vs. 6.5%) and 6 months (12.6% vs. 8.1%). Changes between baseline and 8-week follow-up in depressive symptoms and behavioral activation favored Actify!. **Conclusions:** In this pilot trial, Actify! showed considerable promise as a novel mHealth treatment, as evidenced by high usage and consistently higher user satisfaction and quit rates than the NCI QuitGuide app at both short-term and long-term follow-up. The next step is to evaluate Actify! in a larger trial that is adequately powered to assess intervention outcomes.

FUNDING: Federal



PPS3-4

STATISTICAL METHODS FOR PREDICTING E-CIGARETTE USE EVENTS BASED ON BEAT-TO-BEAT INTERVAL (BBI) DATA COLLECTED FROM WEARABLE DEVICES

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The prevalence of e-cigarette use among young adults in the USA is high (14%). Although the majority of users plan to quit vaping, the motivation to make a quit attempt is low and available support during a quit attempt is limited. Using wearable sensors to collect physiological data (e.g., heart rate) holds promise for capturing the right timing to deliver intervention messages. This study aims to fill the current knowledge gap by proposing statistical methods to (1) denoise beat-to-beat interval (BBI) data from smartwatches worn by 12 young adult regular e-cigarette users for 7 days; and (2) summarize the denoised data by event and control segments. We also conducted a comprehensive review of conventional methods for summarizing heart rate variability (HRV) and compared their performance with the proposed method. The results show that the proposed Singular Spectrum Analysis (SSA) can effectively denoise the highly variable BBI data, as well as quantify the proportion of total variation extracted. Compared to existing HRV methods, the proposed second order polynomial model yields the highest area under the curve (AUC) value of 0.76 and offers better interpretability. The findings also indicate that the average heart rate before vaping is higher and there is an increasing trend in the heart rate before the vaping event. The fact that there is a development of increasing heart rate shows that there is time to intervene as this physiological signal emerges. Future intervention may be designed to deliver messages through e-cigarette users' smartphones during such critical periods.

FUNDING: Federal

PPS3-5

THE ROLE OF MOOD IN SHAPING REACTIONS TO SMOKING CESSATION MESSAGES AMONG ADULTS WHO SMOKE: A MULTIMODAL INVESTIGATION

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Introduction: As decades of research on consumer behavior have shown current mood to be one of the biggest influences on purchasing behavior, many innovative companies like Apple are developing mood-tailored messaging (selecting the best messages for a specific mood) to increase the content's influence on the customer. Mood-tailored communications may also help increase the effectiveness of smoking cessation messaging interventions; however, the approach has not been tested. As a first step in this novel research area, we tested the impact of mood on responses to cessation messages in adults who smoke, using a novel method that integrated self-report and psychophysiological measures. **Methods:** In a two-part study, 30 smoking cessation messages spanning themes of motivation to quit, challenges in quitting, quality-of-life, health harms, and financial costs/rewards were tested. Using crowdsourcing, participants (N=617) were randomized to a mood induction task: positive, negative, or neutral, then rated messages based on self-reported motivations to quit, message receptivity, and perceived relevance of the message. In an in-lab study, participants (N=42) were similarly randomized to a mood induction task and then viewed 30 cessation messages while being monitored for heart rate, skin conductance, and eye-tracking. Using a multi-attribute decision-making model (MADM), the crowdsourcing and psychophysiological data were integrated to rank each message on outcomes, weighting self-report and psychophysiology equally. **Results:** The top messages for positive mood included challenges in quitting ("Realize the first 48 hours after quitting is the most difficult time. Make a plan to handle it. It gets better!"), health harms, and financial costs/rewards. Those in the neutral mood condition had all top three messages in the challenges in quitting theme. Those in a negative mood had top messages in the challenges in quitting ("Feelings of stress are normal when quitting smoking. You are not alone! Talk with your doctor or a friend about ways to reduce stress before your quit date"), quality-of-life, and motivations to quit themes. **Conclusions:** There were variations in the preferences of messages by mood condition, suggesting that mood-tailored communication may increase their relevance and effectiveness. The novel integrated crowdsourcing and psychophysiology shows promise for helping the development of tailored health communication interventions for smoking cessation.

FUNDING: Academic Institution

PPS3-6

FEASIBILITY AND ACCEPTABILITY OF A CONVERSATIONAL AGENT FOR AMBIVALENT SMOKERS: RESULTS FROM A PROOF-OF-CONCEPT STUDY

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Background: Most smoking intervention studies target individuals intending to quit smoking, and few resources exist for individuals who are not actively contemplating quitting (ambivalent smokers). Conversational agents, or chatbots, are easy-to-use scalable approaches for smoking behavior change. Chatbots can provide motivational, behavioral nudges/prompts to move ambivalent smokers along the quit continuum and connect them to evidence-based resources when they are ready to quit, thereby capitalizing on a window of opportunity. Existing studies on chatbots for smoking are few and target participants actively intending to quit smoking. Our study aimed to develop and test preliminary acceptability and feasibility of a human-centered designed proof-of-concept supportive smoking cessation chatbot for ambivalent smokers. **Methods:** The study was completed in two phases. In Phase 1, n=300 ambivalent smokers completed a one-time cross-sectional survey that assessed user preferences for the proposed prototype using conjoint analysis (CJA) to identify key features of the chatbot prototype. In phase 2, n=20 ambivalent smokers were recruited to engage with the prototype chatbot daily for 2 weeks. Feasibility and acceptability were assessed using validated questionnaires. **Results:** In Phase1, five primary attributes/participant preferences were identified for the chatbot: tracking number of cigarettes per day, receiving quit-tips, tracking money saved, self-monitoring mood, and logging daily cravings to smoke. These were programmed for Phase 2 testing. At the end of the 2-week chatbot intervention (Phase 2), 81% reported the chatbot met their approval, 76.2% said it appealed to them, and 81% reported the chatbot helped to connect them to supportive resources to quit smoking. Over 80% interacted with the chatbot daily, a majority (60%) selected at least one quit smoking resource, and 45% of participants reduced the number of cigarettes smoked. **Conclusion:** Our proof-of-concept chatbot prototype was acceptable and feasible. This is the first study utilizing CJA to develop a chatbot using a human-centered for individuals not actively contemplating quitting smoking. Next steps include refining the prototype with enhanced participant elicited preferences and efficacy testing in a larger scale trial. Our model is scalable and pragmatic and is designed for easy accessibility to the broader population of individuals who are not actively contemplating quitting smoking.

FUNDING: Academic Institution



PAPER SESSION 4: RECENT TRENDS IN NICOTINE USE

PPS4-1

TRENDS IN E-CIGARETTE AND TOBACCO CIGARETTE PURCHASING BEHAVIORS BY YOUTH IN THE UNITED STATES, CANADA, AND ENGLAND, 2017-2022

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Significance: Tobacco cigarette (TC) purchasing by minors has long been a focus of government tobacco control efforts, but with the increase in e-cigarette (EC) use by youth, EC purchasing has also garnered increased attention from governments in many countries. We examined trends in EC and TC purchasing behaviors between 2017 and 2022 among youth who used ECs or TCs in the past 12-months in Canada, England, and the United States (US). **Methods:** We analyzed data from eight cross-sectional online surveys from 2017-2022 (N=104,467) of national samples of 16- to 19-year-olds in Canada, England, and the US. Average wave percentage change (AWPC) in EC and TC purchasing and purchase locations were estimated using Joinpoint regressions. To examine characteristics associated with product purchasing and purchase locations, we estimated logistic regression models using the respondents' sex, age, and frequency of product use as predictor variables of purchase behavior for each product (EC vs TC), stratified by country. **Results:** In all three countries, EC purchasing increased between 2017 and 2022 (CA: 31.9%-55.8%, AWPC=11.7%, 95%CI: 6.7 to 16.9; US: 39.6%-52.9%, AWPC=4.8%, 95%CI: 1.3 to 8.5; EN: 26.1%-60.7%, AWPC=15.6%, 95%CI: 11.3 to 0.2), although the pattern of change differed by country. EC purchasing plateaued in the US after 2019 and in Canada after 2020, while purchasing increased through 2022 in England. Vape shops were the most reported location for EC purchasing across all countries (54.5%), though with significant declines in England (from 57.6% to 47.3%, AWPC=-4.6%, 95%CI: -6.8 to -2.3) and the US (from 64.8% to 51.8%, AWPC=-4.9%, 95%CI: -7.0 to -2.8), but not Canada (from 68.3% to 64.4%, AWPC=-1.1%, 95%CI: -2.9 to 0.8). Between 2017 and 2022, TC purchasing declined sharply in the US (from 44.8% to 23.8%, AWPC=-19.7%, 95%CI: -26.1 to -12.7) with a decline in purchasing from traditional retail locations (from 82.7% to 69.1%, AWPC=-6.4%, 95%CI: -9.4 to -3.3) and an increase in purchasing from social sources (from 23.9% to 53.4% AWPC=15.7%, 95%CI: 7.8 to 24.2). EC and TC purchasing were associated with older age (18-19 vs 16-17) and regular product use (use 20 or more days out of 30 vs less than 20 days). **Conclusions:** Trends in EC and TC purchasing behaviors were consistent with changes in minimum legal age (MLA) laws in the three countries. Other countries could consider raising the MLA of purchase of tobacco products to at least 21 years.

FUNDING: Federal

PPS4-2

CHANGES IN KNOWLEDGE ABOUT MAJOR HARMS OF TOBACCO SMOKING AND SECONDHAND SMOKE EXPOSURE AMONG ADULTS WHO SMOKE: FINDINGS FROM 26 COUNTRIES OF THE INTERNATIONAL TOBACCO CONTROL (ITC) PROJECT (2002-2022) AND 32 COUNTRIES OF THE GLOBAL ADULT TOBACCO SURVEY (GATS) (2008-2020)

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Significance: Smoking and secondhand smoke (SHS) exposure increase the risk of lung cancer and cardiovascular disease (CVD), two leading causes of mortality globally. This study assessed knowledge that smoking and SHS causes lung cancer and CVD, country variations in knowledge, and within-country changes in knowledge among adults who smoked tobacco and participated in the International Tobacco Control (ITC) Surveys (2002-22) and the Global Adult Tobacco Surveys (GATS) (2008-20). **Methods:** Data from adults (18+) who smoked cigarettes in 26 ITC countries (N=133,410, longitudinal survey

with replenishment) and adults (18+) who smoked tobacco (e.g., cigarettes, cigars, waterpipe) in 32 GATS countries (N=110,537, repeat cross-sectional survey) to estimate (1) prevalence of knowledge that smoking causes lung cancer, heart disease, and stroke; SHS causes lung cancer, and heart attack in people who do not smoke; and (2) change over time in knowledge of each harm. Weighted multinomial logistic regression models adjusted for sex, age, smoking status, and time-in-sample (ITC countries) to compare differences in knowledge of each harm in ITC and GATS countries. Generalized estimating equations used in the longitudinal ITC data to account for within-subject correlations. **Results:** Knowledge that smoking causes lung cancer among adults who smoke was about 90% (ITC=90.8%, GATS=88.8%). Compared with knowledge that smoking causes lung cancer, knowledge that smoking causes heart disease (ITC=82.6%, GATS=77.5%) and stroke (ITC=73.3%, GATS=64.6%) was lower, as was knowledge about SHS harms for people who do not smoke (SHS causes lung cancer: ITC=74.7%, GATS=79.0%; SHS causes heart attack: ITC=60.4%, GATS=70.5%) (all p<0.0001). In 25 ITC countries and 12 GATS countries with >1 survey wave, knowledge increased in some countries (e.g., India, Bangladesh) but decreased in others (e.g., Romania, Japan), resulting in little overall average change in knowledge of the five harms (-0.7% to +0.4% per year). **Conclusions:** This 46-country study, covering over 80% of people who use smoked tobacco globally, found high knowledge that smoking causes lung cancer among adults who smoke, lower knowledge that smoking causes CVD, and even lower knowledge for SHS harms. There was no overall change in knowledge over two decades. This highlights the need for renewed global efforts to increase knowledge about the health risks of smoking and SHS to promote smoking cessation and reduce smoking prevalence.

FUNDING: Federal; State; Academic Institution; Nonprofit grant funding entity

PPS4-3

TRENDS IN HARM PERCEPTIONS OF E-CIGARETTES COMPARED WITH CIGARETTES AMONG ADULTS WHO SMOKE IN ENGLAND, 2014-2023

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Significance: Substantial evidence shows e-cigarettes expose users to a fraction of the harmful substances cigarette smokers inhale. However, public health and media reporting have often overstated the potential risks of e-cigarettes, causing many people to hold inaccurate perceptions of their relative harms. This study examined time trends in harm perceptions of e-cigarettes compared with cigarettes among smokers in England, and differences by socioeconomic position. **Methods:** Data come from a representative monthly cross-sectional survey between Nov 2014 and June 2023. Participants were 28,393 adult (≥18y) smokers. They were asked whether they thought e-cigarettes were less, equally, or more harmful than cigarettes. Logistic regression modelled monthly time trends and interactions with occupational social grade. **Results:** In Nov 2014, the most common perception was that e-cigarettes were less harmful than cigarettes (44.4%[95%CI 42.0-46.8]), particularly among smokers from more (53.4%[49.3-57.4]) vs less advantaged (39.8%[36.8-42.8]) social grades. Around one in three thought e-cigarettes were equally harmful (30.3%[28.2-32.6]), one in ten more harmful (10.8%[9.4-12.3]), and one in seven did not know (14.5%[12.9-16.4]). However, by June 2023, the proportion who thought e-cigarettes were less harmful had fallen significantly (prevalence ratio [PR]=0.60[0.55-0.66]) and the proportion who thought they were more harmful had more than doubled (PR=2.16[1.84-2.54]). Changes over time were non-linear and more pronounced among more vs less advantaged smokers. Late-2019 saw a sharp decline in the proportion who thought e-cigarettes were less harmful (to a low of 25.1%[21.0-29.3] in Q1-2020) and increases in those who thought they were equally or more harmful (reaching highs of 50.6%[45.7-55.5] in Q1-2020 and 19.7%[16.6-22.9] in Q4-2019, respectively). These changes were relatively short-lived, returning to pre-2019 levels by the end of 2020. However, perceptions worsened again from 2021: the proportion who thought e-cigarettes were more harmful increased to a new high (surpassing the previous peak in late 2019) and the proportion who thought they were less harmful fell to levels comparable to late 2019. As a result, in June 2023, the perception that e-cigarettes were equally as harmful as cigarettes was the most commonly held view among adults who smoke (33.7%[31.4-36.1]), with similar proportions perceiving e-cigarettes to be less (26.7%[24.6-28.9]) and more (23.3%[21.1-25.7]) harmful, and little difference by social grade. **Conclusions:** In England, harm perceptions of e-cigarettes have worsened substantially over the last decade, such that the vast majority of adults who smoke do not believe e-cigarettes are less harmful than cigarettes. The timing of the most notable changes in harm perceptions coincided with the EVALI outbreak and the recent rise in youth vaping.

FUNDING: Nonprofit grant funding entity



PPS4-4

UNDERSTANDING MORE ABOUT ASIAN ADOLESCENT VAPING IN NEW ZEALAND: THE ASH (ACTION FOR SMOKEFREE 2025) YEAR 10 SNAPSHOT SURVEY ANALYSIS

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Introduction In New Zealand, there have been significant concerns in recent years around the increasing prevalence rates of vaping among adolescents aged 14 to 15. But there is a lack of studies that focused on vaping in Asian adolescents. The purpose of the study is to understand more about Asian adolescent vaping in relation to those of Non-Asian in New Zealand. **Method** The ASH (Action for Smokefree 2025) Year 10 Snapshot Survey, a nationally representative census style survey collected annually on Year 10 students aged 14 to 15 from all schools in New Zealand except those from distance education, was analyzed. The analysis was conducted on vaping by ethnicity (Asian vs Non-Asian), by Asian major subgroups (Chinese vs Indian vs 'Other Asian') and by gender (girl vs boy vs other) as well as on smoking for comparative purposes. A Chi-square test was used to detect the association between variables of interest. A binary logistic regression test was performed to detect a linear trend in the prevalence of Asian adolescent vaping over time. **Results** In all groups, from 2014 to 2022, the prevalence of vaping increased while the prevalence of smoking decreased. However, between 2021 and 2022, except for Indian group, the vaping prevalence in all groups fell for the first time, but these decreases were not statistically significant. In 2022, the prevalence of ever and current vaping by Asian adolescents was 16.4% and 4.5% compared to 44.2% and 20.3% for Non-Asian adolescents. Among Asian adolescents, the vaping by Indian adolescents showed the highest prevalence with 21.1% for ever vaping and 6.2% for current vaping. In all groups, the prevalence of vaping in girls had overtaken that of boys. Social supply, experimentation and pleasure were the commonest factors associated with Asian adolescent vaping, but a significant association was found with experimentation (by ethnicity and by Asian gender) and pleasure (by ethnicity only). Disposable e-cigarette (45-55%) was the main type of e-cigarettes they used. Over 80% of all adolescents answered, 'Vaped first' than 'Smoked first' and 'Using e-cigarettes with nicotine'. Over 85% of Asian adolescents answered 'Trying e-cigarettes soon' compared to about 70% in Non-Asian and about 10-15% of Asian adolescents answered, 'Willingness to vape from best friend's offer' compared to about 30% in Non-Asian. **Conclusion** Although slower than other ethnic groups, Asian adolescents also show an increase in vaping over time with the highest prevalence seen in Indian adolescents. Like Non-Asian adolescents, Asian adolescents also reveal similar risky behaviours and attitudes about vaping. Ongoing monitoring and more in-depth research (such as qualitative research) will be needed to further examine and understand the vaping behaviours in Asian adolescents in order to better inform targeted messaging to them, parents, and schools, as well as for appropriate policy and regulations.

FUNDING: No external funding reported

PPS4-5

BIRTH COHORT-SPECIFIC SMOKING PATTERNS BY AGE AND SEX IN ARGENTINA

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Significance: Smoking prevalence in Argentina has declined from 29.5% in 2005 to 22.2% in 2018. However, detailed analyses are needed to better understand how these trends could be driven by underlying differences across birth cohorts and to inform policy interventions. This study aims to estimate patterns by age, sex, and birth cohort of smoking initiation, cessation, intensity (cigarettes per day), and prevalence in Argentina using the validated Cancer Intervention and Surveillance Modeling Network Lung Working Group CISNET-LWG's age, period, and cohort (APC) modeling approach.

Methods: We combined annual data on sex, age, individual smoking status, age of smoking initiation, and time since smoking cessation from three Argentinian nationally representative surveys: the National Risk Factors Survey (2005, 2009, 2013, 2018), the National Survey on Prevalence of Consumption of Psychoactive Substances (2008, 2011), and tobacco-specific question from surveys conducted by The Argentine Drug Observatory (2004, 2006, 2008, 2010, 2017) (n=271,596). We used APC models to calculate initiation and cessation probabilities, ever and current smoking prevalence estimates, and smoking intensity by age, sex, and birth cohort from 1950 to 2023.

Results: Smoking prevalence increases up to age 25; it is decreasing in recent birth cohorts. Smoking initiation probability peaks between 15-18 years of age and is decreasing in men and women in recent birth cohorts. Among women, initiation increased

until the 1960 cohort, with a second peak in the 1980-85 birth cohorts. Among men, initiation has decreased since the 1950 birth cohort, with a slight increase around the 1985 cohort; men continue to have higher initiation probabilities than women. Current smoking prevalence is decreasing in recent birth cohorts, except for a peak in the 1980-85 cohorts concordant with initiation. Cessation increases with age, and among recent birth cohorts; 1980-85 women cohorts show a steeper cessation slope after age 25. **Conclusions:** Recent birth cohorts seem to be experiencing lower rates of initiation, stable or increased rates of quitting, and as a result, lower current and ever smoking prevalence. Women and men follow overall similar patterns, with women having lower rates of initiation, current smoking prevalence and ever smoking prevalence. Women from 1980-85 birth cohorts show a slightly different pattern, probably due to tobacco marketing strategies targeting women during the 70's and 80's.

FUNDING: Federal

PPS4-6

VAPING NICOTINE IS THE NEW SMOKING

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Introduction: The prevalence of vaping nicotine has increased dramatically, especially among young adults (age 18-24), coinciding with newer salt-based nicotine devices, while smoking is trending downward. Historically, this age group has been critically important to the tobacco industry, forecasting future tobacco use. **Method:** Data were analyzed from the FDA Population Assessment of Tobacco and Health (PATH) study, a nationally-representative longitudinal survey conducted 2013-2021. Statistical analyses included descriptive statistics and longitudinal models per outcome for young adults (18-24). Longitudinal models were produced using weighted generalized estimating equations with exchangeable working correlations, survey weights, balanced repeated replication with Fay's adjustment=0.3/adjfay=2.040816 and variance estimates calculated utilizing data from all adult participants. Models included main effects for sex, race, ethnicity, education, and income adjusted for time. Interactions were included in initial models, determining whether use varied by race/sex over time and chosen by backward selection.

Results: Ever smoking prevalence decreased from 53.2%(Wave 1) to 35.2%(Wave 6), while ever e-cigarette use increased from 32.0%(Wave 1) to 52.7%(Wave 6). The prevalence of current established smoking decreased from 19.6%(Wave 1) to 6.1%(Wave 6), while current established vaping increased from 3.8%(Wave 1) to 14.5%(Wave 6). The prevalence of those with current established vaping who were never established smokers rose from 1.1%(Wave 1; 27.9% of established vaping) to 8.1%(Wave 6; 56.2% of established vaping). The rate of everyday e-cigarette use rose from 1.2%(Wave 1) to 8.3%(Wave 6). Both models retained all demographic variables as main effects. Adjusted established vaping rates increased over time for both sexes, but rates started higher and increased less rapidly for males. Adjusted established smoking rates decreased over time (p<0.0001). No interactions were retained in the model for smoking. **Discussion:** These data reveal a shift in tobacco use among the critical 18-24 age group showing cigarette use at a historic low, which has positive public health significance. However, e-cigarette use is at a higher rate than has been previously reported. Over half of established vaping young adults never regularly smoked. This age group has historically been important to the tobacco industry as a time when tobacco users often transition to established use and brand loyalty, and these data may forecast a future in which e-cigarettes are the dominant tobacco product in the US. Research should aim to further reduce the prevalence of cigarette smoking and create treatments for e-cigarette users who want to quit nicotine altogether.

FUNDING: Unfunded; Federal; State

PAPER SESSION 5: IMPACT OF PRODUCT USE ON PULMONARY AND CARDIOVASCULAR HEALTH

PPS5-1

ROLE OF ALDEHYDES AND CATECHOLAMINES IN ELECTRONIC CIGARETTE-DERIVED AEROSOL-INDUCED ENDOTHELIAL DYSFUNCTION IN MICE

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Significance: Human and animal studies demonstrate that acute Electronic Nicotine Delivery Systems (ENDS) aerosol exposures induce endothelial dysfunction (ED), however, the specific constituent(s) in ENDS-derived aerosols responsible for ED is(are) unknown. As ENDS use solvents, propylene glycol and vegetable glycerin (PG:VG) that thermally decompose into aldehydes, we hypothesized that acrolein and formaldehyde in ENDS aerosols stimulate ED via activation of the autonomic nervous system (ANS). **Methods:** To test this hypothesis, female C57BL/6J mice were exposed by inhalation to either filtered air, PG:VG-derived aerosol, acrolein alone (AC; 1 ppm), or formaldehyde alone (FA, 5 ppm). Biomarkers both of exposure (AC: 3-hydroxypropylmercapturic acid, 3HPMA; FA: 4-thiazolidine carboxylic acid, 4TCA) and of harm (aortic ED; urinary catecholamines) were measured. **Results:** As expected, PG:VG and AC exposures significantly increased urinary 3HPMA levels; and PG:VG and FA exposures significantly increased urinary 4TCA levels vs air control groups. Both PG:VG and FA exposures (6h/d x 4d) in female mice stimulated aortic ED (-64.6±3.8; -66.7±5.5 % ACh), but not EPI nor 5HT; FA exposure increased DA (+3x), EPI (+2.5x), NE and NE metabolites (+1.2-2.5x), 5HT and 5HT metabolite (+2.5x) only in late PE; while AC exposure decreased early PE DA (-73%) and 5HT (-42%) levels. **Conclusions:** Aldehydes induce ED through time-dependent mechanisms mediated in part by ANS stimulation. These data indicate that ENDS use may increase cardiovascular disease risk via aldehydes generated by PG:VG solvents independent of nicotine and flavorants.

FUNDING: Federal; Academic Institution; Nonprofit grant funding entity

PPS5-2

PATERNAL E-HOOKAH EXPOSURE INCREASES THE RISK OF THROMBOTIC DISORDERS

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Cardiovascular disease (CVD) is well documented as the leading cause of death worldwide, with smoking being the most preventable cause. Indeed, most smokers die from thrombotic-based diseases, in which platelets play a major role. To this end, because of the proven harm of smoking, other novel tobacco products- including e-hookah- have been gaining popularity even among the youth and young adults, partly due to the "false safety claims" associated with their use. While many investigators have focused on the negative health effects of direct as well as maternal/*in utero* exposure of tobacco products on the unborn fetuses, little is known about paternal exposure, i.e., that of "future" fathers, which we investigated herein. Thus, we employed a whole-body exposure model of e-hookah in which we exposed male mice for six-weeks before mating, and throughout the mating period until the females were visibly pregnant. Exposures took place seven times a week, according to the well-known Beirut protocol, whereas control mice were exposed to clean air. The Beirut exposure protocol- which has been employed in many studies as it mimics real-life scenarios- involves the delivery of 171 puffs of 530 ml volume of the e-liquid at 2.6s puff duration and 17s puff interval. Experiments were performed on the offspring once they reached 10-12 weeks of age. Our results show for the first time- that paternal e-hookah exposed mice-which had elevated levels of the marker cotinine- exhibit shortened bleeding and occlusion times when compared to the clean air exposed controls, which indicates a prothrombotic phenotype. Investigation of the mechanism underlying this phenotype showed that

e-hookah exposed platelets had enhanced agonist-triggered aggregation and dense granule secretion. Additionally, flow cytometry analysis of surface markers of platelet activation showed that integrin GPIIb-IIIa activation and p-selectin expression were also enhanced in the e-hookah exposed platelets, indicating hyperactivity. We also found that the spreading response is enhanced in the exposed platelets, indicating that outside-in signaling is potentiated. In terms of biochemical markers of activation, our data revealed that Akt phosphorylation is elevated in the e-hookah exposed platelets. Finally, our data also indicate that e-hookah renders platelet more resistant to inhibition by prostaglandin I₂, supporting the notion that inhibitory signaling is also impacted as a result of exposure. Collectively, we document for the first time, that paternal e-hookah exposure does exert negative health effects in the context of thrombosis-based CVD, in part, via modulating platelet stimulatory and inhibitory signaling, thereby leading to a state of platelet hyperreactivity. Hence, e-hookah should not be considered a safe alternative to traditional cigarette smoking.

FUNDING: Federal; Academic Institution

PPS5-3

DOES 'SWITCHING' FROM TOBACCO CIGARETTES TO HEATED TOBACCO PRODUCTS FACILITATE RESOLUTION OF PULMONARY INFLAMMATION AND DAMAGE INDUCED BY CIGARETTE SMOKE

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Significance: IQOS, a heated tobacco product (HTP), was designed to reduce toxic exposure in users by heating tobacco instead of burning it. Industry data suggests that the potential harm to respiratory health is significantly reduced among healthy people who had previously used combustible cigarettes and switched completely to IQOS. However, it is currently unknown if similar health benefits exist among people with underlying lung diseases and susceptibility to recurrent infections who use combustible cigarettes. We thus sought to determine if switching from chronic cigarette smoke exposure to exposure to IQOS aerosols can reverse or minimize detrimental pulmonary effects induced by cigarette smoke. **Methods:** We used a well-validated preclinical animal model to address these critical questions. Mice were exposed for 16 weeks to 3 different conditions: 1) continued exposure to cigarette smoke (*continued smoking*); 2) exposure to cigarette smoke followed by exposure to IQOS aerosols (*switching condition*); and 3) exposure to cigarette smoke followed by exposure to air only (*cessation condition*). After 16 weeks, all animals were given an acute pulmonary bacterial infection with non-typeable *Hemophilus influenzae* (NTHI). We evaluated biomarkers of pulmonary inflammatory microenvironment and associated lung damage. **Results:** Our results reveal that switching to IQOS-inhalation before acute respiratory infection resulted in poor pulmonary bacterial clearance and only modestly reduced lung-endothelial damage, whereas cessation of cigarette smoke exposure was considerably superior. Pulmonary immune cell infiltration, a marker of response to inflammation, infection or pulmonary stress, measured post-bacterial challenge, was not reduced in mice that were switched to IQOS but it was significantly reduced in the cessation group. At several time points measured, markers of lung epithelial damage were equivalent in mice switched to IQOS vs mice with continued cigarette smoke exposure, whereas a significant reduction in these levels occurred upon cessation of cigarette smoke exposure, suggesting increased lung permeability, extravasation, or local protein synthesis. **Conclusions:** Our findings highlight that inhalation of IQOS aerosols induces detrimental effects in a manner similar to exposure to smoke emitted from combustible cigarettes and therefore provides important new information both for regulatory purposes, clinical practice and for the user. **Funding:** This study was supported by grants from the National Heart, Lung, and Blood Institute of the National Institutes of Health (R01 HL142511) to YT and MLG, the US Food and Drug Administration (FDA), and the National Cancer Institute Grant U54CA228110 to MLG, and P30CA016056 involving the use of Roswell Park Core facilities.

FUNDING: Federal; Nonprofit grant funding entity



PPS5-4

RESPIRATORY IMMUNE MEDIATOR LEVELS DIFFER IN EXCLUSIVE AND DUAL E-CIGARETTE USERS COMPARED TO NON-USER CONTROLS AND BY SEX IN NON-INVASIVE NASAL EPITHELIAL LINING FLUID LONGITUDINALLY SELF-COLLECTED AT HOME

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Significance: E-cigarette (EC) use continues to be of concern in youth and young adults as 14.1% of middle and high school students reported current use in 2022. Use of any inhaled product that alters the respiratory immune environment has potential health consequences, especially in youth and young adults with respiratory tracts that are still developing. Thus, we aimed to characterize the respiratory immune milieu in exclusive and dual EC users over a 4-week longitudinal study. **Methods:** Adult subjects aged 18-25 (N = 67; Mean[SD], 22.1[0.4] y/o; 59% female; 36% Hispanic/Latino) who were exclusive EC Users (EC, n=11), EC and Other Tobacco Product (EC+OTP, n=23), or Non-Users (NU, n=33) were recruited into the Biomedical Respiratory Effects Associated through Habitual Use of E-cigarettes (BREATHE) Study in Southern California, USA. Subjects participated for 4-weeks from May to December, 2021. Five virtual visits and weekly nasal epithelial lining fluid (NELF) and saliva collection were conducted. NELF and saliva were self-collected after study staff instruction and stored frozen until analysis. NELF samples were analyzed via multiplex ELISA for 29 cytokines and chemokines. Saliva was analyzed for cotinine via competitive ELISA. Descriptive statistics and standard or repeated measure ANOVAs with exposure group, visit date, and sex as factors and post-hoc tests were conducted. **Results:** Increases in immune mediator levels in EC and EC+OTP groups over NUs suggest a significant respiratory immune effect of EC and OTP product use in young adults. Differences in NU vs EC were found in 12 mediators, NU vs EC+OTP in 6 mediators, where 4 of those mediators were uniquely EC+OTP vs NU differences, and EC vs EC+OTP in 7 mediators. Effects of visit date across the 4 weeks were only found in 2 mediators. The largest differences were in IL-1 Beta, IL-8, IL-16, MDC, MIP-1 Beta, and VEGF in EC vs NU groups and IL-16, Eotaxin, and TARC in EC+OTP vs NU groups. Effects of sex were identified in 15 mediators and an exposure group by sex interaction was identified in 6 mediators. **Conclusions:** Together, these data suggest significant respiratory immune alteration, specifically increased inflammation, with both exclusive and dual EC use that remains consistent over a period of 4 weeks compared to non-users. These data also demonstrate the feasibility of at home self-sampling of NELF as a non-invasive measure of respiratory immune biomarkers.

FUNDING: Federal

PPS5-5

ASSOCIATIONS OF VALIDATED E-CIGARETTES AND TOBACCO CIGARETTES EXPOSURE AND SUBJECTIVE AND OBJECTIVE LUNG HEALTH MEASURES INCLUDING MULTIPLE BREATH WASHOUT IN ADOLESCENTS: A CROSS-SECTIONAL STUDY

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Background: A growing number of adolescents are using e-cigarettes. Data on possible harms of e-cigarettes to adolescents is lacking. We compared indicators of lung health, including objective measures of exposure, in adolescents who vape, smoke, or do not vape nor smoke. **Methods:** We included adolescents from a birth cohort in Bern, Switzerland, and enriched the dataset with adolescents who vape recruited through social media. We assessed demographic, substance use, respiratory symptoms (longest episode without coughing in past year), and lung function measures: conventional lung function, lung clearance Index (LCI) via multiple breath washout and fraction of exhaled nitric oxide (FeNO). We validated exposure to inhaled toxins through urinary analyses of polycyclic aromatic hydrocarbons (PAH), volatile organic compounds (VOC), tobacco-specific nitrosamines (NNAL), and salivary analyses of cotinine. Categories of exposure were: daily smoking; daily vaping without daily smoking (daily vapers); vaping or smoking weekly or monthly (occasional users); and no vaping nor smoking in the past year (abstainers). We adjusted results by gender, age, education level, second-hand smoke and ambient air pollution exposure, and self-reported atopic disease. **Results:** We included 89 participants. Median age was 17.0 (range 15 to 22) years, 52% were women. Daily smokers (n=11) and daily vapers (n=22) reported not coughing for the same number of days (94 versus 95 days, difference: 1 day, 95% CI -75 to 77), but abstainers (n=35) reported more cough-free days (194 days, 95% CI 153 to 236 days /

year). Lung function results, including LCI and FeNO, were similar in all groups. Urinary NNAL concentrations were elevated in daily smokers (p=0.02) and salivary cotinine levels were elevated in daily vapers and daily smokers (p=0.001), indicating that self-reporting was adequate. Levels of inhaled toxins (PAH and VOCs) were higher in daily smokers than in other groups (e.g. PAH 2.7 (1.7 to 3.6) vs 0.3 (0.0 to 1.0) in daily vapers). Results for occasional users (n=21) resembled abstainers in all measures. **Conclusion:** Lung function results were comparable in adolescents who vaped, smoked or did none. Adolescents vaping or smoking reported more respiratory symptoms than abstainers, indicating that both impaired lung health. Adolescents vaping were less exposed to toxins than smoking adolescents, suggesting vaping could be substituted for smoking to reduce harm in adolescents.

FUNDING: Academic Institution; Nonprofit grant funding entity

PPS5-6

ACUTE EXPOSURE TO TOBACCO AND TOBACCO WITH NICOTINE-FLAVORED ELECTRONIC CIGARETTE AEROSOLS AFFECT THE LUNG LIPIDOME IN A STRAIN AND SEX-DEPENDENT MANNER IN VIVO

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Rationale: Electronic cigarette (e-cig) use has become widespread, especially among naive users such as never-smokers. E-cigs come in many flavors and tobacco flavors have dominated the market as a cessation method for combustible cigarette use. Flavoring chemicals and other toxicants in these e-cigs form various metabolites upon exposure to e-cig aerosols. Lipidome homeostasis is pivotal to the health of the lungs. We hypothesized that acute exposure to propylene glycol (PG/VG) and tobacco-flavored e-cigs with and without nicotine adversely alter the lung lipid profile. **Methods:** In this study, we compared two mouse strains, C57BL/6J and BALB/cJ, to assess the genetic predisposition to adverse lipidomic changes upon exposure to flavored e-cigs. Male and female mice of each strain were exposed to air, PG/VG, tobacco 0 mg nicotine, and tobacco 6 mg nicotine 2 puffs/min (55 mL puff volume) for 2 hours for three consecutive days. Twenty-four hours post-exposure, the mice were sacrificed and their bronchoalveolar lavage fluid (BALF) was collected by saline instillations. LC-MS/MS technique (Cayman Chemicals) was used to characterize and quantify the lipid profile in bronchoalveolar lavage. **Results:** Ceramides such as N-acylsphinganine, N-acylsphingosine, Diacylglycerols, Unsaturated fatty acids, N-acyl amines, Fatty acylcarnitines, Glycerophosphocholines, Glycerophosphoethanolamines, Glycerophosphoglycerols, Glycerophosphoinositols, Glycerophosphoserines, Monoradylglycerols, Neutral glycosphingolipids, Phosphosphingolipids, Sterols, and Triradylglycerol profiles were differentially altered upon exposure to PG/VG and tobacco compared to the air-exposed (control) counterparts. Further, the presence of nicotine augmented the response. Additionally, we observed strain and sex-dependent alterations in the lung lipidome upon exposure to e-cig aerosols. **Conclusion:** This study provides comparative lipid biomarkers of exposure and disease to unflavored-, tobacco-flavored, and tobacco with nicotine-containing e-cigs. **This study was supported by K99ES033835 and U54CA228110.**

FUNDING: Federal



PAPER SESSION 6: RECENT DEVELOPMENTS IN VARENICLINE RESEARCH

PPS6-1

PRE-QUIT CHANGES IN SMOKING RATE MEDIATE SMOKING CESSATION OUTCOMES IN A RANDOMIZED CLINICAL TRIAL OF EXTENDED PRE-QUIT VARENICLINE

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Significance: The mechanisms by which extended pre-loading of medication enhances abstinence are not well-studied, particularly for varenicline. Based in an extinction of reinforcement framework and evidence of sex differences, we hypothesized that pre-quit reduction in cigarettes smoked per day (CPD) would mediate smoking cessation in a trial of extended pre-quit duration varenicline, particularly among females. **Methods:** Participants were 320 adults (179 female) reporting smoking 5+ cigarettes/day, enrolled in a randomized, double-blind, placebo-controlled trial (NCT03262662). The extended run-in group received varenicline throughout a 4-week pre-quit period; the standard run-in group received 3 weeks of placebo, followed by 1 week of varenicline. Both groups subsequently received 11 weeks of open label varenicline. CPD were reported as part of a daily smartphone assessment. The primary outcome was cotinine-verified (at end of treatment [EOT]) self-reported continuous abstinence from smoking during the last 4 weeks of treatment. Mediation was tested with bootstrapped confidence intervals within a structural equation model. **Results:** Reductions in pre-quit CPD were greater in the extended run-in group (path $a = -0.818$, $p < .001$); greater reductions in pre-quit CPD were associated with greater likelihood of being continuously abstinent at EOT (path $b = -0.347$, $p = .03$); and the indirect effect was statistically significant ($a \times b = 0.284$, 95%CI=0.078-0.624, $p < .01$). Sex-specific models suggested that mediation of abstinence at EOT was limited to females. Comparable results were obtained when an alternative measure of change in CPD (percent change from baseline to the final week pre-quit) was evaluated. With a more proximal measure of abstinence (bio-verified 7-day point prevalence 4 weeks post target quit date), the indirect effect (using either continuous or percent change metrics of CPD) was significant in females, males, and the overall sample. **Conclusion:** Results were consistent with the hypothesis that extended pre-quit varenicline treatment promotes extinction of reinforcement as indexed by reductions in pre-quit smoking rate, and this extinction process supports abstinence. The observation that mediation of EOT abstinence was limited to females raises possibilities for targeted intervention in females and questions about why extended pre-quit varenicline reduced smoking rate in males without enhancing the likelihood of prolonged abstinence.

FUNDING: Federal; Pharmaceutical Industry

PPS6-2

AN EVALUATION OF PRE-QUIT CHANGES IN CRAVING AND WITHDRAWAL AS CANDIDATE MEDIATORS OF SMOKING CESSATION OUTCOMES IN A RANDOMIZED CLINICAL TRIAL OF EXTENDED PRE-QUIT VARENICLINE

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Significance: Mechanisms by which extended pre-loading of varenicline (var) may enhance smoking abstinence are not well understood. We tested the hypotheses that var-induced reductions in craving and withdrawal during the pre-quit period would mediate smoking cessation in a trial of extended pre-quit var, particularly among females. **Methods:** Participants were 320 adults (179 female) reporting smoking 5+ cigarettes/day, enrolled in a randomized, double-blind, placebo-controlled trial (NCT03262662). The

extended run-in group received var throughout a 4-week pre-quit period; the standard run-in group received 3 weeks of placebo, followed by 1 week of var. Both groups subsequently received 11 weeks of open-label var. A 4-item craving questionnaire and the Minnesota Tobacco Withdrawal Scale were completed as part of a daily smartphone assessment. The primary outcome was cotinine-verified (at end of treatment [EOT]) self-reported continuous abstinence from smoking during the last 4 weeks of treatment. Bio-verified 7-day point prevalence 4 weeks post-target quit date was a secondary measure as it was more proximal to pre-quit measurements of craving and withdrawal. Mediation was tested with bootstrapped confidence intervals within a structural equation model. **Results:** Reductions in pre-quit craving were greater in the extended run-in group (path $a = -0.09$, $p = .003$); greater reductions in pre-quit craving were related to a greater likelihood of being continuously abstinent at EOT, albeit non-significantly (path $b = -1.76$, $p = .08$); and the indirect effect was statistically significant ($a \times b = 0.15$, 95%CI=0.001-0.39). Results were in the same direction for 4 weeks post-target quit date but were non-significant ($b = -1.55$, $p = .11$; $a \times b = 0.14$, 95%CI=-0.03-0.35). While extended var resulted in reductions in pre-quit craving among females but not males, sex-specific mediation models were non-significant for pre-quit changes in craving. Mediation models of withdrawal resulted in non-significant indirect paths for both timepoints. **Conclusions:** Extended pre-quit var may improve abstinence rates in part by reducing craving even before the target quit date. Although pre-quit craving reduction by var was limited to females, mediation of abstinence was not evident in either sex, likely due to limited statistical power. Future research should investigate a range of candidate mechanisms, both pre- and post-quit, to optimize the effectiveness of pharmacologic interventions for smoking cessation.

FUNDING: Federal; Pharmaceutical Industry

PPS6-3

ASSESSING SEX-SPECIFIC EFFECTS OF VARENICLINE ON PRE-QUIT CRAVING AND CONSUMPTION

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Significance: The disparity between females and males in smoking cessation rates may be related to greater cigarette craving in females. Varenicline (VAR) may be more efficacious in females; however, there is limited research on sex-specific predictors of treatment efficacy. We hypothesized VAR would significantly reduce cigarette craving in females, and craving would moderate the effects of VAR on cigarette use. **Methods:** We conducted a secondary analysis of ecological momentary assessment data from the pre-quit period of a double-blind, randomized, controlled trial (NCT03262662) assessing extended run-in VAR (4 weeks) vs. standard run-in (3 weeks placebo, 1 week VAR). Each morning during the 1-week baseline and 4-week run-in to quit-date, participants ($n = 317$, 56% female) responded to a 4-item craving questionnaire and reported the number of cigarettes they smoked the day before (CPD); daily responses were averaged at the weekly level and modelled at 5 time-points. To determine the sex-specific effects of VAR on craving and cigarette use, linear mixed effects models with craving as the outcome and then CPD as the outcome and craving as a moderator were assessed in each sex. **Results:** For both sexes, the extended run-in group had significantly greater decreases in CPD during the 5-week pre-quit period than the standard run-in group ($t_{498} = -5.2$, $p = .0001$; $t_{675} = -6.3$, $p = .0001$, respectively). Females in extended run-in had significantly greater decreases in craving relative to females in the standard group during pre-quit (group $\times$ time; $t_{664} = -4.0$, $p = .001$), whereas this interaction on craving was not significant in males ($t_{508} = -1.7$, $p = .09$). In addition, for both sexes lower craving was associated with lower CPD, over time ($t = 2.8_{485}$, $p = .006$; $t_{637} = 4.2$, $p = .001$). Notably, for females there was a significant 3-way interaction between group, time, and craving on CPD ($t_{638} = 4.2$, $p = .001$), indicating CPD declined more rapidly for females in the extended group when craving was low. This 3-way interaction was not significant for males ($t_{488} = 1.2$, $p = .24$). **Conclusion:** During the pre-quit period VAR reduced smoking for both males and females and craving for females. Findings further suggest that effects of VAR on reducing cravings for cigarettes may play a greater role in smoking cessation treatment efficacy for females than for males, which informs as to VAR mechanisms of action and the role of craving in smoking outcomes for females.

FUNDING: Federal; Pharmaceutical Industry



PPS6-4

BREAKING BLIND: PERCEIVED TREATMENT ASSIGNMENT ACROSS THE PRE-QUIT PERIOD OF A PLACEBO-CONTROLLED TRIAL OF VARENICLINE FOR SMOKING CESSATION

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Significance: Blinding participants to treatment assignment is vital to maintaining the internal validity of clinical trials. However, efforts to assess blind integrity are uncommon and existing evidence in the smoking cessation literature is typically constrained to post-quit reporting. The present study investigated whether and when participants began to accurately predict their assigned treatment group before quitting within a varenicline trial. Breaking of the blind was predicted to be more evident among women, as they are more likely to experience nausea with varenicline. **Methods:** Participants were 320 adults (179 women; 56%) reporting smoking 5+ cigarettes/day, enrolled in a randomized, double-blind, placebo-controlled cessation trial (NCT03262662). The extended run-in group received varenicline throughout the 4-week pre-quit period; the standard run-in group received 3 weeks of placebo, followed by 1 week of varenicline. Subsequently, all participants received 11 weeks of standard, open label varenicline. Throughout the 3-week medication manipulation phase, participants reported perceived treatment assignment (PTA) via smartphone assessment. Logistic regressions of PTA, gender, treatment group, and their interactions were conducted early in Week 1, the middle of Week 2 (when the extended run-in group reached full titration), and the end of Week 3. Chi-squares provided follow-up tests and descriptive statistics. **Results:** On average, the blind began to break by Week 2 (ORs=.93, .47, and .43; p s=.75, <.001, <.001, for Weeks 1, 2, and 3, respectively). The Gender x Group interaction was significant by Week 3 (OR=.28, p =.01). Among women, the percentage of accurate PTA increased across weeks (Standard Group 52%, 56%, and 61%; Treatment Group 59%, 64%, 72%, χ^2 s=1.6, 5.5, and 17.0, p s=.22, .02, and p <.001 for Weeks 1-3, respectively). The blind remained intact among men throughout the 3-week period, (χ^2 s<2.3, p s>.13 for Weeks 2-4). **Conclusion:** Findings suggested that females were increasingly accurate in their PTA across time. Whether this was driven by changes in pre-quit smoking rate, craving, and/or side effects will be evaluated in further analyses. The impact of breaking the blind on treatment outcome expectancies will also be evaluated, as differential expectancies would negatively impact internal validity. Future trials should consistently evaluate the maintenance of the blind, as well as predictors and consequences of any breaking of the blind.

FUNDING: Federal; Pharmaceutical Industry

PPS6-5

BASELINE SOCIODEMOGRAPHIC AND CLINICAL PREDICTORS OF SMOKING CESSATION IN A FACTORIAL CLINICAL TRIAL TESTING BEHAVIORAL ACTIVATION AND VARENICLINE IN SMOKERS WITH CURRENT OR PAST MAJOR DEPRESSIVE DISORDER

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The rate of smoking among people with current or past major depressive disorder (MDD) is two times higher than in the general population and is associated with increased disease morbidity and mortality. In our recent 2x2 factorial clinical trial with 300 diverse smokers with current or past MDD, varenicline significantly increased cessation, compared to placebo, but behavioral activation for smoking cessation (BASC) yielded similar quit rates compared to standard behavioral counseling. The sample was racially and socioeconomically diverse and spanned varied psychiatric presentations: 49% of participants had current MDD, 44.3% had other psychiatric diagnoses (including substance use disorder), only 27.3% were being treated for depression, and 16% reported one or more past suicide attempts. In this secondary analysis, we examined baseline variables as potential moderators of the effects of behavioral treatment on end-of-treatment (EOT) abstinence and evaluated baseline variables as predictors of abstinence, controlling for behavioral treatment and pharmacotherapy. Self-reported 7-day point prevalence abstinence at EOT (week 14) was confirmed using breath carbon monoxide (≤ 6 parts per million). As either moderators of behavioral treatment or as predictors of abstinence, we examined a range of sociodemographic (e.g., sex, racial/ethnic minority) and clinical factors (e.g., anhedonia, antidepressant medication use, presence of current MDD, psychiatric comorbidity). In a logistic regression model,

greater likelihood of abstinence was associated with varenicline treatment vs. placebo (31.7% vs. 8.8%; OR=0.21, 95% CI=0.10-0.45), identifying as White vs. belonging to a racial/ethnic minority group (29.5% vs. 17.1%; OR=2.84, 95% CI=1.37-5.86), and lower cigarette dependence (OR=0.73, 95% CI=0.61-0.86). None of the baseline factors interacted with behavioral treatment to predict abstinence. Findings dispel the persistent myth that stable psychiatric status prior to smoking cessation treatment is necessary for successful abstinence. Further effort is needed to: 1) determine which individuals benefit from BASC vs. standard behavioral counseling; and 2) identify interventions that could be added to varenicline treatment to improve quit rates for racial/ethnic minority smokers with a history of MDD. Such efforts may help to address the unique psychological, social, and environmental challenges for this important disparity group.

FUNDING: Federal

PPS6-6

COMBINATION TREATMENT WITH VARENICLINE AND NICOTINE PATCH ON SMOKING CESSATION OUTCOMES IN HEAVY DRINKERS AT 26 WEEK FOLLOW-UP

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Significance: Those who smoke cigarettes and drink alcohol heavily (≥ 14 drinks per week for men (7 for women), ≥ 1 heavy drinking episode monthly) have lower smoking cessation rates compared with those who do not drink heavily. Recent work has shown that combination pharmacotherapy (varenicline+nicotine patch) results in greater smoking abstinence compared with placebo+patch through 12 weeks of treatment in people who smoke and drink heavily, but long-term outcomes after medication discontinuation are unknown. We compared smoking cessation rates between treatment groups at 12 weeks (end-of-treatment) and 26 weeks post-quit day in people who smoke and drink heavily and examined participant characteristics as predictors of smoking quit rates. **Methods:** Participants who smoke ($N=122$, $M_{age}=44\pm 12.4$ SD yr, 45% female, 46% white; $M_{cig/day}=11.8\pm 6.6$; duration 25.2 ± 13.2 yr) and met heavy-drinking criteria ($M_{drinks/week}=24.7\pm 19.6$, 57% met criteria for alcohol use disorder [AUD]) were randomly assigned to either varenicline+nicotine patch or placebo+nicotine patch for 12 weeks. The primary outcome was continuous abstinence (not even a puff of a cigarette) during weeks 9-12. At 26 weeks after the quit date, follow-up telephone interviews determined past 7-day point prevalence of cigarette abstinence. For both time points, self-reported abstinence was verified by in-person expired air carbon monoxide. GEE binomial models examined whether treatment assignment or participant characteristics predicted quit rates; models covaried for baseline cigarettes smoked per day. **Results:** There was a treatment x time interaction ($p=0.02$) such that combination varenicline+patch demonstrated superior efficacy at week 12 (quit rate=44%) relative to placebo +patch (quit rate=28%, $p=0.04$), but not at week 26 (25% vs. 26%, respectively, $p=0.89$). Greater baseline number of cigarettes smoked per day predicted lower quit rates at both intervals in the varenicline group ($p=0.01$) but not the placebo group ($p=0.19$). Race, sex, age, past month heavy drinking, and AUD symptoms were not associated with quit rates. **Conclusion:** While varenicline improves smoking quit rates at 12 weeks in people who smoke and drink heavily, efficacy at 3 months post-treatment was no longer evident relative to patch alone. Future studies extending medication beyond 12 weeks may help determine if longer-term treatment is indicated for vulnerable subgroups, particularly in those who are heavy smokers and heavy drinkers.

FUNDING: Pharmaceutical Industry; Academic Institution



SRNT₂₀₂₄

PODIUM PRESENTATION 2



PAPER SESSION 7: ACCESSIBILITY, AVAILABILITY, AND EXPOSURE OF NICOTINE PRODUCTS

PPS7-1

USING OPENSTREETMAP TO EXAMINE THE SPATIAL DISTRIBUTION OF CIGARETTE VENDING MACHINES: A PILOT STUDY IN HEIDELBERG, GERMANY

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Significance: Cigarette vending machines (CVMs) are widely available in Germany. Currently, the country's Child Protection Act only states that these CVMs need to be set up in a place that is inaccessible to children and young people or that technical devices or permanent supervision ensures that minors cannot take out products. The industry itself has a self-regulation of 100 meters distance between schools and kindergartens and the location of a CVM. The primary aim of this study is to examine the spatial distribution of CVMs in relations to kindergartens and schools. **Methods:** We used OpenStreetMap to obtain school, kindergarten and CVM location data. For the CVM locations, ground truthing was undertaken, whereby the area 100 meters around schools and kindergartens were observed. CVMs not captured in OpenStreetMap were mapped using the OSMAND app. Subsequently, we conducted a spatial point pattern analysis to assess spatial randomness and identify potential clusters of CVMs. Then, we employed a count regression model to investigate the relationship between the distribution of CVMs and the proximity to educational institutions. We also quantified the distances between educational institutions and CVMs using both Euclidean distance calculation and real-world walking distances obtained through network analysis. **Results:** Findings revealed a non-random distribution of CVMs, with notable clustering observed. We found a significant relationship between the occurrence of CVMs and their distance from educational institutions. CVMs are more likely to be found at increasing distances from these institutions, particularly between 100 and 150 meters. However, despite this trend, we identified 20 CVMs within a 100-meter radius of schools and kindergartens, comprising 2 around schools and 18 near kindergartens. **Conclusions:** CVMs can be found in close proximity to entities where children and youth frequent. This finding sheds light on the urgent need for Germany to strengthen its tobacco control laws and ban CVMs. It also demonstrates the utility of OpenStreetMap as a powerful and innovative data source for tobacco control.

FUNDING: Unfunded; Academic Institution

PPS7-2

AVAILABILITY OF E-CIGARETTES AND FLAVORED E-LIQUIDS MAY ENHANCE THE EFFECTS OF A NICOTINE PRODUCT STANDARD ON SMOKING IN VULNERABLE POPULATIONS

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Background: Smoking prevalence has decreased markedly in the general U.S. population but less in vulnerable populations including those with psychiatric disorders or socioeconomic disadvantage. In prior research, very low nicotine content (VLNC) cigarettes decreased smoking and toxin exposure in vulnerable populations compared to normal nicotine content (NNC) cigarettes. We report results from three multi-site randomized clinical trials (RCTs) using common protocols examining whether ready access to e-cigarettes and flavored e-liquids moderate effects of nicotine reduction in vulnerable populations. **Methods:** Adult daily smokers (N=212) were recruited from three vulnerable populations: individuals with (1) affective disorders, (2) opioid use disorder, or (3) women of reproductive age with low educational attainment, and randomly assigned to one of four conditions: (1) 15.8 mg/g cigarettes only (NNC); (2)

0.4 mg/g cigarettes only (VLNCs); (3) 0.4 mg/g cigarettes+JUUL e-cigarettes w/ only tobacco-flavor e-liquids (VLNC+TF); (4) 0.4 mg/g cigarettes+JUUL e-cigarettes w/ the option to personalize flavor of e-liquids (VLNC+PF). Main outcomes are total cigarettes smoked daily (CPD) and breath carbon monoxide (CO) (ppm) at Week 16 analyzed using analysis of covariance. Least Square (LS) means ($\pm$ SEMs) not sharing superscript letters differ significantly at $P<.05$. **Results:** There were main effects of condition on CPD and breath CO at Week 16 ($F[3,180]=17.78, P<.001$ and ($F[3,200]=3.97, P=.009$, respectively). Mean smoking rates were 20.82 ± 1.10^a , 13.81 ± 1.13^b , 13.71 ± 1.16^b , and 9.76 ± 1.07^c , in the NNC, VLNC, VLNC+TF, and VLNC+PF conditions, respectively. Mean breath CO (ppm) levels were 17.24 ± 1.95^a , 14.60 ± 1.87^a , 12.70 ± 1.81^{ac} and 9.29 ± 1.42^c in the NNC, VLNC, VLNC+TF, and VLNC+PF conditions, respectively. **Conclusions:** These results suggest that access to appealing non-combusted sources of nicotine have the potential to enhance the impact of a nicotine reduction policy on smoking in vulnerable populations, with maximal effects being observed when VLNCs are combined with ready access to e-cigarettes and personalized e-liquid flavors.

FUNDING: Federal

PPS7-3

HOW YOUNG PEOPLE AFFORD TO BUY E-CIGARETTES: CHANGES IN PRICE, INCOME AND AFFORDABILITY

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Background: E-cigarettes are the most used tobacco product among youth and young adults in the United States. In 2022, 14% of high school students and 12% of adults aged 18-34 were current e-cigarette users. Additionally, 36% of 16-19-year-olds, 71% of 20-24-year-olds, and 82% of 25-34-year-olds are in the labor force and work at least part time. In this study, we quantified changes in affordability of e-cigarettes by determining if changes in e-cigarette affordability were attributable to changes in price of e-cigarettes, income, or both. **Methods:** We analyzed real price (p/1mL of e-liquid) data from NielsenIQ - 23 State Line File and annual real income data from Integrated Public Use Microdata Series for age groups: 16-17, 18-19, 20-24, and 25-34 from 2015 to 2021. Using the relative-income price (RIP) method, we first analyzed real price differences for the 23 states for 2021. Second, we calculated 2021 RIPs by calculating the percentage of income needed to purchase 100 mLs of e-liquid with 2021 real annual income for each age group in each state. Third, we calculated annual percentage change (APC) in real prices and RIPs from 2015 to 2021 and decomposed the APCs into changes in price and changes in RIP. **Results:** In 2021, prices varied from \$2.76 in Alabama to \$6.73 in Massachusetts. On average, 16-17-year-olds needed 30% of their annual income to purchase 100 mLs of e-liquid, whereas 25-34-year-olds needed 1%. From 2015 to 2021, the average APC in price of 1 mL of e-liquid decreased in 7 states. Relative changes in affordability across all age groups were similar; despite the presence of e-cigarette taxes, e-cigarettes on average became more affordable in 12 states (e.g., Michigan and Florida), and less affordable in 11 states (e.g., Pennsylvania and Kentucky). Additionally, we found that most increases in affordability were attributed to both decreases in price and increases in income. In states with decreased e-cigarette affordability, we found that price increases were larger than annual income increases. **Discussion:** E-cigarettes have become increasingly more affordable for the majority of the NielsenIQ states from 2015 to 2021. Alarming, we found that the presence of an e-cigarette tax didn't always make e-cigarettes less affordable for youth and young adults. Policy efforts should focus on reducing e-cigarette affordability by increasing tobacco product prices through higher excise tax rates, limiting rebates and coupons, and establishing minimum pricing and markup laws.

FUNDING: No external funding reported

PPS7-4

COMPLIANCE WITH TOBACCO CONTROL LAWS AT POINTS OF SALE IN ARGENTINA

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Introduction: In Argentina, while a national law regulates how tobacco products can be presented and marketed at points of sale (POS), each province has the authority to enact laws beyond the minimum national standard. For instance, in Cordoba and La Pampa provinces the display, advertising and promotion of tobacco products at POS is prohibited, whereas in Buenos Aires and Jujuy provinces it is allowed, as long as there is up to one advertising poster per brand. Adherence to these laws is not well



understood. **Methods:** Using a codebook developed from past research, between April and July 2023 we assessed compliance with tobacco legislation at POS in four cities in four provinces in Argentina (Cordoba, Cordoba province; Santa Rosa, La Pampa province; Quilmes, Buenos Aires province; San Salvador de Jujuy, Jujuy province). In each city, schools were randomly selected and stratified according to neighbourhood socioeconomic status, with all POS located in pre-planned routes around the schools observed. **Results:** A total of 512 POS were observed, with 234 in cities in provinces with restrictive laws (Cordoba and Santa Rosa) and 278 in cities in provinces with more permissive regulations (Quilmes and San Salvador de Jujuy). Across the four cities, despite a ban on single cigarette sales throughout the country, 16% (n=82) of the POS displayed open cigarette packs for sale, and in 75.2% (n=385) it was possible to buy single cigarettes even though they were not displayed. In 97.5% (n=499) of the POS the mandatory “no sale to minors” sign was absent, and in 95.4% (n=330) of POS where a person could enter a store, and where there should be a “no smoking” sign, this was absent. In the two cities where the display, advertising and promotion of tobacco products is banned, 69.2% (n=162) of the POS displayed cigarette packs and 11.5% (n=27) advertising. In cities where display, advertising and promotion is allowed, of the 50 POS in which advertising was observed, 20% (n=10) were in violation of the law for presenting more than one advertising poster per brand. **Conclusions:** We observed violations of national and provincial law across four Argentinian cities, emphasising the need for more effective enforcement, and continuing monitoring of compliance with the law.

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PPS7-5

EXAMINING VAPE-RELATED THEMES ON TIKTOK: A COMPUTATIONAL QUALITATIVE THEMATIC ANALYSIS

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Background TikTok is a popular global social media platform, particularly among young individuals, for sharing short videos. Despite the restriction of uploading videos containing “the depiction, promotion, or trade of drugs or other controlled substances”, there are posts on TikTok that clearly violate this policy. Young social media users, who are susceptible to peer pressure and persuasive advertising, remain exposed to e-cigarette promotional content on the platform. Previous content analytic research primarily relied on manual coding to examine e-cigarette posts on TikTok, limiting studies to small-scale datasets. This study employs K-means clustering, an unsupervised computational technique, and qualitative thematic analysis to obtain a comprehensive picture of e-cigarette posts on TikTok with a much larger dataset. **Methods** Fifty e-cigarette-related hashtags were used to search for content posted on TikTok from 2015 to 2023. We collected 18,946 posts. After de-duplication (n=193) and removal of non-English-language posts (n=4,751), we obtained a final sample of 13,263 unique TikTok posts. We used K-Means clustering to identify clusters and used the elbow method to determine the optimal number of clusters. Authors with expertise in tobacco regulatory science conducted a qualitative thematic analysis of the chosen topic clusters to discern themes. **Results** We identified five themes from 15 topic clusters, including a) TikTok influencer (28.5%; e.g., keywords: skateboarding, vapediktoker, videogames i.e., influencers who skateboard and play games while vaping), b) general vaping (including components such as coil, cartridges, and pod; and use (20.7%; e.g., keywords: smoke, vapeo, vapor), c) vape brands (15.4%; e.g., keywords: elfbars, juulgang, lostmary), d) vaping cessation (9.6%; e.g., keywords: addiction, quitvaping, vapingisbad), and e) vape product marketing (8.7%; e.g., keywords: premiumliquid, eliquidshop, flavour). **Conclusions** The mixed analysis was an effective method to identify e-cigarette-related topics on TikTok. We discovered topic clusters using computational methods from a large TikTok dataset and identified stable themes from the clusters using qualitative thematic analysis. Our findings provide important insights and guidance to regulate e-cigarette marketing (e.g., restricting the posting of promotional e-cigarette content by influencers) on TikTok.

FUNDING: Federal

PPS7-6

‘TAG A FRIEND’: CHARACTERIZING ‘VIRAL’ PROMOTIONAL STRATEGIES ENHANCING ENGAGEMENT WITH CIGAR-RELATED POSTS ON INSTAGRAM

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Significance. Tobacco manufacturers and vendors increasingly promote their products through social media—a popular medium of expression among youth and minoritized populations. However, strategies used to maximize exposure to tobacco marketing content in the digital space have not been extensively studied. “Viral” marketing in the form of consumer-generated shares of official branded or influencer tobacco-related messages is instrumental in increasing visibility and reach of promotional content on social networking sites. Viral message cues include presence of incentives for content creation and sharing, as well as interactive message components, e.g., polls and contests. The present study aims to characterize viral strategies used to promote engagement with and dissemination of cigar, little cigar and cigarillo (CLCC)-related posts on Instagram. **Methods.** Keyword rules were used to collect publicly available CLCC-related Instagram posts from CrowdTangle, from August 2016 to October 2021. Posts were categorized as commercial and organic and coded for consumer engagement strategies (i.e., presence of viral cues), using a combination of machine learning methods, keyword algorithms, and human coding. Metadata were analyzed to assess geographic dispersion of the posts and user engagement over time. **Results.** Keyword filters captured 320,488 CLCC-related public posts. The proportion of commercial messages was 44.6% (n=142,875), with 47,832 commercial posts (33.5%) containing viral cues or user engagement prompts. Commercial posts promoting virality featured discounts and giveaways for tagging friends/peers, liking, commenting, or following the CLCC brand and spokesperson/influencer accounts; and included calls to participate in contests and polls (e.g., asking viewers to select preferred product flavor). Commercial messages containing engagement calls garnered more comments per post (11 comments on average) and likes per posts (403 likes on average), compared to commercial posts that did not include such cues. The accounts generating the highest engagement were global and platform-native celebrities (popular actors; sponsored musicians/DJs) and CLCC-related communities/lifestyle accounts (e.g., @girlswithcigars, @cigaroftheday, @highmerica). **Conclusion.** Viral social media marketing may amplify youth exposure to tobacco content. The proliferation and high level of engagement with publicly available Instagram messages promoting LCC use warrants urgent need for surveillance and attention from public health.

FUNDING: Federal

PAPER SESSION 8: MAXIMIZING THE IMPACT OF PLAIN PACKAGING AND HEALTH WARNINGS ON ALL PRODUCTS

PPS8-1

EFFECTS OF PICTORIAL HEALTH WARNING LABELS ON INTENTION TO QUIT WATERPIPE: A MEDIATION ANALYSIS

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Introduction Pictorial health warning labels (HWLs) on waterpipe (WP) tobacco packages represent a better strategy for communicating the health risks associated with WP use and promoting quit intention than text-only. However, the mechanism by which these HWLs lead to higher intentions to quit remains unknown. This study explores how pictorial HWLs vs. text-only induce higher quit intention among a sample of young adult WP smokers in Lebanon. **Methods** An online randomized cross-over experimental study was conducted in August 2021 among 276 young adult WP smokers who observed two conditions: pictorial HWLs and text-only HWL on WP tobacco packages in random order. After each image, participants completed post-exposure assessments of health communication outcomes (e.g., attention and negative affect). Using serial and parallel mediation analysis, we examined the role of attention, negative affect, cognitive elaboration, and perceived harm in mediating the relationship between exposure to HWLs and intention to quit. **Results** Using serial mediation, exposure to pictorial HWLs vs. text-only was found to affect intention to quit through the following pathways: attention and negative affect, which accounted for 17.28% of the total effect, and through negative affect and cognitive elaboration, which accounted for 21.53% of the total effect. Results of parallel mediation showed that the indirect effect pathways via negative affect [$\beta = 0.063$; (95% bootstrap CI=0.004, 0.149)] and cognitive elaboration [0.047; (0.001, 0.114)] were statistically significant. **Conclusions** The findings call on designing and implementing attention-grabbing, emotionally evocative, and cognitively persuasive pictorial HWLs in Lebanon and other countries to curb WP tobacco smoking.

FUNDING: Federal

PPS8-2

PLAIN PACKAGING IN AOTEAROA NEW ZEALAND FIVE YEARS POST-IMPLEMENTATION: A QUALITATIVE ANALYSIS OF FEAR MANAGEMENT STRATEGIES

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Significance: On-pack warning labels have evolved from short text messages to large graphic pictorial warnings (PWLs) that aim to increase knowledge of smoking's harms and prompt cessation attempts. Initial studies of plain packaging, which features large graphic PWLs, found these increased negative affect and micro-behaviours associated with quitting. However, PWLs' effects may erode over time as people learn to manage the fear aroused. We used the extended parallel processing model (EPPM) to probe fear management strategies and consider new approaches that could support cessation more effectively. **Methods:** We undertook in-person in-depth interviews with 27 people who currently smoke (range 44 to 91 minutes in length). We explored participants' current smoking patterns and how they interpreted and responded to existing PWLs, before analysing their responses to novel warnings and efficacy messaging. Māori and non-Māori researchers reviewed the transcripts using a reflexive thematic analysis approach and agreed on common themes that did not vary by ethnicity. **Results:** We recruited a diverse sample (16 women; 8 Māori; age range 19-68). Most participants displayed maladaptive responses where they managed the fear aroused by current PWLs rather than change their smoking practices. We identified three over-arching themes. First, ignoring or avoiding the threat; participants used containers, directed their gaze elsewhere so they did not see PWLs, and argued they were desensitised to the risks shown. Second, prioritising alternative sources of evidence; several minimised the

threat by framing it as inaccurate, exaggerated, inconsistent with their lived experiences, sometimes risibly so. Third, the tussle for agency; participants reaffirmed smoking as a choice yet simultaneously thought addiction dictated choice. PWLs lack the power to override either choice or addiction. **Conclusions:** Five years following the introduction of plain packaging and large PWLs, participants had developed several strategies to manage the fear aroused by on-pack health warnings. It is timely to consider whether other themes, such as the economic cost of smoking and impact on others, could complement health warnings; enhancing efficacy may also reduce maladaptive responses and support cessation more effectively.

FUNDING: Federal

PPS8-3

ENDS USERS' REACTION TO ENDS PICTORIAL HEALTH WARNING LABELS: A MIXED METHODS APPROACH COMBINING FOCUS GROUPS WITH BRIEF SURVEY

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Introduction: Electronic nicotine delivery systems (ENDS) use has increased dramatically among young adults in the US, mainly due to marketing, product design, and highly addictive nicotine. Pictorial Health Warning Labels (PHWLs) are effective in communicating smoking-related risks. A panel of experts in tobacco control recently developed 24 ENDS PHWLs. PHWLs were grouped into three themes: 1) ENDS toxicity, 2) ENDS health effects, and 3) ENDS-specific harms. This study aims to gain insight into young adults' reactions and effectiveness perception of the 24 PHWLs. **Methods:** We conducted 22 focus groups with young people who used ENDS regularly (daily or occasionally in the past 30 days) (n = 61; 57% females; age 21-29 years). Participants completed an anonymous survey to 1) rate the PHWLs on attention, reaction, and overall effectiveness and 2) rank them from the most to the least important in each theme. Then, via Zoom, participants provided in-depth feedback on their reactions and perceptions of the PHWLs. Sessions were audio-taped, transcribed verbatim, and analyzed using directed qualitative content analysis. **Results:** The three top-ranked PHWLs were "the effect of dual use of ENDS and cigarettes on the fetus" in theme 3, followed by "the effect of Acrolein on lungs" in theme 1, and "ENDS and popcorn lung disease," in theme 2. The survey rating results mirrored the qualitative results. Anti-industry PHWLs in theme 3, "specific harm," received the highest rating for attention. Focus group results further showed that participants perceived these PHWLs as "new," "clever," and "attractive," and capturing the tobacco industry deceiving youth. PHWLs in theme 2, "health effect," with graphics depicting serious health effects (e.g., bladder cancer, lung disease), received the highest rating for eliciting strong reactions, specifically to human suffering, as revealed in the focus groups. PHWLs in theme 1, "toxicity," received the highest rating for effectiveness. Focus group results indicated that participants perceived these PHWLs as "believable," "relevant," and new information conveyed through emotionally provocative pictures (e.g., "scary," "disturbing"). **Conclusion:** This study identified ENDS PHWLs perceived as attractive and effective by young ENDS users. Emotion-provoking PHWLs that show human suffering were the top-ranked. PHWLs about "ENDS toxicity," "anti-industry sentiment," and "dual use harmful effect" are promising. Results will inform the PHWLs optimization for young ENDS users, a high-risk population for ENDS use.

FUNDING: Federal

PPS8-4

PERCEPTIONS OF CURRENT AND PROPOSED STANDARD BIDI PACKAGING IN BANGLADESH

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Introduction. Bidis (or tobacco hand-rolled in tendu leaves) are smoked by 5.3 million adults in Bangladesh. Bidis are roughly eight times cheaper than cigarettes and disproportionately consumed by individuals with a low socioeconomic status. Additionally, bidis are available in a wide variety of packaging material, shapes, and sizes. The lack of standard bidi pack shape also limits compliance with the application of graphic health warning labels (HWLs) on the top 50% of the pack on both sides and provides space for attractive branding. The current study qualitatively explored how men who



currently use bidis and those who have never used tobacco perceive current bidi packs, a proposed standardized bidi pack size and shape, and the role that HWL placement on current and standard bidi packs plays in harm perceptions. **Methods.** In February 2021, we conducted 14 focus groups (FG) with men across three regions of Bangladesh: Dhaka, Sylhet, and Khulna. The groups were stratified equally by urban/rural residence and bidi use/never tobacco use. Trained facilitators led group discussions about the noticeability of HWLs and perceived harmfulness of current and proposed standard bidi packs. Data were collected in Bangla, translated into English, and thematically analyzed. **Results.** Across all FGs, participants discussed the limited noticeability of HWLs on existing bidi packs, noting that the HWL images were often distorted or obscured, and this sometimes seemed intentional to make more space for branding. Most FGs discussed how the poor HWL placement and unclear HWL text on the existing bidi packs decreased perceived harm. In contrast, most FGs discussed how the HWLs on the standard bidi pack were more clearly visible because the HWLs on the standard pack were printed on both sides of the pack and the image and text were legible. Given the prominence of the HWLs, all groups discussed how the standard pack appeared more harmful than existing bidi packs available in the marketplace, and that individuals "will be able to understand [from the standard pack that bidis are] injurious to health...". **Discussion.** Results suggest that standardizing the pack shape and size of bidi packs sold in Bangladesh could increase harm perceptions of bidis among current and never users, which may help reduce use and resulting health harms.

FUNDING: Nonprofit grant funding entity

PPS8-5

SHOULD VERY LOW NICOTINE CIGARETTES FEATURE LOW NICOTINE MESSAGES? A CROSS-SECTIONAL SURVEY FROM AOTEAROA NEW ZEALAND

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Significance Findings from randomised controlled trials indicate that denicotinisation could reduce interest in smoking, decrease exposure to toxins, stimulate quit attempts and increase the success of those attempts. From April 2025, smoked tobacco products sold in Aotearoa New Zealand will contain a maximum of 0.8mg/g of nicotine. Labelling these cigarettes 'Very low nicotine' (VLN) may reinforce misperceptions of very low nicotine cigarettes (VLNCs) as less harmful than regular cigarettes and disrupt the policy implementation. **Methods** To explore beliefs about nicotine and VLNCs, perceptions of different low nicotine labels (e.g., Very Low Nicotine), and responses to mitigating statements (e.g., No cigarettes are safe), we surveyed 354 people who smoked, 142 who formerly smoked, and 214 people who had never smoked regularly. **Results** Around half of all respondents believed VLNCs were less harmful than regular cigarettes and around two-thirds incorrectly thought nicotine causes most of the related health problems caused by smoking. When exposed to different low nicotine messages, 29% of respondents thought Very Low Nicotine cigarettes would be less harmful than regular cigarettes, while 34% believed they would be just as harmful. Mitigating statements did not affect how people who smoked perceived the VLN message or its impact. However, people who formerly smoked or who had never smoked regularly, perceived mitigating statements referring to poisons and cancer as significantly more likely than the VLN message to discourage smoking. **Conclusions** Beliefs that VLNCs are less harmful than regular cigarettes are widespread; VLN labels may reinforce this misperception, which mitigating statements did not correct. Introducing VLNCs on a specified date and developing public information campaigns could avoid phase-in confusion and obviate the need for VLN labels.

FUNDING: Federal

PAPER SESSION 9: FLAVOR AND MENTHOL: UNDERSTANDING DIFFERENTIAL EFFECTS AND PREFERENCES

PPS9-1

ARE E-LIQUID FLAVOURS DIFFERENTIALLY ASSOCIATED WITH NICOTINE DEPENDENCE, CRAVING AND INDIVIDUAL USE CHARACTERISTICS?

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Significance: The use of Electronic Nicotine Delivery Systems (ENDS) remains a pervasive problem and there are growing concerns about the role of flavours in the appeal and widespread use of these products. Pre-clinical evidence suggests that some flavours (i.e., fruit, menthol) may increase nicotine consumption and reinforcement; however, more research is needed to clarify the relative risks associated with common e-liquid flavours in human ENDS users. **Methods:** 215 Canadian adult ENDS users completed an online survey assessing their flavour preferences, dependence severity, craving, and other indices of abuse liability (i.e., use frequency, age of initiation, desire to quit, perceived addictiveness). Multiple linear regression and relative importance analyses were used to determine to what extent three binary flavour preferences (i.e., Tobacco, Menthol, Fruit/Dessert) are differentially associated with vaping-related reinforcement and abuse liability. **Results:** Fruit/dessert and Menthol were both associated with a significantly younger age of initiation (Fruit/Dessert: $t(206)=-4.00, p<.001$; Menthol: $t(206)=-2.71, p=.007$) and younger current age (Fruit/Dessert: $t(209)=-3.53, p<.001$; Menthol: $t(209)=-2.30, p=.027$), relative to Tobacco. Fruit/Dessert emerged as the most important predictor in both cases ($ri=.073$ and $ri=.058$, respectively). Menthol was the only significant predictor of dependence severity ($ri=.035$), craving ($ri=.030$), and past-month frequency of use ($ri=.022$). Menthol users had higher dependence scores ($t(209)=3.02, p=.003$), reported stronger cravings ($t(210)=2.34, p=.020$), and used their ENDS on more days in the past month ($t(210)=2.36, p=.019$), relative to non-menthol users. None of the flavours predicted users' desire to quit or their beliefs about the addictiveness of ENDS. **Conclusion:** Results suggest that while both fruit/dessert- and menthol-flavoured ENDS may be more appealing to younger users and contribute to an earlier initiation to vaping relative to conventional tobacco flavour, menthol may uniquely enhance the addictive potential of vaped nicotine. The present findings add to the growing body of evidence supporting the regulation of fruit- and menthol-flavoured nicotine products. More research is needed to better understand the mechanisms underlying menthol's effect on nicotine reinforcement and dependence in human ENDS users.

FUNDING: Federal

PPS9-2

THE ROLE OF MENTHOL CIGARETTE PREFERENCE IN QUITLINE SMOKING CESSATION ENGAGEMENT AND OUTCOMES IN DIFFERENT RACIAL AND ETHNIC GROUPS IN 4 U.S. STATES, 2018-2020

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Significance: Free telephone smoking cessation service (Quitlines) provide evidenced-based counseling, with a broad reach and are adaptable to diverse tobacco users and products. Some previous studies have found that people who smoke menthol cigarettes have lower quit rates as compared with non-menthol cigarette smokers. This study aimed to examine the characteristics, engagement and short-term outcomes of Quitline callers in 4 states in order to identify whether between-group racial/ethnic differences in cigarette cessation persist after controlling for baseline differences in Social Determinants of Health and menthol preference. **Methods:** Data from 4 U.S. states, using de-identified data from the National Jewish Health Quitline database, to include every caller who enrolled in Quitline support from January 2018 through June 2020. Participants included in analyses were cigarette smokers who completed one registration call, participated in at least one counseling call, and had no missing data on



key baseline data (e.g. age, gender, race, ethnicity, CPD, education etc). Main outcomes were (a) completing at least 3 counseling calls (b) receiving an FDA-approved smoking cessation medicine and (c) self-report on a call between 2-6 weeks after registration that they had quit smoking. **Results:** The final sample (n=30,664) comprised 22,572 smokers identifying as White (non-Hispanic), 5,296 identifying as Black (non-Hispanic), 1,801 identifying as Hispanic and 995 identifying as belonging to other racial/ethnic groups. Overall, 45.3% (13,904) reported smoking menthol cigarettes, but this proportion was significantly higher for Black callers (87.2%) than Hispanic (57.4%) or white callers (34.4%). There were statistically significant differences between the racial/ethnic groups on all outcomes, as well as many of the baseline variables in univariate analyses, with white, non-Hispanic smokers having a slightly (but significantly) higher quit-rate than each of the other groups (17.5% versus 15-16%). When the outcomes were entered in multivariable linear/logistic models using step-wise selection, with menthol preference included, many variables remained in the model and Black smokers still had a lower quit rate than White smokers (OR=0.91, 95% CI=0.83-0.99) but menthol preference was not a significant predictor. Black smokers were more likely to receive NRT than White smokers (unrelated to menthol preference), and menthol smokers compared to non-menthol smokers were less likely to complete at least 3 counseling calls: OR=0.94 (95% CI=0.88-0.996). **Conclusion:** There are small but consistent differences between racial and ethnic groups in engagement and quitting smoking with free Quitline services, and these differences largely remain after controlling for menthol preference and other baseline differences.

FUNDING: Nonprofit grant funding entity

PPS9-3

THE ACUTE EFFECTS OF A MENTHOL- AND TOBACCO-FLAVORED HEATED TOBACCO PRODUCT (IQOS) AMONG INDIVIDUALS WHO USE MENTHOL CIGARETTES

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Significance. The acute effects of tobacco product flavorings (e.g., menthol) have been studied in cigarettes and other tobacco products, but less is known about how flavors influence heated tobacco product (HTP) abuse liability. New evidence is needed to inform ongoing regulatory decision-making regarding HTP flavor availability, particularly in light of FDA's forthcoming menthol ban. **Methods.** Twenty-four individuals who smoke at least 5 menthol cigarettes/day were recruited for a parallel-group trial in Richmond, VA. Participants completed 4 clinical lab sessions over two weeks (Mon, Fri both weeks). During week 1, participants used their own-brand (OB) menthol cigarette; during week 2, participants used the IQOS 2.4 in either the "Tobacco" (IQOS-T) (N=11) or "Fresh Menthol" (IQOS-M) (N=13) flavor in the clinical lab (Mon, Fri) and at home for 3 days (Tues-Thurs). In the clinical lab, participants completed a 10-puff directed use bout (30-second inter-puff interval). Puffing topography was captured during the use bout; plasma nicotine as well as subjective effects were sampled before and after product use. T-tests compared outcomes between groups. **Results.** OB, IQOS-T, and IQOS-M all suppressed cigarette cravings after use; however, IQOS-M suppressed cigarette cravings ($p < 0.10$) and alleviated nicotine abstinence symptoms to a greater extent than IQOS-T ($p < 0.10$). IQOS-M was rated as more satisfying ($p < 0.05$) than IQOS-T with a better "overall flavor," but OB was rated more favorably than both IQOS products. OB delivered the highest average nicotine boost (15.5 ng/mL), followed by IQOS-T (8.6 ng/mL) and IQOS-M (6.0 ng/mL). Average puff duration (1.8 seconds for all products) and volume (OB: 54.1 mLs, IQOS-T: 68.7 mLs, IQOS-M: 61.9 mLs) were statistically similar between products. Nicotine boosts, subjective effects, and topography parameters for IQOS were similar from the beginning to the end of the exposure week for both flavor conditions. **Conclusions.** Both IQOS-T and IQOS-M delivered potentially reinforcing amounts of nicotine, reduced cigarette cravings, and ameliorated nicotine abstinence symptoms among people who use menthol cigarettes; but neither performed as strongly as OB. People that use menthol cigarettes rated the subjective experiences of IQOS use more favorably with menthol- than tobacco-HeatSticks. These findings suggest that HTP abuse liability among people who use menthol cigarettes may be heightened by access to a menthol-flavored HTP.

FUNDING: Federal; Academic Institution

PPS9-4

DIFFERENCES IN RECEPTIVITY TO MENTHOL CIGARETTE ADVERTISING BETWEEN ADULTS WITH AND WITHOUT ANXIETY AND DEPRESSION

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Background: Adults with common mental health problems (MHP), such as anxiety and depression, report disproportionately high prevalence of cigarette smoking. Further, among those who smoke cigarettes, menthol use is also higher among those with MHP. One potential driver of these disparities is elevated receptivity to tobacco advertising, yet receptivity to menthol cigarette advertising specifically has not been examined. This study examines receptivity to menthol cigarette advertising among those with and without MHP. **Methods:** Wave 6 of the Rutgers Omnibus Study (May 2023) was completed by 2,518 U.S. adults aged 18-45. Participants were randomized to view 1 of 2 ads for menthol cigarettes (Newport and Natural American Spirit [NAS]). Respondents were asked 4 questions adapted from the Population Assessment of Tobacco and Health Study to assess receptivity, including whether: 1) they had seen the ad in the past 12 months, 2) they liked the ad, 3) the ad made them curious about the product, and 4) the ad made them want to try the product. MHP was defined as having symptoms of anxiety (GAD-2) or depression (PHQ-2). Bivariate and multivariable models examined associations between MHP and each receptivity variable. Multivariable models controlled for study condition (Newport/NAS), age, race/ethnicity, and smoking status (non-smoker, past 30-day smoker, past 30-day menthol smoker). We also examined interactions between MHP and smoking status. **Results:** Chi-square tests revealed that a greater proportion of adults with MHP reported receptivity across all 4 measures vs. those without MHP ($p < .01$). In multivariable models, adults with MHP reported greater odds of seeing the ad in the past 12-months (aOR: 1.56, $p < .05$) and that the ad made them curious about the product (aOR: 1.35, $p < .01$). There were no significant interactions between MHP and smoking status. **Discussion:** Communication theories posit that for advertising to impact behavior, individuals must be exposed to the ad, pay attention to and recall the ad, and then have a favorable response to the ad. Findings suggest that adults with MHP report greater odds of ad recall and favorable response to menthol cigarette ads (i.e., curious about the product) than those without MHP. Research is needed to understand the potential role of advertising in menthol cigarette use disparities for this high-risk group, given that menthol cigarettes are associated with increased initiation, escalation to regular smoking, greater nicotine dependence, and decreased cessation.

FUNDING: Federal; Academic Institution

PPS9-5

CONTENT ANALYSIS OF TOBACCO FLAVOR DESCRIPTORS ON BRAND WEBSITES

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Significance: Globally, there is a growing adoption of policies restricting the availability of characterizing flavors in a variety of tobacco and nicotine products. Evidence suggests that the tobacco industry is shifting marketing strategies in response to this trend, particularly with combustible tobacco products such as cigarillos with the emergence of concept-named flavors. The purpose of this research was to identify potential marketing cues and descriptors suggesting flavor particularly among nominally concept or unflavored products among leading cigarillo brands. **Methods:** Cigarillo products and their descriptions were extracted from seven leading cigarillo brand websites between October 2022 and June 2023. Two coders independently categorized brand-blinded product names (n=87) as characterizing (e.g., grape), concept (e.g., diamonds), characterizing concept (e.g., banana smash), or neither (e.g., original). Coders then extracted words and phrases from each brand- and name-blinded product description (n=131) that were indicative of flavor. **Results:** Concrete nouns describing specific fruits, alcoholic drinks, chocolate or other sweets were the most common words used to indicate flavor across all products. Products categorized as neither characterizing nor concept were most likely to have the fewest or no flavor descriptors. Products categorized as concept flavors predominantly included the word "sweet" in their descriptions. Several phrases emerged as indirectly suggesting flavor, but without a concrete noun, such as "off-the-vine," "ripe for the picking" and "freshly squeezed." Similarly, other product descriptions used adjectives to suggest flavor including the words "delectable" and "delicious." **Conclusion:** This research demonstrates that flavored cigarillo product descriptions

consistently include verbiage that directly and indirectly indicate the presence of a flavor. The use of indirect flavor descriptors may present unique challenges especially relevant to the enforcement of tobacco flavor restrictions.

FUNDING: Federal

PPS9-6

EFFECTS OF E-CIGARETTE FLAVOR ON NICOTINE PRODUCT CHOICE AMONG PEOPLE WHO DUAL USE E-CIGARETTES AND MENTHOL CIGARETTES

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Introduction: One-third of people who use tobacco use more than one product. The most common product combination is combustible cigarettes (CCs) and e-cigarettes (ECs), representing over 13 million Americans. People who use multiple products may substitute one for the other, largely as a function of product characteristics (e.g. flavor, nicotine level). EC flavor restrictions increase appeal of CCs, yet the impact of these restrictions in the context of a menthol ban is unknown. This study assessed the degree to which EC flavor restrictions may impact the effect of eliminating menthol from CCs. **Methods:** Adults who regularly use flavored ECs and menthol CCs were randomized to either the menthol CC condition (n=18) or non-menthol CC condition (n=20). EC type varied across three counterbalanced preference sessions: 1) own device and flavor, 2) tobacco-flavored study device, and 3) preferred flavor study device. Participants made 10 choices in each session, with the option to take 2 EC puffs, 2 CC puffs, or abstain. Generalized estimating equations assessed choices for CC and EC, with EC type as a within-subjects factor and menthol CC condition as a between-subjects factor. **Results:** Participants (n= 38; 40% female; 32% African American; mean age = 32) reported using an average of 8.9 menthol CCs per day on 24.8 days per month and using ECs 12.3 times per day on 27.1 days per month. Participants had higher CC preference during tobacco-flavored vs own device (B= 0.74, p=0.04) and preferred flavor vs own device EC sessions (B= 0.53, p=0.02). Alternatively, participants had lower EC preference during tobacco-flavored vs own device EC sessions (B= -1.21, p=0.006). CC menthol condition and CC menthol X EC flavor interactive effects were not significant. **Discussion:** Given CC preference was higher during tobacco flavored EC sessions while EC preference was lower, removing all EC flavors other than tobacco from the market may have a detrimental effect on nicotine product choice among people who use multiple products. Furthermore, this did not differ by menthol CC condition, so findings may be applicable to a variety of regulatory environments worldwide during consideration of EC flavor regulation, regardless of menthol bans.

FUNDING: Federal

PAPER SESSION 10: NOVEL PREDICTORS OF SMOKING CESSATION AND RELAPSE

PPS10-1

PREVALENCE AND CORRELATES OF SELF-REPORTED ADVERSE SIDE EFFECTS OF VAPING EXPERIENCED IN THE PAST MONTH BY ADULTS WHO SMOKE CURRENTLY OR IN THE RECENT PAST

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Significance: Adverse side effects associated with vaping product use, who is more likely to experience them, and whether such experiences are associated with product harm perception are not well understood. We examined past 30-day prevalence of adverse side effects from vaping product use among people who smoke cigarettes currently or quit in the recent past. **Methods:** Data were from 3906 participants aged 18+ years from the 2020 ITC Four Country Smoking and Vaping Survey (Canada [CA], US, England [EN] and Australia [AU]) who were currently vaping daily/weekly or had vaped in the last month, and smoking currently (n=3252) or recently quit ≤2 years (n=654). Participants were asked whether they experienced any adverse side effects from vaping in the last 30 days and whether they sought medical advice. Socio-demographic and smoking/vaping-related data were also collected. Prevalence estimates were computed using weighted data and multivariable logistic regressions were used to examine correlates and associations. **Results:** Overall, 12.8% reported experiencing at least one adverse side effect of vaping (CA=14.5%; US=14.1%; EN=11.7%; AU=10.6%). The most common side effects were: throat irritation (5.8%), cough (5.5%), and mouth irritation (4.1%). The most common side effects where participants had sought medical advice were: mouth irritation (46.8%; 1.9% overall sample), loss of sense of taste (45.2%; 0.4% overall), and throat irritation (38.2%; 2.2% overall). Those more likely to experience any adverse side effects were aged 40+ (vs 18-39), male, currently smoking (vs quit), vaping for ≤6 months (vs >1 year), using disposables or cartridges/pods (vs tanks), using vapes with nicotine, using menthol/mint flavour (vs sweet flavour), and believing vaping causes various diseases. Adults who reported at least one adverse side effect (vs none) were more likely to believe that vaping is equally/more harmful than smoking (51.7% vs 21.0%). **Conclusion:** Reports of adverse side effects in the past 30 days from the use of vaping products were low but not trivial among people who currently or formerly smoked in all four countries. Those newer to vaping or who concurrently smoke and vape were more likely to experience adverse side effects but unclear if effects were really due to vaping given their smoking history. Regardless, experiencing any adverse side effects was associated with vaping harm misperceptions, which could undermine its use for smoking cessation purposes.

FUNDING: Federal

PPS10-2

ASSOCIATIONS BETWEEN E-CIGARETTE CHARACTERISTICS AND CIGARETTE SMOKING CESSATION BEHAVIORS AMONG ADULTS WHO USE E-CIGARETTES: LONGITUDINAL FINDINGS FROM THE US PATH STUDY 2014-2021

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Significance: It is unknown whether e-cigarette characteristics are independently associated with cigarette cessation behaviors among adults in the US who use e-cigarettes. **Methods:** We analyzed PATH Study 2014-2021 data from 1,985 adults ages 21+ who smoked cigarettes daily and used e-cigarettes in the past 30 days. E-cigarette characteristics evaluated were: use frequency (daily, nondaily), flavor type (tobacco, menthol/mint, sweet, combination), device type (disposable, cartridge, tank), and year



of data collection as proxy for evolving e-cigarette marketplace. Outcomes evaluated at follow-up were: (1) making a cigarette quit attempt (QA), (2) cigarette cessation among those who made a QA, (3) overall cigarette discontinuation regardless of QA. Generalized estimating equations were used to evaluate associations between each e-cigarette characteristic (assessed at baseline in one approach, assessed at follow-up in another approach) and cigarette cessation outcomes, controlling for demographic, cigarette smoking, and other e-cigarette use characteristics. **Results.** Daily versus nondaily e-cigarette use was associated with greater overall cigarette discontinuation rates (13% vs. 6%, AOR=2.26, 95%CI:1.34-3.81); use of e-cigarettes in 2019-2021 versus 2014/15-2015/16 was also associated with greater overall cigarette discontinuation rates (12% vs. 5%, AOR=2.75, 95%CI:1.13-6.67). Use of menthol/mint versus tobacco flavor e-cigarettes was associated with greater overall cigarette discontinuation rates (9% vs. 5%, AOR=2.63, 95%CI:1.32-5.27) only when assessing e-cigarette use at baseline. E-cigarette device type was not associated with cigarette discontinuation rates in adjusted analyses. **Conclusions.** Daily e-cigarette use and use of e-cigarettes in 2019-2021 were consistently associated with greater cigarette discontinuation rates. Research focused on modern-day e-cigarettes is needed to inform product regulation. **Funding:** This abstract was funded by the National Institute on Drug Abuse of the National Institutes of Health and FDA Center for Tobacco Products (CTP) under Award Number R21DA051446. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH or the Food and Drug Administration.

FUNDING: Federal

PPS10-3

FINANCIAL STRAIN AND CIGARETTE SMOKING CESSATION AND RELAPSE AMONG US ADULTS WHO SMOKE: A LONGITUDINAL COHORT STUDY

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Significance: Cigarette smoking disparities are associated with increased smoking-attributable mortality, making it important to identify barriers to smoking cessation without relapse. Financial strain, defined as difficulty in meeting key financial needs and obligations, has been proposed as one such barrier. However, few studies have longitudinally examined associations between financial strain and smoking cessation and relapse. This study examines the prospective association between financial strain and smoking cessation and smoking relapse among US adults with established smoking. Because tobacco companies distribute coupons to price-sensitive customers, we also tested whether financial strain was differentially associated with smoking cessation and relapse based on coupon receipt. **Methods:** Using nationally representative data from Waves 1-5 (2013-2019) of the Population Assessment of Tobacco and Health Study, separate discrete-time survival models were fit for smoking cessation ($n=7,393$) and smoking relapse ($n=1,282$). Financial strain was measured as a lagged time-varying covariate, based on difficulty paying important bills. We adjusted for baseline age, sex, race and ethnicity, education, income, quit attempts, coupon receipt, and nicotine dependence. Effect modification by coupon receipt was assessed with an interaction term. **Results:** Among adults with established cigarette smoking at baseline, adults who reported financial strain were 19% less likely to report cessation compared to those who did not report financial strain, adjusting for covariates (HR: 0.81, 95% CI: 0.71, 0.92). Among adults who reported a successful cigarette smoking cessation event, those who reported financial strain were 54% more likely to report cigarette smoking relapse than those who did not, adjusting for covariates (HR: 1.54, 95% CI: 1.21, 1.95). The interaction term was not statistically significant, suggesting that the effect of financial strain was independent of coupon receipt. **Conclusions:** We found that financial strain reduced the likelihood of cigarette smoking cessation and increased the likelihood of cigarette smoking relapse among a cohort of adults with established smoking at baseline. These findings remained statistically significant after adjusting for confounders and other indicators of socioeconomic position and suggest that financial strain may induce a stress response that facilitates cigarette smoking among adults who currently smoke or recently quit smoking.

FUNDING: Federal; Academic Institution

PPS10-4

ANTI-TOBACCO MESSAGE LENGTH AND SKIPPABILITY: AN EXPERIMENTAL STUDY EXAMINING IMPACT ON QUIT OUTCOMES

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Significance: The shift toward online, and away from, televised viewing has increased the use of ads that are shorter (15 seconds) and skippable (viewers choose whether to

watch the whole ad). There is little evidence about the effect of these changes on quitting outcomes in the context of tobacco control campaign ads. **Methods:** 805 people who smoke were randomized to view an ad that varied by type (anti-tobacco vs control) $\times$ length (15 vs 30 secs) condition. A week later, participants re-viewed their assigned ad, but were randomized to a skippable or non-skippable version. Each time, ads were viewed with another counterbalanced neutral filler ad, prior to viewing a decoy video. Quitting attitudes and behaviours were measured 3-7 days later. Associations between follow-up quitting outcomes and length and skipping conditions, and predictors of opting to skip, were estimated using prevalence ratios from mixed-effect generalised linear models. **Results:** Participants in the 30-sec anti-tobacco condition were more likely to have high quitting priority (66% cf. 58%), intend to discuss quitting with someone (52% cf. 49%) and intend to use pharmacotherapy (43% cf. 35%) than those in the 15-sec anti-tobacco condition. When given the choice at second exposure, opting to skip anti-tobacco ads was more common than control ads (25% cf. 15%). General skipping predictors (i.e., opting to skip control ads) were being younger, healthcare card holder, not having seen the ad before and using an ad blocker. After adjusting for general skipping predictors, motivation to change was protective against skipping anti-tobacco ads. Regardless of ad length, participants who opted to skip anti-tobacco ads were less likely to intend to discuss quitting with someone (46% cf. 51%), plan to quit within the next month (14% cf. 28%), discuss the ad with someone (22% cf. 29%), stub or butt a cigarette before finishing (35% cf. 44%) and use pharmacotherapy (18% cf. 33%) relative to those who completed the ad view. These findings were not observed for those in the control condition. **Conclusions:** Exposure to 30-second ads, and completed subsequent views, was associated with improved quitting attitudes and behaviours. As some audiences are prone to skipping, media buyers should prioritise the inclusion of longer and non-skippable messages where possible. This approach will increase the chance of exposing the target audience to the intended message, thereby optimising campaign effectiveness.

FUNDING: Nonprofit grant funding entity

PPS10-5

THE EFFECT OF EXPOSURE TO ELECTRONIC NICOTINE DELIVERY SYSTEM (ENDS) ADVERTISING ON CIGARETTE SMOKING RELAPSE IN 2018-2019 AMONG ADULTS REPORTING FORMER CIGARETTE SMOKING IN 2016-2017

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Significance: Little is known about how exposure to ENDS advertisements may impact combustible cigarette smoking relapse among adults. This study examined associations between ENDS advertisement exposures and cigarette smoking relapse in 2018-2019 among adults who reported former cigarette smoking in 2016-2017. **Methods:** Participants were 5,186 U.S. adults who reported former cigarette smoking at Wave (W) 4 (2016-2017) of the PATH Study. Past 30-day (P30D) cigarette smoking (i.e., cigarette relapse) and ENDS advertising exposure were measured at W5 (2018-2019). We examined exposure to (i) ENDS and/or cigarette coupons in the past year and (ii) P30D ENDS advertising exposure across nine channels (e.g., billboards, internet) at W5 as predictors of cigarette relapse at W5 in separate weighted multivariable logistic regression models. Models controlled for sociodemographic characteristics and P30D other tobacco product use, including ENDS use, at W5. **Results:** Among W4 adults who reported former cigarette smoking, 15.1% reported cigarette relapse at W5. Approximately half of the W4 sample (50.6%) reported no P30D ENDS advertisement exposure at W5, whereas 27.9% reported exposure on 1 channel, 11.7% on 2 channels, and 9.9% on 3+ channels. Compared to no ENDS advertisement exposure, exposure to ENDS advertisements on 2 (aOR=0.40; 95% CI=0.27, 0.59) or 3+ channels (aOR=0.51; 95% CI=0.33, 0.80) at W5 was associated with reduced odds of cigarette relapse at W5. Only 2.9% and 10.1% of the W4 sample reported receiving any ENDS or cigarette coupons in the past year at W5, respectively. After controlling for covariates, receiving ENDS (but not cigarette) coupons at W5 was associated with reduced odds of cigarette relapse at W5 (aOR=0.41; 95% CI=0.18, 0.94) whereas receiving cigarette (but not ENDS) coupons was associated with increased odds of cigarette relapse (aOR=3.30; 95% CI=2.37, 4.61). **Conclusions:** Greater exposure to ENDS advertisements in the past 30 days and receiving any ENDS coupons in the past year were both associated with reduced odds of P30D cigarette relapse at W5 among adults who reported former cigarette use at W4. In contrast, receiving any cigarette coupons in the past year was associated with increased odds of cigarette relapse. Future work should focus on understanding the mechanisms by which ENDS advertisements impacts cigarette smoking relapse in order to inform regulatory action around ENDS marketing.

FUNDING: Federal; Nonprofit grant funding entity



PPS10-6

WHICH PROXIMAL AND DOWNSTREAM HEALTH WARNING LABEL OUTCOME MEASURES PREDICT SUBSEQUENT QUIT ATTEMPTS? FINDINGS FROM A COHORT STUDY OF AUSTRALIAN ADULTS WHO SMOKE

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Significance: Pictorial health warnings (HWs) may stimulate responses that lead to quit attempts. We examined HW outcomes previously found to predict quit attempts as well as novel HW outcomes such as smoking discord (feeling uneasy about smoking), to determine their effectiveness in predicting subsequent quit attempts. **Methods:** We undertook a secondary analysis of data extracted from a four-arm between-subjects online experimental study of pictorial HWs, in which N=454 Australian adults who smoke had been randomly assigned to one of three experimental conditions. Participants were exposed to either tobacco HWs or new product attribute HWs that educated about product manipulations (filter-venting, menthol, or roll-your-own additives) known to mislead people about harms. Participants completed follow-up surveys at 8-days and 4-weeks. Bivariate logistic regression models examined associations between eleven HW outcomes measured at 8-days and past month quit attempts at 4-weeks, adjusting for days between follow-up surveys, baseline 30-day quit intention, type of product use, cigarettes smoked per day, gender, education and age. Adjusted multivariable models then identified those that independently predicted quit attempts. **Results:** Among the 43.0% of those at the 8-day survey who completed the 4-week follow-up survey, 48.7% had made a quit attempt at the 4-week follow-up. Past month quit attempts were predicted by knowledge of tobacco harms, knowledge of industry manipulation of tobacco products, negative emotional responses to HWs (both self-centric: felt uncomfortable, worried, embarrassed; and industry-centric: felt angry at and deceived by industry), smoking discord, HW rumination, discussing HWs with others, limiting cigarettes smoked per day, stubbing out cigarettes early and forgoing cigarettes (all $p < .010$). Multivariable models showed that self-centric negative emotional responses independently predicted quit attempts ($p = .001$), along with smoking discord ($p < .001$) and inter-personal discussion about the HWs ($p = .049$). **Conclusion:** Tobacco pack HWs that increase knowledge, provoke negative emotional responses (especially self-centric), elicit feelings of smoking discord, lead to rumination, prompt further information seeking or discussions with others, can increase the likelihood of subsequent quit attempts. Health warnings that elicit these early outcomes are strong candidates for inclusion in all health warning rotations.

FUNDING: Federal

PAPER SESSION 11: TOBACCO RETAILER POLICY INTERVENTIONS

PPS11-1

SIMULATING THE IMPACT OF MOVING CIGARETTE SALES FROM TRADITIONAL RETAILERS TO STATE-CONTROLLED OUTLETS

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Background: Compared to states with privatized systems, states with state-controlled liquor outlets have higher prices for liquor and lower per capita alcohol consumption. Less competition among retailers and control over markups are believed to drive higher prices in states with state-controlled outlets. Given the success of alcohol availability restrictions, our study uses Vermont, Oregon, Pennsylvania, and Virginia as a case study to simulate the impact of moving cigarette sales from traditional retailers to state-controlled outlets on sales of cigarette packs and state tobacco revenue. **Methods:** To inform the simulation model, we use cigarette pack prices, state cigarette taxes, and state tax-paid cigarette sales from 2021 from the Tax Burden on Tobacco. The model assumes cigarette sales would continue to decrease annually by 3 percentage-points in the absence of moving cigarette sales to state-controlled outlets, the price of cigarettes would increase once as states transition sales, and the price elasticity of demand would remain constant at -0.4. We model three one-time scenarios with different cigarette price increases: the status quo (median wholesale markup of 4% plus median retail markups of 8% now go to the state), an 8% increase in prices (similar to estimated price increases on alcohol for state-controlled liquor outlets), and a sinking lid model where states reduce the number of packs sold by 5%. **Results:** In the status quo models, where both prices and sales of cigarette packs remain unchanged, gross state revenue (not accounting for operating cost) increases by \$10.2M for Vermont, \$212.4M for Oregon, \$234M for Pennsylvania, and \$226.1M for Virginia. In simulation models where price increases mimic those of alcohol price increases in state-controlled liquor outlets, cigarette pack sales decrease by 3.2% while gross state revenue increases by \$21.7M for Vermont, \$286.9M for Oregon, \$481.8M for Pennsylvania, and \$408.9M for Virginia. Lastly, in sinking lid models, where cigarette pack sales decrease by 5%, gross state revenue increases by \$27.8M for Vermont, \$326.2M for Oregon, \$612.7M for Pennsylvania, and \$506M for Virginia. **Discussion:** States that move cigarette sales to state-controlled outlets should expect cigarette consumption to decline and state revenue to increase. Across the states modeled, cigarette pack sales declined by 3.2%-5% and state revenue increased by 17%-216%. Moving cigarette sales to state-controlled outlets should be considered when implementing tobacco endgame strategies.

FUNDING: Federal

PPS11-2

IS THERE AN ADDITIVE EFFECT OF STATE AND LOCAL TOBACCO RETAIL LICENSING ON TOBACCO RETAIL DENSITY? EVIDENCE FROM CALIFORNIA

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Significance: Higher density of tobacco retailers is associated with higher odds of smoking initiation and lower odds of quitting. In many US states, tobacco retail licensing (TRL) laws are implemented at both state and local levels, with the long-term goal of reducing density. However, the separate and combined effects of licensing are under-studied. This study fills that gap. **Methods:** Using linear mixed effect regression, we examined the interaction between strength of local tobacco retail licensing (TRL) and changes in tobacco retail density, defined as retailers per 1000 persons in all 540 California jurisdictions (cities). The analyses compared data from two 4-year periods, before (2012-2016) and after (2017-2021) California increased its state TRL fee from \$100 to \$265 and required vape shops to obtain a license. We used local TRL data from the American Lung Association (ALA), retailer data from state licensing, and sociodemographic data (% racially/ethnically minoritized, % with a bachelor's degree, % living in poverty) from the American Community Surveys (2011-2016 and 2017-2021).



that described the each of the 540 cities. We restricted the sample to all 164 cities that required local retail licensing and an annual fee (range: \$11.50 to \$940), with sensitivity analyses for all 540 cities regardless of licensing status. All models controlled for the presence of local laws that mandate tobacco-free pharmacies, also obtained from ALA. **Results:** In 164 cities that required a local TRL, the number of state-licensed tobacco retailers declined by 24.5%, from 64,587 to 48,734. Results from models suggest that city-level tobacco retail density was lower after the state increased the licensing fee than before ($\beta = -0.11$, 95% CI: -0.19, -0.03), but not statistically significant. In addition, after the change in state law, localities with strong TRL had lower retail density than cities with weak TRL ($\beta = -0.17$, 95% CI: -0.25, -0.09). However, this association was not modified by any of the city-level sociodemographic variables. Like the main model, there was lower retail density after the state law in the sensitivity analysis ($\beta = -0.19$, 95% CI: -0.31, -0.07). Contrary to expectation, that association was not modified by the strength of local TRL. **Conclusion:** Combining strong state and local TRL laws was associated with fewer tobacco retail stores, unlike when only the state laws were strong, and local laws were weaker. However, these combined laws may not significantly affect store density based on area-level sociodemographic factors. To effectively lower retail density in high-density zones with factors like poverty or minority presence, additional policies or targeted interventions might be necessary. Further research using different retail density measures or in states similar to California's policies could confirm our results

FUNDING: Unfunded

PPS11-3

DID US STATE AND LOCAL T21 POLICIES AFFECT RETAILER COMPLIANCE WITH THE FEDERAL TOBACCO CONTROL ACT?

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Significance: State and local Tobacco-21 laws—raising the minimum legal sales age of tobacco products to 21 years—proliferated across the US over the past decade, as a means to curb youth use. On Dec. 20, 2019, a federal T21 law was adopted. While analyses suggest T21 laws have reduced youth tobacco use, their direct effects on young people's ability to purchase tobacco products are less clear. As effects on underage purchases are central to the expected causal chain between policy adoption and real-world impacts, we examine how state and local T21 adoption relate to retailer compliance with federal prohibitions on sales to minors and checking photo identification before a sale. **Methods:** The US Food and Drug Administration's Center for Tobacco Products is responsible for conducting compliance check of brick-and-mortar tobacco product retailers across the US, typically via undercover purchase attempts (timp-ccid.fda.gov). Before 2020, 76% of these checks involved a person under 18 making the purchase. A longitudinal dataset of inspections from Jan. 2011-Dec. 2019 with consistent retailer identifiers was created and matched to county-level T21 population coverage data. Two-way fixed effects linear regression was used to examine the relationship between T21 and inspection results. **Results:** Among 335,735 first visits to a retailer, the adoption of T21 (moving from 0 to 100% population coverage) decreased the likelihood of the retailer failing to verify an ID by 3.8 percentage points ($p < 0.001$, 95% CI -5.4 - -2.3 ppts) and that of making a sale to a minor by 8.4 ppts ($p < 0.001$, 95% CI -10.4 - -6.4 ppts). Among 811,627 follow-up visits to a retailer, T21 decreased the likelihood of the retailer failing to verify an ID by 1.5 ppts ($p < 0.001$, 95% CI -2.2 - -0.7 ppts) and sales to a minor by 2.7 ppts ($p < 0.001$, 95% CI -3.5 - -2.0 ppts). Rates of retailer compliance were consistently lower in ZIP codes with higher rates of poverty and racial minority populations. However, retailers in these areas still saw significant improvements in compliance after T21, as retailers in ZIP codes with 50%+ black residents saw rates of underage sales on follow-up visits fall 6.0 ppts ($p = 0.001$, 95% CI -9.4 - -2.5 ppts) compared to a 2.7 ppt reduction ($p < 0.001$, 95% CI -3.6 - -1.7ppts) in ZIP codes with less than 5% black residents. **Conclusions:** State and local Tobacco 21 policies were associated with significant improvements in retailer compliance with youth access prevention provisions of the Tobacco Control Act, prior to federal T21 adoption. Inequitable gaps in retailer compliance with youth access laws predated T21, and while these gaps still exist, their absolute size declined after T21 implementation.

FUNDING: Federal

PPS11-4

IMPACTS OF THE MASSACHUSETTS 2019 ANACT MODERNIZING TOBACCO CONTROL ON TOBACCO RETAILER SETTINGS: A MIXED-METHODS STUDY

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Background: In November 2019, the Massachusetts (MA) legislature passed *An Act Modernizing Tobacco Control* (2019 Act) and became the first state to restrict retail sales of all flavored (including menthol) cigarettes, e-cigarettes, and other tobacco products. Perceptions of the impacts of these policies between November 2019 and June 2020 among retailers have not yet been described in the literature. Our study aims to provide insight on the retailer experience of the 2019 Act from the perspectives of multiple stakeholders, including tobacco retailers themselves, public health officials, and consumers. **Methods:** We conducted in-depth interviews with a purposive sample of seven tobacco retailers and ten public health officials from March 2021 to April 2022. Monthly repeated cross-sectional online surveys were administered through the online survey panel Prodege from April 2021 to August 2022 to ask both adolescent and adult participants about where they purchased tobacco and vape products and assess awareness of laws restricting sales of flavored tobacco products. Key themes were identified through thematic analysis, first drawing on deductive codes informed by the interview guide, followed by inductive coding of data. Survey data were descriptively analyzed in R. **Results:** Key themes from the qualitative interviews included retailers' frustration around significant loss of sales to neighboring states, the level of fines for non-compliance and concern about the role of manufacturer letters retailer compliance such as perception of fines and role of manufacturer letters verifying what retailers were allowed to sell, and the need for increased education about the 2019 Act for both retailers and consumers. Survey results showed that both adolescent (13.3%) and adult (26.1%) consumers who vaped in the past 30-days were traveling to border states to purchase vape products, with a majority (86.4% for adolescents, 67.3% for adults) citing the reason being that the other state had products their home state did not sell. For each type of flavored tobacco product, less than one-quarter of adolescent participants and less than half of adult participants could correctly identify which products MA did not sell. **Conclusions:** These findings can inform the use of appropriate implementation strategies, such as improved communication and education to retailers, for similar tobacco control policies in other states. Evidence from the retailer, public health, and end user perspectives support mutual benefits of adjacent states enacting flavored tobacco sales restrictions to improve the public health effect of existing restrictions and to enhance retailer equity across state lines.

FUNDING: Federal

PPS11-5

ASSESSMENT OF ELECTRONIC VERIFICATION OF IDENTIFICATION CARDS FOR JUUL PRODUCTS AS REQUIRED BY FINAL CONSENT JUDGEMENT IN NORTH CAROLINA VERSUS JUUL LABS, INC., 2022

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BACKGROUND: Per a final consent judgement resolving a court case brought by the State of North Carolina (NC) against JUUL Labs, Inc., JUUL was required to implement electronic age verification systems in retail stores selling its products in NC by February 28, 2022. These systems require clerks to scan identification (ID) cards and automate blocking the sale if verification fails. We examined compliance with this provision in a sample of JUUL product purchase attempts. **METHODS:** We conducted a secondary analysis of a larger study testing underage purchase of five different tobacco product types. Trained research assistants aged 18-20 attempted 172 e-cigarette purchases across 27 retail locations in an eastern NC county between March 1 and October 25, 2022. Of these, 75 purchase attempts were for JUUL products and were made by 10 buyers at 17 retail locations. We analyzed frequencies of the sales, ID requests, and electronic age verification. We fit multi-level models with a random store-level intercept to assess if JUUL purchase attempts were more likely to result in a sale and ID scan than other e-cigarette product purchase attempts. **RESULTS:** Buyers completed purchases 23.8% of the time, and results differed by e-cigarette product with JUUL products being sold less frequently (9.3% of attempts) than other e-cigarette products (35.1%), OR 0.20 (95%CI: 0.60-0.66). JUUL purchases were more likely to result in a buyer reporting their



ID was scanned (62.7%) than other e-cigarette attempts (19.6%), OR 2.81 (95% CI: 0.95-8.30). Four of 17 retail locations (23.5%) where JUUL purchases were attempted sold illegally at least once. The stores selling included two non-chain convenience stores, a chain convenience store owned by an international brand, and a tobacco store. **DISCUSSION:** While we documented some non-compliance with the provisions of the NC consent decree, JUUL product purchase attempts more frequently had IDs scanned and were less likely to result in a sale than other vapor products. The consent judgement may have reduced access to JUUL products for young people at the retail point of sale. Further efforts are needed to ensure enforcement of the retailer provisions of the consent judgement and to use evaluation designs with pre-post data. There are differences in the accessibility of e-cigarettes by brand at the retail point of sale.

FUNDING: Federal; State

PPS11-6

REDUCING YOUTH ACCESS TO COMMERCIAL TOBACCO PRODUCTS ON TRIBAL LANDS THROUGH A RETAILER INTERVENTION

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Significance: High prevalence of commercial tobacco product (CTP) use, including electronic cigarettes (e-cigarettes, vapes), among American Indian/Alaska Native (AIAN) youth constitutes a call for action. Commercial tobacco products are sold at many retail outlets on and near Tribal lands. Federal and California state laws prohibit sales of CTP to people under age 21 (Tobacco 21 Laws). Interventions to increase retailer compliance with tobacco control laws can be effective but have not been demonstrated in Indigenous contexts. Within a multi-level Tribal-community participatory research project under Tribal research governance, we implemented a retailer intervention. **Methods:** The community partner is a Tribal health clinic serving 9 sovereign California Indian Nations with rural land bases and close relationships. We surveyed all tobacco retail outlets operating on and within 5 miles of these lands, assessing types of CTP sold. We surveyed local Tribal laws concerning CTP sales to minors. With Tribal Council approvals, we implemented a Reward and Reminder intervention in which apparent minor volunteers attempted to purchase CTP in all retail outlets without showing proof of age, in 4 waves. Clerks who declined to sell were rewarded, while clerks who sold were reminded of the law. Clerks with rewards were spotlighted in posts on the Tribal health clinic's social media channels. **Results:** 18 retail outlets sold CTP on or near the Tribal lands; 8 of these sold e-cigarettes, and all sold combustible cigarettes. All area Tribes endorsed Tobacco 21 Laws. At baseline, 30% (n=6) of outlets sold CTP to apparent minors without proof of age. In each of Reward and Reminder Waves 1, 3 and 4, clerks in one store sold CTP to apparent minors without proof of age, while clerks in three stores sold CTP to apparent minors in Wave 2. Community members "liked" and commented positively on social media posts showing clerks who received rewards. **Conclusions:** Reduced commercial availability of commercial tobacco products (CTP) supports reduced youth CTP use. Retailer interventions may reduce availability of CTP for youth, and also increase community awareness and support of commercial tobacco control more broadly. Our retailer intervention increased retailer awareness of and compliance with Tobacco 21 Laws. The program also actively engaged Tribal clinic staff and Tribal leaders in assessing and regulating the impacts on youth of commercial activities on and around Tribal lands.

FUNDING: State



SRNT₂₀₂₄

PODIUM PRESENTATION 3



PAPER SESSION 12: TOBACCO AND NICOTINE PRODUCTS FLAVOUR RESTRICTIONS - IMPLEMENTATION, IMPACT AND CONSUMER RESPONSES

PPS12-1

NICOTINE AND TOBACCO PRODUCT SALES AFTER E-CIGARETTE FLAVOR RESTRICTIONS

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Background: Over 300 US localities and 7 states limit or prohibit sales of non-tobacco flavored electronic nicotine delivery systems (ENDS). These policies' effects on combustible cigarette use remain unclear. Public health benefits of reducing flavored ENDS use could be partially or fully offset if ENDS flavor restrictions increase relatively more lethal habits like cigarette smoking. To clarify, we assessed how state and local policies limiting or prohibiting flavored ENDS sales relate to ENDS and cigarette sales across the US. **Methods:** Compiling a new longitudinal dataset of all US state and local tobacco/nicotine flavor policies, we calculated the percent of each state's residents living in areas subject to these policies over time. Information Resources Incorporated's retail sales data covering 44 states were used to calculate each state's per capita sales of ENDS (standardized by volume) and cigarettes (by pack) for each 4-week period from Jan. 2018 - March 2023. Multivariable regressions used these data to estimate two-way fixed-effect analyses, comparing each outcome in states with more vs. less ENDS flavor policy coverage, before vs. after these policies went into effect, adjusting for time-varying national and time-invariant state effects alongside additional policy & environmental covariates, including other tobacco product flavor restrictions. Primary outcomes were total ENDS and cigarette sales/capita, per capita sales of each product by flavor, and cigarettes sales/capita by consumer demographics (i.e., separately for products used disproportionately more or less by under-21 year-olds). **Results:** ENDS flavor policies were associated with decreases in ENDS sales and increases in cigarette sales, particularly once in effect for a year or longer. These relationships were observed for flavored and menthol ENDS, but not tobacco and unflavored ENDS, consistent with flavor restrictions driving the result. Cigarette sales increases were evident across product age-profiles, with 70% of the increase due to non-menthol cigarettes. Coefficient estimates indicate that an additional 14 cigarettes are sold for every one less 0.7 mL ENDS product sold due to ENDS flavor restrictions. **Conclusions:** ENDS flavor restrictions yield decreased ENDS sales but increased cigarette sales, including among products disproportionately used by underage consumers. These findings suggest potential harm from such policies when combustible products are readily available.

FUNDING: Federal

PPS12-2

NATIONAL LONGITUDINAL RISK OF TOBACCO USE AMONG YOUTH AND YOUNG ADULTS IN LOCAL JURISDICTIONS WITH AND WITHOUT FLAVOR AND COMPREHENSIVE SMOKEFREE POLICIES: IMPLICATIONS FOR HEALTH EQUITY

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Significance Flavored tobacco use among young people has been associated with initiation, continued use, and difficulty quitting. Over 350 localities in the US have restricted the sale of flavored tobacco products to reduce tobacco use and potentially reduce disparities. Few national studies have examined the behavioral impacts of living in a jurisdiction with a flavor policy over time or the equity impact of these policies on

racial/ethnic minoritized and socioeconomically disadvantaged populations. **Methods** We used 9 waves of data from the Truth Longitudinal Cohort of 19,341 15-21 year olds (at baseline) collected from 2014-2019. At each wave, individuals reported past 30-day use of cigarettes, cigars, hookah, pipe, smokeless tobacco, snus, e-cigarettes, menthol cigarettes and flavored cigars. We geocoded data from the Truth Initiative Flavor and ANRF Smokefree (SF) policy databases linked to respondent home addresses at each wave to determine who lived in a jurisdiction with an enacted flavor policy and the comprehensiveness of the SF policy. We estimated risk ratios for any tobacco product and menthol cigarettes/flavored cigars using a series of modified Poisson regression models, adjusted for individual and county demographics, and state tobacco tax, and accounting for multiple assessments from participants over time. We coded policy exposure as: 1) any flavor + comprehensive SF, 2) no flavor + comprehensive SF, 3) and no flavor + non-comprehensive SF. **Results** Over the study period, the weighted percent of participants who were covered by a flavor policy increased, from 1.0% to 13.4%, but most flavor policies enacted had exemptions for mint/menthol flavored products. From 2014-2019, respondents living in areas with flavor + comprehensive SF (aRR=0.87 95% CI 0.77-0.99) and no flavor + comprehensive SF (aRR=0.92 95% CI 0.87-0.98) had significantly lower risk of use of any tobacco product vs. no flavor + non-comprehensive SF. There was no difference in risk of use of menthol cigarette/flavored cigar by policy condition. We examined potential effect modification of policy exposure and tobacco use by race/ethnicity and socioeconomic status, but no interactions were significant. **Conclusion** Results suggest that flavor and comprehensive SF policy exposure were longitudinally associated with reduced risk of any tobacco use among young people over and above other factors. However, given exemptions in flavor policies in this period, we did not see reductions in risk of use of menthol cigarettes/flavored cigars. The impact of policies on any tobacco product use was consistent across participants of diverse race/ethnicity and socioeconomic position. As flavor policies have strengthened and spread over time, such policies have great potential for reducing the risks of tobacco use among youth and young adults from all populations.

FUNDING: Federal

PPS12-3

EXAMINING THE POTENTIAL IMPACT OF E-CIGARETTE FLAVOR RESTRICTION POLICIES BY PAST MONTH E-CIGARETTE FLAVOR USED AMONG HIGH SCHOOL YOUTH.

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Background: Youth e-cigarette use remains a public health concern, with 14.1% high school students reporting current (past month) use in 2022. E-cigarette flavors are known to appeal to youth. Currently there are no state-wide e-cigarette flavor restrictions in Connecticut. We assessed youth vaping intentions in two hypothetical e-cigarette flavor restriction scenarios to understand the impact of these policies by current e-cigarette flavors used. **Methods:** 4855 Connecticut high school students completed an online survey in Fall 2022. The analytic sample included 505 youth who endorsed past-month use of one or more flavored e-cigarettes (e.g., menthol, mint, tobacco, fruit). Participants were asked questions about two hypothetical e-cigarette flavor policy scenarios: 'Would you vape if a) only menthol (not mint) and tobacco flavored e-liquids were available for all vaping devices?' and b) 'if only tobacco flavored e-liquids were available for all vaping devices?' Responses were definitely not (0) probably not (1), probably yes (2), and definitely yes (3). We examined mean values for perceived likelihood of vaping in each scenario by current (past-30 days) e-cigarette flavors used. **Results:** The most common e-cigarette flavors used currently were fruit (57%, n=288), followed by mint (33.9%, n=171), menthol (18.2%, n=92), then tobacco (6.7%, n=34). If only menthol and tobacco flavored e-liquids were available, youth who used tobacco (M[SD] = 2.55[0.79]) and menthol (M[SD] = 2.18[0.92]) e-cigarettes had higher reported mean probability of vaping compared to fruit (M[SD] = 1.37[1.05]) and mint (M[SD] = 1.58[1.06]). If only tobacco flavored e-liquids were available, similar mean probability of vaping was seen among youth using tobacco flavored e-liquids (M[SD] = 2.52[0.83]), while lower probability of vaping was seen among those vaping menthol (M[SD] = 1.64[1.19]), fruit (M[SD] = 1.09[1.03]), and mint (M[SD] = 1.26[1.10]). **Conclusion:** Survey results suggest flavor restrictions in e-cigarettes may reduce vaping among youth especially those using flavors other than tobacco. However, longitudinal analyses are needed to better understand the impact of these policies. Additional research is needed to understand how the use of multiple flavors is associated with vaping in response to flavor ban policies.

FUNDING: Federal



PPS12-4

THE ASSOCIATION BETWEEN LOCAL FLAVOR RESTRICTIONS AND TOBACCO AND E-CIGARETTE USE AMONG CALIFORNIA ADOLESCENTS AGES 12-17

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Significance: In the absence of a comprehensive federal ban on flavored tobacco products, states and localities have restricted flavored (including menthol) product sales to limit tobacco use especially among vulnerable population groups. This study investigates the association between local flavor restrictions and socioeconomic differences in youth cigarette and e-cigarette use in California. **Methods:** Data from the California Health Interview Survey (CHIS) and the American Lung Association (ALA) for 2016 to 2021 were pooled. For 540 localities, ALA city/unincorporated county grades were designated as having at least one flavor restriction (1) or none (0). The CHIS data specified exclusive ever use (any lifetime use) of cigarettes, e-cigarettes, and dual use. Multilevel multinomial logistic regression models tested the relationship between the presence of a flavor ban and three outcomes among adolescents ages 12-17, nested by localities. In a separate model, we examined the potential for effect modification of the relationship by family income relative to the federal poverty level (FPL). All models controlled for strength of local smoke-free and tobacco retail licensing laws, as designated by ALA. **Results:** 82 localities had at least one flavor restriction and among sample participants across all years (n=3,250), 1.6%, 10.4%, and 3.2% had ever used cigarettes, e-cigarettes, or dual use, respectively. In the unadjusted models, adolescents in cities with flavor restrictions reported lower odds of ever cigarette use (OR= 0.20, 95% CI: 0.05-0.79) compared to adolescents in cities with the weak grade, but the association was not statistically significant when controlled for other variables. However, we found a statistically significant association between flavor restrictions and poverty level, with cigarette use in the interaction model. Compared to cities without flavor restrictions, participants with lower family income (0-299% FPL) living in cities with flavor restrictions had lower odds of ever using cigarettes, relative to those at higher incomes (300% FPL and above). There was no association between flavor restrictions and e-cigarette or dual use overall or by poverty level. **Conclusion:** Local flavor restrictions might be associated with reduced cigarette use among individuals in lower-income households compared to higher-income households, but these results need to be confirmed in larger studies and with longitudinal data.

FUNDING: Unfunded; Other

3) Funding is necessary for training, media outreach, staffing, space, materials, tracking/enforcement databases, transportation, court costs, and more. A few states had earmarked funds while others operated under unfunded mandates. Funding challenges led states to tradeoff between competing priorities, reallocating time and resources from other tobacco control initiatives. **CONCLUSION:** Implementation of e-cig flavor restrictions is complex and varies across states. The clarity of policies defining flavors, sales, and enforcement authority; the structure and strength of the relationships between policy actors; and funding and available resources were all reported to affect success. These findings have implications for the formulation and implementation of future policies. Research on the effects of flavor restrictions should acknowledge and account for heterogeneity in implementation.

FUNDING: Federal

PPS12-5

IMPLEMENTATION OF STATE-LEVEL POLICIES RESTRICTING FLAVORED E-CIGARETTES IN THE U.S.

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SIGNIFICANCE: Youth and young adult e-cigarette (e-cig) users often cite flavors as central to e-cigs' appeal. By July 2023, 8 U.S. states (CA, MA, MD, MT, NJ, NY, RI, UT) & DC (states) had instituted restrictions on flavored e-cig sales. Evaluations of flavor restrictions have not accounted for policy implementation details. Qualitative evaluation of how state policy actors implement e-cig flavor restrictions was conducted to understand the determinants and processes of implementation. **METHODS:** From April-July 2023, 8 semi-structured interviews with government personnel in 7 of the 9 states were conducted. Interviews were double-coded using domains from Bullock's (2021) theoretical policy implementation framework. Data analysis generated themes addressing successes, challenges, and variations in implementation. **RESULTS:** 3 major themes emerged. 1) Clarity of the policy in identifying flavors, defining sales, and detailing enforcement processes (by whom, under what authority) were identified as key determinants. E.g., states described challenges in identifying the characterizing taste or smell of products in retail packaging or in determining when a product is being offered for sale. Some states noted lack of clarity led to disjointed implementation, industry exploitation of loopholes, and higher costs (staff time, legal costs). 2) Interagency cooperation facilitated implementation within state government (e.g., health, revenue/licensure, and code enforcement agencies) and between levels of government (state to local agency coordination on inspection and enforcement). State and local health agencies had key roles in education and expertise in the product landscape but lacked enforcement authority. Enforcement was often carried out by licensure and consumer protection agencies. Good working relationships and regular, proactive communication were reported to strengthen efforts, and weak coordination hindered implementation.



PAPER SESSION 13: MARKETING, CONSUMER PERCEPTIONS, AND POLICY FRAMING ON SOCIAL MEDIA

PPS13-1

CONTENT ANALYSIS OF REGULATORY COMPLIANCE AND AD THEMES IN TOBACCO INDUSTRY OWNED INSTAGRAM ACCOUNTS

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Introduction: In recent years, tobacco brands have strategically shifted their marketing to online platforms, with a notable rise in e-cigarette promotions on Instagram. Despite U.S. Food and Drug Administration's (FDA) restrictions on marketing e-cigarettes to youth and Instagram's restrictions against advertising e-cigarettes on their platform, visually enticing e-cigarette promotions persist on Instagram, raising concerns about the efficacy and enforcement of existing guidelines. **Objectives:** This study investigated the prevalence and characteristics of the content generated by tobacco-industry-owned accounts on Instagram, identified prominent themes, and evaluated their compliance with existing FDA advertising guidelines to determine if Instagram posts were held to the same guidelines as print and broadcast media. **Methods:** We identified Instagram posts of tobacco brand accounts between January 1, 2021, and February 14, 2022, using the Mintel Comperemedia Omni database and conducted content analysis on the posts in two waves. Wave 1: N=1,243 Instagram posts from 27 tobacco brand-owned accounts were assessed for compliance with FDA tobacco advertising guidelines related to labeling and youth-appealing content. Wave 2: a subsample of n=453 posts that explicitly promoted a specific brand and/or product as ads were analyzed to conduct a content analysis examining the themes and product features used to promote tobacco products on the platform. **Results:** The study revealed limited compliance with FDA advertising guidelines, with only 12.8% of posts having fully compliant warning labels. Numerous violations were identified, including unauthorized health claims, sports branding, and young models. Posts with explicit tobacco branding highlighted tech elements (45%), device customizability (24.5%), vaper identity (17.7%) used stylized product photography (33.6%), memes (5.7%), and social media engagement tactics (32.2%) to promote their products. **Conclusions:** These findings underscore the gap between tobacco advertising restrictions and their implementation in the modern media landscape. This emphasizes the need for FDA and Instagram to update/enforce advertising regulations to address the challenges posed by social media platforms. Traditional methods using existing guidelines can no longer protect youth from exposure to pro-tobacco advertising on Instagram and other digital platforms.

FUNDING: No external funding reported

PPS13-2

"DISCREET SHIPPING" ON TIKTOK ENABLES SELLING OF E-CIGARETTES TO YOUTH

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Background: Previous research has found pro e-cigarette content on TikTok, a concerning trend given the popularity of the platform among youth, and rates of underage e-cigarette use. We identified accounts selling e-cigarettes via "discreet shipping", packaging that obfuscates the primary content, allowing underage buyers to curtail age restrictions and parental oversight. We conducted a case study of one prominent account: Air Cosmeticss, an account selling Air Bar vapes hidden in cosmetics kits. **Methods:** Keywords were used to search TikTok to find discreet shipping accounts. Accounts posting videos since April 2023 that showed age restricted products being hidden within non-age restricted items were documented. Metadata for Air Cosmeticss videos was collected in July 2023 for the case study. Comments on Air Cosmeticss videos (n = 4739) were analyzed to determine the frequency of comments concerning (a) ID or signature requirements, (b) age restrictions or (c) hiding the e-cigarette. **Results:** Twenty-one videos by Air Cosmeticss were identified. Engagement ranged from 11,600 views to 1,500,000 views. Videos had a mean of 152,319 (SD = 375,036) views, 743.47 (SD = 2341.56) shares, and 225.6 (SD = 492.93) comments per video. The review of

comments by Air Cosmeticss in response to user questions, revealed that the account: assured users on 14 occasions signatures or identification would not be required for purchasing or delivery; confirmed in 8 comments the e-cigarette would be hidden if they ordered a discreet bundle; confirmed in 6 comments users could be any age to purchase. User comments also showed youth used the service. One comment stated "my sister ordered and its legit shes 15 and didn't get IDed" another says "I told my dad it was makeup stuff." Eleven further discreet shipping accounts were identified, posting a cumulative 95 videos (M = 8.64, SD = 5.43). As well as offering e-cigarettes, other accounts also sold THC products (n = 4) and alcohol (n = 1). **Discussion:** TikTok policies forbid accounts from "the trade of alcohol [and] tobacco products". Additionally, US federal law forbids e-cigarettes sales to people under 21, and requires age verification for online e-cigarette sales. Despite contravening policies and federal law Air Cosmeticss and similar accounts remain open. Stricter enforcement of TikTok's policies and laws are needed to ensure those who are underage are not able to covertly and easily purchase e-cigarettes online.

FUNDING: Unfunded

PPS13-3

THE EFFECT OF A "TOBACCO-FREE" WARNING LABEL AND A HEALTHY LIFESTYLE THEME IN E-CIGARTE-RELATED INFLUENCER MARKETING ON SUSCEPTIBILITY TO E-CIGARETTE USE AMONG YOUTH: SURVEY-BASED EXPERIMENTS

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Background: Tobacco industry marketing tactics on social media, such as the use of "tobacco-free" warning labels or influencer promotion of e-cigarettes alongside non-substance-related themes (e.g., healthy lifestyle), may encourage youth e-cigarette use. Two between-subjects experiments assessed the effects of marketing tactics on perceptions of influencer credibility and susceptibility to e-cigarette use among youth. **Methods:** In Study 1 (2022), adolescents (N = 1910, M_{age} = 17 [SD=0.6]; 55% female, 55% Hispanic) were randomized to view six posts (images and videos) featuring influencers promoting e-cigarettes in 5 conditions: two conditions with a "tobacco-free" warning label (placed on an e-cigarette product in the post or at the top of the post), two conditions with the FDA (Federal Food and Drug Administration) nicotine warning label (placed on an e-cigarette product in the post or at the top of the post [control]), and one no-label condition. In Study 2 (2023), young adults (N = 1494, M_{age} = 23 [SD=1.8]; 63% female, 51% Hispanic) were randomized to watch 10 video posts that featured influencers promoting e-cigarettes while depicting a healthy lifestyle vs. 10 video posts depicting a healthy lifestyle alone. In both studies, after viewing each post, participants rated each influencer's personality (e.g., honesty). Susceptibility to use e-cigarettes among never-users was then assessed. **Results:** In Study 1, participants perceived influencers as more honest, trustworthy and informed if they saw posts with the FDA warning label at the top of the post (compared to tobacco-free labels or no label). Participants who viewed posts with a tobacco-free warning label placed on an e-cigarette product in the post reported greater odds of susceptibility to e-cigarette use (AOR: 1.57, 95% CI: 1.11;2.23). In Study 2, viewing e-cigarette use paired with a healthy lifestyle increased odds of susceptibility to e-cigarette use among participants who perceived influencers positively (AOR: 2.63, 95% CI: 1.55;4.47). **Conclusions:** "Tobacco-free" labels and influencer marketing that promotes health alongside e-cigarettes may increase e-cigarette use among youth. The FDA nicotine warning labels with the required placement (top of the post) increased influencer credibility and decreased adolescent susceptibility to use e-cigarettes. Tobacco control authorities may consider increasing enforcement of nicotine warning labels. Results also support public health efforts to harness influencers for anti-tobacco messaging.

FUNDING: Federal; State

PPS13-4

PUBLIC PERCEPTIONS OF SYNTHETIC COOLING AGENTS AND SENSORY EXPERIENCES IN ELECTRONIC CIGARETTES: AN ANALYSIS OF TWITTER DISCOURSE

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Significance: Considering the potential FDA menthol ban, electronic cigarette (e-cigarette) companies use synthetic cooling agents such as WS-3 and WS-23 in e-cigarettes to create a cooling sensation like the menthol/mint flavor. While there is no regulation on synthetic cooling agents to date, it is essential to understand how the public perceives these new additives. This study uses Twitter data to examine public perceptions and discussions of synthetic cooling agents in e-cigarettes. **Methods:** Using Twitter Streaming API, from May 2021 to March 2023, we collected tweets related to synthetic cooling agents and sensations with keywords such as 'WS-23', 'ice', 'frozen', and 'arctic'. Using two deep learning roBERTa models, we classified the attitudes expressed in tweets about synthetic cooling agents. We determined whether Twitter users were discussing synthetic cooling agents and whether Twitter users were e-cigarette users. The deep learning BERTopic model was used to identify major topics of tweets with positive and negative attitudes. Two proportion Z-tests were used to compare the proportion of positive and negative attitudes between e-cigarette users (vapers) and non-e-cigarette-users (non-vapers). **Results:** From 6,940,065 tweets related to e-cigarettes, we have identified 5,788 non-commercial tweets related to synthetic cooling agents. The longitudinal trend analysis showed a clear increasing trend in the discussions related to synthetic cooling agents. Vapers posted most tweets (73.05%, 4,228/5,788). Overall, about half of the tweets (47.87%, 2,771/5,788) held a positive attitude toward synthetic cooling e-cigarettes, which is significantly higher than those with a negative attitude (19.92%, 1,153/5,788) with a P -value < 0.0001 . The proportion of tweets with positive attitudes from vapers (60.17%, 2,544/4,228) was significantly higher ($P < 0.0001$) than that from non-vapers (14.55%, 227/1,560). The proportion of tweets with negative attitudes from non-vapers (30%, 468/1,560) was significantly ($P < 0.0001$) higher than that from vapers (16.2%, 685/4,228). The top topics from tweets with a positive attitude included "enjoyment of specific vape flavors", "preference for lush ice vapes", and "liking of minty/icy feelings". Major topics from tweets with a negative attitude included "disliking certain vape flavors" and "dislike of others vaping around them". **Conclusion:** On Twitter, vapers are likelier to have a positive attitude toward synthetic cooling agents than non-vapers. Our study results provide vital insights into public perceptions of these agents in e-cigarette products. These insights are crucial for future FDA regulatory decisions to regulate their use in e-cigarettes and other tobacco products to protect public health.

FUNDING: Federal

PAPER SESSION 14: SPECIAL SESSION: CENTERING LMICS IN NICOTINE AND COMMERCIAL TOBACCO RESEARCH (RAPID FIRE)

PPS14-1

ILLICIT CIGARETTE TRADE AND TAX EVASION IN ZAMBIA: FINDINGS FROM THE TOBACCO CONTROL DATA INITIATIVE 2023.

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Background: Although evidence has shown that reduction of illicit cigarette trade is effective in reducing smoking, there is no study that has estimated the extent of illicit cigarette trade and tax evasion in Zambia. Therefore, the aim of the study was to estimate the extent and the proportion of the illicit cigarette trade and tax evasion in Zambia.

Methods: A cross sectional study was used to collect empty cigarette packs from the retailers and street/bins in 25 districts which included 9 border districts and 16 non-border districts, covering all 10 Provinces in Zambia, which were further stratified as either urban or rural. We used a descriptive analysis to calculate the proportion of illicit packs and other specific criteria. **Results:** Of the 118,344 empty cigarette packs collected (82.0% from the retailers and 18.0% the street/bins), Rothmans accounted for 40.7% and Stuyvesant 13.1%, both manufactured by British American Tobacco. The highest collection was in Lusaka province (38.6%) followed by Copperbelt province (18.9%). Out of the total empty cigarette packs collected, 14,428 (12.2%) were deemed illicit. 1792 (1.5%) did not have a Textual Health Warning, 343 (0.3%) did not have a Textual Health Warning in English, 1490 (1.3%) had duty-free stamps even though they were purchased from retail outlets that were not duty-free shops, and 11,939 (10.1%) did not have a ZRA stamp. The most cigarette brands which were illicit were; Chelsea (100%), liberty (100%), time change (73%) and Zark (44%). Most of the illicit packs were collected from the non-boarder town (15.5%) and urban districts (15.3%). **Conclusions:** The study has shown a notable illicit cigarette trade and tax evasion within the cigarette market. This not only results in revenue loss for the government but also leads to an increase in cigarette consumption. With a high prevalence of packs without ZRA tax stamp, there is a need to adopt a track and trace system to monitor the supply chain. In addition, strengthen the law enforcement and border security patrol especially on the western side of the country where the overall prevalence is high. **Implications:** Zambia should ratify and implement the WHO Protocol on Illicit Tobacco Trade (ITP) to counter the supply of illicit cigarettes. This would lead to the adoption of a track and trace (T&T) system hence enabling the customs officers to detect counterfeit and smuggled cigarettes.

FUNDING: Academic Institution; Nonprofit grant funding entity

PPS14-2

CHANNELS OF USE, REASONS FOR USE AND REPORTED HEALTH HARMS OF SMOKELESS TOBACCO USE AMONG A SAMPLE OF USERS IN SOUTH AFRICA: A QUALITATIVE STUDY

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Significance: Smokeless tobacco (SLT) use is implicated as a risk for developing cancer of the mouth, esophagus and stomach. About 1.8 million South African adults use SLT. This study aimed to explore reasons for use, and reported health harms caused by using SLT among a sample of users in South Africa. **Methodology:** This is a qualitative study, involving key-informant interviews conducted among 13 adults who currently use SLT in KwaZulu-Natal Province, South Africa. Participants were purposefully sampled from a place where SLT is sold until saturation was achieved. Interviews were conducted in isiZulu (the language most spoken in this region), transcribed verbatim and translated

into English. Thematic analysis was conducted with the aid of NVivo version 12. **Results:** This paper reports on the results obtained under three main themes; (1) channels of use (2) reasons for SLT use and (3) harms caused by SLT use. Participants mentioned that they use SLT through the mouth, nostrils and vagina. Reasons mentioned by participant for using SLT include connecting with their ancestors, for "traditional cleansing", self-medication, as an aphrodisiac and as an aid to cope with stress. Harms of SLT use mentioned included harms to health, financial harms and harms to relationships. Reported health harms of using SLT included developing of sores, peeling of skin, and burning of the channel of consumption (mouth, nostril and vagina). For those that use SLT via the vagina, it was reported to also burn the genitals of their partners. Other health harms included vomiting, rotting of teeth, tiredness and hot flushes. Financial harms of using SLT resulted in participants being in debt as a result of buying SLT on credit as well as sacrificing money for food to buy SLT. SLT use also harmed participants' relationships by alienating them from friends who do not use SLT and who see their use as disgusting. **Conclusion:** South African adults use SLT for both traditional and non-traditional purposes and reported harms caused by these products irrespective of their reasons for using these products. Culturally and context sensitive cessation interventions are therefore needed to help those who use SLT to quit.

FUNDING: No external funding reported

PPS14-3

RS148582811 REGULATES THE EXPRESSION OF ITS HOST GENE ARVCF BY BINDING TO XRCC5 TO AFFECT NICOTINE-ASSOCIATED HIPPOCAMPUS-DEPENDENT MEMORY

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Significance: Although numerous susceptibility loci are nominated for nicotine dependence (ND), there was no report showing any association of ARVCF with ND or other addictions. The purpose of this study was to determine how ARVCF involves in the pathogenesis of ND. **Methods and Results:** Through genome-wide sequencing analysis, we first identified genetic variants associated nominally with ND and then replicated them in an independent sample. Of the six replicated variants, rs148582811 in ARVCF locates in the peaks of enhancer-associated markers. The effective-median-based Mendelian randomization analysis indicates that ARVCF is a causal gene for ND. RNA-seq analysis detected decreased ARVCF expression in smokers relative to nonsmokers. Luciferase reporter assays indicate that rs148582811 and its located DNA fragment regulate ARVCF expression in an allele-specific way. Immunoprecipitation analysis revealed that transcription factor X-ray repair cross-complementing protein 5 (XRCC5) is bound to the DNA fragment containing rs148582811 and allele-specifically regulates ARVCF expression at the mRNA and protein levels. Finally, with the Arvcf knockout mouse model, Arvcf deletion not only impairs hippocampus-dependent learning and memory, but also alleviates nicotine-induced memory deficits. **Conclusion:** This study demonstrates for the first time that ARVCF is a novel causative gene for ND, which plays a key role in nicotine-associated hippocampus-dependent memory.

FUNDING: Federal; Academic Institution

PPS14-4

THE CIGARETTE MARKET IN BRAZIL: NEW EVIDENCE ON ILLICIT PRACTICES FROM THE 2019 NATIONAL HEALTH SURVEY

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Significance: The lack of adjustment in tobacco taxes and the minimum legal price (MLP) has led to a sustained decrease in real prices of cigarettes manufactured by companies legally registered in Brazil. The major aim of this study was to explore new evidence on illicit practices, such as selling legal brands below the minimum legal price (MLP), and smugglers selling illicit brands at or above the MLP. **Methods:** For the first time in Brazil, self-reported information on cigarette brand name and price paid per pack in smokers' last purchase from a nationally representative survey conducted in 2019 was used to distinguish the illicit and the legal markets. We estimated the proportion of illicit cigarette consumption, using the combination of brand and price. **Results:** The proportion of smuggled illicit cigarette consumption based on brands not approved on the Brazilian market was estimated at 38.6% (95% CI: 35.8% to 41.5%). When we added legal brands not paying taxes, it increased to 47.1% (95% CI: 44.2% to 49.9%). Around 25% of illicit brand cigarettes were sold at or above MLP. **Conclusions:** In Brazil, since 2017 there is a lack of adjustment in tobacco taxes and the MLP for inflation and income growth. The increase in cigarette affordability and the presence on the market of

a segment of 'higher-priced' illicit brands suggest patterns of illicit brand loyalty and/or perceived 'brand quality' among smokers of illicit cigarettes. The evidence also shows that a sizeable proportion of legal brand cigarettes were sold below the MLP. This study offers insight into what happened in circumstances in which a government failed to keep current with tax policies and the monitoring of domestic manufacturing. Brazil has been a world leader in the monitoring of the tobacco epidemic, and this study also offers an innovative use of data that an increasing number of countries are collecting.

FUNDING: No external funding reported

PPS14-5

INCREASING TRENDS IN WATERPIPE SMOKING EXPLAINS MOST OF THE INCREASE IN POST-COVID-19 PANDEMIC SMOKING RATES IN SOUTH AFRICA: RESULTS FROM A DECOMPOSITION ANALYSIS

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Significance: Recently published trends data from South Africa covering the period 2007-2018 suggest that except for factory manufactured cigarettes (FMC), there has been a significant increasing trend in the use of other combustible tobacco products (predominantly waterpipe [WP] and roll-your-own [RYO] cigarettes), non-combustible tobacco and nicotine products (predominantly snuff [SLT] and e-cigarettes [EC]) and concurrent use of both combustible and non-combustible tobacco and nicotine products (TNP). However, only limited information is available on the impact of COVID-19 on the current pattern of use of TNPs. This study therefore aimed to assess sociodemographic patterns in the use of TNPs and how these characteristics may explain any possible differences in pre- vs. post-COVID-19 smoking rates. **Methods:** Data from three waves (2017, 2018 and 2021) of the South African Social Attitudes Survey (N=8,140) were analyzed. The sociodemographic correlates of current daily and non-daily use of FMC, RYO cigarettes, WP, EC, SLT and use of any combination of FMC, RYO and WP (i.e. current smoking) during 2017/2018 (pre-pandemic) were compared with that for 2021 (post-COVID pandemic). Chi-square analyses and regression models were used to compare prevalence between the two periods. Blinda-Oaxaca decomposition analysis was also used to explore the role of various sociodemographic factors, including any differences in the use of TNPs in explaining any observed differences in smoking rates pre- and post-COVID-19 pandemic onset. **Results:** Current smoking significantly increased from 22.4% (20.4-24.5) in 2017/2018 to 27.6% (24.3-31.1) in 2021 (post-COVID-19 pandemic) (p=0.009). Smoking FMC did not significantly change overall (20.1% vs. 22.1%; p=0.240), except for a significant increase among those who self-identified as African blacks and a decrease among those who self-identified as coloureds and those currently employed. However, the use of WP (+157%), e-cigarettes (+114%), RYO (+81.7%) and SLT (+67%) all significantly increased. Female, followed by African blacks showed the largest increase in WP smoking and e-cigarette use. Decomposition analysis showed increased WP and RYO use explained 52% and 15% respectively of the increase in smoking rates, while employment at pre-COVID levels would have reduced smoking by 14%. **Conclusion:** The use of all TNPs continued to increase in South Africa, with the COVID-related temporary ban in TNPs sales likely to have increased the use of waterpipe and roll-your-own cigarettes, particularly among females and those unemployed. These have policy and practice implications for addressing socioeconomic disparities in tobacco-related disease burden.

FUNDING: Nonprofit grant funding entity

PPS14-6

A SYSTEMATIC REVIEW ON TOBACCO USE AMONG INDIA'S INDIGENOUS AND TRIBAL POPULATION

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Background - Tobacco use is primarily responsible for the global economic burden of death and disease, which is currently connected to around 8,000,000 deaths per year, with approximately 80% of these fatalities occurring in low- and middle-income economies. The goal of this study was to conduct a comprehensive assessment of current literature on tobacco use among Indian tribal populations in order to determine the prevalence, distribution, and factors influencing tobacco use. These data are required to develop and adapt control methods targeted at reducing tobacco use among this disadvantaged population and preventing long-term illnesses. **Methods -** A systematic review of evidence on tobacco usage among Indian tribal populations was done. This study used relevant articles published between 2005 and 2023 in PubMed, Crossref, Google Scholar, and Web of Science. We considered studies that reported the preva-

lence of tobacco use among Indian tribes in our review using the PRISMA standards. Results - A total of 14 studies were reviewed, with a total population of 28,572 people. Tobacco consumption rates ranged from 12% to 42.5%. In gender-specific research, female smoking tobacco use ranged from 1.2% to 12%, whereas male smoking tobacco use ranged from 15% to 52%. Smokeless tobacco consumption, on the other hand, was quite common among the indigenous community. Lack of information about oral health, deeply ingrained dental beliefs, and restricted access to health services were the most significant risk factors for tobacco use. Conclusion - In order to combat the tobacco use, further research into better methods and research-based regulations and workable quitting strategies must be prioritized. Campaigns promoting tobacco cessation and abstinence are advised in this review as a definite way to lessen the negative effects of cigarette smoking and tobacco misuse.

FUNDING: No external funding reported

PPS14-7

EVALUATION OF PERCEIVED SELF-EFFICACY TO DELIVER TOBACCO CESSATION INTERVENTIONS AMONG HEALTHCARE PROVIDERS WORKING IN PRIMARY HEALTHCARE CENTERS IN LEBANON

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Significance: Primary healthcare professionals' role in helping people quit tobacco use is crucial, especially in low-resource settings. In some low- and middle-income countries, healthcare providers have inadequate tobacco cessation training, which hinders patient access to tobacco use treatment. Thus, educating healthcare providers on evidence-based strategies is a viable solution. We evaluate the perceived self-efficacy to deliver tobacco cessation interventions among healthcare providers in primary healthcare centers in Lebanon, where the smoking rate reached 53.9%, the highest in the Eastern Mediterranean region. **Methods:** Pre/post surveys were conducted among physicians (n=24) and nurses (n=34) from primary healthcare centers in Lebanon who participated in a half-day tobacco treatment training. The training involved didactic lectures and interactive role-play sessions. Adapted from prior studies, the survey items were refined to align with the objectives of a subsequent randomized controlled trial. The questions aimed to assess the effectiveness of this training by measuring the confidence in applying acquired tobacco cessation skills and knowledge, particularly in counseling, pharmacology, and brief education, encompassing the 3 As method (Ask, Advise, Assist) and AAC method (Ask, Advise, Connect) for aiding in tobacco cessation. A 5-point scale was utilized. Wilcoxon signed-rank test and McNemar's test were used to evaluate the changes in the variables measured both at pre-and-post surveys. **Results:** Upon comparing providers' confidence before and after training, 6 questions were numerically scaled for analysis, ranging from 0 (not confident at all) to 4 (extremely confident). Nurses' mean confidence significantly increased post-training (p<0.001). Mean values (pre: post) were as follows: in asking appropriate questions to assess tobacco use and readiness to quit (1.9:3.1), pharmaceutical knowledge (0.9:2.7), brief education (1.9:3.0), coping with triggers (1.9:3.0), identifying key cessation factors (1.3:3.1) and explaining telephone counselor role (1.5:3.1). Similarly, physicians' results showed significant post-training improvements for all six (p<0.001). **Conclusion:** These findings highlight a promising trend toward the training's potential to enhance providers' confidence in tobacco cessation interventions. This proposes the possibility of considering implementing of similar programs in primary care and low-resource settings aiming to equip providers with essential skills to potentially reduce tobacco-related morbidity and mortality.

FUNDING: Federal

PPS14-8

TOBACCO CESSATION FOR PEOPLE LIVING WITH HIV: EXPLORING THE ROLE OF HEALTH PROVIDERS IN HIV OUTPATIENT CLINICS IN VIETNAM

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Background The prevalence of tobacco use among people living with HIV (PLWH) is 2-3 times that of HIV-negative counterparts, especially in low- and middle-income countries. In Vietnam, over 50% of men living with HIV use tobacco, threatening gains in long-term survival resulting from widespread access to antiretroviral therapy. Yet,

tobacco use treatment (TUT) services are not available in HIV outpatient clinics (OPC). The purpose of this study was to explore current tobacco use treatment practice patterns, and attitudes, normative beliefs, and self-efficacy related to TUT among health providers at HIV outpatient clinics. **Methods** A cross sectional survey was conducted from 11/2021 to 10/2022 with 73 health providers from 13 OPCs in Ha Noi, Vietnam. TUT practices patterns including asking about tobacco use, advising smokers to quit, providing assistance (3As) and attitudes, self-efficacy, and normative beliefs related to TUT were assessed. Bivariate and multiple logistic regression analyses were used to assess the associations between TUT practices and attitudes, beliefs, self-efficacy, and other factors. **Results** 13.7% of health providers reported asking patients about current cigarette use, 26% offered advice to quit, 5.5% provided brief counseling, and 2.7% referred patients to the National Quitline most or all of the time in the last month. Rates were lower for waterpipe smokers: 12.3% health providers asked patients about current smoking, 16.4% advised patients to quit, and 4.1% offered brief counseling. Health providers' attitudes and normative beliefs toward TUT were supportive: 97.5% agreed or strongly agreed that counseling their patients would increase the likelihood that they would quit smoking, 86.3% agreed that helping patients quit smoking fits well into routine practice, 97.3% agreed that it is their job to help patients stop using tobacco. However, 38% agreed that smoking cessation is a priority in their OPC. Over 60% reported that they did not have the skills to effectively counsel patients about smoking cessation and 95% health providers never received training related to tobacco use treatment. Having positive attitudes related to TUT (OR = 2.1, 95% CI 1.3-3.6) and receiving training on smoking cessation (OR=88.5, 95% CI 2.0-3857.4) were associated with health providers' screening for tobacco use. Having university education (OR = 11.4, 95% CI 2.2-58.2) and positive attitudes related to TUT (OR = 1.6 95% CI 1.2-2.2) were associated with health providers' advising patients to stop smoking. **Conclusion** Health providers at HIV OPCs support expanding their role to include providing tobacco use treatment. Additional resources and training to treat cigarette and waterpipe use are needed to increase health providers' self-efficacy and skills to provide effective tobacco use treatment. There is also a need to change organizational norms to facilitate consistent treatment.

FUNDING: Federal

PPS14-9

ONLINE MARKETING OF E-CIGARETTES AND HEATED TOBACCO PRODUCTS ON BRAND WEBSITES IN THE PHILIPPINES

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Background: In July 2022, the Philippines passed bill RA11900 permitting previously banned e-cigarette (EC) and heated tobacco product (HTP) flavors and lowering the minimum purchase age from 21 to 18. This research investigated product features and marketing strategies employed on EC and HTP brand websites in the Philippines following the flavor ban reversal. **Methods:** In September 2022, we conducted Google searches to identify EC and HTP brands available in the Philippines and accessed their respective brand websites. Internet connection from a Filipino IP address through a VPN was used. Websites specifically targeting people in the Philippines, as determined by the web domain or country selection option, were included in the study. We coded and analyzed a total of 632 web pages (within two clicks from the homepages) across 12 EC and 3 HTP websites. **Results:** Mint/menthol flavored products were observed on 14 of 15 websites (93%), followed in prevalence by tobacco (n=12, 80%), fruit (n=11, 73%), and sweets (n=8, 53%). Concept flavor descriptors indicating the presence of flavor or sensation without explicit naming were observed on most websites (n=12, 80%). Common engagement strategies included links to social media sites (n=13, 87%), endorsement/testimonials (n=8, 53%), pay-to-promote affiliate or ambassador programs (n=7, 47%), and referral discounts (n=6, 40%). Promotions like discounts, free shipping, or gifts were offered by 73% (n=11) of websites. Common marketing messages focused on cessation assistance (n=13, 87%), claims of lower health risks compared to cigarettes (n=10, 67%), and responsible or self-regulatory portrayals of the company (n=10, 67%). Prevalent advertising appeals included flavor depictions using text or images beyond flavor descriptors in product names (n=14, 93%) and claims of innovation (n=13, 87%) and luxury or high status (n=13, 87%). Cartoon characters (n=6, 40%) and other recreation or pop culture references (n=9, 60%) were also observed. **Conclusion:** EC and HTP brand websites in the Philippines commonly employ marketing strategies directed at youth, including fruit and sweets flavors, and the use of cartoon characters and pop culture references, along with other promotional and engagement

tactics. To protect youth from tobacco harm, the Filipino government should strengthen regulations, consider reversing the decision to lower the minimum purchase age, and implement stricter flavor bans.

FUNDING: Nonprofit grant funding entity

PAPER SESSION 15: NOVEL SMOKING CESSATION INTERVENTIONS

PPS15-1

EFFICACY AND SAFETY OF CYTISINICLINE FOR SMOKING CESSATION: CONFIRMATION WITH A SECOND RANDOMIZED PHASE 3 TRIAL (ORCA-3)

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Significance: The need for new medications to treat nicotine dependence for smoking cessation remains high. ORCA-3 was the second of two phase 3 trials testing the efficacy and safety of cytisinicline for smoking cessation to support eventual market approval of cytisinicline administered for 6 or 12 weeks using a novel dosing regimen of 3 mg 3 times/day (TID). Positive results of the previous ORCA-2 trial are published (*JAMA* 2023;330:152). **Methods:** ORCA-3, a 3-arm double-blind, placebo-controlled phase 3 trial conducted at 20 U.S. sites, randomized 792 adults smoking ≥ 10 cigarettes daily who committed to quit smoking. Participants were randomized (1:1:1) to receive 12 weeks of placebo (Arm A, n=265), cytisinicline 3 mg TID for 6 weeks followed by placebo for 6 weeks (Arm B, n=263) or cytisinicline 3 mg TID for all 12 weeks (Arm C, n=264). All groups had behavioral support at each visit. Primary outcomes were continuous biochemically-verified (breath CO<10ppm) smoking abstinence during the last 4 weeks of cytisinicline treatment (Arms B and C) vs. placebo (Arm A). Secondary outcomes were continuous abstinence to week 24 (6 months), risk of relapse between 6- and 12-week treatment schedules, and incidence of adverse events. **Results:** CO-verified continuous smoking abstinence rates at end of drug treatment were 30.3% vs. 9.4% for Arm C vs. placebo (OR 4.4, 95% CI 2.6-7.3, p<0.0001) during weeks 9-12 and 14.8% vs. 6.0% for Arm B vs. placebo (OR 2.8, 95% CI 1.5-5.6, p<0.0008) during weeks 3-6. Continuous abstinence rates through 6 months were 20.5% vs. 4.2% during weeks 9-24 for Arm C vs. placebo (OR 5.8, 95% CI 2.9-12.4, p=0.0001) and 6.8% vs. 1.1% during weeks 3-24 for Arm B vs. placebo (OR 6.2, 95% CI 1.8-34.6, p<0.0006). Among participants who had quit by week 6, switching from cytisinicline to placebo for Weeks 6-12 (Arm B) did not increase the risk of relapse compared to continuing cytisinicline for another 6 weeks (Arm C). Cytisinicline was well tolerated with no treatment-related serious adverse events. The most commonly reported (>5% overall) adverse events for placebo, 6-week and 12-week cytisinicline were insomnia (7.6%, 11.0%, 11.9%), abnormal dreams (5.7%, 9.1%, 7.7%), nausea (7.3%, 9.5%, 6.9%) and headache (6.1%, 7.6%, 8.5%). **Conclusions:** When combined with behavioral support, both 6- and 12-week courses of a cytisinicline treatment regimen in ORCA-3 were more effective than placebo for smoking cessation. Both regimens were well tolerated. The efficacy and safety results of this Phase 3 trial are similar to those of the previous ORCA-2 trial, in which the end-of-treatment continuous abstinence rates for cytisinicline vs. placebo were 25.3% vs. 4.4% during weeks 3-6 (6-week cytisinicline arm) and 32.6% vs. 7.0% during weeks 9-12 (12-week cytisinicline arm). The two trials support use of cytisinicline at a 3 mg dose given TID.

FUNDING: Pharmaceutical Industry

PPS15-2

EFFECTS OF GENETICALLY-INFORMED RISK FEEDBACK ON SMOKING CESSATION AND TREATMENT UPTAKE IN A DELAYED INTERVENTION RANDOMIZED CONTROLLED TRIAL

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Significance: Genetic variation in nicotinic receptor subunits explains differences in smoking behaviors and risk of smoking-related diseases. Despite promising findings in proof-of-concept testing, it remains unknown whether a personalized intervention featuring genetically-informed risks of smoking and benefits of treatment can motivate smoking cessation and tobacco treatment, particularly long term. **Methods:** In a fully-remote randomized controlled trial, we enrolled 148 adult participants who



smoke. Participants completed genetic testing via 23andMe, received a genetically-informed risk feedback tool (*RiskProfile*) or active comparator (brief cessation advice) via Zoom, and completed assessments at 30-day and 6-month follow-up. *RiskProfile* uses a participant's smoking-specific genetic information to calculate, categorize, and communicate personalized risks for lung cancer and recommendations for treatment and cessation. The active comparator group received *RiskProfile* after their 6-month follow-up. Given promising findings after 6 months, we added an 18-month follow-up in this delayed intervention randomized controlled trial. Results: At 6-month follow-up, we found clinically meaningful and statistically significant reductions in cigarettes per day (CPD) from 12.2 to 7.9 in the *RiskProfile* intervention group versus 11.3 to 9.3 in the active comparator group (partial eta-squared=.04, small-to-medium effect size; $p=.027$). Participants receiving the *RiskProfile* were nearly twice as likely as those receiving the active comparator to use smoking cessation medications (20% vs 11%) and report 7-day point prevalence abstinence (18% vs 10%) at 6 months. At the 18-month follow-up (12 months after the active comparator had received *RiskProfile*), we found that the delayed intervention group had reached the same level of smoking reduction in CPD (7.3 vs 7.3), use of smoking cessation medications (40% vs 42%), and 7-day point prevalence abstinence (29% vs 27%) as the original *RiskProfile* intervention group. Conclusion: In this fully-remote delayed intervention randomized controlled trial, the *RiskProfile* group outperformed the active comparator group at 6 months on all tobacco use and treatment outcomes. The active comparator group then received their personalized *RiskProfile* and, by 18 months, had obtained the same benefits as the original intervention group, demonstrating significant reductions in smoking and increases in tobacco treatment and smoking cessation.

FUNDING: Federal

PPS15-3

SAFETY, TOLERABILITY AND PHARMACOKINETIC PROFILE OF SBP-9330 IN A RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED PHASE 1 CLINICAL TRIAL IN HEALTHY NONSMOKERS AND HEALTHY SMOKERS

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SBP-9330 is an investigational, selective positive allosteric modulator (PAM) of metabotropic glutamate receptor 2 (mGlu₂) in clinical development as an aid to smoking cessation. Here we report results from the recently completed randomized, double-blind, placebo-controlled Phase 1 clinical trial (SBP-9330-101; NCT04948827) which consisted of three parts: a single-ascending dose (SAD) study in healthy nonsmokers that included a food-effect arm, a multiple-ascending dose (MAD) study in healthy nonsmokers, and a MAD study in healthy smokers. All three parts were conducted at a single inpatient clinical pharmacology unit. Participants in MAD cohorts were dosed once daily for 14 consecutive days. The primary objective of the trial was to assess the safety and tolerability of SBP9330, and the secondary objective was to assess its pharmacokinetic (PK) profile. Overall, SBP-9330 was well tolerated in both healthy nonsmokers and healthy smokers. The majority of the reported adverse events were mild-to-moderate in severity and transient in nature. With repeated dosing, the most common treatment-emergent adverse events were headache, dizziness, nausea, and orthostatic tachycardia. No participants experienced a serious adverse event. There were no clinically significant adverse findings in laboratory parameters, vital signs, electrocardiograms, physical examination, or the Columbia Suicide Severity Rating Scale. The PK profile of SBP-9330 showed near dose-proportional increases in the maximal plasma concentration (C_{max}) and overall exposure (area under the curve; AUC). A modest food-effect was observed that reduced the C_{max} and prolonged the time to peak drug concentration with a limited effect on the AUC. The drug levels displayed a terminal half-life of 9-16 hours in plasma. Following once-daily repeated oral dose administration of SBP-9330 for 14 consecutive days, the mean accumulation ratio for plasma AUC was as much as 2.6-fold in healthy nonsmokers and 1.4-fold in healthy smokers. In conclusion, SBP-9330 has a favorable safety and tolerability profile in humans, supporting further clinical development and evaluation of the compound in a proof-of-concept study in smokers as an aid to smoking cessation.

FUNDING: Federal

PPS15-4

CUE RESTRICTED SMOKING TECHNIQUE REDUCES CIGARETTE CONSUMPTION INDEPENDENTLY OF ADDITIONAL SMOKING CESSATION THERAPY EFFICACY

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Introduction: We previously investigated the effectiveness of the cue-restricted smoking technique in conjunction with varenicline, a highly effective smoking cessation medication. The results demonstrated increased abstinence rates. In this study, we conducted a double-blind, placebo-controlled trial involving 100 individuals who desired to quit smoking. The primary objective was to assess whether deep transcranial magnetic stimulation (dTMS) would outperform sham stimulation in smoking cessation treatment. The second objective was to evaluate smoking reductions. Our hypothesis posited that dTMS could generate a magnetic field targeting the frontal and parietal regions of the brain, thereby stimulating neurotransmitter release and reducing nicotine withdrawal symptoms. **Methods:** We conducted a randomized, double-blinded, 1:1 study, with a treatment duration of 12 weeks and 21 stimulation sessions. Of the 100 participants, 50 received active TMS while the remaining 50 received sham stimulation. All participants were instructed to attempt smoking cessation from the second week onward. If unsuccessful, they were advised to employ the "Cue Restricted Smoking technique." This technique involves limiting smoking to a designated isolated area, standing, facing a wall, and eliminating external stimuli from the cigarette. **Results:** At the end of the 12-week treatment period, cessation rates were comparable between the active and sham stimulation groups, both yielding a rate of 14%. However, cigarette consumption was significantly reduced among all participants throughout the study, as evidenced by self-reported cigarette consumption day (cig/day) (pre-treatment: sham group 9.5 ± 4 and dMTS 11.6 ± 6, versus 12 weeks sham 6.4 ± 4 and dMTS 8.5 ± 6 $p=0.001$; also confirmed through carbon monoxide levels (ppm) (pre-treatment sham 18 ± 7 and dMTS 20.6 ± 9 versus 12 weeks sham 8.9 ± 6 and dMTS 11 ± 8 $p>0.001$, and serum cotinine level (ng/ml) (pre-treatment sham 175.5 ± 47 ng/ml and dMTS 184.8 ± 39 versus 12 weeks sham 135 ± 73 and dMTS 146 ± 76 $p=0.001$. **Conclusion:** While deep magnetic brain stimulation did not demonstrate superiority over the placebo (sham) group, implementing the behavioral technique "Cue Restricted Smoking" led to decreased cigarette consumption among all participants. This straightforward behavioral technique should be considered in future smoking cessation trials due to its low cost and practicality.

FUNDING: Academic Institution

PPS15-5

A RANDOMIZED TRIAL FOR SMOKING CESSATION USING VERY LOW NICOTINE CONTENT CIGARETTES AND FACILITATED EXTINCTION

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Significance: Smokers in some markets have access to significantly reduced nicotine cigarettes as a modified-risk tobacco product. Use of these cigarettes has potential to aid smoking cessation through a process of extinction learning. We conducted a double-blind randomized controlled trial to examine the effects of cigarettes with very low nicotine content (VLNC, <0.45 mg/g) on smoking cessation among treatment-seeking smokers. Participants were randomized to 1 of 4 interventions crossing 2 nicotine reduction schedules (immediate vs gradual) with 2 types of weekly behavioral intervention (standard cognitive-behavioral vs facilitated extinction [FE]). All interventions were 5 weeks culminating with a target quit date (TQD). Due to the COVID-19 pandemic, only 61% of the target sample size (208) was achieved. With the reduced sample, we evaluated feasibility and acceptability of the treatments, in-treatment smoking-related variables, and abstinence 2 months post-treatment. **Method:** After 1 week of normal nicotine content study cigarettes, there was either an immediate or gradual (over 4 weeks) reduction to VLNC. All participants received written cessation materials and individual counseling. The FE intervention included additional content designed specifically to improve extinction learning during use of study cigarettes. In-treatment measures were 5 weekly self-reports of study cigarettes per day (CPD), reinforcing effects of smoking, and urges to smoke. Intervention satisfaction was assessed at TQD. Abstinence (7-day point prevalence) was assessed 2 months after TQD for responders only and with missing imputed as smoking. Logistic regression with nicotine reduction schedule and behavioral intervention type as predictors was used to evaluate treatment completion and abstinence. In-treatment variables were evaluated using linear mixed models with week, nicotine reduction, behavioral intervention, and interaction terms as predictors.



Results: With N=127, treatment completion (80%) was higher for the gradual reduction groups (88% vs 72%, $p=.024$). Weekly measures of study CPD, urge to smoke, and effects of smoking all showed a linear decrease ($p<.001$). For study CPD, the decrease was modified by an interaction with nicotine reduction ($p=.006$). The gradual reduction groups had relatively higher CPD over the final 3 weeks ($p<.02$). Treatment satisfaction was very high ($M=3.8$ of 4). Abstinence rates for those who completed treatment ($n=101$) were 47% and 31% with missing imputed as smoking. There were no group differences. **Conclusion:** Findings support the feasibility and acceptability of VLNC cigarettes as a smoking cessation tool. Generalizability is limited due to the reduced sample size and the pandemic disruption. Future research on the efficacy of VLNC cigarettes for smoking cessation and components of the intervention is warranted.

FUNDING: Federal; State

PPS15-6

ADDING REMOTE CO MONITORING AND INCENTIVES TO QUITLINE TREATMENT: RESULTS OF A RANDOMIZED PILOT

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Background. Carbon monoxide (CO) testing acts as an objective measure of harm from smoking and CO monitoring can increase motivation to quit. However, the effectiveness of CO monitoring when used with a multi-component cessation program such as a state tobacco quitline (offering counseling, nicotine replacement and ancillary tools) is unknown. The present study pilot-tested remote CO monitoring (via smartphone app and Bluetooth device) as an additive component to the Maryland Tobacco Quitline (MTQ), investigating feasibility, acceptability, and effects on quitline engagement and cessation outcomes. **Methods.** Tobacco smokers with smartphones ($N=229$) were recruited from incoming callers to the MTQ and randomized into 3 groups: MTQ (quitline as usual), CO (MTQ + CO monitoring 2x/day for 60 days), or CO+IN (MTQ + CO monitoring + small financial incentives). CO and CO+IN were sent CO devices upon randomization; MTQ was sent devices for biochemical verification of cessation at day 60. MTQ coaches had access to CO monitoring data and were prompted to encourage testing and reinforce low readings. Surveys were completed at baseline and 60 days. **Results.** Participants were aged 55 on average ($SD\ 11.5$), 62% female, 47% Black, and smoked $M=16$ cigarettes per day ($SD=8.5$). Of those who were sent their CO device immediately (CO & CO+IN), >70% downloaded the app and completed at least one breath test. CO+IN participants completed more breath tests than CO ($M=80.9$, $SD\ 48.5$ vs. $M=55$, $SD\ 49.6$, $p=.007$). Nearly 10,000 breath tests were completed in total and satisfaction with CO monitoring was high. All groups had high satisfaction with the MTQ. The CO+IN group completed more coaching calls than MTQ (2.7 vs. 2.2, ns). Incentive cost was modest: \$117 per participant on average. Most in the CO+IN group received at least 50% of the available incentives. Survey-reported quit rates (complete case): 35.7% MTQ, 37.5% CO, 40.3% CO+IN (ns). Biochemically verified quit rates based on 60-day CO reading (complete case): 26.9% MTQ, 40% CO, 41% CO+IN (ns); (missing = smoking): 9.6% MTQ, 28.9% CO, 28.8% CO+IN ($p=.005$). The CO+IN group had higher survey response rates ($p=.01$) and both CO and CO+IN completed more 60-day CO tests than MTQ ($p=.001$). Differential response rates among groups make cessation outcomes difficult to interpret. **Conclusions.** Overall, this pilot showed smartphone-based CO monitoring (with and without financial incentives) was feasible and acceptable to quitline participants. A larger fully powered study is needed to evaluate engagement and cessation outcomes.

FUNDING: Unfunded; State

RAPID RESPONSE PODIUM SESSION 1

RAP1

RAPID RESPONSE PODIUM SESSION 1 - SELECTED PRESENTATIONS ARE LOCATED IN THE SRNT RAPIDS ABSTRACT PDF. [CLICK HERE.](#)



SRNT₂₀₂₄

PODIUM PRESENTATION 4

PAPER SESSION 16: TOBACCO INDUSTRY MARKETING AND INTERFERENCE

PPS16-1

EXAMINING THE SCOPE OF PMI'S FOUNDATION FOR A SMOKE FREE WORLD GRANTMAKING AND SCIENTIFIC PUBLICATIONS

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Significance: The tobacco industry has long tried to use research to legitimize their agenda. In 2017, Philip Morris International (PMI) created the Foundation for a Smoke-Free World (FSFW) to fund research "... that is nonduplicative and novel, focusing on scientific and regulatory gaps" to "advance global progress in smoking cessation and harm reduction." This project examined FSFW grants to U.S.-based organizations as well as resulting published works from 2017-2022 to better understand the reach of industry money into academic publishing. **Methods:** Using FSFW's grant award website and their 990 tax records from 2018-2022, researchers compiled and analyzed grant recipients, organization type, amounts awarded, amounts paid, dates, purpose of grants, investigators, categorizations, areas of focus, and various types of publications (e.g., peer-reviewed, self-published, earned/paid media). **Results:** FSFW awarded 61 grants to 42 U.S.-based organizations from 2017-2022, totaling \$67,443,695. Twelve grantees received more than one grant. Most grants (74%) went toward FSFW's "Health and Science" category, focusing on "research and projects regarding quitting or switching," "public opinion about tobacco harm reduction," and "verification studies." Researchers identified eight projects focused on dissemination to specific audiences, such as grants to The Influence Foundation, which owns/operates Filter Magazine, to bolster its capacity to disseminate information about tobacco harm reduction. Grantees included top universities (e.g., Yale University, Cornell University, and Michigan State University) as well as individuals affiliated with other universities and 51% of grants went to for-profit companies. Publications by grantees appeared in well-regarded scientific journals, such as: BMC Public Health, Addictive Behaviors, and the Journal of Medical Internet Research. It is not clear to what (if any) extent journals knew they were publishing research sponsored by an industry-funded foundation. **Conclusions:** The grants awarded to U.S.-based organizations primarily focused on advancing a narrative favorable to "harm reduction" and the use of "harm reduction products" to quit smoking. FSFW grantees may have been somewhat effective in communicating, publishing and disseminating information, with several grantees publishing in respected academic journals. This analysis demonstrates the industry's desire and ability to seek legitimacy in scientific and policy circles.

FUNDING: Unfunded

PPS16-2

TOBACCO INDUSTRY SOCIAL RESPONSIBILITY CLAIMS, CONSUMER PERCEPTIONS, AND SUPPORT FOR TOBACCO CONTROL POLICIES IN BRAZIL

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Significance: Internal tobacco industry documents highlight how companies strategically employ corporate social responsibility (CSR) initiatives to improve their public image. While tobacco industry document reviews provide insight into companies' motivations for publicizing their CSR initiatives, it is unclear whether exposure to this publicity affects people's attitudes and perceptions concerning tobacco companies and their products and tobacco-related regulations. Thus, we assessed the impact of a faux CSR video on Brazilian adults' attitudes about a fictitious tobacco company, tobacco regulations, and their perception of the harm and appeal caused by the company's products. We also conducted exploratory analyses to assess potential association variations by moderators (age, gender, smoking status) and if harm perceptions were a mediator for the association between exposure and attitudes about tobacco regulations. **Methods:** We conducted an online experimental study of Brazilians ages 18+ (smokers/nonsmokers)

and part of Qualtrics' Brazilian panel (n=4,047). Participants were randomized to view a control video (business activities) or experimental video (business activities and CSR initiatives - e.g., supporting family farming) featuring a fictitious Brazilian tobacco company inspired by CSR videos from actual companies. Results: Participants that viewed the experimental video were 8% more likely to agree that the fictitious tobacco company is socially responsible (IRR=1.08, 95% CI:1.05-1.11) and 14% more likely to agree that its cigarettes are less harmful than other companies' cigarettes (IRR=1.14 95% CI:1.05-1.25). Effects were often larger among nonsmokers and women. The experimental video exposure did not affect outcomes related to product appeal or tobacco regulations. The relationship between exposure to the experimental condition and support for tobacco control policies mediated by perceived harm will also be presented. **Conclusions:** The presence of CSR initiatives in a three-minute video significantly influenced viewers' attitudes about the tobacco company and their perception of the harm associated with its cigarettes. This influence could be mitigated by adopting the WHO Framework Convention on Tobacco Control (FCTC), Article 5.3 Guidelines. The Guidelines aim to "denormalize" and "regulate" tobacco companies' initiatives disguised as CSR, thereby reducing the consequential deceptive effects on the population.

FUNDING: Nonprofit grant funding entity; Academic Institution

PPS16-3

THE CASE AGAINST JUUL LABS FOR MARKETING TO CHILDREN: EVIDENCE FROM DOCUMENTS SHARED AT TRIAL

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States, school districts, local governments, tribes, and underage individuals have filed thousands of lawsuits against JUUL Labs, Inc. and Altria (Philip Morris) for unlawfully marketing highly addictive products to minors and causing the youth vaping epidemic. As of August 2023, 48 states and territories had settled their cases with JUUL, with settlement payments exceeding \$2 billion. The U.S. state of Minnesota (Attorney General Keith Ellison) was the first and only state to take their case to trial against JUUL. Minnesota had previously won a landmark \$6.5 billion settlement against the major cigarette companies in 1998, leading to the release of previously secret tobacco industry documents. Minnesota also sued Altria for their role in providing services to JUUL. Opening statements were given on March 28, 2023. This presentation will cover key aspects of the case against JUUL as presented by Dr. Ribisl who was the State's lead trial witness and first researcher to testify in any case against JUUL. Dr. Ribisl will show how JUUL caused the youth vaping epidemic in the United States through creating strong youth demand and appeal for their candy and fruit-flavored products including Mango, Mint, Fruit Medley and Creme Brule. They also conducted research on flavors that appeal to youth. JUUL launched "Project Apple", which created colorful JUUL devices that copied popular iPhone colors Rose Gold, Blush Gold, and Navy. JUUL marketing executives joked about the youth appeal of these colors on their Slack messaging channel. JUUL launched a large-scale influencer program focusing on youth-friendly models, musicians, and actors. This program even reached musician Katie Perry by "seeding" devices to her stylist. The presentation will also cover JUUL's intentionally lax youth prevention programs. Only after receiving criticism in 2018 did JUUL begin implementing and publicly touting its youth prevention program. The documents, however, reveal a lack of meaningful action against Minnesota stores that failed JUUL's internal or FDA's external compliance checks. For its part, Altria continued to give offending stores prime placement in shelving units, placing the #1 youth e-cigarette brand JUUL next to the #1 youth cigarette brand Marlboro. Hours before closing arguments, Minnesota settled its case against JUUL and Altria for \$60.5 million - an amount higher on a per capita basis than any other state. The settlement also mandates release of over ten million industry documents.

FUNDING: State; Academic Institution; Other

PPS16-4

TOBACCO INDUSTRY'S USE OF OUTER PACKAGING IN MEXICO INCREASES MARKETING SPACE

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Significance: Mexico requires a pictorial health warning covering 30% of the cigarette pack front and text health warnings covering 100% of the back and one side. Packaging is required to display information on contents and emissions. Packaging that is misleading in terms of health effects or emissions is prohibited. Using additional outer packaging



around primary cigarette packaging adds surface area that tobacco companies can use for marketing. We examined the outer packaging of cigarettes purchased in Mexico for marketing features and appeals. **Methods:** Unique cigarette packs (i.e., pack with at least one different exterior feature such as colors, images, or descriptors) were systematically purchased in Mexico. Data collectors visited 12 neighborhoods of varying socioeconomic status in each of five cities: Mexico City, Guadalajara, Leon, Durango, and Merida. Packs were purchased at common retailer types. Packs were double coded and descriptive statistics for features and appeals were assessed. **Results:** 262 unique cigarette packs were purchased; 24 were enclosed by outer packs. Of these outer packs, 10 (42%) presented "Limited Edition" descriptors and 7 (29%) featured Mexican national appeal imagery/descriptors. Four of the packs with national appeals had a statement that the outer pack can be used as an ashtray. Two outer packs depicted their tar, nicotine, and carbon monoxide content as "0", conflicting with what was displayed on the corresponding primary pack. 11 (46%) of them were metal boxes as opposed to sliders. 10 (42%) displayed and advertised a change to the appearance of the pack, most in color scheme: the outer pack displayed the new color and statement "new image same taste," while the primary still had the old color. Embossing and/or shiny metallic detailing was used on 9 (37%) of the outer packs. **Conclusions:** Outer packaging provides more space to tobacco companies for marketing. By presenting outer packaging as "limited edition," ashtrays, and collector items, tobacco companies encourage consumers to not only purchase their pack but retain possession of it as a special item and further promote the product. In some cases, outer packaging is used to conceal constituent levels at time of purchase. These findings contribute to the evidence base on the need for plain and standardized packaging and the elimination of outer packaging to protect consumers from appealing marketing and misleading tobacco industry claims.

FUNDING: Nonprofit grant funding entity

PPS16-5

X MARKS THE SPOT: WHAT 'GREENWASHED' FEATURES OF CIGARETTE ADS MAKE THEM APPEAR LESS HARMFUL TO YOUNG PEOPLE?

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Significance: Tobacco companies use "greenwashing" tactics - advertising tactics that inaccurately portray a product as natural and eco-friendly - to promote commercial cigarettes. Exposure to greenwashing tactics can decrease harm perceptions, which is a violation of US regulations prohibiting tobacco brands from being false or misleading or making unauthorized explicit or implicit reduced-risk claims. This study describes which greenwashing tactics young adults (18-29 years) understand as communicating reduced harm messages. **Methods:** We conducted an online experiment in January 2023. Participants (n=1,504) were randomized to view one of eight cigarette ad conditions which varied by combinations of the following: greenwashed image (leaf) vs. none; greenwashed text (tagline "Tobacco and Water" plus descriptive text: "We source from many Earth-friendly farms...") vs. none (no tagline and just descriptive text: "Made with tobacco of uncompromising quality..."); greenwashed cigarette pack (vine/leaf design) vs. none (no plant imagery). Respondents could click on up to 10 features, including any imagery, any descriptive text, the required Surgeon General's warning, product website, and brand name, that made the product in the ad appear "less harmful than other cigarettes." They also answered an open-ended question to describe what features made the cigarettes in the ad appear less harmful. **Results:** Overall, 58% of participants clicked on at least one ad feature as conveying reduced harm. Participants most frequently clicked on the greenwashed (36.2%) and non-greenwashed descriptive text (32.6%); the greenwashed (24.2%) and non-greenwashed cigarette pack image (19.6%); the greenwashed tagline "Tobacco and Water" (23.3%); and the greenwashed leaf image (19.5%). Fewer participants clicked on the brand name (9.4%), Surgeon General's warning (4.2%), and product website (3.1%). In the open-ended question, participants most frequently mentioned the leaf imagery, the two ingredients "Tobacco and water", and earth-friendly farming as features that made the cigarettes appear less harmful. **Discussion:** Young adult participants identified some greenwashed cigarette ad imagery and text as conveying reduced harm messages. Results highlight areas for future regulatory action and suggest companies using similar greenwashing tactics are in violation of federal law.

FUNDING: Federal

PPS16-6

WORDS MATTER: HOW A COMPLETE BAN ON E-CIGARETTE AND HEATED TOBACCO PRODUCT SALES IS FRAMED IN VIETNAMESE MEDIA COVERAGE

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Significance The Ministry of Health and Ministry of Industry and Trade in Vietnam disagree on whether to ban domestic sale and production of electronic nicotine delivery systems (ENDS) and heated tobacco products (HTPs) or to try a pilot program, allowing sales for a short period to evaluate its impact. Tobacco companies are also engaged in the debate by lobbying and shaping media discourse on a pilot program. Media coverage of this issue can influence policymaking. We analyzed how news stories framed the issue of the sale and/or manufacture of ENDS or HTPs in Vietnam. **Methods** We used the online news aggregator Tobacco Watcher to retrieve 479 news stories specific to ENDS/HTPs from Jan 2019 to June 2022. Two trained Vietnamese coders reviewed all news stories, and our final sample was 278 unduplicated, relevant stories. Coders identified each issue frame, or coherent story with a single argument position, across the stories. A 10% sample was double coded with high reliability. For each frame, coders documented the argument position (support or against a ban), problem source (e.g., government), problem solution (e.g., ban), and social values present in argument construction (e.g., protect youth). **Results** There were 290 frames across the 278 news stories; 95% contained one frame and most (67.6%) were against a ban on ENDS/HTPs. Among frames against a ban (n=196), the most mentioned problem sources were retailers (n=124), the tobacco industry (n=95), and illicit trade (n=81); the most common solutions were legalized sales regulations (n=75) and education (n=46). Among frames in support of a ban (n=94), the most common problem sources were the tobacco industry (n=70), of-age consumers of ENDS/HTPs (n=57), and retailers (n=52); the most frequent solutions were a complete sales ban (n=84) and enforcement-related regulations (n=25). Similar social values were used in support of and against a ban, like government accountability to the people, the right to health, and the need to protect youth. **Conclusion** Results suggest most media coverage during the study period was against a ban on ENDS/HTP sales in Vietnam. Despite some difference in problem sources and solutions, overlap of social values within pro and anti-sales ban arguments could create confusion on the issue for the public and policymakers. Our findings highlight opportunities to shape and clarify messaging in support of ENDS/HTP regulation in Vietnam and other countries facing decisions to ban ENDS/HTPs.

FUNDING: Nonprofit grant funding entity



PAPER SESSION 17: SPECIAL SESSION: HIGHLIGHTING WORK FROM TRAINEES AND EARLY CAREER RESEARCHERS (RAPID FIRE)

PPS17-1

SEXUAL AND GENDER MINORITY COMBUSTIBLE AND VAPORIZED NICOTINE AND CANNABIS USE DISPARITIES AMONG EMERGING ADULTS

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Significance: It is unclear whether disparities in nicotine and cannabis use associated with sexual and gender minority (SGM) status generalize across diverse SGM identities and products. This study examined associations between a diverse set of SGM identities and use of various combustible or vaporized nicotine and cannabis products. **Methods:** A prospective cohort from Los Angeles County were surveyed four times (2019-2022) as emerging adults (ages 18-23, n=2706). We tested contemporaneous associations of 7 sexual orientation (heterosexual [reference], asexual, bisexual, gay/lesbian, pansexual, queer/another identity, and questioning) and 4 gender (cisgender female [reference], cisgender male, non-binary, transgender) identities with past 30-day use of nicotine (cigarette, nicotine vaping) and cannabis (combustible cannabis flower, blunts, cannabis vaping) products. Time-varying negative binomial and binary logistic regressions estimated rate ratios (RRs) and odds ratios (ORs), respectively, of product use outcomes associated with SGM statuses after adjusting for age, race/ethnicity, education, employment, and financial status. **Results:** Asexual and heterosexual participants did not differ in use of any nicotine or cannabis product. Past 30-day cigarette use prevalence was higher among bisexual, questioning, and queer/another identity participants than heterosexual participants (ORs: 1.71 to 2.86). Past 30-day nicotine vaping prevalence was higher in gay/lesbian vs. heterosexual participants (OR=1.52, 95% CI=1.01-2.29). There were no other SGM identities associated with nicotine use. Gay/lesbian (vs. heterosexual) participants had higher past 30-day use frequency for all 3 cannabis products (RRs: 1.61 to 1.95). Bisexual or pansexual (vs. heterosexual) participants had higher past 30-day combustible flower and vaped cannabis use frequency (RRs: 1.44 to 2.02). Transgender (vs. cisgender female) participants had higher past 30-day use frequency for all 3 cannabis products (RRs: 2.82 to 2.96). Non-binary (vs. cisgender female) participants had higher past 30-day combustible flower and vaped cannabis use frequency (RRs: 2.32 to 2.59). **Conclusion:** Emerging adults who identify as most, but not all, SGM identities may be at greater risk of using various combustible and vaporized nicotine and cannabis products, especially those identifying as transgender or gay/lesbian. Inclusive SGM measurement may aid in more precise identification of combustible and vaporized nicotine and cannabis product use disparities.

FUNDING: Federal

PPS17-2

TOBACCO SMOKING QUIT METHODS AND SUCCESS RATES AMONG ADULTS WITH A DISABILITY: A LONGITUDINAL POPULATION SURVEY, 2013-2019

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Introduction: People with disabilities disproportionately use tobacco and some disability domains (e.g., cognitive, vision) have lower odds of formerly smoking cigarettes. Research on quit methods among people with disabilities is incongruent, with some research indicating people with disabilities make fewer quit attempts while others indicate people with disabilities make more quit attempts. The purpose of this study is to assess tobacco smoking quitting behavior and success rate among people with disabilities. **Methods:** Data from individuals participating in five waves (Wave 1 to Wave 5, 2013-2019) of the Population Assessment of Tobacco and Health (PATH) were analyzed to estimate the prevalence of tobacco use among adults with disabilities (aged 18+). Weighted generalized estimating equation models produced adjusted risk ratios

(aRR) to evaluate the association between attempting to quit smoking in the last 12 months, successfully quitting smoking, using a quit aid, and the use of cessation aids (i.e., e-cigarette, nicotine replacement therapy, behavioral counselling, prescription medication) and disability (any disability and six disability domains: cognitive, hearing, independent living, mobility, self-care, vision). **Results:** In Wave 1, people with any disability had a higher prevalence of current cigarette smoking (25.7%) compared to those without a disability (15.6%). At any follow-up wave, people with any disability were more likely to make a quit attempt (aRR=1.18) and use a quit aid (ARR=1.28) than people with no disability; however, there was no difference in quit success (aRR=1.01) between these groups. Adults with any disability were more likely to use e-cigarettes (aRR=1.23), nicotine replacement therapy (aRR=1.37), and prescription medications (aRR=1.43) as quit aids than people with no disability. People with a mobility disability were more likely to use a quit aid (aRR=1.28), including nicotine replacement therapy (aRR=1.45), behavioral counselling (aRR=1.52), and prescription medication (aRR=1.40) than those without a disability. **Conclusion:** Adults with disabilities attempt to quit and use recommended quit methods more than those without a disability but have similar quit success. Given persistent disparities in tobacco use among people with disabilities, further research is needed to understand aspects of quit methods that may need to be tailored or improved to increase success rates and ultimately reduce health disparities.

FUNDING: Federal

PPS17-3

COPING AND SOCIAL SUPPORT IN RELATION TO MINORITY STRESS AND CIGARETTE SMOKING AMONG LESBIAN, GAY, AND BISEXUAL (LGB) VETERANS

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Significance: The intersection between minoritized sexual orientation identity and military Veteran status places lesbian, gay, and bisexual (LGB) Veterans at increased risk for cigarette smoking. The high prevalence of smoking among LGB individuals can be explained by the Minority Stress Model, which suggests LGB individuals are exposed to sexual orientation-related prejudice and stigma that result in stress. The model also suggests that coping and social support may act as protective factors that mitigate the effects of minority stress. The purpose of this study was to assess whether coping and social support (i.e., general, Veteran-specific, and LGBT-specific support) moderated the association between minority stressors and past-year cigarette smoking among LGB Veterans. **Methods:** Veterans were recruited for an online, national prospective cohort study. We conducted secondary data analysis of baseline surveys collected from September 2019-December 2020. Our sample included cisgender, LGB Veterans (n=463). Adjusted multivariable logistic regression models estimated the odds of past-year smoking with interaction terms between minority stressors and coping/social support to test for moderation. Statistically significant interaction terms at alpha=0.05 were probed using simple-slopes. **Results:** Higher versus lower levels of coping buffered the relationship between victimization and past-year smoking (adjusted odds ratio (aOR)=0.91, p-value=0.045). Results indicated that as occurrences of victimization increase, the likelihood of past-year smoking also increases among LGB Veterans with below average levels of coping. Findings suggested that Veteran-specific social support buffers the relationship between LGB military events and past-year smoking (aOR=0.76, p-value=0.041) and LGBT-specific social support buffers the relationship between LGB military experiences and past-year smoking (aOR=0.98, p-value=0.042). However, general social support strengthened the relationship between social exclusion and past-year smoking (aOR=1.12, p-value=0.048). **Conclusion:** Findings provided some evidence for the Minority Stress Model whereby coping and social support may mitigate stress in some cases leading to lower odds of past-year smoking. However, general social support exacerbated stress, leading to higher odds of past-year smoking in relation to social exclusion. LGB Veterans may benefit from learning additional positive coping skills that build resiliency allowing them to withstand the adverse effects of stress, which may ultimately reduce cigarette use. Leveraging social support linked to LGB identities and Veteran status could also support cessation.

FUNDING: Federal; Academic Institution



PPS17-4

SMOKING BEHAVIOR OF FLAVORED CIGARETTES AMONG CALIFORNIA'S DIVERSE LOW-INCOME POPULATION TO INFORM A POPULATION-BASED CESSATION CAMPAIGN FOR HEALTH EQUITY

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Significance: While California has a policy to restrict the sale of flavored tobacco, little is known about how to support population-based cessation of flavored tobacco to advance health equity. California has a diverse population and people with low-income public insurance (Medicaid) have higher rates of smoking than the general population. This study examines the flavored smoking behavior for California's Medicaid population to help inform the development of a statewide cessation campaign. **Methods:** Data from the 2021 California Health Interview Survey was analyzed to describe behavior of adults aged 18 and older who smoke and have Medicaid. Flavored smoking behavior was defined as agreeing to having smoked flavors such as mint or menthol. Racial/ethnic groups were categorized as Latino and non-Latino groups (African American, American Indian/Alaskan Native, Asian American, Whites, Multiple races/Other). **Results:** Over a third (36.3%) of California's adult Medicaid members report having smoked flavors such as mint or menthol. Menthol use within racial/ethnic groups was significantly different ($p < 0.001$) across groups with the highest proportion within non-Latino African Americans (65.0%), multiple races/non-Latino other (41.9%), Latinos (36.3%), non-Latino Asian Americans (34.7%), American Indian/Alaskan Native (22.5%), and non-Latino Whites (13.6%). Population weighted estimates show the largest racial/ethnic groups using menthol cigarettes are Latinos ($n=110,259$), non-Latino African Americans ($n=56,298$), non-Latino Whites ($n=29,610$), non-Latino Asians ($n=8,550$) and multiple races/non-Latino others ($n=8,300$). Among the racial/ethnic groups, the menthol users within the multiple race/non-Latino other group had statistically significant higher rates than non-menthol users for thinking about quitting (89.0% vs. 52.2%, $p=0.008$) and there was a trend for more stopping smoking at least once to quit (79% vs. 43.8%, $p=0.10$). **Conclusion:** A large proportion of California's adult Medicaid smokers use flavors such as mint or menthol and are significantly diverse across racial/ethnic groups, requiring a statewide cessation campaign that reflects diverse images and community channels. While African Americans have the highest proportion of smokers using flavors, Latinos represent the largest total at almost double that of African Americans. People who self-identify as multiple races/non-Latino others may be particularly responsive to a cessation support campaign.

FUNDING: State

PPS17-5

CARRIERS OF APOL1 RISK VARIANTS MAY BE PARTICULARLY SUSCEPTIBLE TO TOBACCO-RELATED CORONARY HEART DISEASE

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Significance Among African American (AA) people, smoking was recently reported to be associated with a more than 2-times higher risk of coronary heart disease (CHD) compared to non-smoking. About one half of AA in the U.S. carry at least one of two genetic variants (G1 and G2) of apolipoprotein L1 (apoL1), a component of high-density lipoprotein particles. The role of the *APOL1* risk variants in tobacco-related CHD is unknown. The objective of this study is to determine whether presence of *APOL1* risk variants modify relationship between tobacco smoking and CHD in African American adults. **Methods** In a cross-sectional study, we analyzed data from 519 AA adults recruited through the UCSF Lipid Clinic. Participants' DNA, plasma, and questionnaire data were used to determine *APOL1* genetic status, smoking status, and history of CHD (history of myocardial infarction, coronary disease on angiogram, stent placement, angioplasty, or coronary revascularization). Using unstratified and stratified logistic regression models, we examined the association between smoking history (ever smokers vs. never smokers) and odds of CHD, among carriers of risk variants and non-carriers, separately. In a secondary analysis, we examined the association between current smoking (current vs. non-smokers) and odds of CHD stratified by *APOL1* genetic status. **Results** Among participants, 52% were female, 41% were ever (current and past) smokers, 54% were carriers of the *APOL1* risk variants, and 28% had a history of CHD. We observed a strong association between history of ever smoking and prevalent CHD (OR= 3.5; 95% CI: 2.4, 5.2; $P < 0.001$), but the association did not differ by the *APOL1* risk genotypes. However, the relationship between current smoking and CHD differed by the *APOL1* risk genotype. Among carriers, current smokers had 2.5-higher odds of CHD than never smokers (95% CI: 1.3, 4.8; $P=0.005$). Among non-carriers, current vs. never smoking was not associated with odds of CHD (OR:1.1; 95% CI: 0.4, 2.9; $P=0.81$). **Conclusion** In conclusion, *APOL1*

G1 and/or G2 risk variants may modify the association between smoking and risk, or survival, from CHD. Future larger prospective studies are needed to explore the role of the *APOL1* risk variants in the relationship between smoking and risk of incident CHD.

FUNDING: Federal; State; Nonprofit grant funding entity

PPS17-6

ACCUMBENS NEUROIMMUNE SIGNALING IS DYSREGULATED BY NICOTINE USE BUT IS NORMALIZED BY PROGESTERONE WITH SEX-SPECIFICITY

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Progesterone (P4) has been examined clinically as a smoking cessation agent and shows promise for women but not men. We have found that neuroimmune signaling within the nucleus accumbens core (NAcore) is driven by nicotine consumption in a sex-specific fashion, whereby female rats are more susceptible to nicotine-induced consequences of microglial reactivity as compared to males. However, it is unknown if this translates to changes in brain and circulating cytokines, and if neuroimmune signaling is regulated by sex steroid hormones as a function of biological sex. Thus, here we determined if P4 decreases nicotine self-administration (SA) and NAcore microglial reactivity with sex-specificity, and if nicotine SA induces dysregulations in brain and circulating cytokine profiles specifically in females. **Methods:** 72 male and female Long Evans rats underwent nicotine (0.06 mg/kg/infusion) or saline SA for 10 sessions, followed by 15 sessions with pretreatments of either P4 (1.75 mg/kg in 0.1 mL sesame oil, SC) or vehicle (sesame oil, SC) injections. Females were vaginally swabbed to track estrous cycle, and all rats were perfused following the 25th session. NAcore tissue was then dissected for microglial morphometrics using 3DMorph. A separate cohort of 30 female rats underwent nicotine or saline SA and were vaginally swabbed for at minimum 10 sessions, followed by live decapitation during the estrus phase of cycle. Ventral striatum and serum from trunk blood were then collected for cytokine analysis (Eve Technologies). **Results:** Females displayed unique nicotine SA-induced structural changes in NAcore microglia as compared to males (ANOVAs, $p < 0.05$), indicating that these cells are unable to respond to injurious stimuli following nicotine SA. Ramification index (RI) and number of endpoints were decreased in females but not males (LME, $p < 0.05$). P4 treatment reversed these effects and increased the number of microglia only in females (LME; $p < 0.05$). Supporting this female-specific structural consequence, we found that nicotine SA altered cytokine profiles within the ventral striatum as compared to saline SA controls whereby TNF α , IL-6, IL-1 α , among others were suppressed (two-tailed t tests, $p < 0.05$). Conversely, specific circulating cytokines in serum were increased, including TNF α , IL-6, IL-1 α and IL-18 (two-tailed t tests, $p < 0.05$), which may reflect a compensatory mechanism for nicotine-induced cytokine suppression within the NAcore. **Conclusion:** Neuroimmune signaling in the NAcore is driven by nicotine use and regulated by sex steroid hormones in a sex-specific fashion. These results indicate critical sex differences in nicotine-induced dysregulation of the neuroimmune and peripheral immune landscape, which may have translational implications for novel sex-specific therapeutics for smoking cessation.

FUNDING: Federal; Academic Institution

PPS17-7

INDIVIDUALS WHO SMOKE AND CO-USE CANNABIS HAVE HIGHER REACTIVITY TO AN ELECTRONIC NICOTINE DELIVERY SYSTEM (ENDS) CUE: A VIRTUAL CUE REACTIVITY STUDY

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Background: There is growing evidence that in-person exposure to electronic nicotine delivery systems (ENDS) use acts as a cue that elicits desire for cigarettes and ENDS among individuals who smoke. However, less is known about the impact of virtual cues, which has increasingly become an area of interest following the COVID-19 pandemic. In addition, cannabis vaping in the U.S. is rising, which marks a critical need to understand how individuals who vape cannabis react to ENDS cues. This study aimed to extend previous in-person cue work by leveraging a virtual cue-delivery platform to compare reactivity to a virtual ENDS cue in persons who smoke and co-use cannabis versus those who smoke but do not co-use cannabis. **Methods:** Participants were 106 adults who smoke and have vaped cannabis in the past year ($n=45$, 10.8 cigs/day, 67% weekly cannabis vaping) and those who have not vaped cannabis ($n=61$, 10.5 cigs/day). They were exposed to a virtual confederate-delivered cue paradigm in which they interacted



with a study confederate who first drank a bottle of water (control cue) and then used an ENDS (active cue). Ratings on desire for cigarettes, ENDS, and cannabis were compared between groups at baseline, post water cue, and post ENDS cue. Multilevel modeling determined the effect of cue and group on post-cue desire ratings. **Results:** The virtual ENDS (vs. water) cue elicited greater increase in desire for cigarettes, ($F(1,104)=9.23$, $p<.01$), ENDS ($F(1,92)=5.36$, $p<.05$), and cannabis ($F(1,104)=7.18$, $p<.01$). Further, among cannabis co-users (vs. non-co-users), the ENDS cue elicited significantly greater desire for cigarettes ($M=+9.3$ vs. $M=+1.74$; $F(2,104)=3.86$, $p<.05$), ENDS ($M=+11.19$ vs. $M=+1.89$; $F(2,93.4)=4.68$, $p<.05$) and cannabis ($M=+6.74$ vs. $M=+0.82$; $F(2,104)=4.48$, $p<.05$). **Conclusions:** Virtual ENDS cues elicit desire for cigarettes, ENDS, and cannabis in persons who smoke, and this effect was driven by those who co-use cannabis. This is the first study to show that individuals who smoke and use cannabis are more susceptible to ENDS cues. ENDS exposure may have implications for the maintenance of co-use behaviors and regulatory policy should consider the impact of prevalent ENDS exposures on users' desire to use tobacco or cannabis products.

FUNDING: Federal

PPS17-8

REGULATION OF CRAVING PREDICTS SMOKING RELAPSE VULNERABILITY: A DATA-DRIVEN RESTING-STATE FMRI STUDY

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Significance: Regulation of craving (ROC) is critical for reducing drug use. Although mechanistic studies of ROC have been conducted, previous research has relied on hypothesis-driven univariate analyses of task-state functional magnetic resonance imaging (fMRI). However, no research has investigated ROC via data-driven multivariate analyses of resting-state fMRI. Knowledge of ROC neural mechanisms may help identify treatment targets for improving cessation outcomes; and data-driven analyses provide bias-free approaches to advance models of addiction pathophysiology. **Methods:** Adult nicotine-dependent cigarette smokers ($N=213$) attended a baseline session, consisting of resting-state fMRI, assessing resting-state functional connectivity (rsFC); and a smoking relapse analog task (SRT), assessing ROC performance, latency to inhibit ad-lib smoking, and recorded who prematurely quit the task to smoke (i.e., lapse). Cox regression was used to examine associations between ROC performance and rsFC on smoking lapse. Resting-state neural mechanisms underlying ROC performance were investigated using functional connectivity multivariate pattern analysis (fc-MVPA) and followed up with post-hoc seed-to-voxel analyses. K-means clustering ($k=2$) was used to divide participants into clusters in order to examine if group differences in ROC performance (better vs. worse) and rsFC (high vs. low) predicted smoking lapse. **Results:** Smokers successfully reduced craving on the ROC task ($p<.001$) and better ROC performance predicted less lapse risk ($p=.034$). Smokers with better relative to worse ROC performance, had over a 200% decreased risk of lapse ($p=.028$). Resting-state fc-MVPA of ROC performance identified significant clusters in fronto-striatal-limbic circuitry (e.g., left inferior frontal gyrus [LIFG]). Post-hoc seed-to-voxel ROC regression analyses, seeding the LIFG cluster, demonstrated that better ROC performance was associated with stronger rsFC between the LIFG and a cluster spanning the right striatum, thalamus, and posterior insula ($R^2_{adj}=.312$), and that stronger rsFC predicted less lapse risk ($p=.08$). Participants with high relative to low ROC rsFC, had nearly a 50% decreased risk of lapse ($p=.032$). **Conclusions:** rsFC between the LIFG to right striatum, thalamus, and posterior insula underlies ROC performance and stronger rsFC may protect against smoking lapse. Furthermore, the LIFG may serve as a treatment target for smoking cessation.

FUNDING: Federal

PPS17-9

SUBSTITUTABILITY OF COMBUSTED AND NON-COMBUSTED NICOTINE PRODUCTS FOR CIGARETTES USING THE EXPERIMENTAL TOBACCO MARKETPLACE

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Significance: Regulation proposed by the US FDA to reduce nicotine in cigarettes could result in switching from cigarettes to other nicotine products. Prior research demonstrates that e-cigarettes can substitute for cigarettes but it remains unclear whether little cigars and cigarillos (LCCs) could also substitute for cigarettes if LCCs are excluded from a nicotine reduction policy. This study used an online Experimental

Tobacco Marketplace, a paradigm wherein the price of cigarettes is increased and the price of other products remain fixed, to examine the substitutability of combusted and non-combusted nicotine products for cigarettes. **Methods:** Participants ($N=132$, 71.43% female, 85.71% White) were recruited using Amazon Mturk. Participants made hypothetical purchases for 7 day's nicotine products using their average weekly expenditure at five price points for cigarettes (\$0.25, \$0.50, \$1, \$2, \$4 per cigarette) in three marketplaces: (1) all products (e-cigarettes, LCCs, nicotine gum/lozenges [NRT], snus, chewing tobacco, and nicotine pouches), (2) all products except e-cigarettes, and (3) all products except LCCs. Significant positive Spearman's correlations between demand for a product and log transformed cigarette price indicated substitution. **Results:** Cigarette demand decreased as price increased across all sessions (all $p<.001$). In the marketplace with all products available, demand increased for e-cigarettes ($r=0.25$, $p<.0001$) and NRT ($r=0.22$, $p<.0001$) as cigarette price increased. In the marketplace with no e-cigarettes, demand increased for LCCs ($r=0.19$, $p<.0001$) and all other products (all $p<.05$) as cigarette price increased. In the marketplace with no LCCs, demand increased for e-cigarettes ($r=0.28$, $p<.0001$) and NRT ($r=0.22$, $p<.0001$) as cigarette price increased. **Conclusions:** Overall, both e-cigarettes and nicotine gum/lozenges substituted for cigarettes when all products were available illustrating the importance of having these products in the marketplace if a reduced nicotine product standard is implemented. When e-cigarettes were unavailable, all other products including LCCs served as substitutes for cigarettes. The substitutability of LCCs when e-cigarettes were unavailable is concerning given the immense harm from combusted tobacco and supports including LCCs in a nicotine reduction policy.

FUNDING: Federal

PPS17-10

FLAVOR PROFILES OF US MENTHOL/MINT FLAVORED E-LIQUID REFILL SOLUTIONS DIFFER FROM LABEL INFORMATION

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Background: Menthol/mint flavored e-liquids continue to be popular among those who vape, especially in light of the US FDA ban on flavors other than tobacco and mint in pod-based e-cigarettes in the United States in 2020. The dominant flavorants in the most popular mint varieties are the monoterpenoids menthol (peppermint) and L-carvone (spearmint), as well as methyl salicylate (wintergreen). However, extracts of these three plants usually contain a distinct mixture of several flavorants. This study aimed at characterizing a sample of 107 US refill liquids for their main flavorant content, and to identify if label content matched the experimentally established flavorant profile. **Methods:** Amazon Website Traffic and Analytics data was used to identify the 10 most visited websites in 01/2019 using several vaping-related search terms. Menthol/mint related refill liquids were identified on these sites, and a total of 107 e-liquids containing 'menthol', 'mint', or 'wintergreen' on the label information were purchased. E-liquids were diluted in methanol and characterized using GC/MS and menthol, l-carvone, and methyl salicylate were quantified using GC/FID using commercially available standards. **Results:** Detection frequencies and average concentrations (mean $\pm$ SD) were as follows: Menthol was detected in 101/107 samples, average concentration 11.8 ± 11.9 mg/g; L-carvone was detected in 47/107 samples, average concentration 6.0 ± 6.7 mg/g; methyl salicylate was detected in 17/107 samples, average [c] 2.9 ± 1.9 mg/g. The peppermint oil constituents menthone, eucalyptol, and menthyl acetate were detected in 65/107 samples but only 14/107 and 19/107 e-liquids were labeled "peppermint" or "mint", respectively; l-carvone was detected in 47 samples, but only 18/107 and 19/107 were labeled as "spearmint" or "mint", respectively; methyl salicylate was detected in 17/107 samples, but only 7/107 were labeled as "wintergreen". Other detected compounds included WS-3 (10/107), vanillin (15/107), ethylvanillin (12/107), and ethyl maltol (16/107). **Conclusions:** Labels of the 107 analyzed US refill liquids were usually specifically labeled as "menthol", or as a species of mint ("peppermint", "spearmint", or simply "mint"), or as wintergreen, chemical analysis showed that ingredient lists frequently did not match the label information. In addition, synthetic coolants or sweet flavorants were also detected in menthol/mint e-liquids. As a result, menthol/mint e-liquid label information must be used cautiously by consumers, by researchers for example in user studies, or by regulators, and chemical analysis of constituents is advised to verify the actual e-liquid constituent list. In addition, the presented average value for menthol content in 101 US refill liquids (11.8 ± 11.9 mg/g) can be useful to inform future studies that involve menthol/mint e-liquids.

FUNDING: Federal



SRNT₂₀₂₄

PODIUM PRESENTATION 5

PAPER SESSION 18: E-CIGARETTE CESSATION: INSIGHTS FROM DIGITAL HEALTH, EMA, AND CLINICAL TRIALS

PPS18-1

FEASIBILITY TRIAL OF VAPEX: A DIGITAL HEALTH INTERVENTION TO PROMOTE VAPING CESSATION AMONG ADOLESCENTS WITH DEPRESSIVE SYMPTOMS

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Significance: Nearly half of all adolescents who vape are seriously interested in quitting, yet extant cessation interventions have received little empirical investigation. An ideal vaping cessation treatment must directly target established vaping risk factors, such as depression, and be highly disseminable. The goal of this study was to: 1) develop a self-directed digital health intervention ("VapeX") incorporating Behavioral Activation (BA) to address depressive symptoms and promote vaping cessation among older adolescents, 2) evaluate intervention feasibility, and 3) describe preliminary efficacy. **Methods:** Participants were recruited nationwide and were eligible if between ages of 18 and 20, vaping daily, experiencing current depressive symptoms, and active in primary care. Those enrolled (N=103; 67% Female, Age (M(SD))=18.5(0.9)) reported a mean of 19.2(22.7) nicotine vaping instances per day and depressive symptoms consistent with major depression (PHQ-9=15.0(3.5)). Participants were randomized to receive either VapeX (n=54) or Treatment As Usual (TAU; n=49), with TAU consisting of a recommendation to discuss quitting vaping with their primary care provider. Outcomes were assessed through four weeks of follow-up. **Results:** VapeX engagement was strong: 100% of participants used the app during Week 1, and 89%, 76%, and 69% during Weeks 2, 3, and 4. Across follow-up, participants completed 17.1(11.7) app sessions. Total time spent using the app was 26.1(19.9) minutes. Regarding BA components, participants created 2.3(2.4) goals and 3.4(4.2) goal-driven activities, scheduled 10.0(20.3) instances of those activities, and completed 37% of scheduled activities. The most frequently viewed app components were the Home (18.3(12.7)) and Progress (16.0(14.1)) screens. VapeX usability on the System Usability Scale at Week 4 was excellent (79.6(16.9)). While this trial was not powered for efficacy, vaping and depression outcomes numerically (but not statistically) favored the VapeX group: 44% of VapeX (vs. 39% TAU) participants reduced their vaping by at least 50%; 13% of VapeX (vs. 10% TAU) participants reported a 7-day period of complete abstinence during the trial duration, and 43% of VapeX (vs. 35% TAU) participants reported less than minimal symptoms of depression during follow-up. **Conclusions:** VapeX is a usable and feasible digital intervention. Additional work is needed to promote engagement with the intervention which may ultimately bolster efficacy.

FUNDING: Federal

PPS18-2

USING ECOLOGICAL MOMENTARY ASSESSMENT TO CHARACTERIZE DYNAMIC PATTERNS OF E-CIGARETTE USE IN ADULTS PLANNING TO QUIT E-CIGARETTES

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Purpose: Growing evidence suggests that many adults who use e-cigarettes want to quit e-cigarettes someday. To understand patterns of e-cigarette use and cessation, the current study aimed to (1) characterize patterns of e-cigarette use, cessation behavior, and putative contextual, person-level, and product-specific antecedents of quit attempts and (2) examine the association between variability in these factors and concurrent or near-term future e-cigarette quit attempts. **Method:** The median age of participants was 21 years (IQR = 3.5). Participants self-identified as 47.7%: cisgender women, 47.7%: cisgender men, ~ 40%: sexual and gender minority, 15.0%: Hispanic/Latino, and 75.7%:

White. Participants reported exclusive daily use of e-cigarettes and had plans to quit e-cigarettes within 30 days. Participants were sent five daily ecological momentary assessments (EMA) for 30 days to assess quit attempts and putative antecedents of quit attempts (e.g., mood, confidence, e-liquid flavor, non-nicotine substance use). Multi-level logistic regression was used to examine associations between variability in contextual, person-level, and product-specific factors and odds of making a quit attempt during the same and subsequent days. **Results:** Participants submitted a total of 5730 surveys and completed a mean of 53.6 assessments (SD = 42.1) out of a possible 150 per participant across 12.5 days (SD = 8.5) out of a possible 30 days, and 2.31 responses (SD = 1.23) out of a possible 5 responses per day. Sixty-five percent of the sample reported a quit attempt during the study period. Increased confidence in and intention to quit tomorrow, relative to one's average increased their odds of making a quit attempt the next day ($p < .01$). Increased fatigue and pain, relative to one's average, were associated with reduced odds of making a quit attempt ($p < .01$). There were no significant effects of non-nicotine substance use or e-liquid flavor on concurrent or near-term future attempts to quit e-cigarettes (all $p > .05$). **Discussion:** Findings add to the growing literature suggesting that people who use e-cigarettes are initiating quit attempts. The current study has the potential to inform the development or refinement of e-cigarette cessation interventions by identifying treatment foci (e.g., increasing confidence), risk factors (e.g., fatigue, pain) for continued e-cigarette use, and the optimal timing (e.g., in the hours/day prior to a quit attempt) of intervention delivery.

FUNDING: Federal

PPS18-3

MHEALTH PROGRAM ENGAGEMENT AND VAPING CESSATION OUTCOMES AMONG YOUNG ADULTS

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SIGNIFICANCE: Vaping among young adults aged 18-24 (YAs) remains a critical public health concern. However, evidence of effective interventions for vaping cessation among YAs are limited. Smartphone-delivered mHealth interventions have shown promise as vaping cessation solutions, yet more research is needed on program engagement and the impact on cessation outcomes. This analysis describes engagement in an mHealth intervention and examines vaping cessation outcomes based on program engagement. **METHODS:** 508 US YA exclusive vapers aged 18-24 were recruited nationwide to a vaping cessation study. All participants were offered up to 2 phone calls from quitline coaches and were randomized to receive an mHealth program or not. The mHealth program included up to 90 days of interactive text messages and engaging online content through TikTok-style videos, podcasts, animations, and quizzes. Participants were categorized as low engagers (12 or fewer text responses OR 3 or fewer online sessions; n=175) or high engagers (13+ text responses OR 4+ online sessions; n=73). Cessation outcomes were measured as self-reported 7-day point prevalence (7dpp) abstinence at 3 months. **RESULTS:** Text message responses averaged 12.5 (SD=17), and 50% of participants texted 1+ keyword for specific support (e.g., CRAVE, STRESS) over the 90-day period. 43% clicked 1+ links to additional online content, averaging 3.7 (SD=3.1) sessions and 8.2 minutes (SD=13) of time spent over the 90-day period. Most were satisfied with the mHealth program (79%) and would recommend it (73%). More participants found the text messages helpful for quitting vaping (68%) than the online content (57%). Qualitative items show participants found the program supportive and motivational, but some felt they received too many texts and that texts weren't always relevant. 19% opted out prior to the full 90 days in the program. 7dpp quit rates (assuming missing = vaping) were 41% for low engagers and 60% for high engagers ($p=0.007$). **CONCLUSIONS:** The mHealth program paired with quitline coaching calls saw active engagement from YAs. Both low and high engagement in the mHealth program yielded promising vaping cessation rates, but high engagers were significantly more likely to quit. Further investigation is needed to understand factors influencing differential mHealth engagement and for strategies to encourage engagement in mHealth programs.

FUNDING: Nonprofit grant funding entity



PPS18-4

CYTISINICLINE FOR VAPING CESSATION AMONG ADULT NICOTINE E-CIGARETTE USERS: A MULTI-SITE RANDOMIZED PLACEBO-CONTROLLED TRIAL (ORCA-V1)

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Significance: The prevalence of e-cigarette use among U.S. adults, especially young adults, rose from 2021-2022. Many users seek help to quit vaping, but evidence to guide treatment, especially pharmacotherapy, is limited. Cytisinicline, a partial agonist at $\alpha_4\beta_2$ nicotinic acetylcholine receptors that mediate nicotine dependence, has shown efficacy for cigarette smoking cessation. Because it acts to reduce nicotine dependence, we hypothesized that it would also help e-cigarette users to quit vaping. **Methods:** A 5-site Phase 2 double-blind randomized clinical trial tested the efficacy and safety of cytisinicline to help adults (≥ 18 years) stop using nicotine e-cigarettes. Daily e-cigarette users who had not used other tobacco products for >4 weeks and sought to quit vaping were randomized, stratified by lifetime smoking history (Y/N), 2:1 to 12 weeks of cytisinicline 3 mg or placebo taken 3/day. At weekly visits from weeks 2-12, participants received behavioral support and e-cigarette abstinence, validated by saliva cotinine <10 ng/ml was assessed. Cotinine-verified continuous e-cigarette abstinence during Weeks 9-12 was the primary outcome. We examined effect modification by baseline demographics and smoking history. Secondary outcomes were sustained continuous abstinence for 4 weeks after treatment ended and frequency of adverse events. **Results:** 160 participants were randomized to cytisinicline ($n=107$) or placebo ($n=53$); 82% completed the study. Baseline group characteristics were similar: mean age=34 yrs; 52% female; 84% White, 9% Black, 6% Hispanic; 79% had ever smoked a cigarette and 72% had smoked >100 lifetime cigarettes. The primary outcome, cotinine-validated continuous vaping abstinence during weeks 9-12, was significantly higher in the cytisinicline group vs. placebo group (31.8% vs. 15.1%, odds ratio [OR] 2.64, 95% CI 1.06-7.10, $p=.035$). Vaping abstinence was consistently higher for cytisinicline vs placebo in subgroups stratified by sex, age, race, and smoking history, though subgroups were small and CIs were wide. We found no significant interaction of cytisinicline efficacy with moderators to suggest heterogeneity of treatment effect. The difference persisted for 4 weeks after treatment ended but was not statistically significant (Weeks 9-16: 23.4% vs. 13.2%; OR 2.0, 95% CI 0.82-5.32, $p=.147$). Cytisinicline was very well tolerated. Most common adverse events were abnormal dreams (12.3% vs 1.9%) and insomnia (10.4% vs 1.9%). Nausea was more common with placebo than cytisinicline (11.3% vs. 4.7%). **Conclusion:** A 12-week course of cytisinicline was efficacious at end of treatment and well tolerated by adults seeking to quit vaping nicotine e-cigarettes. A larger trial is warranted to confirm this benefit, assess its durability post-treatment, and explore the effect of treatment in subgroups that vary by race/ethnicity and smoking/vaping characteristics.

FUNDING: Federal; Pharmaceutical Industry

PPS18-5

A PRELIMINARY RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED CLINICAL TRIAL OF VARENICLINE IN ADULTS WHO USE E-CIGARETTES

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Significance: Approximately 5% of U.S. adults report current e-cigarette use. An increasing number of these individuals are interested in quitting e-cigarettes and are open to treatment for this purpose. Yet, little is known about effective e-cigarette cessation methods. **Methods:** We conducted an 8-week randomized, double-blind, placebo-controlled, 2-site RCT of varenicline (titrated to 2mg daily using the standard induction regimen) for treatment-seeking adults who reported exclusive daily use of e-cigarettes for ≥ 6 months and no other tobacco use in the past 30 days ($N=40$). Participants were randomized to varenicline or placebo, both of which were encapsulated to maintain blinding. To mimic a primary care model, all participants received a brief advice session with a licensed healthcare provider, a self-guided e-cigarette behavior change booklet designed for the study, and information about a free text-based e-cigarette cessation program (i.e., Truth Initiative's "This is Quitting"). Participants were advised to set a quit date within 1-2 weeks of initiating study medication. They completed weekly electronic diaries of their e-cigarette use behaviors, medication use, and any adverse events. The

primary outcome was self-reported 7-day point prevalence e-cigarette abstinence at Week 8. **Results:** Enrolled participants were 28.2 (8.5) years of age, 50% female ($n=20$), and primarily white (32/40, 80%) and non-Hispanic (39/40; 98%). Most participants were former cigarette smokers (21/40, 53%). Of the 40 randomized participants, 37 completed the trial and provided outcome data. There were no serious adverse events. One participant in the varenicline group had a dose reduction to 1mg daily due to tolerability. Five participants reported signing up for the text-based program. At Week 8, the varenicline group reported numerically higher quit rates (9/20, 45%) than the placebo group (6/20, 30%) (RR: 1.5; 95%CI: 0.5-4.3) that were not statistically significant, likely due to the small sample size. Among former smokers, only 1 participant in the varenicline group resumed any cigarette smoking during the trial. Importantly, across groups, former smokers were more likely (numerically) to be abstinent from e-cigarettes at Week 8 than never smokers (10/21, 47.6% vs. 5/19, 26.3%; RR: 2.0 95%CI: 0.7-5.8). **Conclusions:** These results provide support for further testing of varenicline + brief advice for adults who report exclusive use of e-cigarettes.

FUNDING: Unfunded

PPS18-6

EFFECTIVENESS OF THE 'CRUSH THE CRAVE' SMARTPHONE APP ON VAPING CESSATION AMONG YOUTH AND YOUNG ADULTS: A RANDOMIZED CONTROLLED TRIAL

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Significance: The prevalence of e-cigarette use, or vaping, is greatest among young people aged 18-24 years and 15-17 years, respectively. Emerging research suggests that intention to quit and past-year quit attempts are considerable in this population. Despite this, few evidence-based interventions are available to young people seeking support. Technology-based interventions, such as smartphone apps and text messaging services, are a promising area of vaping cessation research and intervention development. **Methods:** A two-arm, single-blind, parallel randomized controlled trial was conducted between March 2022 and February 2023 to determine the effectiveness of the 'Crush the Crave' smartphone app for vaping cessation ($n=300$) versus an assessment-only control ($n=300$). Eligible individuals were youth aged 16-18 years and young adults aged 19-29 years who resided in Canada and used nicotine e-cigarettes in the past 30 days. Participants were recruited through an existing panel at the University of Toronto. The primary outcome was self-reported 30-day point prevalence abstinence (ppa) at 3 months analyzed under the intention-to-treat (ITT) principle. Secondary outcomes included 30-day ppa and intention to quit vaping assessed at 6 months. The trial protocol was established prior to the study (OSF Registries: osf.io/ra5m6). **Results:** Of the 600 participants included in the trial, 50.5% were under 19 years old, 74.3% were female, 82.4% were White, 59.8% had a high school education, and 90.2% completed at least one follow-up survey. There were no statistically significant differences among the participants by age, sex, province of residence, smoking status, and vaping dependence. Abstinence rates were 22% (95% CI, 18.66%-27.36%) among participants in the intervention group and 16% (95% CI, 12.99%-20.30%) among participants in the control group. The number needed to treat was 16.8. Intervention participants were 2.05 times more likely to quit vaping, 1.43 times more likely to have a long quit, and 1.1 times more likely to intend to quit vaping compared to the control group ($p < 0.05$). **Conclusions:** Trial results demonstrated that the Crush the Crave smartphone app and its features was effective in supporting vaping cessation among youth and young adults. Findings are consistent with existing research highlighting technology-based approaches to promote youth vaping cessation.

FUNDING: Unfunded



PAPER SESSION 19: ABUSE LIABILITY OF PRODUCT USE

PPS19-1

ABUSE LIABILITY OF FLAVORED CIGARILLOS IN YOUNG ADULT DUAL USERS: A CROSS-OVER TRIAL USING THE PURCHASE TASK

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Introduction: Flavorings are popular for cigarillos, but little is known about the impact of flavorings on cigarillos' abuse liability among young adults who dual use cigars and cigarettes. This study examined demand for flavored vs. unflavored cigarillos using the single commodity purchase task. **Methods:** Using a cross-over within-subjects design, 53 young adults (18-34 years) who used both cigarettes and little cigars/cigarillos (LCCs) on ≥8 of the past 30 days replaced their usual LCC brand with preferred flavor and unflavored Swisher Sweet cigarillos for one week each (order randomized). They completed single-commodity hypothetical purchase tasks for usual brand (UB) cigarettes (all visits), UB LCCs (baseline), and study cigarillos (follow-up visits), as well as a Timeline Followback assessing daily smoking of cigarettes and all cigars/LCCs. Individuals with unsystematic/flat demand curves were excluded prior to calculation of demand intensity (consumption when free) and elasticity (sensitivity of consumption to price increases) for cigarettes and study cigarillos. Linear mixed effects models with a random effect for subject estimated treatment effects for the following outcomes: UB cigarette and study cigarillo intensity and elasticity (mg of nicotine), past 7-day cigarette and cigar/LCC smoking, and mean cigarettes and cigars/LCCs smoked per day on smoking days. Predictors were sequence, visit, treatment (flavored vs. unflavored study cigarillo condition), and baseline outcome value. **Results:** The mean (± SD) demand intensity was similar for flavored (107.15 ± 2.04) and unflavored (100.00 ± 2.19) study cigarillos, and demand was less elastic for flavored (-3.11 ± 0.48) than unflavored (-3.01 ± 0.53) study cigarillos. Of the 6 excluded from study cigarillo demand curves, 5 were excluded for null unflavored cigarillo demand. In the adjusted models, there was no treatment effect on study cigarillo demand intensity, cigarette or study cigarillo elasticity, number of smoking days, or mean smoked day. However, intensity of cigarette demand increased under the unflavored cigarillo condition compared to the flavored cigarillo condition. **Conclusions:** Among young adults who use both cigarettes and LCCs, demand for flavored cigarillos was less price sensitive, suggesting greater abuse liability than unflavored cigarillos. However, a ban on cigarillo flavors may increase demand for cigarettes. Plans to ban characterizing cigar flavors should consider simultaneous cigarette regulation to discourage product switching and encourage cessation.

FUNDING: Federal; Nonprofit grant funding entity

PPS19-2

SWITCHING FROM CIGARETTES TO IQOS: THE ROLE OF IQOS-ASSOCIATED REWARD, REINFORCEMENT, AND ABSTINENCE RELIEF

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Significance: IQOS is a heated tobacco product that delivers nicotine through heating rather than combusting tobacco, potentially reducing exposure to harmful chemicals. Pilot research suggested that IQOS can fully or partially substitute for combustible cigarettes among daily smokers and that the reinforcing efficacy of IQOS relative to cigarettes was a key predictor of fully switching. We sought to follow up on our preliminary findings in a fully powered study. **Methods:** Nontreatment-seeking adult daily smokers (N=90; 18-65 years old) completed a within-subjects study consisting of a baseline ad-lib smoking period (days 1-5), two laboratory visits (days 6-7), and a two-week period where participants were instructed to switch from smoking cigarettes to using IQOS (days 8-21). Mixed-effect modeling estimated the changes in cigarettes smoked per day (CPD) as a result of IQOS HeatStick use during the switching period. Predictors of use included IQOS-associated subjective reward, relative reinforcement, craving relief, and withdrawal relief. **Results:** Smokers initially substituted IQOS for 56% of their average daily cigarettes, increasing to 84% by the end of the switch period ($\beta = 0.84$, 95%CI 0.56 - 1.12, $p < .0001$). For every HeatStick used, there was an associated

5% reduction in the number of CPD (IRR = 0.95, 95%CI 0.94 - 0.96, $p < .0001$). Smokers who found IQOS less effective at alleviating withdrawal symptoms consumed fewer CPD ($\beta = -0.01$, 95%CI -0.02 - -0.006, $p < .001$) but did not consume more HeatSticks. Smokers who found IQOS less effective at alleviating the desire to smoke (craving) consumed more CPD ($\beta = 0.01$, 95%CI 0.004 - 0.01, $p < .001$) than those who found IQOS effective, but they did not consume more IQOS HeatSticks. Compared to smokers who found cigarettes more reinforcing than IQOS, those with a lower reinforcing value showed greater reductions in CPD across the switching phase (87% versus 62%, 11 versus 8 CPD, $p < 0.001$). **Conclusions:** Most smokers appear unable to fully switch to IQOS, at least within a two-week period, resulting in various levels of dual use. Negative and positive reinforcing effects of IQOS appear to play a role in facilitating the transition from combustible cigarettes to a heated tobacco alternative. It will be important to determine if IQOS use results in the eventual cessation of cigarette smoking among those seeking smoking cessation treatment and if harm exposure is reduced when switching is not complete.

FUNDING: Federal

PPS19-3

ARTIFICIAL SWEETENERS IN US-MARKETED ORAL NICOTINE POUCH AND SNUS PRODUCTS: CORRELATION WITH NICOTINE CONTENTS AND EFFECTS ON PRODUCT PREFERENCE IN MICE

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Significance: Artificial sweeteners, including sucralose and saccharin, are added at high levels in US-marketed smokeless tobacco (SLT) products such as snus and snuff. Artificial sweeteners are also listed as ingredients in oral nicotine pouches (ONPs), a new class of smokeless tobacco products with rapidly growing market share. Sweetener amounts added to ONPs are unknown. Addition of artificial sweeteners to SLT products may encourage product use initiation and preference behavior. **METHODS:** Sweetener content (sucralose, Acesulfame-K) was determined by LC-MS in the major ONP brands. The role of sweeteners in ONP and snus consumption was modeled in a single-tube oral-consumption assay in mice. Naïve mice were offered aqueous extracts of ONPs and snus calibrated to contain sweetener and nicotine concentrations expected to be present in saliva of SLT users. A 2-bottle choice (2-BC) test was conducted to determine the effect of sweetener on preference or aversion of nicotine solution. Consumption volumes and drinking patterns, for both sexes, were compared between wild-type (WT) mice and mice deficient in the sweet-taste receptor, Tas1r2 (Tas1r2^{-/-}), over four days. **RESULTS:** Artificial sweetener Acesulfame-K was detected in on!, Zyn and Velo-Dryft ONPs, whereas sucralose was present in Velo ONPs. Sucralose content in Velo ONPs (Mint, Citrus) correlated with nicotine strength, with ~double the sucralose content in 4mg pouches compared to 2mg pouches. WT mice consumed approximately the same amount of ONP and snus extracts as water, at nicotine and artificial sweetener concentrations of ~150µg/mL and ~40-160µg/mL, respectively. In contrast, Tas1r2^{-/-} mice consistently consumed less of the extracts. In 2-BC tests, WT mice preferred nicotine solutions sweetened with artificial sweeteners over nicotine only solutions, whereas Tas1r2^{-/-} mice demonstrated no such preference. WT adolescent mice demonstrated much higher preference. **CONCLUSIONS:** ONPs contain significant amounts of artificial sweeteners. For some ONP brands, higher sweetener amounts are added to products with higher nicotine content. The sweet taste imparted by sweetener additives is a key determinant of ONP and snus consumption. Artificial sweeteners facilitate product use initiation and preference behavior by decreasing aversive sensations elicited by nicotine and other smokeless tobacco product constituents.

FUNDING: Federal

PPS19-4

EXPOSURE TO VAPORIZED NICOTINE DURING ADOLESCENCE BUT NOT ADULTHOOD CONTRIBUTES TO ENHANCED EXCITABILITY OF MEDIAL PREFRONTAL CORTIX NEURONS

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Background: Electronic nicotine delivery systems (ENDS) are distinctly different from combustible cigarettes due to the availability of flavor options. This key difference has contributed to a high degree of popularity among adolescent and teen populations. To date, there have been no preclinical investigations into the impact of vaporized



nicotine on late-developing brain regions such as the prefrontal cortex. The goal of this investigation was to determine how neuronal function and drug self-administration differed between adult and adolescent exposure timepoints. **Methods:** Male and female adolescent (7 weeks old) and adult (3 months old) C57BL/6J mice were used in a e-Vape® self-administration (EVSA) assay. Self-administration occurred over a 20 session paradigm where 5 sessions were fixed-ratio 1, 5 sessions at FR2, 5 sessions at FR3, 3 sessions on a progressive ratio, and 2 final sessions at FR3. Following this, brains were extracted for brain slice patch-clamp electrophysiology. Sections containing the ventral tegmental area (VTA) were collected to determine changes in intrinsic excitability in VTA dopamine neurons. Additional sections were collected to examine pyramidal cells in the prelimbic area of the medial prefrontal cortex (mPFC). **Results:** We observed that adolescent and adult mice self-administered nicotine plus menthol with similar magnitudes of reinforcement-related behaviors. We observed that adults and adolescents also exhibited similar changes in VTA dopamine neuron excitability. However, we observed that adolescent mice exhibited a significant increase in intrinsic excitability (lower rheobase and increased firing frequency) of mPFC pyramidal neurons when compared to adult mice. Additionally, the magnitude of reinforcement-related behavior observed during EVSA assays correlated with adolescent mPFC neuronal excitability; but did not with adult mPFC neuronal excitability. **Conclusions:** These observations show that adolescent exposure may uniquely change the prelimbic area of the mPFC. The established correlation between self-administration and mPFC neuronal excitability in adolescent mice suggests a causal role in drug intake and may suggest this brain region to be uniquely important for adolescent nicotine dependence. Given the importance of this brain region, this suggests early exposure to vaporized nicotine may trigger other long-term consequences, included increased abuse liability to nicotine and other drugs. **Funding:** This work was supported by NIDA (DA050717 to BJH).

FUNDING: Federal

PPS19-5

E-VAPE EVALUATION OF THE ADDICTIVE POTENTIAL OF E-CIGARETTES: RESULTS OF AN FMRI MOTIVATION TASK

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Introduction Tobacco use is one of the leading preventable causes of death and disease. Reducing tobacco use is, therefore, an urgent public health goal. Recently, a lively scientific debate has developed regarding the potential benefits and risks of electronic cigarettes (ECs), which are increasingly considered as smoking cessation aids. However, few studies have examined the rewarding effects and addictive potential of nicotine-containing ECs. **Methods** This study included 44 daily EC users (18-65 years, 34 male) and a control group of 29 nicotine-naïve individuals (18-57 years, 11 male). Participants processed an instrumental motivation task during fMRI to examine anticipatory brain activity to reward-predicting stimuli for money, e-liquid, or tobacco cigarettes (TCs). The subsequent instrumental response (number of button presses) to obtain the reward served as a measure of motivation, with each reward category comprising four reward levels. The averaged number of button presses were subjected to 2x3x4 repeated measures ANOVA. To examine the influence of reward category on anticipatory brain activity, individual contrasts were created for each reward category, which modeled the parametric linear increase in reward level, and were then included in a full factorial model. **Results** Instrumental response data showed a significant interaction between group and reward category. Controls showed more frequent button presses to obtain money compared to e-liquid and TCs. EC users put equal effort in obtaining e-liquid and money, but not TCs. There were no significant differences in response rates for money between EC users and controls. In anticipatory brain data, money was found to be associated with higher activation of regions related to the reward system (e.g., anterior cingulate cortex) compared to e-liquid or TCs. Compared to TCs, liquid also activated regions related to the reward system (e.g., anterior cingulate cortex, striatum). **Conclusion** Although EC users work equally hard for money as for e-liquid, the anticipation of money appears to elicit increased activation in limbic regions. Increased activation in reward-associated regions was also detected during anticipation of e-liquid compared to TCs, indicating that ECs have potential for abuse. Although most EC users had smoked TCs for years, the reward value and motivation for TCs seems to have decreased. This may be of interest for treatment programs that support switching from TCs to ECs. **Funding** The project was supported by grants from the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation, Project ID-437718741).

FUNDING: Federal

PAPER SESSION 20: PRODUCT USE AND TOXICANT EXPOSURE

PPS20-1

APPLYING THE U.S. EPA RISK ASSESSMENT FRAMEWORK TO RESPIRATORY EFFECTS OF HEAVY METAL EXPOSURES FROM ELECTRONIC CIGARETTE USE

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Introduction: Heavy metals such as Cr and Ni have been found in e-cigarette aerosols and are elevated in user's blood/urine. However, it is unknown how intermittent low-level inhalation exposure of metals from e-cigarette use will affect risk of lung outcomes. Risk assessments have typically not included behavioral exposure measurements such as tobacco use in their dose calculations. The goal of this research is to understand the contribution of Cr and Ni inhaled from e-cigarette use to long term health outcomes. **Methods:** Exposure metrics (i.e., e-cigarette use, preferences, and daily behaviors) were collected from 175 participants from the EMIT Study. E-cigarette aerosol metals were analyzed by inductively coupled plasma mass spectrometry (ICP-MS). Margin of Exposure (MOE) was calculated according to the US EPA risk assessment guidelines comparing a dose estimate to a toxicity reference value. Risk was calculated using a probabilistic approach, accounting for exposure distributions. **Results:** E-cigarette users, on average, take 192 (SD=344) puffs per day. Each puff is on average 3.43 seconds long (SD=2.08). The geometric mean (GM) concentration for total Cr in the e-cigarette aerosols is 1.30×10^{-5} mg/m³ (GSD=70.7); and for Ni is 1.50×10^{-3} mg/m³ (GSD=17.9). The average daily dose (ADD) of Ni is 2.96×10^{-4} mg/kgBw/day for 3 years of use. The ADD of Cr is 2.58×10^{-6} mg/kgBw/day for 3 years of use. The MOE for Ni is 101, Cr (III) is 1.16×10^6 , Cr (VI) is 775. **Discussion:** The ATSDR provides minimum risk levels (MRL) for chronic inhalation exposures to Ni, Cr (III), and Cr (VI). The GM Ni concentration exceeds the MRL of 2.00×10^{-4} mg/m³, the GM Cr concentration exceeds both MRLs for Cr (III) of 1.00×10^{-4} mg/m³ and Cr (IV) 5.00×10^{-6} mg/m³. Based on the GM values for e-cigarette aerosol, Ni and Cr (III) exposure may not increase risk of respiratory disease. If the Cr in the aerosol samples contains Cr (VI), vapors would be at increased risk of upper respiratory effects. While the Cr in our samples was not speciated, it is possible that some Cr in the aerosol is Cr (VI) and there is a potential for increased risk in e-cigarette users.

FUNDING: Federal

PPS20-2

CHANGES IN URINARY TOBACCO-SPECIFIC NITROSAMINE (NNAL) AND COTININE AFTER SWITCHING FROM FILTERED TO UNFILTERED CIGARETTE SMOKING

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Significance: Cigarettes continue to be the leading cause of premature mortality and morbidity in the United States. The cellulose acetate filter, attached to almost all cigarettes, misleads consumers and policy makers about the harm reduction offered by filtered cigarettes; it also creates toxic plastic pollution from discarded butts. Regulatory agencies are now considering sales bans on cellulose acetate filters because of this environmental concern. Such policies may have health implications among people who smoke. This study aims to evaluate potential changes in the tobacco-specific urinary biomarkers, NNAL and cotinine, when committed smokers switch to smoking unfiltered cigarettes. **Methods:** We conducted a 9-week crossover randomized control trial among smokers and investigated the effects of switching from filtered to unfiltered cigarettes on smoking behavior. We provided all participants with a Clinical Research Support System device to measure Smoking Topography (ST). The final analytic sample for this study consisted of participants who completed the trial and provided urine samples during both experimental conditions (N=29). We calculated geometric means and used Mixed-Effect-Models (MEM) to evaluate associations between experimental conditions and the log transformation of urinary NNAL and cotinine while controlling

for ST measurements, daily smoking rates, number of cigarettes smoked, and gender. **Results:** Median and geometric means levels of creatinine-corrected NNAL were similar among participants when they smoked filtered and unfiltered cigarettes (5.4×10^{-4} ng/ug, 5.6×10^{-4} ng/ug respectively). Median and geometric mean levels of creatinine-corrected cotinine were also similar among participants smoking unfiltered cigarettes (0.9 ng/ug, 1.3 ng/ug). In final adjusted MEMs, creatinine-corrected NNAL levels were similar for those who smoked filtered cigarettes compared to unfiltered cigarettes (Beta=-0.32, 95% CI -0.66, 0.01). Similarly, in the final adjusted MEM, creatinine-corrected cotinine levels were similar among those who smoked filtered cigarettes compared to unfiltered cigarettes (Beta=-0.17, 95% CI -0.46, 0.14). **Conclusion:** We found no significant differences in geometric mean, median levels or MEM of NNAL and cotinine measurements for participants in this small proof-of-principle, crossover clinical trial. This study reinforces current understanding about the lack of harm reduction from smoking filtered cigarettes.

FUNDING: State

PPS20-3

E-CIGARETTES: DEPOSITION AND WASHOUT OF NICOTINE FROM THE ORAL CAVITY

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Introduction/Significance: Smoking has significant adverse effects on oral health. The oral cavity is the main route of administration for tobacco aerosols, and the initial target for exposure to constituents of these aerosols. One of these constituents is nicotine, which is the major bioactive ingredient in tobacco products and is a primary component of tobacco use dependence. The aim of the present study was to directly assess the deposition and washout of nicotine from the oral cavity after the use of e-cigarettes (E-cig) and traditional cigarettes (C-cig). **Methods:** Using a within-subjects design, 16 dual E-cig and C-cig users (10 females) received two 15-min dynamic PET/CT head scans in a randomized order. The participants smoked a mean ($\pm$ SD) of 15.8 ± 3.0 cigarettes per day with a mean of 20.1 ± 10.7 years of smoking history and a mean FTND score of 5.8 ± 3.1 . They had a mean of 2.6 ± 1.5 years of E-cig use history and vaped 9.0 ± 10.6 episodes per day. During each scan participants inhaled a single puff of vapor (55 mL over 4 sec) or smoke (35 mL over 2 sec) containing ¹¹C-nicotine. The E-cig vapor was produced by V2 EX Blanks refillable cartomizer, containing V2 Red e-liquid (1.2% nicotine, 20/80 VG/PG, pH 9.4). For research C-cigs, Capri Magenta cigarettes were used. After the head dynamic scan, a full-body scan was conducted to measure total absorbed dose of ¹¹C-nicotine (TAD). **Results:** Mean ($\pm$ SE) oral cavity initial deposition of nicotine from E-cigs vs. C-cigs was 4.2-fold greater (12.4 ± 1.6 and $2.9 \pm 0.7\%$ TAD, respectively, paired t-test $P < 0.0001$). The respective areas under time activity curves from 0 to 15 min were 133 ± 20 and $30 \pm 7\%$ TAD $\times$ min ($P < 0.0001$). The difference in $T_{1/2}$ washout of nicotine after E-cig and C-cig use was not statistically significant (18.4 ± 2.8 and 16.2 ± 2.3 min, respectively). Both $T_{1/2}$ values were at least 5 times longer than $T_{1/2}$ saliva turnover (range 1 - 3 min, calculated based on saliva flow rate (0.3 - 0.5 mL/min and saliva volume 0.5 - 1.1 mL). There was a strong correlation between $T_{1/2}$ washout values after use of e-cigs and C-cigs (Spearman's rank correlation $r_s = 0.78$, $P < 0.0004$). **Conclusions:** The data suggest that: 1) compared to C-cigs, the use of E-cigs with alkaline pH results in excessive nicotine exposure to the oral cavity and 2) after using both products, nicotine is adsorbed on the surface of the oral cavity and remains adsorbed for a relatively long time. These results fill a gap in current knowledge about oral nicotine deposition from e-cigarette use and, with future research, may provide critical data for scientific evidence-based policy development for regulating e-cigarettes to protect public health, as well as evaluating the risks and benefits of e-cigarettes when used for smoking cessation and tobacco harm reduction.

FUNDING: Federal

PPS20-4

NICOTINE SALT ACIDS REACT WITH COILS TO PRODUCE FREE RADICALS IN ELECTRONIC CIGARETTE AEROSOLS

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Significance: High levels of free radicals produced by electronic cigarettes can result in oxidative stress and damage in users. While this is largely dependent on the solvent (propylene glycol and glycerin) and coil temperature, the effects of nicotine salts on free radical production are largely unknown. Found in most "pod" devices and refillable solutions, nicotine salts are a combination of free base nicotine and an acid in an e-liquid. Depending on the metal used to make the coil, acids present in the e-liquid

may interact with them to different degrees and alter the chemistry of the aerosol being produced. **Methods:** To understand the impact of these acids and better characterize free radicals formed by electronic cigarettes, different acids (ascorbic, benzoic, citric, lactic, and tartaric) were added at concentrations equivalent to what might be found in a 60 mg/mL nicotine salt e-liquid to a mixture of propylene glycol and glycerin (60:40, vol:vol). These samples were vaped and the free radical output in the aerosol were analyzed using both stainless steel and Kanthal alloy coils. Aerosols were generated at 35W on a VooPoo Argus GT "mod" device and 0.5 Ω stainless steel (SS316L) or 0.5 Ω Kanthal Innokin iSub coil and tank with a puffing topography of: puff duration, 3 seconds; interpuff interval, 30 seconds; flow rate, 500 mL/min; and number of puffs, 50. We also analyzed these effects in a Caliburn X "pod" device with a 1.0 Ω Kanthal coil operating at 11W. Free radicals in the aerosols were captured in an impinger containing phenyl-N-tert-butyl nitron (PBN) and analyzed using electron paramagnetic resonance (EPR). **Results:** With stainless steel coils, the addition of acid to the e-liquid resulted largely in decreases in free radical production with ascorbic acid decreasing nearly 90% as compared to the base. With Kanthal coils in both "mod" and "pod" devices, the opposite trend was seen with ascorbic, citric, and tartaric acid producing substantially higher levels of free radicals with tartaric and citric acids producing nearly a 5000% increase compared to base. **Conclusion:** These findings suggest that the acids used in nicotine salts are reacting with certain metals in the coil resulting in more free radical production and potentially greater harm to the user. Future studies will need to be done to better understand what these free radicals are and their potential health impacts on those exposed to them.

FUNDING: Federal

PPS20-5

WHAT IS THE IMPACT OF LONGER-TERM EXCLUSIVE USE OF HEATED TOBACCO OR NICOTINE VAPING PRODUCTS OR NO PRODUCT USE ON SELECTED TOXIN AND CARCINOGEN EXPOSURE? A CROSS-SECTIONAL COMPARISON WITH CIGARETTE SMOKING

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Aims: Limited industry-independent data exist on the impact of heated tobacco product (HTP) use on health-related biomarkers. Such data are needed to inform policy makers on how to legislate different harm reduction products, which also include nicotine vaping products (NVP). We compared exposure to known toxins and carcinogens among longer-term (>3 months) users of HTP, NVP and users of no products relative to exposure among combustible cigarette (CC) users. **Methods:** We recruited from four naturally occurring groups in London, UK: non-smokers with no product (NNP) use, past smokers with exclusive HTP or NVP use, and exclusive CC smokers (N=45/46 per group, total N=182, mean age in years=36.6 (SD=14.6), male=59.9%, white=74.2%). Participants provided urine samples analysed for metabolites of nicotine (cotinine), carcinogenic tobacco-specific nitrosamines (NNAL), and toxic/carcinogenic volatile organic compounds acrolein, acrylamide, acrylonitrile and toluene. Participants completed a questionnaire assessing environmental smoke exposure, socio-demographic and physical/mental health characteristics, and had their breath carbon-monoxide (CO), lung function (LF) and heart rate (HR) measured. All analyses were adjusted for key characteristics and, for urinary metabolites, creatinine. Outcomes are presented in percent relative to CC user results (set to 100%). **Results:** All groups had similar significant reductions in CO (18.8-25.6%) compared with CC users. Cotinine levels for HTP (108.3%, 95% confidence interval (CI) 80.7-145.4) and NVP (135.7%, 95%CI 93.1-197.8) users were similar to CC user levels, and mostly undetectable for NNP users. NNAL levels were reduced among all groups relative to CC users, but HTP users had significantly higher levels (27.2%, 95%CI 18.6-39.7) than NVP (11.0%, 95%CI 7.6-15.9) and NNP (5.6%, 95%CI 3.6-8.9) users. Similarly, while acrylonitrile exposure was reduced relative to CC users, HTP users had significantly higher levels (12.7%, 95%CI 7.2-22.3) than NNP (4.1%, 95%CI 2.6-6.6) users, with NVP users not differing from either (7.5%, 95%CI 4.6-12.2). Relative to CC users, all groups had significantly lower acrolein and acrylamide exposure levels, with the biggest reductions observed for NNP (26.4% and 55.9%) followed by NVP (42.3% and 60.3%) and then HTP (53.7% and 77.7%) users. Groups did not differ from CC users in toluene exposure, LF or HR. **Conclusions:** Findings suggest that HTP and NVP deliver nicotine effectively while reducing exposure to harmful substance relative to CC, but HTP less so than NVPs. Policy makers should therefore consider differential treatment of these harm reduction products to maximise population health benefits.

FUNDING: Nonprofit grant funding entity



PAPER SESSION 21: EMPLOYING QUALITATIVE RESEARCH METHODS TO PROMOTE HEALTH EQUITY IN NICOTINE AND COMMERCIAL TOBACCO

PPS21-1

TOBACCO USE PROGRESSION AMONG SEXUAL MINORITY EMERGING ADULTS

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Significance: The risks of cigarette smoking initiation and use are higher among sexual minority (SM) emerging adults (aged 18-25 years). Mechanisms through which tobacco product use progresses from experimentation to escalation to maintenance during sexual identity development is unclear. We conducted a virtual qualitative study utilizing semi-structured interviews and timeline maps to outline tobacco use history and sexual identity development. **Methods:** We recruited participants using online ads and paper flyers. Subjects were eligible if they were a current tobacco user, identify as SM emerging adults and lived in the states with structural discrimination. Themes were identified to relate to tobacco use progression and sexual identity development. Based on the timeline activity, we classified participants into *fast progressors* who became daily users or dual users of tobacco products within or equal to one year of initiation of tobacco products and *moderate/slow progressors* who became daily or dual users greater than one year after initiation of tobacco products. We compared themes between *fast and moderate/slow progressors*. **Results:** Virtual interviews were completed with 20 participants. *Fast progressors* (n=13) were more nicotine dependent. We identified three themes related to smoking: i) *SM specific stress* (i.e., discrimination, violence, and SM identity concealment); ii) *perception of negative views on SM identity*; and iii) *perception of positive views on SM identity*. *Fast progressors* were more likely to describe experiencing intensified individual level SM-specific stress such as workplace discrimination and stress related to coming out to their family, friends and significant other and were also more likely to describe perceiving negative views related to their individual SM identity from friends, the community or society. *Fast progressors* were more likely to describe using tobacco products as a way to cope with SM specific stress than *moderate/slow progressors*. *Moderate/slow progressors* were more likely to describe global SM-specific stress on a community level but not describe experiencing SM-specific stress on an individual level. *Moderate/slow progressors* were more likely to describe perceiving positive views on SM identity by their surroundings compared and were less likely to describe smoking as a result of SM stress. **Conclusion:** This study suggests greater minority stress is associated with tobacco use acceleration during sexual identity development in emerging adults. Study limitations include potential recall bias, and the timing of experiences may not line up with tobacco use progression. However, the differences in experiences based on different tobacco progression trajectories could inform the development of intervention methods aimed at preventing tobacco escalation for the SM population.

FUNDING: Academic Institution

PPS21-2

FACILITATORS AND BARRIERS TO ADDRESSING PARENTAL TOBACCO USE AMONG RACIALLY AND ETHNICALLY MINORITIZED PARENTS IN PEDIATRIC CLINICS

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Significance: Racially and ethnically minoritized children face high levels of exposure to household commercial tobacco use. Physician-delivered parental tobacco treatment during routine pediatric primary care visits can reduce children's household tobacco exposure and increase the likelihood of parental tobacco cessation. This study examined clinician, staff, and health system leaders' perceptions of facilitators and barriers to addressing parental tobacco use during pediatric visits among racially and ethnically minoritized parents. **Methods:** We conducted 25 semi-structured interviews with clinicians, staff, and health system leaders from 5 pediatric primary care clinics

using the Health Equity Implementation Framework as a guide. Interviews were transcribed and then analyzed thematically. **Results:** Interviewees expressed interest in addressing parental tobacco use among racially and ethnically minoritized parents in their practices, but shared multilevel facilitators that fell into 5 main themes: 1) linking smoking cessation benefits directly to the child's health outcomes, 2) leveraging the cultural knowledge of interpreters, 3) engaging culturally congruent clinicians and staff, 4) integration of prompts and resources within the electronic health record, and 5) building off previous health system change mechanisms. Key barriers included: 1) lack of clinician knowledge, skills, and confidence, 2) additional time and complexity of interpreted visits, 3) medical mistrust and the stigmatization of tobacco use, 4) lack of alignment with external policy drivers/priorities, and 5) health system navigation challenges. **Conclusions:** Pediatric clinicians and staff face health systems, training and resources, and linguistic and cultural barriers to addressing parental tobacco use among racially and ethnically minoritized populations. Our findings can help inform multilevel strategies to bridge these challenges and strengthen pediatric clinics' capacity to address household tobacco exposure among minoritized patient populations as a component of pediatric preventive care.

FUNDING: Academic Institution

PPS21-3

KIA WHAKATŌMURI TE HAERE WHAKAMUA: MĀORI SOVEREIGNTY IN SMOKEFREE AOTEAROA - LEARNINGS FOR DECOLONISING AUSTRALIAN TOBACCO POLICY

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Significance Commercial tobacco use is a leading cause of preventable ill-health and inequities among Indigenous peoples in Aotearoa New Zealand (A/NZ) and Australia. Successive governments have failed to protect Indigenous peoples from tobacco-related harm. Colonisation is both a basic and direct cause that has embedded tobacco use among Indigenous peoples. To address this decolonising policy approaches are needed. **Methods** We aimed to better understand the contribution of national, regional and community leadership, perspectives and expectations in shaping the tobacco control landscape in A/NZ. Nine in-depth interviews with Māori and Pacifica health leaders were conducted in December 2022 before the passage of the Smokefree Environments and Regulated Products Act. **Results** Participants discussed the sustained Māori advocacy and activism from mid-2000s that led to the world-leading legislation and how the health of the nation was at odds with the profit driven motives of the Tobacco Industry and their associates. Deep and meaningful community engagement, mobilisation, high profile awareness-raising and a Māori-led parliamentary inquiry on the Tobacco Industry was instrumental in the genesis of the Smokefree Aotearoa Action Plan and associated legislation. However, concerns were expressed that a population averaged 5% target did not go far enough. Concerns about the new legislation inadequately addressing the rapid increase in e-cigarettes use among youth were also discussed. These findings are being used to hold the A/NZ Government to account to ensure the implementation of the Action Plan as intended including stronger action on e-cigarettes. Learnings will be embedded in tobacco control and shared with Indigenous peoples internationally, including Australia. **Conclusion** Participants called for the elimination of all commercial tobacco and careful regulation of e-cigarettes, demonstrating community demand for strong leadership on policy. There is an urgent need for action on the social and cultural determinants underpinning nicotine dependence. This Indigenous sovereignty and leadership case-study highlights what can be achieved and provides guidance for influencing public health policy. This Indigenous-led study, with all interviews conducted by at least one Indigenous research team member, is overseen by the Māori governance structures of the TAke study in Aotearoa and Aboriginal and Torres Strait Islander governance through Thiitu Tharrmay.

FUNDING: Academic Institution

PPS21-4

DEVELOPING A PATHWAY FOR THE INCLUSION OF CULTURALLY AND LINGUISTICALLY DIVERSE PARTICIPANTS IN SMOKING CESSATION RESEARCH

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Significance: Under-representation of culturally and linguistically diverse (CALD) people in health research limits our understanding of how these groups experience cessation support, including in the tertiary care setting. Low research participation rates for CALD populations are in part due to the cost and difficulty of incorporating interpreter services into the operations of study consent and data collection. In association with the 'Care to Quit' trial operating in cancer centres, this study explored the possibility of working with existing health service staff to include CALD participants, who would otherwise have been ineligible for the trial. **Methods:** People who smoke and present to nine cancer centres in Australia are eligible for the 'Care to Quit' trial. A process of consultation between the health service, interpreter service and research team was conducted to explore options for including people with limited or no English in the trial. The consultations identified multiple pathways and communication flows which could be used to recruit and interview CALD participants. Translated study recruitment documents, videos and text messages in Arabic, Greek, Simplified Chinese and Vietnamese were developed. In addition, recruitment protocols for communication and liaison across the teams and between settings were developed for use in participant recruitment, data collection and follow-up. **Results:** One health service which had a strong champion and an agreed priority around research inclusion, facilitated the involvement of interpreters in research. The logistics of the approved recruitment process are described via a series of flow charts which illustrate the many steps and resources required to support participation by CALD populations. The process is also illustrated using the study recruitment materials. The actual experiences of the initial cohort of potential participants (n=10) is described, including some variations on the initially-intended protocols. **Conclusions:** While inclusive approaches to study recruitment remain challenging and somewhat complex, it is possible to make progress on inclusion where supportive leaders and policies can be identified.

FUNDING: Federal; State; Academic Institution; Nonprofit grant funding entity

PPS21-5

ASSESSING DIGITAL HEALTH SMOKING CESSATION NEEDS FOR ADULTS IN THE SAN JOAQUIN VALLEY

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Significance. In 2019, 12.0% (3.6 million) of California (CA) adults used tobacco products. However, 15.6% (0.6 million) of adults in the San Joaquin Valley (SJV) are current smokers, a disproportionately high rate. Digital cessation support might help address this disparity. **Methods.** UCSF partnered with UC Merced's Nicotine and Cannabis Policy Center and the California Health Collaborative (CHC; community-based organization) to conduct a smoking cessation needs assessment. Four focus groups (2 English, 2 Spanish) were conducted with 25 predominantly Hispanic adult current smokers considering quitting smoking in the next 6 months, and residing in Fresno, Merced, and Madera Counties. We used an inductive approach to identify needs for smoking cessation digital tools and desired features for mobile health support to quit smoking. **Results.** Participants initiated smoking at a young age, with some initiating with materials other than tobacco (e.g., grass rolled in cornhusk leaves or notepaper), and many described family influences on smoking initiation. Using tobacco to cope with stress significantly influenced regular use and reduced motivation to quit. Other factors related to tobacco use or fail quit attempts were poly-use, particularly alcohol & cannabis. Smoking was integral to their social activities when initiating and continuing tobacco use. Many participants discussed wanting to quit smoking, but emphasized the need for culturally affirming services to increase or sustain engagement, such as integrating content reflecting lived experience (e.g., using testimonies or communicating with other smokers quitting in a chat) and person's ability to use any cessation approach, whether online or in-person. Participants wanted resources that helped them quit; and provided social supports such as use of chat rooms to connect with others, and having a person to talk to on the quitlines, and apps. **Conclusion.** Participants in the SJV community expressed interest in digital health programs that acknowledge their unique needs and cultural context. Such programs would be in their preferred language, provide a sense of community, and include supportive services emphasizing understanding. We are currently co-creating a program with our participants to address these needs.

FUNDING: Federal; Academic Institution

PPS21-6

ESSENTIAL ELEMENTS OF A TOBACCO INTERVENTION FOR ARAB AMERICAN WOMEN: RESULTS OF A COMMUNITY-PARTICIPATORY QUALITATIVE EVALUATION

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Significance: Smoking is a top preventable cause of death globally. California's comprehensive tobacco control programs have reduced rates of smoking, but not all Californians have benefited equally. For people of Arab heritage, smoking is highly normative, yet there are few culturally or linguistically appropriate tobacco programs for Arabs who smoke and none in California, where the largest number of Arab Americans live. Arab Americans smoke tobacco in waterpipes (shisha, or hookah) as well as cigarettes. Shisha smoking is common among men and rising among women. There are scarcely any tobacco interventions specifically for women, or for people who smoke shisha. In a community-based participatory research program in the San Francisco Bay Area, we designed and piloted a smoking intervention for Arab American women. We qualitatively assessed community perspectives on essential elements of this program. **Methods:** We recruited 30 Arab American women motivated to change their own or their family member's smoking habits, with a Community Advisory Board (CAB) of Arab American women leaders. Participants were primarily Yemeni immigrants, aged 21-81. We developed a twelve-week program of online meetings with guest expert speakers to inform the women about nicotine dependence, tobacco- and particularly shisha-related health harms, tobacco industry practices, tobacco control, cessation methods, and harm reduction. We hosted a support group in WhatsApp; participants posted about their learning and quitting experiences, and encouraged each other, including with Islamic teachings. We recorded meeting discussions in written notes. We held two participant focus groups to evaluate the program, documented in transcribed recordings. We analyzed the notes, WhatsApp chats, and transcripts thematically. We reviewed and revised our analyses and interpretations with CAB members. All activities were conducted in Arabic, with translation to English as needed. **Results:** Essential elements for creating an effective, accessible, and culturally appropriate tobacco intervention program were: Community support group; Women-only; Virtual meetings; Arabic language; Culturally-responsive; Strengths-based; Including people who don't smoke; Intergenerational and age-inclusive; Including Islamic teachings; and Focus on shisha not just cigarettes. Participants stated they had never before accessed a tobacco prevention and intervention program; this was their first experience learning about tobacco prevention and intervention. Because of the social nature of smoking in the Arab community and low community awareness of harms, the community-centered design of the program was critical to success. **Conclusions:** The 10 essential elements made the program accessible to a community that has been overlooked and unserved or inappropriately served in tobacco health research and programming.

FUNDING: State



RAPID RESPONSE PODIUM SESSION 2

RAP2

RAPID RESPONSE PODIUM SESSION 2 - SELECTED PRESENTATIONS
ARE LOCATED IN THE SRNT RAPIDS ABSTRACT PDF. [CLICK HERE.](#)



SRNT₂₀₂₄

PODIUM PRESENTATION 6



PAPER SESSION 22: THE INFLUENCE OF MARKETING AND MESSAGING ON HARM PERCEPTIONS

PPS22-1

BEYOND THE LABEL: THE IMPACT OF "ADDITIVE-FREE" VS. "TOBACCO & WATER" CLAIMS ON CIGARETTE PACKS

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Introduction: The 2017 agreement between the FDA and the makers of Natural American Spirit (NAS) cigarettes restricted use of "additive-free" (AF) claims in marketing. However, a more implicit claim (i.e., "ingredients: tobacco and water" (TW)) was allowed and has since increasingly been used by NAS and adopted by other brands, including on updated packaging by the value brand L&M. We tested how participants' perceptions differed when exposed to AF versus TW claims on NAS and L&M packs. **Methods:** A short between-subjects experiment was embedded within a recurring online survey on a convenience sample of 2,526 adult participants in August 2022. Participants were randomized to view one of three packs: an NAS pack with the AF claim, an identical NAS pack with a TW claim, or new L&M packaging with a TW claim. Logistic regressions assessed differences in perceived pack attractiveness, relative chemical perceptions (i.e., believing the product has fewer chemicals than other cigarette brands), and relative harm perceptions (i.e., believing the product is less harmful than other cigarette brands) by experimental condition. Interactions by smoking status (current, former, never) were examined. **Results:** No differences were observed between the NAS AF and NAS TW packs on perceived attractiveness (0.90) or relative harm (1.02), although odds of low relative chemicals perceptions were higher in response to the NAS AF pack among never smokers (1.81). Odds of perceived pack attractiveness (0.68), low relative chemical perceptions (0.62), and low relative harm perceptions (0.68) all tended to be significantly lower for the L&M TW pack compared to the NAS TW pack. **Conclusion:** Replacing "additive-free" with "tobacco & water" does not reduce low harm perceptions from exposure to NAS packs. The NAS brand image also appears to contribute to higher perceived pack attractiveness and lower perceptions of chemicals and harm compared to L&M. Additional marketing regulations and corrective campaigns may be needed to reduce perceptions that NAS cigarettes are less harmful and contain fewer chemicals.

FUNDING: Federal

PPS22-2

MODIFYING THE NICOTINE ADDICTION WARNING LABEL MANDATED BY THE UNITED STATES FOOD AND DRUG ADMINISTRATION TO INCLUDE THE TERM "TOBACCO-FREE NICOTINE" ALTERS PERCEPTIONS OF ADDICTIVENESS AND HARM

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Background: Except for cigars and pipe tobacco, the United States Food and Drug Administration (FDA) requires the following warning label on all tobacco products: "This product contains nicotine. Nicotine is an addictive chemical." Some brands of e-cigarettes and nicotine pouches are now marketing products containing non-tobacco nicotine using a modified warning label: "This product contains tobacco-free nicotine. Nicotine is an addictive chemical." The public health impact of altering the warning is unknown, so we examined its impact on perceptions of addictiveness and harm. **Methods:** From November 2022 to February 2023, 1,000 participants completed an anonymous online survey. Participants viewed the black-and-white, text-based FDA and Tobacco-Free Nicotine (TFN)-modified warning labels in isolation (i.e., not on product packaging). The order of presentation was randomized. While viewing each label, participants reported on addictiveness conveyed by the label. Using a forced-choice paradigm, participants then selected which label conveyed the most harm overall. A generalized estimating equation model was used to evaluate the impact of label type and interactions with participant characteristics on perceived addictiveness. Multivariable logistic regression was used to evaluate relationships between participant characteristics and choosing

which label conveyed the most harm. **Results:** The TFN-modified label was associated with lower addictiveness ratings than was the FDA label. A significant interaction also emerged between warning label type and race. The TFN-modified warning label was associated with significantly lower addictiveness ratings than was the FDA label for Asian individuals, Black individuals, and individuals of other races compared to White individuals; mean difference in addictiveness ratings between the two labels was at least twice as large for racial minoritized individuals compared to White participants. Overall, 25.5% of participants selected the TFN-modified label as conveying the most harm, with younger individuals (<21 years) significantly less likely to choose the TFN-modified label. **Conclusions:** Modifying the FDA-mandated nicotine warning label to include the term "tobacco-free nicotine" may negatively impact public health, as this wording was associated with reduced perceptions of addiction and harm. The FDA should enforce inclusion of its originally-required warning label on product packaging irrespective of nicotine source.

FUNDING: Federal

PPS22-3

IMPACT OF SNUS ADS AND FACT SHEETS WITH MODIFIED RISK INFORMATION AMONG ADULTS WHO SMOKE

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Significance: The US Food and Drug Administration (FDA) authorized one brand of snus to market itself as a modified risk tobacco product (MRTP) with claims that it poses lower disease risks than smoking. However, industry ads provide limited space to address risks of snus compared to smoking, and may not be viewed as credible. We aimed to compare different formats of MRTP information about snus. **Methods:** We conducted an online experiment (April 2023) with a nationally representative sample of 1630 adult (ages 21+) cigarette smokers in the US, who were randomized to one of six conditions which varied in the dose and format of MRTP information: 1) ads for General Snus brand, with no MRTP claims (control); 2) identical ads with MRTP claims (basic MRTP ads); 3) MRTP ads which also referenced FDA claim authorization; 4) MRTP ads + FDA authorization press release (PR); 5) ads + a snus fact sheet with both snus risk and reduced risk information, presented as coming from the Centers for Disease Control (CDC); and 6) ads + fact sheet presented as from Swedish Match (SM) company. We compared product and message perceptions and interest outcomes by experimental and control groups. **Results:** Participants in all experimental groups had significantly higher odds of indicating snus to be less harmful than smoking compared to those in the control group. Odds ratios were highest for those in the CDC fact sheet group (OR=7.56), followed by the groups presented with the SM fact sheet (OR=6.38), PR (OR=4.48), MRTP ads with FDA authorization reference (OR=3.73), and basic MRTP ads (OR=2.49) (all p<.001). When examining beliefs about specific disease risks addressed in stimuli, only the PR and fact sheet groups elicited differences relative to control ads. More participants in the PR and fact sheet groups rated the information as credible compared to those in the MRTP ad-only groups (x=4.32 vs 3.82) and were more likely to correctly indicate that snus can only reduce risks if one no longer smokes cigarettes at all (~63% vs ~43%, respectively). Only the fact sheet conditions (CDC and industry) resulted in significantly higher mean levels of interest in trying snus compared to control (x=1.56 vs x=1.33, p<.05). **Conclusions:** While industry ads with MRTP claims may impact comparative product harm perceptions, other sources and formats that allow for more comprehensive information such as fact sheets may elicit stronger effects.

FUNDING: Federal

PPS22-4

EFFECTS OF MESSAGES ABOUT VERY LOW NICOTINE CIGARETTES ALONE AND IN COMBINATION WITH MESSAGES ABOUT E-CIGARETTES: FINDINGS FROM A RANDOMIZED CLINICAL TRIAL

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Background: The FDA proposed reducing nicotine in cigarettes to non-addictive levels. Given widespread misperceptions that very low nicotine cigarettes (VLNCs) are less harmful than regular cigarettes, we tested messages about VLNCs (alone and in combination with messages about e-cigarettes being a less harmful nicotine source) that may prepare key population segments for this groundbreaking regulation. **Methods:**



In 2023, in an online experiment, a nationally representative sample of 971 current exclusive smokers, 472 dual users (cigarettes and e-cigarettes), and 458 young adult nonsmokers was randomized to: 1) messages about VLNCs being harmful but making it easier to quit, 2) messages about e-cigarettes being less harmful, 3) VLNC and e-cigarettes messages ("combined condition"), or 4) control messages. Post-message exposure outcomes were perceived harm and addictiveness of VLNCs (1-5 scale) and intentions to switch to e-cigarettes (1-7 scale). Interactions between tobacco user type and message condition were assessed. **Results:** Perceived harm of VLNCs was higher in the VLNC only condition ($M = 4.00$) compared to the e-cigarette only condition ($M = 3.74$, $p < .05$) and the control condition ($M = 3.80$, $p < .05$), and higher in the combined condition ($M = 3.95$, $p < .05$) compared to the e-cigarette only condition. Interaction analyses revealed that among young adult nonsmokers, VLNC condition ($M = 3.65$, $p < .05$) and combined condition ($M = 3.54$, $p < .05$) led to lower perceived addictiveness of VLNCs than e-cigarette messages ($M = 4.05$). Among dual users, intention to switch to e-cigarettes was higher in the VLNC condition ($M = 5.00$) than in the e-cigarette ($M = 4.36$), combined ($M = 4.38$), and control ($M = 4.08$, $p < .05$) conditions. Current exclusive smokers had very low intentions to switch to e-cigarettes in the context of the reduced nicotine policy regardless of the message condition. **Conclusions:** Messages emphasizing harms of VLNCs while highlighting their potential ease of quitting are effective in increasing perceived harm of VLNCs. FDA should precede the nicotine regulation with messages that emphasize harms of VLNCs and explain how VLNCs would make quitting easier. It is not necessary to accompany this policy with messages about switching to e-cigarettes as an alternative source of nicotine.

FUNDING: Federal

PPS22-5

AN EXPERIMENTAL STUDY OF PACK HEALTH WARNINGS TO INFORM PEOPLE WHO SMOKE ABOUT THE MISLEADING EFFECTS OF TOBACCO PRODUCT MANIPULATIONS

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Significance: The tobacco industry has long manipulated cigarettes to provide sensory cues that mislead people who smoke or distract from harms. Manipulations include filter-venting to yield smoother and lighter-tasting smoke, adding menthol to make smoke taste fresh, and adding humectants to moisten roll-your-own tobacco and imply naturalness. Our study tested pack health warnings (HWs) that pilot research found would improve understanding of these product attributes. **Methods:** Australian adults who smoke ($n=2,548$) were randomly assigned to view: Control HWs (pharmaceuticals); Tobacco HWs (THWs) with images of smoking harms; Tobacco Product Attribute HWs (PAHWs); or PAHWs plus a video (PAHW+V). At baseline, participants were exposed to 7 HWs specific to their condition (+ 30-second video for PAHW+V); then potentially re-exposed to one HW daily for up to 7 days (+ up to six viewings of 15-second video for PAHW+V). 1,418 participants were followed-up at 8 days. **Results:** Compared to controls, those in the PAHW condition reported: greater increases in concern when inhaling smoke with misleading favourable sensory cues (e.g. smooth) as well as unfavourable sensory cues (e.g. harsh); higher levels of discord about smoking; more knowledge of industry manipulation; greater self-centric negative emotional responses (felt uncomfortable, worried, embarrassed); greater industry-centric negative emotional responses (felt angry at and deceived by industry); a higher likelihood of past-week rumination about HWs; but no difference in smoke-limiting behaviours (e.g. forgoing smoking). Compared to those in the THW condition, those in the PAHW condition had significantly greater knowledge of industry manipulation of tobacco products and industry-centric negative emotional responses, but similar elevated self-centric negative emotional responses and past-week rumination about HWs. Those in both the PAHW and PAHW+V condition had similar elevated negative emotional responses and rumination, but only those in the PAHW+V condition reported greater inter-personal discussion and online information-seeking about HWs compared to control. **Conclusion:** Compared to THWs, using PAHWs to correct misperceptions about filter-venting, menthol and roll-your-own tobacco yields many similar outcomes, but also offers unique beneficial outcomes. Because PAHWs may challenge long-standing myths fostered by tobacco companies, nations should look to include PAHWs in their suites of tobacco HWs.

FUNDING: Federal

PPS22-6

AD RECEPTIVITY AND YOUTHS' PERCEPTIONS OF VAPING HARM

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Background: Greater receptivity among youth to pro-e-cigarette marketing has been linked to increased e-cigarette product use. Mass media public education campaigns are an effective population-level intervention for preventing tobacco use among youth/young adults. Studies reveal that youth/young adults with greater awareness of anti-e-cigarette mass media campaigns are more likely to report anti-tobacco attitudes. Less is known about the relationship between anti-e-cigarette ad receptivity and anti-tobacco attitudes. The goal of this study was to determine how ad receptivity impacts youth anti-tobacco beliefs and if this relationship varies based on youth risk for e-cigarette initiation. **Methods:** The Truth Continuous Tracker Online (CTO) was utilized to assess the impact of ad receptivity on youth's perceptions of vaping risk based on youth's risk profile. The CTO is an online weekly cross-sectional survey of 15-24-year-olds, weighted to be nationally representative. This study utilized data collected between September 2021 and February 2023 for those reporting exposure to truth ads ($N=20,022$). Ad receptivity was measured by: "How much do you agree or disagree with the following for this advertising campaign you saw: (a) "This advertising campaign grabbed my attention," (b) "This advertising campaign was convincing," and (c) "This advertising campaign gave good reasons not to vape." Responses ranged from 'strongly disagree' to 'strongly agree' on a 5-point scale. Respondents were dichotomized as high vs low risk for vaping based on their responses to numerous psychographic items. Perceived risk of harm was measured with four items, "Imagine you are someone who vapes. How likely are you to: (a) "Feel bad physically because of vaping," (b) "Feel bad mentally or emotionally because of vaping," (c) "Be stressed, worried, or anxious because of vaping," and (d) "Develop brain changes that affect the way you think because of vaping." Responses ranged from 'very unlikely' to 'very likely' on a 4-point scale. **Results:** For every 1% increase in ad receptivity, respondents at lower risk for vaping were 2.1% more likely to perceive vaping as harmful, while respondents who were at higher risk for vaping were 0.6% more likely to perceive vaping as harmful. **Contribution:** Receptivity to tobacco education ads increases youth's perceptions of vaping harms including those at higher risk for vaping. Increased harm perceptions can lead to lower rates of tobacco use.

FUNDING: Other



PAPER SESSION 23: EXAMINING THE IMPACT AND APPROACH TO A US MENTHOL BAN

PPS23-1

THE HARM CAUSED TO THE US POPULATION BY DELAYING THE MENTHOL CIGARETTE BAN FOR A DECADE

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Significance: Numerous studies have shown that the availability of menthol cigarettes in the market poses a serious public health risk. While the FDA announced in April 2022 a proposed rule to ban menthol cigarettes, those products are still available in the market as of August 2023. In this study, we show the damage that menthol cigarettes have caused since 2011, when the Tobacco Products Scientific Advisory Committee (TPSAC) issued a report to the FDA indicating that removing menthol cigarettes from the market would benefit public health. **Methods:** We recalibrated a validated computational model to reflect the conditions regarding menthol smoking in 2011, using data from the National Health Interview Survey (NHIS). Then we simulated the model over 2011-2104 to estimate the present and future public health costs of delaying banning menthol cigarettes from 2011 to 2022 under different scenarios. **Results:** Under the conservative assumption that without menthol cigarettes, all menthol smokers would have switched to non-mentholated cigarettes, our results show that menthol cigarettes would be responsible for approximately 578,000 smoking-related premature deaths and 9.5 million life-years lost (LYL) due to the 10-year delay in banning menthol cigarettes. Under the very optimistic assumption that the unavailability of menthol cigarettes would have caused all menthol smokers to quit in 2011, our results show that menthol cigarettes would be responsible for about 806,000 premature deaths and 19 million LYL. **Conclusion:** Despite the recent positive changes in smoking initiation and cessation, the cost of delaying the menthol ban for ten years is significant, particularly to the African American population. Our findings provide tobacco regulators with quantitative estimates of the damage caused by further delaying the banning of menthol cigarettes in the US.

FUNDING: Federal

PPS23-2

ASSESSING THE CONJOINT IMPACT THAT A MENTHOL FLAVOR BAN, REDUCED-NICOTINE STANDARDS, AND GRAPHIC WARNING LABELS HAVE US SMOKERS' WILLINGNESS TO PAY FOR CIGARETTE PACKS

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Background: Implementation of graphic warning labels (GWLs) on cigarette packaging, banning menthol as a characterizing cigarette flavor, and setting a product standard to reduce nicotine in cigarettes to non-addictive levels, are all potential regulatory actions the FDA could take to improve the public's health. To estimate which policy may have the greatest impact on reducing smoking behavior, we sought to investigate the potential impact that these policies may have on cigarette purchasing behavior. **Methods:** Adult daily smokers who prefer menthol (N=412) or non-menthol (N=640) cigarettes (54% Female; Mean age=39.4 [SD=10.8]) were recruited from the online research panel Prolific to complete an experimental cigarette pack purchase task. An adaptive choice-based conjoint designed to partition off the importance of cigarette pack attributes ascertained the impact that regulatory policies (GWLs, nicotine standards, and menthol ban) have on cigarette pack purchase decisions. Hierarchical Bayesian multinomial logit models estimated smokers' willingness to pay for cigarette packs under various regulatory scenarios. **Results:** The most important attribute influencing purchase behavior was flavor (menthol vs non-menthol), accounting for roughly 45% of the decision to purchase a product, followed by nicotine concentrations (22%), pack price (17%), and warning labels (16%). On average, smokers paid \$8.17 (SD=\$2.35) for their usual pack of cigarettes. Removing menthol decreased a pack's perceived value by -\$6.65 (95%CI=-\$6.80, -\$6.49) for menthol smokers. For all smokers, the pack's perceived value decreased by -\$1.33 (95%CI=-\$1.42, -\$1.24) when nicotine levels were minimal (1.3 mg) and by -\$1.94 (95%CI=-\$2.06, -\$1.83) when non-addictive (0.4 mg). The inclusion

of large GWLs diminished the packs' perceived value by -\$1.89 (95%CI=-\$1.97, -\$1.82) for the most aversive image (PVD) and by -\$0.95 (95%CI=-\$0.99, -\$0.91) for the least aversive image (Diabetes). **Conclusions:** Among these policies, banning menthol would likely have the greatest impact on deterring smoking behavior at the point of purchase but only for the subpopulation who smoke menthol cigarettes. Nicotine reductions and GWLs have broader population coverage and similarly, albeit marginally, diminish the perceived value of cigarettes, effects which could be offset by industry discounts during the initial implementation period. Yet, exposure to reduced nicotine cigarettes is likely to further diminish price perceptions while the GWL effect may wear-out after continued exposure.

FUNDING: Federal

PPS23-3

FORECASTING THE EFFECTS OF A MENTHOL CIGARETTE BAN AND A CIGARETTE VENTILATION BAN ON LEGAL AND ILLEGAL PRODUCT PURCHASING IN THE EXPERIMENTAL TOBACCO MARKETPLACE

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Significance: The Food and Drug Administration has the authority to regulate cigarette features, including flavors and filter ventilation. The present report utilizes the Experimental Tobacco Marketplace (ETM) to understand the impact of bans on menthol cigarettes (Experiment 1) and cigarettes with high levels of filter ventilation (Experiment 2) on legal and illegal tobacco product purchasing. **Methods:** In each study, participants (Experiment 1: N=128; Experiment 2: N=226) from Amazon Mechanical Turk were randomized into one of four groups according to separate 2x2 factorial designs (menthol/high-ventilated cigarettes available vs. banned and illegal menthol/high-ventilated cigarettes available vs. unavailable). Participants were provided an individualized experimental budget to purchase tobacco products from the ETM. **Results:** In Experiment 1, when illegal menthol cigarettes were unavailable, significantly lower legal cigarette purchasing (p=0.010) and higher electronic cigarette purchasing (p=0.016) were observed under a menthol ban. When illegal menthol cigarettes were available, significantly lower legal non-menthol cigarettes (p < 0.001) and higher illegal menthol cigarettes (p < 0.001) were purchased. A significant difference in electronic cigarette purchasing (p=0.713) was not observed. In Experiment 2, when illegal high-ventilated cigarettes were unavailable, significantly lower legal cigarettes (p=0.010) were purchased under a high-ventilated cigarette ban. When illegal high-ventilated cigarettes were available, significantly lower legal low-ventilated cigarettes (p < 0.001) were purchased. A significant difference in illegal cigarette purchasing (p=0.113) was not observed. **Conclusions:** In the absence of the illegal market, both bans decreased purchasing of cigarettes, but only a menthol ban increased e-cigarette purchasing. In the presence of the illegal market, a menthol ban increased legal cigarette purchasing but decreasing levels of filter ventilation did not. Our findings suggest that the ETM is a sensitive experimental model to examine the potential effects of regulations on legal and illegal tobacco product purchasing behaviors.

FUNDING: Federal; Academic Institution

PPS23-4

EXAMINING DISCOURSE ON TWITTER AND REDDIT IN RESPONSE TO FDA'S ANNOUNCEMENT OF A BAN ON MENTHOL TOBACCO PRODUCTS

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Significance: The FDA proposed rule to prohibit menthol as a characterizing flavor in tobacco products, if implemented, could reduce existing health disparities created by decades of targeted marketing of menthol tobacco products to African American/Black (AA/B) communities. Identifying what narratives are present and prevalent in social media discourse surrounding the announcement of the proposed rule provides insight regarding how to communicate effectively around the menthol ban. **Methods:** Relevant posts from Reddit (N= 281) and Twitter (N= 2,155) surrounding the 4/28/2022 announcement of a federal menthol ban on cigarettes and little cigars (4/21/22 to 5/14/22) were examined both quantitatively and qualitatively to decipher the most



prominent narratives emanating from online discussion. Top retweeted tweets and their authors along with Reddit posts were content analyzed while unsupervised topic modeling was used to characterize prominent themes in N=5,408 Reddit comments. Top shared URLs were also content analyzed to identify social media's role in disseminating legacy media content. **Results:** The conversation on Twitter was heavily concentrated with tweets by the top 32 users accounting for 86.76% of all retweets. Among the less than 10% of tweets that received at least one retweet, 82.38% opposed the ban on the grounds that it would lead to over-policing. About 1/5 of unique shared URLs focused on the impact of the ban on AA/B communities with the most shared URL highlighting controversy among AA/B leaders. On Reddit, the conversation largely revolved around politicization of the menthol ban and the potential to alienate AA/B voters from the democratic party. **Conclusion:** Social media conversation about the menthol ban announcement echoes the tobacco industry's exploitative narrative that a ban will harm AA/B people who smoke menthol cigarettes. This narrative, largely perpetuated in spaces lacking AA/B voices, has the potential to negatively affect public sentiment toward a menthol ban, which is predicted to prevent hundreds of thousands of deaths in the coming years. Communication efforts should avoid inadvertently perpetuating industry narratives mischaracterizing the impact of menthols on AA/B communities and prioritize inoculating the public against these narratives.

FUNDING: Unfunded

PPS23-5

CONSUMER RESPONSES TO NEW NON-MENTHOL BRAND VARIANTS: A QUALITATIVE STUDY OF YOUNG ADULT SMOKERS IN CALIFORNIA AND MASSACHUSETTS

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Background. Kool, Camel, and Newport cigarette brands introduced new "non-menthol" (NNM) variants following California's ban on flavored tobacco product sales. NNM ads and/or packaging feature color schemes previously used to market menthol cigarettes. The extent to which younger smokers perceive NNMs to be substitutes for menthol cigarettes is unknown. **Methods.** Eligible respondents were California (CA) or Massachusetts (MA) residents aged 18-30, smoked 100 or more cigarettes in their lifetime, and reported currently smoking every day or some days. During screening, respondents were asked about their usual brand prior to December 2022 (CA) or June 2020 (MA). The research team classified them as menthol preferers or non-menthol preferers using a predetermined list of brands. A trained moderator led six 75-minute focus group discussions (FGDs) (3-5 participants/session) over Zoom (July 5-6, 2023). Four FGDs consisted of menthol preferers and two of non-menthol preferers. Respondents were shown NNM ads in random order (Camel Crisp & Camel Crush Oasis; Newport Non-Menthol; Newport EXP; Kool Blue & Kool Non-Menthol) and a control (Newport or Camel Regular). In addition to eliciting feedback and perceptions of each ad, the moderator asked about smoking history, flavor ban awareness, and perceived impacts of the ban. **Results.** Participants felt NNM ads/packaging highly invoked menthol cues (e.g., green hues described as minty, cool, fresh; blue or water images as refreshing; certain descriptors) and are easily mistaken to be menthol cigarettes. Several respondents mentioned similarity of ads to other consumer products (e.g., mint gum, sports drinks). "Non-menthol" labeling was frequently overlooked. Certain ads were perceived to appeal to younger people and/or new/experimental smokers who were open to trying new brands. Some participants had previously tried the featured NNMs; none reported a minty or menthol taste, though some NNMs were perceived to be smoother than a regular non-menthol cigarette. Though menthol preferers reported some "brand-hopping" following their state's flavor ban, most had access to menthol cigarettes from: retail stores (e.g., "friendly" staff, bootleg inventory), often at increased cost, driving out-of-state; and online retailers. Non-menthol preferers were largely unaware of the flavor ban in their state. **Discussion.** Young smokers felt NNM ads relied heavily on imagery and color schemes typically used for menthol cigarettes. Ads were perceived as appealing to young, new, and/or experimental smokers, rather than established menthol smokers. Limited, anecdotal descriptions suggest that the sensory profiles of NNMs do not include characterizing flavors, but some may be smoother and easier to smoke than traditional non-menthol brands. Reports of reduced harshness and youth-appealing packaging raises concerns of NNMs as an entry product for youth.

FUNDING: Unfunded

PPS23-6

WIDESPREAD MISPERCEPTIONS ABOUT TOBACCO COMPANY ENGAGEMENT IN BLACK COMMUNITIES

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Background. Menthol and flavors make up a large proportion of the cigarette and cigar market in the U.S., bringing sustained profits to U.S. tobacco companies at the cost of Black /African American (B/AA) lives. Tobacco companies have also cultivated relationships with B/AA civic and community organizations. The goal of this study was to describe perceptions of tobacco company engagement and activities in B/AA communities related to menthol cigarettes and flavored cigars. **Methods.** Wave 4 of the Rutgers Omnibus Study (December 2022) was completed by 2,307 U.S. adults aged 18-45. Six items measured beliefs about tobacco company funding of B/AA community organizations, payment of B/AA lobbyists to oppose public health policies, support of health equity efforts in B/AA communities, and targeted marketing of menthol cigarettes and flavored cigars in B/AA communities. Adjusted prevalence estimates were calculated for each belief item overall and by race (B/AA vs. other) and cigarette smoking status (current menthol vs. current non-menthol vs. no current use), controlling for age, sex, and education. **Results.** Few participants believed that tobacco companies deny the harms of menthol cigarettes (37%) and flavored cigars (37%), pay Black lobbyists to oppose health policies (20%) and fund black community organizations (12%). A higher proportion of B/AA adults believed that tobacco companies target Black communities with menthol cigarette and flavored cigar marketing (62% vs. 46%). Compared with people who do not smoke cigarettes, a greater proportion of adults who smoke cigarettes believed that tobacco companies support health equity efforts, did not target Black communities with menthol cigarette and flavored cigar marketing, and did not deny the harms of menthol cigarettes and flavored cigars to B/AA communities. Similarly, a greater proportion of adults who smoke menthol cigarettes believed that tobacco companies fund Black community organizations (18% vs. 10%) and that tobacco companies do not pay Black lobbyists to oppose public health policies (26% vs. 14%). **Conclusions.** Community-engaged, culturally-tailored communication efforts are needed to correct disinformation about flavored tobacco policies among B/AA and those who currently smoke menthol cigarettes. Increasing awareness of how tobacco companies engender B/AA community goodwill while actively opposing tobacco policies that would improve B/AA health may be an important part of such communications.

FUNDING: Federal



PAPER SESSION 24: HEALTH EQUITY CONSIDERATIONS IN RANDOMIZED CONTROLLED TRIALS

PPS24-1

EFFICACY OF ELECTRONIC NICOTINE DELIVERY SYSTEMS (ENDS) FOR SMOKING CESSATION IN POPULATIONS WITH PSYCHIATRIC AND SUBSTANCE USE PROBLEMS: SECONDARY ANALYSIS OF A RANDOMIZED CONTROLLED TRIAL

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Background: People with psychiatric disorders and substance-related problems are more likely to smoke, less likely to quit smoking than the general population, and more likely to have tobacco-induced health problems. Electronic nicotine delivery systems (ENDS or e-cigarettes) can help smokers quit, but have not been assessed in this population. **Methods:** We conducted a secondary analysis of data collected in the "Efficacy, Safety, and Toxicology of ENDS as an Aid for Smoking Cessation" (ESTxENDS) trial, an open-label, two-arm, 1:1 parallel group, pragmatic randomized controlled trial (July 2018 to June 2021) conducted at 5 sites in Switzerland. The study recruited adult smokers (≥ 5 cigarettes/day) willing to quit from the general population. For 6 months, the intervention group received ENDS and e-liquids ad libitum, plus standard-of-care smoking cessation counseling (SOC). The control group received only SOC. The primary outcome was sustained self-reported abstinence from cigarette smoking at 6 months, biochemically validated by anabasine and if missing by CO. We categorized participants with missing follow-up outcomes as smokers. We analyzed two subgroups with psychiatric problems, defined as having the following conditions at the baseline visit: 1) psychotropic medication use (benzodiazepines, antidepressants, hypnotics, or sedatives) and 2) problematic substance or polysubstance use (problematic alcohol use, problematic cannabis use, or use of at least two illicit substances during the 6 months before the baseline visit). We accounted for potential unbalanced randomization balance in each subgroup by using inverse probability to weight treatments. **Results:** We randomized 1243 participants; among participants using psychotropic medications ($n=384$), abstinence rates were 33.2% in the intervention group and 15.6% in the control group (relative risk: 2.10, 95% confidence interval: 1.27; 3.48). Among participants with problematic substance or polysubstance use ($n=812$), abstinence rates were 35.4% in the intervention group and 24.5% in the control group (relative risk: 1.62, 95% confidence interval: 1.20; 2.20). **Conclusion:** ENDS plus SOC were more effective than SOC alone for smoking cessation, meaning that ENDS could be used to help patients with psychiatric or substance-related problems quit smoking. Trial Registration: ClinicalTrials NCT03589989. Funding: Swiss National Science Foundation via the "Investigator-initiated clinical trials - IICT" grant # 173552, Swiss Tobacco Prevention Fund (TPF) #19.017477, Swiss Cancer Research (SCR) #KFS4744-02-2019 and LungeZürich.

FUNDING: No external funding reported

PPS24-2

CULTURAL ADAPTATION AND TESTING OF A U.S. PEER TEXTING INTERVENTION TO PROMOTE QUITLINE USE AND SMOKING CESSATION AMONG RURAL PARTICIPANTS IN VIETNAM: RANDOMIZED CLINICAL TRIAL

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Introduction: Vietnam (a lower-middle-income country) established national Quitline services to address their high smoking rates, but these are underused. In a randomized trial (2017-2022), we culturally adapted and tested a texting intervention designed to

increase Quitline use, and subsequent smoking cessation, among people who smoke. **Methods:** Our setting was four rural communes in Hung Yen, a northern province. The texting intervention included daily messages designed to motivate Quitline use, and biweekly two-way messages assessing interest in engaging with the Quitline and smoking status. To adapt the intervention to rural Vietnam, we recruited Vietnamese people who currently or recently smoked and had used the Bach Mai Quitline. We had these participants write messages responding to common smoking cessation challenges faced by this population, and rewrite translated messages from our U.S. intervention. In the RCT, participants ($N = 749$) were randomized to the intervention or an attention control limited to bi-weekly texts assessing current smoking status. Our main outcomes were Quitline use, self-efficacy, and six-month carbon monoxide-validated smoking cessation. After six months, we also conducted qualitative interviews with a purposive sample of intervention participants ($n=30$). **Results:** The intervention led to higher Quitline use (25%, 95% CI 0.21, 0.30) than control (2%, 95% CI 0.009, 0.04, $p<0.0001$). However, follow-up cessation self-efficacy and smoking cessation did not differ by randomized group. Notably, both intervention (28.3%, 95% CI) and control (28.1%, 95% CI) participants had substantial smoking cessation rates. Cessation self-efficacy also increased from baseline in both groups (32 to 43 in intervention, and 33 to 43 in the control group). In exit interviews, most participants endorsed the text message content but wanted more flexibility in when they received the messages. Participants were positive about their Quitline counselors, but some felt they could quit on their own and did not need the help. The COVID-19 pandemic occurred during the trial and participants reported differing effects (smoking frequency) on their smoking habits. **Conclusions:** This low-intensity texting intervention successfully increased Quitline use but not cessation among this rural population of people who smoke. Given the high smoking cessation rates achieved in both groups, the Vietnam Ministry of Health should consider brief interventions for increasing the reach and impact of tobacco interventions, coupled with investigating methods to increase the effectiveness of Quitline services.

FUNDING: Federal; Academic Institution

PPS24-3

CHANGES IN MARIJUANA AND OTHER TOBACCO PRODUCT USE AS PARTICIPANTS REDUCE CIGARETTE USE DURING PARTICIPATION IN A SMOKING CESSATION CLINICAL TRIAL

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Significance: Marijuana (MJ) use is common in a subset of people who smoke cigarettes, yet little is known about what happens to MJ and other tobacco product (OTP) use as smokers reduce their cigarettes used per day (CPD) during a quit attempt. **Methods:** Secondary data analysis of a smoking cessation randomized clinical trial that enrolled 392 Black adults who smoked cigarettes daily to receive 18 weeks of standard (nicotine patch) or optimized pharmacotherapy (2 weeks of nicotine patch and varenicline and/or bupropion plus nicotine patch). Participants reported past 7-day use of cigarettes, MJ (blunt, joint, spliff, bowl, mole, dab, hookah, dab, edible, other), and OTP (cigars, cigarillos, pipes, smokeless tobacco, hookah, bidis, e-cigarettes) at weeks 0 (baseline), 2, 6, 12, 18, and 26. Carbon monoxide (CO) was collected at week 6. Participants were dichotomized into ever MJ (reported at any timepoint) versus never MJ (no MJ reported). The study endpoint was W12 with long-term follow-up through W26. Inclusion of treatment did not change outcomes; models are reported without adjustment for treatment. **Results:** 185 people (47.2%; 104 female) reported ever MJ use; 65.9% used MJ at 3 or more timepoints (range 1-6). All but 2 (1.1%) used combustible MJ. MJ users were significantly younger than never MJ users [50.2 years (12.0) vs 54.8 years (10.7), $p<.001$]. Baseline CPD [12.9 (11.9) vs 12.6 (11.6)] and CO [20.3 (14.8) vs 18.5 (12.1)] were similar, respectively ($p>.05$). There were no between group differences in change in CPD or OTP; MJ ever and never users significantly reduced their CPD from W0 to W12 ($p<.001$). CPD at W12 was 2.8 (4.2) in MJ users and 3.3 (4.6) in non-users ($p=.24$). OTP use was low and did not change significantly over time [<1 OTP per day in MJ users and non-users at W12, $p=.93$]. However, as CPD decreased, MJ users significantly increased their marijuana use ($p<.001$). The average amount of marijuana ($>80\%$ blunts and joints) used per week at W12 was 12.2 (16.0). After controlling for CPD and OTP, MJ use was significantly associated with higher week 6 CO ($p=0.02$). **Conclusion:** Among people in a smoking cessation clinical trial, MJ use increased over time and contributed to higher CO, potentially limiting possible health benefits of CPD reduction. Long term patterns of compensation are an important area of future study. Concurrent treatment of MJ and cigarette co-use is warranted to maximize harm reduction.

FUNDING: Federal; Pharmaceutical Industry



PPS24-4

THE INTERACTION BETWEEN SELF-REPORTED FINANCIAL STABILITY AND RANDOMIZED STUDY ARM IN A MULTISITE RANDOMIZED CONTROLLED CIGARETTE CESSATION TRIAL FOR PEOPLE WITH HIV

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Significance: Individuals experiencing less financial advantage are more likely to use tobacco products and less likely to successfully quit even after receiving cessation support. **Method:** Drawing from a U.S. multisite randomized controlled cigarette cessation trial for people with HIV (PWH), this secondary analysis investigated the interaction between self-reported financial stability and study arm (Positively Smoke Free on the Web (PSFW+), an internet and SMS intervention for cigarette cessation versus an attention-matched internet control) on biochemically confirmed 7-day smoking cessation at 3 and 6 months among 504 PWH. **Results:** There was a significant interaction between financial stability ("enough" versus "not enough") and intervention arm on cessation at 3 months (aOR=3.55; 95% CI=1.19, 10.60; p=.023) and 6 months (aOR=6.04; 95% CI=1.77, 20.63; p=.004). Participants who indicated "enough" financial stability were significantly more likely to quit smoking if they were in PSFW+ vs control. Quit rates for those who indicated "not enough" financial stability did not differ by intervention arm. Financial stability remained a significant moderator of the intervention effect on smoking cessation after controlling for nicotine dependence, sex, ethnicity, race, age, and study site (3 months: aOR=4.01; 95% CI=1.32, 12.24; p=.023; 6 months: aOR=6.43; 95% CI=1.84, 22.47, p=.004). Among those with higher financial stability, program engagement (mean total active days=19.6 vs 4.1; p<.001), satisfaction (51% vs 38%, p=.038) and the proportion who made a quit attempt (37% vs 19%; p=.003) were higher in PSFW+ vs control. Among those with lower financial stability, there were no significant differences in quitting between arms. Despite more engagement in PSFW+ versus control (M=19.3 vs 4.4 total active days; p<.001), participants with lower financial stability were less satisfied with the PSFW+ program (35% PSFW+ vs. 52% control, p=.032). **Conclusion:** Overall, these data show that an interactive web-based approach was more effective in achieving smoking abstinence among PWH with higher financial stability. A better understanding of cessation programs that engage with and can support patient populations with different socioeconomic challenges is important to help guide healthcare providers in referring patients to treatment resources that are more likely to effectively engage and support tobacco cessation success. More effective cessation interventions for groups with less financial stability are needed.

FUNDING: Federal

PPS24-5

FINANCIAL INCENTIVES TO PROMOTE ENGAGEMENT WITH THE STATE TOBACCO HELPLINE IN COUNTIES EXPERIENCING PERSISTENT POVERTY: THE CLIMB PILOT STUDY

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Significance: Persistent poverty counties (PPCs) are U.S. counties that have had ≥20% of residents living in poverty for ≥30 years. Cancer incidence and mortality rates in PPCs are exceptionally high, likely due in part to disproportionately high smoking rates. Incentivizing state tobacco helpline engagement is a promising approach for reducing smoking rates and tobacco-related cancers in PPCs. **Methods:** Oklahoma Tobacco Helpline (OTH) callers from 15 PPCs (mostly rural counties) in Oklahoma were randomly assigned to receive standard OTH treatment (N=79; counseling + 8 weeks of nicotine replacement therapy [NRT]) or OTH + financial incentives (OTH+FI; N=81) for completing up to 5 counseling calls over 8 weeks. Participants assigned to OTH+FI earned \$20 for completing the first counseling call, and this amount increased by \$5 for each consecutive call completed through the 5th call. The incentive amount reset to \$20 if a call was missed. Participants could earn up to \$150 in incentives if they completed all 5 calls on schedule. Study enrollment was completed in May 2023, and all participants have had the opportunity to complete the 8-week follow-up. Final 12-week follow-up assessments will be completed in August 2023. **Results:** Participants (N=160) were predominantly female (63.8%); they reported White (78.8%), American Indian (12.5%), Black (2.5%) or other (6.3%) races; and 66.3% reported an annual household income of <\$20,000. At baseline, participants smoked an average of 21.05 (SD=11.69) cigarettes per day and had smoked for an average of 28.69 (SD=13.48) years. Self-reported 7-day

point prevalence abstinence rates were greater in OTH+FI vs. OTH at 8 weeks post-quit (50.6% vs. 32.9%, p=0.03) and 12 weeks post-quit (48.7% vs. 39.1%; n=150 [results will be updated upon study completion for remaining 10 active participants]). Participants assigned to OTH+FI completed significantly more counseling calls than those assigned to OTH by the end of treatment at 8 weeks post-quit (49.4% vs. 25.3% completed ≥3 calls, p<0.01). OTH+FI participants earned a mean of \$58.54 (SD=\$40.28; of \$150 possible) for completing counseling calls during the first eight weeks post-quit. Follow-up completion rates were 81.3% and 85.6% at 8- and 12-week follow-ups. **Conclusion:** Initial evidence suggests that offering small financial incentives for completing counseling calls is a low-cost, effective way to increase treatment engagement and cessation rates among OTH callers from PPCs.

FUNDING: Federal; State

PPS24-6

DIFFERENCES IN CIGARETTE ABSTINENCE FOR THOSE WHO SMOKE MENTHOL VERSUS NON-MENTHOL CIGARETTES IN A SMOKING CESSATION RCT FOR PEOPLE WITH HIV FROM URBAN COMMUNITIES IN THE UNITED STATES

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Significance: Studies in the U.S. have reported the majority of people with HIV (PWH) who smoke cigarettes have a preference for menthol cigarettes. Findings are inconsistent on associations between menthol preference and cigarette cessation outcomes in the general population. Data are scarce specifically among PWH who have intersecting risk factors for addiction, tobacco use, and tobacco-related diseases. **Methods:** This secondary analysis compared baseline characteristics of PWH who smoke menthol vs. non-menthol cigarettes among a US sample (N=506) who participated in a randomized cigarette cessation intervention (2016-2020; NCT02781090). Multivariable models examined if preference for menthol use was associated with 12- and 24-week biochemically confirmed intent-to-treat 7-day smoking abstinence. Flavor preferences of other tobacco products are also described. **Results:** Participants were 42.7% female, 82.6% Black, 19.2% Hispanic, 77.1% had stable housing, mean age = 50.2 years, nearly half (45.5%) were considered to be moderately nicotine dependent, 33.6% were living with a smoking partner, and 29.4% used other tobacco product(s) in the past 30 days (P30D). Notably, 86.2% reported baseline P30D menthol cigarette smoking and significantly more Black participants were smoking menthol cigarettes than White participants (p<.001). Marginally significant findings signaled that participants who smoked non-menthol cigarettes in P30D were also more likely to use another tobacco product in the P30D (p=.052). The top two other tobacco product flavor preferences among those who smoked non-menthol were tobacco (45.8%) and sweet-fruity/candy (27.1%). In contrast, other tobacco product flavor preferences among menthol smokers were sweet-fruity/candy (32.5%) and minty/menthol (23.4%). After controlling for covariates, PWH who smoked menthol cigarettes at baseline had significantly reduced odds of cigarette abstinence at 12 weeks (12 weeks; aOR=0.41; 95% CI=0.21, 0.80), but not at 24 weeks (aOR=0.69; 95% CI=0.31, 1.54). The lack of association at 24 weeks may have been a consequence of insufficient power to detect statistical significance due to lower quit rates. **Conclusion:** The vast majority of this sample of PWH smoked menthol cigarettes at baseline and were less likely to quit smoking at the 12-week follow-up than those who smoked non-menthol. Results contribute to the evidence base that supports policy level interventions to prohibit menthol flavors in cigarettes and other tobacco products.

FUNDING: Federal



PAPER SESSION 25: E-CIGARETTE FOR CIGARETTE SMOKING CESSATION

PPS25-1

LONG-TERM EFFICACY OUTCOMES OF ELECTRONIC NICOTINE DELIVERY SYSTEMS (ENDS) FOR SMOKING CESSATION: 12- AND 24-MONTHS FOLLOW-UP OF THE EFFICACY, SAFETY AND TOXICOLOGY OF ENDS (ESTXENDS) RANDOMIZED CONTROLLED TRIAL

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Background: Randomized controlled trials (RCT) testing the efficacy of electronic nicotine delivery systems (ENDS) for smoking cessation have shown promising short-term results, but no RCT followed participants for more than 12 months. We tested the efficacy of combining ENDS with standard-of-care smoking cessation counseling (SOC), comparing it to SOC alone at 6-months; ENDS effectively helped smokers quit smoking. We extended follow-up to 12- and 24-months. **Methods:** Our pragmatic, open label, randomized controlled trial at 5 study sites in Switzerland randomized persons smoking at least 5 tobacco cigarettes per day and willing to set a quit date. For 6 months, the intervention group received ENDS with e-liquids plus SOC; the control group received only SOC. After the 6-month intervention period, participants in both groups were followed up for 12- and 24-months after quit date. Primary outcome was 7-day point prevalence abstinence, validated by exhaled carbon monoxide 12- and 24-months after target quit date. Stabilized inverse probability weights accounted for attrition. **Results:** We randomized 1246 participants; 1243 were included in the intention-to-treat analyses. Twelve-month follow-up rate was 62% (n=768) for self-reported smoking status; 87 participants withdrew (3.4% (n=21) in the intervention and 10.6% (n=66) in the control group). In the intervention group, 29.4% (n=182) were lost to follow-up vs. 33.1% (n=206) in the control group. Validated 7-day point prevalence abstinence rate at 12 months was 25.8% (n=160) in the intervention and 15.9% (n=99) in the control group (multivariable adjusted relative risk (RR): 1.36; 95% confidence interval (CI): 1.10 to 1.69). At 24-month follow-up, 56% (n=695) reported on their smoking status: 102 withdrew (4.5% (n=28) in the intervention group and 11.9% (n=74) in the control group); 446 were lost to follow-up (35.0% (n=217) in intervention and 36.8% (n=229) in the control group). Validated 7-day point prevalence abstinence at 24 months was 22.7% (n=141) in the intervention and 16.4% (n=102) in the control group (adjusted RR: 1.16; 95% CI: 0.93 to 1.44). **Conclusion:** At 12-month follow-up, but not at 24-month follow-up, smokers who received ENDS combined with standard-of-care smoking cessation counseling for 6 months were more likely to quit smoking cigarettes than those who received standard-of-care alone.

FUNDING: Federal; Nonprofit grant funding entity

PPS25-2

A PILOT INVESTIGATION OF E-CIGARETTES AS A HARM REDUCTION TOOL AMONG SMOKERS WHO PREVIOUSLY FAILED TO QUIT WITH PHARMACOTHERAPY

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SIGNIFICANCE: Switching completely from cigarettes to e-cigarettes reduces exposure to tobacco-related toxicants, and recent data have shown that e-cigarettes may be more effective than nicotine replacement therapy (NRT) at helping people who smoke abstain from cigarettes. Indeed, many individuals attempt to use FDA-approved smoking cessation pharmacotherapy to quit smoking cigarettes but are unsuccessful, even after repeated attempts. For those who have already tried pharmacotherapy and are unable to quit smoking, e-cigarettes may serve as tobacco harm reduction tools. **METHODS:** We conducted a pilot study directly comparing e-cigarettes to traditional pharmacotherapy among people who smoke daily, were motivated to quit, and failed to quit with pharmacotherapy within the past 5 years. Eligible participants were assigned to either try to 1) switch completely to e-cigarettes (n=20) or 2) quit with combination transdermal nicotine patch and nicotine lozenge (n=10). Participants received five weeks of their assigned product or medication and selected a switch date (e-cigarette group) or quit date (NRT group) approximately one week after randomization. Participants in the e-cigarette group received 2 NJOY Ace batteries and 36 pods (5% nicotine, tobacco and menthol flavor options). Participants were told to sample their assigned product or medication ad libitum in advance of their chosen switch or quit date, and to stop smoking completely on that date and use only their assigned product or medication. Participants had a brief behavioral counseling session with study staff in preparation for their switch or quit date. Study assessments were completed remotely each week, and participants returned to the lab 4 weeks after their switch or quit date to provide a breath carbon monoxide sample. **RESULTS:** There were significant reductions for both the e-cigarette and NRT groups in the number of self-reported cigarettes smoked per day (86% and 77% reduction, respectively) and expired carbon monoxide (48% and 44%, respectively). In the e-cigarette group, 35% of participants reported continuous abstinence through 4 weeks (confirmed with CO< 6ppm at Week 4), while only 10% of participants in the NRT group reported continuous abstinence (OR= 4.8; 95% CI=0.5-46.5). **CONCLUSIONS:** Results suggest e-cigarettes may be useful harm reduction tools for people who smoke and are unable to quit with traditional pharmacotherapy, and large-scale clinical trials are needed.

FUNDING: Nonprofit grant funding entity

PPS25-3

SMOKING HARM REDUCTION AMONG PERSONS IN SUBSTANCE USE DISORDER TREATMENT PROGRAMS: PROMISING RESULTS FROM A PILOT RANDOMIZED TRIAL

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Introduction: The goal of this study is to compare the outcomes of a randomized controlled pilot clinical trial of nicotine replacement therapy (NRT) and electronic cigarettes (EC) among people in substance use disorder (SUD) treatment programs who are in treatment for opioid or alcohol use disorders. We also assess the change in nicotine dependence associated with using these tobacco treatment interventions. **Methods:** This pilot study included 40 eligible participants aged over 21 years old, who were being treated for SUD and are current combustible cigarettes (CC) smokers who smoked at least 5 CC per day (CPD). Participants were recruited from substance use treatment programs in New York City. They were randomized to either EC or NRT along with receiving telehealth counseling in both arms for 6 weeks. To compare the preliminary efficacy of EC versus NRT, risk ratios of reduction in CPD at different reduction levels compared to baseline (50%, 75%, and 100%) were contrasted. The nicotine dependence was evaluated using the Fagerstrom Test of Nicotine Dependence (FTND) and the withdrawal symptom was estimated by Minnesota Nicotine Withdrawal Scale (MNW). We compared the scores of both measures at the baseline and the end of treatment conducted by paired t-test. **Results:** Participants' average age was 51.63 (SD = 8.26), were mostly male (87.5%) and Non-Hispanic African Americans (45%). There were no differences in sociodemographic characteristics among participants in both arms



(N=41). In the EC arm (n= 18), 58.8% achieved complete abstinence from CC smoking compared to 17.4% of participants in the NRT arm (n=23). The relative rate between the two groups was 3.19 (p = 0.011, 95% CI = [1.20, 8.53]). The mean baseline FTND scores for the EC arm was 5.12 (SD = 1.45) and decreased to 1.71 (SD = 2.14) at the end of treatment, while the mean baseline FTND scores for the NRT arm decreased from 5.22 (SD = 1.57) to 1.91 (SD = 1.86) after the intervention was completed. Regarding the MNW, the mean score for the EC arm was 25.24 (SD = 8.95) at visit 2 and declined to 16.88 (SD = 8.50) at the end of the intervention, however, for the NRT arm, the mean scores decreased from 20.43 (SD = 8.23) to 16.70 (SD = 8.62) and it was not significant. **Conclusion:** Both interventions equally demonstrated a significant reduction in CC nicotine dependence; however, EC was significantly more effective in assisting participants achieve CC abstinence. These findings suggested that EC may serve as a more successful smoking harm reduction treatment among this vulnerable population. Future large scale studies should assess whether EC could have a potential use in tobacco treatment among vulnerable populations.

FUNDING: State

PPS25-4

LATEST EVIDENCE FROM THE COCHRANE E-CIGARETTES FOR SMOKING CESSATION LIVING SYSTEMATIC REVIEW

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Significance: Ongoing debate surrounding electronic cigarettes (EC) underlines the importance of gathering up-to-date information on effectiveness, safety and long-term use of EC when used to quit combustible cigarettes (CC). We present the latest evidence on these outcomes to ensure the timely dissemination of critical information to inform health policy and practice. **Methods:** As part of the Cochrane living review process, we search the literature monthly for studies testing EC interventions for smoking cessation in people using CC. At this update, our searches were up to date to July 2023. Our main comparators were EC vs nicotine replacement therapy (NRT); nicotine EC vs non-nicotine EC; and EC vs behavioural support or no support. Eligible studies had to report abstinence from CC at six months or more and/or data on adverse events or other markers of safety at one week or more follow-up. Screening and data extraction were done in duplicate, according to Cochrane methods. **Results:** We identified 88 eligible studies (total n = 27,325), ten more studies since the last update in 2022. Evidence suggested EC are effective smoking cessation tools. There was high certainty evidence that quit rates were higher in people randomized to nicotine EC than in those randomized to NRT (RR 1.59, 95% CI 1.29 to 1.93; I² = 0%; 7 studies, n = 2,544). There was moderate certainty evidence (limited by imprecision) that the rate of occurrence of adverse events (AEs) was similar between nicotine EC and NRT groups (RR 1.03, 95% CI 0.91 to 1.17; I² = 0 percent; 5 studies, n = 2052). The most commonly reported AEs were throat/mouth irritation, headache, cough, and nausea, which all tended to dissipate with continued EC use. Serious adverse event (SAEs) were rare, but there was insufficient evidence to determine whether rates differed between the nicotine EC and NRT groups due to serious imprecision (RR 1.20, 95% CI 0.90 to 1.60; I² = 32 percent; 6 studies, n = 2761). We did not find evidence of harms associated with EC use up to a maximum follow-up of two years when used to quit CC. **Conclusions:** The most up-to-date data from our living systematic review continues to signal the benefits of nicotine EC for smoking cessation and no clear evidence of short-term harms when used to quit CC. More research is needed to establish drivers and implications of continued EC use, including longer-term studies investigating potential harms.

FUNDING: Nonprofit grant funding entity

PAPER SESSION 26: TAXATION POLICY, PRODUCTS PRICE AND BEHAVIOURAL ECONOMICS

PPS26-1

WHERE ARE CIGARETTES CHEAPER? PATTERNS OF PRICE DISCRIMINATION IN 26 US CITIES

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Significance: Price discrimination refers to selling the same product at different prices to different buyers to maximize profits. A systematic review of 20 studies from US, UK, and Australia found that cigarettes cost less in neighborhoods with lower household income, a higher percentage of youth, and higher percentage of Black residents. Previous studies have examined place-based differences in prices for menthol and non-menthol cigarettes, but this study is the first we are aware of to investigate place-based differences in cigarette price by manufacturer. **Methods:** Trained professional data collectors conducted retail marketing surveillance in a random sample of 1560 tobacco retailers in 26 US cities (completion rate=95.4%). Data collectors recorded four single-pack prices: R.J. Reynolds' Newport menthol and Camel Crush (with a menthol capsule) and Philip Morris International's Marlboro menthol and non-menthol. Inter-rater reliability ranged from ICC=0.80 to 0.94. ArcGIS 10.8.2 was used to create half-mile, store-centered buffers. Demographics for store buffers (% of residents who are racially/ethnically minoritized, % under 21, % households with food stamps, population density) were derived from the American Community Survey (2017-2021) census tract data, weighted proportionally to tract area in the buffers, then scaled to 10 percentage point increments. Generalized Estimating Equation models (1489 stores nested in 26 cities) examined price as a function of demographics, controlling for store type. **Results:** The average single-pack price (including sales tax) ranged from \$10.45 (SD=2.51) for Marlboro menthol to \$11.24 (SD=2.34) for Newport menthol. Controlling for store type, the percent of non-Hispanic Black residents in store neighborhoods was the only significant predictor of Newport menthol price (-0.04, 95% CI= -0.07,-0.01), the percent of Hispanic/Latinx residents was the only significant predictor of Camel Crush price (-0.06, 95% CI= -0.10,-0.01), and percent of residents under 21 was the only significant predictor of Marlboro menthol (-0.09, 95% CI= -0.16,-0.02) and Marlboro non-menthol (-0.10, 95% CI= -0.10,-0.03) price. **Implications:** Patterns of price discrimination differed by cigarette manufacturer. Lower prices for R.J. Reynolds' brands were found in neighborhoods with a higher proportion of racially/ethnically minoritized residents. However, lower prices for PMI's Marlboro varieties were found in neighborhoods with a higher proportion of youth. Results are consistent with evidence from industry documents about target marketing to racial/ethnic subgroups and to youth. Minimum price laws, prohibitions on discounts and other price policies are needed to eliminate price discrimination and to promote health equity.

FUNDING: Federal

PPS26-2

PROJECTED IMPACT OF HIGHER E-CIGARETTE AND/OR COMBUSTIBLE CIGARETTE TAXES ON USE OF BOTH PRODUCTS IN THE US

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Significance: Higher taxes on e-cigarettes (e-cigs) are proposed as a way to reduce e-cig use, but these taxes might instead encourage new or continued use of combustible cigarettes (cigarettes). The downstream impact of taxes on use of e-cigs, cigarettes, or both is a critical policy consideration. Microsimulation models can project the differential impact of policy changes on youth and adults. **Methods:** We used the Simulation of Tobacco and Nicotine Outcomes and Policy (STOP) model, a validated Monte Carlo microsimulation, to project the impact of higher taxes on e-cigs, cigarettes, or both on the prevalence of e-cig use and cigarette use among US youth (ages 12-17y), young adults (ages 18-24y), and adults (ages ≥25y). The STOP model includes current/former/



never states of e-cig use and cigarette use. We used Markov multi-state models to derive age- and gender-stratified probabilities of transition across these states between Waves 2-5 (2014-2019) of the Population Assessment of Tobacco and Health (PATH) Study. We applied these transition probabilities to a simulated cohort in STOP, reflective of PATH Wave 5, to project e-cig use and cigarette use forward over five years in a *Status Quo* scenario. For higher tax scenarios, we estimated the impact of a \$1 increase in e-cig tax (*E-cig Tax*), a \$1 increase in cigarette tax (*Cigarette Tax*), or a \$1 increase in tax on both (*Combined Tax*). We applied multipliers to relevant transition rates based on point estimate and confidence interval data (for base case and sensitivity analysis) from published US studies of tax effects. **Results:** Starting with a simulated population reflecting PATH Wave 5 and compared with *Status Quo* five years later, the relative changes among youth/young adults/adults in prevalence of use would be: *E-cig Tax*, -38%/-69%/-28% (e-cig use) and -6%/-18%/-1% (cigarette use); *Cigarette Tax*, 0/+4%/+6% (e-cig use) and -4%/-15%/-5% (cigarette use); *Combined Tax* -38%/-69%/-29% (e-cig use) and -10%/-26%/-6% (cigarette use). In sensitivity analysis around tax effects, the greater uncertainty in tax impact on young adults yielded greater variation in prevalence of e-cig use and cigarette use among this group. **Conclusions:** While a higher tax on e-cigs only may not increase cigarette use, a combined tax on both e-cigs and cigarettes would likely provide greater public health benefit by producing the greatest decreases in both e-cig use and cigarette use, with effects especially pronounced in young adults.

FUNDING: Federal; Nonprofit grant funding entity

PPS26-3

EFFECTS OF STATE-LEVEL EXCISE TAXES ON ELECTRONIC NICOTINE DELIVERY SYSTEMS (ENDS) USAGE AMONG ADULTS IN THE US

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SIGNIFICANCE: Twenty-nine states and Washington DC in the US have an ENDS excise tax while the rest of the states do not. We examined whether there were differences in ENDS usage prevalence among adults between states that charged an excise tax compared to non-excise tax states over a four-year pre-post period. We explored whether these differences varied in magnitude by subgroups of ENDS users: 1) all ENDS users, 2) former smokers, and 3) dual users of ENDS and combustible cigarettes. We also assessed whether ENDS excise taxes impacted the prevalence of current cigarette smokers. **METHODS:** We utilized secondary data from the Behavioral Risk Factor Surveillance System (2017-2021). Difference-in-differences (DID) modeling was used to determine the average treatment effect of excise taxes on ENDS prevalence. The model also contained six demographic control variables (age, sex, race/ethnicity, household income, employment, and education), two state-level control variables (standardized ENDS price and number of ENDS-related policies), and a time-varying control variable. **RESULTS:** For the overall prevalence of ENDS usage among US adults, there was an absolute differential reduction of 1.91% (1.46%-2.21%, $p<0.001$) in the prevalence of ENDS usage among adults in excise tax states. While ENDS usage increased during the 2017-2021 period for both excise tax and no-excise tax states, the growth rate was significantly less in the excise tax states (37.3%) than in no-excise tax states (77.8%), a relative pre-post difference of 40.5%. Among former smokers, the absolute differential reduction was 0.43% (0.21%-0.65%, $p=0.04$). While there was an increase of 13.3% in ENDS prevalence in the excise tax states group, this increase was smaller than the 15.2% increase among the non-excise tax group equating to a relative pre-post difference of 1.92%. For dual users of cigarettes and ENDS, the absolute differential reduction was 0.12% (0.17%-0.73%, $p<0.001$). There was a relative pre-post difference of 34.2%, with a 76.8% increase in dual usage prevalence in the excise tax group compared to a 111% increase in the non-excise tax group. Among cigarette smokers, a greater absolute differential reduction of 0.09% (95% CI: 0.07%-0.58%, $p<0.001$) was observed in non-excise tax states compared to states with such a tax. The excise tax group experienced an 18.8% decrease in cigarette usage while the non-excise tax state experienced an 18.3% decrease in cigarette usage, resulting in a relative percentage difference of 0.50%. **CONCLUSIONS:** The results lead us to conclude that ENDS use prevalence growth was significantly attenuated in states that implemented an excise tax. Furthermore, the excise tax did not discourage current and former smokers and dual users to shift away from or back to combustible cigarettes.

FUNDING: Unfunded

PPS26-4

A STATE TOBACCO TAX INCREASE WITH AN ATTENDANT INCREASE IN SPENDING ON TOBACCO CONTROL WAS ASSOCIATED WITH INCREASED QUITTING

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Background: In November 2016, California voters approved Proposition 56, increasing the tobacco tax by \$2 per pack and quadrupling state spending on tobacco control. This study examined whether the initiative was associated with changes in population cessation. **Methods:** Cessation data from the Behavioral Risk Factor Surveillance System (N=442,037) and data on cigarette taxes, per-pack prices, and tobacco control spending were compared for 2014-16 and 2017-19 for four groups of states: (1) California, (2) other states with tax increases plus price increases $\geq 10\%$, including the District of Columbia (N=11), (3) states with tax increases plus price increases $< 10\%$ (N=7), and (4) states without tax increases (N=32). **Results:** From 2014-16 to 2017-19, California had the largest increases among U.S. states in tax (210.7%), price (41.8%), and spending (300.2%), and 3-month quit rates increased from 11.5% to 14.2% ($P<0.01$). The increase in quitting was significant only among smokers with > 12 years of education. Among other states with tax increases, quit rates were unchanged both in states with price increases $\geq 10\%$ (8.4% and 8.6%; $P=0.489$) and those with price increases $< 10\%$ (8.9% and 8.8%; $P=0.807$). Quit rates declined significantly in states without tax increases, from 9.5% to 9.0% ($P<0.05$). **Conclusions:** A large cigarette tax increase in California was associated with significantly increased quitting, but only among smokers with more than a high school education. Policies increasing tobacco taxes and re-investing new revenue in tobacco control can improve population cessation, but more must be done to help less educated smokers quit.

FUNDING: Federal; State; Academic Institution

PPS26-5

THE IMPACT OF CALIFORNIA PROPOSITION 56 ACROSS URBAN AND RURAL COMMUNITIES

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Significance: In 2016, California passed Proposition 56 (Prop 56). Enacted April 1, 2017, Prop 56 raised taxes by \$2/pack on cigarettes and equivalent products. While a growing body of work highlights the positive impact of Prop 56 in curbing smoking behaviors among a variety of sociodemographic group, questions remain regarding the geographic impact of Prop 56 across urban and rural communities. **Methods:** Emulating previous work, we identified 61,196 respondents aged 21+ from the 2012-2018 California Behavioral Risk Factor Surveillance Survey. Based on county identifiers and designations created by the California State Association of Counties, we classified respondents as living in urban (78% of respondents), suburban (20% of respondents), and rural (2% of respondents) counties. Mirroring existing work, we created a binary variable indicating whether Prop 56 was in effect (Yes/No). We used a two-part econometric model to estimate the association of Prop 56 with smoking participation among all adults and smoking intensity (average number of cigarettes smoked per day (CPD)) among current smokers. Models were run for the full sample and separately for urban, suburban, and rural subgroups. Additional covariates included sociodemographic characteristics and time trend variable. **Results:** Smoking prevalence was lowest in urban areas (9.1%) followed by suburban and rural (10.3%) communities. We observed a similar trend with average CPD, with smoking intensity ranking lowest in urban communities (8.3 CPD) and higher in suburban (8.4 CPD) and rural areas (10.7 CPD). While we identified a significant, negative association between Prop 56 and smoking prevalence among the full sample and among the urban subgroup ($P<0.001$), the Prop 56 coefficient was not significant in the suburban or rural subsample analyses. Paralleling existing work, our analyses did not suggest the Prop 56 was associated with changes in smoking intensity among the full sample or for any geographic subgroup. **Conclusions:** An extensive literature highlights the efficacy of price tools, such as excise tax increases, in promoting positive changes in smoking behaviors. That said, given the persistent and acute smoking disparities in rural communities, public health experts, clinicians, and policymakers might consider additional interventions that can be implemented in tandem with pricing tools to help reduce observed disparities in rural - and even suburban - communities.

FUNDING: No external funding reported



PPS26-6

HOW US VAPORS CHOOSE AMONG DIFFERENT E-CIGARETTE (EC) MODELS AND CIGARETTES IN RESPONSE TO PRICES

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SIGNIFICANCE: As a growing number of states impose excise taxes on ECs, there is a heated debate over how to design EC pricing policies to minimize the unintended consequences of increasing smoking. Moreover, as the EC features rapidly evolve, it is important to investigate how to design excise tax systems to promote the use of EC models with a greater potential to assist in smoking cessation over other models. **METHODS:** We conducted a nationally representative volumetric choice experiment (VCE) of 700 US adults aged 21+ who vape ECs in the past 30 days in April/May 2023. Each participant reported their spending on nicotine or tobacco products and was asked to make purchases for monthly use among 9 sets of products, including disposable EC, pod device, pack of 4 pod refills (5% nicotine salt), pod starter kit (4 pods, 5% nicotine salt and 1 device), tank device, bottled e-liquid (60ml, freebased nicotine at 6%), and pack of 20 cigarettes. Zero-inflated negative binomial models were used to estimate the own- and cross- price elasticities among these products, while controlling for individual-level spending and sociodemographic characteristics. **RESULTS:** If prices increase by 10%, US adults who vape will reduce disposable and pod device purchases by 1.1% ($p < 0.001$), pod starter kit purchases by 1.4% ($p < 0.001$), pod refill purchases by 0.8% ($p < 0.001$), tank device purchases by 0.6% ($p < 0.001$), e-liquid purchases by 0.9% ($p < 0.001$), and cigarette pack purchases by 1.4% ($p < 0.001$). Substitutability was found between the following pairs: pod devices/starter kits and disposables/bottle e-liquid, pod devices and tank devices, pod packs and starter kits, and pod starter kits/refills and cigarettes. In addition, complementarity was found between the following pairs: tank/e-liquid and cigarettes, and pod devices and disposables. **CONCLUSIONS:** Increasing prices reduces the purchases of nicotine or tobacco products among US adults who vape ECs. Further, increasing cigarette prices encourages EC users to purchase more pods but less e-liquid, which could lead to increased quitting if salt-based ECs are better substitutes for cigarettes than freebase nicotine e-liquid. Increasing EC prices did not lead to unintended consequences of increasing cigarette purchases among people who vape ECs. Future research is needed to inform the best design of EC taxes by EC models and components, given their complex economic relationships.

FUNDING: Federal

RAPID RESPONSE PODIUM SESSION 3

RAP3

RAPID RESPONSE PODIUM SESSION 3 - SELECTED PRESENTATIONS ARE LOCATED IN THE SRNT RAPIDS ABSTRACT PDF. [CLICK HERE.](#)



RAPID RESPONSE PODIUM SESSION 4

RAP4

RAPID RESPONSE PODIUM SESSION 4 - SELECTED PRESENTATIONS
ARE LOCATED IN THE SRNT RAPIDS ABSTRACT PDF. [CLICK HERE.](#)



 SRNT₂₀₂₄

POSTER SESSION 1



POS1-1

DIFFERENCES BETWEEN ADOLESCENTS AND YOUNG ADULTS IN NICOTINE VAPING MOTIVES

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Significance: Rates of nicotine vaping remain very high among adolescents and young adults. Recent estimates indicate that 14% of high school students and 20-25% of young adults are current nicotine vapers. Unfortunately, mounting evidence indicates that e-cigarettes pose significant health risks, including interfering with normal brain development. Thus, it is critical to understand factors that motivate vaping initiation and maintenance in order to inform prevention and intervention efforts. Flavors, cost, and harm reduction have been reported as reasons for use. However, emerging work suggests the presence of additional motivating, including curiosity, enjoyment, relaxation, socialization, and coping. Further, examinations of vaping motives have either combined adolescents and young adults into one sample or looked at each age group separately. Therefore, the purpose of the current study was to examine differences between adolescents and young adults in nicotine vaping motives at vaping onset and currently. **Methods:** Participants were 140 adolescents (*Age* = 14.91, *SD* = 1.30; 71.4% male; 84.3% White) and 116 young adults (*Age* = 21.53, *SD* = 1.85; 54.3% female; 65.5% White) reporting current nicotine vaping who completed online assessments of their current reasons for vaping and retrospective reports of motives at vaping initiation. **Results:** Adolescents were more likely than young adults to report starting vaping nicotine because it was cool (25% vs. 12.1%, *p* = .009), and young adults were more likely start vaping nicotine to feel less anxious (33.6% vs. 22.1%, *p* = .04) and to "get a high or buzz" (25% vs. 13.6%, *p* = .02). Adolescents were more likely to report they currently vaped nicotine because they believed it to be less harmful than other tobacco products (25% vs. 9.5%, *p* = .001), and young adults were more likely to currently vape because of the high (25.9% vs. 12.1%, *p* = .005) and due to boredom (28.4% vs. 17.1%, *p* = .03). **Conclusions:** These findings suggest that adolescents and young adults have different motives for vaping. Adolescents are motivated to start vaping for socialization reasons and continue because they believe it is less harmful. Young adults are motivated to start vaping for coping and stimulation reasons and continue for stimulation reasons. Considering these differences will be important for intervention efforts and health messaging campaigns when developing information for these age groups.

FUNDING: Nonprofit grant funding entity

POS1-2

TEMPORAL TRENDS IN YOUNG ADULT CANNABIS AND TOBACCO USE IN RELATIONSHIP TO CANNABIS POLICY

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Significance: Cannabis legalization may lead to change in both cannabis and tobacco use, given the high prevalence of co-use of these products among young adults (YAs) in the United States. The objective of this study was to examine trends in YA any cannabis, blunt, cigarette, and cigar use over a 16-year period (2002-2018) in states that passed adult and medical use (AMU) or medical use only (MUO) cannabis laws during that time (*N*=18). **Methods:** Using data from the National Survey on Drug Use and Health, we conducted a segmented regression analysis to calculate absolute percent change between time points and inflection points in the data where trends changed over time. These data were compared with key legalization dates to describe patterns within and across states with varying cannabis policies. **Results:** States consistently showed a steady decline in YA cigarette smoking over time, a slight decline in cigar smoking, and increases in cannabis and blunt use. Most states with MUO laws had higher prevalence of cigarette smoking than cannabis use in 2018, while all states with AMU laws had higher prevalence of cannabis use than cigarette smoking by 2018. AMU states had lower average 2018 prevalence of cigarette smoking than MUO states (18.3% vs. 21.5%) and higher cannabis use (32.3% vs. 21.3%). Cannabis use most often surpassed cigarette smoking following passage of a law, but other trends in relation to policy changes varied across states. For example, Colorado experienced a stable increase in cannabis use over time following passage of AMU (+4.0% since 2012), while Washington experienced an initial decrease (-20.3%) following AMU passage (2012) then increase (+16.3%) after retail dispensaries opened in 2014. Generally, there appears to be a slight delay in cannabis use increases, and in some states a temporary decline, following AMU laws; there were no apparent changes in cigarette use trends based on cannabis policy. In AMU states, blunt use has surpassed cigar smoking, while in MUO

states, the prevalence of blunt and cigar use is about the same. **Conclusions:** States with cannabis laws vary in prevalence of YA cannabis and tobacco use over time in relation to policy changes. Any cannabis use and blunt use were more prevalent than cigarette and cigar smoking, respectively, in states where AMU laws are in place. Trends observed may correlate with cannabis policies, as well as tobacco policies and other political, economic, or social factors at the state level.

FUNDING: Unfunded

POS1-3

SENSORY RATINGS FOR CIGARETTES, VAPING PRODUCTS, AND CANNABIS AMONG ADOLESCENTS AND YOUNG ADULTS

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Significance: Using tobacco and cannabis elicits various subjective effects, which can impact use of these products. The goal of this study was to compare sensory ratings for cigarettes, electronic vaping products (EVPs), and cannabis (any mode of delivery) among adolescents and young adults. **Methods:** Policy Communication and Evaluation (PACE) Vermont Study participants aged 12-25 years who used cigarettes (*n*=56), EVPs (*n*=85), or cannabis (*n*=145) in the past 30 days provided sensory ratings of the last product used. Using a scale of 1 to 10, items assessed the extent to which 13 adjectives described the taste and feelings they experienced during their last use. Bivariate associations examined correlations between sensory ratings, demographic, and use variables, including past 30-day flavored product use. **Results:** Highest average sensory ratings across products were "strong" for cigarettes (4.1) and cannabis (3.7) and "sweet" for EVPs (4.7). Teens and young adults who used EVPs endorsed higher ratings of "sweet" and "cool/cooling" for their last product used and lower ratings of "harsh", "dry", or "burning" compared with those who smoked cigarettes or used cannabis. Cigarettes were rated higher as "bitter" than the other products. Participants who smoked menthol cigarettes rated products as "cool/cooling" higher than people who used non-menthol cigarettes (5.6 vs. 1.5). Participants who used non-mint/menthol flavored EVPs endorsed a higher rating of their products as "sweet" compared with those who used mint/menthol flavored and unflavored EVPs, and all participants who used flavored EVPs reported a higher rating of "cool/cooling" than unflavored users. Sensory ratings were not associated with use, but there were some associations found with reasons for use; for example, higher endorsement of "strong" for EVPs was associated with using these products because they are "hooked and have to have it." **Conclusions:** Sensory experiences differed across product types and flavors. EVPs had higher ratings for more positive adjectives (e.g., sweet), while cigarettes and cannabis had higher ratings for more negative adjectives (e.g., harsh). Users of flavored EVPs reported cooling effects of their products regardless of whether their product was menthol-flavored. Measuring subjective effects among adolescents and young adults can elucidate potentially reinforcing properties of product types and characteristics.

FUNDING: Federal

POS1-4

A MULTI-NATIONAL STUDY OF THE SAFETY OF SMOKING CESSATION PHARMACOTHERAPIES DURING PREGNANCY: THE RISK OF CONGENITAL MALFORMATIONS IN INFANTS

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Significance: Maternal tobacco smoking causes adverse pregnancy outcomes, the risk of which can be reduced if mothers stop smoking in the first 20 weeks of pregnancy. The medications varenicline, nicotine replacement therapy (NRT) and bupropion are the most effective strategies for smoking cessation, but whether they are safe to use during pregnancy is not known. Prior studies have not been able to provide conclusive evidence on the risk of congenital malformations in infants. In this multi-national study, we assessed the risk of congenital malformations associated with the use of varenicline, NRT or bupropion in the first trimester of pregnancy. **Methods:** We identified all pregnancies that resulted in birth (2003-2019) from routine birth records in New South Wales (NSW, Australia's most populous state), Norway, Sweden, and New Zealand. Birth data were linked to records of prescription medication dispensings, congenital malformations, inpatient and outpatient care, and mortality. We identified pregnancies



in which women used varenicline, NRT and bupropion within the first 13 weeks of gestation (first trimester). We defined outcomes as the presence of any major congenital malformation (MCM), MCMs grouped by body system, and individual MCMs in infant's records within 18 months of birth. We compared MCMs between infants born to women who used a pharmacotherapy and those born to mothers who smoked without using pharmacotherapy. To date we have calculated crude relative risks (RR) with 95% confidence intervals (CI) for Norway and Sweden. Next, we will include NSW and New Zealand data, apply propensity score matching to account for confounding, calculate adjusted RRs and perform a meta-analysis to create pooled estimates of risk. **Results:** In Norway and Sweden, we identified 558, 64 and 118 infants born to women who used varenicline, NRT and bupropion in the first trimester, respectively. Crude analyses of Norway and Sweden data showed no association between varenicline and any MCM (RR 1.03, 95%CI 0.67-1.58). The risk of cardiac MCMs associated with varenicline was 1.46 [0.84-2.57]. Among infants born to women who used NRT or bupropion in the first trimester, fewer than five had any MCM; hence RR was not calculated. **Conclusions:** Unadjusted estimates from two countries show no increased risk of reported MCMs but are imprecise. Our pooled estimates will provide more robust evidence on the safety of smoking cessation pharmacotherapies during pregnancy. This evidence is urgently needed to support informed decision-making and optimise maternal and child outcomes for pregnant women wanting to stop smoking.

FUNDING: Federal; Academic Institution; Nonprofit grant funding entity

POS1-5

VARIATION IN NICOTINE AND TOBACCO FLAVOR POLICIES ACROSS THE US

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Background: While over 300 US localities and 7 states have limited or prohibited sales of flavored tobacco products and electronic nicotine delivery systems (ENDS), geographic and characteristic differences in these policies are poorly understood. This study sought to analyze variation in these policies across space, time, and by content. **Methods:** To create a comprehensive dataset of US state and local flavored tobacco product policies, we compiled existing lists published by sources including the Campaign for Tobacco-Free Kids, Truth Initiative, and American Nonsmokers' Rights Foundation, supplemented with our review of news articles, and state and municipal websites. Each policy's text was reviewed to identify passage dates, legislated effective and enforcement dates, products covered, whether the policy restricted menthol flavors, retailer and/or product exemptions, and unusual details (e.g., if it also restricted unflavored ENDS sales). Where sources were contradictory or the legislation's text was unclear, we contacted local authorities for clarification. These data were matched to state and local population sizes from the 2020 census to calculate the proportion of each state's residents covered by a particular policy on a given date. **Results:** In 2018, only ~1% of US residents lived in a jurisdiction restricting or prohibiting flavored ENDS sales. By Jan. 2020, ~6% of the population was covered by ENDS flavor prohibitions while ~3% were subject to sales limitations with retail exemptions (e.g., for 21+ retailers, onsite use smoking bars). By Jan. 2023, flavor limitation coverage was largely unchanged, but prohibitions rose to cover ~24% of US residents. Specific details of these policies have also evolved over this period. Thus, analyses of "ENDS flavor policies" in different regions or different times may refer to distinct policies with substantively different effects. Additional results concern the overlap of ENDS flavor restrictions and other flavored tobacco products, including cigars and cigarettes, and implications of geographic variation for key sociodemographic exposure. **Conclusions:** The proportion of the US population subject to state and/or local flavor restrictions has evolved markedly over time, with substantial variation in policy details, geographic location, and overlap with other tobacco control policies. Such variation may have implications for health equity and the interpretation of current evidence on such policies' effects.

FUNDING: Federal

POS1-6

MEMORY AND BEHAVIORAL DEFICITS IN ADULT OFFSPRING WITH GESTATIONAL EXPOSURE TO E-CIGS DURING PREGNANCY

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Significance: Since electronic cigarettes (E-cigs) were released >15 years ago proponents have suggested they should be used for smoking cessation and/or alternative for smoking during pregnancy. However, teens and young adults make up the majority of users creating new generations with nicotine addiction, and an expanding population of women who are encouraged or told to use E-cigs in place of cigarettes during

pregnancy. These recommendations are alarming, given the long-term consequences of human vaping during pregnancy toward offspring health is not yet known. However, pre-clinical data from animal models suggest longstanding cardio- and cerebro-vascular dysfunction occurs in offspring with perinatal E-cig exposure. Therefore, we tested the hypothesis that in-utero exposure to E-cigs will lead to memory and neurocognitive deficits in the offspring. **Methods:** Female rats (N=25) were time-mated, and randomly assigned to the following exposure groups, ambient air (control, N=5), E-cig with no nicotine (Ecig0) at either 5-(w)att or 30w (Ecig0-5w, n=5; Ecig0-30w, n=5) or E-cig with 50mg of nicotine (Ecig50-5w, n=5; Ecig50-30w, n=5). Exposure was 60 puffs/day (1.5hr/day, 5 days/week) beginning on gestational day 2-4 until birth using whole-body chambers. E-liquid composition 50:50 vegetable glycerin, propylene glycol with no flavoring. Offspring were studied at 3, 6, and 12-months of age using open field (OF) to test for anxiety-like-behaviors, and Novel Object Recognition (NOR) to evaluate memory at 12-months of age. **Results:** All E-cig exposed offspring at 3-month showed decrease by 9-13% (p<0.05) in central tendency compared to air controls, and an 80-96% increase in fecal boli during OF testing (p<0.05). Both findings suggest increased anxiety in E-cig groups compared to air controls. OF assessments of offspring at the remaining ages (i.e. 6 and 12-months) were not different compared to air group. In 12-month old offspring, all E-cig exposure groups (except for Ecig0-5w) spent equal time exploring the habituated object vs novel object, compared to air controls which spent 78±5% exploring the novel object, suggesting short-term memory is impaired or reduced in E-cigs compared to air (p<0.05). **Conclusions:** These pre-clinical data suggest that offspring with in-utero exposure to E-cig via maternal vaping develop neurocognitive deficits that are evident and manifest in adolescent and adult life. E-cig use during pregnancy should not be viewed as safe for fetus, and can be expected to have long-term adverse consequences on offspring health and well-being.

FUNDING: Federal; Nonprofit grant funding entity

POS1-7

PREDICTORS OF VAPING RELAPSE AMONG YOUTH AND YOUNG ADULT E-CIGARETTE USERS: A MACHINE LEARNING ANALYSIS

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Significance: Although large number of youths reported trying to quit vaping, little is known about the factors that influence vaping cessation among this population. Understanding these factors are crucial for planning successful quitting. The objective of this study was to build a machine learning (ML)-based predictive model and identify the most important factors predicting individual probability of time to vaping relapse among youth and young adult e-cigarette users. **Methods:** Data was taken from the "Stop Vaping Challenge" smartphone app for vaping cessation, which allows users to start quit challenges with the help of a timer. We included past 30-day e-cigarette users aged 15-35 years at baseline (n=325) who took part in a quit challenge of at least 5 mins duration in this analysis. The outcome was time to vaping relapse defined by time interval in days between starting a quit challenge and stopping the challenge. The dataset (1,172 observations and 42 predictors) was split into training set and testing set in 4:1 ratio and a gradient boosting machine (GBM) survival model was built on the training set. Model performance was evaluated on the testing set and interpretation was done by using Shapely Additive ExPlanations (SHAP) analysis. The predictive performance of the GBM survival model was compared with traditional cox proportional hazard (CPH) model. **Results:** The GBM survival model performed excellently and similar to the CPH model (AUC 0.84 and 0.87 respectively and C-index 0.73 and 0.74 respectively). Overall, gender, self-confidence in quitting, number of puffs taken during vaping, age, average time a vape pod lasts, reasons for quitting, vaping device type, self-perceived general health, past 30-day alcohol drinking, time to first vape, e-cigarette flavour, past month vaping expenses, and frequency of vaping were the top 15 predictors of time to vaping relapse. All these factors were also identified as significant predictors in the CPH model. The SHAP force plot showed individual risk of vaping relapse and factors contributing towards this risk. **Conclusion:** We built a ML model which can be used in any personalized digital health interventions for vaping cessation targeting youth and young adults. It will predict probability of quit success for individual users and the identified predictors will empower them to make informed decisions to adjust their behaviours for improving these probabilities.

FUNDING: Federal; Academic Institution



POS1-8

CORRELATES OF ENGAGEMENT WITH NICOTINE CORRECTIVE MESSAGING IN U.S. ADULTS

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Significance: Widespread misperceptions of nicotine could undermine the public health benefits of FDA's proposed nicotine reduction policy. Delivering brief nicotine corrective messages may improve understanding of the effects of nicotine, though little is known about individual variation in engagement and its relationship with repeated exposure to nicotine educational messages. **Methods:** 393 U.S. adults in NORC's AmeriSpeak Panel were exposed to 8 nicotine corrective messages (NCM) containing smoke imagery and text education information three times over 12 weeks (Wave 1: N=393; Wave 2: n=313, 80%; Wave 3: n=295, 75%). All participants completed a heatmapping (HM) task for each message exposure to assess message engagement and were instructed to self-report up to three message features that attracted their attention. We examined associations with self-reported attention over time using linear mixed models, controlling for smoking status and message order. **Results:** Compared to Wave 1, participants reported attending to more message features at Wave 2 ($b=0.08, p=0.001$) and Wave 3 ($b=0.20, p<0.001$). Regardless of Wave, the time to participants' first reported attention ($b=0.004, p=0.003$) and the total time on the page ($b=0.01, p=0.02$) were positively associated with the total number of message features to which they reported attending. Compared to Wave 1, participants were more likely to report attending to the text of the message vs. the smoke imagery at Wave 2 ($b=0.10, p<0.001$) and Wave 3 ($b=0.23, p<0.001$). At all waves, the message communicating nicotine as the addictive substance in tobacco products had the least reported attention compared to all other messages ($p<0.001$). Across all waves, individuals with less reported attention were those who currently smoke cigarettes vs. those who formerly smoked cigarettes ($p=0.01$), 25-34 years of age vs. all other ages ($p=0.001$), and those with a high school education relative to those with higher education ($p=0.005$). **Conclusions:** Self-reported attention, as a proxy for engagement with the NCM, increased with repeated exposures and HM indicated that reported attention shifted toward the text component of the message relative to the image. There remained, however, differences in self-reported attention by smoking status, age, and education. Findings suggest that HM may be a useful online measure of engagement with messaging and that repeated message exposures promote engagement with different aspects of campaign messages.

FUNDING: Federal

POS1-9

IMPACT OF SURVEY ITEM WORDING AND RESPONSE OPTIONS ON PREVALENCE OF BELIEFS ABOUT NICOTINE CAUSING CANCER: A RANDOMIZED SURVEY EXPERIMENT

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Background: Misperceptions of nicotine's role in health harms increased between 2015 and 2019. The goal of this study was to determine how survey item wording affects estimates of nicotine beliefs, specifically the belief about nicotine itself causing cancer. **Methods:** 2,526 U.S. adults aged 18-45 completed a brief survey through Cloud Research. Participants were randomized to one of 10 survey items about the role of nicotine in causing cancer from national surveys and prior research, as well as items developed for this study. Participants also completed an open-ended question explaining their response. Analyses examined prevalence of beliefs by study condition and open-ended responses. **Results:** The prevalence of believing that nicotine does not cause cancer varied by condition and ranged from 9.6% - 80.7%. A greater proportion held this belief when "don't know" was removed as a response option (49.6% vs. 43.8%) and when the stem of the item specifically referred to nicotine's role as "on its own" (33.3% vs. 21.6%). Of those believing nicotine does not cause cancer, 46% provided an open-ended response explaining that "exposure to other chemicals or smoke cause cancer, not nicotine" and 38% that "nicotine only causes cancer by keeping people addicted to tobacco." Agreement with a novel item ("Just the nicotine in cigarettes causes cancer") produced the lowest proportion of responses that directly related nicotine and cancer (19.3%). **Conclusions:** While misperceptions persist across survey conditions, question wording greatly influences the prevalence of beliefs about the role of nicotine in causing

cancer. Caution should be used when comparing findings across existing studies when wording varies. Findings from this study may inform interpretation of existing studies and inform novel items to be included in future surveys.

FUNDING: Federal; Academic Institution

POS1-10

SEX/GENDER DIFFERENCES IN THE RELATIONSHIP BETWEEN CESSATION FATIGUE TO ABSTINENCE AND CIGARETTE SMOKED DURING A PRACTICE QUIT ATTEMPT PROCEDURE: AN ECOLOGICAL MOMENTARY ASSESSMENT (EMA) STUDY.

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Introduction: Cessation fatigue is associated with lower abstinence during a quit attempt and women report greater cessation fatigue than men. This study examined the overall and sex-specific relationships between cessation fatigue and both abstinence and cigarette smoked during a practice quit attempt. **Methods:** Adults with daily cigarette smoking ($n=184$, 49% female), completed ecological momentary assessment (EMA) (e.g., smoking, cessation fatigue) for 28 days with a practice quit attempt approximately one week after starting EMA. Multi-level models were run on days with a morning abstinence plan investigating main effects of sex and cessation fatigue (between-person and within-person) and the sex by cessation fatigue interaction with same day number of cigarettes and cigarette abstinence. Lag models investigated the same predictors on next day number of cigarettes and abstinence. Models controlled for baseline cigarette dependence and baseline age. Next-day models also controlled for prior day quit plan. Significant interactions were followed up with models stratified by sex. **Results:** Regarding abstinence, there were no significant main effects but there was a significant between-subject cessation fatigue $\times$ sex interaction with same day and next day abstinence such that between-subject cessation fatigue decreased likelihood of abstinence in females (ORs=0.48-0.49, $ps=0.002$) with no relationship seen for males. There was no significant within-subject cessation fatigue $\times$ sex interaction with same day or next day abstinence. Similarly, there were no significant main effects but there was a significant within-subject cessation fatigue $\times$ sex interaction on next day number of cigarettes. Models stratified by sex showed a significant positive association of within-subject cessation fatigue on next day number of cigarettes in females (estimate=0.47, $p=0.01$). There was not a significant association of within-subject cessation fatigue with next day number of cigarettes in males (estimate=0.03, $p=0.48$). **Conclusions:** During a practice quit attempt, greater cessation fatigue was associated with lower odds of abstinence and greater cigarette smoked for women but not men. Targeting cessation fatigue may be especially useful for women trying to achieve cigarette abstinence.

FUNDING: State

POS1-11

MONITORING UNDERAGE USE OF BIDI STICK DISPOSABLE ENDS

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Significance: Within the US the Premarket Tobacco Product Application submission requires those seeking to legally market their tobacco products to quantify the benefit of their product in assisting adult smokers to quit and to quantify the risk their product poses to non-users including youth and underage young adults. National, government funded studies in the US quantify underage use of ENDS as a product category and ENDS device type but do not quantify underage use of specific ENDS devices though such data are imperative for companies seeking regulatory approval. **Methods:** An online questionnaire was administered to cross-sectional, nationally representative samples of 2,340 and 4,500 underage individuals aged 13 to 20 years in June 2022 and June-July 2023 respectively. Participants were recruited through Ipsos' KnowledgePanel and online opt-in panels. Current use of ENDS by youth was used on at least one of the past 30 days. Current use of ENDS by underage young adults was now using every day or some days. Estimates were obtained for current use of ENDS, the BIDI® Stick brand and 11 BIDI® Stick flavor variants. BIDI® Stick is the second most popular disposable e-cigarette brand currently sold in the US. **Results:** In June 2022, youth reported current use of ENDS (6.7%), the BIDI® Stick brand (0.04%) and one flavor variant (BIDI® Stick Summer 0.04%). In June 2022, underage young adults reported current use of ENDS (15.9%), the BIDI® Stick brand (0.6%) and specific BIDI® Stick flavors (0.04% to 0.3%). June-July 2023 data will be presented to assess any change in current use of BIDI® Stick ENDS by underage individuals within the US. **Conclusions:** ENDS are the most popular tobacco product used by young people within the US. As a result, regulatory



action has been initiated requiring manufacturers to report data showing the impact of their product on adult smokers and those who are below the legal age at which tobacco can be legally purchased within the US. Despite this focus most research to date has reported on levels of ENDS use in general with much more limited reporting of the use of the wide variety of individual ENDS devices. This study underlines the importance of monitoring ENDS prevalence of use in terms of brand and device usage rather than in terms of the category. Such data can also be used to support regulatory submissions and to fulfil postmarket surveillance requirements where FDA have provided a marketing granted order to manufacturers.

FUNDING: Unfunded

POS1-12

ESTIMATING THE SIZE OF THE ILLICIT CIGARETTE MARKET IN THE BRAZILIAN URBAN CITY OF GUARUJÁ BASED ON CIGARETTE BUTTS LITTERED IN THE STREETS

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Significance: Globally, over 5.5 trillion cigarettes are produced annually, with approximately 4.5 trillion of them being littered. Although smokers are more likely to discard cigarette butts (CBs) than other type of litter, surveillance often overlooks that CBs' branding could be used to estimate the size of the illicit market. The present study aimed at estimating illicit cigarette consumption in the Brazilian city of Guarujá based on cigarette butts littered in urban areas. **Methods:** The fieldwork was conducted between March and April 2023. CBs were collected in walkways of 9 sample sites considering different urban density levels. Each sample site was visited 3 times during hours that avoided street cleaning. The CBs' brands were visually identified by searching for printed designs, logos, or words. CBs' brands were then assessed for their legality status by checking the list of brand names approved on the market by the Brazilian Health Regulatory Agency (ANVISA). Cigarette packs (CPs) were also collected. Thus, current Brazilian health warnings printed on CPs could also be used to establish their legality status. **Results:** Around 81.5% of CBs found in Guarujá (n=3,521 from 26 brands) presented visibly identifiable physical characteristics. The illicit market based on CBs was estimated as low as 21.7%. However, the estimate could be as high as 36.6% of the cigarette market since three brands appear on the Brazilian market in legal and illicit varieties; these brands can't be distinguished through mere visual inspection of the butts without also using information on health warnings. The illicit cigarette market based on CPs littered in the streets (n=30 from 10 brands) was estimated at 33.3%. **Conclusions:** It is important to estimate the size of illicit cigarette trade based on the evidence from non-industry-funded studies. The tobacco industry consistently overestimates it to claim that evidence-based tobacco control policies will result in an increased illicit cigarette market. By simultaneously monitoring and analyzing CBs and CPs littered in the streets, it is possible to cross-validate estimates of illicit cigarette consumption from different methodologies. Our findings may be also valuable for the implementation of logistic reverse actions seeking environmentally sustainable and socially resilient cities by identifying the percentage distribution of the cigarette brands in the environment. There are nine tobacco companies allowed to sell 215 different cigarettes brands in Brazil. These companies should be accountable for the pollution they generate, following the polluter pays principle.

FUNDING: Nonprofit grant funding entity

POS1-13

EXPLORING PERCEPTIONS OF THE RELATIONSHIP BETWEEN SLEEP, SMOKING AND SMOKING CESSATION. A QUALITATIVE STUDY WITH CURRENT SMOKERS AND EX SMOKERS

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Significance. Smokers report poorer sleep quality than non-smokers. Furthermore, sleep quality worsens during early cessation, which could increase the risk of relapse. Despite this, sleep is rarely considered in cessation support and little is known about smoker's experiences of sleep before and during cessation. This qualitative study explored perceptions of the relationship between smoking and sleep among smoker's and ex-smokers. This included insight into how sleep may change during a quit attempt

and whether existing sleep interventions may be useful adjuncts to cessation support. **Methods.** Online semi-structured interviews were conducted with current smokers (at least 5 cigarettes per day) and ex-smokers (who had quit within previous 12 months) (n=17). During the interview, participants were presented with a short video explaining traditional Cognitive Behavioural Therapy for Insomnia (CBT-I). This provided participants with knowledge of the approach and enabled them to provide thoughts on its potential usefulness as a cessation support adjunct. **Results.** Using framework analysis, four primary themes were identified. These were: 1) recognition of a "vicious cycle" between sleep quality and psychological affective state during cessation; 2) effectiveness of a CBT-I intervention is dependent on perceptions of achievability and value of the components; 3) there is a need for CBT-I to be tailored to smoking cessation; 4) benefits of digital delivery of CBT-I. **Conclusion.** Participants showed awareness of poor sleep during a quit attempt, although they were less aware of poorer sleep quality while smoking (e.g., compared to non-smokers). Participants reported experiencing different types of sleep problems during cessation that could increase risk of relapse. There was support for CBT-I as an adjunctive cessation tool, although some components were not considered helpful or optimised for smokers, and the timing of the programme in relation to a quit attempt was viewed as important. Therefore, participants identified a need for tailoring and personalisation to encourage engagement.

FUNDING: State; Academic Institution

POS1-14

USAGE-PATTERN AND NICOTINE DELIVERY IN AD LIBITUM USE OF E-CIGARETTES AND HEATED TOBACCO PRODUCTS

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Significance For some years now, electronic nicotine delivery systems (ENDS) such as e-cigarettes or electronic tobacco heaters have been available on the German market in addition to classic smoking tobacco products, with its best-known representative the tobacco cigarette. While the consequences of tobacco smoking have been very well researched, there is still a need to gather more information on ENDS. It is important to know how these products work, how they deliver nicotine, and how consumers use the products. In particular, the speed at which nicotine reaches its "site of action" in the brain, also referred to as the rate of flare-up or acute phase, appears to be responsible for the addictive potential of the product. Therefore, the nicotine delivery of ENDS is an important factor in assessing the risk of these products. If the nicotine delivery is too low, the craving for the product may not be satisfied, which may lead to increased use of the product. Therefore, it is important to know about the usage behavior of the new products under as real-life conditions as possible and to observe it in relation to nicotine kinetics and craving for the product. **Methods** In our study, we examined a pod e-cigarette (pod e-cig), a tobacco heater (HTP), and a conventional cigarette (CC). Fifteen experienced users of each product category consumed their usual product within a 90-minute period, at will and without specific instructions for use (ad libitum). In order to analyze usage behaviour and smoking topography, the sessions were video recorded. Blood samples were taken at fixed time points to determine nicotine concentration. Subjective effects were assessed by questionnaires. **Results** During the 90-minute study period, the same average number of consumption units was consumed in the CC and HTP groups (4.2 each). The pod-e-cig group took the highest number of puffs (pod-e-cig: 71.9; HTP: 52.2; CC: 42.3) with the longest mean puff duration (pod-e-cig: 2.8 s; HTP: 1.9 s; CC: 1.8 s). Pod-E cigars were predominantly used with single puffs or in short clusters of 2 - 5 puffs. Maximum plasma nicotine concentrations were highest with CC, followed by HTP and pod e-cig at 24.0, 17.7, and 8.0 ng/ml, respectively. Craving was reduced by all products. **Conclusion** The results suggest that the high nicotine delivery known for CC may not be necessary for other nicotine products to satisfy craving in experienced users.

FUNDING: State

POS1-15

NICOTINE USE AND IMPULSIVITY: DIRECT INFLUENCES ON SUICIDAL IDEATION

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Significance: Suicide is the second-leading cause of death among people aged 15 to 24 years in the US, and its rate has quadrupled for males and doubled for females in the past 60 years. Cigarette use and the intensity of smoking increase the risk of



suicide ideation, but less is known about e-cigarette use. Here we examine the direct and interactive influences of cigarette versus e-cigarette use on suicide ideation among 16 to 23-year-olds in Texas. We also examine impulsivity, which is higher in this age group than older adults, as another risk factor for suicide attempts that is increased by nicotine. Methods: Since 2019 the Texas Adolescent Tobacco and Marketing Surveillance study has collected suicidal ideation every six months covering the previous 2-weeks. Those youth answering that they had "thoughts that you would be better off dead, or of hurting yourself" on more than two of the 14 days were categorized as having suicidal ideation. Generalized mixed-effects logistic regressions examined the influence of ever and past 30-day (P30D) use of cigarette and e-cigarette use on suicide ideation, over time. Interactions between ever and P30D of both products and a) impulsivity and b) gender were examined, controlling for anxiety (GAD-7), race/ethnicity, SES and grade in school (all fixed effects). Results: Participants (N=2,329) were 58% female, 38% Hispanic; mean age=19.0 yrs (SD=1.57 yrs), from waves 10 to 14. Overall, 29.1% reported ever and 6.5% reported P30D cigarette use, 48.2% reported ever and 11.6% reported P30D e-cigarette use, and 18.5% reported some suicide ideation. Ever e-cigarette use (OR=1.47; 95% CI: 1.15-1.86), P30D e-cigarette use (OR=1.30; 95% CI: 1.00-1.68) and P30D use of cigarettes (OR=1.47; 95% CI: 1.06-2.05) higher risk for suicidal ideation for all. Ever cigarette use (OR=1.83; 95% CI: 1.36-2.46) increased suicide risk only among females. Impulsivity [attention deficits OR=1.81 (95% CI: 1.48-2.21), motor OR=2.02 (95% CI: 1.77-2.30), and non-planning OR=1.19 (95% CI: 1.02-1.38)] and anxiety OR=1.30 (95% CI: 1.28-1.32) directly increased risk for suicidal ideation regardless of type of product used. Hispanic youth had higher risk of suicidal ideation than white youth, but higher levels of SES were protective against suicidal ideation. Conclusion: In summary, both cigarettes and e-cigarettes, as well as impulsivity and anxiety, directly increased risk for suicidal ideation.

FUNDING: No external funding reported

POS1-16

SMOKING REDUCTION TRAJECTORIES AND THEIR ASSOCIATION WITH SMOKING CESSATION: A SECONDARY ANALYSIS OF LONGITUDINAL CLINICAL TRIAL DATA

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Significance: Tobacco smoking remains the leading cause of preventable death worldwide, with quitting the only cure. Smoking reduction (SR) can be recommended to people unmotivated to quit, but evidence on reduction outcomes is mixed, and little is known about how people reduce their smoking without receiving specific instructions. Despite a range of available behavioral SR strategies, there is no clear evidence to support one method over others. Methods: In a pre-registered secondary analysis of five randomized, placebo-controlled trials of nicotine replacement therapy (NRT), we determined latent smoking trajectories using cigarettes per day (CPD) at four time points across 26 weeks. Participants were adults who smoked daily and were unmotivated to quit. All were instructed to reduce their cigarettes as much as possible. We used predictive modeling to identify associations between smoking trajectories and participant characteristics at baseline (e.g., sex, age, nicotine dependence, depression, anxiety). Finally, we assessed whether smoking trajectories improved prediction of smoking cessation at trial follow-up week 52. Results: Participants (N=2066) smoked a mean 27.26±9.74 CPD at baseline. Of these, 1783 had CPD values for at least two time points and were included in analyses. We selected a three-class trajectory model: Class 1 (n=186) achieved the greatest reduction in CPD from baseline (57-90%), mostly within the first two weeks; Class 2 (n=803) reduced by ~50%; Class 3's (n=794) CPD remained stable. Older, male participants with lower baseline anxiety were most likely to reduce their smoking (cross-validated AUCs = 0.520-0.684, p's < .01). Latent class improved prediction of smoking cessation at the 52-week follow-up by 14.4% over prediction using baseline characteristics alone (AUC = 0.776±0.010, p = 0.002). Those who reduced their smoking by more than 50% were nearly 90% more likely to quit than those who reduced minimally (ORs compared to Class 1: Class 2 = 0.111±0.013, Class 3 = 0.070±0.005). Conclusions: Our findings quantified the level of SR (more than 50%) most associated with smoking cessation and identified participant characteristics that predicted greater magnitudes of reduction among people unmotivated to quit at baseline. We emphasize the importance of reducing smoking within the first two weeks of an intervention, as this group was nearly twice as likely to achieve complete cessation. This work may help clinicians identify patients most likely to quit and those in need of additional support.

FUNDING: Federal; Academic Institution

POS1-17

ONLINE CANDY LOOK-ALIKE TOBACCO PRODUCTS

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Introduction Youth tobacco use remains a critical public health concern, and childhood use of candy tobacco look-alike appears to contribute to cigarette use among youth. However, no research has examined the full extent of candy tobacco look-alike products available for purchase. **Methods** We conducted a content analysis of candy tobacco look-alike products available on the internet and sold in the U.S. We identified sites that marketed candy tobacco look-alike products utilizing Google and candy retail websites, examining each product for product names, the tobacco product being replicated (e.g., cigar, cigarette), manufacturer, candy flavor, images, product rating, pack color, and if the packaging contained content appealing to youth (i.e., modified version of the CAY index). **Results** We found 66 candy tobacco look-alike products available on English-language, US-based websites. The most popular tobacco look-alike products were cigars, with 39 separate products (59%), followed by candy cigarettes- 14 products (21%), candy pipes- 8 products (12%), and chewing tobacco - 5 products (8%). In the 52 products where packaging design was available, 39 (75%) had a CAY index indicating packaging especially appealing to youth. **Conclusion** Candy tobacco look-alike products across multiple types of tobacco are available for purchase across the U.S. These findings could stimulate policy actions, such as removal of candy tobacco look-alike products from popular retail websites, labeling of candy tobacco look-alike products as potentially dangerous to youth, or age verification requirements prior to the purchase of candy tobacco look-alike products.

FUNDING: Unfunded; Academic Institution

POS1-18

ABUSE LIABILITY OF ELECTRONIC CIGARETTES IN NEVER-SMOKING ELECTRONIC CIGARETTE USERS

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Background: Extant work examining the abuse ability of electronic cigarettes (ECIGs) is based largely on samples of former and/or current cigarette smokers. Thus, results are confounded by preexisting nicotine dependence. This study compared the abuse liability of ECIGs to nicotine gum for ECIG users with a minimal cigarette use history. **Methods:** Participants (N=10) were, on average, 21.0 (SD=2.2) years of age, with 50% identifying as male, 90% as non-Hispanic white, and 90% as heterosexual. They reported using ECIGs (100% pod-style or disposable devices) 7.0 (SD = 0.0) days per week for the past 2.5 (SD=1.3) years, and had a moderate level of ECIG dependence (11.9, SD=3.5 via PSECDI). They had smoked an average of 17.7 (SD=21.5) lifetime cigarettes. Participants completed a within-subject study with three conditions that differed by the product used: own ECIG, 4mg nicotine gum, and placebo gum. Within each condition, participants used the assigned product ad lib (i.e. 5 minutes of ECIG puffing or 30 minutes of gum use) over two bouts. Before and/or after each bout, participants completed subjective questionnaires and a multiple-choice task. **Results:** All subjective outcomes were significant for a main effect of condition [F's (2,18) > 5.2, p's < .05], such as the subscales of Relief, Psychological Reward, and Satisfaction of the Product Evaluation Scale. Specifically, ratings were higher for the ECIG condition than both gum doses for all subscales. Similarly, the crossover point (point at which participants choose money over assigned product) was higher for ECIGs than for the gum conditions; however, the main effect for this outcome was not significant [F(2,18) = 3.7, p = 0.51]. **Conclusions:** These preliminary results suggest that ECIGs have a higher potential for abuse than gum among never-smoking ECIGs users, who are the fastest growing population of ECIG users in recent years.

FUNDING: Federal; Academic Institution



POS1-19

DEVELOPMENT OF AN E-CIGARETTE & TOBACCO USE INTERVENTION FOR ADOLESCENTS AND YOUNG ADULTS IN THE PEDIATRIC HOSPITAL

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Significance The pediatric hospital represents a valuable opportunity to identify and treat e-cigarette use among adolescents and young adults (AYAs). However knowledge on how best to provide this care is lacking. We aim to fill this gap by developing and preliminary testing an intervention to treat e-cigarette use among hospitalized AYAs. **Methods** We enrolled AYAs (14-21 years) admitted to a pediatric hospital who reported past 30 day e-cigarette use. We offered an evidence-based intervention including education, motivational interviewing, and quit planning delivered by a health educator and pharmacotherapy prescription. We used previously developed survey items (multiple choice, Likert scale items) to assess demographics, e-cigarette use behaviors, nicotine dependence, motivation and confidence to quit at baseline and post-intervention. We also enrolled caregivers of AYA participants to assess intervention acceptability and feasibility using 5-point Likert scale items. Descriptive statistics were used to calculate proportions, means and standard deviations (SD). **Results** Of 21 AYAs approached, six (29%) were eligible (i.e., reported past 30 day e-cigarette use), and five (83%) enrolled. The mean age was 16.4 years (SD:1.3), four (80%) were female, and three (60%) had government insurance. Four (80%) reported occasional use (<5 e-cigarette use days) and one (20%) reported regular use (10-19 e-cigarette use days) in the past month. The mean nicotine dependence score was 2.6 (SD:1.4; low to moderate dependence). Compared to baseline the mean motivation increased mid-intervention (6.8 [SD: 0.5] to 8.0 [SD: 1.7]) and confidence to quit increased post-intervention (4 [SD: 0.7] to 4.6 [SD: 0.6]). All five (100%) committed to a quit plan, four (80%) enrolled in a quit program, and none were eligible for pharmacotherapy. Four AYA caregivers enrolled and reported they strongly agreed (mean score 4.7 SD: 0.5) it was acceptable to talk privately with their child and felt the intervention was not at all disruptive (mean score 1, SD: 0) to their child's clinical care. **Conclusions** Preliminary testing indicates our intervention is feasible and acceptable and may have positive effects on motivation, confidence and quit planning. AYA caregivers agreed the intervention was acceptable and not disruptive to clinical care. Based on these preliminary findings we plan to launch a pilot randomized trial to further assess feasibility, implementation outcomes, and efficacy.

FUNDING: Federal

POS1-20

A QUALITATIVE STUDY EXPLORING POTENTIAL PUBLIC SUPPORT FOR NEW HEALTH TAXES ON TOBACCO, ALCOHOL AND SWEETENED BEVERAGES IN GHANA: A 'WIN-WIN SITUATION'?

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Significance: Ghana has been facing the continuing need to tackle infectious diseases, while also dealing with the growing burden of non-communicable diseases (NCDs), which account for nearly 43% of Ghana's all-cause mortality. Unhealthy commodities (such as alcohol, sugar, and tobacco) are an important factor in the growing NCDs burden in the sub-Saharan African region. The COVID-19 pandemic further exacerbated the pressures on this front: the economic impacts of the pandemic have caused financial pressures, and the pandemic itself have contributed to the health burden that the health system is dealing with. Health taxes, with the right design, have the potential to help address both the financial and the health burden pressures on Ghana's health system. **Study aim:** This study aimed to compare policy stakeholder beliefs about public opinion on health taxes in Ghana with the views expressed by members of the Ghanaian public. **Methods:** A qualitative design using stakeholder interviews (representing policymakers and industry representatives) (n=29) and focus group discussions (n=5) (adolescents and young adults). **Results:** Stakeholder perceptions of public views on health taxes were mixed, but the dominant view was that public support for new or additional health taxes was likely to be low. Five themes emerged from public perception on health taxes (1) Reasons participants provided for supporting health taxes, perceived effectiveness of such taxes in reducing consumption and the benefits of this in terms of their health and finances (2) concerns about, and objections to, health taxes, concerns about the reality of how tax funds would be collected and spent (3) views about the potential role

of advocacy and public campaigns in shaping public support, advocacy, and public education campaigns are needed to garner sufficient support (4) the varying ways in which participants framed health taxes, health taxes are a way of 'Saving lives' (achieving better health) and a win-win policy and, (5) views on the design of health taxes, different kinds of health taxes could achieve different outcomes. **Conclusion:** Stakeholder belief that public support is limited is challenged by the FGDs we ran, which demonstrated strong support for health taxes and some sophisticated engagement with the potential details of how new health taxes might work in a Ghanaian context.

FUNDING: Nonprofit grant funding entity

POS1-21

COVERAGE OF INDOOR SMOKING AND VAPING RESTRICTIONS IN THE UNITED STATES, 1990-2021

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Background: Secondhand cigarette smoke (SHS) is a known cause of serious disease and premature death. Over the past few decades, many US states and local jurisdictions have adopted restrictions on indoor smoking to protect employees and the public from SHS. With the recent rise in popularity of e-cigarettes, some jurisdictions are also adopting policies restricting indoor vaping. The aim of this study was to quantify state and national US coverage of policies restricting indoor cigarette and e-cigarette use.

Methods: We analyzed data from the American Nonsmokers' Rights Foundation on indoor smoking restrictions (ISR) and indoor vaping restrictions (IVR). Using these data, which included 12,719 entries for state and local law changes (including repeals), and 2015 population estimates, we calculated percent state and total US population covered by partial and comprehensive ISR (1990-2021) and IVR (2006-2021) in bars, restaurants, and workplaces. **Results:** Between 1990-2021, national coverage of comprehensive ISR increased for bars (0%-66.5%), restaurants (0%-77.7%), and workplaces (0%-76.0%). Partial coverage of ISR increased slightly for bars (12.6%-13.8%), and decreased for restaurants (43.2%-15.4%) and workplaces (45.1%-24.0%). Moreover, between 2006-2021, national coverage of comprehensive IVR increased for bars (0%-44.3%), restaurants (0%-52.6%), and workplaces (0%-49.4%). Despite these increases in coverage, in many states, less than half of the population is protected by comprehensive ISR for bars (19 states), restaurants (14 states), and workplaces (16 states). **Conclusions:** The percentage of the US population protected by ISR and IVR has increased over time. However, gaps in coverage still remain, which may be contributing to disparities in tobacco-related disease and death.

FUNDING: Federal

POS1-22

RESPONSES TO NICOTINE SOURCE DESCRIPTORS: RESULTS FROM A RANDOMIZED EXPERIMENT

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Background: A variety of e-cigarette products are made with synthetic nicotine, often marketed with "tobacco-free nicotine" and "non-tobacco nicotine" claims. The tobacco industry has a long history of marketing cigarettes with claims (e.g., "low-tar/light," "additive-free," "organic") that have been found to reduce harm perceptions and mislead consumers. Similarly, nicotine source descriptors for e-cigarettes have the potential to affect consumer perceptions. **Methods:** We conducted an online between-subjects experiment among e-cigarette using (n=700) and non-e-cigarette/tobacco product using (n=700) young adults (ages 21-29). Participants were randomly assigned to view a single advertisement for a fictional e-cigarette brand ("Pylis") with different nicotine source claims: 1) "Made with synthetic nicotine", 2) "Made with tobacco-free nicotine", 3) "Made with non-tobacco nicotine", "Made with nicotine from tobacco", or 5) control (no nicotine source claim). Outcomes included harm perceptions, nicotine satisfaction perceptions (e-cigarette users only), susceptibility, and curiosity. One-way ANOVAs or chi-square tests were used to examine the impact of nicotine source descriptor on outcomes and Tukey's post-hoc tests were used to compare means across specific conditions. All analyses were stratified by e-cigarette user group. **Results:** Among non-e-cigarette/tobacco product users, nicotine source descriptors impacted perceived product harm (F=3.08; p=0.016), perceived nicotine harm (F=5.01; p<0.001), and perceived conditional harm (F=4.04; p=0.003), but not susceptibility (X²=3.40; p=0.493) or curiosity (X²=7.60; p=0.108). Among current e-cigarette users, nicotine source descriptors impacted



perceived nicotine harm ($F=3.18$; $p=0.013$) and perceived conditional harm ($F=3.56$; $p=0.007$), but not perceived product harm ($F=2.07$; $p=0.083$), perceived nicotine satisfaction ($F=0.64$; $p=0.637$), susceptibility ($X^2=3.66$; $p=0.454$), or curiosity ($X^2=4.82$; $p=0.306$). "Non-tobacco nicotine" and "tobacco-free nicotine" descriptors consistently produced the lowest (i.e., less harm) mean perceived harm values. **Conclusions:** "Tobacco-free nicotine" and "non-tobacco nicotine" descriptors may reduce harm perceptions for e-cigarettes. Marketing regulations may be needed

FUNDING: Nonprofit grant funding entity

POS1-23

COMPARING NICOTINE CONTENT, FORM, AND RELEASE FROM TOBACCO-FREE VS. TOBACCO-CONTAINING ORAL NICOTINE POUCHES

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Significance: Tobacco-free oral nicotine pouches (ONPs) have steadily been gaining popularity in the US, importantly among youth. Unlike their snus counterparts (tobacco-containing pouches, TPs), ONPs do not contain tobacco leaf, although they still contain nicotine. This study evaluated differences in nicotine content per pouch, nicotine form (freebase vs. protonated and R/S-isomers), and its release between ONPs and TPs. **Methods:** A convenience sample of ONPs ($n=16$, average reported nicotine content of 8.3 ± 4.3 mg) and TPs ($n=5$, unreported nicotine content) was purchased online in the US between 2021 and 2022. Nicotine pouch content was measured using GC-MS after extraction with methanol. Freebase to protonated nicotine ratio was calculated using the Henderson-Hasselbach equation and laboratory measured pH. Isomeric (R/S) ratio was determined by analyzing nicotine extracts via LC-QQQ with a stereoselective column. To determine nicotine release, individual pouches were stirred in 37°C water at 350 rpm using a magnetic stir bar. Initial aliquots were taken and every 5 minutes thereafter up to 60 minutes, then analyzed via LC-QQQ. Differences between ONPs and TPs were analyzed using Mann-Whitney tests for statistical significance ($p<0.05$). **Results:** Average measured nicotine content in ONPs was 7.6 ± 4.2 mg/pouch compared to 14.3 ± 7.9 mg/pouch in TPs (not significant, $p>0.05$). Both ONPs and TPs on average contained slightly more freebase than protonated nicotine ($61.6\pm29.9\%$, $p=0.04$ for ONPs; $56.0\pm39.1\%$, $p>0.05$ for TPs). Three ONPs contained racemic nicotine (50:50 R/S), suggesting synthetic nicotine, while all TPs contained the S-nicotine isomer only. ONPs released $89.7\pm29.3\%$ of nicotine after 5 minutes, while TPs only released $66.9\pm21.0\%$ within the same time ($p=0.03$). Both products released all nicotine within 60 minutes. **Conclusions:** While TPs contain more nicotine per pouch on average, ONPs appear to release nicotine faster. Both products appear to have a similar freebase to protonated nicotine ratio. Most ONPs contain the S-nicotine isomer only, indicating that while tobacco is absent in these pouches, the nicotine remains tobacco-derived. These data suggest characteristic differences between product types, which could impact product appeal and use.

FUNDING: Federal

POS1-24

HOUSEHOLD-BASED AND COMMUNITY-BASED ADVERSE CHILDHOOD EXPERIENCES ASSOCIATED WITH HOME TOBACCO SMOKE EXPOSURE AMONG U.S. SCHOOL-AGED CHILDREN

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Significance: Adverse childhood experiences (ACEs) are potentially traumatic events that can occur within the household and community during childhood. While school-aged children are vulnerable to both ACEs and tobacco smoke exposure, less is known about the potential association between household-based and community-based ACEs and home tobacco smoke exposure. Therefore, the study objective was to assess the associations between household-based and community-based ACEs and home tobacco smoke exposure status among U.S. school-aged children. **Methods:** A secondary analysis of the 2020-2021 National Survey of Children's Health data including 26,590 children 6-11 years old was conducted. Based on the distributions, household-based ACEs (e.g., parents divorced/separated) were assessed as a composite score of 0, 1, and 2-6 ACEs, and community-based ACEs (e.g., treated unfairly due to race/ethnicity) were assessed as 0 and 1-3 ACEs. Home tobacco smoke exposure status included no home tobacco smoke exposure defined as the child did not live with smokers, home

thirdhand smoke exposure only defined as the child lived with smokers who did not smoke indoors, and home secondhand and thirdhand smoke exposure defined as the child lived with smokers who smoked indoors. Weighted adjusted multinomial logistic regression models were fitted and included the covariates of child age, child sex, child race/ethnicity, parent education level, family structure, and federal poverty level. **Results:** Concerning home tobacco smoke exposure, 12% were exposed to thirdhand smoke only and 2% were exposed to secondhand and thirdhand smoke. Compared to those with 0 household-based ACEs, children with 1 or 2-6 household-based ACEs were at increased odds of being exposed to home thirdhand smoke exposure only (adjusted odds ratio [AOR]=1.76, 95% confidence interval [CI]=1.39-2.22; AOR=3.20, 95%CI=2.46-4.16, respectively) and home secondhand and thirdhand smoke exposure (AOR=1.92, 95%CI=1.09-3.38; AOR=5.55, 95%CI=3.26-9.47, respectively). Children with 1-3 community-based ACEs were at increased odds of being exposed to home thirdhand smoke exposure only (AOR=2.14, 95%CI=1.60-2.88) and home secondhand and thirdhand smoke exposure (AOR=3.82, 95%CI=2.17-6.72) compared to those with 0 community-based ACEs. **Conclusion:** Household-based and community-based ACEs were associated with home tobacco smoke exposure among U.S. school-aged children. Tobacco smoke exposure screening and remediation efforts are critically needed to reduce exposure among children exposed to ACEs.

FUNDING: Federal

POS1-25

SYNTHETIC CONTRACEPTIVE HORMONES OCCLUDE THE ABILITY OF NICOTINE TO REDUCE ETHANOL CONSUMPTION IN OVARY-INTACT FEMALE RATS

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Tobacco and alcohol use disorders (TUD and AUD) are tremendous health liabilities, and co-use of these substances is highly prevalent. Women are particularly at risk, as AUD is increasing at alarming rates and long-term smoking cessation is more difficult to achieve in women. Ovarian hormones can affect frequency of binge drinking and cigarette craving, with increases in 17 β -estradiol (E2) and progesterone being associated with addiction risk and resilience. Despite clinical literature demonstrating interactions between steroid hormones and polydrug use, little research has examined how contraceptive hormones may influence motivation for alcohol and nicotine. We determined the influence of ethinyl estradiol (EE) and levonorgestrel (LEVO) on nicotine and ethanol (EtOH) consumption using a sequential use model in female rats. We hypothesized that rats treated with LEVO alone will consume less nicotine and EtOH, and rats given EE+LEVO will show higher consumption of both drugs. 77 Long Evans female rats first underwent 15 daily 4-hr drinking sessions. Rats in the EtOH group received an additional 12 sessions of two-bottle preference testing. Rats underwent morning drinking sessions, followed by subcutaneous injections of either LEVO, EE+LEVO, or vehicle and afternoon nicotine or saline self-administration (SA) sessions on a fixed-ratio (FR)-1 schedule. Nicotine SA groups then underwent within-session nicotine demand where nicotine dose was manipulated. Finally, rats underwent additional EtOH preference testing and blood ethanol concentration analysis. All rats demonstrated consistent preference for EtOH over water. Contrary to our hypothesis, EE+LEVO did not increase nicotine or EtOH consumption above vehicle levels when it was co-used, but EE+LEVO increased EtOH consumed in the single use (EtOH drinking/saline SA) control condition. However, rats receiving vehicle treatments consumed less EtOH and nicotine when EtOH and nicotine were sequentially self-administered, indicative of economic substitution. This effect was occluded in rats that were exposed to either EE+LEVO or LEVO alone. Water control rats showed high EtOH preference following nicotine SA, and nicotine demand experiments further suggest an economic substitute relationship between nicotine and EtOH which is interrupted by synthetic hormone treatment. The results show that EtOH and nicotine act as economic substitutes when they are consumed sequentially, and chronic synthetic hormone exposure impacts nicotine and EtOH co-use in females. Future studies are needed to understand how chronic use of different contraceptive formulations alter patterns of polydrug use in women.

FUNDING: Federal

POS1-26

E-CIGARETTE AND CIGARETTES USE AMONG ADULT CANCER SURVIVORS: A US NATIONAL CROSS-SECTIONAL STUDY

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Introduction: While the causal link between cigarette smoking and cancer risk is well-established, research on e-cigarette use and cancer is in its infancy. This study assessed e-cigarette and cigarette use among cancer survivors and how it differs from the general population. **Methods:** Data came from 29,482 US adults who participated in the 2021 National Health Interview Survey. Weighted multivariable logistic regression was performed to examine the patterns of tobacco use by cancer status accounting for confounders including age, race, education, sex, sexual orientation, and income. Adjusted odds ratios (AORs) with 95% confidence intervals (CI) were reported. Tobacco products use patterns were reported as never, former (used in the past but not now), and current (use some days or every day). **Results:** In 2021, 9.8% (estimated 25 million) of the US population were cancer survivors. Overall, 18.3% of reported cancers were smoking-related (e.g., lung cancer). Compared to the general population, cancer survivors were more likely to be former users of e-cigarettes (AOR=1.28; 95% CI:1.07-1.52, $p=0.006$) and cigarette (AOR=1.33; 95% CI:1.21-1.47, $p<.0001$). No significant difference was observed in the current use of these products. Nevertheless, cancer survivors with smoking-related cancers (vs. non-smoking-related) were more likely to be current (AOR:2.3; 95% CI:1.55-3.41; $p<.0001$) and former cigarette smokers (AOR=1.61; 95% CI:1.25-2.07, $p=0.0002$). They also had higher odds of being current e-cigarette users (AOR: 2.19; 0.88-5.45; $p=0.09$) than non-smoking-related cancer survivors. **Conclusion:** These findings are critical to inform regulatory agencies to curb tobacco product use among cancer survivors and help clinicians to provide tailored evidence-based tobacco cessation programs.

FUNDING: Unfunded

POS1-27

MARIJUANA AND E-CIGARETTE INITIATION AMONG ADOLESCENTS: A SURVIVAL ANALYSIS

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Significance: Prior literature suggests marijuana and e-cigarette initiation among adolescents is surpassing combustible cigarette uptake. Marijuana and nicotine co-use is also a concern as these products grow in popularity. Initiation trajectories for marijuana and e-cigarette products are not well understood, let alone how the use of one product may impact initiation susceptibility for the other. **Methods:** We used national longitudinal data from the Population Assessment of Tobacco and Health (PATH) study from 2013-2018. Eighth graders in Wave 1 made up the analytic sample ($N = 2270$). We employed discrete time survival analyses to determine the likelihood of initiating marijuana and e-cigarettes between Waves 2-5. We used survival analyses to estimate the relationships between prior cigarette and marijuana use and subsequent e-cigarette initiation, as well as prior cigarette and e-cigarette use and subsequent marijuana initiation. **Results:** Previous marijuana initiation was associated with later e-cigarette initiation, Odds Ratio [OR] = 76.88, 95% CI (54.89, 9.67). Previous e-cigarette initiation was associated with later marijuana initiation, OR = 9.28, 95% CI (6.86, 12.56). By wave five, adolescents were over 42% likely to initiate marijuana and e-cigarettes. **Conclusions:** Susceptibility to marijuana and e-cigarette products starts as early as 8th grade and increases over time. The use of one product is significantly related to later initiation for the other. Rather than addressing marijuana and nicotine as separate concerns, interventions may benefit by recognizing the closely related nature of these products.

FUNDING: State

POS1-28

EXAMINING ONP UPTAKE AMONG OHIO APPALACHIAN CIGARETTE SMOKERS: 6-MONTH FOLLOW UP SURVEY

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Significance: Since 2016, sales of tobacco-free oral nicotine pouches (ONPs) have skyrocketed in the United States. With their low toxicant burden relative to cigarettes, ONPs could potentially provide a less harmful nicotine source for cigarette users. However, little research has evaluated ONP uptake among cigarette smokers. We evaluated ONP uptake and changes in smoking in a sample of cigarette smokers who enrolled in a clinical trial that involved brief sampling of ONPs. **Method:** Adult cigarette smokers ($N = 41$) with no recent ONP use participated in one of two human laboratory clinical trials assessing the abuse liability of ONPs. In the trials, participants tried two different ONPs for 30 minutes (trial 1: 3mg vs. 6mg Zyn ONPs; trial 2: synthetic nicotine vs. tobacco-derived nicotine ONPs). Participants were not instructed to change

smoking behaviors or continue ONP use at any point. Six months later, participants completed an online survey assessing ONP use and frequency of cigarette smoking. We descriptively examined ONP uptake and changes in smoking frequency. We also used paired t-tests to examine changes in smoking from baseline to 6-month follow-up. **Results:** Nearly half (46.3%) of participants (63.4% men, 85.4% white non-Hispanic, mean age=39.6 years; 85.4% response rate) reported current ONP use at 6-month follow-up. ONP users reported ONP use on average 9.5 (SD=11.3) days of the last 30 days. Participants used an average of 3.8 (SD=3.7) ONPs per day, with Zyn (57.9%), mint (52.9%), and > 4mg nicotine concentration (57.9%) ONPs being the most popular. From baseline to follow-up, we observed statistically significant declines in (1) the frequency of smoking in the past 7 days ($M=6.7$ vs. $M=5.2$ days, respectively; $p=0.002$, $SD = 2.8$) and (2) number of cigarettes smoked/day ($M=15.2$ vs. $M=11.0$, respectively; $p=0.006$, $SD = 9.5$). **Conclusion:** Following a brief sampling of ONPs, nearly half of cigarette smokers studied reported ONP uptake at follow-up, and frequency and quantity of smoking declined over time. Future work using a larger sample size should evaluate the role of ONP uptake in changes in smoking behavior, as well as identify predictors of ONP uptake and changes in smoking.

FUNDING: Academic Institution; Nonprofit grant funding entity

POS1-29

THE EFFECT OF SWEET FLAVORING ON THE REWARDING AND REINFORCING VALUE OF CIGARILLO USE AMONG YOUNG ADULTS

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Significance: Cigarillos dominate the U.S. cigar market, and young adults largely drive use. While young adults prefer flavored to non-flavored cigarillos, especially those flavored to taste like fruit or other sweets, the factors that underlie this preference have received little attention. We sought to determine if key indicators of abuse liability, the rewarding and reinforcing effects, are greater for sweet versus non-flavored cigarillos. **Methods:** Young adults (18-24 years old, $N=86$) completed three laboratory visits assessing the subjective rewarding value (exposure paradigm), relative reinforcing value (computerized choice task measuring breakpoint), and absolute reinforcing value (ad libitum cigarillo smoking session measuring cigarillo puffs) of sweet-flavored versus non-flavored cigarillos. General linear models were fit with the appropriate family link for each outcome measure. Models controlled for other variables that could account for an association of flavor with the outcome variables. **Results:** Young adults rated sweet-flavored cigarillos as 20% more rewarding (Estimated Marginal Mean=4.52 [95%CI=4.00, 5.03]) than the non-flavored cigarillo (EMM=3.31 [95%CI=2.80, 3.83]; $B=1.20$ [95%CI=0.80, 1.60], $p<0.001$). The reinforcing value of sweet-flavored cigarillos, measured by breakpoint, was higher relative to non-flavored cigarillos (6.34 versus 3.66 trials out of 10), especially among young adults with a preference for flavored cigarillos compared to those without a flavor preference (8.86 versus 6.93 trials; $B=1.94$ [95%CI=0.70, 3.17], $p=0.003$). During the ad libitum smoking session, young adults took 1.9 times the number of puffs (35.18 versus 18.56) from sweet-flavored cigarillos compared to non-flavored cigarillos ($RR=1.90$ [95%CI=1.27, 2.83], $p=0.002$). **Conclusions:** These findings make a critical contribution to the evidence base documenting the impact of sweet flavoring on combustible cigarillo use. Sweet flavoring increases the abuse liability of cigarillos among young adults as reflected in greater liking, motivation to use, and actual use. Banning sweet flavoring in cigarillos may diminish their use in young adults.

FUNDING: Federal

POS1-30

EVALUATING THE EFFECTS OF A TOBACCO-FREE WORKPLACE PROGRAM ON PROVIDER BELIEFS ABOUT GUEST/CLIENT TOBACCO USE AND SELF-EFFICACY TO INTERVENE AT TEXAS HOMELESS-SERVING AGENCIES

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Significance: Cigarette smoking, a known cause of cancers, is elevated among people experiencing homelessness, with a prevalence of ~78%. There is considerable interest in quitting smoking in this group, however, agencies that serve them rarely provide evidence-based tobacco screening and intervention. Barriers to care provision include



inaccurate provider beliefs that clients are not concerned about quitting smoking and lack of knowledge on addressing tobacco dependence. Consequently, it is critical to implement comprehensive tobacco-free workplace programs (TFWPs) that include provider training where people experiencing homelessness receive services. One such TFWP was implemented in homeless-serving agencies pre-COVID-19, yielding significant increases in providers' capacity to address tobacco use. Here, we extended the TFWP to new agencies, examining its effects on provider beliefs about their clients' smoking and knowledge about evidence-based cessation interventions during COVID-19. **Methods:** From 2021-2023, the TFWP was implemented in 3 homeless-serving agencies serving 1,355 adults annually across 3 Texas counties. Providers at each agency completed anonymous surveys at pre- (N=9) and post-implementation (N=9) where they rated their agreement with 5 items (e.g., "My clients are concerned about smoking"; "I have the required skills to help my clients quit smoking"; etc.) on a 5-point Likert scale ranging from 1=strongly disagree to 5=strongly agree. Logistic regression analyses were used to measure changes in key variables over time, controlling for agency. **Results:** Analyses demonstrated increases in providers' beliefs about client concerns about smoking (11.11% to 55.56%), beliefs clients who smoke want to quit smoking (0.00% to 44.44%), and beliefs they have the skills to help clients quit smoking (33.33% to 66.67%); however, they were not statistically significant (p range=0.1480-0.9467). Knowledge of where to refer clients to receive cessation care (55.56% to 55.56%) was unchanged; beliefs that clients follow provider advice (55.56% to 33.33%) decreased, but not significantly ($p=0.3986$). **Conclusion:** In this expansion study, TFWP implementation led to desirable changes in provider beliefs about smoking among their clients. The lack of significant findings may be due to small sample sizes, low statistical power, and observed COVID-19 challenges to agency capacity-building. Results may reflect the need for enhanced agency engagement in provider training (i.e., Motivational Interviewing, tobacco treatment specialist) to increase skills addressing tobacco dependence; only 1 agency participated in these opportunities. Future studies should include more agencies and providers, considering program adaptations to accommodate competing priorities (e.g., COVID-19) that can disrupt TFWP investment and participation.

FUNDING: Federal; State

POS1-31

TOBACCO USE SCREENING IN SAFETY-NET PRIMARY CARE CLINICS BY VISIT MODALITY

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Significance: Primary care delivery was significantly impacted by COVID-19, with rapid deployment of telehealth after the United States' national public health emergency (PHE) declaration in March 2020. In the year following the PHE, rates of screening for tobacco use decreased, particularly during telehealth visits. It is unknown if these changes in screening persist. Using data from safety-net primary care clinics, which provide care to patients with disproportionately high smoking rates, we examined monthly percentages of tobacco use screening overall and by visit modality (in-person, telehealth) prior to and during the COVID-19 PHE. **Methods:** Electronic health record data were extracted from 104 Oregon (United States) safety-net clinics in the OCHIN network from adult patients with at least 1 telehealth (phone, video) or in-person visit by a primary care team member (e.g., MD, PA) between 01/01/2019-12/31/2022. We examined monthly percent of visits with tobacco use screening (yes/no) overall and by visit modality. **Results:** Prior to March 2020, <2% of primary care visits were via telehealth. In the months immediately following the PHE declaration (April-July 2020), >50% were telehealth, leveling to 30% in the latter months of the study period (March-December 2022). During each study month prior to the PHE declaration, >90% of all visits (in-person, telehealth) included tobacco use screening; the highest monthly visit percentage of screening after the PHE declaration was 73% (October 2022). For in-person visits, screenings occurred at >90% of visits in each study month prior to March 2020, with subsequent monthly percentages ranging from 64% (April 2020) to 94% (April 2022). In contrast, only 6-9% of telehealth visits included tobacco use screenings in each month from May 2020-April 2022, dipping to 4-5% from May-December 2022. **Conclusions:** Tobacco use screening has remained consistently lower during the PHE compared to the study months prior to the PHE, primarily driven by lack of screening during telehealth visits. Over one-third of all primary care visits in our sample continued to be delivered via telehealth, exposing a concerning discrepancy in tobacco use screening by visit modality. If these findings are replicated in larger and more diverse settings, concerted efforts are needed to ensure that patients receive appropriate tobacco use screening and evidence-based tobacco use treatment regardless of visit modality.

FUNDING: Federal

POS1-32

CHARACTERIZING VAPING AND SOCIAL MEDIA USE AMONG MEXICAN AMERICAN COLLEGE STUDENTS WITH ECOLOGICAL MOMENTARY ASSESSMENT

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Significance: Social media (SM) and vaping usage are highly prevalent in the daily lives of young adults, especially among Mexican American (MA) college students. Although SM is an established risk factor for vaping, little is known about daily/weekly patterns of ENDS and SM use in this population. The current study seeks to describe use patterns in this population to inform intervention development. **Methods:** We collected ecological momentary assessments (EMAs) from a sample of 52 MA college students who reported vaping and SM use in the past 30 days. Participants (mean age=21.0 (SD=1.8), 72.5% females) provided daily data on vaping and SM use patterns, for 14 consecutive days via a mobile phone-based EMA application. **Results:** Results from 14 daily diaries showed that participants used e-cigarettes for an average of 5.7 (SD=4.3) days, with average use of 41.8% on weekdays and 43.5% on weekends. The average frequency of e-cigarette use was 1.2 times per weekday and 1.3 per weekend. Disposable devices were the most used, and fruit was the most frequently used flavor, followed by menthol. On average participants used 1.5 different flavors (Max=4). The nicotine concentration used most often was 5.0-5.9% followed by "I don't know the concentration." Social use of e-cigarettes with another person was higher on weekends (39.2%) compared to weekdays (30.5%). In terms of SM exposure, over the two-week period, participants used SM 9.7 days on average (SD=3.6), with use on 70.9% of weekdays and 73.5% of weekend days. Instagram was reported as the most used platform, followed by TikTok. Participants reported spending an average of 4.6 hours (SD=1.7) on SM platforms per day, with no variation across week and week-end days, and seeing only 1 e-cigarette advertisement on SM over the 14-day study period. Of the e-cigarette content reported across all participants, 65.8% was user-generated, 18.4% was posted by influencers, 7.9% was industry-sponsored, and 7.9% was from unidentified sources. Notably, TikTok was the primary platform where participants most frequently saw vaping advertisements and content. **Conclusion:** Understanding the daily patterns of e-cigarette and SM use among MA college students is important for guiding effective interventions. Findings help researchers design targeted intervention messages, select the most impactful platforms and social settings, and continually monitor and adapt strategies based on real-time data.

FUNDING: Federal

POS1-33

INNOVATIVE LATENT CLASS MODELS FOR NICOTINE AND TOBACCO RESEARCH: ONLINE RESOURCES OF THE LATENT CLASS ANALYSIS KNOWLEDGE BASE

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Nicotine and tobacco researchers have been at the forefront of applying innovative latent variable models and multilevel models to address critical questions in epidemiology, etiology, prevention, and intervention. Latent class analysis (LCA) and its extensions have been increasingly applied to understand heterogeneity in nicotine and tobacco behaviors, social and structural determinants, and intervention effects. In the Society's journal, *Nicotine and Tobacco Research*, approximately 110 articles (59 in the last 5 years alone) have applied the approach. Recent methodological developments have extended LCA to accommodate multilevel data structures such as those inherent in ecological momentary assessment and other intensive longitudinal data, which have proven critical to contemporary nicotine and tobacco research. Although traditional latent variable models (e.g., factor analysis, structural equation modeling) and longitudinal data analysis (e.g., multilevel modeling, generalized estimating equations) are addressed in some graduate curricula, LCA and its extensions typically are not addressed. This is especially the case for newer methodological developments such as multilevel LCA (MLCA). Researchers are often required to learn these methods through multiday workshops, some of which are costly in terms of time and money. The Latent Class Analysis Knowledge Base (LCAKB; latentclassanalysis.com) provides the knowledge and tools needed to conduct rigorous science with LCA and its extensions. The LCAKB also provides software tools, learning paths, recommended reading, videos, and materials for course instructors. A highlight is the LCAKB code repository that provides annotated sample code for multiple software packages (Mplus, Latent Gold, SAS, Stata, R). This poster will present this free resource to nicotine and tobacco researchers interested in



applying LCA and its extensions. Sample code will be presented from several papers that addressed complex features of nicotine and tobacco use, including reasons for vaping (cross-sectional Monitoring the Future data), transitions in polytobacco use (longitudinal panel data from the Population Assessment of Tobacco and Health Study), changes in smokers' social networks after cessation (longitudinal panel data from the University of Wisconsin Center for Tobacco Research and Intervention), and contexts of vaping behaviors (daily diary data from the Penn State Student Engagement, Learning, and Flourishing Study).

FUNDING: Federal

POS1-34

ASSESSING THE CAUSAL EFFECTS OF ENVIRONMENTAL TOBACCO SMOKE EXPOSURE: A META-ANALYTIC MENDELIAN RANDOMISATION STUDY

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Objectives Cigarette smoking is a major cause of global morbidity and premature mortality. There is evidence that exposure to environmental tobacco smoke (ETS; "second-hand smoking" or "passive smoking") contributes substantially to ill health. However, it is difficult to establish causality given well-described problems of confounding and selection bias. We applied Mendelian randomisation (MR) to investigate the causal effects of ETS exposure. **Design** We employed six MR estimation approaches: the effects of each parent's smoking on their offspring, the effects of each parent's smoking on the other parent, and the effects of self-reported exposure to second-hand smoking both inside and outside of the home. **Setting** Genome-wide association studies (GWASs) with sample sizes ranging from 397,732 to 909,629 individuals of predominantly European ancestry. **Interventions** To mimic exposure to ETS in the first four approaches, we used an individual's exposure to their relative's genetic liability to smoke, conditional on the original individual's genetic liability to smoke. In the final two approaches we used instruments associated with self-reported exposure to ETS. **Outcomes** Lung cancer, chronic obstructive pulmonary disease (COPD), stroke, cardiovascular disease, hypertension, and depression. **Results** Our findings support a causal effect of genetically predicted ETS exposure on lung cancer and COPD (odds per hour exposed in a typical week = 1.41 [95% CI: 1.23 to 1.61] and 1.11 [95% CI: 1.01 to 1.16] respectively). We did not find evidence supporting an effect on other outcomes. **Discussion** ETS may cause both lung cancer and COPD. Although our results do not support an effect of ETS on other outcomes, this might reflect low statistical power to detect smaller effect sizes. These results support public health measures to limit exposure to ETS.

FUNDING: Federal

POS1-35

DEMOGRAPHIC, SMOKING RELATED, AND CLINICAL ASSOCIATIONS OF CANNABIS AND TOBACCO CO-USE AMONG PEOPLE WITH HIV WHO ARE SEEKING TOBACCO TREATMENT

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BACKGROUND: Cannabis and tobacco use is elevated among people with HIV (PWH) vs. the general US population. Cannabis and tobacco co-use is associated with reduced likelihood of quitting tobacco, a crucial goal for PWH who experience high tobacco-related morbidity and mortality. **METHOD:** We describe co-use and associated demographic, smoking, and HIV-related clinical variables among PWH recruited nationally online to date (n=194) to an ongoing smoking cessation RCT examining a fully-automated, app-based tobacco cessation approach (target n=500). **RESULTS:** On average, participants were 44.9 (SD=11.6) years old, cis-gender men (82.0%) or women (13.9%), and LGB+ (67.0%). Forty-four (22.7%) reported past month co-use and, of these, 40.9% primarily used blunts. PWH who co-used were more likely to be Black (39.5% vs. 19.7% of non co-users) and less likely to be Hispanic (23.7% vs. 47.9%, $p=.01$). They were more likely to be unemployed ($p=.04$), and to report more economic strain ($p=.02$) and loneliness ($p=.048$). PWH who co-used endorsed fewer intrinsic (e.g., health concerns) vs. extrinsic reasons (e.g., social influences) for quitting ($p<.01$), were more likely to use e-cigarettes ($p=.02$) and otherwise, did not differ on tobacco-related variables (e.g., dependence, motivation to quit, smoking abstinence goals). Co-use was associated with increased

likelihood of missing HIV medication (ART) doses (56.1% missed at least one dose in a month vs. 34.5% of non co-users, $p=.01$). Over 40% of PWH who co-used reported a CD4 count of <200 (41.7% vs. 18.8% no co-use), although this effect was not significant ($p=.09$). There was no difference in HIV symptom burden count ($p=.47$). Interestingly, PWH who co-used self-reported better general health ($M=3.05$, $SD=0.94$ vs. no co-use $M=2.74$, $SD=0.85$, $p=.045$). There were no differences in acquiring opportunistic infections ($p=.60$) or chronic diseases ($p=.12$) in the last 6 months between the two groups. PWH who co-used were more likely to report other recreational or illicit drug use in the past month (38.6% vs. 12.4% of non co-users, $p<.001$). **CONCLUSION:** PWH who do and do not co-use differed in notable ways. Many PWH who co-use engaged in behaviors (e.g., blunt use) and reported psychosocial and motivational characteristics associated with reduced cessation success. Additionally, they reported being less adherent to ART. These findings indicate that cannabis and tobacco co-use should be further evaluated in tobacco cessation treatment trials.

FUNDING: Federal; Academic Institution

POS1-36

MENTHOL AND FILTER VENTILATION IN CIGARETTES: PREVALENCE ESTIMATES, RISK PERCEPTIONS, AND RELATIONSHIPS WITH SMOKING BEHAVIOR AND EXPOSURES

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Introduction: To protect public health, the U.S. FDA plans to prohibit the manufacturing of menthol cigarettes. Filter ventilation (FV) is another cigarette characteristic that contributes to appeal and may be leveraged by cigarette manufacturers to offset losing customers to the menthol ban. This is a descriptive study examining the prevalence and user characteristics of menthol versus non-menthol cigarettes by FV level and whether cigarettes per day (CPD) and urinary biomarkers of exposure (BoE) vary by menthol and FV level of the cigarettes. **Methods:** Wave 1 (2013-2014) of the Population Assessment of Tobacco and Health Study was merged with data on FV levels of cigarettes purchased in 2015-2016. This study was restricted to adults who smoked daily, had a usual brand/sub-brand of cigarettes, and did not regularly use other tobacco products (N=1614). Weighted descriptive statistics were used to identify the prevalence of menthol and non-menthol cigarette use by low (<10%), moderate (10-25%), and high FV (>25%) and risk perception of their usual brand based on a continuous score of -1 (less harmful than other brands), 0 (no different), and 1 (more harmful than other brands). Weighted linear regression models were used to estimate mean CPD and geometric means of BoE by menthol and FV adjusting for potential confounders. **Results:** The prevalence of menthol cigarette use by low, moderate, and high FV was 14.96%, 15.0%, and 7.94%, respectively. The prevalence of non-menthol cigarette use by low, moderate, and high FV was 2.91%, 23.84%, and 35.35%, respectively. Among non-menthol users, those using high FV cigarettes, versus low FV cigarettes, were more likely to perceive their brand as less harmful than other brands (-0.14 versus 0.04; $p<.001$). In adjusted analyses, CPD and BoE were not significantly different by levels of menthol and FV; however, levels were consistently elevated in the non-menthol, low FV group versus the non-menthol, high FV group. **Conclusion:** The lowest prevalence of use was observed for non-menthol, low FV cigarettes, which could suggest that these cigarettes are the least appealing. Non-menthol, high FV cigarettes had the highest prevalence of use and the greatest proportion of users perceiving their brand to be less harmful. Biomarker findings point to the need for future studies to examine the benefits, and potential unintended consequences, of a combined ban on menthol and FV versus a ban on menthol alone.

FUNDING: Federal

POS1-37

ASSOCIATIONS OF SEXUAL IDENTITY CHANGE AND DISCORDANCE WITH TOBACCO USE IN A NATIONALLY REPRESENTATIVE SAMPLE OF U.S. ADOLESCENTS AND ADULTS

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Significance: Research identifying disparities in tobacco use among sexual minority individuals conceptualize sexual orientation as a static unidimensional construct and often do not consider variations across age in the US. This study examined sexual identity change and sexual identity-attraction discordance as potential markers of risk for tobacco use as a function of age. **Methods:** This study used data from Waves 1 through 5 of the Population Assessment of Tobacco and Health (PATH) study and was restricted to observations in which individuals were ages 15 to 60 years old at follow up



(n=87,491 observations; 49.5% male). Individuals were categorized into 4 sexual identity change groups: heterosexual stable, bisexual stable, gay/lesbian stable, and any sexual identity change. Individuals were coded as discordant if there was a mismatch in sexual identity and attraction (e.g., identified as heterosexual and reported sexual attraction to males and females). We used time-varying effect models to estimate sexual identity change and discordance as a function of age and age-varying associations of change and discordance with tobacco use and tobacco dependence symptoms at follow up while controlling for baseline tobacco use. All analyses were stratified by sex and weighted to account for sample design and attrition. **Results:** Sexual identity change was most prevalent in adolescence and ranged from 13.4% at age 15 to 1.5% at age 60 among females and 6.4% at age 15 to 2.1% at age 60 among males. Identity-attraction discordance was most prevalent in young adulthood and ranged from 18.1% at age 25 to 6.3% at age 55 among females and 5.7% at age 25 to 2.5% at age 55 for males. Among females, identity change was associated with greater odds of tobacco use (adjusted odds ratio [AOR] range=1.4-1.9) and greater dependence (adjusted β range=0.3-0.5) at follow up for ages 15 to 45; discordance was associated with greater odds of tobacco use (AOR range=1.2-1.6) and greater dependence (adjusted β range=0.1-0.4) at ages 15 to 35. For males, sexual identity change (adjusted β range =0.3-0.5) and discordance (adjusted β range=0.1-0.2) was associated with greater tobacco dependence for ages 15 to 50 and 18 to 40, respectively. **Discussion:** Increasing awareness of the fluidity and multidimensionality of sexual orientation across much of the life course is important since periods of change and discordance may be a potentially vulnerable period for tobacco use.

FUNDING: Federal

POS1-38

REPRESENTATION OF OLDER ADULTS IN RESEARCH ON NICOTINE AND TOBACCO

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INTRODUCTION: In 2019, the National Institutes of Health began requiring the inclusion of older adults in clinical research, and in 2022, the National Academies highlighted older adults as an underrepresented group. Previous research shows that older adults are only represented in 0.006% of peer-reviewed publications focused on substance use in leading journals. However, the representation of older adults in tobacco use research has not been systematically examined. This study aims to determine the degree to which older adults are represented in nicotine and tobacco research presented at the four most recent annual meetings of the Society for Research on Nicotine and Tobacco (SRNT). **METHODS:** We manually extracted age data from all abstracts published in SRNT conference booklets from 2020 through 2023 (N = 2,996 abstracts). Abstracts were coded into one or more of the following categories depending on the presence of age-relevant keywords or descriptive statistics: "Children, Youth, and Young Adults", defined as 24 years or younger; "Middle Age", defined as between the ages of 25 and 59; and "Older Adults", defined as 60 years or older to be consistent with the World Health Organization's definition of older adult. Studies with human participants that lacked age-relevant keywords or statistics were coded as "adults broadly". **RESULTS:** Among the 1,396 studies that specified one or more age groups, 77% included <25 year-olds, 25% included 25-59 year-olds, and 6.3% included 60+ year-olds. Among the 141 studies that excluded a specific age group from the analyses, 22% excluded <25 year-olds, 0% excluded 25-59 year-olds, and 78% excluded 60+ year-olds, suggesting that not only are older adults underrepresented in nicotine and tobacco research, but they are also being excluded from this work. **CONCLUSIONS:** Our findings suggest a need to improve the representation of older adults in nicotine and tobacco research. Such efforts are especially important given that smoking prevalence among older adults in the United States has not changed in at least 20 years, unlike younger cohorts. Moreover, our research found inconsistent definitions of "older adult" which can decrease the consistency, precision, and generalizability of study findings to different age groups. Future studies should expand on this work by determining how many of these studies focused on treatment- versus prevention, health disparities, or other types of co-occurring substance use.

FUNDING: Unfunded

POS1-39

THE IMPACT OF OVER-TIME ALTERATIONS IN ORGANIZATIONAL READINESS TO CHANGE ON TOBACCO-CESSATION PROGRAM IMPLEMENTATION IN AGENCIES SERVING UNHOUSED PEOPLE: A QUALITATIVE STUDY

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Significance: Despite high tobacco use rates (~73%), people who are unhoused are rarely treated for tobacco use at unhoused-serving agencies (USAs). We explored enablers and inhibitors to implementing an evidence-based tobacco-free workplace (TFW) program offering TFW policy adoption, specialized provider training to treat tobacco use, and nicotine replacement therapy (NRT), within USAs. **Methods:** From January 2022-July 2023, 12 providers from 3 USAs in Texas, jointly serving 1,355 unique clients yearly engaged in semi-structured individual/group interviews. Pre- and post-implementation interviews pursued adapting interventions to specific USAs, and assessed program success, respectively. Via thematic analysis and constant comparison, 2 analysts independently coded transcripts inductively, then compared and agreed on findings. The Organizational Readiness for Change (ORC) theory constructs (change commitment, change efficacy, and contextual factors) guided final data analysis. **Results:** Analysis yielded 3 main themes with 11 categories. Pre- to post-implementation, USAs saw rising or new challenges impact providers' attitudes, wherein previously enabling (E) factors were reframed as inhibiting (I), (E/I; i.e., loss of program-buy-in). I. **Change commitment:** pre-implementation, providers voiced high 1) program buy-in (E/I), 2) motivation to change (E/I), and 3) valuing benefits for clients (E). II. **Change efficacy:** Initially, 4) valuing training to treat client tobacco use was high (E/I), as was 5) TFW policy support (E), and 6) perceived fit with agency cultural values (E/I). While providers reported major commitment and change efficacy pre-implementation and valued program tailoring to local USAs, changing contextual factors affected limited implementation, or program withdrawal (N=1), by post-implementation. III. **Contextual factors:** included 7) high staff turnover (I), 8) leader attitudes/changes (E/I), 9) lack of resources (I), 10) contending priorities (e.g., high caseloads) (I), and 11) COVID-19 related issues (I). **Conclusions:** Despite flexible implementation providing adaptation to local USAs, provider training to treat tobacco use, and free NRT, changing contextual factors adversely impacted implementation. Findings show that ORC is a contingent and thus, unstable state, and that low-resourced USAs require additional support, guidance and innovation to recuperate from infrastructure challenges and to build the capacity needed to implement a TFW program.

FUNDING: Federal; State; Academic Institution; Nonprofit grant funding entity

POS1-40

LONGITUDINAL TRANSITIONS BETWEEN SMOKING AND QUITTING BEHAVIOR AND CHARACTERISTICS ASSOCIATED WITH SUCCESSFUL CESSATION IN ADULTS WHO SMOKE CIGARETTES: ANALYSIS OF THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (WAVE1-5)

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Aim: To determine prevalence of and factors associated with cessation success among U.S. adults aged ≥ 18 years, who smoked cigarettes with or without other tobacco products. Furthermore, we describe and visualize transitions of smoking behavior (over time) between waves of data collection. **Method:** Data analyzed were from Waves 1-5 of the Population Assessment of Health and Tobacco (PATH) study. Sample (N=5,594) included adults who smoked 100 cigarettes in lifetime, smoked every day or some days at W 4, and provided follow-up data, at W 5, on cessation success, defined as cigarette smoking abstinence of ≥ 3 months vs (continued) smoking. Type of cigarette use included cigarettes only, dual cigarettes+cigs, dual cigarettes+electronic cigarettes (ECIG), cigarettes+smokeless, and poly tobacco. Influencing factors examined: type of cigarette use, menthol/mint cigarette use, cessation interest (10-point scale), nicotine dependence (ND), average responses (1-5 scale) of 16 items, assistance (use of medications or counseling), BMI, self-rated mental health (SRMH) and quality of life (QoL; excellent-poor). Weighted multiple logistic regression model was constructed. **Results:** Of adults who smoked cigarettes at Wave 1, 85% continued to smoke one year later, 6.6% quit <3 months and 8.2% quit ≥ 3 months. Of the latter group, 72% stayed quit at Wave 3, and 18.8% relapsed back to smoking. 77.6% of adults who quit ≥ 3 month, in previous year, reported prolonged abstinence at Wave 4, of whom 81% were abstinent at follow



up and only 13% of them relapsed. Compared to cigarettes only, other use types, dual cigarettes+ECIGs (3.5; 95%CI: 2.5-5.5), cigarettes+smokeless (2.9; 95%CI: 1.8-4.6) and poly tobacco (1.3; 95%CI: 1.1-1.4) had higher odds of cessation success. Higher ND was negatively associated with success. While menthol/mint cigarette use, assistance, BMI, and SRMH were not associated with cessation success, 'poor' QoL rating rather than 'excellent' was associated with higher odds. **Conclusion:** Type of cigarette use (dual and poly tobacco) influence success in cigarette smoking cessation. Findings are pertinent to inform product labeling and public health campaigns addressing dual and poly tobacco use.

FUNDING: Federal; E-cigarette/Alternative nicotine products Industry

POS1-41

PREVALENCE OF AND REASONS FOR USING VAPES IN AN ENGLISH COLLEGE SAMPLE

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Significance E-cigarettes (vapes) are less harmful than combustible cigarettes but are not without risks. Use in never-smokers is not recommended; however, vaping in young never-smokers is increasing. This project investigated factors that predict vaping in young people, specifically whether empirical expectations (EE; what they see their peers doing) and/or normative expectations (NE; what they think their peers believe they should do) are relevant or whether vaping is independent of others (driven by personal normative beliefs [PNBs]). Understanding the extent to which peers influence vaping could help inform interventions to reduce vaping amongst young never-smokers. **Methods** We applied Bicchieri's (2016) social norms framework to college student's (N=339, aged 16-19) vape use. An online questionnaire asked about their current vaping, motivations for vaping, perceived levels of peer usage and both personal and peer approval of vapes. In a logistic regression, the outcome variable was vaping status (yes/no) and predictor variables included self-reported EE, NE, and PNBs (measured from 0-100, higher scores represent more perceived peer use, peer approval and personal approval) and controlled for college, year group and gender. In a hierarchical regression, hypothetical vignettes where EE and NE were manipulated (high/ low) assessed the effect of these expectations on the likelihood of stopping vaping (7-point likert scale), controlling for college, year group, gender, PNBs and actual vape use. **Results** Actual vape use was significantly predicted by both EE [odds ratio(OR) = 1.03, 95% Confidence interval(CI) = 1.02, 1.05] and NE [OR = 0.98, 95% CI = 0.96, 0.99] as well as PNBs [OR = 2.96, 95% CI = 2.26, 3.88]. Conditional preference vignettes showed significantly higher likelihood of the character stopping vaping when NE and EE were both low compared to high NE and low EE [standardised beta [SB] = -.27, 95% CI = -1.58, -.67], low NE and high EE [SB = -.47, 95% CI = -2.27, -1.40] and high NE and high EE [SB = -.63, 95% CI = -3.09, -2.18]. **Conclusion** Actual vaping in this sample is likely to increase if young people perceive their peers to be vaping or approve of vaping themselves. Vaping becomes less likely if young people think their peers approve of vaping. These findings were also reflected in the vignette hierarchical regression which emphasised the importance of perceived usage as participants were most likely to report the character stopping vaping in conditions of low perceived usage, even if perceived approval was high.

FUNDING: Academic Institution

POS1-42

"THE ANXIETY IS UNBELIEVABLE," THE EMOTIONAL AND MENTAL STATES OF PATIENTS ATTEMPTING TO QUIT SMOKING AS THEY TRANSITION FROM HOSPITAL TO HOME

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Significance: In patients who smoke cigarettes, hospitalization provides a critical opportunity to promote smoking cessation. However, the transition home can be a challenging time for patients and rapid relapse is common. Little is known about the needs of smokers during this transition. **Methods:** We performed semi-structured longitudinal interviews of current smokers with cardiopulmonary disease to help identify unique stressors and emotions, with the goal of identifying unmet needs. We first interviewed patients during hospitalization and then after discharge at 6-36 hours and 3, 5, 7, 14, and 28 days. Transcribed interviews were coded and analyzed using content analysis to identify major themes. Prior to discharge, all patients met with a tobacco treatment specialist and were prescribed smoking cessation medications. **Results:** We interviewed 9 smokers (mean age of 58 ± 3.6 yrs.; 40% female, 33% non-white), in 34 separate in-

terviews. At the time of the last interview, 7 had successfully quit smoking, 1 reduced, and 1 relapsed. Upon analysis, the following key themes emerged; 1) although initially confident in the hospital, upon returning home patients expressed increased anxiety, especially regarding medical concerns/questions, and anxiety about family stressors, 2) patients expressed confusion or hesitancy regarding the use of nicotine replacement therapy (NRT), in part due to misunderstandings about their use, and 3) they requested increased support to help deal with smoking triggers. Withdrawal symptoms were not commonly reported. An overarching sense of feeling overwhelmed was expressed in all patients, especially those who relapsed or continued to smoke. In those who continued to smoke, relapse was attributed to an "unconscious habit." **Conclusions:** Patients were initially optimistic about quitting while in the hospital, but after discharge, this quickly transitioned to feelings of being overwhelmed due to anxiety, life stressors, and medical concerns in the first few days after hospitalization. Concerns about optimal medication use were common. These findings may be helpful to practitioners to better meet the needs of patients who want to quit as they transition home.

FUNDING: Federal

POS1-43

CHARACTERIZING REASONS FOR FLAVORED TOBACCO USE AMONG AFRICAN AMERICAN/BLACK PEOPLE WHO SMOKE CIGARETTES

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Significance. The United States FDA has proposed a ban on menthol cigarettes and flavored cigars. African American/Black (AA/B) people will be disproportionately affected by this ban, considering 85% of AA/B people who smoke use menthol cigarettes, and flavored cigar use is most common among AA/B people. Better understanding reasons for flavored tobacco use among AA/B people who smoke can assist efforts aimed to ensure the flavor ban promotes health among communities most likely to be affected. **Methods.** AA/B people who smoked cigarettes daily (N = 77) were recruited to participate in a 6-week trial aimed to evaluate how electronic nicotine delivery system (ENDS) flavor availability impacts tobacco use behavior, related biomarkers, and likelihood for future use. Baseline measures of tobacco use history and reasons for flavored tobacco use were assessed using measures informed by a TCORS working group and PATH (2021). Descriptive and bivariate analyses focus on outcomes collected at baseline due to ongoing nature of study (IBM SPSS V29, p<0.05). **Results.** On average, participants were 42 years old and 58% were male. They smoked 14 cigarettes per day and had been smoking this number for more than 10 years. Almost all smoked menthol cigarettes (97%), and due to trial inclusion criteria, most (68%) reported ENDS use in the past 30 days. Highly preferred flavors for non-cigarette tobacco products included menthol/mint, fruit, and candy/sweets. Reasons for flavored tobacco use endorsed by more than 50% of participants were "like flavors", "like smell", "more appealing than tobacco flavor products", "easier to smoke than tobacco flavor products", and "affordability". While less common, "perceived lower harm", "less bothersome to others", and "positive impact of quitting smoking for flavored products" were endorsed by 23-41% of participants. There were no significant differences by sex for reasons, but correlations with age revealed that older individuals were significantly less likely to endorse "flavored products less bothersome to others" and "help with quitting smoking". **Conclusions.** Most AA/B people who smoke endorse positive sensory attributes for flavored tobacco products. Perceptions of lower harm and benefits related to quitting smoking for flavored tobacco products were more common for younger individuals, suggesting a target for prevention. This information can be used to support implementation efforts for the proposed flavor ban.

FUNDING: Federal

POS1-44

SWEET ADDITIVES IN WATERPIPE TOBACCO AND THEIR EFFECT ON HUMAN PUFFING BEHAVIOR, TOXICANT EXPOSURE AND NICOTINE UPTAKE

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Significance: Although waterpipe (WP) smoking prevalence has recently decreased among U.S. adolescents (12-16 years old), it remains a major public health issue worldwide. Many youth initiate smoking with WP, likely because the mass ratio of sweet additives to nicotine in WP tobacco is significantly higher than any other combustible tobacco product. Sweet additives can degrade to form carcinogens and cardiovascular and respiratory toxicants that are subsequently inhaled by WP smokers. To define the effects of WP tobacco's sweet chemical additives on puffing behavior, toxicant exposure and nicotine uptake, we conducted a crossover study of WP smokers smoking four manipulated WP tobaccos that differed by added sugars and humectants. **Methods:** Experienced WP smokers (n=45) completed four WP laboratory ad libitum smoking sessions, each separated by a week, with tobacco prepared according to a 2x2 matrix of ecologically valid levels of sugars, medium (X) and high (2X), and humectants, medium (X) and high (2X). Participant puffing topography data were acquired, and exhaled CO, and plasma nicotine were collected before and after each smoking session. Data were analyzed using linear mixed models to account for repeated observations, and Tukey-Kramer method was used for pairwise comparisons. **Results:** The biggest differences were found for participants smoking tobacco with high vs medium sugars with high humectant held constant. For this comparison, when participants smoked tobacco with high sugars they took more puffs (34%), with greater average puff volume (27%) and longer duration (21%) for a greater total volume of smoke inhaled (30%), resulting in a greater exhaled CO boost (96%, all p 's<0.03). Also for this comparison, nicotine tobacco content (39%) and participant nicotine uptake (64%) was lower for high sugar (p <0.01). Topography outcomes were not different between high sugar tobaccos that differed in humectant, even though nicotine content (37%) and participant nicotine uptake (36%) was higher in the medium humectant tobacco (p <0.03). Together these findings suggest that both nicotine compensation and appeal may have been driving the more aggressive puffing of high sugar tobaccos. **Conclusions:** These data provide supporting evidence that sugar and humectant additives in WP tobacco are associated with significant changes in puffing behavior, carbon monoxide exposure and nicotine uptake. **Statement of Relevance to CTP Regulatory Authorities:** These data can inform the development of evidenced-based product standards, or limits to additives in WP tobacco, designed to reduce smoking-related death and disease.

FUNDING: Federal

POS1-45

CONTINUOUS ASSOCIATIONS OF URINARY TOBACCO EXPOSURE BIOMARKER CONCENTRATIONS AND TRANSITIONS BETWEEN CIGARETTE AND E-CIGARETTE USE IN THE EXHALE COHORT

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Significance: Urinary tobacco exposure biomarkers, including 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol (NNAL), cotinine, and trans-3'-hydroxycotinine (3HC) may be more reliable estimates of tobacco exposure than self-reported product use. **Methods:** We used data from an observational study of 380 adults who smoked cigarettes daily and may or may not have used e-cigarettes and who were followed every 2 months for up to 2 years (2015-17). We assessed the continuous associations of urinary tobacco biomarker concentration and ratios (NNAL, cotinine + 3HC, and ratio 3HC:cotinine) measured every 4 months with transition propensities using a multistate transition model. **Results:** Propensity to stop smoking cigarettes decreased with increasing concentration of NNAL and cotinine+3HC, for both participants who only smoked cigarettes and those who used both cigarettes and e-cigarettes. In one year, we estimate that 12.5% (95%CI: 0.0%, 25.3%) of those who only smoke cigarettes and 9.6% (95%CI: 0.0%, 18.0%) who dual use would transition to non-current cigarette use and e-cigarette use, respectively, at the 10th percentile of NNAL concentration, while at the 50th percentile, we estimate these probabilities to be 1.3% (95%CI: 0.0%, 3.9%) and 0.9% (95%CI: 0.0%, 2.3%), respectively. Biomarker concentrations were not associated with transitions from dual use to cigarette-only use. The ratio 3HC:cotinine was not associated with starting or stopping cigarettes or e-cigarettes among those who only smoked cigarettes or used both products. **Conclusions:** Personalized transition propensities based on urinary tobacco exposure biomarkers may inform cigarette cessation interventions. Future work should consider associations of biomarkers and transitions for nicotine salt-based e-cigarettes.

FUNDING: Federal

POS1-46

EEG STATE SPACE DESCRIPTORS DURING ANESTHESIA IN PATIENTS DIFFERING IN SMOKING STATUS: A DESCRIPTIVE ANALYSIS

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Significance: Global electrical brain activity, detected through multichannel EEG recordings, changes over hours of surgery-related general anesthesia in patients with and without subsequent postoperative delirium (POD) (Neuner B et al. Brain Communications, under review). There is evidence that smoking status is associated with POD. Aim of this exploratory analysis was to analyze changes in EEG global state space descriptors (SSD) with increasing exposure to general anesthesia in patients differing in smoking status. **Methods:** A subsample of 73 patients of the Surgery Depth of Anaesthesia and Cognitive outcome (SuDoCO)-study (SRCTN 36437985) received intraoperative multichannel EEG recordings. Smoking status was available in 57 patients (16 never-smokers and 41 [8 current + 33 former] smokers). Overall 676 artefact-free EEG intervals (each ~ 50 s of length) were analyzed in regard to the SSDs Sigma (overall variance of the EEG data across all sampling electrodes), Phi (generalized frequency), and Omega (lower-bound estimate of the number of uncorrelated brain processes). SSDs served as dependent variables in multiple adjusted multivariable linear mixed effects models. The main independent variables of interest were grouped in a 3-way interaction of anesthesia duration (time from anesthesia induction), smoking status and current EEG status (suppression vs. non-suppression EEG). **Results:** The mean age was 70.5 (6.2) years, 25 (43.9%) were women and the median anesthesia time was 210 (range 75-675) minutes. At anesthesia onset, no differences in SSDs between patients differing in smoking status existed (all p > 0.5). With increasing exposure to general anesthesia, Sigma and Omega developed differentially in smokers and non-smokers: smokers showed a significant decline in Omega, both in suppression and in non-suppression EEG. While Sigma decreased under non-suppression EEG in both smokers and never-smokers, it non-significantly increased under suppression EEG solely in smokers. **Conclusion:** Smoking status in elderly surgical patients seems to affect a brain's reaction to ongoing exposure to general anesthesia. Smokers showed a pattern of declining uncorrelated brain processes (Omega) combined with increasing EEG variance (Sigma). This combination was identified as a potential risk factor for POD. The link with smoking status warrants further research. **Funding information:** This study was financed solely by institutional resources of both University Hospital of Psychiatry Bern and Charité Universitätsmedizin Berlin.

FUNDING: Academic Institution

POS1-47

INTERNET-BASED PROGRAMS TO SUPPORT TOBACCO CESSATION: A SYSTEMATIC REVIEW AND META-ANALYSES OF RANDOMISED CONTROLLED TRIALS

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Background: Internet interventions for tobacco cessation are potentially a highly cost-effective way to disseminate behavioural support to people stopping tobacco use. We conducted a systematic review to evaluate the effectiveness of internet-based interventions for tobacco cessation as tested in randomised controlled trials (RCTs). **Methods:** We searched PubMed, CINAHL, Cochrane, Embase, PsycINFO, Scopus, and Web of Science on 8 June 2022. Additional searches were conducted using the Google Scholar search engine, trial registries and secondary references, with an updated search conducted on 9 July 2023. No language or country restrictions were applied. RCTs of internet-based tobacco cessation interventions for people aged 15 and over who used tobacco regularly. Five independent reviewers extracted the data, which was checked by one reviewer. The outcomes of the studies were narratively summarised and a meta-analysis performed for studies that were combinable and that reported outcomes at least 6 months post-randomisation. Certainty of the evidence was assessed using the GRADE criteria. **Results:** Seventy-six RCTs were identified that met inclusion criteria. There was substantial heterogeneity in the interventions, comparator conditions, and populations. Overall, the meta-analysis indicated that internet interventions were not more likely to result in abstinence at follow-ups of 6 months or longer compared to minimal/no intervention (RR 1.11, 95% CI 0.98-1.25, 16 RCTs), or compared to less in-



teractive/functional/tailored internet interventions (RR 1.12, 95% CI 0.96-1.31, 15 RCTs), or when delivered with additional counselling or coaching (RR 1.10, 95% CI 0.75-1.61, five RCTs), or with pharmacotherapy (RR 1.28, 95% CI 0.94- 1.74, 7 RCTs). **Conclusions** - Internet-based interventions have substantial potential to deliver smoking cessation support widely at low cost. However, the certainty of evidence on their effectiveness is very low. There are also wide variations in program content and adherence. Further research is needed to develop standardised internet interventions that effectively support long-term abstinence.

FUNDING: Federal; Academic Institution; Nonprofit grant funding entity

POS1-48

A CASE STUDY OF AUSTRALIA'S GROWING ILLICIT TOBACCO MARKET: SHOULD WE BE CONCERNED?

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Significance: Illicit tobacco (IT) includes any kind of tobacco products entering the market without necessary duties and taxes being paid, such as unbranded loose-leaf tobacco, counterfeit branded cigarettes, or illegally imported foreign cigarettes. International evidence suggests that IT causes substantial losses in tax revenue, funds organised crime syndicates, and undermines tobacco control policies. This case study draws on data from the Australian Taxation Office (ATO), National Drug Strategy Household Survey (NDSHS) and an analysis of Australian media articles (2000-2022) to examine whether there is evidence to support anecdotal reports of a rapidly growing IT market in Australia, and provides an overview of policy measures that could mitigate Australia's IT market. **Method:** First, we collated publicly available data from the ATO (net and gross tobacco tax gap percentages, seizures, lost tax revenue; 2015/16-2020/21) and NDSHS (self-reported illicit tobacco use; 2007-2019) to investigate trends in Australian IT use. Second, we analysed Australian news articles describing IT-related crimes reported between January 2000 and December 2022. News articles were coded for location, product type, dollar value, distribution/storage methods, agencies involved, and other crimes involved. **Results:** ATO data suggests a 34% increase in IT use since 2015/16, costing Australia \$1.9billion in lost tax revenue in 2020/21 alone. NDSHS data suggest an increase in the number of Australians reporting current IT use (3.6% in 2013 to 4.9% in 2019). Our media analysis suggests an increase in Australian media reporting of IT-related crimes since 2000. The presentation is supported with photographs of IT products found on Brisbane streets. **Conclusions:** Increasing IT use in Australia is likely worthy of concern. The low cost and increasingly widespread availability of IT products threatens the effectiveness of Australia's world-leading tobacco control policies, thus undermining Australia's attempts to achieve a tobacco endgame. Measures that could mitigate the Australian IT market include Queensland's recently-implemented law making supply of IT an offense, increased resources aimed at improving detection of IT shipments at border points, and implementation of public campaigns promoting community tip-offs.

FUNDING: Federal; Academic Institution

POS1-49

E-CIGARETTE USE, REASONS FOR USE, AND ASSOCIATIONS WITH CIGARETTE CESSATION AMONG PEOPLE WITH HIV IN A RANDOMIZED CONTROLLED SMOKING CESSATION TRIAL

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Significance: Tobacco use is a leading cause of death in persons with HIV (PWH). The role of e-cigarettes in cigarette cessation among PWH is understudied and important given higher rates of cigarette smoking and lower rates of intervention success compared to the general population. **Methods:** These secondary analyses examined e-cigarette use, reasons for use, and associations of e-cigarette use with 6-month biochemically confirmed 7-day cigarette abstinence among a sample of PWH who were smoking tobacco cigarettes at baseline and participated in a randomized cessation intervention (2016-2020; NCT02781090). **Results:** Among 504 participants (mean age 50.2 years, 57% male, 19% Latinx, 83% Black; 13% White, and 32% did not graduate high school), 8.1% (n=41) reported past 30-day (P30D) e-cigarette use and 37.3% (n=188) reported ever using (not P30D) e-cigarettes at baseline. At 6-month follow-up (n=410; response rate 81%), 8.5% (n=35) reported P30D e-cigarette use and 21.0% (n=121) reported ever using e-cigarettes. Baseline P30D (vs never) e-cigarette use was more common among White participants, participants with high self-efficacy to quit, and participants who had ever used cigars, cigarillos, pipes, and hookah. The top two most common reasons for

baseline P30D e-cigarette use were using "in places where smoking cigarettes isn't allowed" and "e-cigarettes don't smell". Among those who ever (but not past 30D) used e-cigarettes, the top two reasons for use were "they might be less harmful to people around me than cigarettes" and "e-cigarettes come in flavors I like". After adjusting for intervention arm, sex, race, ethnicity, age, nicotine dependence, living with a smoking partner, housing stability, and self-efficacy to quit, baseline e-cigarette use (ever or P30D) was not significantly associated with 6-month cigarette abstinence. **Conclusion:** Although self-efficacy to quit cigarettes was higher among those with P30D e-cigarette use at baseline, no differences were observed in cigarette abstinence at follow-up by ever or P30D e-cigarette use. The intervention in this RCT was focused on cigarette cessation and did not encourage or discourage e-cigarette use. E-cigarettes were used by more than a third of this sample of PWH. Future trials that integrate and directly address issues of tobacco product co-use, switching, and reduced harm into cessation interventions are warranted to address the real-world role these products play among populations at high risk for addiction and tobacco-related disease.

FUNDING: Federal

POS1-50

TOBACCO INDUSTRY DENORMALIZATION BELIEFS WERE ASSOCIATED WITH GREATER SUPPORT FOR TOBACCO ENDGAME POLICIES: A POPULATION-BASED STUDY IN HONG KONG

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Significance Tobacco industry denormalization (TID) exposes the misconduct of tobacco manufacturers in hindering the progress of tobacco control policies. We examined the associations between TID beliefs and support for tobacco endgame policies in Hong Kong. **Methods** The 2018-19 Tobacco Control Policy-related Survey of Hong Kong Council on Smoking and Health using landline random digit dialing with oversampling current and ex-smokers included 2810 respondents aged 15 or above (weighted, male: 56.6%; current smokers: 10.1%, ex-smokers: 30.5%, never-smokers: 59.4%). TID beliefs (agree/disagree or unsure) including 7 items based on the World Health Organization report were used: tobacco manufacturers ignore health, induce addiction, hide harm, spread false information, lure smoking, interfere with policies, and should be responsible for health problems. The score of each item was summed up and dichotomized based on a median score of 5 (>5 strong beliefs; ≤5 weak beliefs). Tobacco endgame policies were measured by support for total bans on tobacco sales (yes/no) and use (yes/no) within 10 years from 2018. Poisson regression yielded adjusted risk ratios (ARR) for the associations of TID beliefs with support for total bans on sales and use, adjusting for sociodemographic and smoking status. Descriptive statistics were weighted to the general population. **Results** Agreement of TID beliefs ranged from 54.6% to 78.1%. Fewer current smokers (22.5%) had strong beliefs (median or above) of TID than ex-smokers (47.1%) and never-smokers (48.0%) (p<0.001). Support for total bans on tobacco sales (73.4%) and use (75.8%) was lower in current smokers (35.7% and 37.6%) than ex-smokers (74.0% and 77.6%) and never-smokers (75.7% and 78.0%) (all Ps<0.001). Individual TID belief was associated with support for a total ban on tobacco sales (ARR ranged from 1.13 to 1.35, all Ps<0.001) and use (ARR ranged from 1.12 to 1.30, all Ps<0.001). Increasing per TID belief was linearly associated with support for a total ban on sales (ARR 1.06, 95% CI 1.05-1.08, P<0.001) and use (1.06, 1.05-1.07, P<0.001). The corresponding associations were non-significantly stronger in current smokers than ex-smokers and never-smokers (sales: ARR 1.87 vs. 1.25 vs. 1.24, P for interaction=0.08; use: 1.78 vs. 1.23 vs. 1.20, P for interaction=0.07). **Conclusion** Stronger TID belief was associated with greater support for banning tobacco sales and use. TID interventions may be needed to increase support for tobacco endgame policies, especially for current smokers.

FUNDING: No external funding reported

POS1-51

TWELVE-HOUR ABSTINENCE CHANGES THE RELATIVE IMPORTANCE OF PRODUCT FEATURES IN HYPOTHETICAL CHOICES BETWEEN CIGARETTES AND E-CIGARETTES: A DISCRETE CHOICE EXPERIMENT

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SIGNIFICANCE: Discrete choice experiments (DCEs) systematically present tradeoffs to assess how product information is prioritized in the formation of preferences. This study evaluated whether 12-hour smoking abstinence interacted with the relative strength of preferences for cigarette and e-cigarette features. **METHODS:** A sample of adults who smoke daily completed two lab visits in a randomized order ($n = 40$): one after smoking as usual and one after at least 12 hours of smoking abstinence (bio-verified). At each visit, participants completed a DCE that featured 8 hypothetical choices between a cigarette option and an e-cigarette option. Across trials, cigarette nicotine delivery was described as either very low or normal; e-cigarette nicotine delivery described was either low or moderate; and the availability of e-cigarette flavor was described as either limited to only tobacco and menthol flavors or expanded to include fruit and dessert flavors. Participants selected a preferred product from the two shown and could also indicate if they would opt to use neither. Using the choice data from each visit, we estimated the average part-worth utilities of the manipulated product features. We then calculated the average relative importance of each feature and the average predicted choice shares for selecting the cigarette option, the e-cigarette option, or neither given specific cigarette vs. e-cigarette comparisons. **RESULTS:** Product type was most important to preferences indicated after smoking as usual. All cigarette options were preferred over all e-cigarette options, though very low cigarette nicotine content decreased the magnitude of the difference between average cigarette and e-cigarette utility. In contrast, cigarette nicotine delivery was most important in choices made after 12 hours of smoking abstinence. Normal nicotine cigarettes remained highly preferred when available, but during abstinence, cigarettes with very low nicotine had a lower average utility than e-cigarettes (especially when e-cigarettes offered moderate nicotine delivery). **CONCLUSIONS:** Context affected the relative expected value of nicotine product features in this study. Patterns of multi-product use may reflect changes in overall product utility per context. When employing DCEs to understand nicotine and tobacco use patterns, potential interactions between situational factors and the value of specific product features should be considered.

FUNDING: Federal

POS1-52

CO-DESIGNING MODELS OF SMOKING CESSATION CARE IN DIVERSE CANCER CENTRES: OUTPUTS AND COSTS

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Significance: Care to Quit is a stepped wedge cluster randomised controlled trial designed to implement best practice smoking cessation care through cancer centres in Australia. The trial aimed to optimise the delivery of a smoking cessation intervention in cancer care by co-designing evidence-based models of care to suit the circumstances of individual cancer centres. **Methods:** The implementation intervention was developed based on the Theoretical Domains Framework and in consultation with clinical stakeholders who participated in an APEASE criteria rating exercise of identified strategies. The on-the-ground models of care involving application of an Ask-Advise-Act/Help approach to care were co-designed to meet the needs of the individual cancer centres and departments through extensive consultation with relevant stakeholders (oncologists, nurses, nurse unit managers, care coordinators, pharmacists, IT professionals, wellness manager etc.) over a period of 3-6 months at six cancer centres. **Results:** The findings of the APEASE process are described. Seven models of care were created across the six centres, each differing according to the needs of the site. The nature and outcomes of the consultation processes are described in both quantitative and qualitative terms. Centre-specific variations were found to be dependent on the engagement of a range of cancer care disciplines involved in delivering patient care. The level of engagement across disciplines influenced the intensity of smoking cessation care that could be delivered, particularly in relation to pharmacotherapy. There were varying levels of capability and motivation to complete the Act/Help part of evidence-based cessation support across cancer centres and specialties. **Conclusion:** Implementing evidence-based cessation care in cancer centres is challenging, time intensive and highly subject to the circumstances of the individual department and cancer centre.

FUNDING: Federal; State; Nonprofit grant funding entity

POS1-53

COLLABORATING WITH CALIFORNIA FIREFIGHTERS TO PREVENT SMOKELESS TOBACCO AND NICOTINE POUCH UPTAKE: A CBPR CASE STUDY

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Significance: As an occupation, U.S. firefighters have lower combustible smoking rates (13.6%) than the general population (15.5%) yet have elevated use rates of smokeless tobacco (SLT). Overall tobacco use, including SLT, is higher in California's rural areas than in urban counties. Nicotine pouches (NP) have also gained traction among rural youth. This study describes the establishment of a firefighter-research partnership's Community Advisory Board (CAB), and initial views from the CAB on factors that may encourage or inhibit use of SLT/NP among new firefighters in rural California. **Methods:** A case study approach to CAB input lays the groundwork for SLT/NP uptake prevention intervention design, resonant with the occupational culture. Tobacco-related occupational health researchers and project staff experienced in community tobacco control partnered to develop a pilot project aimed at uncovering factors linked to SLT/NP uptake among new rural fire trainees. Following a community-based participatory research (CBPR) approach, we invited subject matter experts to join the CAB. Six individuals accepted the invitation: a rural county fire chief; a rural county fire engineer; a retired firefighter active in the Firefighter Cancer Support Network; a metro fire district health and fitness program manager; a former hotshot (specially trained wildlands firefighter); and the president of a large firefighter union. During CAB meetings, members shared their insights into firefighter use of SLT/NP. **Results:** Despite declining combustible tobacco use, CAB members agreed that SLT/NP use is pervasive, and that "it's a cultural thing." One member described "ZYN (i.e., NP) runs" that fellow firefighters would go on; another described how ZYN was entirely sold out at convenience stores located near a large wildfire area. Some factors that members thought were linked with SLT/NP use included peer pressure, boredom, perceived calming effect of nicotine, and perceived need for a nicotine-fueled "energy boost." Firefighters have a high risk of developing occupation-related cancer; some members felt that this contributed to a fatalistic mentality regarding tobacco use. Members agreed that a crucial juncture for SLT/NP uptake occurs after program trainees graduate and join the fire service. **Conclusion:** Guided by the CAB's input, this CBPR project is poised to further probe factors linked to SLT/NP uptake that can be used to draft training, educational, and policy recommendations.

FUNDING: State

POS1-54

UNVEILING CHARACTERISTICS OF VAPERS AND SMOKERS: BEYOND THE CLOUDS IN THE DEEP SOUTH

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BACKGROUND: Electronic nicotine delivery systems (ENDS) have become increasingly common as both a replacement for and an adjunct to combustible tobacco use. Currently, 8% of the US population has reported ever use of an ENDS, whereas 11.5% use tobacco cigarettes. Despite trends of increasing ENDS use, little is known about the characteristics of ENDS users as compared to smokers, especially in the Deep South, which leads the nation in smoking rates and smoking-related morbidity and mortality. **OBJECTIVES:** To examine demographic characteristic differences between individuals who use ENDS and those who smoke traditional tobacco cigarettes. **METHODS:** A sample of 347 participants were recruited in Birmingham, Alabama, consisting of both vapers and smokers. Demographic information, including age, race, income, and education, was collected through self-report surveys. **RESULTS:** ENDS users ($n = 185$) exhibited a younger mean age ($M = 28.40$ years, $SD = 10.21$) as compared to smokers ($n = 162$, $M = 46.75$ years, $SD = 10.95$). Furthermore, a higher proportion of ENDS users were White (74.6%) relative to smokers (28.8%), whereas a lower proportion of ENDS users were Black (10.8%) as compared to smokers (64.4%). Regarding education, a higher number of ENDS users had graduated from high school ($n = 119$, 64.3%) versus smokers ($n = 95$, 58.3%). Of those who graduated high school, smokers had only 26.9% of individuals obtain higher education compared to 34.6% of vapers. Income also included differences where 40% of vapers made less than \$10,000/year, compared to 61.3% of smokers. There were no differences related to gender, sexual orientation, or veteran status. **CONCLUSION:** Results revealed notable distinctions between the two groups in terms of their demographic profiles. Understanding these differences is essential for tailoring public health interventions and policies to both vaping and smoking populations. Examples of tailored interventions could include increased cigarette cessation efforts provided to older adults at low or no cost. Regarding e-cigarette use, further information could be provided to young adults about harms of ENDS use, and



increased efforts could be made to target nicotine cessation among this population. Further research is needed to explore the underlying factors contributing to these demographic variations and their implications for public health initiatives, especially as related to the population of Deep South

FUNDING: Federal

POS1-55

E-CIGARETTE AND CIGARETTE FLAVOR INTERACTIVELY AFFECT PRODUCT CHOICE AMONG PEOPLE WHO DUAL-USE E-CIGARETTES AND MENTHOL CIGARETTES

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Introduction: One-third of people who use tobacco use more than one product. The most common product combination is cigarettes (CCs) and e-cigarettes (ECs), representing over 13 million Americans. People who use multiple products may substitute one for the other, largely as a function of product characteristics (e.g. flavor, nicotine level). EC flavor restrictions increase appeal of CC, yet the impact of these restrictions in the context of a menthol ban are unknown. This study assessed the degree to which EC flavor restrictions may impact the effect of eliminating menthol from CC. **Methods:** Participants who regularly used flavored ECs and menthol CCs were randomized to either the menthol CC condition (n=18) or non-menthol CC condition (n=20). EC type varied across three counterbalanced preference sessions: 1) own device, 2) tobacco-flavored study device, and 3) preferred flavor study device. Participants made 10 choices in each session, with the option to take 2 puffs EC, 2 puffs CC, or abstain. Generalized estimating equations assessed the outcome of choices for CC, with EC type as a within-subjects factor, menthol condition as a between-subjects factor, and monthly CC/EC ratio, race, age, and sex as covariates. **Results:** Participants (n= 38; 40% female; 32% African American; mean age = 32) reported using 8.9 menthol CCs per day on 24.8 days per month and using ECs 12.3 times per day on 27.1 days per month. Participants randomized to menthol vs. non-menthol CCs had greater preference for CCs across trials (B= 0.15, p<0.001). A significant EC flavor x CC menthol interaction indicated the non-menthol group had lower CC preference during preferred vs. tobacco flavored EC sessions (B= -0.47, p<0.001) and the menthol group had greater CC preference during preferred vs. tobacco flavor EC sessions (B= 0.0079, p<0.001). Both the menthol and non-menthol groups had lower CC preference during own device vs. tobacco flavored EC sessions (B= -0.31, -0.35 respectively, p<0.001). **Discussion:** Participants randomized to non-menthol CCs had lower preference for CC vs. EC or abstinence, providing further support for a menthol ban. Since menthol-prefering participants randomized to non-menthol CCs still had greater preference for these assigned CCs than for tobacco ECs (vs. flavored ECs), stringent EC flavor regulations may have deleterious effects in the context of a menthol ban among people who use both products.

FUNDING: Federal

POS1-56

SECOND HAND SMOKING IMPACTS ON CHILDREN AS A RESULT OF DOMESTIC SMOKING- A PILOT STUDY IN URBAN INDIA

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Background Smoking has a harmful impact on health not just for smokers but also for others around them owing to secondhand smoke (SHS) exposure in persons of all ages and genders. If their parents smoke, their children may be exposed to tobacco products in a variety of ways. SHS exposure in children is very common in the household environment. The dangers of secondhand smoke (SHS) are well documented, and substantial data suggests that children exposed to tobacco smoke are at a higher risk of developing childhood malignancies. Urine cotinine is an excellent method for identifying smokers and determining children's SHS exposure from their parents. The present study examines the impact of secondhand smoke exposure on children in urban India. The purpose of this study was to look into the relationship between parental smoking and the presence of cotinine in children's urine. **Methods** A pilot study with 50 smoking (Group A) and non-smoking (Group B) parents and their children was done. After describing the purpose of the study, demographic data, frequency and duration of smoking, domestic smoke exposure, and biological urine samples in sterile containers were collected from all participants. The Fastep quick diagnostic test kit was used to determine the presence of cotinine in the urine of the participants, with a cut off value of 100ng/ml urinary cotinine. **Results** A high prevalence (100%) of urinary cotinine was identified among smoker parents and children (Group A). This association was directly reliant on the domestic smoking habit and indirectly depending on the smoker's behavior

iors after smoking. However, nonsmokers and their children (Group B) had no signs of cotinine in their urine. **Conclusion** The amount of cotinine in the urine of parents and children was found to be correlated in this study, suggesting the incidence of domestic smoking exposure due to the parents' smoking habit. Although preventing indoor home smoking will reduce children's tobacco exposure, there is a need to discover additional sources of smoking exposure and maintain effective monitoring and enforcement of home smoking bans in India.

FUNDING: No external funding reported

POS1-57

RACIAL/ETHNIC DISPARITIES IN DAILY ANXIETY AND DAILY ENDS USE AMONG US ADULTS: THE NATIONAL HEALTH INTERVIEW SURVEY, 2020-2022

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Significance: Extant research has established a link between anxiety symptoms and electronic nicotine delivery systems (ENDS) use. However, the extent to which daily anxiety is associated with daily ENDS use, as well as whether racial/ethnic disparities in these relationships exist, is not as known. **Methods:** We used data from the 2020-2022 National Health Interview Survey on adults 18 years or older (n=83,593). To estimate the association between daily anxiety and daily ENDS use, we conducted logistic regression, adjusted for survey year, age, sex, race/ethnicity, sexual orientation, education, income-to-poverty ratio, urbanicity, health insurance status, anxiety medication use, and other tobacco use (i.e., cigarettes, cigars, pipe/hookah, or smokeless tobacco every day or some days). We tested a two-way interaction between anxiety and race/ethnicity for its statistical significance and stratified the adjusted model by race/ethnicity to explore effect modification. **Results:** Among the sample, 13.0% had daily anxiety, and 2.4% used ENDS every day. Daily anxiety was more prevalent among adults who identified as another race/ethnicity (18.7%), followed by non-Hispanic (NH) White (14.3%), NH Black (10.9%), Hispanic (10.6%), and NH Asian (6.2%) adults. These patterns were similar for daily ENDS use, with adults who identified as another race/ethnicity having the highest prevalence (4.9%), followed by NH White (3.0%) and Hispanic, NH Black, and NH Asian each at 1.2%. In the adjusted model, adults with daily anxiety had higher odds of daily ENDS use (OR: 1.41, 95% CI: 1.20-1.65). The Wald test p-value for the interaction between anxiety and race/ethnicity was statistically significant (p=0.01), warranting stratification. In these models, daily anxiety was associated with daily ENDS use among Hispanic (OR: 2.49, 95% CI: 1.50-4.11) and NH White (OR: 1.30, 95% CI: 1.09-1.55) adults but not NH Black, NH Asian, and adults who identified as another race/ethnicity. **Conclusions:** Daily anxiety was linked to daily ENDS use, and these associations appeared stronger for Hispanic adults. Understanding the mechanisms by which daily anxiety may influence nicotine consumption is needed to better inform interventions aimed at reducing mental health and tobacco use comorbidity. As certain racial/ethnic populations are more susceptible to anxiety and ENDS use, prioritizing these populations in intervention efforts will promote racial health equity.

FUNDING: Federal

POS1-58

IMPACT OF VANILLA FLAVOR ON NICOTINE TASTE, CHOICE, INTAKE, AND SEEKING BEHAVIORS

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Significance: Electronic delivery systems and smokeless tobacco products often contain flavors that impact nicotine product choice and use. We aimed to investigate the impact of vanillin, the principal chemical of vanilla flavor in tobacco products, on nicotine taste and behavior. We utilized specific paradigms in rats to assess nicotine taste responses, motivation, and addiction potential. **Methods:** We employed a two-bottle free-choice test (2BC) to measure the preference for different concentrations of vanillin and its effect on nicotine preference. To explore the long-term effects of early exposure to sweetened vanillin, we utilized a combined model of 2BC and intraoral self-administration (IOSA). We specifically assessed nicotine initiation, maintenance, and seeking behaviors in the presence or absence of vanillin. To quantify the liking (ingestive) and disliking (aversive) taste responses to oral nicotine with or without vanillin, we conducted a taste reactivity test (TRT). Additionally, we determined the effects of commercial vanilla flavor on nicotine intake in an operant vapor self-administration (VSA) model. Female and male Sprague Dawley adolescent and young adult rats were used in separate experiments of 2BC, IOSA, TRT, and VSA. We used nicotine concentrations of 10 µg/ml for oral and 6 mg/ml for inhalation studies. While vanillin (1 - 5000 µg/ml) was used for oral intake



studies and a vanilla flavor containing commercial e-liquid (DuraSmoke) was used for inhalation studies. **Results:** In 2BC tests, female rats preferred vanillin containing solutions more than their male counterparts. In the IOSA, vanillin alone and the combination of vanillin plus nicotine led to greater IOSA compared to water. However, female rats self-administered vanillin plus nicotine more than their male counterparts. Vanillin also increased nicotine-seeking only in females. Vanillin reversed nicotine aversion by increasing ingestive taste responses and blocking nicotine's aversive taste responses to high concentration of nicotine, in both sexes. Vanilla flavor did not alter nicotine vapor intake at tested concentrations in VSA. **Conclusion:** The results indicate that vanilla flavor can increase oral nicotine intake and seeking, and can also increase liking and decrease disliking of nicotine's taste. The impact of vanilla flavor on nicotine taste and nicotine choice, intake, and seeking behaviors is dependent on concentration, sex, and administration route.

FUNDING: Federal

POS1-59

ELECTRONIC NICOTINE DELIVERY SYSTEMS USE AND CARDIOVASCULAR DISEASE RISK: A NEED FOR NEW TOOLS

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Cigarette smoking is positively and robustly associated with cardiovascular diseases (CVD), including hypertension, atherosclerosis, cardiac arrhythmias, stroke, thromboembolism, myocardial infarctions, and heart failure. However, after more than a decade of electronic nicotine delivery systems (ENDS) presence in the U.S. marketplace, uncertainty persists regarding the long-term health consequences of ENDS use for CVD. New approach methods (NAMs) in the field of toxicology are being developed to enhance rapid prediction of human health hazards. Recent technical advances can now consider impact of biological factors such as sex and race/ethnicity, permitting application of NAMs findings to health equity and environmental justice issues. This has been the case for hazard assessments of drugs and environmental chemicals in areas such as cardiovascular, respiratory, and developmental toxicity. Minimizing the time between the emergence of risk (e.g., ENDS use) and the administration of well-founded regulatory policy requires thoughtful consideration of the currently available sources of data, their applicability to the prediction of health outcomes, and whether these available data streams are enough to support an actionable decision. This challenge forms the basis for our analysis of how best to reveal potential toxicities of ENDS use in the human cardiovascular system - a primary target of conventional tobacco smoking. We identify current approaches used to evaluate the impacts of tobacco on cardiovascular health, in particular emerging techniques that replace, reduce, and refine slower and more costly animal models with NAMs platforms that can be applied to tobacco regulatory science. The limitations of these emerging platforms are addressed, and systems biology approaches to close the knowledge gap between traditional models and NAMs are proposed. It is hoped that these suggestions and the use of these NAMs will result in fresh data streams that will support and enhance the decision-making capacity of tobacco regulatory agencies worldwide.

FUNDING: Federal; Nonprofit grant funding entity

POS1-60

TOBACCO INDUSTRY STRATEGIES TO INFLUENCE THE REGULATION OF NEW TOBACCO AND NICOTINE PRODUCTS IN LATIN AMERICA AND THE CARIBBEAN

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Significance: Tobacco companies have increasingly invested and promoted new tobacco and nicotine products (NTNPs), including electronic cigarettes and heated tobacco products (HTPs) to undermine the implementation of the WHO Framework Convention on Tobacco Control (FCTC). This situation is increasingly evident in Latin America and the Caribbean (LAC) where tobacco companies have increased NTNP marketing on social media, especially among youth. Research on NTNPs globally has primarily focused on their potential health risks and marketing. Only a few studies have examined NTNPs in LAC. This study aims to expand on this limited research by analyzing key tobacco

industry strategies regarding NTNP regulation in LAC. **Methods:** Analysis of industry websites, advocacy reports, news media and government documents triangulated with 15 key advocate surveys from 14 different countries. Application of the Policy Dystopia Model (PDM) to analyze industry action and argument-based strategies regarding NTNP regulations. **Results:** Industry actors engaged in four instrumental (action-based) strategies attempting to influence NTNP regulations including coalition management, information management, direct involvement and access to the policy process and litigation. Coalition and information management consisted of forming and managing coalitions of key policymakers, academics and vaping associations and providing grants to media groups to produce and disseminate favorable information about NTNP harm reduction in LAC. Meanwhile, involvement in policy and litigation consisted of participating in public consultations, presenting at public hearings, inserting industry-inspired language for favorable NTNP legislation and filing injunctions to challenge NTNP bans. The tobacco industry primarily focused on disseminating its 'harm reduction' approach through larger and influential countries (e.g. Argentina, Brazil and Mexico) and countries viewed as diffusion hubs (e.g. Costa Rica, Jamaica and Uruguay). Industry discursive (argument-based) strategies centered on arguing NTNPs are less harmful, provide safer alternatives and should be regulated as 'harm reduction' products or, at least, the same as conventional tobacco products. **Conclusion:** Applying the PDM to new industry tactics regarding NTNPs provides a better understanding of industry strategies to undermine FCTC implementation. Proactively exposing deceptive and misleading industry tactics should help regulate and ban NTNPs.

FUNDING: Academic Institution; Nonprofit grant funding entity

POS1-61

DIFFERENCES IN TRANSITIONS IN TOBACCO USE BEHAVIOR BY RACE/ETHNICITY: RESULTS FROM THE TRUTH LONGITUDINAL COHORT (2019-2021)

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Purpose: To characterize how patterns of use across cigarettes, e-cigarettes, and little cigars, cigarillos, and cigars (LCCs) differed by race/ethnicity. **Methods:** Data were obtained from the Truth Longitudinal Cohort, a nationally representative, probability-based cohort which includes 15-24 years at baseline. Participants indicated that they had ever used cigarettes, e-cigarettes, or LCCs at Wave 10 or Wave 11 (baseline, 2019-2020) and provided information on past 30-day use of these tobacco products at Wave 12 (follow-up, 2021) to be included in latent class and latent transition analyses. **Results:** Users tended to retain their use status over time, though this differed by race/ethnicity. For non-Hispanic Whites, 92.0% of former/noncurrent tobacco users, 86.0% of predominantly e-cigarette/LCC users, 76.0% of predominantly cigarette with polytobacco users, and 78.0% of predominantly e-cigarette users retained their latent status. These percentages were: 90.0%, 60.0%, 72.0%, and 75.0% for non-Hispanic Black participants, and 93.0%, 86.0%, 54.0%, and 68.0% for Hispanic/Latino participants. A greater proportion of those who identified as non-Hispanic White (22.0%) or Hispanic/Latino (23.0%) transitioned from being predominantly cigarette with polytobacco users to predominantly e-cigarette users, relative to those who identified as non-Hispanic Black (7.0%). A greater proportion of those who identified as non-Hispanic Black (25.0%) and Hispanic/Latino (21.0%) transitioned from being predominantly e-cigarette users to being former/noncurrent tobacco users, relative to non-Hispanic Whites (16.0%). **Conclusion:** Future research is needed to identify common and unique mechanisms of tobacco product use across race/ethnicity groups, such as why non-Hispanic White and Hispanic/Latino respondents are more likely to transition to e-cigarette use.

FUNDING: Unfunded

POS1-62

INITIAL EVALUATION OF THE LEARN2QUIT NEW YORK (L2QNY) TEXTING TOBACCO CESSATION PROGRAM

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Significance: Automated text messaging cessation programs are more efficacious than minimal support, but little is known about efficacy and characteristics of different types of programs, especially in response to the new National Texting Portal. L2QNY is a unique automated text messaging cessation program derived from an evidence-based, cognitive behavioral treatment manual. L2QNY helps users prepare for, achieve, and maintain abstinence from tobacco using cognitive behavioral content, weekly goal setting, skill building, thought-provoking questions, and pre-programmed interactivity.



Methods: Participants enrolled via the NYS Quitline (NYSQ) website (nysmokefree.com) from 08MAR2022 to 20JUL 2023 and become eligible for outcome assessments 7 months after enrollment. Participants completed basic demographic and clinical information and received between 1-3 texts per day for 6 wks. A link to the outcome assessment was sent 7-months after enrollment via email followed by telephone calls. Logistic regression and complete case analyses were used to calculate 7-day point prevalence abstinence rates. Rates were compared to telephone treatment rates. **Results:** Participants (n = 1,250), 70% of whom smoked cigarettes, were 76.6% White, 15.8% were Hispanic; 12.8% identified as a sexual/gender minority; 51.7% reported a high school education or less; 22.1% reported a yearly income below \$10,000; 38.8% were unemployed; and 11.1% of participants reported living in public housing; 90.6% remained enrolled until program completion. Of the 590 participants who were eligible for outcome assessment, 74 (12.5%) completed the outcome assessment. **Results:** 43.8% of respondents were abstinence which compares to 33.9% of NYSQ callers. Among those who did not quit, 48.8% reported smoking fewer cigarettes per day, an average decrease of 3.3 +/- 8.7 cigarettes per day. **Conclusions:** A large, diverse group of adults who smoke cigarettes enrolled in L2QNY. Evidence suggests this unique texting programs results is effective at supporting abstinence and reducing cigarette consumption. Reaching participants for outcome assessments is particularly challenging, particularly because individuals may appreciate the relative anonymity of the text program and not welcome a phone- or email-based questionnaire. While our response rate is relatively low, this is approximately 3x greater than the percentage of outcome responses typically gathered from NYSQ callers. Future efforts may consider matching the mode of outcome assessment to the mode of enrollment.

FUNDING: No external funding reported

POS1-63

RESPIRATORY SYMPTOMS AND OUTCOMES AMONG CIGAR SMOKERS, FINDINGS FROM THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY, WAVES 2-5 (2014-2019)

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Significance The mechanisms by which cigarette smoking increases the risk of respiratory disease have been studied. However, less is known about risks of respiratory symptoms and outcomes associated with smoking cigars, especially by different cigar types. **Methods** Using Waves 2-5 (2014-19) of the Population Assessment of Tobacco and Health (PATH) Study, we examined associations between cigar use, including traditional cigars, cigarillos, filtered cigars, and dual cigar and cigarette use, and three outcomes, 1) functionally important respiratory symptoms (FIRS), 2) lifetime asthma diagnosis, and 3) uncontrolled asthma. Our analytic sample included adults, 18 and older by Wave 5, with no COPD or non-asthma respiratory disease, resulting in 44,040 observations for population-averaged cross-sectional analysis and 7,930 individuals for longitudinal analysis. **Results** We found that those with current established cigarillo use had higher odds of having FIRS (AOR: 1.72; 95% CI: 1.08, 2.74) compared to those who never smoked cigarillos and cigarettes, after adjusting for covariates. Those with current established filtered cigar use had higher odds of asthma diagnosis (AOR: 1.35; 95% CI: 1.10, 1.66) while those with current established dual use of filtered cigars and cigarettes had higher odds of uncontrolled asthma (AOR: 5.13; 95% CI: 1.75, 15.02) compared to those who never smoked filtered cigars or cigarettes. Those with current established cigar use and current established dual use of cigarettes and cigars had higher odds of new FIRS compared to those who never smoked cigars or cigarettes (AORs: 1.62; 95% CI: 1.02, 2.60 for exclusive cigar use and 2.55; 95% CI 1.57, 4.14 for dual use of cigars and cigarettes). **Conclusions** This study provides evidence that those who smoke cigars or dual use cigars and cigarettes have greater odds of FIRS, asthma, and uncontrolled asthma and that smoking any cigar increases new cases of FIRS compared to never cigar or cigarette smoking. Understanding health impacts associated with cigar use is important for policymaking as well as designing clinical interventions focused on smoking cessation for cigars.

FUNDING: Federal

POS1-64

TOBACCO USE OF SELF-IDENTIFIED FEMALES AND THEIR IMMIGRANT STATUS

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Significance: The prevalence of smoking among immigrants in the United States (U.S.) ranges between 14% and 28.3%. More than half of immigrants who smoke and desire to quit are unsuccessful in smoking cessation. While smoking rates among male immigrants reduce as they become more assimilated in the U.S., the reverse effect occurs among female immigrants. Evidence should be updated to reveal if there are any current gaps for the female population. **Methods:** To evaluate most recent available trends, Wave 5 of the original Population Assessment of Tobacco and Health (PATH) Study was used. In the R software, G-test and Barnard's test were used to determine likelihood and association for categorical variables, respectively. **Results:** Around 51% of participants self-identified as females, 30.4% as immigrants, and 27% as adults who currently smoke. Among these, 1030 were female participants who immigrated from another country and smoked every day. Compared to 17.3% of non-immigrant females, who currently smoke, 13.4% of immigrant ones used e-cigarettes to quit smoking. Immigrant and non-immigrant females who currently smoke were equally likely (12.6% and 12.9%, respectively) to use the U.S. Food and Drug Administration's (FDA) recommended cessation options. Immigrant females (94.7% vs 94.1%) who smoked were only slightly more likely to succeed in quitting. Among females who currently smoke, immigrants were less likely (9.9% vs 11.7%) to consider dual tobacco use with e-cigarettes. All analyses were non-significant. **Conclusion:** Literature shows that immigrant adults are less likely to use e-cigarettes than those who were born in the U.S. This study clarifies this trend in respect to the female population. Similar to prior studies, it is encouraging that no significant differences were among immigrant and non-immigrant females' use of FDA's recommended smoking cessation options and that both populations are equally likely to succeed in their quitting attempts. Further research should focus on these trends among specific ethnic populations and compare them to those who lived in the U.S. their whole lives.

FUNDING: Unfunded

POS1-65

"THAT'S TOO BIG FOR ME TO EVEN CONCEPTUALIZE": LGBTQ+ DUAL USERS' PERSPECTIVES ABOUT QUIT-SMOKING AND QUIT-VAPING MASS MEDIA COMMUNICATION

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Significance: Dual use of cigarettes and e-cigarettes is particularly common amongst lesbian, gay, bisexual, transgender, queer, and questioning (LGBTQ+) adults in the US. This is concerning as health risks of dual use may be as high or higher than exclusive smoking. We sought to examine tobacco use beliefs and quitting experiences of LGBTQ+ dual users and to learn their perspectives on mass media quitting messages. **Methods:** Between January-March 2022, twenty adults who self-identified as LGBTQ+ and dual users of cigarettes and e-cigarettes in North Carolina, USA participated in semi-structured interviews. Participants were asked about their beliefs, identity, motivations, and personal and social quitting barriers as LGBTQ+ dual users. Participants were then shown 4 quit-smoking and quit-vaping advertisements (from the US Food and Drug Administration (FDA), US Centers for Disease Control and Prevention (CDC), and original ads) and asked about their perceptions. Recordings were transcribed, coded, and examined using ATLAS.ti and a thematic content analysis approach. **Results:** LGBTQ+ dual users described how they use tobacco products to cope with stress and fit in socially, as smoking and vaping were common in their social groups. While most said they were not ready to quit both smoking and vaping, some were open to quitting smoking. Some participants thought e-cigarettes may be as harmful as cigarettes, reducing their motivation to quit vaping. In response to viewing ads, participants said that LGBTQ+-focused ads that address dual use would be helpful and would be received well if they are supportive, authentic, and inclusive. They discouraged ads that felt stereotypical, paternalistic, or patronizing. **Conclusions:** Mass media quitting ads for LGBTQ+ dual users should be authentic, explicitly address both smoking and vaping, and offer support without alienating individuals or reinforcing stigma. These findings can be used to inform ad refinement and quantitative testing to determine the most effective ads for encouraging and supporting LGBTQ+ dual users in quitting and inform mass media campaigns by governmental and non-governmental organizations.

FUNDING: Federal



POS1-66

PREDICTIVE FACTORS OF ANXIODEPRESSIVE SYMPTOMS AMONG SMOKERS, A HOSPITAL-BASED SURVEY, ARIANA, TUNISIA, 2020-2021

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Introduction: Anxiodepressive symptoms ADS should be detected from the first medical smoking cessation consultation. This detection should improve the management of patients during smoking cessation. For this, the identification of the predictive factors of these symptoms could help the tobacco specialist to take care of his patients appropriately. **Significance:** To identify the predictive factors of ADS in smokers wishing to quit. **Methods:** It was a study carried out retrospectively from medical records which took place in the epidemiology and statistics department at the Abderrahmane Mami hospital in Ariana. It took place over 2 years, from January 2020 until December 2021. It focused on patients in the smoking cessation consultation in their first consultation. Data collection was done from patient records. Data analysis was performed using R version 4.3 software. Binary logistic regression was used for the multivariate analysis. The significance threshold was set at 0.05 for all analyses. **Results:** We collected 175 patients during two years of consultation. The sex ratio M/F=2.78. The median age of smoking initiation was 17 years (Inter Quartile Range IQR 25-75 = [15-20]). Two-thirds of consultants (66.9%) have tried to quit smoking for at least once in their lives. The median Fagerström score was 7 (IQR 25-75=[5-8]). Sixty-one percent (61.4%) of smokers had a strong tobacco dependence. Fifty-two percent of our smokers have had at least one of the two ADSs: 22.2% had depression symptoms and 51.2% had anxiety symptoms. The independent protective factors against ADS in smokers were having a good mood currently (Odds-Ratio adjusted ORa=0.7; 95% CI=[0.6-0.9], p=0.001) and the independent risk factors were have a personal history of depression (ORa=3.4, 95% CI=[1.5-7.6]; p=0.002) and Fagerström score (ORa=1.3; 95% CI=[1.1- 1.6]; p=0.001). **Conclusion:** High nicotine dependence and personal history of depression were independent risk factors for ADS, while having good moral status was an independent protective factor. It is recommended to detect these symptoms during all the follow-up of the smokers at the consultation to be able to help him in all the steps to be taken until the success of the withdrawal.

FUNDING: Unfunded; Academic Institution

POS1-67

PREVALENCE AND CORRELATES OF CURRENT CIGARETTE SMOKING AMONG TRANSGENDER WOMEN IN ARGENTINA

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Objectives: 1) To assess the prevalence of current cigarette smoking among transgender women in Argentina, and 2) to examine the unique associations of current cigarette smoking with demographic and psychosocial factors. **Methods:** This study is a secondary data analysis of the TransCITAR - a prospective cohort study of transgender individuals living in Buenos Aires, Argentina - baseline data. The TransCITAR baseline survey collected information on sociodemographic characteristics, perceived health status, depressive symptoms, and suicide attempts. Current cigarette smoking, alcohol use disorder, and substance use were also assessed. Participants were also asked about lifetime experiences of physical and sexual violence from partners, clients and/or the police, and experiences of gender identity stigma in the past year from healthcare workers and the police. Lastly, participants were asked if they had ever been arrested by the police. Fisher's exact test was used to compare proportions in categorical variables and student t-test was used for continuous variables. Significant associations with current cigarette smoking were tested in a logistic regression model that adjusted for all significant associations. **Results:** A total of 41.7% of participants reported current cigarette smoking. Compared to their non-smoking counterparts, participants who reported current cigarette smoking 1) had lower levels of education, 2) were less likely to be born in a different country, 3) more likely to have migrated to Buenos Aires from other parts of the country, 4) more likely to report lifetime sex work, 5) more likely to perceive their health as excellent, 6) more likely to screen positive for hazardous alcohol drinking, 7) more likely to report any substance and cocaine use in the past year, 8) more likely to experience gender identity stigma from the police in the past year, and 9) more

likely to being arrested by the police in their lifetime (all p's < 0.05). After controlling for all significant associations, education level of less than high school (AOR = 1.79, 95% CI 1.02-2.12), hazardous drinking (AOR = 2.65, 95% CI 1.30-5.37), and any substance use in the last year (AOR = 2.14, 95% CI 1.16-3.94) were positively and independently associated with current cigarette smoking. **Conclusion:** Among transgender women in Argentina, current cigarette smoking was high. Current cigarette smoking was associated with education, hazardous drinking, and any drug use. These results will inform future smoking cessation interventions among transgender women in Argentina.

FUNDING: Unfunded

POS1-68

DESIGNING A COLLECTION OF TEXT MESSAGES FOR PREVENTING ADOLESCENT TOBACCO USE: A QUALITATIVE INVESTIGATION

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Introduction: Communicating the dangers associated with tobacco use to adolescents can prove to be difficult, particularly given the tobacco industry's efforts to attract youths. To meet the demand for enhanced tobacco risk communication to adolescents, text message interventions have arisen. Founded on the transtheoretical model, we present the development of a library of text messages aimed at addressing the risks associated with various tobacco products and applying processes of change for health persuasion. **Approach:** We derived the research findings from two distinct phases. The first phase involved online focus group discussions with 25 participants and an in-depth paired interview. In the second phase, we conducted online brainstorming workshops, which resulted in the design of the current message version. We conducted this study as part of a broader project focused on developing and testing a program for tobacco prevention. By employing thematic analysis and the affinity mapping technique, two members of the research team systematically identified recurring topics and relevant quotes, organizing them into overarching themes and subthemes. **Findings:** We extracted four main themes: 1) Limited tobacco knowledge, 2) Social factors of tobacco use, 3) Marketing attitude, and 4) Message framing. In the second phase, participants actively refined the original messages, generating a range of 1 to 7 versions for each message. Through a combination of voting and engaging in discussions, this collaborative effort led to the design of an extensive message collection comprising 306 messages. We organized the messages into seven sections based on processes of change from the transtheoretical model. This design ensured that the messages were not only enriched by participant input but also tailored to align with the various stages of behavior change identified in the model. **Discussion:** This study offers key insights necessary for the design and assessment of a scientifically sound library of text messages aimed at tobacco prevention and tailored to adolescents. We ensured that contemporary adolescents could relate to these messages. In our subsequent research, we will work to advance the initial message design and test the message library with both adolescents and experts in tobacco risk communication. There is potential to develop messages that are customized according to gender, ethnicity, nuanced adolescent age groups, and other factors that may predict tobacco use.

FUNDING: Federal

POS1-69

DEATHS FROM SMOKING VERSUS OPIOIDS AMONG PEOPLE WHO USE OPIOIDS IN ENGLAND

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Significance: People who use illicit opioids, such as heroin, are far more likely to smoke cigarettes than the general population, yet they are rarely offered smoking cessation support. It is important to examine how smoking affects death rates in this population. **Methods:** Data came from the HUPIO cohort of 138,761 patients (between 1997 and 2020) with primary care records suggesting a history of illicit opioid use. Causes of death were categorised as smoking-related, opioid related, or neither. Life tables were created to model survival from age 18 to 70. We estimated (i) the proportion of premature deaths and (ii) the number of life-years lost per person by age 70 related to either smoking or opioids. **Results:** An estimated 20.2% of deaths by age 70 were from smoking-related causes, while 24.6% were from opioid-related causes. Deaths from opioids occurred at a younger age, leading to greater life-years lost for opioid- than smoking-related causes (4.8 years versus 1.0 year per person by age 70). However, from age 55 onwards, mortality rates were higher from smoking related causes and, by age 60, individuals were three times as likely to die from smoking- than opioid-related causes (in the subsequent year). **Conclusion:** As people who use illicit opioids



in England move into middle and old age, they experience greater risk of death from smoking- than opioid-related causes. Alongside treatment for their opioid use, support should be provided to help this population quit smoking.

FUNDING: State; Nonprofit grant funding entity

POS1-70

PUBLIC SUPPORT FOR TOBACCO ENDGAME POLICIES IN THE REPUBLIC OF KOREA: FINDINGS FROM THE 2020 INTERNATIONAL TOBACCO CONTROL KOREA SURVEY

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Significance: Public support may increase the likelihood of tobacco endgame policy implementation. This study assessed public support for six endgame policies: limiting nicotine and banning all additives in cigarettes, restricting the number of places where cigarettes are sold, and banning the manufacture and sale of cigarettes (without any conditions, with provision of quit support, and with alternative tobacco products available), among adults with different nicotine use statuses in the Republic of Korea (KR).

Methods: Data from the 2020 International Tobacco Control (ITC) Korea Survey of 4,794 adults aged 19+ were analyzed stratified by nicotine use: 1) do not use any product, 2) vape and/or use heated tobacco products (HTPs) but do not smoke cigarettes, 3) smoke cigarettes only, and 4) smoke cigarettes and vape and/or use HTPs. Attitudes were classified as supportive, undecided (don't know/refused), or opposed. Weighted multinomial logistic regression models were used to assess level of support for six endgame policies (opposed as the reference). Separate regressions were conducted for all participants combined, and for those who used at least one product. **Results:** Overall support was highest for limiting nicotine (68.4%, 95% CI=64.6-72.3%) and restricting the number of retailers (68.1%, 95% CI=64.5-71.7%), banning cigarette sales combined with quit support (64.2%, 95% CI=60.4-68.0%), banning cigarette sales unconditionally (61.3%, 95% CI=57.4-65.2%), banning additives (59.7%, 95% CI=55.8-63.7%), and banning cigarette sales if alternative products are available (45.0%, 95% CI=40.9-49.1%). Respondents who did not use any product were most likely to support endgame policies, except for banning cigarette sales with alternatives available. Support for banning additives in cigarettes was higher among those who vaped and/or used HTPs and smoked, than those who vaped and/or used HTPs but did not smoke (aOR=1.82, 95% CI=1.07-3.09). Support for banning cigarette sales with alternatives available was lower for respondents who smoked cigarettes only (aOR=0.49, 95% CI=0.28-0.87) compared to those who vaped and/or used HTPs but did not smoke. **Conclusions:** Public support for endgame policies is high in KR, with more than 68% in favor of policies to limit the nicotine content of cigarettes and to restrict the number of retailers. Findings suggest that public acceptability is not a barrier to the implementation of endgame policies in KR.

FUNDING: Federal; State; Nonprofit grant funding entity

POS1-71

RACIAL AND ETHNIC DIFFERENCES IN TOBACCO-CANNABIS CO-USE AMONG ADULTS: EVIDENCE FROM THE US POPULATION-BASED STUDY

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Significance: Tobacco and cannabis use varies with race and ethnicity, but less is known about racial and ethnic differences in tobacco-cannabis co-use (TCU). To better understand these differences, we investigated racial and ethnic differences in exclusive cannabis use, cigarette smoking and TCU among the US general population. **Methods:** We analyzed population-based, nationally representative cross-sectional data from the 2021 Behavioral Risk Factor Surveillance System, Marijuana Use module. Outcomes were exclusive cigarette smoking, past 30-day cannabis use (≥1 days of use in the past 30-day) and TCU. Independent variable was race and ethnicity categorized as non-Hispanic (NH) Black, Hispanic, NH White and Other (including NH Asian, NH American Indian/Alaskan Native, NH Native Hawaiian/other Pacific Islander only, NH other race only, NH Multiracial). Predictors were demographics, physical health, mental health, cancer history, and past year unmet healthcare need because of cost. The sample included 128,218 adults aged ≥18 years living in 20 US states. Descriptive statistics and multivariable logistic regression analysis were used. Sampling weights were applied to account for the complex survey design with results generalizable to 41.6 million adults. **Results:** Overall sample was 52% female, 50% aged ≥50 years, 73% NH White (10% NH Black, 9% Hispanic, 8% Other), 37% ≤ high-school education. NH Blacks and Hispanics were more likely to report unmet healthcare needs than NH Whites (17%, 9%, vs. 7%, p<0.001). About 14% reported current smoking, 12% past 30-day cannabis use, and 3.5% TCU. Prevalence of current smoking was higher in NH Whites (14%), than in Hispanics (11%) and NH Blacks (13.6%, p<0.001). Prevalence of past 30-day cannabis use (16% NH Black, 11% NH Whites, 12% Hispanics, p<0.001) and TCU (5% NH Black, 3.4% NH Whites, 2.6% Hispanics p<0.001) varied by race and ethnicity. Hispanics had lower odds (adjusted odds ratio [aOR] 0.47; p<0.001) and NH Blacks had higher odds (aOR 1.34; p=.02) of reporting TCU than NH Whites. Men, divorced/separated adults, those reporting poor mental health in the past 30 days and past year unmet healthcare needs were more likely to report TCU. **Conclusion:** Racial and ethnic disparities exist in TCU among the US general population. Population-level targeted psycho-social interventions are required to reduce TCU, especially among ethnic minorities who are disproportionately affected by socio-economic deprivation.

FUNDING: No external funding reported

POS1-72

SOCIODEMOGRAPHIC CHARACTERISTICS, HEALTH AND SMOKING AMONG LATINX TRANS AND NON-BINARY ADULTS IN PUERTO RICO AND FLORIDA

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Introduction: In the United States (US), transgender (35.5%) adults reported higher cigarette smoking rates than cisgender adults (14.9%). However, little is known about the prevalence and correlates of cigarette smoking among Latinx Trans and Non-Binary (LTGNB) adults. This study examines the prevalence and correlates of current cigarette smoking among LTGNB adults in Puerto Rico (PR) and Florida (FL). **Methods:** The study is a secondary data analysis of a cross-sectional survey. The recruitment was completed by availability between July 2020 and April 2021. Self-reported sociodemographic characteristics (e.g., age), smoking status, mental health condition (e.g., depression), and physical illness diagnosis (e.g., diabetes) were assessed. Descriptive analysis was used to explain the data. Chi-square and Fisher's exact tests were used to evaluate correlates in self-reported variables with smoking status (smoking vs. non-smoking). **Results:** A total of 133 participants completed the online survey in Spanish. The mean age was 34.4 (SD=10.28) years. The 46.1% self-identified as trans-women, 35.2% trans-man, and 22.7% as non-binary. Half of the participants were born in PR (53.5%) and reside in the FL (53.5%). The 64.8% had an associate educational degree or higher, and 47.7% had an income of \$0 to \$1000. The 28.6% reported current smoking, with a median of 6 (2.0-10.0) cigarettes daily. There was a significant correlation between smoking, place of birth (X²(1) = 11.208, p=.002), and income (X²(1) = 7.665, p=.017). The proportion of participants born in PR (70.3%) and with a lower income (\$0-\$1000; 63.2%; p=.017) was higher among those who smoke. No significant correlations were identified between smoking and age, gender, country of residence and education (p>.05). Other significant correlations were identified between smoking and depression (X²(1) = 7.973, p=.007), bipolar disorder (X²(1) = 8.674, p=.006), and diabetes (X²(1) = 16.254, p<.001). The proportion of participants reporting depression, bipolar disorder, and diabetes diagnosis (68.4%, 21.1%, and 21.1%) was higher among those who smoke. **Conclusions:** Results highlight the elevated smoking prevalence and its correlations with sociodemographic factors such as place of birth and income among LTGNB adults. In addition, results demonstrate the potential association of smoking with physical and mental health. Our study supports prioritizing tailored smoking cessation treatments for LTGNB adults.

FUNDING: No external funding reported

POS1-73

EMERGENCY DEPARTMENT INTERVENTIONS FOR SMOKING CESSATION- A SYSTEMATIC REVIEW

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Significance Emergency Departments offer a valuable opportunity to intervene to support smoking cessation however there has been mixed trial evidence. **Methods** We searched Embase, MEDLINE, PsycINFO, CINAHL and CENTRAL for randomised controlled trials from inception to May 12, 2023, using free text and subject headings relating to smoking cessation and emergency departments. Inclusion criteria were randomised controlled trials intending to support people to quit smoking and the location was the emergency department. No date or language limitations were applied. **Results** We identified 19 studies. Studies mostly tested either the provision of opportunistic brief advice, an offer of NRT, or both, compared with usual care. No studies tested interventions involving e-cigarettes. All trials were at high risk of bias. Statistical pooling of these studies using a Mantel-Haenszel random effects model favours brief advice for increasing quit rates, but confidence intervals included the potential of no benefit (RR 1.35, 95% CI 0.88-2.08, $I^2=34\%$; 7 studies; 2861 participants). Results favour offering NRT over not offering NRT (RR 1.47, 95% CI 1.04-2.07, $I^2=45\%$; 5 studies; 2938 participants). **Conclusion** Emergency Department based interventions to support smoking cessation interventions which incorporate brief advice +/- NRT appear to be more effective than control in achieving smoking abstinence.

FUNDING: No external funding reported

POS1-74

UNDERSTANDING TOBACCO MARKETING PERCEPTIONS AND SMOKING TRENDS AMONG SEXUAL AND GENDER MINORITY INDIVIDUALS

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Significance: Tobacco use rates continue to be disproportionately high among the sexual and gender minority (SGM) community, prompting the need for a deeper understanding of the underlying factors contributing to this trend. This study addresses this crucial gap by investigating the perceptions of SGM individuals towards big tobacco and their association with current smoking behaviors. **Methods:** A bilingual (English and Spanish) cross-sectional survey was distributed during the month of June 2023 among SGM individuals in Texas through a pen-and-paper format, phone calls and a quick-response code (QR code). Socio-demographic, self-reported tobacco use characteristics, as well as perceptions about the tobacco industry tactics were collected from study participant and summarized with descriptive statistics. Chi-squared test was used to compare the perception of tobacco marketing between current and non-current smokers. Multiple binomial logistic regression was used for assessing the association between the perception of tobacco marketing and current cigarette smoking after adjusting for sociodemographic determinants. **Results:** Prevalence of current cigarette smoking among SGM individuals participating in our study was 10.9%. After adjusting for participants' sociodemographic characteristics, current SGM smokers are more likely than non-current SGM smokers to advocate for SGM organizations/events to accept sponsorship money from tobacco companies (aOR=2.66) and advocate against making pride celebrations smoke-free events (aOR=3.85). **Conclusion:** By shedding light on the intricate interplay between tobacco marketing perceptions and smoking behavior within the SGM population, this research paves the way for more targeted interventions and strategies aimed at reducing tobacco use and improving the overall health outcomes of this vulnerable community.

FUNDING: Federal

POS1-75

EXPLORING USE OF DATA ON PRODUCT SALES TO IDENTIFY AND CHARACTERIZE EMERGING ENDS BRANDS IN FLORIDA AND THE US

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SIGNIFICANCE: The tobacco marketplace is ever evolving with rapid growth of electronic nicotine delivery systems (ENDS) brands creating challenges for policymakers and practitioners to keep pace. Surveillance systems are needed to quickly detect emerging (i.e., gaining in popularity) ENDS products. We analyzed ENDS sales data to identify and characterize emerging brands in Florida and the US. **METHODS:** We initially identified 283 ENDS brands appearing in NielsenIQ retail scanner sales data (convenience, grocery, pharmacy, mass merchandiser, discount/dollar, and military commissary store sales) from July 2020-June 2022. We calculated each brand's monthly dollar sales market share for each market in the NielsenIQ data (US, Florida) across all brands. We used time series clustering to identify and characterize sales growth patterns across brands

(n=121 brands fell into distinct growth patterns) that appeared in Q2 2022 sales data and Jenks natural breaks algorithm on sales data from these brands to determine market share size segments (n=64 brands fell into distinct segments). We placed brands into 4 market segments that were determined by rounding results from Jenks natural breaks algorithm. We combined data on growth and market share size segments to define and develop emerging brand profiles. **RESULTS:** Time series clustering revealed 4 Florida market clusters: declining market share brands (n=20), brands with rising then falling share (n=41), brands with short market share spikes (n=44), and brands with steady growth (n=16). Market share size segment analysis revealed 4 segments: very small (<1%; n=54), small (1-5%; n=4), mid (5-25%; n=3) and large (>25%; n=1). Combining market share cluster and size analyses revealed 3 notable growth profiles. "Quickly Dominant" brand Fume was in the growing cluster and large market segment with ample Florida sales growth, limited US sales growth and low US market share. "Steady Climbers" HQD and Cali Plus grew steadily in Florida and the US, but had overall low US market share. "Rapid Newcomer" Elf Bar went from obscurity to notable Florida and US market share in a few quarters. **CONCLUSION:** Combining market growth clusters with size segments helped identify emerging ENDS brands of interest, which we supplemented with national trends to characterize brands gaining in popularity. These findings can provide early indicators of what brands are gaining in popularity and should be monitored by policymakers and practitioners.

FUNDING: State

POS1-76

EXPERIENCES FROM THE FIRST SIX COUNTRIES TO IMPLEMENT TOBACCO ENDGAME GOALS

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Significance: Some governments have adopted 'endgame' goals to reduce smoking or tobacco use to a low level over a defined time period. The first endgame goal was introduced in Finland in 2010. By 2018, endgame goals had been introduced in Aotearoa New Zealand (2011), Ireland (2013), Scotland (2013), Sweden (2016), and Canada (2018). The INSPIRED project aims to describe and critically review progress with endgame goals in these countries. **Methods:** Performance towards achieving endgame goals was assessed by completion of data collection templates by tobacco control experts from each country. Key measures included prevalence patterns, nature of the endgame goal, action plans, progress reports, and introduction of tobacco control measures. **Results:** The endgame goals are: Canada, <5% current tobacco use prevalence by 2035; Finland, <5% daily use of all tobacco products, including all non-medical nicotine products, by 2030; Ireland, <5% current smoking prevalence by 2025; New Zealand, <5% daily smoking prevalence and minimal tobacco product availability by 2025; Scotland, <5% current smoking prevalence by 2034; and Sweden, <5% daily smoking prevalence by 2025. Smoking prevalence in all INSPIRED countries has declined over the past decade. The latest prevalence figures for current smoking range from 9% in New Zealand (2021/22) to 18% in Ireland (2022). Unacceptable inequities in smoking prevalence remain in each INSPIRED country. Each country has produced at least one formal report on endgame goal progress and has implemented at least three of the World Health Organization MPOWER measures at a 'best practice' level (Scotland classified under the United Kingdom). All countries have a formal strategy or action plan for their endgame goal and have implemented interventions beyond MPOWER measures, such as health warnings on individual cigarettes (Canada), a slim cigarette ban (Canada, New Zealand), and standardised packaging (all). New Zealand alone has adopted three endgame measures for implementation between 2024 and 2027 (greatly reduced retailer numbers, mandated denicotinisation, and a smokefree generation). **Conclusions:** Having an endgame goal does appear to have helped in the battle against tobacco, and other countries could significantly benefit from setting such goals. However, to ensure INSPIRED countries equitably meet their endgame goals, further interventions including endgame measures suitable for their country are likely to be needed.

FUNDING: Academic Institution; Nonprofit grant funding entity



POS1-77

CIGARETTE, E-CIGARETTE, AND HEATED TOBACCO PRODUCT MARKETING AT POINTS-OF-SALE NEAR SCHOOLS IN THE PHILIPPINES

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Significance Tobacco advertising at point-of-sale (POS) is associated with smoking initiation and progression. Policies in the Philippines prohibit tobacco and nicotine product sale and marketing within 100 meters of schools. As of 2019, 10% of students ages 13-15 years smoked cigarettes and 14.1% of students used e-cigarettes. We examined advertising and promotion of tobacco and nicotine products at POS to assess compliance with existing regulations and describe the nature of marketing at POS. **Methods** An observational study of cigarette, e-cigarette, and heated tobacco product (HTP) advertising at retailers selling any of these products within 200 meters of primary, secondary, and high schools was conducted in nine diverse cities/regions of the Philippines. A multistage sampling approach was used - urban and rural neighborhoods were randomly selected in each city and within those areas, schools were randomly selected while ensuring that the 200-meter radii around each school did not overlap. Observations of retailers included tobacco and nicotine product types sold, presence and types of advertisements displayed, and availability of flavors. **Results** We observed 6,566 retailers within 200 meters of 353 schools selling cigarettes, e-cigarettes, or HTPs. All retailers sold cigarettes, 112 sold e-cigarettes, and 123 sold HTPs. 32% (n=2,075) of retailers selling cigarettes, 21% (n=23) selling e-cigarettes, and 55% (n=67) selling HTPs displayed outdoor ads for the respective products. 98% (n=6,452) of cigarette retailers sold single cigarette sticks. Most retailers selling cigarettes (90%, n=5,877), e-cigarettes (98%, n=110), and HTPs (98%, n=121) sold the products in flavors other than tobacco. Cigarettes, e-cigarettes, and/or HTPs were sold within 100 meters of 78% (n=276) of the schools sampled. **Conclusions** Non-compliance with regulations that prohibit sale of tobacco and nicotine products within 100 meters of schools is an issue in the Philippines. Advertisement of tobacco and nicotine products and marketing tactics that appeal to youth like sale of single cigarette sticks and availability of flavored products are widespread at POS. Enforcement of current regulations and adoption of strong tobacco control policies like a comprehensive ban on advertising at POS are needed to help reduce tobacco and nicotine product initiation and encourage quitting.

FUNDING: Nonprofit grant funding entity

POS1-78

FLAVOR CHEMICALS IN BAT VELO NICOTINE POUCHES SOLD IN PAKISTAN

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Significance: Oral nicotine pouches usually include some flavor chemicals along with nicotine, filler material, and other possible additives; a range of flavors and nicotine strengths are available. Sales of oral nicotine pouches are increasing globally, with Velo (BAT), On! (Altria) and Zyn (Swedish Match) among the popular brands. There have been no independent assessments to date assessing a broad range of flavor chemicals in oral nicotine pouches. We assessed the presence of flavor chemicals in Velo products, which are sold by many tobacco vendors in Pakistan, a country with millions of people who use smokeless tobacco use. **Methods:** Ten variants of Velo were purchased in Karachi in 2022 and shipped to the US for analysis. Samples were assessed for 180 flavor chemicals as well as nicotine. Chemical analyses gave the mg/pouch values for menthol, a broad collection of other flavor chemicals (OFCs), and a subset of OFCs—total fruit flavored chemicals (TFFCs). **Results:** All ten brand variants had detectable levels of flavor chemicals. The three "Polar Mint" variants had no detectable levels of TFFCs. Brand variants with descriptors of "Mint", "Frost" and "Blast" had the highest levels of menthol. The "Paan Rush" variant contained the lowest amount of menthol but the highest level of OFCs at 1.79 mg/pouch, with benzyl alcohol, a well-known cherry flavorant, contributing to most of the OFCs value at 1.68 mg/pouch and to the subset of TFFCs. The variants "Elaichi Blast" and "Urban Vibe" had the next highest levels of OFCs, and in both cases the fruit group contributed significantly, thus also having a relatively large TFFCs parameter. The two brand variants with "max" descriptors had the highest levels of nicotine, followed by the six variants with "strong" descriptors; the two variants with "medium" descriptors had the lowest levels of nicotine, advertised at 6 mg/pouch. **Conclusion:** This is the first independent assessment of a broad range of flavor chemicals in oral nicotine pouches. Pakistan has ratified the WHO FCTC which indicates "there is no justification for ... the use of ... flavoring agents, which help make tobacco products attractive." Flavors increase product appeal, adolescent initiation and

experimentation, and difficulty quitting. These analyses found that oral nicotine pouches purchased in Pakistan contained flavor chemicals including menthol. Regulation of flavor chemicals in these tobacco products should be considered in Pakistan.

FUNDING: Nonprofit grant funding entity

POS1-79

SMOKING AND QUITTING CHARACTERISTICS OF SMOKERS WITH AND WITHOUT A MENTAL HEALTH CONDITION IN AUSTRALIA: A COMPARATIVE ANALYSIS UTILISING POPULATION-LEVEL SURVEY DATA

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Significance People with a mental health condition (MHC) continue to smoke at rates far higher than the general population, resulting in significant physical health inequity including reduced life expectancy. Large-scale population level data however is rarely available to help us better understand the smoking and quitting characteristics of these smokers and examine possible differences to those smokers who do not have a MHC. Such information may assist in better targeting and tailoring of cessation support to this vulnerable group of smokers. **Aims** To describe the smoking characteristics, quitting behaviours and motivation, intentions and self-efficacy in quitting for current Australian smokers, comparing those with and without a MHC; and to examine whether such factors are associated with number of quit attempts. **Methods** The Cancer Institute Tobacco Tracking Survey has been undertaken by the Cancer Institute NSW since 2005 to collect data from current smokers. A question asking about diagnosis or treatment of any MHC in the last 12 months was added to the survey in 2018, and data from March 2018 to June 2021 was utilised in the present study. Characteristics were compared between smokers with and without a MHC using t-tests and chi-squares. Associations with number of quit attempts were assessed using negative binomial regression, with interaction terms to assess differences by presence of a MHC. **Results** Data was available for 5,416 survey participants (n = 1,687 with a MHC and n = 3,729 without). Preliminary findings suggest smokers with a MHC were likely to report higher motivation to quit (p<0.001), a greater number of quit attempts (p<0.001), lower quitting self-efficacy (p<0.001) and higher nicotine dependence (p<0.001) than smokers without. There was no difference in intention to quit in the next 30 days between smokers with and without a MHC (p=0.150). A greater number of quit attempts was associated with lower nicotine dependence, higher motivation to quit and lower self-efficacy to do so, with no differences by presence of a MHC. **Conclusions** Smokers with a MHC are a vulnerable group who despite high motivation to quit and a large number of quit attempts, are less likely to successfully do so than other smokers. A greater number of quit attempts is associated with high motivation and low nicotine dependence, but lack of success may compound a low self-efficacy to quit. Smokers who have a MHC represent a growing proportion of remaining smokers, and targeted efforts with supports tailored to the needs of this group are urgently required.

FUNDING: Academic Institution

POS1-80

PERCEPTIONS AND BELIEFS ON E-CIGARETTE AND CONVENTIONAL CIGARETTE: RESULTS OF A REPRESENTATIVE SAMPLE IN THE EUROPEAN PERSPECTIVES

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Significant: According to the 2020 Eurobarometer study, France had the second-largest proportion of current electronic cigarette (EC) users in Europe: currently, the rate is 7.5%. While prevalence and usage are well documented, limited research on perceptions has been conducted in Europe; this is our study's objective. **Methods:** The French Cancer Barometer (INCa/SpFrance) is a cross-sectional phone-administered survey conducted on a representative sample of the general population in France in 2021 (n=4938). Perceptions of the harmfulness of ECs were assessed 1/ directly to health and 2/ compared to conventional cigarettes (CCs). Descriptive analyses and multinomial logistic regressions were conducted. **Results:** 70.1% of the respondents considered ECs to be harmful to one's health with 24.3% perceiving them as very/extremely and 45.8% as somewhat harmful. Women (OR=1.63 [1.16-2.31]) and people under 55 were more likely to perceive ECs as very/extremely harmful to health (vs 55-75, 15-24, OR=3.38 [1.78-7.88]; 25-34,



OR=5.47 [3.12-9.62]; 35-44, OR=4.38 [2.58-7.45]; 45-54, OR=2.34 [1.41-3.87]), as the one with the lower level of education (vs 5 years of higher-education, OR= 0.42 [0.23-0.80]). According to smoking/vaping status, "ex-smokers/vapers" (OR=0.14 [0.04-0.42]) and dual users (OR=0.12 [0.04-0.32]) were less likely to share this opinion than "never smokers/never vapers". Compared to CCs' harm, 53% of respondents considered ECs to be equally or more harmful. Those with the lower income level were more likely to think so (vs €1101-€1799/month, OR=0.57 [0.40-0.80]; >€1800 OR=0.36 [0.25-0.54]) as the one with the lower education-level (vs 5 years higher-education, OR=0.31 [0.17-0.57]). Vapers were less likely to share the opinion that ECs are more harmful than CCs, especially current vapers (vs "never smokers/never vapers", ex-smokers who vape, OR=0.04 [0.01-0.22]; dual-users, OR=0.14 [0.06-0.35]). Conclusion: This study is the first one in Europe to investigate finely perceptions of EC harmfulness on health and compared to CCs. It reveals fairly negative perceptions and marked by social inequalities with regard to health and increasingly negative perceptions in relation to CCs, which contrasts with ECs use increase observed in France and draws perspectives for further research. These results provide venues for understanding the changes observed in Europe.

FUNDING: State

POS1-81

TOBACCO-FREE NICOTINE: KNOWLEDGE, AWARENESS, USE, AND PERCEPTIONS OF RELATIVE ADDICTIVENESS AND HARM AMONG PEOPLE WHO USE E-CIGARETTES

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Significance: Little is known about knowledge, awareness, use, and perceptions of synthetic nicotine (also marketed as tobacco-free nicotine [TFN]) products. We analyzed data from a survey of adults who use e-cigarettes to explore these constructs. **Methods:** Our sample included US adults (21+) who used e-cigarettes in the past 30 days (N=1163), with most (92%) being daily users. The web-based survey was completed from Feb to Apr 2023. Knowledge of the presence of nicotine and tobacco and the source of nicotine in TFN were assessed before we provided a definition of TFN. Then, awareness, ever use, past 30-day use, and perceptions of relative addictiveness and harm (TFN versus tobacco-derived nicotine [TDN]) were self-reported. All participants self-reported awareness and perceptions. Ever use was reported by those who were aware of TFNs, and past 30-day use was reported by those who ever used TFNs. Descriptive analyses were conducted. **Results:** Overall, 87% (n=1009) knew TFN contained nicotine, 89% (n=1032) knew TFN did not contain tobacco, and 55% (n=636) knew it was created in a lab from chemicals that did not come from tobacco. About 44% (n=517) had previously heard of TFN. Of those who had heard of TFN, 66% (n=341) had knowingly used it. Among participants who knowingly used TFN, 83% (n=284) had knowingly used it in the past 30 days. Further, 76% (n=879) and 61% (n=708) of participants perceived TFN and TDN as equally addictive and harmful, respectively. **Conclusions:** Less than half of participants had previously heard of TFN, but irrespectively, most understood nicotine was present, and tobacco was not. There was less understanding of how TFN was sourced. Of those who previously heard of TFNs, many reported knowingly using TFN products. The majority perceived TFN and TDN as equally addictive and harmful. Further exploration is warranted, including examination of reasons for first and continued use, stratification by smoking status, and quantifying unknowing TFN use. Better understanding knowledge, awareness, use, and perceptions of TFN among adults using e-cigarettes will help regulators decide how to regulate TFN, including its marketing.

FUNDING: Federal

POS1-82

GENDER-AFFIRMING HORMONE THERAPY AND TOBACCO USE: A SYSTEMATIC REVIEW

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Significance: Gender-affirming hormone therapy (GAHT) helps alleviate incongruence between a transgender or gender expansive (TGE) person's gender identity and their sex assigned at birth, providing "feminizing" or "masculinizing" changes to their bodies. Because TGE people exhibit significant disparities in tobacco use and there are tobacco-related risks to using hormones, we sought to summarize the existing literature on associations between GAHT for TGE people and tobacco use. **Methods:** We keyword searched five databases (PubMed, Embase, PsycInfo, Google Scholar, and Mednar)

in spring 2023. Screening, extraction, and analyses were conducted in June-August 2023. Results: 300 studies met search criteria. 115 duplicates and irrelevant studies were removed. 94 studies did not meet inclusion criteria (e.g., review articles, commentaries). 91 studies comprised the final sample, containing articles that included GAHT for TGE people, with mentions of patients' tobacco prevalence and/or tobacco-related treatment complications. Approximately 60% of studies focused on GAHT for TGE patients, with the rest focused on gender-affirming surgeries for TGE patients or other considerations (e.g., provider practices). 80% of studies were adult-only samples, 3% were youth-only, and 17% included adults and youth. Approximately equal numbers of studies focused on masculine/transmasculine and feminine/transfeminine patient samples (29% and 25% respectively), while 43% focused on both patient groups. Nine studies (10%) included cisgender patients for comparisons to TGE samples. Tobacco/smoking prevalence was reported in 76 studies (84%), with current use ranging from 6.3% to 40%. Regarding patient behaviors, 78 studies (86%) used language related to "smoking," including 33 studies (36.3%) that named "tobacco" generally, while 16 studies (18%) named cigarettes or other tobacco products specifically. Over 79% of studies made no mention of a cessation requirement for patients. 12% of studies mentioned cessation as "advised" or "instructed," and 6% required cessation for GAHT. Only 7 studies (8%) mentioned providing patients cessation assistance. Finally, 49 studies (54%) explored associations between tobacco use and patient outcomes. 20 of those (41%) demonstrated significant findings such as an increased risk for venous thromboembolism or elevated hematocrit among patients who smoked. 21 studies (43%) showed no differences in patient outcomes by smoking. **Conclusions:** The tobacco burden in TGE communities and the increasing popularity and availability of GAHT makes understanding associations between GAHT and tobacco use critical and deserving of more research. GAHT may be a promising avenue for interventions designed to reduce TGE peoples' tobacco use. Medical practitioners should be aware of the risks between GAHT and tobacco use and offer cessation assistance to patients.

FUNDING: Federal

POS1-83

ASSOCIATION OF ANXIETY AND DEPRESSION SYMPTOMS WITH PERCEIVED HEALTH RISK OF NICOTINE VAPING PRODUCTS FOR SMOKING CESSATION

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Introduction: The health of people with mental health conditions is a priority of Australia's National Preventive Health Strategy, with a higher smoking prevalence (20.2%) than in the wider population (9.9%). As 21% of Australians report experiencing a mental health condition in the past year, this suggests higher risk of tobacco-related illnesses and a greater need for smoking cessation support. This study aimed to explore the association of anxiety and depression with perceived health risk of prescription versus non-prescription access nicotine vaping products (NVP) for smoking cessation in South Australia. **Methods:** South Australians aged ≥15 years completed the SA Health Population Health Survey in 2022, which recorded smoking and vaping status, PHQ-4 anxiety and depression symptoms, risk of nicotine addiction from NVPs, and perceived health risk of prescription access versus non-prescription access NVPs for smoking cessation. Weighted linear regression models were fitted for influence of demographics, general addiction risk perception and anxiety and depression symptoms on perceived health risk of prescription versus non-prescription access NVPs for smoking cessation. **Results:** General concern about nicotine addiction risk of NVP-facilitated smoking cessation was related to greater health concerns of NVP use, irrespective of device source. Anxiety and depression did not directly influence perceived health risks of NVP-facilitated smoking cessation, however interaction of vaping and depression symptoms was associated with higher perceived health risk ratings for prescription sourced NVPs (beta=0.700, 95%CI=0.212, 1.118). **Conclusion:** Findings suggest that people with depression who vape might be less likely to engage with the prescription access system for quitting, highlighting the importance of integrating mental health considerations into this system. **Significance:** People who vape and experience depression symptoms may see greater health risk in using the NVP prescription access model, compared to those without depression symptoms. This has potential implications for this priority population in communicating risk and accessing prescription sourced NVPs as part of a range of smoking cessation pharmacotherapies given that non-prescription sources are highly restricted in Australia. **Disclosure of interest:** This study was supported by Cancer Council SA, The Australian Prevention Partnership Centre, and NHMRC grant GNT1198301.

FUNDING: Federal; Nonprofit grant funding entity



POS1-84

CONNECTING WITH ANTI-VAPING ADS: THE IMPACT OF EMOTIONAL RESPONSE TO ADVERTISEMENT MESSAGING AMONG US YOUTH AND YOUNG ADULTS

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Significance: It is imperative that youth/young adult audiences are receptive to anti-tobacco messages and find a personal connection. While a relationship has been established between emotions prompted by anti-combustible tobacco advertising messages and ad receptivity among youth/young adults, this work does not yet exist for electronic cigarettes. The goal of this study was to explore this relationship between emotions prompted by anti-vape advertising messages and ad receptivity as well as personal relevance. **Methods:** Online surveys of 5,975 (200-300/ad) respondents ages 15-24 captured emotions towards 25 truth campaign anti-vape advertisements. Respondents viewed one ad and were asked the following question about each of 8 emotions "how much does this ad make you feel..." on a scale from 1 "not at all" to 5 "a great deal". Emotions were dichotomized as positive (hopeful, powerful, motivated, inspired) or negative (irritated, angry, sad, afraid) and further paired into dyads based on preliminary correlations: hopeful/powerful, motivated/inspired, irritated/angry, sad/afraid. Linear regressions were performed to indicate whether positive vs negative emotions had a bigger impact on receptivity, the average of 3 items "this ad...was convincing, grabbed my attention, gave me good reasons not to vape" and personal relevance, the average of 3 items "I identify with what the video says, the video speaks to me, the video is for people like me" on a scale from 1=strongly disagree to 5=strongly agree. **Results:** All positive emotions had a significant effect on both outcomes with the combination of motivated/inspired, having the strongest effect on receptivity ($b = 0.26$, $p < 0.001$) and personal relevance ($b = 0.29$, $p < 0.001$). The combined negative emotions of irritated/afraid produced the lowest mean score on both receptivity ($b = -0.22$, $p < 0.001$) and personal relevance ($b = -0.15$, $p < 0.01$). Analysis were also run comparing current vapers to non-vapers. The mean scores were significantly higher for positive emotions and lower for negative emotions on both outcomes for vapers compared to non-vapers. **Conclusion:** Emotional response must be considered when developing anti-vaping messages. These results suggest that positive emotions are useful in driving ad receptivity and personal relevance and while some negative emotions can influence these outcomes in a positive direction - once anger or irritation are present, results can be inversely impacted.

FUNDING: Other

POS1-85

EXPOSURE TO E-CIGARETTE USING TV AND MOVIE CHARACTERS AMONG US SEXUAL MINORITY YOUTH RESULTS FROM 2022 NATIONAL YOUTH TOBACCO SURVEY

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Background Exposure to tobacco use in TV shows and movies is associated with tobacco use among youth, however it is unclear to what extent youth are exposed to e-cigarette use in TV shows and movies. Understanding levels of exposure to e-cigarette-using TV/movie characters is important to inform tobacco prevention strategies, especially among those with higher health burdens, such as youth who are sexually minoritized. Therefore, we used the US national dataset and examined exposure to e-cigarette-using TV and movie characters by sexual identity. **Methods** We used the 2022 National Youth Tobacco Survey (NYTS) to assess the association between sexual identity (i.e., "heterosexual", "gay/lesbian", "bisexual", and "not sure") and exposure to e-cigarette-using TV/movie characters, assessed as "When you watch TV or streaming services, or go to the movies, how often do you see people or characters using e-cigarettes?" (i.e., "never", "rarely", "sometimes", "most of the time" and "always"). We conducted a linear regression on exposure levels by sexual identity, adjusting for sex, age, race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, and non-Hispanic others), and current use of tobacco products (e.g., e-cigarettes, cigarettes, cigars, smokeless tobacco, hookah). **Results** Among total youth respondents (N=28,291), 4.5% identified as gay/lesbian, 11.9% bisexual and 9.9% were unsure. Of all respondents, 24.6% reported 'never', 27.5% 'rarely', 34.3% 'sometimes', 10.2% 'most of the time', and 3.3% 'always' reported seeing an e-cigarette-using TV/movie characters. Our adjusted regression model found that gay/lesbian youth (vs. heterosexual youth) had 1.14 times greater levels of exposure to e-cigarette-using TV/movie characters (95% CI=1.02, 1.27). **Conclusions** This preliminary evidence highlights higher levels of exposure to e-cigarette-using TV/movie characters by youth identifying as gay/lesbian than heterosexual youth. The findings might inform

e-cigarette prevention strategies such as monitoring the depiction of e-cigarette use on TV shows and movies and developing counter-messaging for e-cigarette use, particularly directed at youth who are sexually minoritized.

FUNDING: Federal

POS1-86

ADOLESCENTS VAPING AND MUCOCILIARY TRANSPORT SPEED IN NASAL EPITHELIAL CELL CULTURES. A CROSS-SECTIONAL STUDY.

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Background: E-cigarette use, also known as vaping, is increasingly popular amongst adolescents, but we know little about the health effects in adolescents. We need to know if vaping reduces mucociliary transport in the respiratory tract of adolescents, as cigarette smoking does, to ensure this early defense mechanism against pathogens is not compromised by vaping. We thus investigated associations between vaping and mucociliary transport (MCT) in the nasal epithelial cells of adolescents. **Methods:** We included participants from a birth cohort of healthy children in Bern, Switzerland and enriched the data set by advertising on social media to recruit adolescents who vape. We collected demographic information, self-reported substance use, and nasal epithelial cells via nasal brushing. We cultivated the cells at the air liquid interface for four weeks without additional in-vitro vaping exposure and washed the cells to remove excess mucus. We then apically added puffball spores and used high-speed video microscopy to record MCT, capturing median and maximal MCT speed with the CiliaLyzor open access software. We contrasted daily or weekly vaping and no daily or weekly smoking (vapers) to no exposure to vaping in the past 12 months and no daily or weekly smoking (controls). We log-transformed MCT speed due to skewness and adjusted linear regression models for sex, exposure to second-hand smoke and ambient air pollution. **Results:** We included 32 adolescents (17 women and 15 men), with a median age (range) of 17 [15-21] years. Median MCT speed of nasal epithelial cells in vapers ($n=15$) was $5.7\mu\text{m/s}$, 95% CI 0 to $15.0\mu\text{m/s}$, and $18.6\mu\text{m/s}$, 95% CI 9.9 to $27.3\mu\text{m/s}$ in controls. Maximal MCT speed in vapers was $15.7\mu\text{m/s}$, 95% CI 0 to $34.8\mu\text{m/s}$, and $32.5\mu\text{m/s}$, 95% CI 14.6 to $50.4\mu\text{m/s}$ in controls. Multivariable adjusted log-transformed MCT speed (median value) was similar in vapers and controls (coefficient -0.4, 95% CI -2.3 to 1.5, $p=0.60$), as was multivariable adjusted log-transformed maximal MCT speed (coefficient -0.1, 95% CI -2.3 to 2.1). **Conclusion:** Mucociliary transport speed in adolescents who vaped regularly was like MCT in adolescents who did not vape, perhaps because all participants were youthful, or because our analytical method was based only on in vivo exposure without further exposure during cell cultivation. Future studies should test the short- and long-term safety of e-cigarettes at cellular levels and measure related clinical outcomes.

FUNDING: Academic Institution; Nonprofit grant funding entity

POS1-87

STATE-SPECIFIC E-CIGARETTE USE AMONG US YOUTH BY SEXUAL ORIENTATION, 2019-2021 YOUTH RISK BEHAVIOR SURVEY

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Introduction: Evidence indicates higher rates of electronic cigarette (e-cigarette) use among lesbian, gay, bisexual, and transgender (LGBT) youth compared to their cisgender heterosexual peers, which is a significant concern in the US. In this nationally representative sample of US youth, we aimed to explore the state-specific weighted prevalence of e-cigarette use among LGBT youth and how it differs from their cisgender heterosexual peers. **Methods:** A pooled analysis was conducted using data from the 2019 and 2021 Youth Risk Behavior Survey. Overall, 37 US states collected data from high school students (grades 9-12; $N = 271,614$) on sexual identities (LGBT, $n = 40848$) and cisgender heterosexual (n= 230,766). The weighted prevalence of current (past 30-day) use of e-cigarettes by US states was reported. A multivariable regression model was performed to examine the association between sexual identity and vaping e-cigarettes controlling for potential confounders including demographics (i.e., age, sex, race/ethnicity, and school grade), current cigarettes use, and other tobacco products use. Weighted adjusted odds ratios (AOR) and corresponding 95% confidence intervals (95% CIs) were reported. Data for the state of California was collected only for the 2019 YRBS. **Results:** In 2019-21, current e-cigarette vaping was higher among US LGBT than cisgender heterosexual youths (28 vs 19%; $p < .001$). The weighted prevalence of current vaping was predominant among LGBT (vs. cisgender heterosexual) in several US states including West Virginia (41% vs. 30%; $p = .02$), North Carolina (40% vs. 29%; $p < .0001$),



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New Mexico (39% vs. 28%; $p < .0001$), Ohio (39% vs. 18%; $p = .0013$), North Dakota (35% vs. 26%; $p = .0014$), and Kentucky (34% vs. 17%; $p < .0001$). The lowest prevalence of current vaping among LGBT (vs. cisgender heterosexual) youth was in Alabama (19% vs. 20%; $p = 0.25$) and California (19% vs. 18%; $p = .933$). The multivariable regression model showed that compared to cisgender heterosexual peers, LGBT youth were at greater risk of vaping ($AOR = 1.37$; 95%CI: 1.01-1.86; $p < .001$) in 2019-21, after accounting for the aforementioned confounders. **Conclusions:** This nationally representative study adds to the existing literature that e-cigarettes use among LGBT youth is prevalent in the US, with a wide spectrum within US states. National and state-level vaping prevention strategies should consider sexual identities in designing, developing, and implementing targeted tailored vaping prevention and cessation programs.

FUNDING: State; Academic Institution; Nonprofit grant funding entity

POS1-88

OPTIMIZING MESSAGES AND IMAGES FOR E-CIGARETTE WARNINGS: BRINGING BEHAVIORAL SCIENCE TO POLICY

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Significance: US policies require e-cigarettes to have a single addiction warning, but warnings can grow stale over time. We sought to use behavioral science tools to optimize warning to discourage e-cigarette use, based on health harms associated with vaping. **Methods:** Participants were 1,629 US adults who currently vaped or smoked. In an online survey, we randomized them to evaluate 7 of 28 text-only messages on newly developed warning themes (metals exposure, DNA mutation, cardiovascular problems, chemical exposure, lung damage, impaired immunity, addiction), and the current FDA-required warning (total of 8 messages). Then, participants evaluated images of hazards (e.g., metal), internal harms (e.g., organ damage), or people experiencing harms. **Results:** Regarding intended effects, new warning themes all discouraged vaping more than the current FDA-required warning (all $p < .001$), led to greater negative affect (all $p < .001$), and led to more anticipated social interactions (all $p < .001$). The most discouraging warnings were about toxic metals exposure. Regarding unintended effects, the new themes led to more stigma against people who vape (6 of 7 themes, $p < .001$) and led to a greater likelihood of thinking vaping is more harmful than smoking (all 7 themes, $p < .001$), though unintended effects were smaller than intended effects. Images of harms (internal or people experiencing) discouraged vaping more than images of hazards (all $p < .001$). **Conclusions:** E-cigarette warnings should communicate a broader range of hazards and harms, beyond addiction, to potentially increase awareness of health harms and motivate reductions in tobacco use. While the unintended effects were small, research should continue to explore these to understand the impact of e-cigarette warnings, especially among people who smoke.

FUNDING: Federal

POS1-89

DISPARITIES IN TOBACCO USE AND CO-OCCURRING CANNABIS AND ALCOHOL USE ACROSS SEXUAL ORIENTATION GROUPS OF US YOUNG ADULT WOMEN AND MEN

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Significance. Sexual minority young adults (SMYAs) display elevated rates of tobacco use relative to heterosexual YAs. Polyuse (i.e., the use of 2 or more substances) of tobacco with cannabis and/or alcohol is associated with negative health outcomes (e.g., nicotine dependence, cancer risk, mental health concerns) relative to the single use of tobacco. Research is needed to identify disparities in patterns of polysubstance use (i.e., tobacco, cannabis, alcohol) among subgroups of young adults, particularly SMYAs. **Methods.** We analyzed Fall 2020 survey data from 2,343 women ($n = 1,345$; $M_{age} = 24.65$; 24.8% bisexual, 6.1% lesbian; 35.3% racial/ethnic minority) and men ($n = 998$; $M_{age} = 24.74$; 8.9% bisexual, 13.8% gay; 37.3% racial/ethnic minority) recruited via social media and residing in 6 US cities. We conducted latent class analysis to identify classes of past 30-day combustible tobacco (i.e., cigarette, large cigar, little cigar/cigarillo, hookah aggregated), e-cigarette, cannabis, and alcohol use. Multinomial logistic regression analyses examined the outcome of use class membership (referent: non-use class) among women and men, separately. The primary predictor was sexual identity subgroup (i.e., bisexual, gay/lesbian, heterosexual [referent]); covariates included age, race, and ethnicity. **Results.** Five use classes were identified: alcohol use (29.5%), polysubstance (i.e., combustible tobacco, e-cigarette, cannabis, alcohol) use (24.3%), non-use (18.1%),

cannabis and alcohol use (16.3%), and e-cigarette, cannabis, and alcohol use (11.8%). In regression analyses (referent: non-use), bisexual (vs. heterosexual) women displayed higher odds of polysubstance use and e-cigarette, cannabis, and alcohol use. Bisexual and lesbian (vs. heterosexual) women displayed lower odds of alcohol use. Bisexual (vs. heterosexual) men displayed lower odds of alcohol use and gay (vs. heterosexual) men displayed lower odds of polysubstance use and e-cigarette, cannabis, and alcohol use. **Conclusions.** Bisexual women displayed greater risk for multiple patterns of polysubstance use, particularly those characterized by the use of tobacco with cannabis and alcohol. SMYA women displayed less risk for alcohol only use, whereas SMYA men displayed less risk for most polysubstance use patterns. Findings highlight the importance for interventions and messaging campaigns aimed at curtailing tobacco use to also target co-occurring cannabis and alcohol use among bisexual women.

FUNDING: Federal

POS1-90

CHANGE IN ENDS PERCEPTIONS AS POSSIBLE MEDIATORS OF THE RELATIONSHIP BETWEEN ENDS MARKETING EXPOSURE AND ENDS INITIATION AMONG YOUTH: RESULTS FROM THE PATH STUDY

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Significance: Exposure to ENDS marketing predicts ENDS use among youth. However, little research has examined the pathways through which ENDS marketing impacts use. This study examined potential mediators including, perceived harm, addictiveness, access, disapproval, and social norms, of the association between ENDS marketing exposure and ENDS initiation among youth. **Methods:** Participants were 5,875 tobacco/nicotine naïve US youth (ages 12-17) at Waves (W) 4 and 4.5 of the Population Assessment of Tobacco and Health (PATH) Study. W4 exposure to ENDS marketing (0=no exposure, 1=exposure from one channel, 2=exposure from ≥ 2 channels) in the past 30 days was measured across nine channels (e.g., billboards, retail outlets, computer/internet). Change in perceptions of harm, addictiveness, access, disapproval, and social norms from W4 to W4.5 were examined as mediators of W5 ENDS initiation. Mediation models were estimated using the generalized structural equation modeling package in Stata 17. Models incorporated W5 sampling weights, and controlled for sex, age, race/ethnicity, parental income, and parental education level. **Results:** 35.7% of youth were exposed to W4 ENDS marketing from ≥ 2 channels, 26.7% were exposed from one channel, and 37.6% were not exposed. 12.7% of youth initiated ENDS use by W5. W4 exposure to ENDS marketing consistently predicted W5 ENDS initiation across all five models. Greater exposure to ENDS marketing predicted increased perceived disapproval of ENDS use and decreased disapproval predicted ENDS initiation. However, the indirect path from marketing exposure to ENDS initiation through disapproval as a mediator was not significant. ENDS marketing exposure was not directly associated with change in perceived harm, addictiveness, access, or social norms. Decreased perceived harm and more favorable social norms predicted ENDS initiation, but change in perceived addictiveness and access did not. **Conclusions:** Greater exposure to ENDS marketing consistently predicted ENDS initiation in all models. While there was no evidence of mediation in the models tested, decreases in perceived harm and disapproval, and more favorable social norms did predict ENDS initiation. Unraveling the mechanisms of the impact of marketing requires continued work but the strong relationship between marketing exposure and youth ENDS initiation is important to inform regulatory action around youth-targeted marketing and the need for effective public health messaging.

FUNDING: Federal

POS1-91

REAL-WORLD REMOTE CO MONITORING FOR BIOCHEMICAL VERIFICATION: GOLD STANDARD OR MUDDY WATER?

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SIGNIFICANCE: Biochemical verification is seen as the gold standard outcome for smoking cessation research. However, its methods consume resources, are often limited to only those who self-report being quit, and can yield low response rates - particularly in remote trials. This analysis describes the challenges of carbon monoxide (CO) testing as biochemical verification in a fully remote study in the setting of a state-funded tobacco quitline. **METHODS:** Tobacco smokers with smartphones ($N = 305$) were recruited from incoming callers to the Maryland Tobacco Quitline. Participants were randomized to receive a Bluetooth smartphone-based CO monitoring device at either



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60 days post-randomization or upon study randomization for daily monitoring (with and without incentives). Self-reported tobacco use was assessed via a survey at 60 days. Two methods were defined for end of study biochemical verification of quit status: 2 breath tests closest to 60 days from randomization within 53-67 days (M1); and the last breath test completed between 53-90 days of randomization (M2). Methods were reviewed for valid readings and compared with self-reported quit status. **RESULTS:** 179 participants (58.7%) completed 1+ breath test. 151 (49.5%) completed 1+ breath test and self-reported quit status. 116 participants (38%) had valid outcomes at M1, and 125 participants (41%) at M2. The overall self-report response rate was 67%. Out of 116 participants with valid measures at M1 and M2, 15 (13%) had quit statuses that did not match. Discrepancies were primarily from higher readings on final breath tests after the 67-day max for M1. Discordance with self-report occurred, with a total of 25 participants (22%) discordant at M1 and 31 (26%) discordant at M2. Possible rationales include time between breath tests and self-report (e.g., all discordant at M1 completed self-report after selected breath tests), as well as confounders such as cannabis use (cited at baseline by about 20% of all discordant participants). Differing conclusions based on method decisions will be discussed. **CONCLUSIONS:** Although considered a gold standard, challenges with biochemical verification persist. Low response rates, quit status discrepancies, discordance with self-reported data, and possible confounders are concerning for accurate smoking cessation outcomes. More investigation into strategies to balance biochemical verification requirements with available resources and robust cessation measures is needed.

FUNDING: State

POS1-92

WHAT MAKES IT A "SNUS"? EVOLUTION OF THE U.S.-MANUFACTURED SNUS AND ITS COMPARISON TO SWEDISH SNUS

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Background: Snus is a term for moist snuff produced in Sweden, which is typically a finely ground moist tobacco processed by pasteurization. Swedish snus contains lower levels of tobacco-specific nitrosamines (TSNA) and certain other harmful constituents compared to many other smokeless tobacco products sold worldwide. After the U.S.-manufactured products labeled as Snus were introduced, our team carried out the New Product Watch (NPW) study, capturing temporal and geographical variations in the physical and chemical characteristics of such products as they were test-marketed in various U.S. regions between 2010 and 2013. In the current study, we analyzed a current sample of the U.S.-manufactured products marketed as Snus and compared the results to the historical data and to Swedish snus. **Methods:** A total of 15 Snus products representing various flavors of three US-manufactured Snus brands (Camel, Skoal, and Grizzly) and Swedish snus (General) were purchased in the Twin Cities area, Minnesota. The analyzed constituents and characteristics included moisture content, pH, nicotine (total and the biologically available unprotonated nicotine), and TSNA. We use our routine mass-spectrometry-based analytical procedures and incorporated reference products (CRP1 and CRP2) for quality control purposes. **Results:** Across the U.S.-manufactured products, the sum of the carcinogenic TSNA NNN and NNK ranged from 0.74 to 1.46 µg/g product (wet weight) and levels of unprotonated nicotine ranged from 0.2 to 1.4 mg/g product. Total TSNA content in the U.S.-manufactured brands was 117-540% higher, and unprotonated nicotine was 54-90% lower, than in Swedish snus General. **Conclusions:** Levels of TSNA in today's versions of the U.S.-manufactured Snus have changed in some but not all brands compared to the NPW study findings. Importantly, the chemical profile of the currently marketed U.S.-manufactured Snus appears to be very different from that of Swedish snus. The reasons for labeling these smokeless tobacco brands as Snus are not clear, and such marketing may be misleading to consumers.

FUNDING: Academic Institution

POS1-93

ROLE OF FAMILIES IN TOBACCO USE AMONG AFRICAN IMMIGRANT YOUTH IN THE UNITED STATES

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Significance: Immigrant families in the United States (US) experience social, cultural and economic disruptions which can lead to changes in health-related decision making. An understanding of the effect of these disruptions on health may help in planning effective interventions. We therefore sought to determine the role of the family in combustible tobacco product use among immigrant youth from Africa. **Methods:** We utilized commu-

nity entry and engagement methods to recruit 23 consenting male participants aged 18 to 25 years who identified as immigrants to the US. Participants were also required to have either a current or past history of tobacco use or must have had family members who were either past or current tobacco smokers. Three Focus Group Discussion (FGD) sessions were completed. The sessions were audio-taped, transcribed and analyzed using the Dedoose software. **Results:** There were 14 respondents from Somalia, five from Senegal, three from Ethiopia and one from Ghana who all identified as Muslims. Respondents understood the concept of family in four contexts namely, biological, national/cultural, religious, and racial relationships. Four themes were identified on the effect of families on initiation and cessation of tobacco use: (1) Family structures - breakdown of traditional headship of families due to loss of members, (2) family role models - due to distrust of the official system and unfulfilled expectations, (3) early financial independence of immigrant youth, (4) impulsiveness in decision making among immigrant youth. All participants agreed that the Ramadan fasting period presented a good opportunity for introduction of tobacco cessation programs although the Islamic religion prescribes no particular punishment for adherents who smoke during the period. A notable quote from respondents include, 'based on my definition of family, they are responsible for your moral upbringing and try to protect you from wrong associations'. Another notable quote is 'there are some families where smoking is a crime, but in some families, it is a normal thing'. **Conclusion:** Our study found out that with respect to tobacco smoking, the perception of family was in this order: biological > cultural > religious > racial relationships. These findings highlight potential roles for families in the understanding of and addressing tobacco use in this population.

FUNDING: Unfunded; Academic Institution

POS1-94

RACIAL DISPARITIES IN LOOSE CIGARETTES PURCHASE AND ITS ASSOCIATION WITH QUITTING BEHAVIOUR AMONG SOUTH AFRICAN ADULTS DURING 2010 - 2021

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Significance: A previous study in low-income setting among specific populations in South Africa have suggested single or loose cigarettes is the most common purchase pattern. However, no studies have been done on nationally representative sample and on the potential impact of the COVID-19 pandemic. This study therefore aimed to assess sociodemographic patterns in the purchase of loose cigarettes and its association with quitting behaviour over the period 2010 - 2021. **Methods:** The study involved South African factory-manufactured cigarette (FMC) smokers older than 15 years (n=1,665), who participated in three waves (2010, 2018 and 2021) of the South African Social Attitudes Survey (N=8,684) that featured tobacco module and the questions on cigarette purchase patterns. The sociodemographic data obtained, among others, included participants' age, sex, race/ethnicity, educational level, smoking history including current daily and non-daily smoking of FMC. Also obtained was information on any quit attempts within the 12 months prior to the survey and future quit intentions. Chi-square analyses and regression models were used to compare prevalence between the study waves and groups differences in the pooled analysis. Blinda-Oaxaca decomposition analysis was also used to explore the role of various sociodemographic factors and quitting behaviour, in explaining any observed racial/ethnic disparity in prevalence of loose cigarette purchase. **Results:** Loose cigarette purchase increased, albeit not significantly, from 36.7% (30.6-43.4) in 2010 to 47.5% (40.8-54.2) in 2021 (post-COVID-19 pandemic). Loose cigarette purchase was consistently highest among young adults (16-24 years) and those who self-identified as black Africans. In a multiple variable-adjusted regression model, odds of making a loose cigarette purchase was not significantly associated with smoking intensity (CPD) or quit intention, but was significantly higher among those who had made a past-year quit attempt (OR=1.53; 95%CI=1.03-2.28). However, decomposition analysis suggest only 5% of the difference in the prevalence of loose cigarette purchase between black Africans vs. other race groups was explained by higher quit attempts among black Africans. **Conclusion:** The prevalence of purchasing of loose cigarettes has remained high in South Africa, particularly common among young adults and black Africans. The fact that this was not associated with motivation to quit despite higher past quit attempt suggest this may be more a price minimization strategy than quitting strategy. Therefore, policy to eliminate loose cigarettes from the market and improve cessation support for black Africans could improve racial disparities in tobacco-related health outcomes.

FUNDING: Nonprofit grant funding entity



POS1-95

THE ROLE OF RESIDENT AND COMMUNITY FACTORS IN REDUCING EXPOSURE TO SECONDHAND SMOKE: IDENTIFYING OPPORTUNITIES TO ENHANCE SMOKE-FREE HOUSING POLICIES

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Significance: Voluntary adoption of smoke-free housing policies by providers of low-income housing is needed to reduce disparities in secondhand smoke (SHS) exposure among socioeconomically disadvantaged communities. A better understanding of the relationship between resident characteristics and their social environments and SHS exposure could help support improved implementation of smoke-free housing policies. In 2019/20, we developed and tested an adaptive smoke-free housing intervention. We sought to identify resident and community factors associated with self-reported SHS exposure after implementation of a smoke-free rule, and factors that moderate the policy's effectiveness. **Methods:** Nonsmoker residents (n=174) from 12 federally-subsidized affordable housing communities were surveyed at (baseline) and 8-months post-policy implementation. Participants reported the frequency of smelling SHS inside their apartment and on the property, and seeing smoking on the property. Covariates/moderators included gender, race/ethnicity, education, household composition (spouse or children), support for the policy, and perceptions of community cohesion. Generalized mixed effect logistic regression models examined associations between each factor and SHS exposure at 8-months, controlling for the effect of the policy and implementation intervention. **Results:** Residents with lower support for smokefree housing rules at baseline had lower odds of smelling or seeing smoking anywhere on the property at follow-up compared to those with higher levels of support (OR = 0.15, 95% CI: 0.06 - 0.35), while the odds of frequently seeing smoking on property were lower among those who disagreed with statements that moving smoking off-property is good for me and my family (OR = 0.26, 95% CI: 0.10 - 0.65) and good for everyone (OR = 0.35, 95% CI: 0.14 - 0.85). Residents who reported higher community cohesion at baseline had lower odds of smelling or seeing smoking inside or anywhere on the property at 8-months. Sociodemographic variables did not moderate policy effectiveness. **Conclusion:** Reductions in SHS exposure did not differ by resident or household characteristics, suggesting that the implementation of a smoke-free rule led to equitable benefits for residents. Smoke-free housing policies may produce tangible health benefits even among residents who are unsupportive of the policy. Future research should consider how to enhance community cohesion to promote policy success.

FUNDING: Federal

POS1-96

QUANTIFYING EXPOSURE TO TOBACCO SMOKE: A REVIEW OF EXPOSURE UNITS REPORTED IN RISK ASSESSMENT STUDIES

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Significance: Exposure to tobacco smoke continues to be an area of public health concern as it contributes to an array of adverse effects on health. Accurate quantification of the risk to health posed by tobacco exposure must rely on valid exposure measurements. However, there has been no established standard method for measuring secondhand smoke exposure (SHS). This study provides a comprehensive overview of tobacco exposure measurements reported in risk assessment studies. **Methods:** We conducted a systematic review according to PRISMA guidelines. We searched for observational studies published between Jan 1, 1970, to Dec 31, 2021, and indexed in PubMed that quantified the association between SHS and nine health outcomes: ischemic heart disease (IHD), stroke, chronic obstructive pulmonary disease (COPD), lower respiratory infection (LRI), asthma, lung cancer (LC), breast cancer (BC), type 2 diabetes (T2DM), and otitis media (OM). Cohort and case-control studies published in English with a reported effect size of SHS on the selected health outcomes were eligible for inclusion, regardless of the reported unit of exposure. We grouped similar units of measurement for reporting purposes. **Results:** We identified 407 unique studies that were eligible for inclusion, 184 (45%) of which were prospective cohorts. We found 190 studies reporting on Asthma, 90 on LC, 50 on BC, 39 on LRI, 37 on IHD, 24 on Stroke, 20 on COPD, 17 on OM, and 9 on T2DM. We identified 30 different exposure measurements. Several studies (n = 221) used multiple exposure units. The vast majority of the studies (n = 365) reported the risk associated with a binary exposure classification. Cigarettes per day or equivalent quantity-frequency combination was the most common continuous unit of exposure, followed by hours per week or equivalent, number of smokers, and number of years exposed. Only 14 studies measured the concentration of components of smoke in the environment or through biomarkers. Reported cumulative exposure measurements represented varied combinations of magnitude, duration, and frequency of exposure.

Conclusion: We found great variation in ascertaining exposure to SHS in observational studies. To allow for comprehensive quantification of dose-response relationships between SHS and health outcomes, there is a need to define and validate an exposure unit that combines quantity and frequency of exposure to tobacco smoke. Source of Funding: Bloomberg Philanthropies and Bill & Melinda Gates Foundation

FUNDING: Nonprofit grant funding entity

POS1-97

GLP-1 RECEPTOR AGONISTS FOR SMOKING CESSATION: A POTENTIAL ROLE OF CHRNA5 GENOTYPE

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Significance: Cigarette smoking remains the leading cause of preventable disease and death in the U.S. While the majority of smokers express a desire to quit, and several smoking cessation therapies are available, cessation rates remain low. The latter underscores the need to expand the arsenal of treatment options. In our recent trial, exenatide, a glucagon-like peptide 1 receptor agonist (GLP-1RA), improved smoking abstinence compared to placebo. To extend these findings, this study examined the role of *CHRNA5* variability in predicting response to exenatide treatment. Prior research suggests that the efficacy of smoking cessation medications may vary according to *CNRNA5* rs16969968 genotypes. **Methods:** Blood samples for genetic analysis were collected from participants (n=40) of the parent clinical trial that randomized (1:1) treatment-seeking smokers with prediabetes and/or overweight to once-weekly placebo or exenatide, 2mg subcutaneously. All participants received nicotine patch (21 mg) and brief smoking cessation counseling. Seven-day point prevalence abstinence (CO ≤5ppm) was assessed following 6 weeks of treatment. For the current study, we genotyped the *CNRNA5* rs16969968 variant and used Bayesian generalized linear modeling to evaluate its role in moderating the efficacy of exenatide. Statistical models evaluated abstinence as a function of the interaction between dichotomized polymorphisms and treatment (exenatide vs placebo), controlling for constituent main effects. Posterior probability (PP) thresholds from the statistical literature were used to describe evidence in favor of model effects as moderate (75% - 91%) or strong (> 91%). **Results:** Nineteen participants received exenatide and 21 received placebo; 10 participants had GA/AA genotypes, and 30 had GG genotype. *CHRNA5* rs16969968 moderated treatment response on abstinence (PP= 88.6%), such that participants with GG pair who received exenatide demonstrated strong evidence for greater odds of abstinence vs those who received placebo (OR = 3.84; PP = 95.7%). Moderate evidence was found to support polymorphism differences within the exenatide group; such that GG pair demonstrated higher odds of abstinence (OR = 3.02; PP = 83.7%). **Conclusions:** This study has demonstrated a differential response to treatment with exenatide by *CHRNA5* rs16969968 genotype. If confirmed by larger trials, these findings may enhance our ability to improve the effectiveness of GLP-1RA therapy in treating nicotine dependence.

FUNDING: Academic Institution

POS1-98

THE ASSOCIATION OF CALIFORNIA'S PROPOSITION 56 WITH ADULT CIGARETTE SMOKING PREVALENCE, CONSUMPTION, AND QUIT ATTEMPTS

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Introduction: In November 2016, California voters overwhelmingly approved the California Healthcare, Research, and Prevention Tobacco Tax Act (Prop 56) which increased the excise tax by \$2.00 on each pack of cigarettes. Prop 56 designated a portion of the revenue towards the California Department of Public Health's comprehensive tobacco prevention program, which sought to accelerate the rate of decline in smoking behaviors. We aim to broadly assess the population level change in cigarette smoking behaviors associated with enactment of Prop 56. **Methods:** Differences in adult (18 years or older) current cigarette smoking prevalence, daily and non-daily cigarette consumption, and past year cigarette smoking quit attempts were assessed using California-specific data from the 2014/15 (N=12,248) and 2019 (N=7,223) Tobacco Use Supplements to the Current Population Survey (TUS-CSP), estimated from weighted generalized linear models. Younger and older subgroups (18-to-35-year-olds and 35+ years or older) were investigated. Statistical significance is assessed at the 5% level. **Results:** From 2014/15 to 2019 a small, non-significant decline in current cigarette smoking prevalence was



observed among California adults (8.0% to 7.2%). Among 18-34-year-olds, cigarette smoking prevalence declined significantly by 2.4 percentage points (from 8.7% to 6.3%; 95%CI for change=0.4%, 4.3%; $p=.02$) but not among those ages 35 years or older (prevalence, 7.7% to 7.6%). During this period, a significant decline in the average number of cigarettes smoked per day (CPD) was observed among all adult daily smokers (9.7_{CPD} to 8.2_{CPD}; difference=1.3_{CPD}; 95%CI= -2.3, -0.2; $p=.02$) but not among non-daily smokers (3.2_{CPD} to 3.5_{CPD}). The proportion of CA adult smokers reporting a cigarette smoking quit attempt in the past year remained unchanged during this period (39.7% to 41.6%). **Conclusion:** Proposition 56 and consequent funding to California's Tobacco Control Program appears to be associated with a significant reduction in cigarette smoking prevalence among smokers aged 18-to-35-years old, and a decline in cigarette consumption among adult daily smokers. These should contribute to future decreases in tobacco-related morbidity and mortality.

FUNDING: State

POS1-99

EXAMINING AWARENESS AND USE OF MOONLIGHT REDUCED NICOTINE COMMERCIAL CIGARETTES AMONG AMERICAN INDIAN/ALASKA NATIVE ADULTS WHO SMOKE

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Significance: In 2019 the FDA authorized the commercial marketing of two new products, Moonlight and Moonlight Menthol cigarettes, which are reduced nicotine cigarettes (RNC). There is evidence that RNC could reduce smoking and increase quitting among adults who smoke cigarettes. There is a need to understand commercial use of these products, especially among priority populations such as American Indian and Alaska Native (AI/AN), who have the highest prevalence of cigarette smoking among any racial/ethnic group in the U.S. **Methods:** As part of a larger survey about tobacco use among AI/AN individuals, online survey data were collected in spring 2022 from N=824 AI/AN adults (at least 18 years old) in the U.S. who smoke cigarettes (78.7% males; mean age=28.9, SD=6.1, mean cigarettes per day=11.5, SD=9.4). The survey provided a picture and description of Moonlight and Moonlight Menthol cigarettes and assessed (1) prior knowledge of these products, (2) use of these products, and (3) reasons for use. **Results:** Among AI/AN adults who smoke cigarettes, N=600 (73%) reported prior knowledge of Moonlight cigarettes and N=453 (55%) had tried Moonlight cigarettes. Of those with prior knowledge, N=144 (24%) had not used these products, while N=288 (38%) had used Moonlight regular (non-menthol) cigarettes, N=170 (29%) had used Moonlight Menthol cigarettes, and N=55 (9%) had used both regular and menthol Moonlight cigarettes. Among those who had ever tried Moonlight cigarettes, the most common reasons for use were flavor (51%), affordability (45%), curiosity (44%), and perceptions that they were healthier (29%). Very few reported trying to quit smoking as a reason for use (4%). **Conclusion:** The results suggest many AI/AN adults who smoke cigarettes have tried Moonlight RNC, although very few have done so intending to quit smoking and flavor was a more common reason to use. More research is needed to understand the use and impact of Moonlight and Moonlight Menthol cigarettes on the population-level, especially considering planned FDA tobacco policies restricting menthol flavor in cigarettes. Identifying strategies to use commercial RNC to maximize reductions in smoking and smoking-related harm will be important.

FUNDING: Federal

POS1-100

GROWTH IN THE E-CIGARETTE MARKET DRIVEN BY BIGGER, STRONGER, AND CHEAPER DISPOSABLE DEVICES

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Background: In an annual market valued at over eight billion dollars, disposable products account for over 50% of all e-cigarette units sold in the United States. The only disposable e-cigarette authorized by the Food and Drug Administration is tobacco-flavored NJOY Daily; all other brands are being sold without marketing authorization. This study analyzes changes in product characteristics for disposable e-cigarettes from January 2017 to September 2022, focusing on product size, nicotine strength, and price. **Methods:** We used NielsenIQ Retail Scanner Data to examine changes over time for average volume capacity in mL, nicotine strength (%), and sales-weighted average prices (inflation-adjusted) per unit and per 1 mL of e-liquid for each 4-week period. We also examined trends in sales dollars and number of unique barcodes available in the US market by nicotine strength (less than 5% and equal or greater than 5%) and device

capacity, low (less than or equal to 1 mL), moderate (greater than 1 mL but less than or equal to 6 mLs), and high (greater than 6 mLs). **Results:** Between January 2017 and September 2022, average volume capacity for disposable e-cigarettes increased 518% from 1.1 mL to 5.7 mL, and average nicotine strength increased 294% from 1.7% to 5%. Unit and mL sales-weighted average prices remained relatively constant until January 2020. From January 2020 through September 2022, average unit real prices increased 165.7% from \$8.49 to \$14.07, while the average real price of one mL of e-liquid decreased 69.2% from \$7.96 to \$2.45. At the beginning of 2017, 99.9% of disposable e-cigarette products sold had less than 5% nicotine strength; by September 2022, 95.5% of products sold had 5% or higher nicotine strength. By September 2022, moderate-volume capacity devices accounted for 57.5% of the market. **Discussion:** The current regulatory regime around e-cigarettes has resulted in disposable e-cigarette manufacturers providing consumers with bigger, stronger, and cheaper disposable e-cigarettes. Tobacco policy recommendations such as restricting e-liquid capacity, minimum price laws, and regulation on product characteristics that affect nicotine emissions and delivery, such as nicotine strength, nicotine output, device power, and puff duration, should be considered in regulating the e-cigarette market.

FUNDING: Unfunded

POS1-101

FACILITATORS AND BARRIERS TO PASSING LOCAL POLICIES THAT PROHIBIT THE SALE OF FLAVORED TOBACCO PRODUCTS, 2017-2021

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Significance: To date, 122 localities (cities or counties) in California have enacted policies to regulate the sale of flavored tobacco products, with the goal of reducing youth access. Local policy adoption is important as it can create momentum for wider state policy adoption. This paper examined the facilitators and barriers to successful adoption of local policies that prohibit the sale of flavored tobacco products. **Methods:** The California Tobacco Prevention Program funded 36 local health agencies to pursue objectives related to prohibiting the sale of flavored tobacco products between July 2017 and December 2021. We conducted a qualitative analysis of each agency's Final Evaluation Report (FER) to identify key themes and patterns related to facilitators and barriers to policy adoption. These FERs were a rich source of data, as they follow a standard format to describe strategies used by these agencies, challenges encountered, and lessons learned from their intervention and evaluation activities. **Results:** Nineteen local health agencies (19/36=53%) passed at least one policy to regulate the sale of flavored tobacco products, resulting in a total of 63 local policies. Urban localities passed more policies (16/18=89%) compared with rural areas (3/18=17%). Policy facilitators included engaging the community, involving youth in presenting survey results to lawmakers, understanding the political climate, finding champions, utilizing precedents from neighboring areas, and educating the public through paid advertisements and social media campaigns. Successful projects tended to demonstrate illegal sales to minors, public support for a ban, and the availability of flavored tobacco products in local retail stores. Barriers included the COVID-19 pandemic, California wildfires, staffing shortages, and conservative political climates. **Conclusions:** Over half of the local health agencies that attempted to pass a tobacco flavor ban policy were successful. This study offers insights into the successes and challenges faced by local programs seeking tobacco prevention policy change, which may be different for urban and rural communities. The study also indicates the necessity of adopting flexible tactical plans for overcoming environmental factors that impact intervention and evaluation activities.

FUNDING: State

POS1-102

INTERDEPENDENCE OF BLUNT AND TOBACCO USE: EXPLORING INEQUITIES IN CONCURRENT USE OF BLUNTS AND OTHER TOBACCO PRODUCTS

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Significance: Hollowed out cigar wraps filled fully or partially with marijuana are sometimes referred to as blunts. Frequently, blunts are used concurrently with other tobacco products. This is a public health concern due to low harm perceptions of blunts among youth and young adults (YYA) relative to other tobacco products and the potential compounding health risks of using multiple tobacco products. Black YYA have disparate rates of blunt use. In the 2022 National Youth Tobacco Survey, 11.6% of Black youth reported lifetime blunt use (vs. 7.7% of youth overall). **Aim:** This study explores concurrent use



patterns of blunts and 6 tobacco products (tipped cigarillos, untipped cigarillos, little cigars, cigarettes, hookah, and e-cigarettes) among a sample of YYA who currently use blunts. **Methods:** Data come from a convenience sample (recruited from social media) of U.S. YYA (aged 15-24) that currently use blunts (n=602). The sampling strategy overrecruited for Black and sexual minority populations. Among the Black YYA in our sample, we calculated the proportion who use blunts and engage in concurrent use of other tobacco products (i.e., past 30-day use of blunts and another tobacco product). We ran chi-square tests to determine whether concurrent blunt and other tobacco product use differed significantly by race (Black vs. non-Black participants in our sample including White, Asian, and Multiracial). **Results:** Overall, most of the sample were Black (66.0%). Approximately 12.3% of Black YYA in our sample reported using blunts alone (vs. 19.1% for non-Black YYA); the remainder (87.7%) reported concurrent use with one or more tobacco products (vs. 80.9% for non-Black YYA). Among Black YYAs who concurrently use blunts and another tobacco product, most used e-cigarettes (70.3%) followed by untipped cigarillos (49.7%), cigarettes (37.6%), tipped cigarillos (34.7%), hookah (31.1%) and little cigars (28.8%). Compared to the rest of the sample, Black YYA respondents had higher rates of concurrently using blunts and untipped cigarillos (49.7% vs. 32.1%; $p < 0.001$); tipped cigarillos (34.7% vs. 23.4%; $p < 0.01$); and hookah (31.1% vs. 16.0%; $p < 0.001$). **Conclusion:** Black YYA may experience higher concurrent use of blunts and other tobacco products compared to non-Black YYA. These findings suggest that public health interventions aimed at addressing tobacco related health disparities should consider tobacco and blunt use behaviors.

FUNDING: Federal

POS1-103

ACUTE EFFECTS OF CHARCOAL FILTERED CIGARETTES AND THEIR PACKAGING ON PRODUCT PERCEPTIONS AND BEHAVIORS: RESULTS FROM A PILOT RANDOMIZED TRIAL

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Significance: Cigarette brands utilizing charcoal filters (vs. traditional filters composed of cellulose acetate) have been commercially available intermittently since the 1950's (e.g., Lark, Tareyton) but have never held a major share of the U.S. cigarette market. In 2021, Santa Fe Natural Tobacco Company introduced a new variety of charcoal-filtered cigarettes under its Natural American Spirit (NAS) brand called "Sky," which uses tobacco industry marketing strategies previously shown to imply reduced harm. This pilot study gathered initial behavioral data characterizing how Sky is used and what impact its packaging color has on perceptions of reduced harm. **Methods:** Forty adult daily non-menthol cigarette users (52.5% male, 75.0% White, mean age = 46.1 [SD = 11.7], mean cigarettes per day = 14.3 [SD = 6.2]) completed a single-session deception study. We utilized a 2 x 2 mixed factorial design to manipulate cigarette filter type (charcoal, i.e., NAS Sky vs. regular, i.e., NAS Orange) within subject and pack color (light, i.e., actual Sky pack vs. dark, i.e., NAS Black) between subjects. Each participant smoked two cigarettes identical in appearance but differing in filter type (blinded and order counterbalanced), with 45 minutes in between; cigarettes came from the same package condition between-subject. Participants completed pre- and post-cigarette CO samples and post-cigarette perception and intention questionnaires. **Results:** Participants endorsed more favorable subjective ratings, puffed less of, had greater demand for, and expressed greater intentions to purchase and regularly use the charcoal-filtered (vs. regular) cigarette (p 's < .05). Pack color had few significant effects on outcomes; however, the cigarette in the light vs. dark colored pack was rated as cleaner tasting ($p < .01$). Neither filter type nor pack color affected CO boost. There were no interaction effects on any outcomes. **Conclusions:** Sky charcoal-filtered cigarettes are initially appealing independent of their packaging color, warranting further study of their effects on perceptions, behavior, and exposure after longer use periods. Given FDA's authority to regulate cigarette marketing and design, these findings may inform regulatory decisions regarding cigarette packaging and filter composition.

FUNDING: Federal

POS1-104

ANALYTICAL METHOD FOR IDENTIFYING PRIMARY INGREDIENTS OF DISCARDED ELECTRONIC VAPING PRODUCTS

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Significance: Electronic vaping products (EVPs) are used to create an aerosol with various active ingredients, including nicotine and cannabinoids. Few studies to date have examined the chemical composition of recreational cannabis EVPs due to legal constraints. Like cigarette butts, EVP waste is discarded in urban settings; however, it is unclear if these discarded products only contain nicotine as their active ingredient. This study aimed to develop a rapid analytical method that could detect nicotine, cannabinoids, and solvents to identify discarded EVPs' chemical compositions. **Methods:** Discarded EVPs (n=25) were collected from bar districts and festivals in Buffalo, NY, between March and August 2023. Liquids were extracted either by manual deconstruction of EVPs, followed by dilution into methanol, or by adding methanol directly to the device tank or cartridge. A method utilizing gas chromatography/mass spectrometry (GC/MS) was developed to simultaneously detect trace levels of nicotine, ten cannabinoids (Δ^9 -THC, Δ^8 -THC, THCV, CBD/CBDA, CBDV, CBC, CBN, and CBG/CBGA), and the solvents: propylene glycol (PG), vegetable glycerin (VG), and medium-chain triglycerides (MCT). Calibrations ranged from 0.1-50 μ g/mL with limits of detections at 0.1 and 0.25 μ g/mL for Δ^9 -THC and Δ^8 -THC respectively. Analytical standards were used to confirm peak detections. **Results:** Fourteen products contained nicotine, PG, and VG without any cannabinoids. Eight products contained at least one cannabinoid but no nicotine, PG, or VG. One cannabis-containing EVP also contained nicotine and PG, albeit at comparatively lower levels than other collected nicotine-containing products. All cannabis-containing EVPs contained Δ^9 -THC, THCV, CBD/CBDA, CBC, and CBN. Delta-8 THC was identified in 56% of the cannabis-containing EVPs, approximately 200 times lower than Δ^9 -THC. MCT wasn't detected in any product. **Conclusion:** EVPs still contain residual liquid when improperly discarded in the environment. With the growing national legalization of cannabis, more products may begin to include active cannabinoids, such as Δ^9 -THC, alongside nicotine. Our developed method will be critical in providing future surveillance of emerging EVPs in the marketplace.

FUNDING: Federal

POS1-105

DO SMARTPHONE APPS HELP SEXUAL AND GENDER MINORITY ADULTS QUIT CIGARETTE SMOKING? RESULTS FROM A RANDOMIZED TRIAL COMPARING ACCEPTANCE AND COMMITMENT THERAPY WITH STANDARD CLINICAL PRACTICE GUIDELINES

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Background: Although smartphone apps designed for smoking cessation have demonstrated potential in aiding adults to quit smoking, their efficacy among sexual and gender minority (SGM) adults is unknown. **Objective:** This study utilized secondary data from a randomized controlled trial to explore the relative efficacy of two smartphone apps - iCanQuit, based on Acceptance and Commitment Therapy, and QuitGuide, based on the US Clinical Practice Guidelines - in facilitating cigarette smoking cessation among 403 SGM adults. **Methods:** The primary cessation outcome was self-reported complete-case 30-day abstinence from cigarette smoking at 12 months. Logistic regression was first used to evaluate the interaction between SGM self-identification and app treatment assignment on the primary cessation outcome in the full trial sample (N=2,415). Among SGM participants, we then compared the primary cessation outcome between the two arms (iCanQuit: n=210; QuitGuide: n=193). Mediation analyses examined mechanisms through which the interventions may have operated: acceptance of cravings to smoke and app engagement. **Results:** There was no interaction between SGM self-identification and app treatment assignment on the primary cessation outcome ($P=.41$). Among SGM adults, 12-month cigarette smoking cessation rates did not differ between arms (26% vs. 22% for QuitGuide; $P=.43$). Nonetheless, the iCanQuit app had a positive indirect effect on smoking cessation, mediated by increasing acceptance in cravings that cue smoking ($P<.001$). iCanQuit was also significantly more engaging and satisfying than QuitGuide (all $P<.001$). **Conclusions:** Findings from this large study of SGM adults with long-term follow-up showed no evidence of a difference in quit rates between treatment arms. However, results showed that acceptance of physical cravings that cue smoking



may play a crucial role in helping SGM adults quit smoking. To effectively help this population quit smoking, future interventions should consider incorporating strategies promoting acceptance of cravings to smoke without acting on them.

FUNDING: Federal

POS1-106

THE ROLE OF EXECUTIVE FUNCTIONING IN SMOKING CESSATION: A SCOPING REVIEW OF RESEARCH EVIDENCE

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SIGNIFICANCE: Creating and implementing a plan to successfully quit smoking likely requires executive function (EF) skills such as inhibition, cognitive flexibility, attention, and working memory. Current evidence-based cessation protocols do not necessarily account for those who may struggle with EF due to preexisting conditions or through smoking itself. This includes among some populations burdened by commercial tobacco use disparities, like those living with behavioral health concerns and neurotrauma. In an effort to guide future intervention planning, this scoping review sought to consolidate research evaluating the role of executive functioning in smoking cessation. **METHODS:** Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR), PubMed, EMBASE, ERIC, CINAHL, and PSYINFO were searched between June and September 2022. Articles (n = 2222) were screened for eligibility based on the following inclusion criteria: peer-reviewed, available in English, measured EF, and smoking cessation was recorded as a study outcome. **RESULTS:** Thirteen articles were included in this review. A majority of studies were randomized-control trials (RCT) conducted in the United States (US). While all areas of EF were evaluated across the 13 studies, self-regulation was the most frequently evaluated. Performance on measures of impulsivity was most frequently related to successful smoking cessation. Across studies, areas of attention, working memory, cognitive flexibility, and higher-level EFs were not found to be significantly related to smoking cessation success. **CONCLUSIONS:** This scoping review explores the relationship between EF and smoking cessation. It has been well established that smoking causes a reduction in certain EF. However, the impact of reduced EF on successful cessation has been under-researched. Findings from this scoping review add to the literature base to inform cessation programs designed for tobacco users, in general. It also suggests targeting impulsivity in cessation may benefit populations with pre-existing deficits in EF not related to smoking.

FUNDING: Unfunded

POS1-107

POSITIVE ASSOCIATION BETWEEN DEPRESSION AND THE USE OF ELECTRONIC NICOTINE DELIVERY SYSTEMS IN PATIENTS FROM A LARGE U.S. STATE-WIDE HOSPITAL NETWORK

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Significance Combustible cigarette smoking has declined substantially in the U.S., while e-cigarette use has been on a general upwards trend. Smoking rates among those with mental health disorders are significantly higher than what is found in the general population and have remained high over several decades. However, less is known about the rates of electronic nicotine delivery systems (ENDS) use among this population. This cross-sectional study examined relationships between ENDS use and psychiatric diagnoses among patients who received services from a large state-wide hospital network. The use of ENDS and other tobacco products was tracked through the implementation of a comprehensive, electronic health record-based E-cigarette and Vaping Assessment Tool (EVAT) within the hospital system. The aim was to better understand how ENDS use is associated with two of the most common mental health disorders (depression and anxiety disorder). **Methods** Data from EVAT were extracted across 12 hospitals and 150+ ambulatory sites within the University of Maryland Medical System. Between August 13, 2020 (the date EVAT was implemented) and March 31, 2022, 259,151 adult patients (18+ years old) were screened. Demographic data (age, sex, race, and ethnicity) and ICD-10 codes for medical diagnoses were also collected. Multivariable logistic regression modeling controlling for demographic factors was used to further delineate relationships between ENDS use and mental health disorders. **Results** Among patients with depression, 7.0% used ENDS and 15.9% used other tobacco products compared to 3.7% and 12.0%, respectively, in patients without these diagnoses. The strength of association varied depending on the patient's demographics. The odds of a depression diagnosis in 18-64 year-old ENDS users were 1.5-3.2 times higher compared to those

who never used tobacco, while the association was not statistically significant in 65+ year-old patients. Positive associations between depression and use of other tobacco products were observed in all age groups. The differences in ENDS or other tobacco use among patients with anxiety disorder compared to those without such diagnoses were not statistically significant. **Conclusion** Clinical diagnoses of depression were significantly associated with ENDS use. Patients with a history of any tobacco use, including ENDS, should receive a thorough assessment of depressive symptoms as well as treatment for both tobacco use disorder and depression.

FUNDING: Federal

POS1-108

TEMPERAMENT AND LICIT SUBSTANCE USE AS PREDICTORS OF VAPING FREQUENCY OVER 2 YEARS IN A YOUNG ADULT SAMPLE.

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Significance: There is a dearth of existing interventions for e-cigarette cessation, particularly for young adults among whom use is most prevalent. More information is needed about predictors of e-cigarette use in this population to inform intervention development. In the present study, we tested the hypotheses that vaping frequency over time would positively associated with multiple indicators of risk, including baseline measures of temperament (impulsivity, negative emotionality) and time-varying risk behaviors (cigarette, alcohol, and cannabis use). **Method:** Participants (n=137; 52% male) were 18-25 year old e-cigarette users recruited from across the US who completed online assessments of licit substance use quarterly for two years. Approximately half (55%) were full-time students. We used a longitudinal negative binomial regression model to examine predictors of e-cigarette frequency in the past 2 weeks at each wave. **Results:** In terms of temperament, e-cigarette frequency was higher among participants with higher scores on measures of negative emotionality, and those with higher scores on the sensation seeking, negative urgency, and lack of perseverance components of impulsivity (ps<.05). In terms of other substance use, e-cigarette frequency was positively associated with time-varying frequency of cannabis use (p<.05) but unrelated to alcohol or cigarette use. **Conclusion:** Findings suggest that successful vaping interventions for younger populations should address the overlap between e-cigarette and cannabis use, as well as the use of e-cigarettes for managing negative affective states.

FUNDING: Federal

POS1-109

SWITCHING TO E-CIGARETTES AMONG PEOPLE LIVING WITH HIV/AIDS WHO SMOKE COMBUSTIBLE CIGARETTES

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Introduction: Combustible Cigarette (CC) smoking prevalence among people living with HIV/AIDS (PLWHA) is substantially higher than in the general population. Compared to PLWHA nonsmokers, PLWHA CC smokers are at greater risk for serious HIV-related comorbidities and premature death. PLWHA smokers experience unique CC cessation challenges such as a high prevalence of comorbid conditions especially mental health and substance use disorders, in addition to stigmatization and social pressures to smoke. E-cigarettes (EC) may be a more pragmatic and effective approach to smoking harm reduction for PLWHA that addresses both nicotine and behavioral dependence. The aim of this pilot study is to evaluate the extent to which PLWHA CC smokers may switch to ECs. **Methods:** In an ongoing pilot randomized controlled trial, PLWHA (all 21 years or older) who currently smoke 5 or more CC per day (CPD) were randomized to either receive EC or combination nicotine replacement therapy (NRT) along with behavioral counseling and ecological momentary intervention texting support for both arms. Information on daily CC and EC use was collected at baseline and end-of-intervention. **Results:** Participants' (N=43) average age was 55.05 (SD = 7.32), were mostly male (60.5%) and Non-Hispanic African Americans (60.5%). There were no differences in sociodemographic data between study arms regarding gender, age, ethnicity, and education (p > 0.05). In the EC arm (n=21), 71.4% participants achieved a reduction of at least 50% from CC smoking, compared to 76.2% of participants in the NRT arm (n=22). However, 42.9% in the EC arm achieved complete abstinence from CC smoking compared to 14.3% of participants in the NRT arm; RR=3.0 (CI = [1.04, 8.69], P=0.04). **Conclusion:** While both interventions were equally effective in reducing CPD by at least



50% between baseline and end-of-intervention, complete CC abstinence via switching to ECs seems more feasible among PLWHA smokers. These findings suggest that EC may be a more effective intervention to promote CC abstinence, long-term CC abstinence is yet to be evaluated. While we found significant differences in achieving complete CC abstinence between both approaches, this pilot RCT supports the need for future research to determine the effectiveness of switching to ECs as a harm reduction strategy among PLWHA smokers. Understanding the impact of ECs along with the other components in this intervention can be achieved using adaptive research designs.

FUNDING: Federal

POS1-110

THE ASSOCIATION BETWEEN LOCAL TOBACCO RETAIL LICENSING ORDINANCES AND YOUTH CIGARETTE AND E-CIGARETTE USE BY HOUSEHOLD INCOME

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Significance: Strong tobacco retailer licensing (TRL) laws can help reduce sales to underage youth. In 2022, 27.1% and 39.5% of California (CA) high school students who vape, and smoke respectively reported getting their products from a retail store. This study investigates the association between strength of TRL laws and youth cigarette and e-cigarette use by household income, using CA as a case study. **Methods:** Data sources were the American Lung Association (ALA) and CA Health Interview Survey (CHIS) from 2016-2021. For 540 localities, we coded ALA data to characterize TRL strength (strong, moderate, or weak). The CHIS data include exclusive ever use (any lifetime use) of cigarettes, e-cigarettes, and dual use for youth (ages 12-17, n=3,744). Multilevel multinomial logistic regression models tested the association between the TRL strength and ever use among adolescents, nested by localities. We examined the potential for effect modification of the relationship by individual-level poverty: 0-299% vs. 300%+ Federal Poverty Levels (FPL). All models controlled for the strength of local smoke-free laws. **Results:** Across all years, 1.6%, 10.4%, and 3.2% of participants had ever used cigarettes, e-cigarettes, or dual use, respectively. In the unadjusted models, youth in localities with moderate or strong TRL exhibited lower odds of ever cigarette use (OR= 0.32, 95% CI: 0.15-0.68; OR= 0.43, 95% CI: 0.27-0.68), respectively, compared to adolescents in cities with weak TRL, but the association was not statistically significant with controls for other variables. For ever cigarette use, a statistically significant interaction was observed between moderate as well as strong TRL and poverty level. Youth with lower family income living in localities with moderate or strong TRL reported lower cigarette use relative to those with higher family incomes. For e-cigarettes, moderate TRL was associated with ever use (OR= 2.61, 95% CI: 1.10-6.22), and youth with lower family income in cities with moderate or strong TRL grades reported higher e-cigarette use relative to those with higher family incomes. **Conclusion:** Strong city-level TRL laws are associated with lower cigarette use overall and particularly among youth with lower household income relative to higher income. Yet, these laws were associated with higher e-cigarette use overall and among lower-income individuals. Stronger TRL laws may steer youth away from cigarettes, but towards e-cigarettes rather than abstinence.

FUNDING: Unfunded; Other

POS1-111

THE EFFECT OF RISK AND EFFICACY MESSAGING ON RESPONSES TO TOBACCO HEALTH MESSAGES AMONG YOUNG ADULTS, BY DUAL CIGARETTE AND E-CIGARETTE USE STATUS

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Significance: Young adults (YA) have the highest rates of dual cigarette and e-cigarette use, warranting research on population-level interventions increase quitting in this group. We conducted a secondary analysis of data from an experimental study to develop effective mass-reach health communications for YA engaged in dual use. We aimed to assess the effect of message framing on effects perceptions among YA self-reporting never, former, and current dual use. **Methods:** N=2818 YA aged 18-35 years completed an online experiment. Participants were randomized into a control or one of six experimental conditions in a 2 (risk statement: absolute risk [AR], comparative risk [CR]) by 3 (efficacy statement: quit all smoking and vaping [quit], switch to vaping only

[switch], quit smoking and switch to vaping only [quit+switch]) study design. We modeled associations between condition and outcomes and tested for interactions between condition and dual use (never, former, current). **Results:** Regardless of dual use status, all experimental conditions scored below the midpoint for motivating non-users to start smoking cigarettes and to start vaping nicotine (Means: 1.16-2.17). Most experimental conditions scored near or above the midpoint for motivating smokers to quit (Means: 2.88-3.25). We found significant interaction effects for condition and dual use status (p's <.05). YA's reporting former and current dual use rated experimental messages higher than control for motivating smokers to quit (p's <.05). Among YA's reporting never dual use, CR/quit messages performed better than CR/switch + CR/quit+switch in motivating smokers to quit (p's <.05). Among YA's reporting never and former dual use, AR/switch and AR/quit+switch messages scored lower than control for motivating people to quit completely (p's <.001). Among YA's reporting current and never dual use, AR/quit messages rated higher than AR/switch and CR/switch messages for motivating people to quit completely (p's <.05). **Conclusions:** Risk and efficacy statements were associated with YA's effects perceptions of smoking and vaping, and results differed by dual use status. Messages demonstrated promise for motivating smokers to quit and low potential for unintentionally encouraging smoking or vaping uptake among non-users. Research is needed to optimize messages to influence complete quitting and assess real-world effectiveness on tobacco use among YA who smoke and vape.

FUNDING: Federal; Academic Institution

POS1-112

SMOKING CESSATION RESOURCE UTILIZATION AMONG INDIVIDUALS WITH CANCER

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Significance: There are many tools to assist with cigarette smoking cessation (e.g., counseling, pharmacotherapy). However, there is a dearth of research related to use of these resources among individuals with cancer despite low cessation rates among this population. **Methods:** The current study aimed to describe cessation resource use among individuals with cancer who were currently smoking and who quit after cancer diagnosis, and to compare use to individuals without cancer to see if there are different preferences among those with cancer. Participants (N = 203) completed an online survey about demographics, cigarette use, and cessation resource use. Eighty-nine participants reported being diagnosed with cancer (45 quit after diagnosis, 44 currently smoking) and 114 denied having cancer (57 quit, 57 currently smoking). **Results:** About 76.4% of participants with cancer and 50.9% of participants without cancer used at least one cessation resource. However, not all resources were supported by scientific evidence (e.g., hypnosis, acupuncture). About 73.0% of participants with cancer and 49.1% of participants without cancer used at least one evidence-based cessation resource. Nicotine patches, nicotine gum, and self-help guides were most frequently endorsed among smoking participants with cancer and those who quit, and among participants without cancer who had quit. Nicotine patches, nicotine gum, and bupropion were the most frequently endorsed cessation resources among smoking participants without cancer. Smoking participants with cancer used more cessation resources than those with cancer who quit (B = 1.90, SE = 0.59, p = 0.002). Participants with cancer who quit also used more cessation resources than those without cancer who quit (B = 1.25, SE = 0.40, p = 0.002). Lastly, smoking participants with cancer also used more cessation resources than participants without cancer who were smoking (B = 1.26, SE = 0.58, p = 0.03). **Conclusion:** Individuals with cancer are using cessation resources, but may be using more resources before successfully quitting. Participants with cancer who were currently smoking used more resources than those without cancer, which may indicate a desire to quit but difficulty doing so. Future research may benefit from further assessing the resources used among larger samples to determine cessation resource preferences and efficacy to facilitate increased cessation rates among individuals with cancer.

FUNDING: Academic Institution

POS1-113

PSYCHOMETRIC VALIDATION OF THE INTOLERANCE FOR SMOKING ABSTINENCE QUESTIONNAIRE (IDQ-S) AMONG A SAMPLE OF PEOPLE WITH HIV

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Objective: Despite the high prevalence of cigarette smoking among people with HIV (PWH), no studies have used the Intolerance for Smoking Abstinence Questionnaire



(IDQ-S) to examine smoking abstinence-related distress tolerance among PWH. The current study examined the reliability and validity of the IDQ-S in PWH living in the Bronx, New York. Based on studies in non-HIV samples, we hypothesized that items would load onto 3 sub-scales: 12 items on the Withdrawal Intolerance subscale (IDQ-W), 5 items on the Lack of Cognitive Coping subscale (IDQ-C), and 3 items on the Pain Intolerance subscale (IDQ-P). **Methods:** Analyses included 140 PWH (M age=49.70, SD=10.54) with current cigarette use. Participants completed the 20-item IDQ-S and assessments of demographics and smoking-related variables. We calculated Cronbach's alphas to determine the internal consistency reliabilities of the total scale and subscales. To assess factor structure of the IDQ-S, a principal component analysis (PCA) was performed with promax rotation and the eigenvalue > 1 rule. Pearson and Spearman tests were performed to assess convergent and discriminant validity with empirically and theoretically linked (e.g., cigarettes per day, CPD) and not linked (e.g., age) constructs. **Results:** The total scale (IDQ-S, alpha=0.81) and all 3 subscales (IDQ-W: alp[AW1] ha=0.95; IDQ-C: alpha=0.88; IDQ-P: alpha=0.81) demonstrated good internal consistency reliability. Three components had eigenvalues > 1 and these three extracted components explained 67.31% of the total variance. As hypothesized, 12 items loaded onto IDQ-W, 5 items loaded onto IDQ-C, and 3 items loaded onto IDQ-P. One item ("I can't stand the boredom that goes along with quitting cigarettes") exhibited cross loading onto IDQ-W and IDQ-P. IDQ-C (reverse coded) was negatively correlated with IDQ-P and IDQ-W. The IDQ-S, IDQ-W, and IDQ-P were positively correlated with CPD and cigarette dependence ($ps < .01$). IDQ-C was negatively correlated with CPD, quit motivation, and quit desire ($ps < .05$). No scales were associated with age ($ps > .05$). **Conclusion:** This study provided psychometric evidence for the use of the IDQ-S with PWH who smoke cigarettes. Our PCA was generally consistent with the literature, except for the negative correlation between IDQ-C and the other components. Because the IDQ-C was reverse coded, further studies should investigate whether set shifting contributed to the inconsistency in our results compared to previous studies.

FUNDING: No external funding reported

POS1-114

INTERSECTIONS BETWEEN NICOTINE AND CANNABIS VAPING ON INSTAGRAM: CONTENT ANALYSIS OF HASHTAGS

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Significance: Vaping-related content, including nicotine and cannabis, is prevalent on social media platforms like Instagram, a platform frequently used by young people. The legalization of cannabis in many parts of the world has led to increased production of vaping devices and products (e.g., pods and cartridges) designed specifically for vaping cannabis. These devices often resemble e-cigarettes for vaping nicotine. Less is known however about overlaps in nicotine and cannabis vaping content on social media. Therefore, we conducted a content analysis of e-cigarette-related hashtags used in cannabis vaping posts on Instagram. **Methods:** We selected 16 cannabis vaping-related hashtags (e.g., #thcvapes) and scraped 100 Instagram posts per hashtag in July 2023, including images and associated data/metadata, for 1600 posts total (1432 without duplicates). We coded for use of e-cigarette-related hashtags, including general (e.g., #vaping) and device-specific hashtags (e.g., #juul, #disposablevape, #vapepen), in posts containing cannabis content between 2020 and 2023. **Results:** Out of the 1432 posts identified using cannabis vaping-related hashtags, 793 (55%) contained e-cigarette-related hashtags. Juul-related hashtags were used in n=61 cannabis vaping posts in 2020, n=26 in 2021, n=0 in 2022, and n=3 in 2023. Hashtags for disposable vapes were included in n=1 post in 2020, n=0 in 2021, n=55 in 2022, and n=211 in 2023. Hashtags for vape pens were in n=0 post in 2020 and 2021, n=44 in 2022, and n=149 in 2023. **Implications:** Results highlight overlaps in e-cigarette and cannabis vaping content on social media, particularly in the use of hashtags for vaping devices frequently used for vaping both nicotine and cannabis. Co-promotion of nicotine and cannabis vaping products via overlapping hashtags has evolved over time, likely reflecting changes in the types of devices most frequently used for both nicotine and cannabis vaping. This includes shifts from more frequent use of Juul-related hashtags in 2020 (e.g., in posts marketing Juul-compatible THC and CBD pods) to more frequent use of hashtags for disposable vapes and vape pens in 2022 and 2023. These intersections in devices used for vaping nicotine and cannabis may contribute to overlapping markets, complicating the regulation of both substances. Additional examination is needed to better understand how overlapping marketing content on social media may contribute to dual use of nicotine and cannabis.

FUNDING: Federal

POS1-115

SMOKERS WITH SERIOUS MENTAL ILLNESS HAVE ELEVATED NICOTINE METABOLITE RATIOS: A PILOT STUDY

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Background: The nicotine metabolite ratio (NMR; ratio of trans-3'-hydroxycotinine [3HC] / cotinine [COT]) is a biomarker of nicotine metabolism that may be useful in predicting a smoker's response to cessation medications. While others have found that smokers without mental health conditions classified as normal-to-rapid metabolizers (NMR => 0.31) respond better to non-nicotine smoking cessation aids, less is known about the NMR in smokers with serious mental illness (SMI). We explored the NMR in smokers with bipolar disorder [BD] or schizophrenia spectrum disorder [SSD] to determine whether the NMR was associated with participants' demographic and smoking-related characteristics and to compare the NMR with published normative values in smokers without SMI. **Methods:** Adult cigarette smokers (N=28) who met DSM-5 criteria for BD (n=14; 50.0%) or SSD (n=14) enrolling in a randomized, pilot feasibility smoking cessation trial had a blood sample drawn at screening and completed a battery of smoking-related assessments. 3HC, COT, 3HC+COT, and NMR was determined in plasma using electrospray ionization liquid chromatography tandem mass spectroscopy. Paired sample t-tests were conducted to investigate potential differences in NMR values between diagnostic groups, racial groups, and those who were taking anticonvulsant, antipsychotic, or antidepressant medications. Pearson bivariate correlation tests were conducted to investigate linear relationships among NMR and measures of tobacco exposure, dependence severity, and withdrawal. **Results:** Based on previously published NMR cutoff values, 85.7% of BD smokers and 92.9% of SSD smokers were classified as normal/rapid nicotine metabolizers. The mean NMR (1.20 ± 0.74) in this SMI sample was 3.5-times greater than the grand mean reported in smokers without SMI. Mean NMR values were similar across BD, SSD, racial, and medication groups. NMR was not significantly correlated with measures of tobacco exposure, dependence severity, or withdrawal. **Conclusions:** Consistent with some reports, most smokers with SMI demonstrated an increased rate of nicotine metabolism. NMR was not associated with smokers' racial, diagnostic, or smoking-related characteristics. Further investigation of the NMR in larger samples of smokers with SMI is needed to better assess its potential clinical utility.

FUNDING: State

POS1-116

IS LOWER QUITTING AMONG THOSE WANTING TO QUIT A LOT DUE TO LOWER USE OF EFFECTIVE SUPPORT? FINDINGS FROM THE ITC SMOKING AND VAPING SURVEY

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Significance. The extent of wanting to quit smoking is a very strong predictor of subsequently making quit attempts, but among those making quit attempts is associated with lower chances of success. It has been suggested that the increased failure is because "wanting not to do something a lot" and still doing it is assessing an important aspect of dependence not measured by conventional measure (eg, the Heaviness of Smoking Index). This study attempts to replicate these findings and test an alternative hypothesis, that the reason for lower success among those wanting to quit is due to less use of effective cessation supports. **Methods.** We analyzed three overlapping pairs of waves (initial n=10, 478). Analyses were restricted to daily smokers ages 18+ at the initial wave. We assessed whether Wanting to quit ("Not at all", A bit "somewhat" and "A lot" plus a "don't know" category) at the predictor wave was associated with making a quit attempt by the next wave, succeeding for 1 month or more among those who tried, and reported use of cessation support (vaping, 3 categories of approved help (, NRT, other licensed medications, behavioural support), and no help, with other responses (including reporting other non-approved products) excluded. **Results.** Over the three pairs of waves, only 13.5% of those not wanting to quit "at all" made quit attempts, compared with 60.8% of those wanting to quit "a lot", with success (1 month) among those who tried being 55.8% vs 33.6% respectively. Compared with those who didn't want to quit at all, among those who wanted to quit a lot, there was no difference in reported vaping when quitting, higher use of licensed medications and behavioural support, and consequently they were less likely to attempt to quit without any assistance (27.5% compared with 39.2%), with success rates lower independent of support. **Conclusions.** Replicating previous research, wanting to quit was predictive of making quit attempts but lower success among those trying. Those wanting to quit "a lot" were more likely to use



help, suggesting that the lower success rates are likely to be a function of pre-existing characteristics, not of less optimal use of supports. As suggested in previous work, they may be a group who are indeed particularly dependent such that even help is unable to fully compensate for their high dependence, with "Wanting" assessing an aspect of dependence which is not assessed by conventional measures.

FUNDING: Federal; State

POS1-117

PRESENCE AND CLASSIFICATION OF TOBACCO PRODUCT WASTE OBSERVED IN URBAN SETTINGS OF 9 INDIAN CITIES

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Significance In India, there are approximately 267 million tobacco users. About one fifth (21%) of adults (aged 15+) use smokeless tobacco (SLT), approximately 8% smoke bidis, and 4% smoke cigarettes. These products create a range of waste that is commonly littered including filters/butts and packaging. Filters used in cigarettes and some bidis are made of plastic. SLT packaging is generally made of plastic or paper. Bidi and cigarette packaging is generally paper or cardboard. This study conducted observations to quantify the number and classify the type of tobacco product waste in 9 cities throughout India. **Methods** During November-December 2022, we conducted observations to identify tobacco product waste items in nine Indian cities: Bengaluru, Bhubaneswar, Chennai, Delhi, Guwahati, Hyderabad, Lucknow, Mumbai, and Patna. In each city we conducted observations along 15 different routes for a total of 135 observations; each route was approximately 250m in distance. Each observed waste item was classified as either a cigarette butt, a bidi butt, cigarette packaging, bidi packaging, or SLT packaging. **Results** The study identified N=17,261 tobacco product waste items. Each type of waste was observed along each of the 135 observation routes. SLT packaging comprised the largest proportion of the sample (62%, n=10,767), followed by cigarette butts (26%, n=4,481), bidi butts (8%, n=1,387), cigarette packaging (3%, n=448) and bidi packaging (1%, n=178). The proportion of the types of tobacco product waste observed in each city was similar. In 8 of the cities, >50% of observed tobacco product waste was SLT packaging, the exception was Chennai, where the proportion of SLT packaging was 35%. Chennai had the highest proportion of cigarette butts (36%) and cigarette packaging (9%) waste. **Conclusions** Tobacco product waste is ubiquitous in urban environments in India. In 8 of the 9 cities observed, the majority of the tobacco product waste identified was SLT packaging which is typically made of plastic and/or paper. Although cigarettes are only consumed by approximately 4% of the population, cigarette waste (butts and discarded cigarette packaging) represented over one quarter of the observed waste. Bidi packaging is often repurposed newspaper and identifying this as tobacco product waste is challenging, and therefore this type of waste may be underreported. Opportunities exist to regulate packaging and products to reduce their environmental impact including eliminating filters and requiring packaging to be made of materials that biodegrade. Cities across India are pursuing the elimination of single-use plastic which should include cigarette and bidi filters. Other strategies, such as cities applying abatement fees to tobacco products, could also support mechanisms to eliminate this waste from the environment.

FUNDING: Nonprofit grant funding entity

POS1-118

SOCIO-ECONOMIC GRADIENT IN TOBACCO SMOKE INCURSION INTO PRIVATE HOMES IN ISRAEL: FINDINGS FROM THE 2022 (WAVE 1) INTERNATIONAL TOBACCO CONTROL ISRAEL SURVEY

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Significance: Bans on indoor home smoking have been widely adopted to reduce exposure to secondhand smoke. However, emerging evidence suggests that tobacco smoke may enter dwellings when smoking occurs in close proximity to a building, including on attached structures, such as balconies, porches or patios. People living in multiunit dwellings and those who are socioeconomically disadvantaged may be disproportionately impacted by tobacco smoke incursion (TSI). We assessed residents' self-reported experiences of TSI in private homes in Israel, a country with a high smoking

prevalence (20%) and where a high proportion of the population (74%) live in multiunit dwellings. **Methods:** Data for this cross-sectional study are from 659 adults (aged 18+) who participated in the 2022 (Wave 1) International Tobacco Control Israel Survey. A telephone survey was conducted in March 2022 among a random sample of the adult population. Participants were asked: "Usually, in the past 12 months, how often does tobacco smoke enter your home from somewhere else inside or outside your building, like another apartment, someone's porch/balcony, the stairwell, the building entrance, the garden of the building?" Possible answers were: Every day, 4-6 days/week, 1-3 days/week, Less than weekly, Never. We examined TSI using multinomial logistic regression, and included age, sex, population sector, and smoking status as potential explanatory variables. Analyses were conducted on weighted data. **Results:** Tobacco smoke incursion into private homes affected 38.8% of respondents in the past 12 months, with 22.4% experiencing incursion at least weekly. Those with low/middle income reported substantially more TSI than those with high income (Low/middle versus High: Odds Ratio (OR): 2.28 CI:[1.52,3.44], p<.0001). Younger adults reported significantly more incursion than did others (18-39 versus 60+: OR:1.82 CI:[1.13,2.94]; 40-59 versus 60+: OR: 1.18 [0.71,1.97], p=.0238). **Conclusions:** TSI is a common problem in Israel, and is more likely to affect people who are socioeconomically disadvantaged. These findings call for interventions to denormalize smoking in and around neighbors' dwellings and rigorous policy strategies to protect residents from TSI into private homes. Further research is needed to understand the scope of the TSI problem in other global settings.

FUNDING: Nonprofit grant funding entity

POS1-119

EXAMINING THE RELATIONSHIP BETWEEN RACIAL, ETHNIC AND ECONOMIC RESIDENTIAL SEGREGATION AND CIGARETTE SMOKING AMONG A NATIONALLY REPRESENTATIVE SAMPLE OF YOUNG ADULTS, 2016

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Introduction: This study investigated the relationship between cigarette smoking and racial/ethnic segregation with or without economic segregation using the Index of Concentration at the Extremes (ICE). Residents living in areas with predominantly Black, Hispanic or Latino populations and lower income residents areas are overexposed to tobacco, evident through higher tobacco retailer density, illicit sales to minors, and tobacco marketing. **Methods:** A nationally representative sample of 4,091 18-34-year-olds was recruited through address-based sampling from September to October 2016. Researchers used census-tract population estimates to form ICE measures for ethnicity, race, income, ethnicity and income, and race and income. Quintiles were determined for each, with Quintile 1 (Q1) representing the most Hispanic, Black, and lowest income neighborhoods and Quintile 5 (Q5) representing the most non-Hispanic White, and highest income neighborhoods. Logistic regression models, weighted for representativeness and using a log-link function, assessed the relationship between each ICE measure and past 30-day cigarette use, controlling for individual smoking correlates and state fixed effects. **Results:** When examining ethnic and racial segregation alone, individuals residing in neighborhoods with the highest proportions of Hispanic and Black residents had higher smoking risk compared to those in neighborhoods with the highest proportions of non-Hispanic and White residents (Q1, Q2 vs. Q5). However, the patterns became more intricate when examining economic segregation alone and in combination with ethnic and racial segregation. For the three models including neighborhood economic status, individuals in Q2 and Q3 neighborhoods had a significantly higher smoking risk than those in Q5 neighborhoods, but smoking risk did not differ between Q1 and Q5. In all models, younger age, income, and not using either alcohol or cannabis were protective against cigarette smoking. **Conclusions:** Living in areas with the highest concentration of non-Hispanic White, and highest income residents or a combination of these factors was associated with the lowest smoking risk, even after controlling for individual risk factors. Understanding the impact of ethnic, racial and economic segregation on smoking behaviors can inform targeted interventions to reduce tobacco overexposure in predominantly Black, Hispanic and low income areas, improving public health outcomes.

FUNDING: Federal



POS1-120

KNOWLEDGE AND UTILIZATION OF SMOKING CESSATION SCREENING, AND TREATMENT INTERVENTIONS BY HEALTH CARE WORKERS IN HEALTH FACILITIES IN BOTSWANA

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Significance: Botswana, which is transitioning from a Stage 1 to a Stage 2 tobacco epidemic is in dire need of a smoking cessation intervention that can be implemented at scale. We sought to determine the baseline knowledge and practice of smoking cessation interventions including the 5As among HCWs in health facilities in Botswana. **Methods:** We conducted a cross sectional study to evaluate the knowledge and practice of smoking cessation interventions including the 5As among Health Care Workers (HCW) across 52 facilities in 12 districts across Botswana. The initial survey was shared on a WhatsApp group of 74 staff affiliated with the Botswana University of Maryland School of Medicine Health Initiative and spread by snowball sampling. Due to this approach, a response rate was not determined. **Results:** One-hundred and forty-five health care workers (HCWs) responded to the survey (51% nurses; 28% lay health workers, 15% medical doctors and 3.5% were allied health workers). Over half were female and 79% provided care in rural settings. The majority (71%) reported advising people to quit smoking; yet only a third thought smoking cessation interventions were effective. Only 25% of the HCWs reported a knowledge of the 5As smoking cessation intervention. Among HCWs who had heard of the 5As, 75% had used the model to assist a person in a quit attempt. **Conclusions:** A significant gap in training, knowledge and practice of smoking cessation interventions among HCWs in Botswana may need to be corrected to adequately manage the escalating tobacco smoking epidemic in the country.

FUNDING: Unfunded; Federal; Academic Institution

POS1-121

DIGITAL MARKETING STRATEGIES USED TO PROMOTE WATERPIPE TOBACCO AMONG RETAILERS AND MANUFACTURERS

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Significance: Waterpipe tobacco (WT) products are uniquely used in social settings and sold in an abundance of flavors, which allows retailers and manufacturers to use different strategies to promote products and use on digital media. This study examined WT manufacturers' and retailers' digital marketing content in the United States (US). **Methods:** In 2020, a census of WT brands sold in the US was created and 23 WT manufacturers and 30 WT retailers across the US were identified. Business websites and the first 20 Facebook and Instagram posts from identified manufacturers and retailers were recorded. A codebook was developed and two trained coders reviewed each website and post for marketing appeals and sales propositions present in the marketing content. Marketing appeals were coded for themes including sexuality and romance, US patriotism, Middle Eastern culture, WT smoking cues, health or safety, and enjoyable experiences. Sales proposition content related to price promotions, product scarcity, or free products were also coded. **Results:** Digital marketing content posts (n=1520) were recorded, including 70 websites (primary and secondary pages), 770 Instagram posts, and 680 Facebook posts. Nearly all content (91.0%) included at least one of the described marketing appeals. Common marketing content included smoking cues (54.3% of all marketing content), Middle Eastern culture (29.1%), enjoyable experiences (22.4%), and sexuality and romance (19.7%). At least one sales proposition was used in 28.6% of all marketing content. Smoking cues were more likely to be displayed on websites vs. social media platforms ($p<0.001$). Manufacturers were more likely to use sexuality and romance and depictions of enjoyable experiences compared to retailers ($ps<0.05$). The most used sales proposition was a financial incentive (e.g., "get 25% more" or reduced price advertisement), which was included in 11.8% marketing content. Sales propositions were more common in retailer versus manufacturer marketing content ($p<0.001$) and more common in website digital marketing content compared to Facebook and Instagram posts ($p<0.01$). **Conclusions:** WT manufacturers and retailers in the US use a variety of digital marketing strategies to promote WT products. This marketing content may increase product appeal and decrease harm perceptions

and some sales propositions related to free tobacco products used by retailers and manufacturers may be prohibited by law. Research is needed examine the impact of WT digital marketing strategies on consumer perceptions.

FUNDING: Federal

POS1-122

ARE CIGARETTES STILL CLAIMING 480,000 AMERICAN LIVES EVERY YEAR?

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Introduction. The often-cited CDC estimate of 480,000 annual smoking-attributable deaths (SADs) in the United States derives from 2005-2009 data. Much has changed since then, including a near-halving of adult smoking prevalence, population growth, and population ageing. We present an updated estimate to determine whether the 480,000 figure remains accurate or has changed substantially. As well, we project the likely annual smoking-related mortality toll through 2035. **Methods.** We employ a well-established model of smoking prevalence and health effects to estimate and project the annual number of SADs in the US for two distinct periods: 2005-2009 and 2020- 2035. The estimate for 2005-2009 serves as a benchmark to evaluate the reliability of our model's estimate in comparison to the CDC's. The projections for 2020-2035 provide up-to-date figures for SADs and predict how this figure is likely to change in the coming years. **Results.** Our estimate of 420,000 deaths among current and former smokers over 2005-2009 closely aligns with CDC's estimate of 439,000 deaths during the same period. (CDC's total estimate of 480,000 includes 41,000 second-hand smoke deaths. We do not estimate second-hand smoke deaths.) Our projections indicate that the burden of smoking by current and former smokers has increased modestly since 2005-2009. Beginning in 2020, the total number of SADs will remain relatively stable at approximately 450,000 before starting to decline around 2030. **Conclusions.** Despite further US population growth and the ageing of the smoking population, substantial reductions in smoking will finally produce a steady, if gradual, decline in SADs beginning around 2030.

FUNDING: Federal

POS1-123

TOBACCO PACKAGE INSERTS - AN ONLINE SURVEY IN ISRAEL EXAMINING ADULT SMOKERS' ATTITUDES TO HEALTH-PROMOTING PACK INSERTS

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Significance: Tobacco pack inserts have been used by tobacco companies as a marketing strategy for over a century. Inserts can also be used for health promotion, as required in Canada. Israel legislated for tobacco pack inserts in 2018 but has yet to implement them. Based on qualitative research, we developed 16 pack inserts with messages about smoking cessation or secondhand smoke exposure, using an informative, motivational approach, and tested smokers' views of different messages. **Methods:** In May 2023, 2935 adults were invited through an online panel provider to participate in a survey, which was completed by 809 (27%) smokers (56% male; mean age 41±14; range 18-79; 50% <10 cigarettes/day). 73% had previously tried to quit. Respondents were randomly assigned to view and rate 4 of the 16 inserts on novelty, importance, feelings and thoughts about quitting and support, as well as questions about the inserts in general. All questions were assessed on 5-point Likert scales. **Results:** 62% liked the positive messages very much (rated 4 or 5 out of 5). 51% thought the inserts were a good way of reaching smokers and encouraging them to consider quitting and 35% said they were likely or very likely to keep the inserts as motivation to look after their own or others' health. Over half (56%) agreed that the Ministry of Health should use inserts. 39% agreed or strongly agreed that the inserts could encourage them to quit, 49% that the inserts would encourage them to be more considerate of others when smoking, and 37% that the inserts would encourage them to seek information or advice on quitting. The highest assessment for novelty was seen for messages about physical recovery after quitting and cessation support including length of time for cravings to diminish. Inserts about physical recovery after quitting and children's risk of becoming smokers were rated highest for 'makes me think about the benefits of quitting'. Regarding preferred topics, the highest proportion (70%) chose quitting tips. 57% wanted information on health risks, with a higher proportion among light smokers (60% vs 45% in heavy smokers)($p=0.011$).



More light smokers (52%) wanted information on cigarette content compared to heavy smokers (38%) ($p=0.006$), and were interested in information on e-cigarettes (35% light vs 18% heavy smokers) ($p<0.001$) and on secondhand smoke (47% vs 34%) ($p=0.028$). **Conclusions:** Israeli adult smokers mainly expressed positive attitudes towards tobacco pack inserts with health-promoting messages, and over a third thought they could help motivate them to quit. Messages about recovery and quitting had high ratings. Israel has the opportunity to be the second country to implement tobacco pack inserts and this study suggests the potential for better promoting cessation and awareness of tobacco smoke exposure.

FUNDING: Academic Institution; Nonprofit grant funding entity

POS1-124

IMPROVING ANTI-TOBACCO COMMUNICATIONS: USING A THEORY-GUIDED APPROACH TO OPTIMIZE THE IMPACT OF EMOTION-IMBUED MESSAGES

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Significance: Anti-smoking communications often invoke powerful, negative emotions to drive behavior change. However, the field lacks capacity to predict the effect of specific negative (or positive) emotions on motivation to smoke and quit intentions. We applied the Appraisal Tendency Framework (ATF), which provides a basis for predicting emotion-specific effects on smoking-related outcomes. We predicted that sadness, often featured in anti-smoking communications, could either increase or decrease urge to smoke and quit intentions, depending on whether the form of the emotion is incidental (unrelated to the smoking outcome) or integral (related to the smoking outcome). We predicted that the positive emotion of gratitude would produce the desired effect on increasing motivation to quit. **Methods:** Current, adult smokers participated in online surveys using Amazon Mechanical Turk. Between-groups designs were used in which discrete emotions (vs. neutral) were induced via exposure to a brief, pre-tested video clip and a reflective writing task. In Study 1, we tested the effects of incidental gratitude (vs. neutral control) on enrollment in a smoking cessation program. In Study 2, we tested the effects of integral sadness (vs. neutral) on urge to smoke. In Study 3, we compared low relevance, incidental sadness vs. high relevance, integral sadness (vs. neutral control) on urge to smoke and future quit intention. **Results:** Study 1 ($n = 619$) revealed a significant causal effect of incidental gratitude (vs. neutral) on increasing enrollment in a smoking cessation program (31% vs. 23%, OR = 1.55, 95% CI = [1.08, 2.22], $p = .017$, $d = .24$). In Study 2 ($n = 553$) integral sadness produced significantly lower urge to smoke compared to incidental neutral ($d = -.10$, $p = .006$) and integral neutral conditions ($d = -.13$, $p < .001$). Study 3 ($n = 791$) again found that integral sadness decreased urge to smoke ($d = -.47$, $p < .001$), but incidental sadness increased smoking urge ($d = .12$, $p = .010$). **Conclusion:** These findings demonstrate that the ATF can guide not just the selection of a specific emotion, but also the form and relevance of emotion-imbued anti-smoking messages: distinctions with important impact. These findings have relevance for design of public health communications as well as clinical interventions delivered via digital technologies.

FUNDING: Federal

POS1-125

PRESENCE OF CHROMIUM AND CHROMIUM SPECIES IN E-LIQUIDS AND E-CIGARETTE AEROSOL

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Significance: In e-cigarettes, chromium parts are often used, for example in the coil, from which chromium can migrate to the e-liquid. Moreover, due to heating of the e-liquid for aerolization, chromium migration can increase. Chromium occurs mainly in three valence states: metallic (0), trivalent (III) and hexavalent (VI). The toxicity of these forms (species) of chromium is very different. While Cr(III) is an essential micronutrient for humans, Cr(VI) is carcinogenic. Little is known on which species of chromium are present in e-liquids, or migrate from metal parts of e-cigarettes to the e-liquid. Also little or no information is available if any changes in chromium species occur during the aerolization process in e-cigarettes. The aim of this study is to investigate which species of chromium are present in e-liquids and e-cigarette aerosol, as well as the transfer rate of chromium species from the e-liquid to the vapor. **Method:** Total chromium was determined in e-liquids from refill bottles and pre-filled e-cigarettes. E-liquid samples were diluted 30 fold with a solution containing 2% HNO₃ and 1% HCl. After

homogenization, total chromium was measured with ICP-MS. Chromium species were determined in e-liquids and aerosol by liquid chromatography connected to ICP-MS. A vaping machine was used to generate aerosol by taking two 55 mL puffs per minute with a puff duration of three seconds. The aerosol of 180 puffs was collected on 750 mg of 4 µm metal free silica wool. It has been investigated whether the oxidation state of chromium changes upon aerolization in both pre-filled and refillable e-cigarettes. **Results:** Pre-filled e-cigarettes contain higher chromium concentrations compared to refill e-liquids. For all e-liquids investigated, the chromium concentration in the vapor of e-cigarettes was higher than in the aerolized e-liquid. Data will be shown on the oxidation state of chromium species in e-liquids of refill bottles and pre-filled e-cigarettes, as well as on the stability of chromium species during aerolization of different types of e-cigarettes. **Conclusion:** Metals seem to migrate from the e-cigarette device into the e-liquid in pre-filled e-cigarettes. Metals aerolize together with the e-liquid to the vapor of e-cigarettes and appear to migrate from the e-cigarette device into the aerosol during aerolization. Our data on the presence and species of chromium in e-liquids and aerosol will inform researchers and regulators, and can be used to assess their potential health impact.

FUNDING: Unfunded; Federal; State

POS1-126

THE EFFECT OF "ICY" FLAVORS AND NICOTINE IN E-CIGARETTES ON THE EXPERIENCE, CRAVING AND URGES OF YOUNG ADULT USERS

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Background: E-cigarette use is highly prevalent among young adults. More recently, "icy" e-cigarettes/liquids that combine sweet and cooling flavors have become very popular, but little is known about user experiences from nicotine-containing e-liquids with "icy" sweet flavors. This study examined if "icy" components altered liking and reward from sweet-flavored nicotine e-liquids among young adults. **Methods:** A double-blinded experimental laboratory session was conducted with current (past-month) e-cigarette users aged 18-20 (target N=40). Participants were exposed in random orders to sweet-flavored (watermelon) e-liquids with and without menthol in two 10-puff bouts (A and B). Both e-liquids contained the same nicotine salt (36mg/ml) and had a 50:50 PG/VG ratio. Liking of e-cigarette taste was assessed using the Labeled Hedonic Scale (LHS). Craving for e-cigarettes was assessed using the single-item Yale Craving Scale (YCS). Stimulant and withdrawal effects were examined via the Drug Effects Questionnaire (DEQ). Linear mixed models with flavor condition, sex, and their interaction as fixed effects, controlling for time within session order (bouts A and B) were used to analyze all outcomes. Least square mean differences (LSM_{difference}) were reported for the results. **Results:** Forty participants (average age=19.1, SD=0.8; 52.5% female, 67.5% White, and 22.5% Hispanic) who reported using e-cigarettes on 6.2 (SD=1.5) days/week, with an average e-cigarette dependence score of 11.3 (SD=3.4; ranging from 4-20) completed the lab session. Participants reported liking the taste of watermelon + menthol less than watermelon flavor (LSM_{difference} = -5.18 [SE=2.59], 95%CI: -10.44-0.07, $p=.05$). Although no significant stimulant effects were observed between the two flavors, stimulant effects were lower after using the watermelon + menthol flavor than after using watermelon flavor (LSM_{difference} = -2.87 [1.54], -6.00-0.26, $p=.07$). However, no significances were noted in craving on the YCS and withdrawal effects, nor in any sex difference regarding the above outcomes ($ps>.05$). **Conclusions:** Among our sample of young adult e-cigarette users, exposure to an e-liquid containing watermelon and menthol did not result in an improvement in either liking or stimulation when compared to watermelon alone. These findings suggest that the addition of cooling components to sweet-flavored e-liquids may not be enhancing user experiences. Further research is needed to investigate other popular flavors with other cooling components on e-cigarette user experiences.

FUNDING: Federal

POS1-127

IDENTIFYING PREDICTORS OF TOBACCO HARM REDUCTION SWITCHING BEHAVIOR BASED ON THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY: A MACHINE LEARNING ANALYSIS

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Background: Adult smokers transitioning from smoking to using harm reduction products such as e-cigarettes, or completely quitting smoking, reduce their risk of developing smoking-related disease. Previous studies have revealed that demographics and tobacco use characteristics are associated with harm reduction switching behaviors. However, a more comprehensive set of informative predictors for switching behavior and their detailed causal relationships are still unclear. **Objective:** This study aimed to identify potential predictors for harm reduction switching behavior, as well as assessing associations between these predictors and switching behavior. **Methods:** We analyzed data drawn from Waves (W) 4-5 (2016-2019) of the Population Assessment of Tobacco and Health (PATH) Study. Respondents were adults who were exclusive cigarette smokers at W4 and who were followed up at W5. LightGBM classifiers using a ten-by-ten-fold nested cross-validation algorithm were established to predict the probability of harm reduction switching behavior based on variables measured at W4. The SHapley Additive exPlanations (SHAP) algorithm was deployed to determine and interpret the 20 most influential predictors affecting harm reduction switching behavior. **Results:** Among the 6,245 exclusive cigarette smokers at baseline (W4), 4,476 remained as such and 1,769 executed harm reduction switching behavior at W5. The final predictive model included 438 of the more than 2,000 variables from the PATH dataset (AUC=0.73, 95% CI: 0.69-0.76). We identified 3 demographic characteristics (i.e., age, race and level of education, SHAP values range: 0.024-0.253), 9 tobacco use characteristics (e.g., frequency of smoking or vaping, frequency of using marijuana, history of using a hookah, SHAP values range: 0.025-0.117), 4 self-efficacy factors (e.g., intention to switch away from smoking or quit smoking, SHAP values range: 0.025-0.096), 1 risk perception factor (i.e., perceiving snus is harmful to health, SHAP value: 0.031) and 3 social influence factors (e.g., frequency of visiting social media accounts, SHAP values range: 0.023-0.035) as the most significant (top 20) predictors of harm reduction switching behavior. **Conclusions:** Exploring predictors for harm reduction switching behavior among smokers has the potential to contribute to public health by facilitating a greater understanding of what contributes to smokers' transitioning away from smoking to using reduced harm products. Further research is warranted to investigate and confirm these predictors of harm reduction switching behavior and examine their underlying mechanisms.

FUNDING: Unfunded

POS1-128

COVID-19 AND MATERNAL SUBSTANCE USE DURING PREGNANCY

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SIGNIFICANCE: We examined whether e-cigarette (EC), combustible cigarette (CC), and marijuana (MJ) use among U.S. pregnant women was affected by the coronavirus disease 2019 (COVID-19) pandemic. **METHODS:** Within Phase 8 of the U.S. Pregnancy Risk Assessment Monitoring System, we included mothers who gave birth between June 2016 and December 2021 and had data on EC use (N=141,199), CC (N=141,466), and/or MJ (N=51,532) during pregnancy. Logistic regression was used to fit the pre-COVID trend of EC, CC, and MJ use prevalence from June to September (Jun-Sep) and October to December (Oct-Dec) during 2016-2019. The expected prevalence and 95% confidence interval (CI) during the pandemic (2020-2021) were estimated from regression models and compared with the observed prevalence. **RESULTS:** The observed (Obs) prevalence of EC use was similar to the expected (Exp) prevalence in Jun-Sep (Obs 1.48% vs. Exp 1.50%) and in Oct-Dec (Obs 1.93% vs. Exp 1.56%) in 2020, but significantly higher in Jun-Sep (2.27% vs. 1.63% [95% CI: 1.24-2.13%]) and in Oct-Dec (2.51% vs. 1.69% [1.24-2.30%]) of 2021. The observed prevalence of CC use was similar to the expected prevalence in Jun-Sep of 2020 (6.29% vs. 5.47%) but significantly higher in Oct-Dec (6.65% vs. 4.60% [3.61-5.84%]) of 2020, Jun-Sep (5.28% vs. 3.74% [2.65-5.25%]) and Oct-Dec (5.15% vs. 2.94% [1.85-4.65%]) of 2021. The observed and expected prevalence of MJ use was similar during the pandemic. **CONCLUSION:** U.S. pregnant women were more likely to use EC and CC during the early stage of the COVID-19 pandemic than expected based on the historical trend.

FUNDING: Federal

POS1-129

IMPACT OF HEATED TOBACCO PRODUCTS PLAIN PACKAGING ON AWARENESS OF HEALTH RISKS AMONG ADULTS IN ISRAEL

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Significance: Implementing cigarette plain packaging is associated with increased awareness of cigarette health risks. Plain packaging has been implemented in over 20

countries; however, in most countries, this only applied to cigarettes. Israel is currently one of the few countries to mandate plain packaging for heated tobacco products (HTPs). **Aims:** This study examined: 1) the effects of HTP plain packaging on perceived changes in awareness of health risks associated with HTP use, and 2) factors associated with these perceived changes in awareness. **Methods:** A cross-sectional survey (Nov-Dec 2021) among Israeli panelists ages 18-45 years (n=1,064) assessed the impact of HTP plain packaging on self-reported change in awareness of health risks associated with HTP use ("1=not-at-all" to 4="very much"). Logistic regression examined socio-demographics (e.g. age, sex, nativity, ethnicity) and past-month cigarette and HTP use status (neither [referent], cigarette-only, HTP-only, dual use) in relation to the outcome of reporting impact of HTP plain packaging on change in awareness ("not-at-all" [referent] vs. others"). **Results:** Overall, 29.0% (n=309) used cigarettes-only, 2.5% (n=27) used HTPs-only, 10.3% (n=110) reported dual use, and 58.1% (n=618) used neither. While 54.4% (n=579) reported "not at all" for the impact of HTP plain packaging on change of their awareness of HTP health risks, 45.6% (n=485) reported a change in awareness (10.8% [n=115] "very much", 17.7% [n=189] "somewhat", 17.0% [n=181] "a little"). Those reporting any cigarette use, relative to no use of either, were more likely to report a change in awareness vs. no change (cigarette-only: aOR=2.3, 95% CI: 1.7, 3.0; dual use: aOR=5.1, 95% CI: 3.2, 8.4). Those reporting HTP-only use did not differ from those reporting no use in relation to likelihood of reporting changes in awareness. Additionally, younger (aOR=0.9, 95% CI: 0.9, 1.0), male (aOR=1.4, 95% CI: 1.0, 1.8), born in Israel (aOR=1.6, 95% CI: 1.0, 1.8), and being Arab (vs Jewish) (aOR=1.7, 95% CI: 1.2, 2.6) were more likely to report on the change in awareness. **Conclusions:** About half of the participants reported an impact of HTP plain packaging on their awareness of health risks associated with HTP use. This was especially higher among dual users of both HTPs and combustible cigarettes. Countries should consider extending their plain packaging requirements to include HTPs and all tobacco products.

FUNDING: Federal

POS1-130

EXPOSURE TO E-CIGARETTE AND HEATED TOBACCO PRODUCT ADVERTISEMENTS VIA DIGITAL, TRADITIONAL MEDIA, AND POINT-OF-SALE: AN EXAMINATION OF ASSOCIATIONS WITH USE INTENTIONS AND PERCEIVED RISK AMONG ADULTS IN ARMENIA AND GEORGIA

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Significance: E-cigarette and heated tobacco product (HTP) marketing increasingly capitalizes on digital media channels and points-of-sale (POS), and promotes these products for harm reduction. These products have established their presence in Armenia and Georgia where cigarette use rates are high among men. This study assessed ad exposure in relation to e-cigarette and HTP use intentions and perceived risk among Armenian and Georgian adults. **Methods:** We analyzed 2022 survey data from 1,468 adults (avg. age=42.92, 51.4% female). Multivariable linear regression identified correlates of 4 outcomes (e-cigarette and HTP use intentions and perceived risk; 1=not at all to 7=extremely), including past-month e-cigarette or HTP advertisement exposure via digital media, traditional media, and POS, and controlled for sociodemographics (country, age, gender, education, relationship status, children) and past-month cigarette and e-cigarette/HTP use. **Results:** Past-month use rates were 3.2% for e-cigarettes, 2.7% HTPs, and 31.6% cigarettes. Overall, e-cigarette and HTP use intentions were low (1.47, SD=1.39, respectively); perceived risk was 5.83 (SD=1.60) for e-cigarettes and 5.87 (SD=1.56) for HTPs. Past-month exposure to e-cigarette and HTP advertisements, respectively, were 12.9% and 11.2% via digital media, 6.1% and 4.8% via traditional media, and 22.5% and 21.1% at POS. E-cigarette ad exposure via digital media ($\beta=0.24$, 95%CI [CI]=0.03, 0.44) was associated with greater e-cigarette use intentions, while e-cigarette ad exposure via traditional media ($\beta=-0.32$, CI=-0.55, -0.09) and POS ($\beta=-0.23$, CI=-0.42, -0.03) was associated with lower e-cigarette risk perceptions. HTP ad exposure via digital media ($\beta=0.35$, CI=0.14, 0.56) and at POS ($\beta=0.21$, CI=0.04, 0.36) was associated with greater HTP use intentions, and HTP ad exposure at POS was associated with lower HTP risk perceptions ($\beta=-0.23$, CI=-0.42, -0.03). Greater e-cigarette and HTP use intentions and lower perceived risk were also associated with past-month respective product use and cigarette use. **Conclusion:** Ad exposure via digital media was associated with greater e-cigarette and HTP use intentions, suggesting potential persuasiveness of messages



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on digital media. POS ad exposure was associated with lower e-cigarette and HTP risk perceptions, which may reflect harm reduction claims at POS. Tobacco control efforts should regulate and monitor industry marketing via digital media and at POS.

FUNDING: Nonprofit grant funding entity

POS1-131

PUBLIC PERCEPTIONS AND DISCUSSIONS OF THE FDA JUUL BAN POLICY ON TWITTER

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Significance: On June 23, 2022, the US Food and Drug Administration (FDA) announced a JUUL ban policy to ban all vaping and electronic cigarette (e-cigarette) products sold by Juul Labs. It is important to understand how the public perceived this JUUL ban policy, which might reflect their potential behavior changes. By applying deep learning models, this study aimed to understand public perceptions and discussions of this policy using Twitter data. **Methods:** Using Twitter streaming API, we collected 17,007 tweets potentially related to the JUUL ban policy between June 22, 2022, and July 25, 2022. Based on 2,600 hand-coded tweets, we trained a deep-learning model (RoBERTa) to classify all tweets into pro-policy, anti-policy, and neutral categories. A deep learning model (M3 model) was used to estimate basic demographics (such as age and gender) of Twitter users. Furthermore, we identified major topics using the latent dirichlet allocation (LDA) modeling. A logistic regression model was used to examine the association of different Twitter users with their attitudes toward the policy. **Results:** Among 10,480 tweets related to the JUUL ban policy, there were similar proportions of pro-policy and anti-policy tweets (26.50% vs. 25.44%). Major pro-policy topics include "JUUL cause youth addiction", "market surge of JUUL", and "health effects of JUUL". In contrast, major anti-policy topics include "cigarette should be banned instead of JUUL", "against the irrational policy", and "emotional catharsis". Twitter users at an older age (over 29) were more likely to favor the JUUL ban policy than those younger (below 29). **Conclusion:** Our study showed that the public responded differently to the JUUL ban policy, which varies depending on the demographic characteristics of Twitter users. Our findings could provide valuable information to the FDA for future e-cigarette and other tobacco product regulations.

FUNDING: Federal

POS1-132

IMMIGRATION DISCRIMINATION EXPERIENCES AND DUAL USE OF COMBUSTIBLE TOBACCO AND E-CIGARETTES AMONG IMMIGRANT ADOLESCENTS

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Significance: Dual use of combustible tobacco and e-cigarette is associated with increased health risks. Previous research has shown that tobacco use is positively associated with experiencing racism among adolescents. However, we do not yet know if this pattern is the same for discrimination based on immigration. **Methods:** This cross-sectional study examined the relationship between experiences with immigration discrimination and dual use of combustible tobacco and e-cigarettes among adolescents in grades 9-12 in the Western region of the United States. The analysis included 269 adolescents from two public high schools. Immigration discrimination was measured using the prompt, "Indicate how often you experienced discrimination as an immigrant," across three subscales: (a) Peers ("People your age treated you unfairly because you are an immigrant"); (b) School Personnel ("School staff [principal, counselors] made rude comments about immigrants"), and (c) Community ("Community adults [neighbors, store clerks, police] asked you to speak better English"). We measured dual use with questions assessing lifetime and past year use of tobacco cigarettes, cigars, cigarillos, or little cigars, and e-cigarette use (no use, exclusive use of combustible tobacco or e-cigarette use, or dual-use). Covariates included age, gender, race/ethnicity, maternal education, and origin country income. **Results:** Using multinomial logistic regressions, results showed that higher levels of all forms of immigration discrimination were related to a higher likelihood of engaging in the exclusive use of combustible tobacco and e-cigarettes. No other associations were observed. **Conclusion:** This study highlights the potential impact of immigration discrimination on adolescents' use of combustible tobacco and e-cigarettes. These findings underscore the necessity of targeted interventions that not only address tobacco use but also aim to mitigate the adverse effects

of immigration discrimination on adolescent health and well-being. Further research is needed to better understand the intricate interplay between immigration discrimination and tobacco use among adolescents.

FUNDING: State

POS1-133

CHALLENGES IN REMAINING ABSTINENT FROM SMOKING FOLLOWING RELEASE FROM A SMOKEFREE PRISON

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Significance: Comprehensive smokefree prison policies are being implemented globally. However, studies consistently find that the vast majority return to smoking following release from prison, limiting the individual and public health gains of creating smokefree prison environments. There is sparse evidence on the drivers of return to smoking in this population, particularly outside of the US and Australia, to help reduce tobacco-related harms. To our knowledge, the current study, conducted with people in prison in Scotland, is the first to explore post-release return to smoking among people who have been permitted to vape while in smokefree prisons. **Methods:** 17 interviews were conducted with people in prison in Scotland who were 'ever smokers' prior to imprisonment. Data were thematically analysed with the aid of the Framework approach. **Results:** Participant accounts confirm the continuing importance of environmental factors in return to smoking post-release. Resettlement from prison commonly leads to people experiencing known risk factors for smoking e.g. stress, financial difficulties, and insecure work and housing. Other potential environmental triggers for post-release smoking include: smoking being common; tobacco products being widely and readily available in the neighbourhoods people return to; and (ingrained) co-use of tobacco and alcohol/illegal drugs. Together these often lead to tobacco use being normalised among social networks. Personal attitudes and beliefs about smoking and quitting, and difficulties with goal setting and planning are other potential contributory factors for post-release return to smoking. Symptoms of high dependence on vaping in smokefree prisons were described in interviews. However, the role of e-cigarettes as either a risk or protective factor for return to smoking post-release remains unclear. **Conclusions:** Participants described numerous personal and environmental factors that may interact to influence high rates of return to smoking post release. Findings confirm the need for wraparound support pre-post release to address the substantial obstacles that people may face in achieving aspirations to remain smokefree post-release.

FUNDING: Other

POS1-134

THE ASSOCIATION OF E-CIGARETTE USE WITH HEAVY METALS: A COMPARISON OF NON-INVASIVE BIOMARKERS BETWEEN E-CIGARETTE USERS AND NON-USERS (2015-2020)

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Significance: Toxic metals have been detected in electronic cigarette (e-cigarette) aerosol that is inhaled by the user. While there have been a growing number of studies looking at metal biomarkers from e-cigarette use, few have drawn comparisons among daily e-cigarette users, dual users (also smoke combustible cigarettes), and non-users as well as comparisons between e-cigarette users of different types of devices (i.e., MODs, PODs). The main objective was to assess the differences in metal biomarker concentrations across e-cigarette users (sole and dual) and non-users. **Methods:** We recruited 256 participants from December 2015 until March 2020 (145 sole e-cigarette users, 31 dual users, 80 non-users). Sociodemographic characteristics and e-cigarette use preferences were collected by survey. Urine, saliva, and exhaled breath condensate (EBC) samples were collected and analyzed for metals (Cr, Ni, Mn, As, Cd, Pb, Zn) using ICP-MS. Data was corrected for background and limit of detection. ANOVA and linear regression models on log-transformed metal biomarkers to calculate geometric mean ratios (GMR) were used. **Results:** Majority of e-cigarette users recruited in this study were young (Mean (SD): 28 (9) years), white (82%) males (69%). More than half (53%) vape all throughout the day and more than a third (39%) vape within 15 minutes of waking in the morning. E-cigarette users vaped an average (SD) of 276 (556) puffs/day using 3% nicotine, with POD users vaping fewer puffs (Mean (SD): 113 (152)) but at a higher nicotine concentration (5%) compared to MOD users. In adjusted models, sole e-cigarette users were associated with 112% higher Cr, 58% higher Cd, and 104% higher Pb in urine compared to non-users. Users were also associated with 136% higher Ni and 54% higher As in saliva as well as 172% higher Mn in EBC compared to non-users.



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Among e-cigarette users, those who vaped POD devices were found to have higher urinary Cr, Mn, Ni mean concentrations compared to users of MOD devices (p -values <0.001). **Conclusion:** E-cigarette use represents a relevant contribution to metal exposure as sole e-cigarette users had statistically significantly higher metal biomarkers levels compared to non-users. Differences in device type also determine exposure to certain metals. With the rapidly evolving market of e-cigarette products, constant surveillance of differences in metal exposure as well as establishing metal level standards are warranted to prevent involuntary metal exposure.

FUNDING: Federal; State

POS1-135

SMOKING AND POOR SLEEP ARE ASSOCIATED WITH LOWER SELF-RATED WELLNESS AND HEALTH IN DIALYSIS PATIENTS

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Objective: To assess the association between self-rated wellness/health index and lifestyle factors in patients with dialysis. **Methods:** Demographics, self-rated wellness/health, smoking, sleep pattern, diet, physical activity, body mass index and laboratory findings were collected in 204 patients with dialysis during this cross-sectional study. Multivariable generalized additive model (GAM) with backward elimination was applied to assess the association between self-rated wellness/health index and lifestyle factors. **Results:** 85 females and 119 males who were undergoing dialysis were studied. Their mean (SD) age was 55 (14) years. Mean (SD) self-rated wellness/health index out of 10 was 7 (2.75). The mean score of sleep quality was 20.5/70. Patients went to bed at the same time on weekdays and weekends (mean, 23:42 vs. 23:43 PM, respectively). They also woke up almost at the same time (mean, 6:55 vs. 7:05 AM, respectively) and had similar night sleep duration. The mean mood score was 12.75/35 and the mean diet score was 18.9/42. Sleep quality (EDF=2.14, $P=0.03$) and smoking ($\beta=-0.065$, $P=0.02$) were significant predictors of self-rated wellness/health index showed by GAM model. **Conclusion:** In patients undergoing dialysis, lower self-rated wellness/health index was associated with lower sleep quality and higher smoking rate. **Key Words:** Dialysis, sleep, self-rated wellness/health index.

FUNDING: No external funding reported

POS1-136

AVAILABILITY OF FLAVOUR CAPSULE CIGARETTE PACKS AND STICKS IN ARGENTINA, GUATEMALA, MEXICO AND PERU

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Introduction. The global tobacco epidemic is associated with considerable morbidity and mortality. While many countries have introduced policies aimed at restricting tobacco marketing, tobacco companies take advantage of regulatory gaps to diversify their offerings and retain and attract new consumers. One such example is flavor capsule cigarettes, which are extremely popular in Latin America. **Objectives.** To describe the availability of flavor capsule cigarette packs and sticks in several Latin American countries. **Methods.** Between April and July 2023, a study was conducted in four cities in Argentina, Guatemala, Mexico, and Peru using the TPackSS methodology. A total of 2081 points of sale located around schools in urban (81.6 percent) and rural (18.4 percent) areas in each of the four countries were visited. Characteristics of the flavor capsule packs available were recorded, including place, pack type, and proximity to sweets. **Results.** We found that 1603 (77.0 percent) points of sale were neighborhood stores, 227 (10.9 percent) kiosks, 119 (5.7 percent) convenience stores, 68 (3.3 percent) street vendors, 39 (1.9 percent) supermarkets, and 25 (1.2 percent) petrol service stations. Of 2081 points of sale visited, in 1096 (52.7 percent) the cigarette brands were visible, and in 1089 (99.4 percent of them) they corresponded to flavor capsule cigarette packs. In 211 points of sale (10.1 percent), up to 3 brands of cigarettes with flavor capsules were available, and in an additional 185 points of sale (8.9 percent), up to 4 different brands were available. In 820 (39.4 percent) of points of sale, flavor capsule packs were observed less than 50 centimeters from sweets or toys; the same situation occurs with the sticks in 650 (31.2 percent) points of sale. **Conclusions.** The most frequent points of sale in the four countries were kiosks and neighborhood stores; in half of points of sale, flavor capsule cigarette packs were available; in 3 out of 10 points of sale, the

sticks were close to the sweets; and almost one-fifth of points of sale had flavor capsule cigarettes for three to four different brands. The study provides an insight into the retail market for flavor capsule cigarettes in multiple Latin American countries.

FUNDING: State

POS1-137

SYMPTOMS OF NICOTINE DEPENDENCE BY E-CIGARETTE AND CIGARETTE USE BEHAVIOR AND BRAND: A POPULATION-BASED, NATIONALLY REPRESENTATIVE CROSS-SECTIONAL STUDY

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Background: Many modern e-cigarette brands contain nicotine levels equivalent to or higher than traditional cigarettes. **Objective:** This study examined differences in indicators of nicotine dependence between (a) exclusive past 30-day (P30D) cigarette smokers; (b) exclusive P30D e-cigarette users who use different brands of e-cigarettes; and P30D dual users (e-cigarette use plus cigarette smoking) among a nationally representative sample of adolescents (aged 12-17 years). **Methods:** Data were from Wave 5 (2018-2019) of the Population Assessment of Tobacco and Health (PATH) study ($n=1060$, $N=2,053,659$). Multivariable logistic regression was performed to determine differences in four validated indicators of nicotine dependence by P30D e-cigarette and cigarette use behavior (exclusive vs. dual use) and brand (e-cigarettes only: JUUL vs. non-JUUL vs. Unknown). **Results:** In adjusted pairwise comparisons, the odds of frequent or daily use for JUUL (AOR: 2.11; 95% CI=1.02-4.37) and non-JUUL brand (AOR: 2.12; 95% CI=0.95-4.77) users were similar and paralleled that for dual users (AOR: 3.50; 95% CI=1.46-8.43) but were stronger (JUUL users only) than exclusive cigarette smokers (referent). Also, the odds of "using within 30 minutes of waking" for JUUL (AOR: 2.23; 95% CI=0.80-6.25) and non-JUUL brand (AOR: 1.42; 95% CI=0.47-4.32) users were similar and paralleled that for both dual users (AOR=3.00; 95% CI=1.01-8.88) and exclusive cigarette smokers (referent). For unknown brand users, the odds of all indicators paralleled exclusive cigarette smokers but were lower than dual users, JUUL, and non-JUUL brand users. **Conclusion:** Study findings show that, compared to exclusive cigarette smokers, symptoms of nicotine dependence are similar for adolescent exclusive e-cigarette users, irrespective of brand. Symptoms of nicotine dependence among exclusive JUUL and non-JUUL brand users are also similar to dual users. Tobacco regulation should consider these findings when examining the abuse liability of e-cigarettes. Clinicians should screen all adolescent e-cigarette users for dependence and offer cessation resources during clinical encounters regardless of the e-cigarette brand used.

FUNDING: Federal

POS1-138

A PILOT PROJECT EVALUATING THE 'CATCH MY BREATH' VAPING PREVENTION CURRICULUM IN ONTARIO HIGH SCHOOLS

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Significance: Vaping has increased dramatically among youth in Canada. There is a lack of evidence for effective school-based prevention approaches targeting vaping, particularly for high school-aged students. The objectives of this pilot study were to 1) examine the feasibility of implementing the 'CATCH My Breath' (CMB) vaping prevention curriculum in high schools in Ontario, Canada; 2) identify youth and presenter perceptions of the appeal, appropriateness, and comprehensiveness of the curriculum, and 3) assess short-term changes in knowledge and attitudes towards vaping. **Methods:** A convenience sample of 10 high schools across Ontario implemented the CMB curriculum, an evidence-based vaping prevention curriculum developed in the USA. Surveys were given to students pre/post exposure to the curriculum to assess changes in vaping knowledge and attitudes. A subgroup of students participated in focus groups and curriculum presenters participated in interviews to provide feedback about the curriculum. McNemar's exact test assessed changes in knowledge and attitudes pre/post curriculum delivery. Qualitative thematic analyses identified major themes from student focus groups and presenter interviews. **Results:** During focus group discussions, students highlighted what they learned through the lessons, including the chemicals present in vapes and the negative health effects. While students and curriculum presenters appreciated the interactive nature of the lessons, they offered suggestions for how to improve the curriculum. Presenters also noted facilitators and barriers to



curriculum delivery. After exposure to the curriculum, more students correctly identified that e-cigarette vapour does not contain mostly water (pre: 38.%, post: 82.6%; $p < 0.001$) and fewer students agreed that most people in high school vape (pre: 83.8%, post: 75.2%; $p = 0.049$). Conclusions: The CATCH My Breath vaping prevention curriculum was easily delivered in high school classrooms in Ontario. Some modifications to the curriculum are necessary to make it appropriate for high school students. Future investigations should evaluate the short- and long-term impacts of exposure to the curriculum on student vaping behaviours.

FUNDING: Federal; Nonprofit grant funding entity

POS1-139

ENHANCING POLICY EFFECTIVENESS: EXAMINING THE ROLLOUT OF A COMPREHENSIVE TOBACCO-FREE WORKPLACE POLICY WITHIN HOMELESS-SERVING AGENCIES AND THE IMPACT OF EDUCATION RECEIPT

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Significance: Tobacco is the leading preventable cause of death, disability, and disease in the U.S. Despite declines in smoking among the domiciled adult population, commensurate reductions have not been achieved for individuals experiencing homelessness (current smoking prevalence ~12% vs 80%). Tobacco-free workplace policies (TFWPs) that restrict or prohibit tobacco use onsite are recommended to address high rates of tobacco use in agencies that serve or shelter this group. However, TFWP effectiveness hinges on factors associated with its rollout (i.e., communication, awareness, enforcement, compliance); employee knowledge of the harms of smoking and benefits of quitting may affect these factors. Here, we examine these factors in 3 homeless-serving agencies that either implemented (N=2) or refreshed (N=1) a TFWP as part of participation in a comprehensive tobacco-free workplace intervention program. **Methods:** Logistic regression analyses, controlling for agency, were used to investigate the effect of program implementation on TFWP communication (i.e., clear signage); stakeholder TFWP awareness; fair and consistent TFWP enforcement; and TFWP compliance. Effects were examined overall and by changes in employee education (median split; larger versus smaller changes in agency-level educational exposure from pre- to post-implementation). **Results:** Participating agencies served 3,265 clients annually; employees provided data on TFWP factors at pre- (N=18) and post- (N=19) program implementation. Results indicated increases in reports of clear TFWP signage (61.11% to 68.42%; $p = 0.5326$); perceived client (55.56% to 84.21%; $p = 0.0558$), contractor (50.00% to 68.42%; $p = 0.1721$), and visitor (55.56% to 73.68%; $p = 0.1788$) TFWP awareness; consistent (66.67% to 73.68%; $p = 0.5399$) and fair (66.67% to 73.68%; $p = 0.5814$) TFWP enforcement, and TFWP compliance (72.22% to 78.95%; $p = 0.5371$). Employees' receipt of education increased (5.71% to 42.11%; $p = 0.002$); larger increases in education receipt were marginally associated with greater increases in client and visitor TFWP awareness over time ($ps = 0.0952$). **Conclusion:** Factors related to successful TFWP rollout increased from pre- to post-program implementation within homeless-serving agencies; most factors were highly endorsed by employees at post-implementation. Education receipt increased but reached only about half of employees. Employee turnover limits education penetration in this setting; cascade training within agencies can facilitate sustainable education exposure. Larger changes in exposure to education were accompanied by greater increases in client and visitor TFWP awareness. Novelty-of-information effects may have influenced employees to provide guidance about the TFWP to groups they commonly interacted with. Finally, small sample sizes limited the power to detect statistically significant results.

FUNDING: Federal; State

POS1-140

CUE REACTIVITY IN NEVER-SMOKING ELECTRONIC CIGARETTE USERS

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Significance: Exposure to ECIG-related cues increases craving for ECIGs in cigarette smokers, including those without previous ECIG experience. This study examined the effects of ECIG cue exposure in experienced ECIG users with minimal smoking history. **Methods:** Participants (N = 34; mean_{age} = 21.5, 64.7% female, 76.5% white) were never-

er-smoking (< 100 cigarettes lifetime) ECIG users [mean = 6.5 (SD = 0.9) days/week for 2.9 (1.6) years] with moderate levels of ECIG dependence [PSECDI mean = 10.8 (4.6)]. They experienced two within-subjects cue exposure conditions that differed by pictorial cue type: ECIG or neutral (water) cues. Each condition was preceded by overnight ECIG abstinence, and included two bouts of exposure to the condition-assigned cue type. Before and after each cue presentation, participants completed subjective measures of ECIG craving/withdrawal and mood. They also completed behavioral economic and delay discounting tasks after both cue exposures. These tasks were presented using two different versions, with the ECIG commodity quantified either in puffs or in minutes of use. Mixed-effects regressions and paired-samples t-tests assessed the effects of cue condition on these outcomes. Statistical significance is reported at $p < .05$. **Results:** Ratings of desire to vape (i.e., Questionnaire of Vaping Urges Factor 1) increased significantly from pre- to post-cue exposure for the ECIG cue condition relative to the neutral condition ($p < .05$). A similar pattern was observed for negative mood ($p < .05$). Additionally, a significant cue type x bout x pre/post interaction was observed for ECIG withdrawal (i.e., Questionnaire of Vaping Urges Factor 2); however, post-hoc tests did not demonstrate reliable effects for this outcome. For the minutes version of the delay discounting task, discounting was significantly steeper after exposure to ECIG cues versus neutral cues ($p = .03$). No effects of cue type were observed for positive mood or the other behavioral tasks ($ps > .05$). **Conclusions:** Exposure to ECIG cues increases desire to vape and negative mood in never-smoking ECIG users, similar to what has been reported for cigarette smokers. Study findings may inform regulation of ECIG product advertising, as exposure to ECIG-related cues may promote continued ECIG use.

FUNDING: Federal; Academic Institution

POS1-141

CIGARETTES, ELECTRONIC CIGARETTES, AND HEATED TOBACCO PRODUCTS AVAILABILITY AND ADVERTISING AT THE POINT OF SALE IN GUATEMALA IN 2008, 2019 AND 2023

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Significance: Unlike conventional cigarettes, electronic cigarettes (e-cigarettes) and heated tobacco products (HTPs) are relatively new products. Both e-cigarettes and HTPs were introduced to the market in Guatemala in 2010 and 2017, respectively. We sought to evaluate the availability and marketing of conventional cigarettes, e-cigarettes and HTPs at points of sale (POS) over time. **Methods:** We used POS advertising data from convenience stores and gas stations collected in 2008 (n=25), 2019 (n=75) and 2023 (n=27). Retailers were randomly surveyed in high- and middle-socioeconomic status neighborhoods. A codebook previously used in 2008 and 2019 was adapted for data collection in 2023. To assess cigarettes, e-cigarettes, and HTPs availability and advertising change over time we present descriptive statistics using STATA. **Results:** At all three time-points, cigarettes were available in all POS. E-cigarettes and HTPs were observed in 2019 (79% and 68%, respectively) and 2023 (70% and 78%, respectively). Cigarette advertising inside POS decreased from 2008 to 2023, from 92% to 48%. From 2019 to 2023, e-cigarette advertising increased from 44% to 63% and HTP advertising from 1% to 70%. All three products were found next to the cash register in all surveys. E-cigarettes were observed next to confectionary most/all the time in 2019 (92%) and 2023. This increased from 0% in 2019 to 95% in 2023 for HTPs. **Conclusions:** In Guatemala, a country with weak tobacco control, the POS has continuously been used to advertise cigarettes. However, in recent years, it has become a key advertising channel for e-cigarettes and HTPs. These products appear to be strategically placed to reach adolescents. The impact on youth exposure and perceptions of all three products is needed to advocate for stronger advertising policies.

FUNDING: Academic Institution

POS1-142

FACTORS ASSOCIATED WITH SINGLE, DUAL AND POLY TOBACCO USE AMONG EMIRATI ADULTS IN THE UNITED ARAB EMIRATES

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Significance: According to the Tobacco Atlas, per capita cigarette consumption is declining, but there has been a 99% increase in the number of people who smoke in the Middle East and North Africa (MENA) region over the past 10 years. This may be driven by the popularity of other forms of combustible tobacco. Tobacco use patterns



in the MENA region differ from the rest of the world with widespread use of products such as shisha and midwakh, but few studies examine dual or poly use patterns here. We sought to understand tobacco consumption patterns in a cohort of Emirati adults and examined associations with markers of chronic disease. **Methods:** We analyzed sociodemographic, tobacco use, and lab data from the UAE Healthy Future Study; a comprehensive population-based cohort study in the United Arab Emirates. We performed multinomial logistic regression to investigate the association between a) single, b) dual and c) poly tobacco use (compared with people who never smoked) and sociodemographic factors (age, gender, education), parental tobacco use, and age of smoking uptake, with and without EC use, as predictors. We also examined associations between biomarkers of cardiovascular disease and single, dual or poly tobacco use. **Results:** Data from 7,477 participants showed that nearly 30% self-reported combustible tobacco use; 47% smoked one type of tobacco, 35% two types, and 18% three or more types. More men reporting smoking than women (49% vs 7%). People were more likely to be poly tobacco users if they were men, had less than a college education and started smoking at a younger age. High-density lipoprotein (HDL) (mean (SD) =42.88 (10.64) vs. 51.88 (13.16), $p=0.00$) and apolipoprotein A levels (mean (SD) = 128.63 (21.07) vs. 141.28 (22.63), $p=0.00$) were significantly lower in poly users compared to people who did not smoke, indicating potentially worse cardiovascular health; no other measures showed statistically significant between group differences. **Conclusions:** This is the first study that looks at sociodemographic factors associated with dual or poly tobacco use in the MENA region. We found smoking rates were high and use of multiple tobacco products common, particularly amongst men. This may be associated with adverse markers of cardiovascular health. Concurrent use of multiple forms of tobacco could present challenges when implementing cessation programs designed for a single product (i.e., cigarettes). Research into motivations for dual and poly use of combustible tobacco is needed to better inform cessation programming.

FUNDING: Academic Institution

POS1-143

NICOTINE INDUCES A PATHOLOGICAL ACCUMBENS NEUROIMMUNE LANDSCAPE THAT DRIVES USE IN A SEX-SPECIFIC FASHION

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Abstract: Nicotine use induces changes in neuroimmune response of the reward pathway, including increased pro-inflammatory cytokine production and microglia reactivity in the nucleus accumbens core (NAcore). Microglia are resident brain immune cells, and nicotine withdrawal induces NAcore microglial reactivity. The NAcore is implicated in addiction processes, including nicotine use; however, most studies only evaluate nicotine neurobiology in males, and little is known about how NAcore neuroimmune signaling may drive nicotine use when sex as a biological variable is considered. This is an important factor to consider given neuroimmune signaling and nicotine use are differentially regulated by sex steroid hormones. Here we evaluated NAcore microglia reactivity as a function of biological sex and utilized a recombinase driver CX3CR1 cre-transgenic rat line to chemogenetically manipulate microglia reactivity to determine their role in driving nicotine-seeking behavior. **Methods:** 76 male and female Long Evans rats underwent nicotine or saline self-administration (SA) for 8 sessions (0.06 mg/kg/infusion). NAcore tissue was dissected for immunohistochemistry, confocal microscopy, and microglial morphometrics using automated analysis program 3DMorph. To evaluate the role of microglia in nicotine-seeking behavior, we utilized a cre-recombinase-expressing rat line (the LE-Tg(Cx3cr1-cre)30Ttc strain), which underwent chemogenetic activation or inhibition of microglia prior to reinstatement ($n=76$). To measure alterations in glutamatergic synaptic plasticity, we conducted electrophysiological recordings of AMPA/NMDA ratio (A/N) in NAcore medium spiny neurons (MSNs; $n=76$). **Results:** Males self-administered significantly more nicotine than females during acquisition ($(F_{1,38}) = 6.12$, $p<0.05$; linear mixed effects (LME) modeling), with no sex differences in lever discrimination. Microglia analysis revealed males and females demonstrated nicotine-induced NAcore microglial reactivity; however, profiles of microglia structural changes induced by nicotine were unique between sexes (ANOVAs; $p<0.05$). Ongoing behavioral studies indicate no differences in viral-treated and wildtype animals during SA (ANOVA; $p=0.3201$). Findings indicate increased cue-induced nicotine-seeking following chemogenetic inhibition of microglia compared to control (ANOVA; $p<0.05$), and increased A/N (ANOVA; $p<0.05$). Chemogenetic microglia activation had no effect on reinstatement or A/N compared to control. **Discussion:** These results show that sex-specific dysregulations in NAcore neuroimmune signaling by chronic nicotine SA plays a critical role in driving nicotine-seeking behavior. Further, NAcore microglia regulate aberrant glutamate plasticity induced by nicotine seeking, which may have important implications for therapeutic targeting for smoking cessation.

FUNDING: Federal; Academic Institution

POS1-144

THE ROLE OF RELIGION IN SMOKING CESSATION AMONG MUSLIM SMOKERS IN SAUDI ARABIA: A QUALITATIVE STUDY

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Introduction: The prevalence of cigarette and waterpipe (shisha) smoking in Saudi Arabia is estimated at 15.9% and 6.7%, respectively. Several cross-sectional studies have identified factors associated with smoking and attitudes towards smoking cessation in Saudi Arabia. However, qualitative studies to understand smoking behaviours in Saudi Arabia in-depth are scarce. Religious beliefs influence the daily life of Muslims. This study explored the barriers and enablers to smoking cessation and gathered the views of Saudi residents on the role of faith in smoking behaviours. **Methods:** Participants were recruited from community settings for semi-structured individual interviews. We developed the interview guide to explore: 1) reasons for smoking, 2) perceived barriers to smoking cessation, 3) previous quit attempts in general and during Ramadan, 4) the role of religion in smoking cessation, and 5) their views on developing and implementing a faith-based smoking cessation intervention. We used a general inductive thematic analysis. **Results:** Ten interviews were conducted (7 males and 3 females). Curiosity, peer pressure, and stress were frequently reported as reasons for starting smoking. Shisha smokers reported that having choices of different flavours is attractive, appealing, and a means to socialize. Reasons for wanting to quit included improving well-being and saving money. Those who quit used a range of methods including willpower, medications, and distracting activities. Participants believed that fasting during Ramadan is a good opportunity to quit smoking for the religious atmosphere it provides. Participants emphasized the importance of faith in promoting smoking cessation. **Conclusion:** In Saudi Arabia, and potentially other countries where religious faith is predominant, messages about quitting should emphasize well-being and financial benefits and align with religious values and practices, such as observing Ramadan to enhance motivation to quit.

FUNDING: Academic Institution

POS1-145

LONGITUDINAL ASSOCIATION OF EXCLUSIVE AND DUAL USE OF MENTHOL CIGARETTES AND FLAVORED CIGARS WITH CIGARETTE AND CIGAR SMOKING CESSATION AMONG US ADULTS - POPULATION ASSESSMENT OF TOBACCO AND HEALTH STUDY WAVES 1-5 (2013-2019)

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Significance: As the Food and Drug Administration considers a national ban on menthol cigarettes and flavored cigars, longitudinal studies are needed to better understand the impact of exclusive and dual use of menthol cigarettes and flavored cigars on cigarette and cigar (i.e., combustible) smoking cessation among US adults. **Methods:** Using nationally representative data from Waves 1-5 (2013-2019) of the Population Assessment of Tobacco and Health Study, we ran discrete-time survival models to analyze the association between flavored tobacco product use and 30-day combustible smoking cessation among adults (18+) with established, current cigarette or cigar use at baseline. The lagged, time-varying exposure defined six flavored tobacco use patterns: exclusive or dual use of non-menthol cigarettes and/or unflavored cigars, exclusive flavored cigar use, exclusive menthol cigarette use, dual non-menthol cigarette and flavored cigar use, dual menthol cigarette and unflavored cigar use, and dual menthol cigarette and flavored cigar use. Respondents who did not participate in follow-up waves, exclusively smoked traditional premium cigars at baseline, exclusively smoked cigars less than five days in the past 30 days at baseline, or gave contradictory information about ever smoking cigarettes or cigars were excluded. We adjusted for age, sex, race and ethnicity, education, household income, cigarette and cigar smoking intensity, and blunt use. **Results:** At baseline, the analytic sample (person $n=8,881$, risk period $n=28,389$) was primarily male (53.7%), non-Hispanic White (69.4%), and had a mean age of 41.2 years. Exclusive or dual use of non-menthol cigarettes and/or unflavored cigars (60.0%) was most common. Compared to exclusive or dual use of non-menthol cigarettes and/or unflavored cigars, exclusive flavored cigar (HR: 0.85, 95% CI: 0.54-1.33), exclusive menthol cigarette (HR: 0.99, 95% CI: 0.89-1.09), dual non-menthol cigarette and flavored cigar (HR: 1.09, 95% CI: 0.79-1.51), dual menthol cigarette and unflavored cigar (HR: 0.85, 95% CI: 0.50-1.42), and dual menthol cigarette and flavored cigar (HR: 0.85, 95% CI: 0.64-1.14) use were not associated with 30-day combustible smoking cessation. **Conclusion:** We found no evidence that exclusive or dual use of menthol cigarettes



and/or flavored cigars was associated with 30-day combustible smoking cessation. Additional studies with larger cohorts are needed to examine whether this relationship varies by race, ethnicity, or socioeconomic status.

FUNDING: Federal

POS1-146

'LAUGHS AT NO SMOKING SIGNS' AND MORE... MARKETING STRATEGIES IN BUSINESS-TO-BUSINESS MARKETING FOR ORAL NICOTINE PRODUCTS.

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Background: Oral Nicotine Products (ONPs) are an emerging group of non-combustible nicotine products that typically do not contain tobacco leaf and are marketed as being tobacco-free. While promotion of tobacco and nicotine products targeting consumers is well-documented, tobacco companies also promote their products to tobacco retailers to encourage them to sell these products in their stores. Messages aimed at retailers can provide insight into what products or flavors are being promoted along with other promotional tactics that may foreshadow future consumer marketing strategies. **Methods:** We obtained print and online ONP ads targeted toward U.S. businesses (N=73) between January 2016, and August 2022 from Numerator Ad Intel and reviewed for ad components such as brand, type of product(s), flavor(s), slogan and highlighted statements, and claims. After removing duplicate ads, two reviewers independently coded 50 unique ads using a predesigned protocol. Discrepancies were resolved by discussion among reviewers and co-authors. **Results:** 56% of ads featured nicotine pouches only and 14% contained pouches along with nicotine tablets, gums & lozenges, different from FDA approved smoking cessation aids. 62% (n=31) of all ads featured multiple nicotine strengths. Ads for the brand Rogue constituted 36% of ads followed by Zyn and On! (16% each). 82% ads featured at least one cooling flavor such as wintergreen, menthol, mint, or ice whereas 48% displayed fruit flavors such as strawberry, banana, or mango. Wintergreen flavor appeared most frequently and was observed in 46% of the ONP ads. Slogans were used in most (70%) ads, and these highlighted the advantages of use such as 'Laughs at no smoking sign', 'Chew on this Anywhere... Anytime' and profitability of ONPs for retailers. 18% of the ads referred explicitly to retailers and contained statements like 'small pouches big margins', or 'playing favorites can really pay off'. **Conclusion:** Tobacco companies use flavors and promises of profitability to entice retailers into endorsing their products. Display and marketing of cooling flavors in ads may be more salient to retailers pending the menthol ban in cigarettes. Use of slogans may be attempting to leverage restrictions that apply to other tobacco products. These findings highlight the need to closely monitor trade press to help regulate the marketing of ONPs given their growing popularity among youth and influence of regulations on other tobacco products.

FUNDING: Federal

POS1-147

CORRELATES OF WATERPIPE SUSCEPTIBILITY AMONG YOUNG ADULT SUSCEPTIBLE NONSMOKERS

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Significance: Many US young adults are susceptible to waterpipe (i.e., hookah) tobacco smoking (WTS) initiation, but research on factors associated with WTS susceptibility is limited. We examined sociodemographic, psychosocial, and other tobacco and substance use correlates of WTS susceptibility among young adults. **Methods:** Baseline data from a randomized trial testing messages communicating health and addiction risks of WTS was collected in US young adults aged 18 to 30 who were susceptible to WTS (n=294). The outcome (extent of susceptibility to WTS) was defined using the

average score of a validated four item scale (thinking about using WTS soon, smoking in the next year, experimenting in the future, smoking if asked by a friend; range 1-4; Cronbach $\alpha=0.84$). Correlates were sociodemographics (age, gender, race/ethnicity, income, education, employment, marital status), psychosocial factors (attitudes toward WTS, WTS harm and addiction perceptions, social acceptability), and other tobacco and substance use (cigarette, cigar, cigarillo, smokeless tobacco, e-cigarette, alcohol, and cannabis). A multiple linear regression model identified correlates of WTS susceptibility, controlling for all other sociodemographics, psychosocial factors, and other tobacco and substance use. **Results:** Most participants were male (60%), completed some college education (47%), not married (82%), employed (66%), with an average age of 25 (SD=3.2) years. Nearly 22% were Black non-Hispanic, 9% smoked cigarillos in the past 30 days, and 45% used cannabis in the past 30 days. Our multiple regression model indicated more positive attitudes toward WTS ($\beta=-0.08, p<0.01$), lower perceived addictiveness relative to cigarettes ($\beta=-0.09, p=0.04$), and greater perceived social acceptability of WTS ($\beta=0.05, p<0.01$) were positively correlated with WTS susceptibility. Young adults who smoked cigarillos ($\beta=0.53, p<0.01$), used cannabis ($\beta=0.14, p=0.02$), and Black non-Hispanic versus White non-Hispanic young adults ($\beta=0.18, p=0.03$) also had higher WTS susceptibility. **Conclusions:** Black race, cigarillo and cannabis use, and psychosocial factors related to WTS were associated with higher WTS susceptibility and potentially, higher risk for WTS uptake. Findings suggest that WTS prevention efforts require multicomponent interventions that address other tobacco and substance use and correct misperceptions about WTS.

FUNDING: Federal

POS1-148

NICOTINE FORMULATION INFLUENCES THE AUTONOMIC AND ARRHYTHMOGENIC EFFECTS OF ELECTRONIC CIGARETTES

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Significance. Evidence is mounting that electronic cigarette (e-cig) use induces cardiac sympathetic dominance and electrical dysfunction conducive to arrhythmias and dependent upon nicotine. A variety of nicotine types and concentrations are available in e-cigs, but their relative cardiovascular effects remain unclear. Here we examine how different nicotine forms (racemic, free-base, and salt) and concentrations influence e-cig-evoked cardiac dysfunction and arrhythmogenesis and provide a mechanism for nicotine-salt-induced autonomic imbalance. **Methods.** ECG-telemetered C57BL/6J mice were exposed to filtered air (FA) or e-cig aerosols from propylene glycol and vegetable glycerin solvents either without nicotine (vehicle) or with increasing nicotine concentrations (1%, 2.5%, and 5%) for three 9-min puff sessions per concentration. Spontaneous ventricular premature beat (VPB) incidence rates, heart rate, and heart rate variability (HRV) were compared between treatments. Subsequently, to test the role of β_1 -adrenergic activation in e-cig-induced cardiac effects, mice were pretreated with atenolol and exposed to either FA or 2.5% nicotine salt. **Results.** During puffing and washout phases, $\geq 2.5\%$ racemic nicotine reduced heart rate and increased HRV relative to FA and vehicle controls, indicating parasympathetic dominance. Relative to both controls, 5% nicotine salt elevated heart rate and decreased HRV during washout, suggesting sympathetic dominance, and also increased ventricular arrhythmias. Atenolol abolished e-cig-induced elevations in heart rate and declines in HRV during washout, indicating e-cig-evoked sympathetic dominance is mediated by β_1 -adrenergic stimulation. **Conclusions.** Our findings suggest that inhalation of e-cig aerosols from nicotine salt-containing e-liquids could increase the cardiovascular risks of vaping by inducing sympathetic dominance and cardiac arrhythmias.

FUNDING: Federal

POS1-149

REAL-WORLD EXPOSURE TO TOBACCO CUES AND THEIR ASSOCIATION WITH SUBSEQUENT CRAVING AND USE OF CIGARETTES AND E-CIGARETTES

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Introduction: Although cue reactivity (CR) paradigms have been extensively used in controlled settings to evaluate craving responses to tobacco stimuli, less work has examined the degree to which exposure to tobacco cues in the natural environment drives craving and use. The current study used ecological momentary assessment (EMA) to investigate whether exposure to tobacco cues predicted craving and use of combustible cigarettes and e-cigarettes in a sample of young adult regular dual users. **Methods:** The current study is a preliminary investigation from an ongoing mixed laboratory and EMA study of the shared, distinct, and cross-conditioned processes



underlying tobacco craving and use. Participants (n=9) completed a baseline survey, two laboratory sessions, and 28 days of EMA comprising random surveys, attentional bias surveys, self-initiated cue surveys, self-initiated tobacco use surveys, and morning reports. We fit linear mixed effects models regressing craving for cigarettes and e-cigarettes onto survey type (random versus cigarette cue versus e-cigarette cue). We then fit generalized linear mixed models regressing any use of tobacco, cigarettes specifically, or e-cigarettes specifically onto the same survey type predictor. We limited the window of time investigated following a survey to 120 minutes (right censored when a subsequent survey occurred) and included a log offset for exposure (i.e., number of minutes in the window). **Results:** Craving for cigarettes and e-cigarettes was associated with substance-specific cues such that smoking or combined (i.e., smoking and vaping) cues were associated with craving for cigarettes and vaping or combined cues were associated with craving for e-cigarettes. Regarding actual use, exposure to vaping cues was associated with increased odds of any tobacco use, driven primarily by increased odds of vaping (as opposed to a cross-conditioned effect). **Conclusions:** Tobacco cue exposure in the natural environment is an important predictor of real-world craving and use. Although cross-conditioning between tobacco products has been demonstrated in controlled settings, real-world effects appear to be primarily substance specific, with stronger relationships for vaping than for smoking. Tobacco cue exposure may be an important consideration when designing adaptive interventions for tobacco use that are sensitive to real-world contexts.

FUNDING: Federal

POS1-150

LGBTQ+ SUBGROUP RECEPTIVITY TO THIS FREE LIFE, A TOBACCO PUBLIC EDUCATION CAMPAIGN FOR LGBTQ+ YOUNG ADULTS

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Background: Tobacco control efforts in the US have drastically reduced adult cigarette smoking rates. However, inequities persist among lesbian, gay, bisexual, transgender, queer, and other sexual and gender minority populations (LGBTQ+). Despite this, there are few LGBTQ+-focused tobacco education campaigns and few evaluations reporting LGBTQ+ responses to tobacco education campaigns. **Aim:** To assess receptivity to the US Food and Drug Administration's *This Free Life* (TFL) tobacco education campaign among subgroups of US LGBTQ+ young adults (aged 18-24). **Methods:** We used seven waves of campaign evaluation survey data (2016-2019), which was a nested cohort design with new respondents sampled at each wave. This study used only participants' first wave of data. We examined associations between LGBTQ+ subgroup (e.g., gay male, bisexual female) and interactions with race/ethnicity, smoking status, and LGBT identity connectedness and the outcomes of average perceived effectiveness (PE) of TFL ads (n=2,309-8,477 per ad) and average brand equity (BE) (two measures of perceptions about the TFL's "brand") (n=11,435 total). We estimated relationships between predictors and PE using cross-sectional linear regression models with robust standard errors and BE using random effects paneled linear regression models. We then used weighted grand means to assess differences in PE or BE between subgroups and the sample grand mean. **Results:** Receptivity (Mean PE= 3.7/5; Mean BE=3.3, 4.0/5) was high overall. PE was above the grand mean for bisexual females but below the mean for gender minority respondents and gay and bisexual males. BE was below the grand mean for gender minority respondents. BE was comparable or higher for Black and Hispanic respondents than White respondents. Nonsmokers had higher PE and BE than current smokers. LGBT identity connectedness was positively associated with PE and BE; the BE and identity connectedness relationship was strongest for bisexual males. **Conclusion:** This study showed high overall receptivity to TFL among a diverse LGBTQ+ young adult sample. Bisexual females, those with high identity connectedness, nonsmokers, and Black and Hispanic participants had high receptivity, while gay and bisexual males and gender minority respondents had lower receptivity compared to the sample mean. Therefore, although overall receptivity to TFL was high, differing campaign strategies by LGBTQ+ subgroup may be needed to boost receptivity across groups.

FUNDING: Federal

POS1-151

DIFFERENCES IN CESSATION RISK FACTORS BY MENSTRUAL TIMING VERSUS NO MENSTRUAL TIMING

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Introduction: Women, as compared to men, are more likely to relapse from a cessation attempt. Cessation interventions designed to meet the needs of women are lacking. The goal of this secondary data analysis is to examine the role of cessation risk factors - weight concerns (WC), urge coping (UC), and anxiety sensitivity (AS) - on smoking cessation outcomes in a recently completed randomized control trial in which participants were randomly assigned to quit smoking during the follicular phase (FP) versus standard of care (SC) with no menstrual cycle timing. **Methods:** Females, aged 18-40 years, were recruited nationally in the United States. Upon enrollment and randomization, all participants completed a standard telephone-based smoking cessation intervention (six weekly counseling sessions plus two weeks of nicotine replacement therapy). Validated questionnaires measuring WC, UC, and AS were completed at baseline and end of treatment. Primary outcomes included seven-day point prevalence smoking abstinence (yes/no) and a continuous standardized residual variable capturing whether number of cigarettes/day at end of treatment was greater- or less-than-expected. **Results:** Participants (n=76; 45% assigned to FP) were, on average, 33.9 (standard deviation [SD] ± 4.9) years old and smoked 14.7 (SD ± 7.6) cigarettes/day at baseline. Regardless of randomization, lower UC at baseline predicted worse-than-expected smoking outcomes (i.e., more cigarettes smoked per day; $\beta = -0.31, p < .05$) and lower likelihood of seven-day abstinence ($\beta = -0.86, p < 0.05, OR = 0.42$) at end of treatment. Increases in UC across treatment also predicted seven-day smoking abstinence ($\beta = 0.79, p < 0.05, OR = 2.2$). Increases in UC ($\beta = 0.51, p < 0.01$) and decreases in AS ($\beta = -0.35, p < 0.01$) from baseline to end of treatment predicted better-than-expected smoking outcomes. However, the positive effect of increased UC was significant in FP ($\beta = 0.64, p < 0.01$) and not SC ($\beta = 0.28, p > 0.10$). Additionally, in SC only, increased WC from baseline to end of treatment ($\beta = -0.66, p < 0.05, OR = 0.51$) predicted lower likelihood of seven-day abstinence at end of treatment. **Discussion:** These results indicate that WC, UC, and AS influence cessation outcomes in women, and timing cessation to menstrual phase may allow for tailored treatments. These observations should be replicated in a larger efficacy trial, but may help inform innovative and personalized cessation interventions designed for women.

FUNDING: Federal



This year, we received a large number of submissions which do not present empirical findings, but which the SRNT 2024 Program Committee Co-Chairs think would be of great value and interest to the SRNT audience. As a result, we have introduced a new area to our poster sessions for “Commentary Posters” which we think will educate, inform, and/or promote conversation. Enjoy!



COM1-1

ETHICAL PUBLISHING IN INDIGENOUS CONTEXTS

Raglan Maddox¹, Lisa Whop¹, Shane Bradbrook², Michelle Kennedy³, Sydney Martinez⁴, Patricia Nez Henderson⁵, Hershel Clark⁵, Penney Upton⁶, Dan Tautolo⁷, Billie-Jo Hardy⁸, Lani Teddy⁹, Andrew Waa⁹, Ali Drummond¹⁰. ¹ANU, Canberra, Australia, ²Aotearoa New Zealand, Wellington, New Zealand, ³University of Newcastle, Callaghan, Australia, ⁴University of OK HSC, OK City, OK, USA, ⁵Black Hills Center for American Indian Health, Rapid City, SD, USA, ⁶University of Canberra, Canberra, Australia, ⁷AUT, Auckland, New Zealand, ⁸University of Toronto, Toronto, ON, Canada, ⁹University of Otago, Wellington, New Zealand, ¹⁰The Congress of Aboriginal and Torres Strait Islander Nurses and Midwives, Canberra, Australia.

Background: Commercial tobacco control research involving Indigenous peoples has the potential to cause harm if it is exploitative, lacks Indigenous engagement or does not recognise Indigenous worldviews and aspirations. Publishers, including scientific journals, provide a means through which commercial tobacco and nicotine research is disseminated. Therefore, it is crucial that ethical publishing practices are implemented to minimise and prevent harm. **Method:** We humbly acknowledge, respect and value the strengths and diversity of Indigenous peoples. We proposed a *publication protocol guide* to explicitly uphold ethical research and evaluation practices. Publications involving Indigenous peoples should report how the respective Indigenous communities were meaningfully engaged. The guiding questions from *Ethical publishing in 'Indigenous' contexts* are not intended to be a checklist, but support and promote critical reflection from publishers, funding bodies, institutions, and researchers in undertaking and publishing research. For example, did Indigenous people(s) inform the research question; how have researchers engaged with the respective Indigenous peoples; did the research have Indigenous leadership; did the research have Indigenous governance; how were local Indigenous protocols and approvals adhered to and respected; how were the findings returned to the respective communities; and how has/may the research benefit the Indigenous community? **The Why:** By adhering to ethical practices, researchers can better establish accountability to Indigenous peoples and communities. This helps to ensure that research does not harm Indigenous peoples and is ultimately beneficial and supportive of Indigenous sovereignty, self-determination and agency. **The ask:** Publishing houses, however, generally do not have comprehensive ethical requirements or do not address Indigenous ethical concerns. We strongly urge publishers, funding bodies, institutions, and research teams to adopt publication practices that explicitly promote antiracist ethical research and evaluation practice, helping to minimise harms to Indigenous peoples. All people and institutions involved in publishing should critically assess and uphold antiracist, ethical publishing protocols and practice. It is everyone's responsibility to ensure that research is conducted in the right way. Emphasizing ethical and anti-racism principles and practices can help foster high-quality, culturally and clinically safe, research and evaluation. Ultimately, this contributes to a future free from commercial tobacco and nicotine use and associated harms.

FUNDING: Unfunded

COM1-2

LITIGATION TO PROTECT PEOPLE FROM TOBACCO SMOKE INCURSION INTO THEIR HOMES: ISRAEL SUPREME COURT CASE 1416/21

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Significance: Tobacco smoke incursion (TSI) into private residences is an unresolved global public health threat. In Israel, where population density and smoking are high, 40% of people report past-year TSI, with middle/low income individuals more affected than high-income individuals. Following several high-profile court cases, a petition was filed with the Supreme Court by the NGO Clean Air on behalf of individuals harmed by TSI. **Methods:** We review the process of Supreme Court case 1416/21 on Neighbor Smoking using Court records, media reports, and records of Knesset meetings and academic proceedings. **Results:** In 2020, litigants petitioned the Court against the Ministers of the Environment, Health and Internal Security (Police), for non-protection from TSI due to neighbor smoking. The request to the Court was to determine whether existing laws, primarily Ministry of the Environment (MOE) laws, included protection for individuals from TSI. The MOE requested that the case be dismissed on grounds that the pollution caused by tobacco smoke was very minor and therefore not covered by existing laws. At the hearing in January 2022, the Court rejected the MOE claim and ruled that there was a problem which must be dealt with. One judge suggested that existing laws concerning smell could be relevant. The Court encouraged the sides to come up with a joint plan of action, and stated that, in the absence of a plan, the Court might intervene. In February 2022, the Ministry of Health (MOH) convened a Round Table meeting which included the parties and national tobacco control experts. The clear consensus was that neighbors

must be protected from TSI. Despite this, in Sept. 2022, in its Affidavit to the Court, the MOH opposed protection for neighbors, out of presumed concern for smokers' families. This argument was rejected by the Expert Witnesses for the litigants, by a group of 13 leading public health experts, and by a major international tobacco control figure on scientific, moral and public health grounds. The upcoming Court hearing is scheduled for Sept. 13, 2023. **Conclusions:** To the best of our knowledge, this is the first time that any country has considered protecting all residents from tobacco smoke incursion into their homes. However, the protection from TSI is vehemently opposed by the MOH. A Court ruling in favor of protection would, for the first time, give Israelis subjected to TSI legal recourse, denormalize smoking around others, reduce disparities due to the association between TSI and income, and place Israel in the forefront of the battle for a smoke-free society.

FUNDING: Academic Institution



 SRNT 2024

POSTER SESSION 2



POS2-1

ACUTE EFFECTS OF ORAL NICOTINE POUCHES AND THE INFLUENCE OF NICOTINE DOSE AND FLAVOR: A CLINICAL LABORATORY STUDY

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Significance: Oral nicotine pouches (ONPs) are nicotine products that contain a crystallized powder instead of tobacco leaves and are available in a variety of flavors and nicotine concentrations. ONP sales have increased substantially but research to characterize the acute effects (e.g., abuse liability, withdrawal suppression among those that smoke cigarettes) and use behaviors (e.g., topography) associated with these products is limited. **Methods:** In this ongoing double-blind, within-subjects clinical laboratory study, participants who smoke tobacco cigarettes daily (current $n=6$) completed seven experimental sessions, during which they used ONPs of varying nicotine doses (4mg; 8mg) and flavors (original; mint; citrus) or their preferred brand of cigarettes under both directed and *ad libitum* use conditions. Participants arrived for each session after undergoing ≥ 12 hours of smoking abstinence. Outcomes include acute subjective effects (e.g., product "liking", "craving cigarettes"), use behaviors (i.e., topography), and nicotine pharmacokinetics; blood samples are pending analysis (results will be available for the conference). **Results:** All ONPs moderately suppressed tobacco abstinence symptoms (e.g., "craving"), with the highest symptom reduction observed in the 8mg Mint condition. During *ad libitum* use, cigarettes more effectively suppressed withdrawal symptoms than all ONPs. Abuse liability ratings (e.g., "pleasant," "satisfying") were generally similar for original and mint ONPs, but the lowest ratings were consistently observed in the citrus conditions. Within a given ONP flavor, abuse liability ratings were similar at the low/high nicotine doses, but negative subjective effects (e.g., "unpleasant") were more common at high doses. During *ad libitum* use, participants used the lower nicotine doses for longer than the high doses within each flavor category, but other topography variables generally did not differ across ONPs. **Conclusions:** Nicotine dose and flavor influenced ONP effects, suggesting these characteristics may be important to consider for regulation. ONPs suppressed tobacco abstinence symptoms in this study, but future research is needed to determine the viability of ONPs as long-term substitutes for cigarettes, among other directions. Additional ONP research is also needed among populations not included within the current project (e.g., nicotine-naïve individuals) to comprehensively assess the potential public health impact of these products.

FUNDING: Federal

POS2-2

EVALUATING THE IMPLEMENTATION AND DISSEMINATION OF A TOBACCO-FREE WORKPLACE PROGRAM IN HOMELESS-SERVING AGENCIES

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Significance: Tobacco is the leading cause of preventable death, disability, and disease in the U.S. While the national prevalence of smoking has declined to 11.5%, adults experiencing homelessness continue to smoke at an elevated rate (~80%) and suffer from greater smoking-related morbidity. Our prior work has shown that a comprehensive tobacco-free workplace (TFW) program can increase clinicians' tobacco knowledge, screening rates, and intervention practices in homeless-serving agencies (HSAs). Herein, we evaluate program implementation, including penetration, fidelity, and acceptance, as well as program dissemination objectives, within 3 Texas HSAs. **Methods:** The 3 participating HSAs had 34 employees who served 1,355 adults annually. Program objectives for penetration, fidelity, and acceptance were assessed using pre- and post-implementation surveys (compared via Wilcoxon test). Dissemination objectives included webpage reach, program promotion, and technical assistance provision. **Results:** Penetration: The program provided tobacco-related education to 55.8% of employees (vs $\geq 80\%$ targeted), yielding significant knowledge gains (59.3%; $p<0.0001$, relative to $\geq 20\%$ gain targeted). Only 1 HSA attended specialized training (vs 100% agency participation targeted). Fidelity: 1 HSA withdrew, citing capacity concerns (100% agency retention not met [NM]). Tobacco screenings increased, from 0% of clinicians participating (pre) to 57.1% (post) (vs $\geq 85\%$ compliance targeted; objective NM). Intervention delivery increased over time from 0% of smokers receiving them to 100% (objective of $\geq 85\%$ of patients receiving an intervention by post met). Acceptability: Among completing HSAs, 24.2% (pre) and 23.5% (post) of employees cited concerns about maintaining/sustaining the TFW policy (decrease in concerns over time and $\leq 15\%$ of employees with concerns by post; objectives NM). Of employees

familiar with the program at post-implementation, 75% reported satisfaction with the program (objective of $\geq 80\%$ satisfied NM). Reach: Webpage reach objectives of ≥ 10 /month were achieved (avg=11.8). Promotion: The step-by-step implementation guide was shared with 140 HSAs (165 recipients) across Texas; 12 meetings were held (objectives of ≥ 60 agencies contacted and ≥ 11 meetings met). Technical assistance: Technical assistance and resources were provided to 5 additional HSAs (objective of engaging ≥ 2 agencies met). **Conclusions:** Dissemination objectives were met but implementation objectives were only partially achieved. Contributing factors included high employee turnover, limited agency capacity, competing priorities, and contextual circumstances. Additionally, small sample sizes and low survey completion rates influenced objective achievement. Future work should focus on capacity-building of agencies and tailoring programming.

FUNDING: Federal; State

POS2-3

POSTPARTUM NICOTINE/TOBACCO USE: WHAT IS THE ASSOCIATION WITH BONDING, CONNECTION, AND OXYTOCIN?

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Introduction: Breastfeeding is a well-known protective factor against cigarette smoking relapse. The mechanisms of action of this association remain unknown; however, subjective connection with baby and oxytocin (a hormone that increases with breastfeeding) may play a role. We sought to explore the role of subjective connection with infant and oxytocin in postpartum nicotine/tobacco use. **Methods:** This secondary-data analysis utilized data from an ongoing prospective cohort that explores the role of hormones in postpartum opioid use among those with and without opioid use disorder [OUD]. At study enrollment, participants reported on their history of nicotine/tobacco use (ever/never). During the first four weeks postpartum, participants provided saliva samples (for oxytocin) and completed the Postpartum Bonding Scale (PBQ) weekly. Additionally, they completed daily surveys to report subjective connection with infant (100-point visual analog scale [VAS], from 0 "not at all" to 100 "very much"), nicotine/tobacco craving (100-point VAS, from 0 "not at all" to 100 "extremely"), and nicotine/tobacco use (yes/no). We used correlations and t-tests to examine these relationships in SAS 9.4. **Results:** Participants ($n=60$; 77% with OUD) were, on average, 29.2 (standard deviation [SD]: 5.1) years old. Most reported a high school education or less (57%), ever using nicotine/tobacco (80%; including 80% use of combustible cigarettes and 20% use of e-cigarettes), using nicotine/tobacco in the three months prior to pregnancy (75%), and no use of nicotine/tobacco in the first four weeks postpartum (61%). Connection with infant was greater among those who reported never using nicotine/tobacco compared to those who reported ever using nicotine/tobacco at postpartum weeks one (94.3 ± 7.2 vs 86.7 ± 14.7 , $p=0.039$), two (96.2 ± 6.7 vs 86.0 , $p=0.004$), three (94.1 ± 6.1 vs 84.1 ± 17.3 , $p=0.013$), and four (93.2 ± 8.2 vs 82.0 ± 18.3 , $p=0.034$). Cigarette craving was inversely correlated with feelings of rejection and anger towards infant, a subscale on the PBQ, at postpartum week two ($r=-0.44$, $p=0.039$). Cigarette craving was also inversely correlated with oxytocin at postpartum week four ($r=-0.95$, $p=0.011$). **Discussion:** These findings suggest that the subjective connection with infant varies by use of nicotine/tobacco; this association may be influenced by aspects of bonding and/or oxytocin. Additional research is needed with larger sample sizes to explore how these observations may protect against postpartum relapse to nicotine/tobacco use.

FUNDING: Federal

POS2-4

INTERNALIZING PSYCHOPATHOLOGY AMONG YOUNG ADULT E-CIGARETTE CONCEALERS AND NON-CONCEALERS

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Significance: The prevalence of e-cigarette use is exceedingly high among young adults with recent estimates suggesting rates of past month use as high as 25%. Unfortunately, mounting evidence indicates that e-cigarettes pose significant health risks, including interfering with normal brain development. Further contributing to the public health concern associated with e-cigarettes, their use is also linked to internalizing psychopathology as well as affective vulnerability factors, such as emotion dysregulation and anxiety sensitivity. One of the reasons behind the popularity of e-cigarettes is that it is easy to hide their use from others who might disapprove. This concealment of e-cigarette use could result in a decreased likelihood of disclosing e-cigarette use to health care providers. However, no research, to date, has examined psychological differences between those who do and do not hide their e-cigarette use. Therefore, the purpose of



the current study was to examine differences between concealers and non-concealers in anxiety and depression symptoms and affective vulnerability factors (i.e., anxiety sensitivity, emotion dysregulation, distress intolerance). **Methods:** Participants were 131 college students reporting past 30-day e-cigarette use who completed self-report measures of e-cigarette use, internalizing symptoms, and affective vulnerability factors for course credit. Participants were divided into two groups based on whether they reported hiding their vaping from others (concealers; $n = 62$; 82% female; 80% White) or not (non-concealers; $n = 69$; 67% female; 84% White). **Results:** After controlling for the effect of gender identity, concealers reported greater depression symptoms [$F(1,128) = 4.91, p = .028$, partial eta squared = .04], anxiety sensitivity [$F(1,126) = 9.11, p = .003$, partial eta squared = .07], emotion dysregulation [$F(1,126) = 3.99, p = .048$, partial eta squared = .03], and distress intolerance [$F(1,122) = 9.18, p = .003$, partial eta squared = .07]. There were no group differences in anxiety symptoms. **Conclusions:** These findings suggest that e-cigarette users who hide their use have more symptoms of depression and are at greater risk for internalizing symptoms because of greater affective vulnerability. It will be important for healthcare providers, including those providing mental health services, to recognize the tendency to conceal their vaping when screening for e-cigarette use in patients with depression and affective vulnerability.

FUNDING: Unfunded

POS2-5

A SYSTEMATIC REVIEW OF PREDICTORS OF VAPING CESSATION AMONG YOUNG PEOPLE

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Significance: E-cigarette use among young people has emerged as a growing public health concern. Understanding the factors influencing vaping cessation related behaviors among young people is crucial for planning targeted intervention programs. The objective of this review was to systematically summarize the individual and environmental factors that predict vaping cessation related behaviors in the young population. **Methods:** PubMed, PsycINFO, IEEE Xplore, Google Scholar and the Ontario Tobacco Research Unit library catalogue were systematically searched for English language literatures published since 2005. We included studies that investigated predictors of intention to quit vaping, quit attempts and vaping abstinence young people aged 10-35 years. Studies that examined predictors of cessation of cigarettes, other tobacco products, cannabis vaping, dual use, or polysubstance use, and studies evaluating efficacy of cessation interventions were excluded. Data on general characteristics and analyzed predictors were extracted by one reviewer and checked by a second reviewer. Quality in Prognosis Studies (QUIPS) tool was used to assess risk of bias. **Results:** A total of 24 studies were included which investigated predictors of intention to quit vaping ($n=15$), quit attempts ($n=11$), and vaping abstinence ($n=7$). We identified a total of 107 predictors and grouped them into 'probable', 'possible', 'insufficient evidence', 'probably unrelated', and 'inconsistent direction' categories. For 'probable' predictors, we found 11 for intention to quit, 8 for quit attempts and 5 for vaping abstinence. Most studies were rated as having a low risk of bias in most of the domains except study attrition. Overall, harm perception of vaping, current other tobacco product use, frequency of use, and level of nicotine dependence were common 'probable' predictors across three outcomes. **Conclusion:** These findings on 'probable' predictors can be used to plan targeted vaping cessation programs for high-risk populations and investigate causal associations between these predictors and outcomes. Moreover, we identified a number of 'possible', 'insufficient evidence' and 'inconsistent direction' predictors which needs further testing by future longitudinal research. Finally, future researchers should focus on studying different population groups in different jurisdictions to minimize the research gap and expand our knowledge on this area.

FUNDING: Federal; Academic Institution

POS2-6

NICOTIDE MENTHOL - SMOKE TOPOGRAPHY, NICOTINE KINETICS, AND SUBJECTIVE SMOKING EXPERIENCE WITH MENTHOL-CONTAINING HTP (HEATED TOBACCO PRODUCT) OF THE BRAND IQOS

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Background Heated Tobacco Products (HTP), which heat tobacco without burning it, are becoming increasingly popular among younger populations. Since 2016, the IQOS system by Phillip Morris has been available on the German market as a well-known representative of HTP. Menthol as an additive in tobacco products has been a significant topic in tobacco consumption prevention for several years. By altering taste and inhalation-sensory effects, it is believed to facilitate the initiation of tobacco product use. In terms of youth protection, the sale of menthol cigarettes and menthol HEETS was banned nationwide in Germany in early 2020. Due to an exemption, menthol in HTPs was re-approved in Germany in April 2022. **Objective and Methods** In this study, we aimed to investigate the extent to which the additive menthol influences the subjective smoking experience and usage behavior (smoke topography) when using HTPs. Special attention was given to the subjective positive reinforcing effects of menthol and the facilitation of smoking behavior. Smoking behavior was examined based on potentially differing smoke topographies of heat-not-burn products with and without menthol additives. Additionally, the nicotine kinetics of menthol-containing HTPs were examined as it could provide indications of increased addictive potential. $N = 15$ "occasional smokers" (inclusion criteria including no tobacco dependence, minimum 1 smoking event per month, maximum 3 smoking events per week) were included. They individually tested 3 products in cross-over design. Participants attended three sessions in which they tested IQOS HEETS with menthol, IQOS HEETS without menthol, or tobacco cigarettes (as a control group) under same conditions. Nicotine kinetics were determined through blood samples taken at specified time points. Questionnaires were used for subjective smoking experience and side effects. **Results** We found no significant differences in nicotine kinetics between the tested products. The maximum concentration of nicotine (C-max) did not significantly differ between the HTP products and tobacco cigarettes. The bioavailability (AUC) of nicotine did not significantly differ between the HTP products and tobacco cigarettes. **Conclusions** Contrary to expectations, nicotine does not flood our non-dependent population more strongly during the acute phase (first 5 minutes) with tobacco cigarettes compared to HTP with and without menthol. A strong surge during the acute phase is a well-known important factor in addiction development. This suggests that HTP with and without menthol may have a similar addictive potential as tobacco cigarettes among non-dependent consumers.

FUNDING: State

POS2-7

TRAJECTORIES OF LIFETIME VAPING IN TEENS AND YOUNG ADULTS: LATENT TRANSITION ANALYSES OVER ONE YEAR

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Background: From 2017-2022, the prevalence of lifetime vaping of nicotine and marijuana among 12th graders increased more than 50%. Despite the bidirectional relationship between initiation of marijuana and nicotine vaping, little is known about the patterns of vaping experimentation and progression among young people. The goal of this study was to describe the progression of vaping behavior over one-year in a longitudinal sample of teens and young adults. **Methods:** 432 Vermont teens and young adults (ages 12-25) completed four items on lifetime occasions of vaping nicotine, marijuana, just flavoring, and CBD at three timepoints (Winter 2020, Summer, 2021, and Winter 2021). Nicotine and marijuana vaping were categorized as "0 occasions", "1-19 occasions", and "20 or more occasions." Vaping flavoring and CBD were dichotomized as "0 occasions" and "1 or more occasions." These items were used in latent class analyses to determine the appropriate number of classes across the three timepoints; latent transition analyses were then completed with a three-class model. Poisson regression analyses identified predictors of transitioning between classes over 1-year, including sociodemographics, substance use, and vaping harm perceptions. **Results:** Three lifetime vaping classes emerged at baseline: never (46.8%), experimenting (38.9%), and experienced (14.4%). The experienced class differed from the experimenting class with a higher proportion of 20+ occasions vaping nicotine (53% vs. 21%) but was defined by vaping marijuana on more than 20 occasions (100% vs. 0%). Over 1 year, 5% of the never vaping class moved to the experimenting class; predictors of this transition were past 30-day tobacco and alcohol use and low relative harm perceptions of vaping nicotine vs. vaping marijuana at baseline, controlling for demographic and other covariates. The experienced vaping class grew by 9% during this time and the only predictor of movement to this class was past 30-day marijuana use at baseline. **Conclusions:** Vaping experimentation can occur rapidly in young people, with 14% transitioning into higher use classes in just one year. Greater lifetime occasions vaping marijuana than nicotine characterized progression to the experienced class, though past 30-day tobacco use and vaping harm perceptions at baseline predicted moving from never vaping to experimenting with vaping. Findings suggest the importance of comprehensive polysubstance prevention efforts to reduce vaping behavior in young people.

FUNDING: Federal



POS2-8

HEPATITIS C AND CIGARETTE SMOKING BEHAVIOR: THEMES FROM FOCUS GROUPS

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SIGNIFICANCE: People with chronic hepatitis C virus (HCV; PWHC) use cigarettes at a high prevalence and smoking has additional harms specifically related to HCV, including amplification of hepatocellular carcinoma risk. While many PWHC report wanting to quit smoking, quit rates are low for PLHC. Little is known about factors related to cigarette use among PWHC, and there is a lack of smoking cessation treatments targeting PWHC. This study used focus group data to better understand beliefs and behaviors related to cigarette use among PWHC with the goal of developing effective, targeted treatments. **METHODS:** Participants were 15 adults (60% male; 80% non-Hispanic Black) with HCV who had completed their HCV treatment and reported current cigarette smoking (100% daily smoking, Mean cigarette per day=7.3, SD=5.1). Qualitative data were collected from two focus groups during which participants were asked about reasons for smoking, barriers to quitting smoking, and HCV's relationship to smoking. Four coders examined themes that arose in the focus groups (e.g., HCV, tobacco use). Coded transcripts were inputted into NVivo 12, and queries were run to examine how many times each of the themes were coded in the focus groups. **RESULTS:** Common reasons for smoking included addiction to cigarettes, stress, substituting cigarettes for other drugs, and social norms. Reasons for quitting included health, physical concerns like the smell of cigarettes, and being free from the use of all drugs. Barriers to quitting included concerns about coping with stress and weight gain, along with having a lack of support and education about quitting. Many focus group participants believed there was a link between smoking and HCV. They discussed smoking in relation to the stress of having a HCV diagnosis, stress related to treatment for HCV, as well as smoking to celebrate being cured of HCV. **CONCLUSION:** Participants identified both non-HCV-related and HCV-related aspects of smoking and cessation-related behaviors that could be targeted to people with HCV as they receive their medical care. More research is needed to understand best treatment approaches to reduce high prevalence and significant medical consequences of cigarette use among PWHC.

FUNDING: Federal

POS2-9

EXPOSURE TO VAPING-RELATED SOCIAL MEDIA CONTENT AND IMAGES AMONG MEXICAN AMERICAN COLLEGE STUDENTS: A QUALITATIVE STUDY

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Significance: Young adults, including Hispanics, have the highest prevalence of social media (SM) use, yet many do not recognize the intent of persuasive promotional material, enhancing their vulnerability. This qualitative study examines exposure to vaping-related SM from the perspective of Mexican American (MA) college students. **Method:** In May and June 2023, ten qualitative interviews were conducted with students from 5 Texas colleges. Participants (MA students, 7 women and 3 men, 18-22 years old) a) described the nature of vaping-related content in their SM feed and b) reacted to three vaping-related SM images: 1) vape advertisement, 2) quitting vaping, 3) humorous vaping meme. Participants described their reactions to the images in terms of message intent, appeal, expected influence on behavior, and affective reactions. Interviews were recorded, transcribed, and coded independently using an iterative process to identify themes/patterns. **Results:** Students reported seeing little to no vaping-related advertisement or promotions in their SM feed. Rather, they described user-generated vaping content in their SM feed as "normalized" i.e., "it's not the focus, it's in the background." Prevention messages (e.g., Truth) were identified by half, and all reported seeing more content in English than Spanish. Image 1 intent was correctly described as an advertisement for "vapes in different flavors." While some participants found it appealing and would buy or vape after seeing the image, others described it as a "cringe ad" that "doesn't even describe the flavor, so it doesn't make me want to use." Image 2 intent was consistently described as "stop vaping... just throwing it away stands out" "tips to quit vaping." Some, who wanted to quit vaping, noted "it would make me want to stop." Others reported an urge to vape as a reaction and seeing similar SM content, i.e., "comments on social media that joke about watching these anti-e-cig ads while using vapes." Others noted there are

better ways to make you want to stop vaping, i.e., "showing you the consequences of vaping." Image 3 was consistently described as funny and drew attention. As one student said, "I would like all the comments and just laugh a little... Other users also would find it relatable." Humor resonated with most; several noted that humor can help "to stop and or to use it, both ways." **Conclusion:** Regardless of message intent, SM vaping-related content may influence behavior in intended and unexpected ways.

FUNDING: Federal

POS2-10

PERCEIVED HEALTH CONCERNS OF CHILD THIRDHAND SMOKE EXPOSURE AND POTENTIAL REMEDIATION STRATEGIES AMONG NONSMOKING PARENTS OF YOUNG CHILDREN

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Significance: Thirdhand smoke (THS) research in real-world settings (e.g., homes) indicates that THS can be highly pervasive and difficult to remove. Since THS contains some of the same toxic chemicals as secondhand smoke, it has been posited that there is no risk-free level of THS exposure. Risks of exposure are higher in younger children due to their age-specific behaviors (e.g., crawling on floors), time spent indoors, and their developing biological systems. However, less is known about the perceived harm of child THS exposure among parents who are nonsmokers. Therefore, this study explored the perceived health concerns of child THS exposure and the likelihood of implementing potential remediation strategies among nonsmoking parents based on hypothetical child hand nicotine levels. **Methods:** Data are from 245 nonsmoking parents of children 0-11 years old who are participating in a large, ongoing THS observational trial. Parents were given hypothetical low hand wipe nicotine results of 10ng/wipe or high results of 200ng/wipe. Parents then completed surveys about their perceived concerns associated with low or high hand nicotine levels and potential remediation strategies that they would likely implement to reduce exposure in their nonsmoking households. Descriptive statistics were computed. **Results:** Overall, when presented with hypothetical low and high hand nicotine results, 52% and 78% of parents said they would be somewhat/very concerned that THS exposure will affect their child's health, respectively. Similarly, when presented with low and high hand nicotine results, most parents (71% and 93%, respectively) said they would be somewhat/very likely to implement remediation strategies to reduce THS exposure. The top remediation strategies that parents said they would implement if their child had low hand nicotine levels were banning smokers and not allowing smoking in either their homes (70%) or cars (69%), and not allowing their children to visit smokers even if they only smoked outside (67%). Similarly, the top remediation strategies that parents said they would implement if their child had high hand nicotine levels were banning smokers and not allowing smoking in either their homes (77%) or cars (77%), and not allowing their children to visit smokers even if they smoked outside (74%). Deep cleaning was the lowest endorsed remediation strategy when parents were presented with hypothetical low and high hand nicotine levels (64% and 64%, respectively). **Conclusion:** The majority of nonsmoking parents were concerned about the potential health risks of child THS exposure, with higher concerns reported when children had hypothetical high hand nicotine results. Universal THS education is needed among nonsmoking households with children.

FUNDING: Federal

POS2-11

COLLECTING TOBACCO PRODUCT WASTE IN THE SAN JOAQUIN VALLEY

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Significance: An emerging area of tobacco research is the impact of tobacco product waste (TPW) on the environment. Filters found in combustible cigarettes are comprised of a complex compound that are resistant to biodegradation; these cigarette butts are one of the largest threats to our environmental ecosystems. Waste product assessment is of great interest to communities and methods to collect waste products can easily lend itself to community participation. Indeed, waste product collection can mobilize communities, but these efforts may or may not coincide with scientific methods required for peer reviewed publications. This paper compares two methodologies of tobacco product waste collections across both residential and commercial environments to assess 1) whether they provide similar estimates and 2) the accessibility of these methods for citizen scientists (i.e., ease, time, and kind of information obtained from data collection). **Methods:** Citizen scientists surveyed residential and commercial areas



in both Merced and Turlock, California (CA). All citizen scientists were paired up and provided with necessary materials (i.e., gloves, item classification printouts, hoops, etc.) and given geographical area restrictions. Using method A, one partner laid down a 20-inch hoop on the ground that contained any visible TPW. The other partner used Survey123 to mark their geo-location, record the type and amount of TPW within the hoop, and took a picture of the TPW. This process was untimed and continued until all TPW was found within each section. Using method B, one partner had 10 minutes to pick up and bag visible TPW, while the other kept track of time and pointed out missed TPW in their section. After 10 minutes has passed, each pair then sorted, counted, and described their TPW into Survey123 and submitted pictures along with a general description of the area. **Results:** Both cities yielded comparable amounts of waste within each type of location. Within a residential area of Merced, methods A and B yielded 76 and 78 pieces of TPW, respectively. In Turlock, methods A and B yielded 78 and 77 pieces of TPW, respectively. In commercial areas, methodology B yielded a greater number of waste. **Conclusions:** Both methodologies yielded similar results in two different cities. Citizen scientists noted the first method to be more taxing and required them to move faster as most waste was found in the gutter which was actively flowing into the drain at the end of the street. This area of investigation is well suited to the citizen scientist approach of data collection, particularly in areas with fewer available resources.

FUNDING: State

POS2-12

VAPING AMONG MEXICAN AMERICAN COLLEGE STUDENTS: A QUALITATIVE ANALYSIS OF VAPING-RELATED BELIEFS, ATTITUDES AND OUTCOME EXPECTATIONS

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Significance: Although college students, including Hispanics, are more likely than non-college peers to vape, we know little about the modifiable risk factors and contextual influences associated with vaping among Mexican American (MA) college students. This qualitative study seeks to identify contextually relevant risk factors, from the perspective of MA college students, by discussing beliefs, attitudes, and outcome expectations related to vaping. **Method:** Semi-structured interviews were conducted in May and June 2023 with 10 MA college students, 7 women and 3 men, aged 18-22 years old, who reported current vaping. Students described the social context of their vaping experiences; questions probed beliefs, attitudes, and outcome expectations regarding first and current vaping. Interviews were recorded, transcribed, and coded independently in NVivo 14, using an iterative process to identify themes/patterns. **Results:** Students underestimate their own vaping frequency and intensity, was "not as intense as other people. I know there are way worse people, ... who are very much addicted..." and, "... I don't think I have a problem, necessarily. Like I do, do it mostly socially. Like I don't go out of my way to smoke..." Several reported vaping as a safer alternative to nicotine. One participant who switched to vaping from cigarettes at the suggestion of a friend: "Why don't you just like vape? It's better for you. I was like, well, yeah, you're right. And you know, with Covid and everything... Why not replace it with something, maybe a little bit cleaner..." Students minimized nicotine addiction and the negative consequences of vaping: "I just kinda vape because I like the way it makes me feel. It's like a little burst of dopamine" and "yeah, I would definitely do it [quit] if it was causing people like, you know, cancer and stuff like that like, and that we know that it's from vaping regular, like, nicotine stuff, and not like the oils and stuff." Additionally, students expected vaping would help manage stress and/or anxiety, "Because the main reason that I use it is for anxiety..." **Conclusion:** MA college students who vape might deceive themselves about their vaping behavior, holding beliefs (i.e., I'm not addicted), attitudes (i.e., it's a safer alternative) and outcome expectations (i.e., helps me manage stress) as reasons to vape. Interventions to reduce vaping among this vulnerable population should address these modifiable risk factors.

FUNDING: Federal

POS2-13

CANNABIS, VAPING AND RESPIRATORY SYMPTOMS IN A PROBABILITY SAMPLE OF ADOLESCENTS AND ADULTS IN THE UNITED STATES

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Significance: The purpose of this study was to assess the association between past-year respiratory symptoms among U.S. adolescents and adults who used cannabis with electronic nicotine delivery systems (ENDS). **Methods:** Wave 6 data (2021) from the Population Assessment of Tobacco and Health Study, a national probability sample (N = 23,896) of adolescents and adults (12-90 years of age), was used for this study. We assessed differences across specific age groups (ages 15 to 17, ages 18 to 34, ages 35 to 49, and ages 50 and older) to determine if the association between past 30-day cannabis use with ENDS and past-year respiratory symptoms varied across different stages of the life course. Logistic regression was used for the analyses, along with weights to account for the complex sampling design. **Results:** Overall, the odds of indicating "wheezing or whistling" in the chest during the past year (adjusted odds ratio 1.46, 95% confidence interval 1.28-1.69) and having a dry cough at night not associated with a cold or chest infection (adjusted odds ratio 1.25, 95% confidence interval 1.11-1.45) was higher among those who indicated using cannabis in ENDS during the past 30 days when compared to their peers who did not use cannabis in ENDS during the past 30 days; models adjusted for history of cigarette use, e-cigarette use, and diagnosis of asthma. Moreover, the association between using cannabis in ENDS and indicating past-year respiratory symptoms was strongest among respondents aged 18 to 34. Among this age group, the odds of indicating "wheezing or whistling" in the chest during the past year (adjusted odds ratio 1.87, 95% confidence interval 1.57-2.22), that they sounded wheezy during or after exercise (adjusted odds ratio 1.78, 95% confidence interval 1.49-2.13), and having a dry cough at night not associated with a cold or chest infection (adjusted odds ratio 1.52, 95% confidence interval 1.29-1.79) was at least 50% higher among those who indicated using cannabis in ENDS during the past 30 days when compared to their same age peers who did not use cannabis in ENDS during the past 30 days. **Discussion:** This study provides further evidence that cannabis use with ENDS may have negative health consequences as it relates to respiratory health. Moreover, this study adds new evidence that may suggest that young adults are at greater risk for respiratory issues due to cannabis use with ENDS which may be due to prolonged exposure from using these devices for a longer period of time when compared to adolescents and older adults within the U.S.

FUNDING: Federal

POS2-14

REDUCTIONS IN TOBACCO USE AMONG PARTICIPANTS IN A SPIRITUALLY BASED SUBSTANCE USE INTERVENTION PROGRAM

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Significance: GROW "Hopes for Life-Communities" (HFL-C) is a one-year curriculum rooted in positive psychology and spirituality which aims to build character strengths, bolster psychological resilience, and decrease unhealthy use of alcohol, tobacco and other drug use. **Methods:** 457 Zambian young adults aged 18-24 years with self-reported problem alcohol use and ASSIST alcohol scores ≥ 2 enrolled in a randomized controlled trial of GROW HFL-C. Participants met weekly for 90 minutes in groups of 20-30 to learn 12 practices for overcoming unhealthy substance use; build character strengths correlated with decreased substance use; and practice spiritual disciplines such as prayer, meditation and forgiveness. Sessions were led by trained lay volunteers. Substance use was assessed using the ASSIST questionnaire, which was administered using audio computer-assisted technology. We analyzed changes in tobacco use by comparing baseline and six-month responses to the question, "During the past 3 months, which of the following substances have you ever used? **Tobacco products** (such as cigarettes [fwaka, nsunko], hookah, chewed or sniffed tobacco [kubee], or tobacco mixed with other drugs)," as well as self-reported frequency of use. Multivariable logistic regression models examined intervention effect. **Results:** Participants had mean(SD) age of 20.8(1.9) years; 49.4% were female; 51.2% lived in rural areas; 22.1% were students; 5.7% were employed; and 49.0% ate <3 meals/day. Among those completing both baseline and 6-month surveys (n=363, 79.4% retained at 6 months), 55.0% of intervention and 54.6% of waitlist control participants reported any past-3-month tobacco use at baseline. At 6-months, a significantly lower proportion of intervention, compared to waitlist control participants, (19.0% vs. 51.7%, $p<.001$) reported any tobacco use in the past 3 months. Also, at 6 months, 4.8% of intervention group participants reported using tobacco ≥ 4 days/week, compared to 29% in the waitlist control ($p<.001$) (baseline rates were similar, 21.2% vs. 24.7%, $p=.14$). **Conclusion:** This study establishes the feasibility and effectiveness of a spiritually based positive psychology intervention in reducing tobacco use



among urban and rural Zambian young adults. Scaling this intervention, which is led by trained volunteers, has great potential for public health impact in sub-Saharan Africa, where few tobacco intervention resources are available for individuals with low incomes.

FUNDING: Nonprofit grant funding entity

POS2-15

CROSS-SECTIONAL PATTERNS, LONGITUDINAL TRANSITIONS, AND TOBACCO DEPENDENCY AMONG US ADULTS WITH FLAVORED AND UNFLAVORED EXCLUSIVE CIGAR USE AND DUAL USE WITH CIGARETTES

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Significance: From 2016-2017, more than half of US adults who used nonpremium traditional cigars, cigarillos, and filtered cigars smoked a flavored product. Previous work has documented the broad appeal of flavored cigars among adults. However, we know little about how smoking flavored cigars impacts the long-term use of cigars and cigarettes. **Methods:** We used restricted data from Waves 1-5 (2013-2019) of the Population Assessment of Tobacco and Health to compare sociodemographic and smoking behavior characteristics of adults with exclusive unflavored cigar use, exclusive flavored cigar use, exclusive cigarette use, dual unflavored cigar and cigarette use, and dual flavored cigar and cigarette use by wave. We then calculated average 1-year longitudinal transition rates of cigar and cigarette use across Waves 1-4. We also compared tobacco dependence across flavored, unflavored, exclusive, and dual cigar use patterns. **Results:** Across waves, most adults who used flavored cigars, with or without cigarettes, were male, non-Hispanic White, and had some college education. Exclusive flavored cigar use was primarily non-daily; however, the majority of those who dual used flavored cigars and cigarettes smoked cigars non-daily but cigarettes daily. On average, 34.2% of adults with exclusive flavored cigar use continued this behavior after one year, 39% transitioned to non-current use, and 9.5% transitioned to dual-flavored cigar and cigarette use. Among those with dual-flavored cigar and cigarette use, 33.7% continued this behavior, 43.6% transitioned to exclusive cigarette use, and 9.1% transitioned to dual unflavored cigar and cigarette use. By comparison, 86.5% of those who exclusively used cigarettes maintained that behavior after one year. Across all waves, tobacco dependence was lowest among adults who exclusively used cigars and highest amongst those who dual-used cigars and cigarettes, regardless of flavor use. **Conclusion:** Compared to exclusive cigarette use, cigar use was far less stable and was particularly transient for those who exclusively used flavored cigars or dual-used cigars and cigarettes. As the United States Food and Drug Administration continues to weigh a ban on flavorings in cigars, it is essential to understand longitudinal patterns of flavored cigar use to determine its potential impact on cigar smoking behavior and tobacco-related health outcomes.

FUNDING: Federal

POS2-16

A SYSTEMATIC REVIEW AND META-ANALYSIS OF TEXT MESSAGING INTERVENTIONS TO SUPPORT TOBACCO CESSATION

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Significance: Given the global ubiquity of mobile phones and the common use and cost-effectiveness of text messages, text message-based interventions are a feasible, low-cost and potentially effective option for promoting smoking cessation. With the literature searches for the most recent Cochrane review of the effectiveness of text messaging-based interventions for smoking cessation conducted in 2018, it is timely to conduct an updated review. This systematic review and meta-analysis aims to review randomised controlled trials (RCTs) investigating the effectiveness of text message-based interventions for smoking cessation, including the effects of dose (number of text messages) and concomitant use of behavioural or pharmacological interventions. **Method:** We searched seven databases (PubMed, CINAHL, PsycINFO, Scopus, EMBASE, Cochrane Library, and Web of Science), Google Scholar, and the reference lists of relevant publications for RCTs in any language. Eligible studies included participants aged ≥15 years who smoked tobacco at enrolment. One reviewer screened titles and abstracts and two reviewers independently screened full texts of articles

using Qualtrics software. One of three reviewers independently extracted data on study and intervention characteristics and smoking abstinence rates. **Results:** 30 of the 40 included studies reported higher rates of smoking cessation among those receiving text messaging interventions compared to comparators, with 11 of the 30 studies reporting a statistically significant effect. A meta-analysis of seven RCTs found that participants receiving text messages were significantly more likely to quit smoking compared to participants in no/minimal intervention or 'usual care' conditions (Risk Ratio = 1.87, 95% CI 1.52, 2.29, $p < 0.001$). Two trials found no benefit from a higher dose of text messages on smoking cessation. Two trials that tested the added benefit of text messaging to pharmacotherapy reported outcomes in favour of adding text messaging. **Conclusions:** Findings suggest that text messaging-based interventions are effective at promoting smoking cessation. Further research is required to establish if any additional benefit is gained from concurrent pharmacotherapy or behavioural counselling, or an increased number of text messages.

FUNDING: Federal; Academic Institution; Nonprofit grant funding entity

POS2-17

TOBACCO-FREE GROUNDS INITIATIVES FOR SMOKING CESSATION IN RESIDENTIAL SUBSTANCE USE TREATMENT - REPEATED FINDINGS

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Significance: People in substance use disorder (SUD) treatment in the United States have smoking prevalence rates that are six times higher than the national average. One approach to reducing smoking among this population is through tobacco-free grounds policies. California funded the Tobacco-Free for Recovery Initiative, which included an 18-month intervention aimed at supporting programs in implementing tobacco-free grounds. In the first cohort of the initiative, client smoking prevalence decreased from 54.2% to 26.6%. The current study aimed to explore whether similar findings could be replicated with additional cohorts. **Methods:** Cross-sectional survey data were collected from clients in 11 residential SUD treatment programs at baseline ($n = 185$), 12 months into the intervention ($n = 223$), and at post intervention ($n = 227$). All clients reported smoking status. Current smokers reported their tobacco use behaviors, including cigarettes per day and concurrent smoking with staff. Current and past smokers reported on receipt of tobacco-related services including screening, receipt of NRT/pharmacotherapy, and referral to/receipt of smoking cessation counseling. Univariate analyses explored differences across the three timepoints and multivariate logistic regression assessed change from baseline to 12 months and baseline to post-intervention. **Results:** Client smoking prevalence decreased from 60.3% at baseline to 40.5% at post-intervention (Adjusted Odds Ratio [AOR] = 0.45, 95% CI = 0.27, 0.76). Current smokers and those who quit while in treatment reported an increase in NRT/pharmacotherapy (31.9% vs 50.0%; AOR = 2.00, CI = 1.12, 3.57), referral to smoking cessation treatment (32.9% vs 54.8%; AOR = 2.42, CI = 1.43, 4.10), and receipt of smoking cessation counseling (61.6% vs 77.3%; AOR = 2.21, CI = 1.16, 4.22) from baseline to 12 months. An increase in receipt of NRT/pharmacotherapy was also present from baseline to post intervention (31.9% vs 45.6%; AOR = 1.84, CI = 1.01, 3.35). **Conclusions:** Like the previous findings from the first cohort, a tobacco-free grounds policy implemented in residential SUD programs was associated with decreased client smoking prevalence. A sustained increase in receipt of NRT/pharmacotherapy was observed comparing baseline to 12 months and post intervention. These repeated findings strengthen the evidence that tobacco-free grounds policies may be an effective approach to reducing smoking prevalence among people in SUD treatment.

FUNDING: Federal; State

POS2-18

ANALYSIS OF CIGAR MARKETING EXPENDITURES BY PRODUCT CATEGORY, PLACEMENT STRATEGY, AND GEOLOCATION IN THE UNITED STATES, 2018 TO 2022

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Significance: Multiple cigar product types are marketed and sold in the U.S., including cigars, cigarillos, little cigars, and cigar wraps (LCCs). Despite known health harms, promotion of these products continues to be under-regulated. Our goal is to describe strategies used by LCC manufacturers and vendors to market these products across



media channels. We systematically tracked the types and amount of LCC marketing expenditures on print, broadcast, internet media, and outdoor mediums from January 2018 to July 2022. **Methods:** Using Kantar Media's Strategy platform, we collected marketing expenditures (in dollars) for 624 LCC products (e.g., product line extensions). Advertising data were collected from print magazines and newspapers, spot/cable TV, radio, outdoor posters/billboards, and internet media. The products were coded into LCC categories: cigars, cigarillos, little/filtered cigars, smoke shop/cigar stores, news/trade press, corporate/event promotion, cigar wraps, and other. Expenditures were aggregated by month, designated market area (DMA), and product category. **Results:** Across the study period, the categories with the most advertising spending were cigarillos (31%), little/filtered cigars (28%), smoke shops/cigar stores (23%), and cigars (13%). While cigarillos dominated LCC expenditures in 2018 from May to December with an average of \$2.1 million in expenditures, cigarillo expenditures declined to \$148K by February 2019. At the pandemic's start, little/filtered cigar spending increased from \$9.8K in February 2020 to \$1.9 million in May 2020. Little/filtered cigar spending plummeted to \$640K in May 2021 and continued to decline, falling to \$10K in July 2022. Starting in May 2020, outdoor advertising expenditures steadily increased through July 2022 (from \$69K to \$155K), peaking in December 2021 (\$224K). This trend was driven by an increase in smoke shop/cigar store expenditures, from \$58K (May 2020) to \$96K (July 2022). Radio expenditures increased from \$17K in January 2020 to \$146K in July 2022. Both local and national radio spending increased over this period, with local radio comprising 64% of all radio spending in 2022 (vs. 36% national radio). Overall LCC advertising spending across the period was highest in the national market (\$18.1 million), followed by Las Vegas (\$2.4 million), Orlando (\$811K), and New York (\$760K) DMAs. **Conclusion:** Advertising expenditures for the top LCC category, little/filtered cigars, declined significantly following the April 2021 FDA press release about the forthcoming flavored cigar ban and continued to decline as subsequent announcements were made about finalizing the proposed rules. As the FDA moves toward implementing a cigar flavor ban, it is important to monitor the promotion of LCC products to inform prevention efforts and help policymakers understand how the tobacco industry may choose to circumvent the ban.

FUNDING: Federal

POS2-19

LEADERSHIP ACADEMIES TO REDUCE COMMERCIAL TOBACCO USE AMONG PEOPLE WITH BEHAVIORAL HEALTH CONDITIONS

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Significance: Tobacco use is concentrated among adults with behavioral health (BH) conditions who face social and structural inequities, calling for renewed efforts to engage state-level stakeholders to implement tobacco treatment in BH facilities. **Methods:** Between 2011 and 2023, the Smoking Cessation Leadership Center (SCLC) implemented an intervention that included: 1) Leadership Academies—a facilitated convening of 40 cross-sector public health leaders per state charged with developing an action plan to reduce tobacco use; 2) coaching to address roadblocks to implementing their action plan for up to 3 years; and 3) educational resources through continuing education webinars and a website. States set targets for reductions in smoking prevalence and completed 6-12-month progress surveys. We used the RE-AIM framework to assess Reach (no. of states & stakeholders reached), Effectiveness (tobacco prevalence for frequent poor mental health at baseline, 18-months, & 5-year follow-up), Adoption (awareness of providing tobacco treatment among BH providers), Implementation (adaptation), and Maintenance (sustained efforts). We used the CDC Behavioral Risk Factors Surveillance Survey, process metrics, quantitative and qualitative data from progress surveys. **Results:** The SCLC conducted 24 state Leadership Academies: 16 in cohort 1 (2011-2017) and 8 in cohort 2 (2018-present). We reached 28,605 BH providers, conducted 127 webinars, and facilitated collaboration with 2,070 organizations to integrate tobacco treatment. For cohort 1, average tobacco prevalence for frequent poor mental health at baseline, 18-month, and 5-year follow-up were 35.7%, 33.6% and 30.6%, respectively (4.9% decline). For cohort 2, average tobacco prevalence for frequent poor mental health at baseline and 18-month follow-up was 31.1% and 30.4% (0.7% decline). Of the cohort 1 and cohort 2 academy attendees, 93.3% and 62.5% respectively, agreed that there was increased awareness of providing tobacco treatment among BH providers. Implementation changed to a virtual model during COVID-19, with some decline in engagement. Leadership staff turnover, limited capacity, and evolving state political priorities were barriers to sustained change. **Conclusions:** Leadership Academies may be an engagement and action model to initiate and sustain incremental change in provision of tobacco treatment in state BH facilities, with a potential to reduce tobacco prevalence among impacted BH populations.

FUNDING: Federal

POS2-20

MOST COMMONLY USED VAPING BRANDS BY YOUNG ADULTS IN TEXAS DURING SPRING 2023

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Background: Surveillance research indicates that electronic vaping product (EVP) brand preferences change frequently, however, the most recent study on young adult EVP brand preferences was conducted in 2020. It is unclear what brands of EVPs young adults are using in the contemporary landscape, limiting our ability to develop effective prevention/intervention programs. **Purpose:** The present study aimed to determine the most commonly used brands of EVPs by young adults in Texas during Spring 2023, and if EVP brand preferences differ by sociodemographic characteristics (age, sex, sexual gender minority status, race/ethnicity) and substance use patterns (daily EVP use, current cigarette smoking, and current cannabis vaping). **Method:** Participants were 2491 18-25-year-olds who used EVPs in the past 30 days (mean age=20.6; 62.9% female, 29.7% identified as sexual and gender minority, 35.9% identified as non-Hispanic White, 45% identified as Hispanic/Latino and 19.1% identified as another race/ethnicity). Participants were recruited via email from 21 Texas colleges during Feb-March 2023 and completed an online tobacco/cannabis use survey. Frequencies were run to determine the EVP brands most often used in the past 30 days. To determine if brand preferences differed by sociodemographic characteristics and substance use, proportions and 95% confidence intervals were calculated. **Results:** The top EVP brands included: Esco Bar (32.5%), Elf Bar (19%), Vuse (10.1%), JUUL (5.7%), Puff Bar (4.5%), and Smok (2.5%). Further, 18.2% indicated they had no usual brand, and 7.5% identified another brand. A larger proportion of Esco Bar, Elf Bar, and Puff Bar users were younger (18-20 years old), female, Hispanic/Latino, and used EVPs on fewer days, compared to those who used Vuse, JUUL, and Smok. In contrast, participants who used Vuse, JUUL, and Smok were older (21-25 years old), male, non-Hispanic White, used EVPs daily, and currently smoked cigarettes, compared to those who used Esco Bar, Elf Bar, and Puff Bar. **Conclusion:** Many of the most commonly used EVP brands by young adults are not currently authorized for marketing or sale by the FDA. Brand preferences have changed substantially since previous surveillance efforts in 2020. Detailed information on the brands of EVPs young adults are using as well as the contents of their device (e.g., nicotine or cannabis) is needed to better inform FDA efforts and public health strategies aiming to prevent and decrease EVP use.

FUNDING: State

POS2-21

CIGARETTE RELIGHTING: A PREVALENT YET UNDERSTUDIED BEHAVIOR

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Significance. Cigarette relighting, i.e., extinguishing, saving, and later relighting and smoking unfinished cigarettes, is prevalent, may be associated with nicotine dependence and negative health outcomes, yet is poorly understood. We aimed to estimate the prevalence, frequency, and correlates of, and reasons for, cigarette relighting. **Methods.** Data came from respondents (n=676) to an Amazon Mechanical Turk (MTurk) survey of 18-45-year-olds in the USA, who smoked cigarettes every/some days. Items assessed frequency of and reasons for relighting. Number of smoking sessions per day was asked and compared to calculations based on reported cigarettes per day (CPD) and relighting frequency. **Results.** 71% of those who smoked reported ever relighting cigarettes. A roughly even split relight ≥ once per day, several times per week, or about weekly (21-22%). Most (70%) relight one cigarette one time, but 20% do so two or more times, and 10% said it varies. Relighting reasons included not having time to finish (77%), not feeling like finishing (75%), to save money or avoid wasting cigarettes (70%), and to make cigarettes last longer (59%). Interestingly, nearly half (44%) relight to cut down or quit smoking, and 34% do so to reduce harm. Hispanic (OR=1.73, CI:1.03 - 2.91) and non-Hispanic Black respondents (OR=2.23, CI:1.20-4.10) had higher odds of relighting than others, as did those who smoke within 30 minutes of waking (OR=2.45, CI:1.33 - 4.52) or wake up at night to smoke (OR=2.40, CI:1.68 - 3.44), all ps <0.05. Respondents demonstrated low consistency in reporting the number of times they smoke (first-lit and relit) cigarettes in a day compared to calculations based on reported CPD and relighting frequency. **Conclusions.** Cigarette relighting is associated with race, ethnicity, and nicotine dependence, and is often done to save money and with the intention of



cutting down and reducing harm. Among those who relight, respondents under-estimated "smoking session" frequency. Thus, single item smoking frequency measures may not be ideal for the many individuals who smoke and relight. These findings could have important implications for surveillance and treatment. Related data collection is underway: a more comprehensive and representative survey with a larger sample (expected completion Oct. 2023), a human laboratory study to characterize the behavior and resultant toxicants, and clinical observation of the potential effects of relighting on treatment and cessation.

FUNDING: Federal

POS2-22

RETHINKING HEALTH COMMUNICATION FOR TARGETED TOBACCO CONTROL AMONG YOUNG PEOPLE: A CO-DESIGN APPROACH

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Tobacco smoking among young people in Nigeria is increasing steadily. Depending on the region of the country, prevalence is 0.2 to 32.5 percent. Health communication has been recommended as a cost-effective preventive approach for African countries as the prevalence of smoking is still low compared with other World Health Organisation Regions. While fifty-three African countries have each conducted at least six campaigns between 2010 and 2020 and reported targeting young people, it is not clear how the perspective of the target group informed the campaigns. This study aimed to fill the gap by using a participatory approach with young people to inform health communication campaigns. A qualitative research design using a participatory methodology and creative methods was employed. The research took place among young people in two senior secondary schools that were located within walking distance of tobacco sales outlets in a community with several hotspots for smoking. 83 participants aged 16 - 20 years participated. Participants were subdivided into 7 teams, facilitating working together in eight workshops. The phases of co-design were engaged with the use of structured drawing activities for data gathering allowing for discussion and group work. Phase 1 (Discovery): This involved group discussion to discover and map out the root causes of smoking among young people using a problem tree Phase 2 (Idea Generation): We brainstormed to generate communication ideas to address the identified causes using the four levels of the socioecological system as a template for idea generation and message framing. Phase 3 (Ideation): Each group created a health communication roadmap for young people based on their campaign focus, message, and preferred communication channels. The ideas generated led to the production of a film, song, & 12 poster designs. Phase 4 (Feedback): Oral and written feedback led to the short film being reviewed as an animation as this would best suit some young audiences. The preliminary analysis revealed three themes; (1) shisha is the focus, (2) messages come visually, textually, and lyrically and (3) physical versus social media space. The data shows that campaigns targeting young people are to focus on shisha and messages should be relayed using an edu-entertainment approach. The campaigns will benefit from taking a life-course approach, focusing on peer pressure & addiction, with the use of posters, short films, or animation & songs as the preferred channel of communication. Results also revealed that access to free products like shisha at parties/clubs should be monitored in line with MPOWER provisions. Researching tobacco control health communication among young people in the study context requires using methods that support diverse means of communication to ensure the campaign and message are better targeted and relevant.

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POS2-23

EARLY TOBACCO TREATMENT ENGAGEMENT PREDICTS LONG-TERM SMOKING ABSTINENCE AMONG WOMEN WITH A HISTORY OF CIN OR CERVICAL CANCER

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Introduction: Examining treatment engagement patterns can yield important insights about why interventions may be efficacious for some yet fail for others. We recently completed an RCT (n=202) evaluating the efficacy of Motivation And Problem Solving (MAPS) vs. Standard Treatment (ST) for smoking cessation among women with a history of CIN or cervical cancer. Participants were followed for 18 months. MAPS comprised 6 phone counseling sessions delivered over 12 months. Abstinence rates were over twice as high in MAPS (23.5%) vs. ST (10.4%) at the end of the 12-month treatment period, although the treatment effect was non-significant by 18 months. MAPS participants (n=98) flexibly scheduled their calls based on perceived need (e.g., clustering around

a quit attempt), and 92.9% completed ≥ 1 call. Using the MAPS call completion and smoking abstinence data, we examined whether abstinence at 12 and 18 months was associated with total calls completed. We also examined whether early engagement in treatment (i.e., during months 1-3, or Q1) predicted continued treatment engagement. Completing ≥ 4 calls in total was previously observed to be positively associated with abstinence. Therefore, we examined the percentage of participants that reached this threshold by the number of calls they completed during Q1. **Method:** T-tests and Pearson's correlations were used to conduct statistical analyses as appropriate. **Results:** Participants abstinent (vs. smoking) at 12 months completed significantly more MAPS calls (5.09 vs. 3.52, $p=.001$). A similar association was observed at 18 months (5.09 vs. 3.74, $p=.03$). Total call completion during Q1 was strongly associated with the total number of calls completed by the end of the treatment period, $r=.68$, $p<.001$. Only 2/20 (10.0%) of participants who completed 0 Q1 calls ultimately completed ≥ 4 calls. The proportions of participants meeting the ≥ 4 -call threshold were 10/24 (41.7%) for those with 1 Q1 call, 22/29 (75.9%) for those with 2 Q1 calls, and 25/25 (100%) of those with ≥ 3 Q1 calls. **Conclusion:** MAPS efficacy was strongly associated with participants' treatment engagement. Results suggest that a lack of engagement early on predicts poor engagement throughout the treatment period. Far from being a lamentable dead end, this raises the possibility that participants with poor adherence early in a cessation trial could be re-randomized to a different treatment, potentially increasing their chances of long-term smoking abstinence.

FUNDING: Federal; Academic Institution

POS2-24

A SCREENING PROCEDURE TO PRIORITIZE TOBACCO PRODUCTS THAT ARE SUSPECTED OF HAVING A CHARACTERIZING FLAVOR OTHER THAN TOBACCO

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Significance: Cigarettes with a characterizing flavor other than tobacco are banned in the European Union (EU). The Independent Advisory Panel on characterizing flavors in tobacco products (IAP) uses a trained sensory panel to determine whether or not a tobacco product has a characterizing flavor. Member states can request an (expert) opinion from IAP regarding products suspected of having a characterizing flavor. Our aim was to establish a screening procedure to prioritize tobacco products that are suspected of having a characterizing flavor other than tobacco. **Methods:** Twelve suspicious products and three reference products were selected as samples for a smelling experiment. The cigarette filler from these products was transferred into glass vials. Untrained participants (n=16) smelled 15 anonymized samples and rated them for the presence (yes/no) and intensity (7-point Likert Scale) of flavor attributes derived from the IAP. We distinguished between tobacco-related flavor attributes (dried fruits, cardboard, black tea, cheese, wood, nature) and non-tobacco related flavor attributes (spicy, floral, candy, sweet, fruity, menthol). The intensity of flavor attributes in suspicious products was corrected for the intensity of flavor attributes in reference products. **Results:** Non-tobacco flavor attributes were identified in all products. Floral, sweet and menthol flavor attributes were most frequently identified. For five products, participants identified significantly more often a non-tobacco flavor attribute (two samples menthol, one sample sweet, two samples floral and sweet) than in reference samples. **Conclusion:** We have set up a screening procedure to select products suspected of having a characterizing flavor other than tobacco. The smelling experiment resulted in five products that are suspected of having a characterizing flavor. This screening procedure can be used as a pre-selection of cigarette products that possibly have a characterizing flavor and therefore qualify for an (expert) opinion from IAP.

FUNDING: Federal

POS2-25

FEATURES OF MOBILE HEALTH APPS FOR SMOKING CESSATION THAT APPEAL TO BLACK SMOKERS: A QUALITATIVE STUDY

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Significance: Mobile health (mHealth) interventions show promise in supporting smoking cessation. However, Black individuals who use tobacco products are not well represented in mHealth studies for smoking cessation and their preferred features of mHealth apps are not well known. Identifying features of mHealth apps that appeal to



Black people who smoke is a key step to develop an app which they are likely to use.

Method: A comprehensive list of features of mHealth apps for smoking cessation was developed based on previous research and a review of existing mHealth literature. Through a content analysis, this list was divided into different domains and refined through focus groups. Eligible participants included people who reported current use of a tobacco product, identified as African American or Black, and were 21 years or older. Participants were asked about their opinions about different app features, including what features they felt would increase the use of an app by Black individuals who use tobacco products. We conducted a thematic content analysis of resulting transcripts.

Results: Forty adults (58% female), aged 21 - 69 years old (mean age of 43 years), participated in the eight focus groups. Participants identified the following domains as important: inclusivity, personalization, connecting with others and tracking. Most participants reported that they like an app with features that Black individuals can identify with, including short videos or testimonials from Black individuals or celebrities who struggled with smoking and quit successfully, and real and/or animated images representing individuals from different racial/ethnic groups. Many participants stated that inclusion of statistical health data related to the health consequences of smoking and as it affects minority individuals would appeal to them. Other highly appealing features included the ability to personalize their use and experiences with the app and to connect anonymously with other users of the app. Many were interested in an app that can track their urge to smoke, their triggers, and the number of cigarettes smoked during a given period. **Conclusions:** Black individuals who use tobacco products prefer a tobacco cessation app with features that are inclusive and relatable. These findings can serve as the groundwork for the development of a mHealth app that will appeal to Black individuals who smoke, potentially increasing app use and successful cessation.

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POS2-26

CAMPAIGN MESSAGES TO SUPPORT HEALTH WARNING LABELS FOR LITTLE CIGARS AND CIGARILLOS: AN ONLINE EXPERIMENT

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Significance: Campaign messages have been used to support the introduction of pictorial health warning labels (HWLs) for cigarettes and have been effective in enhancing the narrative around the static images on the HWLs. However, no research specific to cigars (including little cigars and cigarillos) exists. If HWLs for cigars are introduced, a communication campaign with messages to augment the HWLs may help enhance their effectiveness, especially among priority populations. **Methods:** Using Qualtrics research panels, we recruited current cigar users who were 21-29 years old and U.S. residents. Participants (n=315) were randomly assigned to one of three conditions: 1). Messages designed to elaborate HWLs alone. 2). HWLs alone 3). Messages and HWLs paired together. Within their condition, participants were shown messages describing six negative health effects of cigars, in the corresponding format and answered questions about perceived message effectiveness (PME), negative affect, thinking about risks (TAR) and self-reported learning (SRL). After viewing all messages within their condition, participants were then asked about their quit intentions and their concerns about their health because of cigar use, and overall reactance to the messages. **Results:** Most participants identified as male (60%) and either black (45%) or white (45%). Mixed Model analysis found that there was no statistically significant difference between conditions for PME (p=0.1762). We found that there was a statistically significant difference between conditions for Negative Affect (p=0.0352), and no significant difference between conditions for SRL (p=0.3143). We also found no significant difference between conditions for TAR (p=0.4325). Neither the presence of a message (p=0.1977) nor a warning (p=0.6162) significantly impacted TAR. There was no statistically significant difference between conditions for the following measures: quit intentions (p=0.1597), concern (p=0.2838), and reactance (p=0.8353). **Conclusions:** Our findings show no statistically significant differences between media messages, HWL, and the combined condition except for negative affect. Additional research is needed to identify factors that can enhance the effectiveness of campaign messages for cigars such videos, which may allow for more realistic elaboration of messages.

FUNDING: Federal; Academic Institution

POS2-27

WHAT DO DOCTORS AND NURSES IN CANCER CENTRES TELL THEIR PATIENTS ABOUT THE BENEFITS OF QUITTING SMOKING AFTER CANCER?

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Significance: Continuing cigarette smoking after a cancer diagnosis is associated with reduced survival and increased likelihood of treatment toxicity, complications, hospitalisation, medication side effects and cancer recurrence. Cancer care providers such as oncologists, cancer care coordinators and cancer nurses have a crucial role in communicating the benefits of smoking cessation post-diagnosis to optimise motivation to quit. **Methods:** During the baseline phase of a stepped-wedge smoking cessation implementation trial staff at nine cancer centres in Australia completed quantitative surveys and qualitative interviews about perceptions and practices regarding smoking cessation care. Staff included doctors (medical oncologists, radiation oncologists, respiratory physicians and surgeons), nurses (cancer care coordinators and cancer nurses) and radiation therapists. The survey listed six known benefits of post-diagnosis smoking cessation and asked participants to indicate which of those benefits were generally mentioned when advising their patients to stop smoking. The qualitative interviews explored systems and processes around cessation care practices. **Results:** A total of 197 staff completed the quantitative survey, and 37 staff completed a qualitative interview. Mention of reduced complications or side effects was reported most often (52.3%), followed by improved treatment effects (49.7%). More than one-quarter of the sample (26%) reported that they did not mention any benefits of stopping smoking. Associations between participant characteristics (profession, specialty type, years in profession) and the mention of benefits were modelled. Analysis of the qualitative interview provided further insights to the quantitative findings, including the influences of perceived roles and system factors. **Conclusion:** Discussions about the benefits of stopping smoking after a cancer diagnosis are limited and tend to focus on treatment-related benefits, which may reflect the nature of some providers' roles. It appears that some patients are not being told of any of such benefits despite the potential importance in motivating or supporting a quit attempt.

FUNDING: Federal; State; Academic Institution; Nonprofit grant funding entity

POS2-28

EVALUATING THE FEASIBILITY OF A SMARTWATCH-BASED SMOKING RELAPSE INTERVENTION

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Significance: Despite clear health benefits from smoking cessation both for the individual and society, stopping smoking is difficult and many quit attempts fail. Innovative, evidence-based methods of helping smokers quit are needed. We present a low-cost, smartwatch-based intervention system that uses passive detection of smoking to trigger just-in-time smoking cessation support. **Methods:** The "Person-Based Approach" for intervention development (Yardley, 2015) was used to design a smoking relapse intervention with messaging co-designed by smokers themselves. The intervention timing was controlled by an algorithm identifying smoking behaviour from the smartwatch's motion sensors, and the intervention messaging was delivered on the smartwatch screen. Twenty smokers tested the intervention over a period of two weeks and provided qualitative feedback on acceptability of both the intervention and the smartwatch platform; data on smoking instances and adherence to the intervention was also recorded by the smartwatch. **Results:** Participant feedback indicated that the smartwatch intervention led to increased awareness of smoking, and encouraged quitting. There were also challenges around battery life and adherence to the charging regime, bulkiness of the device, and notification style. **Conclusion:** The combination of sensors for passive detection, provision for messaging, on-board processing and convenient wearable format makes a smartwatch a powerful tool to host a just-in-time behaviour



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change intervention. Feasibility testing indicates our smoking relapse intervention is both feasible and acceptable to participants, and also highlighted some challenges to be overcome in the use of this method.

FUNDING: Academic Institution; Nonprofit grant funding entity

POS2-29

NORMS AND NICOTINE: A SYSTEMATIC REVIEW OF NORMATIVE PROCESSES AND TOBACCO USE BEHAVIORS AMONG SEXUAL AND GENDER MINORITY POPULATIONS

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Introduction Tobacco use disparities persist within sexual and gender minority (SGM) populations, highlighting the need for a comprehensive understanding of the factors contributing to these disparities. Prior empirical investigations have predominantly centered around the concept of minority stress processes, which encompass the stress responses arising from individuals' marginalized identities. However, the existing minority stress models have predominantly neglected to incorporate the impact of normative influences on tobacco use behaviors among SGM individuals. The purpose of this rapid systematic review was to characterize current evidence for the influence of normative processes on tobacco use behaviors (TUB) among SGM populations. **Methods** Title and abstract searches were conducted in June of 2022 and April 2023 by a medical librarian at Temple University using keywords that described SGM populations, tobacco use behavior, and social norms. The databases used in this search included PubMed (NLM), PsycInfo (EbscoHost), Applied Social Sciences Index & Abstracts (ProQuest), and Cochrane CENTRAL (Wiley). A grey literature search was also conducted. Two independent researchers reviewed titles and abstracts for inclusion. Articles were included if they reported on qualitative or quantitative data, included SGM populations, and described/measured normative aspects of TUB. **Results** Of 26 included studies, all were conducted in North America, 1 in a rural community, and 8 focused on gender diverse populations. All but 1 were cross-sectional and most were limited to quantitative data. Collectively the research indicates that TUBs are often carried out in social settings (e.g., bars). TUBs were used as a way to gain social acceptance and connect with others. Six articles were also explicitly informed by minority stress theory. TUBs were associated with experiences of psychological distress, high levels of discrimination, and/or minority stress factors. There was no attempt to theoretically integrate minority stress and normative processes. Analytically, these variables were modeled as independent contributors to TUBs. **Conclusion** This rapid systematic review sheds light on the understudied role of normative processes in influencing TUBs among SGM populations. We propose an expanded minority stress model where normative processes moderate the association between minority stress and TUBs.

FUNDING: Academic Institution

POS2-30

ELECTRONIC NICOTINE DELIVERY SYSTEMS: OVERHEATING, FIRE, AND EXPLOSION TRENDS FROM 2016 - 2022

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Background: The US Food and Drug Administration (FDA) Center for Tobacco Products (CTP) track cases of Electronic Nicotine Delivery Systems (ENDS) overheating/fire/explosion (OFE) reported to multiple US federal agencies, including FDA's tobacco product surveillance team (TPST), US Department of Transportation/Federal Aviation Administration (DOT/FAA), and US Coast Guard/National Response Center (USCG/NRC). Since the first reported case in 2011, FDA/TPST has received over 137 cases of OFE, including three reports of user deaths and three serious injuries to nonusers. **Method:** FDA/CTP scientists search for and review cases of OFE reported to multiple US federal agencies such as FDA/TPST, DOT/FAA, and USCG/NRC. Duplicate reports are removed, and cases are analyzed. **Findings:** From 2016 - 2022, a grand total of 283 cases of OFE have been reported to the agencies monitored. FDA/TPST received a total of 117 cases, 112 cases were reported to DOT/FAA, and 54 cases reported to USCG/NRC. OFE cases peaked in 2018 when a total of 75 cases were reported across federal agencies that year, which accounts for over a quarter of all cases from 2016 - 2022. Since 2018, OFE cases have been on a downwards trend with an uptick in 2022 as 56 cases were reported. The majority of OFE cases in 2022 occurred in airplanes, predominantly involving devices that had the batteries installed but were not charging or connected to power. Most OFE events with sufficient information submitted to FDA/TPST since 2014 involved ENDS with user inaccessible batteries (58 events) rather than ENDS with user accessible batteries (48 events). Nonetheless, despite representing a smaller number of cases, most injuries reported because of OFE occurred in ENDS with user accessible batteries

(33 reported injuries) compared to ENDS with user inaccessible batteries (21 reported injuries). Additionally, ENDS with user accessible batteries also caused more serious injuries. **Conclusion:** ENDS OFE events continue to pose significant public health risks to users and nonusers. CTP scientists will continue to monitor these risks given the rapidly evolving E-cigarette/ENDS market. Enhanced OFE reporting and tracking would assist adverse experience analysis, which may help identify mechanisms of OFE that can be used to develop mitigation measures. **Disclaimer:** The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Food and Drug Administration.

FUNDING: Federal

POS2-31

RELATIONSHIPS AMONG TOBACCO PRODUCT USE IN MINORITY PATIENTS IN A LARGE HEALTH SYSTEM

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Intro: Cigarette use continues to decline in the United States through public health efforts. Unfortunately, the decline in traditional cigarette use has been met with a dangerous rise in the use of electronic nicotine delivery systems (ENDS)/vaping. Demographic characteristics have been found to have associations with use, with non-Hispanic white race being associated with tobacco product use. Tobacco product use has been associated with male gender, lower educational attainment, rural dwelling, being on Medicaid insurance or not insured, and having a disability. The analysis presented here is a first step toward a better understanding of who our tobacco product users are. **Methods:** Through the EVAT tool in EPIC data was collected from 8/13/2020 (the date the vaping tool went live in the EHR) through 3/31/2022 and analyzed. To be included in the analysis patients had (a) evaluated for ENDS use with EVAT, (b) had data on tobacco use in the EHR social history, and (c) be at least 18 years old. The final sample comprised 259151 adult patients. **Results:** Of the 259151 patients the majority (92%) were aged 25 and over, 59.5% were female, 61.8% were non-Hispanic white, and 26.9% were Black. ENDS use was the highest among White patients (4.9%) and lowest among Black patients (2.6%) while other tobacco products use was the highest among Black patients (16.8%) and lowest among "Other" race/ethnicity groups (7.2%). In Black NH female patients of 18-44 years old, the ORs comparing ENDS users to those who do not use tobacco were similar to those of males of the same age and race (varied between 1.68 and 1.75). However, in Black female patients of 45-64 years old the odds were significantly higher than in males of the same age and race. **Conclusions:** Through the implementation of the EVAT tool and the data collected has provided a better understanding of those using ENDS has been established. Through this understanding further analysis of ENDS use in minority patients can be conducted in order to develop targeted culturally appropriate interventions for this demographic.

FUNDING: Federal

POS2-32

WEIGHT CONCERNS AS A PREDICTOR FOR SMOKING CESSATION IN SMOKERS PARTICIPATING IN A COMMUNITY-BASED CESSATION PROGRAM

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Significance: Concern about weight gain is a barrier to smoking cessation, but it is unclear if weight concerns are predictive of cessation in the context of community-based cessation programs. **Methods:** Using mixed effects logistic regression, data from baseline and three follow up periods (7-weeks, 6-months, 12-months) were analyzed from a cessation trial of 392 adults, randomized to physical activity (PA) or general wellness counseling as adjunctive treatment for cigarette smoking. The dependent variable was smoking status (quit or smoking) measured as biochemically verified 7-day point prevalence at each follow up time period. Independent variables included two measures of weight concern: 1. Use of smoking to control weight ("control") and 2. Willingness to tolerate weight gain without returning to smoking ("intolerance"), using validated instruments. Covariables included body mass index, nicotine dependence, age, and time. Mixed effects logistic regression models stratified by sex were used to determine whether weight concerns were predictive of cessation. Covariables modeled as effect moderators with weight concern (nicotine dependence, time, and race) were removed if insignificant. **Results:** Neither measure of weight concern predicted cessation for women or men. Covariables that consistently predicted smoking cessation in most models included nicotine dependence, older age, and time since quit day. **Conclusions:**



Within this community sample of smokers attempting to quit, weight concerns were not predictive of cessation and therefore may not need to be specifically addressed to increase quit rates. However, weight concerns may impede cessation attempts which could not be evaluated in this sample which volunteered for a cessation program.

FUNDING: Unfunded; Federal

POS2-33

DEMOGRAPHIC FACTORS ASSOCIATED WITH TOBACCO TRANSITION PATTERNS OF CIGARETTE-EXCLUSIVE USERS: LONGITUDINAL ANALYSES FROM PATH WAVES 1-3

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Introduction. Conventional cigarette (CIG) use is positively correlated with electronic cigarette (ECIG) use; however, the patterns of transition between CIG, ECIG, and dual use of both products remains unclear. These analyses aim to assess the patterns of change in product use among CIG-exclusive users using longitudinal data. **Methods.** Data were drawn from the first three waves of the Population Assessment of Tobacco and Health (PATH) study. CIG-exclusive users were identified in wave 1 (N = 10,308) and then identified as continued CIG-exclusive users, ECIG-exclusive users, and dual users in subsequent waves with complete data in waves 2 and 3 (final N = 318). The probability of use group assignment in wave 3 was estimated based on wave 2 group use. These probabilities were then used as the outcome variable for a linear regression in wave 3 to identify demographic factors (nicotine dependence (ND), age, sex, race, education, and income) that were associated with transitions in usage. **Results.** Most non-users at wave 2 returned to some form of ECIG use (either dual, N = 59 or ECIG-exclusive use, N = 68) rather than returning to CIG-exclusive use (N = 3) or remaining abstinent (N = 7). Mean levels of ND were significantly higher among wave 3 non-users and dual users. Lower education level was significantly associated with the probability of transition to dual use in wave 3 relative ($aRR_{\text{HS/GE}} = 1.15$, 95% CI = 1.03-1.28; $aRR_{\text{HS/GE}} = 1.13$, 95% CI = 1.02-1.25) to college graduates. Lower education was also associated with reduced probability of CIG-exclusive use relative to college graduates ($aRR_{\text{HS/GE}} = 0.89$, 95% CI = 0.88-0.99; $aRR_{\text{HS/GE}} = 0.89$, 95% CI = 0.81-0.99). Age was associated with dual use among those 35-44 ($aRR = 1.09$, 95% CI = 1.03-1.16) relative to 18-24 year olds. Older ages were also associated with CIG-exclusive use relative to the youngest age group ($aRR_{\text{35-44}} = 0.93$, 95% CI = 0.88-0.98; $aRR_{\text{55+}} = 0.93$, 95% CI = 0.88-0.99). All other demographic factors were not significantly associated with the probability of transition. **Discussion.** Non-users at wave 2 returned to ECIG or dual use rather than returning to CIG-exclusive use which may suggest ECIGs are appealing to non-users beyond their initial CIG-exclusive use. The probability of transition to dual use is significantly associated with middle age and lower education levels. Further research is needed to examine reasons for returning to tobacco use with ECIG rather CIG-exclusive use.

FUNDING: No external funding reported

POS2-34

SINGLE OR LOOSE MANUFACTURED CIGARETTE PURCHASE IN BANGLADESH: EVIDENCE FROM THE GLOBAL ADULT TOBACCO SURVEY, BANGLADESH 2017

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INTRODUCTION The sale of single cigarettes makes the cigarettes more affordable than a full pack of cigarettes. It may also undermine effective tobacco control policies by limiting individuals' exposure to health warnings on cigarette packs and reducing the impact of tobacco tax increases on cigarette packages. We assessed the prevalence of single cigarette purchases, and associated factors, among adults who currently smoked manufactured cigarettes in Bangladesh. **METHODS** We used Global Adults Tobacco Survey data, a nationally representative cross-sectional household survey of adults aged ≥ 15 years, conducted in Bangladesh in 2017. Among respondents who currently smoked manufactured cigarettes, a single cigarette purchase was defined as the respondent having bought their last cigarette as a single cigarette stick for themselves. The intensity of cigarette smoking was calculated as the number of cigarettes smoked/day. We estimated the weighted prevalence with 95% confidence interval (CI) for single cigarette purchases by sociodemographic characteristics, location of purchase, living with someone who smokes, and intensity of cigarette smoking. We used logistic regression with predicted marginal means to calculate adjusted prevalence ratios (aPR) with 95% CIs to examine factors associated with single cigarette purchases. **RESULTS** During 2017, 14.0% (13.1-15.0) adults currently smoked manufactured cigarettes in

Bangladesh and 78.6% (74.2-82.4) of them purchased single cigarettes. The common location of purchase was store/shop/super shop (48.3%, 42.8-53.7), followed by street vendors/pan shops (37.0%, 32.3-42.0). Approximately 87.2% (79.3-92.3) of 15-24 year-olds, 79.4% (75.6-82.8) of rural residents, 83.0% (76.3-88.1) of adults with less than a high school education, and 82.2% (76.6-86.8) of adults with low wealth index purchased their last cigarette as a single cigarette. Single cigarette purchase was significantly associated with intensity of smoking—adults who smoked < 5 cigarettes/day were 1.6 times more likely to purchase a single cigarette compared with adults who smoked ≥ 25 cigarettes/day (aPR=2.64, 95% CI, 1.55-4.50), after adjusting for potential confounders. **CONCLUSION** Nearly 8 in 10 adults in Bangladesh who smoked manufactured cigarettes purchased single cigarettes. Our findings indicate that adult smoking in Bangladesh could be reduced by public health measures that prohibit sales of single cigarettes.

FUNDING: Other

POS2-35

IMPLEMENTATION OF AN OPT OUT TELEHEALTH-PHARMACIST ASSISTED TOBACCO TREATMENT PROGRAM FOR PATIENTS SEEN IN ONCOLOGY OUTPATIENT CLINICS

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Significance: The provision of cancer care is complex, with patients being seen in multiple clinical settings over an extended duration often involving multiple visits with multiple unique health care providers. In this presentation we will describe the implementation of a proactive opt-out telehealth-pharmacist assisted tobacco treatment program (TTP) for patients seen in a diverse group of oncology outpatient clinics in South Carolina. **Methods:** We report the results of screening and referring patients to the TTP, delivery of tobacco cessation treatments, and patient smoking status assessed in a random sample of patients followed-up 4-12 months after referral to the TTP. Between May 25, 2021 and December 31, 2022 adult patients (≥ 18 years) visiting any of 43 oncology clinics affiliated with the Medical University of South Carolina Hollings Cancer Center were screened for their cigarette smoking status. Those endorsing current cigarette use were automatically sent to the TTP. A trained tobacco treatment specialist attempted to contact patients (up to 5 times) by phone following their clinic visit. Among those reached we offered patients free telehealth tobacco treatment counseling and a 2-week starter kit of nicotine patches unless otherwise contraindicated. **Results:** During the 19-month reference period we captured data on 72,320 clinic visits made by 35,756 patients, of whom 3,319 (9.3%) were adults who reported current smoking. Among patients referred to the TTP, 2,393 (72.1%) were reached by phone. Of those eligible for enrollment in the TTP, 76.7% received treatment and 23.3% opted out. Most of those enrolled in the TTP reported long-term heavy smoking and past quit attempts that were made primarily without the use of professional counseling or stop smoking medications. All patients received telehealth counseling with most patients only receiving a single counseling call session only; 67.6% of patients were dispensed stop smoking medications and 42.6% also accepting a referral to the state Quitline. The follow-up evaluation captured data on 219 patients referred to the TTP on average 8 months earlier with 37% self-reporting not smoking at the time of the follow-up. **Conclusion:** The findings demonstrate the broad reach and reasonable effectiveness of a proactive opt-out telehealth-pharmacist assisted tobacco treatment program for patients seen in a diverse set of oncology outpatient clinics spread out geographically across the state of South Carolina.

FUNDING: Academic Institution

POS2-36

BREATHS OF DISCOMFORT: COMPARING CHRONIC PAIN IN VAPERS AND SMOKERS

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BACKGROUND: Compared to nonsmokers, smokers report higher levels of chronic pain, pain intensity, and pain interference. Pain interference has also been shown as a barrier for cessation of e-cigarettes. However there has been little to no information comparing pain between e-cigarette users and combustible cigarette users. **OBJECTIVES:** To compare vapers and smokers on the Graded Chronic Pain Scale, a measure of pain intensity and interference with daily life activities. **METHODS:** A sample of 347 participants were recruited in Birmingham, Alabama, consisting of both vapers and smokers. Endorsement of chronic pain was assessed at baseline using the 4 grades of 1) low intensity pain with low interference, 2) high intensity pain with low interference, 3) high intensity pain with moderate interference, and 4) high intensity pain with severe interference.



RESULTS: The distribution of pain categories differed significantly between vapers and smokers ($\chi^2(3) = 15.45, p < .05$). Specifically, smokers reported low intensity pain with low interference with life ($n = 77, 50.7\%$), followed by high intensity pain ($n = 45, 29.6\%$), moderate interference of life ($n = 12, 11.4\%$), and severe interference with life ($n = 18, 15.6\%$). Conversely, among vapers a higher proportion experienced low intensity pain with low interference with life ($n = 126, 70.0\%$), followed by high intensity pain ($n = 25, 38.0\%$), moderate interference of life ($n = 13, 13.6\%$), and severe interference with life ($n = 16, 18.4\%$). **CONCLUSION:** These findings suggest that smoking/vaping status may be related to pain categories, providing preliminary evidence for a potential connection between these variables. Specifically, a larger number of vapers reported low intensity pain with low interference of daily life activities, while more smokers, overall reported high intensity pain. Further investigation is warranted to understand the underlying mechanisms driving these observed results.

FUNDING: Federal

POS2-37

HETEROSEXIST DISCRIMINATION AND SUBSTANCE USE IN YOUNG SEXUAL MINORITY MEN: EXAMINING THE MODERATING ROLE OF MINDFULNESS

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Significance: Experiences of discrimination have been associated with substance use in sexual minority (SM) populations. Studies have found that mindfulness may be an effective intervention in lowering the negative effects of discrimination. The purpose of this paper is to 1) examine the associations of heterosexual discrimination and substance use in young sexual minority men (YSMM) and 2) if mindfulness will moderate the relationship between discrimination and substance use. **Methods:** We used a national survey on YSMM (18-35 years old) collected from June 2021 to May 2022. The primary exposure variable is discrimination (Heterosexual Harassment, Rejection, and Discrimination Scale), and the moderating variable is dispositional mindfulness (Mindfulness Awareness and Attention Scale). The outcome variables are past 30-day cigarette and e-cigarette use and alcohol use (AUDIT-C measure). We also created a substance use class variable to indicate no use, dual use, and poly-substance use to represent the concurrent use of any of these substances. Covariates included age, race, education, religious affiliation, and mental health. We implemented logistic and multinomial logistic regressions, and two-way interactions. **Results:** In a sample of 248 YSMM, mean discrimination was $M=37.12$ ($SD=12.42$; range 14-73), and mindfulness was $M=3.67$ ($SD=0.97$; range 1.8-6). About 57% used cigarettes, and 45% used e-cigarettes in the past 30-days, 67% were categorized as engaging in hazardous drinking, 65% engaged in dual use, and 22% engaged in polysubstance use. Experiences of heterosexual discrimination were associated with increased odds of cigarette use ($OR=1.07$; 95% CI: 1.04, 1.10), e-cigarette use ($OR=1.05$; 95% CI: 1.02, 1.07), and alcohol use ($OR=1.04$; 95% CI: 1.01, 1.07). Experiences of heterosexual discrimination were positively associated with dual ($RRR=1.09$; 95% CI: 1.05, 1.14) and polysubstance use ($RRR=1.14$; 95% CI: 1.08, 1.20) relative to those who did not engage in dual or polysubstance use. Dispositional mindfulness moderated the relationship between discrimination and alcohol use, suggesting a weakening effect of this relationship with higher scores of dispositional mindfulness. **Discussion:** YSMM are distinctly vulnerable to the effects of discrimination because of the developmental stages they are experiencing compounded with heterosexual experiences. Introducing the practice of mindfulness may be a useful tool to help them cope.

FUNDING: Federal

POS2-38

HUNGER AND HOUSING: ECONOMIC DISPARITIES IN TOBACCO USE AND NICOTINE DEPENDENCE AMONG HIGH SCHOOL STUDENTS DURING THE COVID-19 PANDEMIC.

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Introduction: Economic disparities in tobacco use and dependence are well-documented among adults but not adolescents. This study aims to examine economic disparities in patterns of tobacco use and dependence among a nationally representative sample of high school students. **Methods:** We examined cross-sectional data from the 2021 Adolescent Behaviors and Experiences Survey (ABES). Participants were 9th-12th grade

high school students with complete data ($n=6,705$). Multivariate logistic regressions estimated the association between economic disparities and current (past 30-day) and frequent (20+ days/month) use of: (1) e-cigarettes; (2) cigarettes; (3) cigars; and (4) smokeless products. Economic disparities reflect experiencing homelessness and food insecurity. Models controlled for sex, race/ethnicity, grade, sexual identity, parental monitoring, school connectedness, and other tobacco use. **Results:** In 2021, 1.8% of high school students experienced homelessness. Experiencing homelessness was associated with significantly greater odds of currently using e-cigarettes ($aOR: 2.20$; 95%CI: 1.06 - 4.58), combustible cigarettes ($aOR: 3.37$; 95%CI: 1.38 - 8.19), cigars ($aOR: 3.37$; 95%CI: 1.38 - 8.19), and smokeless tobacco ($aOR: 4.61$; 95%CI: 1.98 - 10.74), controlling for covariates. Similarly, experiencing homelessness was associated with increased risk for daily use of e-cigarette ($aOR: 2.52$; 95%CI: 1.01 - 6.31), combustible cigarettes ($aOR: 10.74$; 95%CI: 3.41 - 33.84), cigars ($aOR: 5.19$; 95%CI: 1.88 - 14.30), but not smokeless ($aOR: 3.23$; 95%CI: 0.75 - 13.99). **Conclusion:** Substantial economic disparities in current and daily tobacco use of e- among high school students were observed in a nationally representative sample. Addressing homelessness, food insecurity, and other economic inequalities has potential as a method of improving public health. Findings reveal a need to consistently assess economics in national surveillance studies of adolescent health behaviors. Public health research, practice, and policy must be responsive to the economic determinants of health during adolescence.

FUNDING: Unfunded

POS2-39

HOW WATER CONCENTRATION OF E-LIQUIDS IMPACTS USER EXPERIENCE

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Background: Many e-cigarettes contain aldehyde flavor chemicals. Aldehydes can undergo chemical reactions with e-cigarette solvents to form acetals; which are known respiratory irritants. One way to impede acetal formation is via the addition of water to the e-liquids. However, it is unknown how adding additional water to e-liquids significantly changes user experience and if this potential harm reduction method could change product appeal. The aim of this pilot study is to examine the effects of added water to e-cigarette sensory experience. **Methods:** Thirty-one regular e-cigarette users (mean age: 35.3 (std. dev: 10.4), 51.7% female) sampled two-puffs each of four e-liquid flavors (three aldehyde-containing, one control) presented with four different water levels (no added water, 5% added water, 10% added water, 20% added water). Strength of sensory irritation, flavor, and sweetness were examined using the generalized labeled magnitude scale (gLMS). Overall appeal (i.e. liking) was examined using the Labeled Hedonic Scale (LHS) and the liking/wanting subscale of the drug effects questionnaire (DEQ). Mixed effects models were used to examine main effects of water level, flavor type, and water x flavor interactions for each outcome. Bonferroni corrected mean contrasts were used to compare levels within outcomes. **Results:** There was an effect of water level on overall appeal for both the LHS and DEQ, such that 20% added water had significantly lower appeal compared to no added water, but 5% and 10% added water did not significantly differ from e-liquids with no added water. There were no effects of water level on strength of sensory irritation, sweetness, and flavor strength. There was an effect of flavor type for all outcomes indicating participants had different ratings of sensory experience and appeal for each flavor. No water x flavor interactions were detected. **Conclusions:** Adding water to e-liquids that contain aldehyde flavor chemicals may be a method for regulators to reduce e-cigarette harm by reducing flavor aldehyde acetal formation. Adding 5-10% of water appears to have a limited effect on appeal, while higher levels of added water may significantly change user experience.

FUNDING: Federal

POS2-40

CHANGES IN MOTIVATION AND SELF-EFFICACY TO QUIT SMOKING AMONG PEOPLE WITH SERIOUS MENTAL ILLNESS WHO SMOKE: A LATENT CLASS GROWTH ANALYSIS

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Significance: Motivation and self-efficacy to quit smoking predicts cessation success. Little is known about the changes in motivation and self-efficacy to quit over time among people with serious mental illness (SMI), a population with low cessation rates. This study investigated: 1) latent classes of patterns of motivation and self-efficacy to



quit smoking, 2) factors predicting latent class membership, 3) effects of latent class membership on smoking abstinence. **Methods:** Participants were 300 adults with SMI in inpatient psychiatric care who smoked at least 5 cigarettes/day pre-hospitalization who were randomized to receive either a tailored smoking cessation intervention for people with SMI (motivational counseling, post-discharge nicotine patches and telephone quitline counseling) or usual care (brief counseling). Participants completed baseline, 1, 3 and 6-month assessments. We conducted four separate latent class growth analysis (LCGA) based on: 1) desire to quit smoking, 2) willingness to work hard at quitting smoking, 3) perceived difficulty in quitting smoking, 4) perceived success in quitting smoking. We assessed whether treatment condition, nicotine dependence and mood symptoms predicted class membership as well as the effects of class membership on 6-month smoking abstinence. **Results:** Across all four LCGA models, the two-class model showed the best model fit. For all four models, two classes were differentiated by overall levels (high vs. low). The rates of change over time in desire to quit, willingness to work hard, and perceived success did not differ across the two classes. For perceived difficulty, one class showed a reduction while the other class remained stable. Only desire to quit (both classes) showed an increase over time. Higher baseline anxiety and receiving treatment predicted higher desire to quit smoking. Higher baseline anxiety, depression, and nicotine dependence predicted lower perceived success and higher perceived difficulty in quitting. Class membership of all four constructs predicted 6-month abstinence. **Conclusions:** Individuals with SMI reported relatively stable motivation and self-efficacy to quit over 6 months after hospitalization while an increase in desire to quit and a decrease in perceived difficulty were also found. Higher sustained motivation and self-efficacy predicted cessation success. Identifying ways to elevate and sustain motivation and self-efficacy may facilitate cessation success for people with SMI.

FUNDING: Federal

POS2-41

A QUALITATIVE ANALYSIS OF NORMATIVE INFLUENCES ON VAPING BEHAVIORS AMONG MEXICAN AMERICAN COLLEGE STUDENTS IN TEXAS

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Significance: Vaping rates among Mexican American (MA) college students are high, yet there is little knowledge about factors that contribute to higher prevalence in this group. The current qualitative study aims to understand normative influences on vaping in this population to inform the development of culturally appropriate interventions. **Methods:** In May and June 2023, we conducted in-depth, semi-structured interviews with 10 MA college students from Texas, aged 18 to 22 years old, who reported current vaping and social media (SM) use. We used thematic analysis to code and interpret the transcripts. **Results:** Friends were frequently mentioned regarding initiation and maintenance of vaping: *"It was usually around my friends because they're the ones who have access. They're the ones who... provided [vape products]"* Family members were also mentioned as providing information about and facilitating access to vape products: *"I would say that... even my mom has told... me to try her new flavor, her new little brands."* Conversely, others said their families consider vaping an unacceptable behavior, which influenced their decisions, *"[I stopped vaping] because I know that if my parents found out, they're not gonna agree on it."* And, *"My mom will tag me in videos that show the effects of how people become... hospitalized after vaping for a while, and... those will make me feel bad."* Similarly, social media served both to bolster and lessen the normalization of vaping. Despite reporting a low incidence of sponsored ad exposure, participants described seeing content not explicitly about vaping but that showed celebrities or other SM users vaping: *"Celebrities that I follow vape. It definitely makes me feel more relaxed about vaping because then it makes me feel like, 'Oh, well if they're doing it then... why is it bad if I'm doing it?'"* or *"The people I follow that I know vape, they don't care too much about hiding it. I always see it in the background... especially if they're out somewhere."* However, others reported seeing content dissuading vaping, such as Truth Initiative's Breath of Stress Air campaign: *"[The campaign] makes me want to think twice."* **Conclusion:** MA college-aged vapers received direct and indirect messages—both negative and positive—from friends, family members, and SM that normalized vaping. Given the centrality of family and extended family among Latinos, addressing family-driven norms and expectations may enhance the success of prevention and cessation efforts.

FUNDING: Federal

POS2-42

CO-USE OF CIGARETTES, E-CIGARETTES, AND MARIJUANA IN CALIFORNIA: IMPLICATIONS FOR CESSATION

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Significance. E-cigarettes and cannabis are growing in popularity among cigarette smokers. Some smokers may adopt these products while trying to quit smoking in an attempt to reduce their exposure to the harms of cigarettes, but little is known about the consequences of co-using these products. To determine whether co-use is associated with either harm reduction or increased harm exposure, we surveyed current and former smokers about their use of and addiction to cigarettes, e-cigarettes, and cannabis. **Methods.** We collected a convenience sample of 210 current smokers and 181 smokers who quit within the past 12 months via the online survey platform Prolific and at community events in California. We grouped current smokers into four product use categories based on their past 30-day use of cigarettes, e-cigarettes, and cannabis: cigarette-only smokers (27.14%), dual-users of cigarettes and e-cigarettes (25.24%), dual-users of cigarettes and cannabis (18.10%), and poly-users of all three products (29.52%). We similarly grouped former smokers into four categories: those who abstain from all three products (48.62%), e-cigarette only users (12.17%), cannabis only users (21.55%), and dual-users of e-cigarettes and cannabis (17.13%). **Results.** Cessation was a common reason for e-cigarette use (61.54% of e-cigarette users) and less-common for marijuana use (27.65% of marijuana users). Among current smokers, poly-users smoked two fewer cigarettes per day than cigarette-only smokers ($b = -2.10$, $p = 0.042$). There was no significant difference in the number of cigarettes smoked per day by dual-users compared to cigarette-only smokers, and there was no significant difference in the number of days smoked per month for co-users compared to cigarette-only smokers. Among current and former smokers, e-liquids with nicotine and combustible cannabis (i.e. joints) were the most popular products. For those who used e-cigarettes, 40.24% felt they were addicted to e-cigarettes and 53.25% reported wanting to quit in the next six months. For those who used cannabis, 24.71% believed they were addicted and 14.12% planned to quit in the next six months. **Conclusion.** For most current smokers, co-use was not associated with less cigarette use, instead, there was additional exposure to nicotine via e-cigarettes and combustion-related toxicants via cannabis. This exposure extended past the point of cigarette cessation for former smokers and included the risk of developing additional addictions to e-cigarettes and cannabis. Further research on how co-occurring addictions impact smoking cessation success and maintenance is greatly needed.

FUNDING: State

POS2-43

PRENATAL VAPING IS MORE PREVALENT IN YOUNG BISEXUAL PEOPLE

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Significance. Bisexual youth are at greater risk of both e-cigarette use (vaping) and adolescent pregnancy than heterosexual youth, but there is little research on prenatal substance use in younger pregnant bisexual people. The goal of this analysis was to examine nicotine and cannabis vaping as a function of bisexual identity in a cohort of younger pregnant people, and to determine if differences in vaping were explained by psychosocial factors that are more prevalent in this understudied population. **Methods.** Pregnant people ages 14-21 (mean = 19 years) were recruited for a cohort study of prenatal nicotine and cannabis use, the YoungMoms (YM) project (N= 411, 77% Black or Biracial). YM participants were recruited primarily during their first trimester of pregnancy (mean = 10 weeks) and asked to complete an online survey. The survey included demographic questions (e.g., race, ethnicity, gender, sexual orientation, gravidity) and items assessing pregnancy timing and intent, social support, intimate partner violence, perceived stress, depressive symptoms, and substance use. **Results.** In the online survey, 23% of YM participants reported that they were bisexual. Bisexual-identified participants were significantly more likely to report vaping nicotine at least once a week before (30% vs 18%) and after (13% vs 4%) they found out that they were pregnant. Bisexual participants were also more likely to vape cannabis before pregnancy than non-bisexual participants (16% vs 5%). Very few YM participants reported vaping cannabis during pregnancy (n = 10). Vaping nicotine during pregnancy was not related to age, pregnancy timing, history of intimate partner violence, stress, depressive symptoms, or social support. In a multivariable model, bisexual identity remained associated with vaping nicotine before (adjusted Odds Ratio = 1.85, 95% confidence interval = 1.06-3.25) and during pregnancy (adjusted Odds Ratio = 3.2, 95% confidence interval = 1.39-7.42). **Conclusions.** Young bisexual people are more likely to vape nicotine before and during pregnancy than young non-bisexual people. This is consistent with findings from studies



of non-pregnant bisexual youth, but inconsistent with findings from a study of adults in their third trimester of pregnancy. As rates of vaping are higher among younger people, health care providers providing obstetric care for young pregnant patients should screen for e-cigarette use/vaping, in addition to combustible commercial tobacco use.

FUNDING: Federal

POS2-44

HEALTH CARE PROVIDER ADVICE TO ABSTAIN FROM USING E-CIGARETTES AND E-CIGARETTE HARM PERCEPTIONS AMONG U.S. YOUTH

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Significance: E-cigarette use persists among youth and remains a major public health concern. The use of e-cigarettes is concerning because of known and potential health effects, and youth are generally misinformed about these possible health harms. Health care providers (HCP) are in a unique position to advise against tobacco use, including e-cigarette use, and youth perceptions of e-cigarette harm may be influenced by such advice. However, research examining these relationships is scant. The purpose of this study is to examine the associations between HCP e-cigarette-related advice and youth e-cigarette harm perceptions. **Methods:** We used data from the 2022 National Youth Tobacco Survey (N=21,580) to examine three components of e-cigarette harm perceptions: addictiveness relative to cigarettes, general harms, and secondhand e-cigarette aerosol (SHA) harm. Associations between HCP advice and each e-cigarette harm perception were examined using multinomial logistic regression adjusted for age, sex, race/ethnicity, sexual orientation, past 30-day frequency of e-cigarette use, and past 30-day other tobacco use. **Results:** Among the sample, 33.9% perceived e-cigarettes as equally addictive to cigarettes, 39.9% perceived e-cigarettes to cause a lot of harm, and 23.4% perceived SHA to cause a lot of harm. Youth who received HCP advice to abstain (OR= 1.25, 95% CI: 1.01-1.54) or were female (OR=1.67, 95% CI: 1.38-2.02) had higher odds of perceiving e-cigarettes as equally addictive as cigarettes, and those who were bisexual (OR= 0.73, 95% CI: 0.57-0.94) had lower odds. Youth who received HCP advice had higher odds of perceiving e-cigarettes as causing a lot of harm (OR=1.48, 95% CI: 1.16-1.89), and those who were non-Hispanic Black (OR=0.64, 95% CI: 0.43-0.94) had lower odds. Youth had higher odds of perceiving that SHA causes a little harm if they received HCP advice (OR= 1.21, 95% CI: 1.03-1.43) or were non-Hispanic another race/ethnicity (OR= 1.56, 95% CI: 1.03-2.37), and youth who were non-Hispanic Black (OR=0.72, 95% CI: 0.54-0.96) or used e-cigarettes every day (OR= 0.41, 95% CI: 0.25-0.68) had lower odds. **Conclusions:** HCP e-cigarette-related advice was associated with youth perceiving e-cigarettes to be as addictive as cigarettes and to cause harm. HCP e-cigarette counseling for youth may help increase understanding of the spectrum of harms associated with e-cigarette use, which may prevent or reduce use.

FUNDING: Federal

POS2-45

CATEGORIZING E-CIGARETTE-RELATED TWEETS USING BERT TOPIC MODELING

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Significance The prevalence of e-cigarette use has increased significantly in recent years among adolescents and young adults. Social media platforms, particularly Twitter, have become a popular forum for discussing e-cigarettes, and several studies have found a significant increase in discussions and content related to e-cigarettes and vaping. However, topic modeling remains underutilized as a method for analyzing e-cigarette related messages on social media. The present study focused on ascertaining the extent to which themes and topics in tweets related to e-cigarettes can be successfully rendered using machine learning and topic modeling for the purposes of future analysis. **Methods** We used topic modeling (BERTopic) to study 154,281 (121,000 unique) tweets from 98,634 unique individuals tweets collected from November 2022-February 2023 and derive vape-related tweet clusters. Experts in tobacco control removed irrelevant topics through an iterative process. We used automated geoparsing methods to attempt to infer the location of tweets and using the Python langdetect library to filter out non-English and Spanish language tweets. **Results** We successfully identified > 100,000 tweets related to e-cigarettes in broad thematic categories in English and Spanish. Our

correlation and inter-topic map analysis of the machine-derived topics indicated that most of the topics were unique (correlation value < .5) and did not overlap with each other. The inter-topic maps visually represented the clustering of topics within each category (n=X categories), which were mutually exclusive and unique. Using geoparsing, which automatically detects location information from a given text, we successfully identified that the United States had the highest number of tweets related to vaping; however, most tweets could not be geolocated. **Conclusions** Our framework leverages BERTopic to analyze large-scale tweets to better understand the potential implications of these discussions for public health messaging and policy interventions. We identified unique clusters of topics related to e-cigarettes. Future work can study available information within these unique clusters in greater depth to gain a more comprehensive understanding of the motivations, attitudes, and experiences of Twitter users engaged in discussions about e-cigarettes. **Funding:** NIHMHD Grant R01MD017280. **Conflict of interest:** None

FUNDING: Federal

POS2-46

REASONS FOR ELECTRONIC CIGARETTE USE AMONG YOUNG- AND OLDER-ADULT MEN AND WOMEN

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Significance: Electronic cigarette (e-cigarette) use motivations among adults likely differ based on sex/gender and age (young adults vs. others), and understanding these differences is essential to tailoring interventions to reduce e-cigarette and tobacco use. However, to date, there are few systematic studies exploring differential motivation for e-cigarette use among these groups. The aim of the present study is to examine sex and age differences in reasons for e-cigarette use. **Methods:** A total of 987 adults completed a questionnaire designed to assess reasons for e-cigarette use. The Reasons for E-cigarette Use questionnaire included scales reflecting eight motives for use: social influence (social modeling and peer pressure); alternative (to cigarettes); experiential effects (such as rush or relaxation); harm reduction (relative to cigarettes); dependence (physical and psychological); (control of) weight/appetite; smell/flavor (variety of options available); and cessation (of cigarette use). Participants also completed demographic and tobacco use measures. Questionnaires were completed via Qualtrics on the Prolific crowdsourcing platform. Participant data were grouped by sex (male vs. female) and age group (young adult (≤29 years old) vs. older adult). **Results:** Significant sex by age interactions were found for social influence, harm reduction, and smoking cessation motives for e-cigarette use. Younger adults (men and women) endorsed similar and higher social influence motives for use than did older adults, but older adult men also endorsed higher social influence motives than did older adult women. Younger adult men endorsed higher harm reduction motives that were similar to those of older adults, and this interaction was driven by lower scores among younger women. Finally, younger adults endorsed lower smoking cessation motives than did older adults overall, but younger women also reported lower cessation motivations than did younger men. Additional main effects revealed that young adults endorse higher experiential and flavor motives, but lower dependence motives for using e-cigarettes. Women endorsed higher dependence motives for use than did men. **Conclusion:** This is among the first studies to systematically examine age and sex differences in reasons for e-cigarette use. Our findings may help to inform the development and refinement of prevention and treatment interventions designed to reduce e-cigarette use and its harms.

FUNDING: State; Academic Institution

POS2-47

AN EXAMINATION OF THE DIFFERENTIAL POPULATION HEALTH IMPACT BETWEEN AN IMMEDIATE VS GRADUAL NICOTINE REDUCTION IN CIGARETTES: A SIMULATION ANALYSIS

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Significance: The Food and Drug Administration (FDA) has announced a plan to explore reducing nicotine levels in cigarettes to non-addictive levels. As such, the FDA must evaluate several implementation timelines for such regulatory action. While a published study (Hatsukami et al., JAMA 2018) found that immediate nicotine reduction in cigarettes produced a larger decline of biomarkers of smoke exposure compared to a gradual reduction, the implications of these findings at the population level are unknown. The FDA needs to evaluate the differential health effects of these two possible schedules to justify their choice of a timetable for this potential regulatory action. **Methods:** We used a well-established population-dynamics simulation model of smoking prevalence



and health effects to calculate and contrast the cumulative mortality over 2025 - 2100 between an immediate and a gradual (over ten years) nicotine reduction regime. We parameterized the model with NHIS data, published results of clinical trial studies of nicotine reduction, and recommendations from an expert panel. We then performed an extensive sensitivity analysis by simulating 40 different scenarios varying the effects of nicotine reduction in the smoking cessation rate (100%, 133%, 163%, and 200% increase) and the persistence of those effects (indefinitely, and increasing to 80% cessation after 15 years), under five different background initiation rates (13%, 7.8%, 5%, 3%, and 0%). Each of the simulated scenarios consisted of two runs, depicting an immediate and a gradual reduction of nicotine in cigarettes. We then reported the difference in cumulative mortality between the immediate and gradual runs for each scenario. **Results:** We find that an immediate reduction of nicotine in cigarettes, enacted in 2025, would outperform a gradual reduction by 700K-1M premature deaths averted (PDA), corresponding to 12-20M life-years saved (LYS) by 2100. A nicotine ban will prevent 1.7-2.7M premature deaths and 30-45M life-years lost between 2025-2100 under current conditions. If the background cessation rate continues to increase and initiation rates decrease, the policy will be less effective (e.g., if the adult initiation rate decreases from 7.8% to 5% by 2025, the policy will prevent around 2M premature deaths by 2100.) **Conclusions:** We provide an update to the 2018 *NEJM* Appleberg et al.'s paper since the smoking initiation rate has fallen precipitously since that study was conducted. We also show that if the FDA were to implement a regulation to reduce the nicotine levels in cigarettes to non-addictive levels, an immediate implementation of such action would save hundreds of thousands more lives than if the regulation were enacted gradually. Only 37% of the smoking-related premature deaths between 2025 and 2100 can be prevented. Of those, we found that around 50% could be prevented by a nicotine reduction policy implemented in 2025.

FUNDING: Federal

POS2-48

LONGITUDINAL ALTERATIONS IN URINE EXOSOMAL MICRORNA EXPRESSION PROFILES ASSOCIATED WITH EXCLUSIVE ADULT ELECTRONIC CIGARETTE USE

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Background: Electronic cigarette (e-cigarette) use in the US has significantly increased in the past few years. Epigenetic-mediated exosomal microRNAs play important regulatory roles immune regulation and inflammatory response. No study has examined the longitudinal changes in expression profiles of urine exosomal miRNAs in exclusive e-cigarette users. We aim to investigate the longitudinal changes in exosomal microRNA expression profile when non-users initiate exclusive e-cigarette use and exclusive e-cigarette users quit vaping. **Methods:** Using the Population Assessment of Tobacco and Health (PATH) Wave 1 (2013-2014) and Wave 2 (2014-2015) urine samples from 45 subjects, we examined exosomal microRNA expression levels through Illumina NextSeq 500/550 sequencing. The differences in exosomal miRNAs expression levels when participants initiate exclusive e-cigarette use (W1 non-users to W2 exclusive fruit e-cigarette users) or quite vaping (W1 exclusive e-cigarette users to W2 non-users) in Wave 2 using the generalized linear mixed-effects models in the *glmmSeq* package in R/Bioconductor that considers the within-subject correlations. Gene enrichment analyses were conducted on target genes regulated by significant exosomal microRNAs. **Results:** We identified two microRNAs (hsa-miR-181b-5p and hsa-miR-221-3p) that had increased expression levels in subjects who initiated exclusive e-cigarettes use in W2 and decreased expression levels in subjects who quit exclusive e-cigarette use in W2. Gene enrichment analysis using the GO Biological Process 2021 database showed that the target genes regulate the apoptotic process, cell cycle, protein localization, and gene silencing. KEGG pathway enrichment analysis found the two significant miRNAs regulate genes involved in many cancerous pathways, such as small cell lung cancer, prostate cancer, breast cancer, cellular senescence, PI3K-Akt signaling pathway, p53 signaling pathway, FoxO signaling pathway, and MAPK signaling pathway. **Conclusions:** Two urine epigenetic exosomal microRNAs had significant expression level changes during the exclusive e-cigarette use initiation and cessation process. Gene enrichment analyses showed that they regulate genes involved in cancerous and cellular senescence pathways, indicating a potentially elevated risk of cancer associated with exclusive e-cigarette use. These findings may have implications on other substance abuse effects on epigenetic alterations.

FUNDING: Federal

POS2-49

DAILY CIGARETTE EXPENDITURE AND IMPACT ON MOTIVATION TO QUIT AMONG PEOPLE LIVING WITH HIV IN VIETNAM

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Significance: The prevalence of tobacco use among people living with HIV (PWH) is 2-3 times that of HIV-negative counterparts, threatening gains in long-term survival, especially in low-and middle-income countries (LMICs). In Vietnam, over 50% of PWH use tobacco. Tobacco taxes are one of the most effective measures to reduce tobacco use. However, there is a lack of data on the impact of these policies among low-income populations that include PWH who use tobacco, particularly in LMICs. Vietnam's tax, 41.6% of retail price, is one of the lowest in the world. As part of a larger trial comparing the effectiveness of interventions to reduce tobacco use among PWH, we evaluated self-reported daily spending on tobacco products and smokers' perceptions about the financial burden of cigarette purchases and the impact on their readiness to quit.

Methods: Our study used parallel convergence analysis to evaluate data collected from smokers (n=99) receiving HIV-care at outpatient clinics (OPC) in Hanoi, Vietnam and who are enrolled in the trial. Baseline surveys (n=75) measured self-reported daily spending on cigarettes and/or waterpipe. Qualitative interviews (n=24) explored smoking behavior patterns, quitting history, challenges associated with quitting and reasons for quitting. **Results:** Participants had a mean (SD) annual income of 186 million (150 million) Vietnam Dong (VND). The amount spent per day on cigarettes was 30,000 (12,057) VND [USD 1.26 (0.51)] and the percent of annual income spent on tobacco was 7.5% (7.11). All participants reported that spending on tobacco did not create a financial burden but acknowledged that price increases might affect those with unstable income or unemployment. Participants agreed that they would be more motivated to quit if the financial burden was higher, but based on current spending none considered a reason to quit. Other motivators to quit include concerns about the harms of smoking and the potential for improving their health. **Conclusion:** The percent of annual income spent on tobacco is higher than other countries in the region (e.g., Cambodia, China), yet is not a factor that motivates PWH who smoke to quit. Increasing the actual cost through modifications in tax policy that align with WHO country recommendations to increase the overall rate through a specific tax rather than the existing ad valorem tax is a key strategy for reducing tobacco use in this population and addressing disparities in health outcomes.

FUNDING: Federal

POS2-50

EFFECT OF TOBACCO USE ON SLEEP IN METHADONE MAINTAINED PATIENTS

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Significance- Opioid use disorder is a common problem worldwide. Opioid substitution therapy is recommended as one of the most effective treatment strategies to manage opioid use disorder. Tobacco use is common in patients with opioid use disorder on opioid substitution therapy. The objective of the current study is to see the prevalence of sleep problems in methadone maintained male patients who have tobacco co-use. **Methodology-** An observational study was conducted in a community clinic in urban India. 50 Male patients who were more than 18 years of age and maintained on a stable dose of methadone for more than six months were enrolled for the study. The participants were assessed on their socio-demographic profile and substance use through ASSIST questionnaire. Sleep was assessed by Pittsburgh sleep quality index. **Results-** one third of the participants were married. Most of them were employed and have received some level of education. The mean age of sample was 27.7 (SD:7.8) years. The median duration of opioid and tobacco use were 5.0 (3.7) years and 12.5 (8.15) years. The mean age of onset for opioid and tobacco were 20.7 (5.3) years and 14.5 (4.7) years. The median duration of methadone treatment was 19 (10.5,22) months and mean dose of methadone was 27.6 (14,36) milligrams per day. There was no correlation between duration of tobacco use, methadone dosage and duration of treatment with sleep problems. **Conclusion-** Duration of tobacco use doesn't have any effect on sleep in methadone maintained patients.

FUNDING: Unfunded; Academic Institution



POS2-51

ENHANCING PRIMARY MEDICAL CARE TOBACCO TREATMENT WORKFLOWS IMPROVED REFERRAL TO LUNG CANCER SCREENING AMONG LOW-INCOME PATIENTS

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Significance: Reductions in tobacco use over the past 20 years has led to a difference in lung cancer mortality in California compared to the rest of the United States. Reductions in tobacco use and incidence of lung cancer vary across communities. Californians in low-income communities are 1.8 (RR) times more likely to be current smokers, are 21% less likely to quit successfully than other smokers and have disproportionate risk for lung cancer. **Methods:** At Family Health Centers of San Diego (FHCSD), one of the ten largest Federally Qualified Health Centers (FQHCs) in the nation, we developed an academic-community partnership to refine tobacco treatment workflows in the electronic health record (EHR). We examined the impact of promoting tobacco treatment on referral practices for lung cancer screening with low dose computed tomography (LDCT) during COVID and 18 months following updates to the EHR (from 1/1/2019-5/31/2022). Mixed effects ordinal regression assessed changes in referral and completions of LDCT patterns over 42-months. **Results:** Among smokers eligible for LDCT (n=4,492), 95% live below 200% of the US federal poverty level, average age 60 years, 22% Hispanic, 14% Black, and 52% White. Diagnoses included Circulatory (26%), Respiratory (11%), Over/Obese (2%), Diabetes (7%), Multiple/other (19%). Substance and Mental Health Diagnoses were noted in 12% of smokers. After the EHR updates, provider referrals to behavioral tobacco treatments increased by an average of 48% (p < 0.001) and smokers were significantly higher odds of referral for LDCT (OR = 1.37; 95%CI=1.14-1.63), an effect that was sustained for 9 months (OR = 1.22; 95%CI=1.02-1.46), and was no longer significant by Jun-2022 (OR = 0.95; 95%CI=0.79-1.15). Those with referral to tobacco treatment had 1.6 (95%CI = 1.4-1.8) higher odds of LDCT.

FUNDING: State; Academic Institution; Other

POS2-52

SHAPING THE FUTURE: EXPLORING PROPOSED REGULATION OF NEW TOBACCO AND NICOTINE PRODUCTS IN LATIN AMERICA AND THE CARIBBEAN

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Significance: The rise in the availability of new tobacco and nicotine products (NTNPs), including electronic cigarettes and heated tobacco products (HTPs) has prompted health officials to carefully examine the safety and potential harmfulness of these products. Given the evolving landscape of NTNPs, it has become increasingly important to regulate these products. This situation is increasingly evident in Latin America and the Caribbean (LAC) where NTNP is rising, especially among youth. Research on NTNPs has primarily focused on their potential health risks and marketing. Only a few studies have examined the regulatory environment of NTNPs. To our knowledge this is first known study that aims to analyze national bills introduced regarding NTNPs in the LAC region to understand government attempts to regulate these products. **Methods:** To track national NTNP bills, we searched national legislative websites using standard snowball search methods. Inclusion criteria included bills regarding the use of NTNPs in public places and workplaces, commercialization, import/export, or concerning advertising, promotion and sponsorship. We examined whether bills regulated or banned NTNPs, which focused on electronic cigarettes or HTPs or both, which country they were derived from, and which were industry friendly. **Results:** A total of 91 NTNP-related bills were identified in 15 of the 33 LAC countries. Mexico had the highest number of bills (n=38), followed by Brazil (n=16), Argentina (n=10), Colombia (n=8) and Chile (n=5). The majority of bills (n=60) addressed both electronic cigarettes and HTPs, almost one third (n=29) applied only to electronic cigarettes, and (n=32) were deemed industry friendly. Six of the 15 countries with identified bills, enacted NTNP laws including Barbados, Bolivia, Costa Rica, Guyana, Mexico, and Panama. Most bills (n=75) found aimed to regulate NTNP usage, while fewer (n=16) sought to ban NTNPs. Since 2019, there has been a steady increase in the amount of introduced NTNP bills in LAC; 2017 (n=10), 2018 (n=10), 2019 (n=23), 2020 (n=23), 2021 (n=16 as of August 2022). **Conclusion:** The substantial increase in NTNP bills introduced since 2019 indicates the growing

importance of regulating NTNPs in LAC. As NTNPs continue to evolve and grow it will be important to continue monitor and evaluate tobacco and nicotine control measures in place while also staying ahead of the evolving market of NTNPs.

FUNDING: Academic Institution; Nonprofit grant funding entity

POS2-53

COULD AN OPT-OUT APPROACH TO TOBACCO TREATMENT HELP IMPULSIVE INDIVIDUALS QUIT SMOKING?

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Significance: Over 3.2 million smokers in the U.S. alone are hospitalized annually, creating an opportunity for smoking cessation intervention when they are already in a period of enforced abstinence. Hospital-initiated smoking cessation treatment using OPT-OUT approaches, compared to OPT-IN, has shown to be effective in helping smokers to engage with their smoking cessation treatment. People with high delay discounting (DD), which reflects an individual's relative preference for smaller immediate versus larger delayed rewards, are usually found to be less likely to maintain smoking abstinence. The purpose of our study was to describe the relationship between DD, OPT-IN, and OPT-OUT approaches and quitting behaviors for recently hospitalized smokers participating in an OPT-OUT smoking cessation clinical trial. **Methods:** These analyses include 411 participants from a clinical trial of OPT-OUT versus OPT-IN treatment for tobacco use. DD was measured at baseline using a five-item adjusting-delay task. Quitting behaviors included quit attempts and biochemically verified 7-day abstinence assessed at 1 and 6 months after randomization. Utilization of smoking cessation treatment was measured as any use of pharmacological treatment or attendance of at least one counseling call 1-month post-discharge. We utilized the median as a threshold to categorize participants into low and high DD and descriptive statistics to compare groups. **Results:** With respect to tobacco abstinence, quit rates were higher for Persons in OPT-OUT regardless of DD status (High DD/OPT-OUT 22%; Low DD/OPT-OUT 22%; High DD/OPT-IN 13%; Low DD/OPT-IN 14%). Likewise, treatment utilization was higher (twice as high) for persons in OPT-OUT regardless of DD status (High DD/OPT-OUT 94%; Low DD/OPT-OUT 97%; High DD/OPT-IN 45%; Low DD/OPT-IN 45%). Those with High DD assigned to OPT-OUT, however, had higher rates of quit attempts compared to those in other groups (High DD/OPT-OUT 70%; Low DD/OPT-OUT 59%; High DD/OPT-IN 61%; Low DD/OPT-IN 55%); these findings were similar at month 6. **Conclusion:** People with impulsive tendencies, as indicated by high DD, were more likely to try to quit when exposed to OPT-OUT treatment. Their response to OPT-IN versus OPT-OUT treatment was otherwise no different from people with low DD. OPT-OUT treatment may be an effective method for helping people with high DD try to quit and try more frequently. Efforts are needed to extend these potentially "impulsive" quit attempts into abstinence.

FUNDING: Federal

POS2-54

PAST-YEAR MENTAL ILLNESS DIAGNOSIS AND E-CIGARETTE USE STATUS: FINDINGS FROM THE NATIONAL COLLEGE HEALTH ASSESSMENT (2017-2019)

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Significance: There is growing evidence of the association between e-cigarette use and symptoms of mental illness (MI), especially among young people. The current study examines associations between past-year MI diagnoses and past 30-day e-cigarette use. **Methods:** Data were obtained from the National College Health Assessment (2017-2019, N = 63,497). Relative risk ratios of e-cigarette use were estimated using multinomial logistic regression, as predicted by the effect of past-year mental health illness diagnoses, adjusting for the effects of age, race/ethnicity, sex and gender, and region. **Results:** Compared to those who had never received any MI diagnosis in the past 12-months, those who did had a 51% higher relative risk (RRR = 1.51, 95% CI: 1.43, 1.60) of being noncurrent e-cigarette users and a 96% higher relative risk (RRR = 1.96, 95% CI: 1.82, 2.12) of being a current e-cigarette user, compared to never e-cigarette users. Substance use or addiction, bipolar disorder, and ADHD demonstrated the strongest associations with noncurrent and current e-cigarette use. **Discussion:** Results indicate that those who were diagnosed with MI in the past year were more likely to report non-current and current e-cigarette use, relative to never e-cigarette use. Findings suggest the need to screen young adults for both e-cigarette use and mental health indicators to facilitate early detection and timely interventions for at-risk college/university students.

FUNDING: Unfunded



POS2-55

MAJORITY SUPPORT FOR RECOMMENDED TOBACCO CONTROL POLICIES AMONG RESIDENTS OF U.S. STATES WITH THE HIGHEST SMOKING RATES

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Introduction: Over the past two decades, much of the decline in cigarette smoking in the United States (U.S.) has been attributed to tobacco prevention efforts. However, 12 states - termed "Tobacco Nation" - report persistently higher rates of cigarette smoking and lower tobacco policy enactment than other U.S. states. Public support of policies can help facilitate policy enactment; however, little is known about Tobacco Nation residents' support of key tobacco policies. We sought to measure public support for recommended tobacco prevention policies in Tobacco Nation and other U.S. states. **Methods:** Survey data were collected in Spring 2023 from a convenience sample of U.S. adults aged at least 18 years-old ($n=1608$). Tobacco policy support was measured using 16 items examining support or opposition to tobacco retailer, tax and price, flavor, and smoke-free air policies. Chi-square tests compared weighted percent support for each policy between the two regions (Tobacco Nation and other U.S. states). Weighted logistic regressions examined policy support by region, controlling for sociodemographics, tobacco use, and political affiliation. **Results:** We found majority support for all 16 policies among residents of Tobacco Nation (50.5-81.0%) and residents of other U.S. states (55.8-84.5%), with Chi-square tests indicating no significant differences in policy support between the two regions for 13 of 16 policies. Among Tobacco Nation residents, policy support was highest for smoke-free air policies (e.g. 81.0% supported smoke-free restaurants) followed by retailer policies (e.g. 70.6% supported requiring tobacco retailers to obtain licenses), flavor policies (e.g. 69.1% supported prohibiting the sale of flavored tobacco), and tax or price policies (e.g. 52.1% supported increasing the tax on a pack of cigarettes by \$1.50). When controlling for tobacco use and sociodemographics, living in Tobacco Nation did not significantly predict support for any of the 16 policies, while current cigarette smoking predicted lower support for all 16 policies. **Conclusions:** Most residents of Tobacco Nation support tobacco retail, tax and price, flavor, and smoke-free air policies. In addition, support for tobacco policies does not significantly differ between Tobacco Nation and other states in multivariable models. Despite this, enactment of tobacco prevention policies is much more limited in Tobacco Nation states than in other U.S. states, which may contribute to and reinforce disparities in smoking between the two regions. Findings can inform tobacco prevention advocacy efforts to reduce geographic smoking disparities in the U.S.

FUNDING: Other

POS2-56

IMPLEMENTATION OF A CESSATION FRAMEWORK FOR TOBACCO CESSATION POLICY RESEARCH

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Significance: California's tobacco policy efforts with public health have been successful in creating social norm change that has reduced tobacco use faster than the rest of the United States. However, California's health care systems and plans have been slow to include or prioritize tobacco cessation, which is needed to maintain low levels of tobacco use. This study describes the use of a framework to organize projects in a Tobacco Cessation Policy Research Center (TCPRC) funded by the California Tobacco-Related Disease Research Program. **Methods:** In 2021, the California Tobacco Control Program hosted a summit with 60 thought leaders that identified 6 key areas for tobacco cessation: building capacity in communities, standardizing delivery in health care systems, creating a norm in behavioral health systems, accelerating quitting behaviors, optimizing surveillance of tobacco cessation, and motivating health care plans to prioritize tobacco cessation. These 6 key areas were synthesized into 4 domains: 1) Health care access, 2) Health care delivery, 3) Health care engagement, and 4) Health care plan reform. **Results:** The four domains organize the projects for research on existing and potential legislative policies. 1) **Health care access.** Community pharmacies are important resources to access cessation services especially rural areas. This study will examine barriers and facilitators to implement a law for Medi-Cal plans to reimburse community pharmacists for cessation services. 2) **Health care delivery.** People with substance use disorders (SUD) have high rates of tobacco co-use but SUD facilities have competing priorities. This study will examine barriers and facilitators to implement a law for SUD facilities to assess and treat tobacco. 3) **Health care engagement.** California's new state law

bans the retail sale of most flavored tobacco products and is an opportunity for people to quit especially racial/ethnic minorities. This study will examine a strategy to engage health care providers on local policy adoption and implementation. 4) **Health care plan reform.** Comprehensive tobacco treatment coverage is not in place for all publicly covered health plans, such as those for state employees or low income groups. Research can help define health economic scenarios for policy decisionmakers. **Conclusion:** California's cessation framework organizes policy research projects whose findings will support efforts that expand into subsequent studies or generate new policy adoption or implementation efforts. The anticipated long-term impact is to optimize policy impacts and improve population-based cessation outcomes to advance health equity.

FUNDING: State; Academic Institution; Nonprofit grant funding entity

POS2-57

WHEN DOES SMOKING REDUCTION COUNSELING DECREASE CESSATION? AN EXPLORATORY ANALYSIS OF A RANDOMIZED FACTORIAL TRIAL OF MOTIVATION-PHASE INTERVENTIONS FOR PEOPLE WHO ARE NOT READY TO QUIT

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Significance: Most US adults who smoke are not ready to quit in the near future, but many are willing to try to reduce cigarettes per day (CPD). However, research shows that reduction treatment's effects on cessation can be highly variable. While such treatment generally yields modest benefit, a recent large randomized factorial trial found reduction counseling resulted in an iatrogenic effect on smoking cessation. **Methods:** This is an exploratory analysis of a 4-factor, randomized trial that enrolled 577 patients who were not ready to quit smoking but were willing to try reducing. The four factors contrasted motivation phase intervention components administered over 1 year: 1) Nicotine Mini-Lozenge; 2) Reduction Counseling; 3) Behavioral Activation Counseling; 4) Motivational 5Rs Counseling. Using logistic regression, we explored magnitude of reduction in CPD from baseline to week 26 as a predictor of 1) making a self-reported quit attempt between weeks 26 and 52 and 2) self-reported 7-day point prevalence abstinence at week 52. **Results:** Reduction in CPD from baseline to week 26 was similar for participants who received Reduction Counseling (Mean CPD reduced=6.07, SD=6.54) vs those who did not (Mean CPD reduced=6.83, SD=7.30, $p=.313$). Across the four intervention factors, a greater CPD reduction predicted smoking cessation at week 52 ($OR=1.07$, 95% $CI=1.02$, 1.12). However, among participants who failed to reduce CPD by at least 50%, those who received Reduction Counseling were less likely to initiate an attempt to quit smoking than those who did not receive Reduction Counseling ($OR=0.52$, 95% $CI=0.31$, 0.90). In contrast, Reduction Counseling did not affect the likelihood of making a quit attempt among participants who achieved >50% reduction in CPD by week 26 ($OR=1.09$, 95% $CI=0.56$, 2.11). **Conclusions:** Overall, a greater reduction in CPD was associated with increased odds of quitting. However, counseling to reduce CPD had an iatrogenic effect among participants who were unable or unwilling to reduce their smoking by 50% or more, suggesting that failing to meet Reduction Counseling goals may have inadvertently discouraged participants from quitting. As such, interventions to reduce CPD might be improved by strategies that mitigate the de-motivating effects of failing to reduce CPD by >50%. Further research is needed to identify the components and strategies of reduction interventions that maximize smoking cessation among people who are not ready to quit.

FUNDING: Federal

POS2-58

CANNABIS USE AMONG NEW YORK STATE QUITLINE CALLERS: FIVE-YEAR TRENDS AND EFFECTS ON QUIT RATES

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Significance: Evidence has suggested that cannabis use can have a negative impact on treatment outcomes among Quitline callers. Driven in part by legalization of cannabis use for recreational purposes, the overall prevalence of cannabis use has increased dramatically in the past decade, especially among young adults. In 2021, past month cannabis use and daily cannabis use were reported by 29% and 11% of young adults respectively, up from 17% and 6% in 2011, the highest prevalence ever recorded. In New York, recreational cannabis use made legal March 31, 2021. The impact of legalization is, as yet unknown, on the characteristics QL callers and their attempts



to quit tobacco. **Methods:** We analyzed data from all individuals who called the NY State Quitline (QL), responded to the question "In the past month, how many days did you use cannabis?" 0 to 30 days, and received standard tobacco treatment services from 2018-2023. Point-prevalence (7-day) abstinence rates 7-months after the first contact were assessed by email and telephone and calculated using complete case analysis. Differences were examined pre- and post- legalization. Logistic regression examined differences in abstinence rates between individuals with and without past month cannabis use. **Results:** The proportion of NY QL participants who reported any past month cannabis use nearly doubled from 8.3% in 2018 to 15.2% in 2023, with the greatest one-year increase occurring in 2022, 1-year post-legalization. The greatest pre-post increases in past-month cannabis use were among young adults, under the age of 25, which increased from 29.3% pre- to 70.8% post-legalization. Among those who reported any cannabis use, no pre- post differences were found in sex, cigarettes per day, or level of psychological distress, however, the odds of abstinence decreased by 71.8% (95% CI [0.71,0.93]) for individuals who reported 21-30 days of past month cannabis use. **Conclusion:** Legalizing cannabis appears to have increased the number and proportion of callers who report past month cannabis use. Evidence suggests that cannabis use is likely to continue to have a negative impact on tobacco cessation. It is clear that increased days of use is likely to interfere with quit attempts, suggesting an area for increased therapeutic intervention.

FUNDING: No external funding reported

POS2-60

TESTING THE EFFECTIVENESS OF A VIRTUAL SUSTAINED TOBACCO TREATMENT: INITIAL REPORTING OF FINDINGS FROM THE EAQ171CD RANDOMIZED CLINICAL TRIAL CONDUCTED BY ECOG-ACRIN WITHIN THE NCI COMMUNITY ONCOLOGY RESEARCH PROGRAM (NCORP)

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Significance: Persistent smoking among patients diagnosed with cancer is associated with adverse clinical outcomes, yet clinical guidelines for tobacco use interventions have not been integrated into community oncology settings. We tested a virtual sustained tobacco treatment intervention that enables access to remote evidence-based treatment within community oncology settings. **Methods:** This RCT conducted through ECOG-ACRIN compared the effectiveness of sustained telehealth counseling plus medication (Virtual Sustained Treatment; VST) to referral to standard quitline tobacco counseling (Enhanced Usual Care; EUC) in assisting recently diagnosed cancer patients to quit smoking. The VST group received up to 11 synchronous telehealth sessions (4 weekly, then 4 biweekly, then 3 monthly) of motivational counseling and up to 12-weeks of free NRT patch and/or lozenge. Eligibility criteria included adults within 4 months of a cancer diagnosis, cigarette use in the past 30 days, English/Spanish speaking, and access to an internet-enabled device. The outcome is 3-month self-reported abstinence. **Results:** From 08/2019 to 12/2022, 306 patients enrolled from 30 NCORP Community Sites and 7 Minority/Underserved NCORP sites were randomized. Participants were 70.9% female; 86.3% White; 8.8% Black; and 2.9% Hispanic with median age = 57.51 years and 46.1% diagnosed with non-smoking-related tumors. At enrollment, mean cigarettes per day was 14.6, 72.6% (n = 220/303) smoked within 30 minutes of waking, 38.9% (n = 117/301) were in precontemplation/contemplation stage of readiness to quit. 19.2% (n = 30/156) of those assigned to VST did not complete a counseling session. Of participants who participated in counseling, 59.5% (n = 75/126) completed at least 6 sessions, 44.4% (56/126) completed at least one monthly booster session (sessions 9-11), and 86.5% (109/126) were dispensed 4 weeks of NRT. 71.6% (n = 219/306) completed the 3-month outcome assessment. Using intention-to-treat analyses, 3-month quit rates were 24.4% (n = 38/156) in the VST group vs. 15.3% (n = 23/150) in the EUC group

(p<.048). **Conclusion:** Among recently diagnosed cancer patients, sustained remotely delivered telehealth counseling and free NRT produced a higher 3-month quit rate than a quitline referral. Findings to date are promising for the possibility of adopting a policy of widespread sustained tobacco treatment and implementation of tobacco treatment into community oncology care settings nationwide.

FUNDING: Federal

POS2-61

INFLUENCE OF EXPERIENCE WITH 22ND CENTURY VLN CIGARETTES ON DEMAND FOR VLN AND USUAL-BRAND CIGARETTES

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Significance: The proposed reduced-nicotine standard has the potential to reduce cigarette smoking in the United States. Approved as modified risk tobacco products, very low nicotine content cigarettes (VLNs) have been introduced to the commercial market yet little is known about use and demand for VLNs in the natural environment. This study investigated use of VLNs and how prior experience with VLNs affects demand for VLN versus usual-brand cigarettes. **Method:** 962 individuals who smoked at least 5 cigarettes/day were recruited from the Chicago, IL metropolitan area where VLNs are for sale. Participants completed study materials online in October 2022 and again in May 2023. At each survey, participants completed smoking history, mental health, substance use, and sociodemographic measures. Participants reported on their exposure to and use of VLNs, and completed a brief assessment of demand for VLN and usual-brand cigarettes. Surveys also included items assessing VLN perceptions, purchasing, and use intentions. **Results:** 789 individuals (82%) completed both surveys. Participants (33% female, 31% African American, 11% Hispanic, average age 34 years) smoked >10 cigarettes/day. 72% endorsed having seen VLN marketing materials and 54% reported ever having used VLNs. Compared to participants who had not tried VLNs, those who had used VLNs reported higher demand for VLNs ($F(1, 784) = 14.75, p = .0001$) and usual brand cigarettes ($F(1, 785) = 22.20, p < .0001$). Participants who had used VLNs also reported a higher number of false beliefs about VLNs ($F(1, 785) = 45.26, p < .0001$). After covarying age, gender, race/ethnicity and nicotine dependence severity, prior use of VLNs was no longer significantly associated with cigarette demand but was still associated with false beliefs. **Conclusions:** VLN cigarettes have the potential to reduce smoking-related health harms but this effect requires reductions in cigarette use. It is imperative to understand how individual experience influences demand, perception, and intentions to use VLN cigarettes. This study addresses the CTP's goal of understanding the impact of tobacco product marketing and public education on people's attitudes, beliefs, perceptions, and use by exploring demand for VLNs and VLN beliefs in the natural environment.

FUNDING: Federal

POS2-62

TOBACCO CESSATION AND PHARMACOGENOMICS RESEARCH WITH AMERICAN INDIAN PEOPLE

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Significance: Pharmacogenetics (PGx) can be used to tailor treatments to improve health care outcomes and decrease adverse events. Our research focuses on using PGx to personalize treatments for tobacco cessation for American Indian and Alaska Native (AIAN) participants. Nicotine is metabolized by the drug-metabolizing enzyme CYP2A6 and genetic variation in the CYP2A6 gene predicts nicotine exposure and successful cessation. Unfortunately, little is known about variability in nicotine metabolism and CYP2A6 genetic variation in AIAN populations. We aim to improve equitable access to PGx for underserved populations by evaluating perceptions of PGx-guided tobacco cessation for participants of the Confederated Salish and Kootenai Tribes (CSKT) on the Flathead Reservation in Montana. **Methods:** We use community-based participatory research to engage stakeholders at the CSKT including a community advisory board, healthcare providers at the CSKT Tribal Health, and tribal leadership within the CSKT Tribal Council. Through a mixed-methods survey, we assessed participant demographics, current and historical tobacco usage, perspectives on tobacco cessation, PGx knowledge, and perceptions of using PGx to guide tobacco cessation. We facilitated participation through snowball sampling, collaborative co-recruitment efforts, and dissemination of surveys online and in-person. **Results:** We assessed the CSKT community's interest



in PGx implementation, potential concerns with PGx implementation research, and identified cultural considerations. Responses reflect a strong interest in using PGx to inform tobacco cessation. Participants also emphasized the significance of ceremonial tobacco as a pivotal part of AIAN culture. Potential barriers to implementation included a lack of knowledge of PGx amongst participants, concerns with returning results to participants in the community, and concerns with storing participant biospecimens. **Conclusion:** Our research will give CSKT Tribal Health providers a useful tool to tailor tobacco cessation in the CSKT community. Significant advances in utilizing genetic variation to guide tobacco cessation will expand the application of PGx; however, it is important to understand the unique considerations for the CSKT community. Our long-term goal is to expand access to PGx research for underserved and tribal populations.

FUNDING: Federal

POS2-63

DIFFERENCES BY EMOTION REGULATION IN THE ASSOCIATION BETWEEN DISCRIMINATION AND TOBACCO USE AMONG SEXUAL MINORITY YOUNG ADULTS

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Significance. Sexual minority young adults (SMYAs) display elevated use rates of a range of tobacco products (e.g., cigarettes, e-cigarettes, cigars) relative to heterosexual YAs. Although discrimination is associated with greater risk for tobacco use among SMYAs, little research has examined factors, such as emotion regulation strategies, that may amplify or mitigate these associations. **Methods.** We analyzed Fall 2020 survey data among SMYA women and men (ages 18-34) in 6 US metropolitan areas recruited via social media. Bivariate analyses examined associations of sociodemographics (age, race, ethnicity, education), discrimination, and emotion regulation strategies (cognitive reappraisal, expressive suppression) with tobacco use outcomes (past 30-day cigarette, e-cigarette, any tobacco [aggregated across cigarettes, e-cigarettes, cigars, hookah] use). Multivariable logistic regressions were built for each tobacco use outcome and included: 1) sociodemographic covariates; 2) discrimination and emotion regulation strategies; and 3) interactions between discrimination and emotion regulation strategies. **Results.** Among SMYA women (N=450; 69.6% bisexual, 18.2% lesbian, 12.2% another sexual identity; $M_{age}=24.11$; 31.1% racial or ethnic minority), 89.5% reported experiencing discrimination in their day-to-day life, and 40.0% reported any tobacco use (ranging from 4.4% for hookah to 30.4% for e-cigarettes). Discrimination was associated with greater odds of past 30-day cigarette use, but was associated with greater odds of past 30-day e-cigarette and any tobacco use for women with lower, but not higher, levels of cognitive reappraisal only. Expressive suppression was associated with higher odds of past 30-day e-cigarette use, but did not moderate associations between discrimination and any tobacco use outcome. Among men (N=254; 33.5% bisexual, 54.3% gay, 12.2% another sexual identity; $M_{age}=24.68$; 28.0% racial or ethnic minority), 83.9% reported experiencing discrimination, and 34.6% reported any tobacco use (ranging from 2.4% for hookah to 21.3% for e-cigarettes). Neither discrimination nor emotion regulation was significantly associated with tobacco use. **Conclusions.** In addition to larger-scale interventions to address social conditions that perpetuate discrimination toward SM individuals, tobacco cessation programs for SM women should incorporate emotion regulation skills development to help individuals cope with discrimination, which could reduce tobacco use.

FUNDING: Federal; State

POS2-64

IMPACT OF COVID-19 ON A SMOKING CESSATION INTERVENTION: A LOOK AT RECRUITMENT, RETENTION, AND NRT ADHERENCE

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Due to the COVID-19 pandemic, many ongoing clinical trials had to rapidly shift to using remote trials, including our smoking cessation trial with the criminal legal population. The purpose of this secondary analysis was to compare recruitment rate, study adherence, retention, and NRT adherence for participants who completed the study as planned (In Person), after implementation of a voucher system and additional check-in appointments to boost recruitment before COVID-19 (Incentivized), and after the pandemic began (Hybrid). The overall test of group differences in recruitment rate was significant ($\chi^2(2) = 12.07, p = .002$). The incentivized group (.41 participants/day) was recruited faster than the In-Person (.29 participants/day) and Hybrid (.28 participants/day) groups. After adding confounding variables that were significantly different between groups,

(employment, sex, Perceived Stress Scale score), the recruitment rate difference between the incentivized group and in-person group remained; however, the difference between the hybrid group and incentivized group was not significant. There were no significant differences for the remaining study outcomes between the methodology groups, suggesting that hybrid methods of research do not result in less visits attended, a higher likelihood of drop-out, or worse adherence to NRT. These results contribute to a better understanding of how remote research methods impact recruitment, retention, and other study outcomes although a fully randomized trial of remote versus traditional methods is needed to address time order effects that were present.

FUNDING: Federal

POS2-65

CONSUMER PERCEPTIONS OF HEALTH CLAIMS ON WATERPIPE TOBACCO PACKAGING

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Many young adults erroneously believe waterpipe tobacco (WT) smoking is less harmful than cigarette smoking, and these misperceptions are positively associated with use. Yet, little research has examined how marketing contributes to these beliefs. We conducted a content analysis of packaging and digital marketing to identify FDA-prohibited modified risk tobacco product (MRTP) claims and other claims that could lead to lower risk perceptions. We included 181 packages, 23 websites, and 640 social media posts from manufacturers; 25 websites and 810 social media posts from retailers who sell WT for onsite use. We identified 109 FDA-prohibited claims, all from manufacturers, including substance-free; light, mild, and low descriptors; and reduced-substance exposures. We identified 562 claims that may be misleading, including premium, quality, fresh, and pharmaceutical-grade/FDA-approved descriptors. We tested 16 claims in an on-line experiment with 1,507 young adults aged 18-29 who had used waterpipe within the past year or were susceptible to use. Participants were shown six fictitious packages with or without a prohibited claim (random assignment) and ten digital marketing images with or without a prohibited claim (random assignment). Participants who saw packages with "0% tar" claims were significantly more likely to report the product is less harmful than other WT products ($M=2.88, SE=0.05$), compared to those who did not see the claim ($M=2.73, SE=0.05$). Participants who saw packages with "no chemicals" claims were significantly more likely to report willingness to try the product ($M=1.90, SE=0.06$) and indicated the product is more appealing ($M=1.91, SE=0.05$), compared to those who did not see the claim ($M=1.63, SE=0.05; M=1.70, SE=0.05$ respectively). Participants exposed to marketing with "lower nicotine tobacco" claims were significantly more likely to report the advertisement made them think smoking hookah is safe ($M=1.99, SE=0.05$), compared to those who did not see the claim ($M=1.69, SE=0.05$). Similar results were found for: "FDA-approved ingredients" (claim $M=2.10, SE=0.05$; no claim $M=1.64, SE=0.05$), "cools and purifies" (claim $M=1.90, SE=0.05$; no claim $M=1.72, SE=0.05$), and "unlike cigarettes" (claim $M=2.15, SE=0.05$; no claim $M=1.88, SE=0.05$). This study identified claims that may contribute to reduced harm perceptions and should be considered by the FDA as unauthorized MRTP claims.

FUNDING: Federal

POS2-66

DISPOSAL PRACTICES OF CIGARETTES AND ENDS AMONG ADULTS, FINDINGS FROM WAVE 6 (2021) OF THE PATH STUDY

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Significance Tobacco product waste is environmentally hazardous but preventable. Therefore, it is important to understand tobacco disposal behaviors among those using tobacco products. **Objectives** To explore self-reported disposal practices of cigarette butts and electronic nicotine delivery systems (ENDS) components among adults (aged 18 and older). **Methods** We used nationally representative cross-sectional data from



Wave 6 (2021; n=29,516) of the Population Assessment of Tobacco and Health (PATH) Study among adults who used cigarettes (manufactured and/or roll your own) and/or ENDS every day, some days, or in the past 30 days. **Results** In 2021, 89.7% (95% CI: 88.7, 90.6) of adults who smoked manufactured cigarettes usually disposed of cigarette butts in landfills (ashtray, trash etc.). Most adults who usually disposed of butts in landfills smoked daily (73.1%; 95% CI: 71.3, 74.9) and smoked an average of 14.6 cigarettes per day. Among those who used ENDS, most adults usually disposed of the components in landfills (disposable devices: 83.1%; 95% CI: 80.5, 85.4; empty pods and cartridges: 85.4%; 95% CI: 82.4, 87.9; coils and atomizers: 71.2%; 95% CI: 68.1, 74.1; batteries: 48.5%; 95% CI: 45.2, 51.9; e-liquid containers: 70.9%; 95% CI: 67.1, 74.5; and leftover or unused e-liquid: 50.5%; 95% CI: 45.8, 55.2). Recycling as a usual practice was limited for people who used ENDS, for disposable devices and empty pods and cartridges: 5-6%; coils and atomizers: 11.7% (95% CI: 9.4, 14.5); batteries: 23.7% (95% CI: 20.9, 26.8); and e-liquid containers: 18.0% (95% CI: 15.1, 21.3). **Conclusions** These findings demonstrate the large scope of tobacco product waste in the United States and may inform efforts to address tobacco product waste management, such as environmental impact assessments and consumer education about proper disposal of tobacco products.

FUNDING: Federal

POS2-67

RESPONSES TO REAL-WORLD AND HYPOTHETICAL E-CIGARETTE FLAVOR BANS AMONG US ADULTS WHO USE FLAVORED E-CIGARETTES.

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Significance: Flavors play an important role in the use of tobacco products. Flavor restrictions on e-cigarettes could reduce or exacerbate health risks depending on how vapers respond to these restrictions. This study aims to assess responses to real-world and hypothetical flavor bans among adults who use flavored e-cigarettes. **Methods:** An online national survey of adults ages 18-41 who use flavored e-cigarettes was conducted in 2021 (n=1,928), oversampling states affected by e-cigarette flavor bans. Participants affected by bans were asked about their responses to real-world changes in the availability of flavored e-cigarettes. Participants unaffected by bans were asked to predict their responses under a hypothetical federal e-cigarette flavor ban. Four types of responses were considered: 1) Switch to smoking cigarettes or other combustible tobacco (e.g., cigars, hookah, pipe tobacco, bidis); 2) Switch to using smokeless tobacco (e.g., chewing tobacco, snus, snuff, dip, dissolvables) or heated tobacco (e.g., IQOS, Eclipse); 3) Switch to tobacco-flavored e-cigarettes or Continue vaping flavored e-cigarettes by getting them from a different source; and 4) Quit all vaping and tobacco use. Responses among people who vape exclusively and those who dual-use cigarettes and e-cigarettes were analyzed separately. **Results:** Among adults who use flavored e-cigarettes, the most common response to real-world flavor bans was to continue vaping (~80%). Among those who exclusively vaped, 23.3% switched to combustible tobacco. Quitting all forms of tobacco was the least common response (8.0% of those who exclusively vape vs. 6.5% who dual use). Under a hypothetical federal ban, more than half of respondents would continue vaping. Among those who exclusively vape, 28.6% would use combustible tobacco in response to a hypothetical flavor ban, and 50.0% of dual users would continue combustible tobacco use. Quitting all tobacco products was endorsed by 29.7% and 18.2% of those who exclusively vape vs those who dual use. **Conclusion:** Adults who vape flavored e-cigarettes have mixed responses to e-cigarette flavor bans. Among adults using flavored e-cigarettes, the most common response to both real-world and hypothetical e-cigarette flavor bans was to continue vaping. The second most common response was to switch (exclusive users) to or to continue (dual users) using combustible tobacco.

FUNDING: Federal; Nonprofit grant funding entity

POS2-68

NICOTINE DELIVERY AND SUBJECTIVE EFFECTS OF AN ORAL NICOTINE POUCH IN PEOPLE WHO USE SMOKELESS TOBACCO

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Significance: Orally administered nicotine pouches (ONPs) do not contain tobacco leaf and have been marketed in the US since 2016. There are few non-industry sponsored data regarding ONP effects. This study examines, in people who use smokeless tobacco (SLT), the nicotine delivery and subjective effects of three ONP doses. **Methods:** Eleven

white men who use SLT [mean age=32.5 (SD=9.4) years] attended four sessions that varied by condition: an ONP ("ON!" brand; 2, 4, or 8 mg) or participants' own brand (OB) SLT. Participants used the product for two 30-minute periods (separated by one hour) per session. Blood was sampled for later measurement of plasma nicotine concentration and subjective effects were assessed. **Results:** Plasma nicotine (N=11) increased with ONP dose, with a significant interaction of condition by time ($p<.05$), and significant increases in plasma nicotine across all conditions following product use. Following two 30-minute use periods, the 2 mg ONP delivered 4.02 ng/ml (SD=1.47), the 4 mg ONP delivered 9.93 ng/ml (SD=4.76), the 8 mg ONP delivered 14.86 ng/ml (SD=5.16), and OB SLT delivered 12.83 ng/ml (SD=7.47). Nicotine delivery from the 4 mg and 8 mg ONP did not differ from OB ($p<.05$). Scores on the item "Craving a dip/nicotine" were significantly reduced in all conditions following product use, with the greatest reduction in the OB condition when compared to all others ($ps<.05$). Following product use, mean craving ratings (scores range from 0-100) were significantly lower in the OB condition (M=10.2, SD=10.0) when compared to the 2 mg condition (M=40.91, SD=33.25), the 4 mg condition (M=30.64, SD=27.54), and the 8 mg condition (M=26.36, SD=23.51). Ratings of product strength differed by condition, with OB rated significantly stronger (M=62.55, SD=18.39) when compared to the 2 mg (M=27.00, SD=23.26) and 4 mg (M=32.80, SD=18.12) ONP; ratings of product strength for the 8 mg ONP (M=46.09, SD=29.56) did not differ from OB. **Conclusions:** Following ONP use, plasma nicotine concentration increased in a dose-dependent manner, and ratings of "craving" were reduced in all conditions. Following product use, plasma nicotine concentration and ratings of product strength for the 8 mg ONP condition did not differ significantly from OB. These results suggest some ONPs may be capable of delivering at least as much nicotine as OB SLT.

FUNDING: Federal

POS2-69

DIGITALISING A SPECIALIST TREATMENT PROGRAMME FOR SMOKING CESSATION IN PREGNANCY

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Significance: Stopping smoking in pregnancy reduces the risk of many pregnancy complications and infant mortality and morbidity. Interpersonal counselling increases quitting in pregnancy, especially when offered with pharmacotherapy, but uptake is typically low. A comprehensive digital support package, including pharmacotherapy, could be offered as an alternative to improve access, particularly for minority and disadvantaged people. Currently the evidence base for pregnancy-specific digital cessation interventions is limited. The aim was to investigate experts' and pregnant smokers' views on the feasibility of translating the UK standard treatment programme for smoking cessation in pregnancy into a digital intervention. Standard treatment consists of structured counselling, regular Carbon Monoxide (CO) monitoring, and provision of nicotine substitution products. **Methods:** Virtual group and individual interviews with 38 experts (11 focus groups, 3 interviews) and a diverse group of 25 pregnant smokers (all interviews). Thematic and Framework analysis were used to examine trends and patterns in the data. **Results:** Experts and pregnant people were supportive of a pregnancy-specific digital intervention. Most counselling content from the standard treatment programme was thought to be transferable to a digital intervention. However, being accountable to a human advisor, along with empathy and the ability to go 'off-script', were considered more difficult to replicate digitally. Suggestions for achieving this included personalisation, use of artificial intelligence tools, and the option to escalate support to a human advisor. While experts had mixed views on integrating remote CO monitoring into a digital intervention, pregnant people were enthusiastic about this. Remote provision of free nicotine replacement therapy (NRT), and potentially vapes if part of routine care, without interpersonal support was generally well received. However, experts had concerns about this exacerbating low NRT adherence and governance issues. Whereas pregnant people were receptive to it if the intervention felt trustworthy and provided tailored advice. Both participant groups expressed concerns about manipulation of the system. **Conclusions:** The UK standard treatment programme was considered largely transferable to a digital intervention and would potentially be helpful to pregnant smokers and increase reach, so merits development and evaluation.

FUNDING: Federal



POS2-71

TOBACCO VENDORS' PERCEPTIONS AND COMPLIANCE WITH TOBACCO CONTROL LAWS IN NIGERIA

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Significance: Tobacco vendors are critical stakeholders in the tobacco supply chain, and their activities are important areas targeted by tobacco legislation/laws and the tobacco industry. Hence, it is important to understand vendors' perceptions and compliance with these laws. Policymakers and stakeholders in Nigeria can leverage these findings to design evidence-based interventions and strengthen law enforcement measures, ensuring a comprehensive approach to tobacco control in the retail setting. **Aim:** To understand tobacco vendors' perception, compliance, and potential economic impact of the tobacco control laws related to the retail setting in Ibadan, Nigeria. **Methods:** This was a qualitative study involving in-depth interviews of 24 purposively-selected tobacco vendors in Ibadan, Nigeria. A semi-structured interview guide aided the audio-recorded face-to-face interviews, which were transcribed verbatim, and analyzed. Thematic analysis, aided by Nvivo version 12, was carried out by identifying codes and generating themes that answered the research questions. **Results:** The participants' mean($\pm$ SD) age was 47.6($\pm$ 11.8) years. Most participants were female (n=20) and never-tobacco users (n=21). Five themes emerged, including reasons for selling tobacco, awareness, perception, compliance with tobacco sales laws, the potential economic impact of the laws, and activities of the law enforcement agents. The vendors commenced tobacco sales due to clients' demand, to make profits and advice from significant others. The vendors were unaware and non-compliant with most of the laws that are related to the retail settings. Most participants had positive perceptions about the ban on sales to and by minors, indifferent about the ban on TAPS and product display, and negative perceptions about the ban on sales of single sticks. Most stated there would be no serious economic impact on their business if they stopped selling tobacco altogether. **Conclusion:** The vendors demonstrated limited awareness and non-compliance with various tobacco control laws relating to the retail setting in Nigeria. These findings underscore the need for targeted educational campaigns and law enforcement interventions to enhance vendors' compliance and strengthen tobacco control measures in the retail setting.

FUNDING: Nonprofit grant funding entity

POS2-72

COMPLIANCE OF TOBACCO COMPANIES IN NIGERIA WITH HEALTH WARNING LABEL REGULATIONS ON CIGARETTES AND OTHER TOBACCO PRODUCTS

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Significance: Nigeria has approved 50% coverage of text and images of pictorial health warning labels (PHWLs) on packages of cigarettes and other tobacco products such as cigars, smokeless tobacco, and loose tobacco. While there is knowledge on the extent to which LMICs like Nigeria adopt the WHO Framework Convention of Tobacco Control (FCTC), there is need to examine the compliance with adopted packaging and labeling policies to generate knowledge for strengthening existing policies and efforts at enforcement. We assessed compliance FCTC regulations as well as Nigerian requirements which are not adequate and do not effectively capture all FCTC requirements to identify the gaps being explored by these companies in an environment of poor regulation in Lagos, Nigeria. **Methods:** This descriptive study was conducted in Lagos State, Nigeria, from October 2022 to January 2023. A multistage random sampling method was utilized. Four local government areas (LGAs) with a combined population of 16 million, accounting for 70% of the population in Lagos, Nigeria were selected while three points of sale were randomly picked from two selected wards in each LGA. Empty discarded packs of cigarette and other tobacco products were collected from these outlets. The pack dimensions were measured and assessed for PHWLs, health warning manipulations and cessation assistance. Findings were assessed for compliance with the FCTC and national legislation. For each compliance feature, we calculated the frequencies and percentages of the packs that were compliant. **Results:** 704 packs: 434 packs of 22 cigarette brands and 270 packs of 17 different tobacco products including cigars, snuff and loose tobacco were included in the study. Of 434 cigarette packs assessed, 50.3% were compliant with 9 indicators measured. These ranged from 48.8% to 55.5% for individual brands. For cessation assistance, image variability and image manipulation, compliance was 0% across all cigarette packs. Out of 270 tobacco product packs assessed, 10.6% were compliant with the 9 indicators assessed. Of the 12 multinational parent companies and product distributors assessed, the overall level

of compliance among them was 24.9%. Level of compliance was noted to very low for companies involved in marketing other tobacco products, ranging from 0% to 20% but moderate for those marketing cigarettes, ranging from 37% to 55.5%. Companies that had no presence or subsidiaries in Nigeria but only export their products were highly non-compliant. **Conclusions:** Tobacco companies had low compliance with HWL on cigarettes and negligible compliance on other tobacco products like cigars, loose and smokeless tobacco. The government should expand and strictly enforce all regulations applying to health warnings, especially on non-cigarette tobacco products and closely monitor companies that merely export their products to the country.

FUNDING: No external funding reported

POS2-73

CORRELATION ASSESSMENT BETWEEN HEAVINESS OF SMOKING INDEX AND ANXIODEPRESSIVE SYMPTOMS AMONG SMOKERS, A HOSPITAL-BASED SURVEY, ARIANA, TUNISIA, 2022-2023

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Introduction: The connection between the extent of smoking and the presence of Anxiety-depressive symptoms (ADS) among smokers is an area of research that is continuously developing. It's crucial to examine these two elements simultaneously to gain a deeper comprehension of a patient's state and enhance the care provided during their efforts to stop smoking. By unraveling the relationship between the degree of smoking intensity and ADS, tobacco specialists can enhance their medical strategies to better assist their patients. **Significance:** To investigate the association between smoking intensity and ADS in smokers who are motivated to quit. **Methods:** It was a study carried out retrospectively from medical records which took place in the epidemiology and statistics department at the Abderrahmane Mami hospital in Ariana. It took place over 2 years, from September 2022 until May 2023. It focused on patients in the smoking cessation consultation in their first consultation. The degree of smoking intensity was evaluated using the Heaviness of Smoking Index (HSI) which was derived from the Fagerström Test for Nicotine Dependence. Data collection was done from patient records. Data analysis was performed using SPSS 2.0 software. The significance threshold was set at 0.05 for all analyses. **Results:** We collected 127 patients from September 2022 until May 2023 of smoking cessation consultation. The sex ratio M/F=2.97 and the median age was 44.5 years (Inter Quartile Range IQR 25-75 = [37-56]). The median age of smoking initiation was 17 years (Inter Quartile Range IQR 25-75 = [15-20]). 55.9% of consultants have tried quitting smoking for at least once in their lives. The median HSI score was 3 (IQR 25-75=[2-4]). 20.16% of smokers had a high tobacco addiction tobacco. Fifty-four percent of smokers consulting have had at least one of the two ADSs: 39.7% had anxiety symptoms and 29.6% had depression symptoms. The correlation coefficient (r) indicated a weak correlation between anxiety symptoms and HSI score: $r=0.27$ ($p>0.05$). Similarly, there was a weak correlation between depression symptoms and HSI score: $r=0.46$ ($p>0.05$). **Conclusions:** Our analysis revealed a weak correlation between anxiety/depressive symptoms and nicotine addiction. This finding indicates that other factors beyond the scope of this study may contribute more significantly to the variation observed in nicotine addiction among individuals with ADS.

FUNDING: Unfunded; Academic Institution

POS2-74

E-CIGARETTE ACCESS AND AGE VERIFICATION AMONG ADOLESCENTS, YOUNG ADULTS, AND ADULTS

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Background: Despite federal law prohibiting tobacco sales to individuals under 21 years and other regulatory efforts to prevent underage e-cigarette use, underage access to e-cigarettes continues. This study aims to determine where and how adolescents, young adults, and adults access e-cigarettes. **Methods:** We conducted a cross-sectional, online survey among U.S. participants (n=6,131; ages 13-40 years) in November-December 2021. Study outcomes included from where and how people who used nicotine e-cigarettes in the past 30 days got and/or bought e-cigarettes (i.e., specific types of retail stores, online including websites, social media, home delivery applications, and people they know), and whether and how age was verified. We conducted descriptive statistical analyses. **Results:** In our sample of 2,256 past 30-day e-cigarette users (36.8% of total sample), 55.0% reported obtaining e-cigarettes from retail stores, 44.9% from



online sources, and 24.0% from someone they know. Among 13-17 year-olds who used e-cigarettes in the past 30-days, 13.4% got their e-cigarettes through social media, which was nearly double the proportion of 21-40-year-olds (7.0%) and greater than the 18-20-year-olds (9.8%). Specifically, past 30-day users under 21 years obtained their e-cigarettes on Snapchat (13-17-year-olds: 40.0%; 18-20-year-olds: 35.1%), Instagram (13-17-year-olds: 33.3%; 18-20-year-olds: 25.7%), and TikTok (13-17-year-olds: 22.2%; 18-20-year-olds: 29.7%), while Instagram and Facebook were the most used sources among 21-40-year-olds (79.3% and 76.8%, respectively). Past 30-day e-cigarette users under 21 years who obtained their e-cigarettes from someone they knew reported getting them from friends and family who were their age (13-17-year-olds: 50.7%; 18-20-year-olds: 40.3%) or older, and those persons mostly got their e-cigarettes from retail stores (13-17-year-olds: 44.7%; 18-20-year-olds: 45.2%). Fewer 13-17-year-old past 30-day e-cigarette users reported that their age was verified all the time (15.8%) compared to 18-20-year-olds (24.6%) or 21-40-year-olds (40.2%). **Discussion:** A sizeable proportion of adolescents and young adults under 21 years report acquiring e-cigarettes in retail stores and online (especially on social media and home delivery applications) or from friends and family who were their age or older. Findings highlight the need to enforce existing age verification regulations and develop effective strategies to prevent underage access.

FUNDING: Federal; Academic Institution; Nonprofit grant funding entity

POS2-75

IS SMOKING PROTECTIVE AGAINST COVID-19?

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Significance: The purpose of the present study was to assess whether symptoms reported in patients who developed COVID-19 differ between those who smoke cigarettes at the time of diagnosis and those who do not smoke. **Methods:** All study patients are from a well-characterized patient cohort collected at Mayo Clinic between March 1, 2020 and February 28, 2021; with confirmed COVID-19 defined as a positive result on reverse-transcriptase-polymerase-chain-reaction (RT-PCR) assays from nasopharyngeal swab specimens. Of the 13,059 eligible patients, 763 (5.8%) patients reported currently smoking. The cohort of smokers (N = 763) was age and gender matched on a 4:1 basis to 3,052 COVID-19 positive patients who did not smoke. A logistic regression analysis was performed separately for each symptom using generalized estimating equations (GEE) with robust variance estimates in order to account for the 1:4 matched set study design. The data analyzed included: age, gender, race/ethnicity, smoking status, co-morbid conditions, reported COVID-19 symptoms, Emergency Department (ED) visits and Hospital admissions. **Results:** Compared to non-smokers, smokers with COVID-19 had similar rates of obesity, diabetes, and immunocompromising conditions, but were more likely to have co-morbid asthma (18.3% vs 13.1%; $p < 0.001$) and more likely to have at least one other comorbidity including COPD/emphysema, chronic lung disease, congestive heart failure, coronary artery disease, renal disease, or liver disease (18.6% vs 9.8%; $p < 0.001$). With respect to COVID-19 symptoms, compared to non-smokers, smokers were significantly more likely to report congestion (OR=1.19, $p=0.022$), anosmia/dysgeusia (OR=1.47, $p < 0.001$) and less likely to report sore throat (OR=0.73, $p=0.003$) and fatigue (OR=0.67, $p=0.012$). No significant difference was found between smokers and non-smokers for ED visits or hospitalization. **Conclusion:** Symptoms seen in smokers are more prevalent in the respiratory epithelium (congestion, anosmia) with less systemic symptoms (fatigue) suggesting a correlation with local inflammation. The unexpected lower incidence of smoking in patients testing positive for COVID may represent differences in health seeking behaviors or a protective effect of smoking. Potential protective mechanisms include enhanced inactivation of SARS-CoV-2 by metalloproteases secondary to the pre-existing local inflammation or by proteases induced by nicotinic receptor activation. Further study is warranted.

FUNDING: Academic Institution

POS2-76

REDUCING ADOLESCENTS' SUSCEPTIBILITY TO TOBACCO USE WITH A GAME-BASED SOCIAL PROGRAM: A PILOT PRE-POST TEST

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Introduction: While the risks associated with adolescent tobacco use are well-documented, nicotine vaping and conventional tobacco use among adolescents remain a concern. We developed Storm-Heroes, a game-based social intervention for adolescent tobacco prevention. Storm-Heroes tackles a comprehensive list of tobacco products through the transtheoretical model of behavior change. The goal of this study was to test the impact of the program on susceptibility to tobacco use. **Approach:** We

implemented Storm-Heroes, targeting 94 students aged 12-14 years over the course of one semester. Storm-Heroes included a social intervention merged with a series of entertainment-education videos. For this sample, among other measures, we assessed students' susceptibility to tobacco use at baseline, post-test, and 1.5-month follow-up. We conducted two separate mixed effects logistic models with time predicting susceptibility to vaping susceptibility to using conventional tobacco products (i.e., cigarettes, cigars, little cigars, hookah, and smokeless tobacco). **Findings:** The results indicated a significant reduction in susceptibility to vaping by post-test ($p=0.011$) and 1.5-month follow-up ($p=0.001$). There was also a significant reduction in susceptibility to conventional tobacco by post-test ($p=0.001$) and 1.5-month follow-up ($p=0.001$). In the two models, tobacco use in the family was related to susceptibility to vaping ($p=0.020$) and conventional tobacco use ($p=0.020$). **Discussion:** This study offers initial testing of the social program Storm-Heroes, highlighting the short-term success of the program in reducing susceptibility to tobacco use. While the results indicate short-term success, our next plan is to conduct a long-term evaluation of the program through a cluster-randomized trial to assess tobacco use among teens at a one-year follow-up. In addition, an understanding of the mechanisms behind the success of the program is warranted.

FUNDING: Federal

POS2-77

HOW POLICY FRAMING OF THE JUUL MDO DISSEMINATED ON TWITTER

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Background: On June 23, 2022, the U.S. Food and Drug Administration (FDA) issued a marketing denial order (MDO) prohibiting JUUL from selling its products in the U.S. Pro-tobacco interest groups dominate tobacco discussions on Twitter and likely played an outsized role in framing the trending discussion among the small percentage of active Twitter users. However, most Twitter users are passive, leveraging the platform for updates from followed accounts rather than engaging with content, suggesting users with an active interest in tobacco policy may be exposed to very different message frames than the general Twitter user base. Understanding these differences can help inform best practices for health communication on and off social media. **Methods:** Keywords were used to scrape Twitter content related to the JUUL MDO announcement (Jun-Jul 2022) and filtered using an SVM classifier ($F1=0.91$) to identify N=62240 relevant tweets. User-level data was then machine-classified based on text from usernames and bios identifying vape advocates (N=188), politicians (N=90), experts (health professionals and academics) (N=242), established news brands (ENBs; journalists, and news organizations) (N=1253) and organic users (N=39964). The SPACY library for Python was used to construct a convolutional neural network from hand-coded training data to identify frames used to discuss the MDO including government overreach (N=4040), misplaced policy priorities (N=3754), JUUL as a tool for harm reduction (N=3578), and JUUL's youth targeting (N=1671). Mann-Whitney U tests were used to compare right-skewed follower counts. **Results:** ENBs Mdn[IQR]=5884[382,99361] had significantly more followers than both vape advocates Mdn[IQR]=3492[680,6924], ($p < .001$) and experts 1412[413,3787], ($p < .001$). ENBs framed the MDO in terms of JUUL's youth targeting six times more frequently than other account types. Although youth targeting was the most frequently used frame by the most followed account type, tweets by experts and ENBs received 2.3 and 8.5 times as many retweets on tweets about harm reduction compared to tweets about youth targeting. **Discussion:** Active Twitter use is more likely to disseminate harm reduction framing, as harm reduction tweets by ENBs and experts receive more retweets. However, those who use Twitter the way most people do—as lurkers rather than active participants, are primarily exposed to ENBs, which tended to frame the MDO in terms of JUUL's youth targeting. These data suggest that news media offer the most successful dissemination of policy frames. Health communication efforts can prime established media brands with accurate frames rather than engaging with Twitter's small, largely industry influenced, active audience.

FUNDING: Unfunded

POS2-78

EFFECTS OF VOLATILE ORGANIC CONSTITUENTS FOUND IN CIGARETTE SMOKE ON INTRACRANIAL SELF-STIMULATION IN RATS

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Significance. Understanding the role of non-nicotine constituents in tobacco use disorder (TUD) is essential for developing more effective TUD treatments and for informing FDA tobacco regulation. Cigarette smoke contains a number of volatile organic compounds (VOCs) including acetaldehyde, toluene, and benzene. Acetaldehyde and toluene have exhibited abuse liability themselves or potentiated the abuse liability of nicotine in some preclinical models (e.g., intravenous self-administration), suggesting they might contribute to TUD. However, the addiction-related effects of acetaldehyde and toluene have not been well established in an intracranial self-stimulation (ICSS) model, and effects of benzene have not been evaluated in any preclinical addiction model. The present study evaluated the abuse potential of acute injections of acetaldehyde, benzene, and toluene in an ICSS model in rats. **Methods.** VOCs were administered every 3-4 days using a within-subjects design (N = 16). Effects of nicotine and methamphetamine on ICSS were also evaluated as positive controls. The ability of acetaldehyde and benzene to influence nicotine's acute effects on ICSS was also examined (N = 8). **Results.** Acetaldehyde did not lower ICSS thresholds at any dose when administered alone, suggesting a lack of abuse liability. Rather, a high dose of acetaldehyde (100 mg/kg) elevated ICSS thresholds by $\approx 15\%$, indicating aversive/anhedonic effects. High doses of benzene (600 - 1500 mg/kg) produced a small ($\approx 5-10\%$) but significant reduction in ICSS thresholds when administered alone, while toluene had no effect at any dose. In contrast to the modest effects of these VOCs on ICSS, nicotine (1.0 mg/kg) produced robust ($> 30\%$) increases in ICSS thresholds, while methamphetamine (0.3 or 0.56 mg/kg) produced robust decreases in ICSS thresholds. Finally, neither acetaldehyde (60 mg/kg) or benzene (600 mg/kg) influenced nicotine's effects on ICSS. **Conclusions.** Our findings indicate that benzene had modest abuse liability in an ICSS model, suggesting it may play a limited role in TUD. However, evaluating effects of these VOCs on ICSS using other approaches (e.g., inhalation exposure, chronic dosing, use of VOC cocktails) and in other TUD models (e.g., self-administration) is needed to better understand their potential contribution to TUD and need for FDA regulation.

FUNDING: Federal

POS2-79

STANDARDIZING THE SHAPE OF SMOKELESS TOBACCO PACKS IN INDIA TO ENHANCE HWL VISIBILITY AND INCREASE PRODUCT HARM PERCEPTIONS

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Significance In India, 21% of adults use smokeless tobacco (SLT). Khaini, a tobacco-lime SLT mixture, is the most popular form of SLT and used by 12% of adults. SLT products are available in a wide variety of pack materials, shapes, and sizes. The lack of a standard SLT size and shape limits compliance with the required placement of health warning labels (HWLs) on 85% of front and back of the pack and leaves room for attractive branding, which can lower harm perceptions. This study aimed to explore how people who use SLT and never users described HWL noticeability and harm perceptions of two different standard pack options for khaini, comparing them to existing khaini products available on the market and to each other. **Methods** In March 2023, we conducted 24 focus groups (FGs) in three Indian states: Jharkhand, Maharashtra, and Uttar Pradesh. The groups were equally stratified by urban/rural residence, gender, and SLT use. Each participant was given six existing khaini packs and the two standard khaini packs: one paper sachet, one tin cylinder. Trained facilitators led FG discussions on HWL noticeability and harm perceptions of the packs. Data were collected in local languages, translated into English, and thematically analyzed. **Results** All FGs discussed the limited visibility of HWLs on existing khaini packs, noting that HWL images were often too small, blurry, faint, or dull to notice. In contrast, most FGs noted how the HWL image and text on both standard packs were more noticeable and legible than the HWLs on the existing packs due to their larger size relative to product branding. All FGs discussed how the two standard packs were perceived to be more harmful than existing packs due to the size and clarity of their HWLs. Between standard packs, most FGs found the standard tin cylinder more attractive due to its durable material and smaller HWL. FGs also discussed that the larger, more noticeable HWL on the standard paper sachet made it appear more harmful than the standard tin cylinder. **Discussion** Both standard khaini packs increased HWL noticeability and perceived harms compared to existing packs on the market, and the standard paper sachet was seen as less appealing and more harmful compared to the standard tin cylinder. Implementing a standard paper sachet khaini pack has the potential to improve HWL compliance and contribute to India's efforts to reduce tobacco use.

FUNDING: Nonprofit grant funding entity

POS2-80

ASSOCIATION BETWEEN TOBACCO RETAILER DENSITY AND HEATED TOBACCO PRODUCT USE AMONG KOREAN ADULTS

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Significance: Lower retail availability of tobacco is associated with reduced tobacco use. Previous studies have examined the association between tobacco retailer density with cigarette smoking and e-cigarette use. However, evidence has been limited regarding the association between tobacco retailer density and heated tobacco product (HTP) use. We aimed to identify the association between tobacco retailer density and HTP use and examine potential spatial heterogeneity in this association. **Methods:** Data from the 2022 Korea Community Health Survey of 231,785 adults aged 19 years or older were used to identify HTP use prevalence in each second-level administrative district (sigungu) in the Republic of Korea. The prevalence of HTP use was defined as the proportion of participants who had used HTPs in their lifetime and who currently use HTPs daily or occasionally. The prevalence of HTP use across 250 districts was then combined with the corresponding tobacco retailer density (number of tobacco retailers per 10,000 square meters of land area). The association between tobacco retailer density and HTP prevalence was examined using linear regression and geographically weighted regression (GWR) models. Age, sex, household income, daytime population, and regional GDP were adjusted. **Results:** As of July 2022, a total of 146,687 tobacco retailers were identified in the Republic of Korea. The number of retailers in each district ranged from 85 to 2002. The overall prevalence of current HTP use was 3.7%, ranging from 0.1% to 6.3% among regions. Tobacco retailer density was positively associated with HTP use prevalence (beta = 0.99, p-value = 0.0266). Lower age (beta = -0.17, p-value < 0.0001) and higher household income (beta = 0.03, p-value = 0.0018) were associated with increased HTP use prevalence. The GWR model suggested no evidence of spatial heterogeneity for the association between tobacco retailer density and HTP use (range = 0.95 to 1.03, p-value = 0.9736). **Conclusion:** Our analyses suggest that higher tobacco retailer density is associated with increased HTP use. Reducing the retail availability of tobacco may be an effective strategy not only for curbing cigarette smoking but also for reducing HTP use. Further evidence is required within different country contexts and population groups.

FUNDING: Nonprofit grant funding entity

POS2-81

BLACK AND LATINO COMMUNITY HEALTH WORKERS SOCIAL NETWORKS AND THEIR INFLUENCE ON PEOPLE WHO SMOKE

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Significance: Community Health Workers (CHWs) are a promising resource for reducing the high prevalence of tobacco-related disparities among Black and Latino communities by disseminating cessation programs. However, literature is limited about their social network and influence on people who smoke. Our primary aim is to describe Black and Latino CHWs social networks (SN) and their perceived influence on people who smoke. **Methods:** The present analysis includes quantitative data from an exploratory study evaluating Black and Latino CHWs SN and influence on people who smoke. Participants completed an interview in their language of preference (English or Spanish). Questions included 1) sociodemographic characteristics (e.g., race, ethnicity, age, gender and preferred language) of CHW; 2) number of people who smoke within their SN and characteristics (e.g., type of relation); 3) perceived influence on people who smoke (i.e., How much influence do you think you have on the thinking and behavior of this person? 1-very little influence to 5-very much influence), and 4) how frequently they communicate with the identified people who smoke (1-never/rarely to 4-always). Data analysis included descriptive statistics on frequency, median (Mdn) and interquartile range (IQR). **Results:** A total of 20 CHWs were included, 75.0% identified as Hispanic/Latino, and 25.0% as Black/African American. The median age was 50.5 (IQR=33.0-59.3) years, 95.0% women, and 55.0% preferred Spanish as the main language. The number of people who smoke within the CHWs SN varied between 3 to 23 (Mdn=8.0, IQR=5.0-10.0). Most people who smoke identified within CHWs SN were family members who did not live at home (Mdn=2.0, IQR=1.0-6.8) and friends (Mdn=2.0, IQR=1.0-3.8) compared to family inside the home (Mdn=0.0, IQR=0.0-1.0), coworkers (Mdn=0.0, IQR=0.0-1.0), neighbors (Mdn=0.0, IQR=0.0-0.8), and clients (Mdn=0.0, IQR=0.0-0.0). CHWs reported having much and very much influence in the thinking and behavior of 2.5 people who smoke (IQR=1.0-5.5) and communicated always and often with 4.5 (IQR=3.0-7.0) people



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who smoke in their SN. Conclusions: The description of Black and Latino CHWs SN show the potential role of CHWs in disseminating smoking cessation programs within their communities. Culturally relevant training programs to increase the influence of Black and Latino CHWs are needed.

FUNDING: No external funding reported

POS2-82

LINKS BETWEEN NICOTINE DEPENDENCE AND MAJOR DEPRESSION AMONG SMOKERS ACROSS THE LIFESPAN: NOTABLE DIFFERENCES BY SEX, RACE, AND POVERTY STATUS

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Significance. Smoking combustible cigarettes is linked to a multitude of negative health outcomes such as heart disease, stroke, and lung cancer. There is also a well-established relationship between heavy smoking and mental health problems, including depression. Less is known about how the magnitude of this association varies by age and whether demographic factors such as sex, race/ethnicity, and poverty status moderate this relationship across the lifespan. **Methods.** Participants ($N=1,099$) were current smokers aged 18 to 80 (54% male; 67% non-Hispanic white) who participated in the 2017-March 2020 National Health and Nutrition Examination Survey (NHANES). Weighted time-varying effect modeling (TVEM) was used to model age trends in the association between nicotine dependence (first cigarette smoked within 30 minutes of waking) and major depression [10 or higher on the Patient Health Questionnaire (PHQ-9)] across the lifespan. Separate TVEM models were run by sex, race/ethnicity, and poverty status to test for moderating effects. **Results.** Over half of the sample (61%) met criteria for nicotine dependence and 17% were classified as having major depression. Nicotine dependence was associated with increased odds of major depression, but this association was only statistically significant from ages 35 to 52. This association was strongest at age 43 (AOR=3.9). The association between nicotine dependence and major depression was not significant at any age among females, non-white individuals, and individuals whose monthly income was greater than 185% of the poverty line. Nicotine dependence was significantly associated with increased odds of major depression from ages 33 to 48 and 53 to 58 among males, ages 35 to 53 among white individuals, and among ages 41 to 59 among individuals whose monthly income was less than or equal to 185% of the poverty line. **Conclusion.** Findings highlight middle adulthood as a period where smokers may be more susceptible to depression associated with their heavy smoking behavior. There have been recent calls for increased research on tobacco use and related health outcomes that use a health equity lens, and this study identified demographic groups that may be at increased risk for smoking-related mental health problems including male, white, and low-income individuals. Targeted prevention and intervention efforts are needed that consider the unique needs of middle-aged smokers in these demographic groups.

FUNDING: No external funding reported

POS2-83

RECENT TRENDS IN TOBACCO PREVENTION RESEARCH FUNDED BY THE NIH

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Significance: Research to prevent the use of tobacco has the potential to have a significant impact on improving population health. It is therefore important to monitor the level of investment in tobacco prevention research over time and to characterize the type of research funded to ensure that gaps are adequately addressed. **Methods:** A stratified random sample of NIH-funded projects from common activity codes over 2012-2021 was coded according to a structured taxonomy. Strata were defined by fiscal year, activity code, and predicted prevention status. Logistic regression accounting for strata was used to estimate the prevalence of various outcomes overall and by fiscal year. Outcomes included prevention of tobacco use and/or cessation in humans, study designs, study populations, and focus on minority health and health disparities. **Results:** Prevention research, as a proportion of all research funded by NIH, experienced a modest but statistically significant increase between 2012 and 2021 (from 17.5% to 23.1%; $p<.001$). During the same time, however, the proportion of prevention projects that focused on tobacco declined from 6.8% in 2012 to 3.1% ($p<.001$). Examination of recent (2016 and 2021) tobacco prevention study designs shows that observational (49.2%) and intervention (47.8%) studies were the most common designs, though the proportion of interventions declined significantly ($p=.006$). Half of tobacco prevention research focused on minority health and/or health disparity (50.3%), significantly increasing over time ($p<.001$). Most tobacco prevention projects included adults (68.6%),

whereas 27.6% studied youth. Less than 10% of projects focused on rural, low income or sexual and gender minority populations (4.3%, 7.4%, 2.6% respectively). **Conclusion:** It is unclear why the number of NIH-funded projects focused on tobacco prevention has been decreasing - especially since prevention research as a proportion of all NIH-funded research has been increasing. The decline in interventions appears to account for much of the decline in tobacco prevention research overall. Tobacco research focused on minority health and/or health disparities has increased in recent years, but populations experiencing the greatest burden of tobacco-related morbidity and mortality continue to be underrepresented in NIH tobacco prevention projects. The data indicating that fewer studies are testing interventions to prevent and/or treat tobacco use makes this trend even more of a concern.

FUNDING: Federal

POS2-84

BIOCHEMICAL VERIFICATION OF TOBACCO USE AS AN INCLUSION CRITERION IN SMOKING CESSATION TRIALS - LESSONS FROM THE COSTED TRIAL

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Significance Biochemical verification of smoking status prior to recruitment into smoking cessation trials is widely used to confirm smoking status, most commonly using exhaled carbon monoxide (CO). There is variation in the level of CO used as a biochemical inclusion criterion, and thus the possibility for people reporting to be current smokers to be incorrectly excluded from trials. **Methods** As part of the Cessation of Smoking Trial in the Emergency Department, people attending the Emergency Department (ED) who reported being current daily smokers underwent CO testing to confirm eligibility. Elective semi-structured interviews were undertaken with the researchers who recruited participants. As part of the interviews, researchers were asked their views and experiences with CO testing. **Results** Of the 1320 participants who reported being current daily smokers and underwent CO testing, 300 (22.7%) blew a CO reading of 7ppm or less and were excluded from taking part. Possible explanations offered by researchers for participants blowing low CO readings were (1) long wait times in the ED, therefore a long period having elapsed since people had last smoked and (2) patients having reduced smoking for the period before the ED attendance due to ill health. **Conclusion** Biochemical verification has the potential to improve internal validity of smoking cessation for inclusion in trials, but at the cost of reduced generalisability through exclusion of participants who would receive the intervention if it were implemented in practice. We would recommend researchers carefully consider whether it is appropriate and necessary to include biochemical verification as an inclusion criterion.

FUNDING: Nonprofit grant funding entity

POS2-85

AN IN-DEPTH ANALYSIS OF HEATED TOBACCO PRODUCTS (HTP) USE AMONG YOUNG PEOPLE IN ROMANIA AND SUPPORT FOR PREVENTION STRATEGIES

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Significance: Our study demonstrates the urgent need for targeted prevention strategies for Heated Tobacco Products (HTPs) use among youth in Romania. HTPs are attractive to younger people as well as to adults who want to quit smoking, indicating a potential public health challenge that requires immediate attention and action. **Methods:** This is a secondary analysis of 2017 Romania Global Youth Tobacco Survey and 2018 Romania Global Adult Tobacco Survey data, to assess HTPs use and awareness among youth (13-15yo) and adults (+15 yo). **Results:** Our study reveals that 20.4% of the youth were aware of HTPs and 3.1% were current users. Some were dual users (10.9% of those who smoked cigarettes currently also used HTPs), but for 1.5% of youth HTPs were their first "tobacco" experience. We noticed that 30% of adults were aware of HTPs and, among those, 10% had ever used the product and 4% were currently using it. Males were more likely to be aware of and to use HTPs (12% of men and 9% of women had used at least one time, respectively 4.5% and 3.7% were currently using). Individuals aged 15-24 or 25-40 were twice as likely to be current HTPs users than older individuals. Being from an urban area was associated with higher HTPs use (5.5% vs 1.7% in rural areas), as well as having higher education (7% vs 4.7% of those who have finished high school) or a high wealth index (5.4% compared to less than 1% for those in the first two quintiles). Almost 10% of youth and 25% of adults acknowledged they have tried to quit cigarette smoking in the past 12 months by using HTPs as a smoking cessation aid, as promoted by the tobacco industry. The main reason for adults who ever used HTPs was that the



product can be used in places where smoking tobacco is not allowed (80%), while 60% believed that they are less harmful than smoking tobacco. 62% of women who used HTPs do so "because it is cool" and secondly to quit smoking (61%). Among men, 51% used HTPs mainly because it is less harmful than smoking tobacco and because they tend to avoid smoking cigarettes (49%). 11.1% of adult non-tobacco smokers noticed any advertisement, sponsorship, or promotion for HTPs. **Conclusions:** our research offers the data for supporting the urgent need to establish HTPs prevention strategies in Romania. Although selling of these products to youth is currently banned in Romania, HTPs are promoted as "high profile status symbol products" and are contributing to the normalization of smoking behaviors in enclosed public spaces, despite the ban of tobacco smoking in these places, thereby undermining public health efforts to denormalize smoking and protect people's health. HTPs serve as an entry into nicotine addiction (among youth and non-smokers who might not otherwise have started smoking), or to exit from smoking (among adult cigarettes smokers). HTPs are a new instrument for tobacco industry to extend their target to reach non-smokers and young people.

FUNDING: Nonprofit grant funding entity

POS2-86

DEVELOPING A WEB-BASED ALGORITHM FOR SMOKING PREVENTION AND CESSATION AMONG SOUTH AMERICAN CANCER CARE PROVIDERS

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Significance: Digital technologies have positively impacted the availability and usability of clinical algorithms, assisting clinicians choose the most effective treatment for each patient, particularly when those technologies can be adapted and designed for low-resource environments. The aim of our study was to build a web-based algorithm designed to support the decision-making process of Colombian and Peruvian cancer care providers (CCPs) interested in offering smoking prevention and cessation services to their patients. We also aimed at testing if CCPs' self-reported self-efficacy and practices for smoking prevention and cessation improved after using the algorithm, as well as the overall usability of the web-based tool. **Methods:** A simple decision-making tree algorithm was built in REDCap using information from an extensive review of currently available smoking prevention and cessation resources. We employed a pre-post study design with a mixed-methods approach among 53 CCPs in Peru and Colombia for pilot-testing the web-based algorithm during a 3-month period. Wilcoxon signed-rank test was used to compare the CCPs' self-efficacy and practices before and after using the web-based algorithm. The algorithm's usability was quantitatively measured with the System Usability Scale (SUS) and qualitatively through the analysis of four focus groups conducted among the participating CCPs. **Results:** The pre-post assessments indicated that the CCPs significantly improved their self-efficacy and practices toward smoking prevention and cessation services after using the web-based algorithm. The overall average SUS score obtained among study participants was 82.9 (±9.33) [Peru 81.5; Colombia 84.1]. After completing the qualitative analysis of the focus groups transcripts, four themes emerged: limited resources currently available for smoking prevention and cessation in oncology settings, merits, and challenges of the Web-based algorithm, as well as suggestions for improving it. **Conclusion:** The web-based algorithm showed high usability and was well-received by the CCPs, promoting a remarkable improvement in their smoking prevention and cessation self-efficacy and practices.

FUNDING: No external funding reported

POS2-87

CELL-SPECIFIC TOXICITY OF TOBACCO AND OTHER FLAVORED E-CIG AEROSOLS USING SINGLE CELL RNA SEQUENCING AND BIOINFORMATICS FOR CHIP-BASED REGULATORY SCIENCE

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The specific toxicity profiles of emerging tobacco or flavored vaping products are not known for tobacco products regulatory science. While many regulations have been placed by the FDA over the sale and marketing of these products, not much work has been done to understand the effect of vaping on pulmonary health at a single cell level. To determine this, we studied the immunological changes in mouse lungs exposed to flavored- and tobacco-derived e-liquid aerosols using single cell transcriptomic. 8-12

weeks old C57BL/6J mice were exposed to nose-only nicotine exposure using PG/VG, Menthol Mint, Mango and Cuban Blend flavors for 5 days duration. 50mg/mL of tobacco derived nicotine (TDN) was added to all the flavors. The lung tissues from each group was harvested and digested to perform scRNA sequencing using NovaSeq6000. Dimensionality reduction using UMAP identified 27 distinct cell populations from our sequenced data illustrating all the major cell populations in the mouse lungs. Interestingly, we identified a unique population of Ly6G⁺ neutrophils in our treated dataset which might be indicative of dysregulated immune responses on e-cig aerosol exposures in the mouse lungs. Differential expression of heat shock proteins (Hsp90aa1, Hsp90ab1, Hspa8), Cold Inducible RNA Binding Protein (Cirbp), and Calcium/Calmodulin Dependent Protein Kinase D (Camk1d) was demonstrated in all the major cell populations in our exposed groups as compared to air controls. Major changes were observed in the myeloid cell population in terms of dysregulation in genes related to metal metabolism, antioxidant and inflammatory responses. Collectively, our work is the first ever attempt to map out the cellular changes at transcriptomic level by e-cig aerosol exposures in mouse to identify potential targets determining differential regulatory toxicity by tobacco and other flavored e-cigarette products. These findings would lead to designing of an immune chip for testing tobacco and flavored e-cig products in regulatory science.

FUNDING: Federal; Nonprofit grant funding entity

POS2-88

USING AGE PREDICTION ALGORITHMS TO ANALYZE CONVERSATIONS ABOUT TOP VAPE BRANDS AMONG YOUTH AND ADULTS

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SIGNIFICANCE: Social media data provide insights into consumer discussion on the evolving electronic nicotine delivery systems (ENDS) marketplace. Segmentation of insights among key audiences can illuminate differences in how consumer groups discuss ENDS. Algorithms that predict social media user features (e.g., age) using public data can aid segmentation. We applied age prediction algorithms to conversations mentioning the top 10 selling ENDS brands (NielsenIQ retail scanner data) in Florida and the US (Jan-Mar 2022) to segment Reddit and Twitter users (youth: < 21; adults: 21+), and explored and compared qualitative conversation themes between age groups. **METHODS:** We developed a search query with general vaping, brand, and product terms (e.g., HQD, ecig) to identify a random sample of Twitter (N=30,000) and Reddit (N=31,585) users posting from Jan 1, 2022-Sep 20, 2022. We ran previously developed age prediction algorithms on public Twitter and Reddit, non-deleted user accounts from the preliminary samples. We restricted the sample to users with predicted probabilities >0.7 of being classified into age groups (final sample: Twitter: 5,139 youth, 7,064 adults; Reddit: 7,860 youth, 7,253 adults). We analyzed conversations from users and compared conversation themes between youth vs. adult Twitter and Reddit users. **RESULTS:** Overall, adults posted more than youth on these platforms. Most conversation among adults and youth was around FDA's announcement about banning JUUL in mid-2022. Reactions were mainly negative, expressing frustration with the government focus on tobacco control when other issues persist (e.g., gun control). Adults suggested that eliminating JUUL would make room for Big Tobacco-affiliated vape brands to dominate. Youth in particular used humor/memes to express displeasure with the ban. Both adult and youth JUUL users sought replacement brands, rather than quitting. When considering what brand to switch to, both groups often focused on flavor. Youth most often discussed mango and mint flavors. Other considerations were price, availability, nicotine content and other features (e.g., quality). **CONCLUSION:** Youth and adults discussed the JUUL ban in conversations about top brands, but differed in how they discussed the ban (e.g., youth used humor/memes, adults discussed Big Tobacco's role). Results suggest algorithms predicting user features (e.g., age) allow researchers to provide more nuanced insights from social media data among age groups.

FUNDING: State



POS2-89

SUPPORT FOR AOTEAROA NEW ZEALAND'S SMOKEFREE ACTION PLAN: FINDINGS FROM THE 2022 ITC NEW ZEALAND (EASE) SURVEY.

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Significance: In 2021, the New Zealand Government implemented the Aotearoa New Zealand Smokefree Action Plan, with world-first measures to rapidly and substantially reduce smoking prevalence. Over the next 4 years, implementation will include: (1) Mandated very low nicotine cigarettes (VLNCs), (2) Substantial reductions in the number of retailer outlets able to sell tobacco, (3) A 'smokefree generation': banning sale of tobacco products to people born after 2009, and (4) Increased funding for media campaigns to prevent young people starting smoking and to promote smoking cessation. This study investigates support for these measures using data from the 2022 International Tobacco Control New Zealand (ITC NZ; EASE) Survey of people who smoke or recently quit smoking. **Methods:** We used data from 1478 participants (698 who smoke daily, 342 who smoke less than daily, and 438 who had quit smoking in the last 2 years), including 597 Māori (indigenous population of Aotearoa New Zealand) and 314 Pacific people. Data were weighted to represent the national profile of people who smoke or recently quit smoking. Response options were "Strongly support" and "Support" (combined into "Support" for reporting), "Oppose" and "Strongly oppose" (combined into "Oppose"), and "Don't know" (DK). Marginal estimates by subgroups were adjusted by smoking status, ethnicity, age, sex, and evidence of financial hardship. **Results:** Support (excluding DK responses) was 66.8% for introduction of VLNCs, 51.2% for a substantial reduction in retail outlets, 67.6% for a smokefree generation, 62.7% for media campaigns to promote smoking cessation, and 85.1% for media campaigns to reduce youth uptake of smoking. DK answers were under 9% for each measure, except the introduction of VLNCs (16.7% DK, leaving 55.7% support and 27.6% oppose when DK was included in the denominator). Support for all of the measures was substantially lower in people who smoked daily and did not intend to quit. **Conclusions:** Overall, the upcoming measures have substantial support from people who smoke or recently quit smoking, providing evidence for the feasibility of their implementation. Support among the general population including non-smokers will likely be much higher. The high proportion reporting DK about support for introduction of VLNCs suggests it is important to ensure people are well-informed about the rationale for introducing VLNCs.

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POS2-90

ESTIMATING THE LONG-TERM HEALTH IMPACT OF NICOTINE EXPOSURE BY DISSECTING THE EFFECTS OF NICOTINE VERSUS NON-NICOTINE CONSTITUENTS OF TOBACCO SMOKE: A MULTIVARIABLE MENDELIAN RANDOMISATION STUDY

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Significance: The detrimental health effects of smoking are well-known, but the impact of long-term nicotine use in humans without exposure to the other constituents of tobacco is less clear. Given the increasing long-term use of alternative nicotine delivery systems, such as e-cigarettes, it is increasingly important to understand and separate the effects of long-term nicotine use from the impact of tobacco smoke exposure. Additionally, not providing clear information regarding the safety of long-term nicotine use via sources which do not contain tobacco could further existing health disparities. **Methods:** Using a multivariable Mendelian randomisation framework and data from published genome-wide association studies and UK Biobank, we explored the direct effects of nicotine compared with the non-nicotine constituents of tobacco smoke on health outcomes (lung cancer, chronic obstructive pulmonary disease [COPD], forced expiratory volume in one second [FEV₁], forced vital capacity [FVC], coronary heart disease [CHD], and heart rate [HR]). Lung cancer was included as a negative control and HR was included as a positive control. **Results:** The results suggest that these smoking-related outcomes (with the exception of HR) are not due to nicotine exposure but are caused by the other components of tobacco smoke. **Conclusion:** Although the results suggest limited harm resulting from long-term nicotine exposure without tobacco smoke exposure, there are multiple potential sources of bias, and the results should be triangulated using evidence from a range of methodologies.

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POS2-91

INDONESIAN ADOLESCENT AND YOUNG ADULT PERCEPTIONS OF BRANDED KRETEK PACKS VS. PLAIN KRETEK PACKS WITH LARGER HEALTH WARNINGS

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Significance: In Indonesia, 33.5% of adults and 18.8% of adolescents smoke tobacco. Kreteks, clove-flavored cigarettes, are most commonly used. Indonesia requires graphic health warning labels (HWLs) that cover 40% of the front and back of tobacco packs. Among jurisdictions in Southeast Asia, Indonesia has one of the smallest tobacco HWLs. We explored adolescent and young adults' perceptions of kretek packs similar to those on the market (branded, 40% HWL coverage) compared to plain kretek packs with a HWL covering 90% of the front and back. **Methods:** We conducted 24 online focus group discussions (FGDs) - eight groups with a total of 48 adolescent males 13-17 years and 16 groups with a total of 98 young adult males and females 18-24 years. FGDs were stratified by age, gender, and smoking status. Participants were shown images of four kretek pack mock-ups of a fictional brand name (branded pack with 40% HWL coverage, plain pack with 40% HWL coverage, branded pack with 90% HWL coverage, and plain pack with 90% HWL coverage) and asked about their perceptions regarding appeal, harmfulness, and behavioral expectancies. We conducted a thematic analysis of the transcripts. **Results:** During daily life, participants cited regularly seeing kretek packs at stores, in possession of friends and family, on the street and school campuses, and in ads. Participants discussed HWLs as a salient feature of the pack. While many participants who did not smoke called HWLs "scary", participants who smoked described themselves as desensitized to the HWLs. Most participants said the branded pack with 40% HWL coverage was the most attractive and least harmful. Compared to plain packs with an olive-colored background, the color featured on the branded packs was viewed as "vibrant" and more appealing. Compared to the packs with 90% HWL coverage, the packs with 40% HWL coverage elicited less of a fearful response. Some participants said the plain packs would be perceived as more harmful because one's eye goes straight to the HWL due to the lack of design. Many participants thought the large HWLs would deter people who do not already smoke from purchasing the product. **Conclusions:** Young Indonesians found branded kretek packs more attractive than plain packs and packs with large HWLs evoked feelings of fear more than those with smaller HWLs. Adoption and implementation of larger pack HWLs and plain packaging may discourage initiation by reducing appeal and better communicate smoking risks.

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POS2-92

SMOKING AND QUITTING BEHAVIORS AMONG ADULT FREQUENT ENDS USERS IN THE U.S.

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Significance: ENDS may help people stop using cigarettes, but the heterogenous ENDS market poses challenges to understand which devices and liquids are most effective. We examine the associations between smoking and quitting behaviors by device-liquid combinations. **Methods:** U.S. adults (21+) using ENDS 5+ days/week completed an online survey for Wave 5 (Feb-Apr 2023) of the Vaping and Patterns of E-Cigarette Use Research (VAPER) Study. Participants (n=1290) were asked details about their most used ENDS device and liquid; reasons for starting to use ENDS; age they first used ENDS, and smoking behaviors. Quitting before starting to use ENDS was defined as quitting smoking regularly at a younger age than when they first used ENDS; quitting at the same time as starting to use ENDS was defined as quitting smoking regularly at the same age they first used ENDS. Descriptive weighted statistics were used. **Results:** 29% smoked cigarettes in the past 30 days. More than half (59%) had quit or not smoked in the past 30 days, and 12% had never smoked regularly. Among those who had smoked regularly and quit, 83% reported they quit smoking at the same time (15%) or after (68%) starting to use ENDS, and 82% said they used ENDS "to quit or cut down on smoking". Devices used by this group include disposable devices with nicotine salt liquid (33%), refillable tank devices with freebase nicotine liquid (23%), refillable pod/cartridge devices with a salt liquid (13%), disposable pod/cartridge devices with a salt liquid (12%), and some other device-liquid combination (19%). The distribution of current device-liquid combination among those who quit smoking regularly at the same time or after starting to use ENDS did not differ from the distribution among those who never smoked regularly or who continued to smoke; it was also similar to those who quit smoking regularly before starting to use ENDS, except those who quit before starting to use ENDS were more likely to currently use refillable tanks with a freebase liquid (35.3% vs. 21.6%; p<0.05). Results for device and liquid characteristics



will also be presented. **Conclusion:** This analysis found that current ENDS device-liquid combinations did not differentiate those who quit smoking at the same time or after starting to use ENDS from those who continued to smoke or those who never smoked. More research is needed to identify ENDS device-liquid characteristics that are most effective at helping people stop smoking.

FUNDING: Federal

POS2-93

USE AND PERCEIVED HELPFULNESS OF CESSATION SUPPORTS, AND AWARENESS OF MASS MEDIA CAMPAIGNS AMONG SMOKERS WITH AND WITHOUT A MENTAL HEALTH CONDITION IN AUSTRALIA: A COMPARATIVE ANALYSIS USING POPULATION-LEVEL SURVEY DATA

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Significance People with a mental health condition (MHC) continue to smoke at rates far higher than the general population, resulting in significant physical health inequity including reduced life expectancy. Large-scale population level data can offer insights into the smoking and quitting behaviours of smokers with a MHC. In particular, information pertaining to use of smoking cessation supports and their perceived helpfulness, as well as awareness of mass media campaigns, may assist in better targeting and tailoring of support to this vulnerable group of smokers. **Aims** To explore use and perceived helpfulness of smoking cessation supports among current and recently quit smokers in Australia, and to compare use of supports and awareness of mass media campaigns for people with and without a MHC. **Methods** The Cancer Institute Tobacco Tracking Survey has been undertaken by the Cancer Institute of NSW since 2005 to collect data from current and recently quit smokers. A question asking about diagnosis or treatment of any MHC in the last 12 months was added to the survey in 2018, and data from March 2018 to June 2021 was utilised in the present study. Logistic regression analyses assessed differences between people with and without a MHC in awareness and use of cessation supports. Descriptive statistics summarised ratings of helpfulness of cessation supports and awareness of campaigns. **Results** Data was available for 6,602 survey participants ($n = 2,019$ with a MHC and $n = 4,583$ without). Preliminary findings suggest people with a MHC were just as likely to be aware of TV campaigns ($p=0.155$) and websites/apps ($p=0.505$); and significantly more likely to have used all types of cessation support except 'social support': pharmacotherapy (OR 1.50), health professional advice (OR 1.81), alternative therapies (OR 1.23), coaching or other support materials (OR 1.43), and electronic cigarettes (OR 1.27). Cessation supports rated as most helpful by people with a MHC were pharmacotherapy, social support and electronic cigarettes. Coaching services (Quitline) were most commonly rated as being "not helpful". **Conclusions** Smokers with a MHC are more likely to use a range of cessation supports, including e-cigarettes, than are smokers without. Such smokers are just as likely to report awareness of recent mass media campaigns encouraging quitting and which generally promote use of the Quitline. The finding that smokers with a MHC reported a greater likelihood of using the Quitline but also found it a relatively unhelpful quitting support confirms a need to explore possible tailoring of coaching for this vulnerable group.

FUNDING: Academic Institution

POS2-94

ALPHA-TERPINEOL REDUCES SOMATIC SIGNS AND ANXIETY-LIKE BEHAVIOR ASSOCIATED WITH NICOTINE WITHDRAWAL IN MALE AND FEMALE C57BL/6J MICE

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Nicotine withdrawal-related effects are primarily responsible for failed tobacco quit attempts and relapse, and in humans include irritability, difficulty concentrating, restlessness, anxiety, and depression. Although there are several approved pharmacotherapies fewer than 5% of those seeking to quit tobacco products remain abstinent for more than 3 months. Nicotine withdrawal rodent models are used to screen novel compounds for the potential to be useful tobacco use disorder pharmacotherapies. Nicotine withdrawal in rodents is associated with somatic behavioral signs such as stretching, head shakes, paw tremors as well as increased anxiety-like behaviors. Cannabinoid 1 receptor (CB₁R) and cannabinoid 2 receptor (CB₂R) agonists can decrease nicotine-related withdrawal behaviors. Recent studies suggest alpha-terpineol, a naturally occurring terpene, acts as a functional CB₁R and CB₂R agonist. We hypothesized that alpha-terpineol may de-

crease nicotine-related withdrawal effects and alone would not produce nicotine-related withdrawal effects. Male and female C57BL/6J mice received either nicotine (2 mg/kg, base) or saline vehicle subcutaneously four times daily for 13 days. On day 14, 30 min after the first nicotine or saline injection mice received either alpha-terpineol (56 mg/kg) or vehicle intraperitoneal injections. One hour after nicotine injections, and 30 min after alpha-terpineol injections, all mice received the non-selective nicotinic acetylcholine receptor antagonist mecamylamine (3 mg/kg, intraperitoneal). Mice were tested again in the body temperature, locomotor assays as well as for anxiety-related behaviors via the light/ dark box. Locomotor assay videos were hand scored for the following nicotine-related withdrawal somatic signs: head shakes, stretching, paw tremors, and hindpaw splaying. Nicotine + Vehicle + Mecamylamine treated mice displayed significant increases in the number of head shakes, stretching, paw tremors and hindpaw splaying somatic signs. These mice also displayed a significant decrease in the time spent in the light side and increase in the time spent in the dark side of the light dark box, indicating increased anxiety-like behavior. Alpha-terpineol abolished these behaviors, which were also absent in the Vehicle + Vehicle + Mecamylamine and Vehicle + Alpha-terpineol + Mecamylamine mice. This terpene may prove to be a useful tool in the fight against nicotine dependence.

FUNDING: State; Academic Institution

POS2-95

PERCEPTIONS OF E-CIGARETTE AND ITS COMPONENTS BETWEEN VAPERS AND NON-VAPERS: RESULTS OF A REPRESENTATIVE SAMPLE AND PERSPECTIVES OF EUROPEAN POLICIES

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Significant: In Europe, the number of vapers has continued to grow. Meanwhile, electronic cigarette (EC) is at the heart of a number of controversies and EC use determinants need to be further investigated. Although perceptions are essential behaviour determinants, few studies in Europe analyse EC perceptions and in particular differences between vapers and non-vapers. Moreover, none studies analyse also the perception of the products contained in the EC: this is one of the objectives of this study. **Methods:** The French Cancer Barometer (INCa/SpFrance) is a cross-sectional phone-administered survey conducted on a representative sample of the general population in France in 2021 ($n=4938$). 3 vaping statuses were defined: never experimented ECs; tried once but not a current vaper; current vaper. Perceptions of ECs: 1/ impact on health, 2/ harm compared to Conventional Cigarettes (CCs) and 3/ carcinogenic risk were assessed. Moreover, harmfulness of nicotine and flavourings in EC were assessed 1/directly on health and 2/ for cancer risks. Descriptive analyses and multinomial and binomial logistic regressions were conducted. **Results:** Ever triers and current EC users were less likely than never users to perceive EC as very or extremely harmful to one's health (respectively, OR=0.59 [0.36-0.94]; OR=0.10 [0.05-0.23]). They were also less likely to perceive EC as more harmful than CCs (ever users, OR=0.54 [0.34-0.86]; current users, OR=0.09 [0.04-0.20]). Regarding EC carcinogenicity, only current users were significantly less likely than never users to perceive a link between both (OR=0.24 [0.16-0.37]). For nicotine in EC, current vapers were less likely to perceive them as harmful to one's health (OR=0.28 [0.15-0.54]) and both ever and current users were less likely to perceive it as a possible cancer risk factor (respectively, OR=0.68 [0.48-0.96]; OR=0.22 [0.14-0.35]). Finally, only current users were less likely to find EC flavourings harmful to one's health (OR=0.23 [0.11-0.46]) and that they can cause cancer (OR=0.52 [0.34-0.78]). **Conclusion:** This study is the first one in Europe to investigate finely EC perceptions among vapers and non-vapers in a representative sample. It highlights the need for tailored prevention communication about EC harms. Further research is needed to specify these perceptions when articulating vaping and smoking status, especially among the younger generations and their experimentation status.

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POS2-96

NICOTINE FLUX BY ENDS DEVICE TYPE AND RELATED MEASUREMENT CHALLENGES: FINDINGS FROM WAVE 5 OF THE VAPER STUDY

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Significance: Nicotine flux is the amount of nicotine emitted per second by an ENDS device and could become a useful regulatory target. We analyzed data from a national survey to estimate and compare nicotine flux by device type. **Methods:** Our sample included US adults (21+) who used ENDS 5+ days per week (N=1289), with most (96%) being daily users. The web-based survey was completed in Feb-April 2023. Nicotine flux was calculated using the device wattage, liquid nicotine concentration and PG/VG ratio. The wattage of tanks and refillable pods during use was determined using photos of visual displays, aggregated wattage data from others' visual displays, self-reported data, and a wattage calculator. The upper limit of wattage for disposable pods and disposables was determined using multimeter measurements and website-reported data. Nicotine concentration and PG/VG were determined using photos of liquids and self-reported data. Median nicotine flux during use was reported for tanks and refillable pods, and the median of the nicotine flux upper limit was reported for disposable pods and disposables. The Mann-Whitney U test was used to compare (upper limit) nicotine flux across device types. **Results:** Overall, 68% (n=871) of the sample was 39 years of age or younger, 60% (n=778) identified as women, 72% (n=928) identified as single-race non-Hispanic white, and 82% (n=1057) reported an annual household income of \$79,999 or less. During use, tanks had a median flux of 48 µg/s (n=290), whereas refillable pods had a median flux of 62 µg/s (n=308) (p=0.42). The median of the flux upper limit for disposable pods was 142 µg/s (n=170) and for disposables was 151 µg/s (n=521) (p=0.88). **Conclusions:** Tanks and refillable pods had similar estimated nicotine flux during use, and the estimated upper limit of flux for disposable pods and disposables was also similar. This was one of the first studies to estimate and compare nicotine flux by device type on a large scale. Adequate data are available to estimate the nicotine flux of tanks and refillable pods during use provided photos of visual displays are requested; however, estimated wattage data (and therefore nicotine flux) of disposable pods and disposables during use could not be determined from survey data alone. Supplemental methods or new analytical approaches are required for surveys to estimate and compare flux during use for all device types.

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POS2-97

TOBACCO USE AND SEXUAL MINORITY IDENTITY DEVELOPMENT: FINDINGS FROM THREE COHORTS OF SEXUAL MINORITY ADULTS IN THE GENERATIONS SURVEY

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Significance: Sexual minority (SM) tobacco use disparities are often explained in part by targeted marketing, which is theorized to have normalized tobacco use in SM communities. There is limited but dated evidence that these resulting pro-tobacco norms help explain why the LGBT community does not view tobacco use as an urgent priority, nor an issue intimately tied to queer identity development in a larger, homophobic society. We sought to explore whether this narrative persisted in the intervening years using data from Generations, the first long-term longitudinal study of how improved social conditions related to LGB acceptance are associated with different trajectories of identity formation and health outcomes across three age cohorts of SM young adults and adults. **Methods:** Two coders conducted secondary qualitative analysis in summer 2023 of the 191 Generations interviews, which focused on participant lifecourse narratives and discussions about healthcare access and experiences, originally conducted in April 2015-April 2016. The three cohorts of SM adults were ages 18-25 (the "Equality" cohort), 34-41 (the "Visibility" cohort), and 52-59 years old (the "Pride" cohort). First-level coding was based on each interview's amount of tobacco content (low, medium, high). From there, interviews were explored based on their existing primary coding related to queer identity development and substance use behaviors. **Results:** Across all three age cohorts of SM adults, most interviews contained low amounts of tobacco-related discussion. Fifty interviews specifically mentioned smoking tobacco products (cigarettes, cigars), but only two interviews contained any substantial discussion of smoking's association with participants' sexual identity. Smoking marijuana/cannabis, alcohol use, and other drug use were far more prominent in participant narratives of substance use and its

overlap with identity development and stress/coping. **Conclusions:** In accordance with limited existing literature, the current study supports prior observations that tobacco is not broadly viewed by SM people as an issue relevant to or influenced by SM identity, or central to their health. Interviews spanning three prominent and nationally representative cohorts of SM adults seem to reflect tobacco use as an individual behavior choice, versus the "causal narrative" paradigm that relates smoking as a social problem caused by stressors associated with living in a larger, homophobic society. Findings from the current study add to our understanding of the etiology of SM tobacco disparities, providing evidence explaining how despite improved social conditions and some acceptance, SM tobacco disparities are persisting, and in some cases worsening.

FUNDING: Federal

POS2-98

EFFECTIVENESS OF TOBACCO CESSATION INTERVENTIONS WITH PEOPLE FROM CULTURALLY AND LINGUISTICALLY DIVERSE BACKGROUNDS: A SCOPING REVIEW

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Significance: This scoping review examined the evidence of the effectiveness of smoking cessation interventions in reducing and preventing tobacco smoking among culturally and linguistically diverse communities across five high-income countries for three key culturally diverse groups prioritised for preventive health initiatives in Australia. **Methods:** We searched peer-reviewed and grey literature from 01/2013 to 03/2022 via five databases, website searches, and health organisation contacts. Literature reporting on tobacco cessation interventions with Chinese, Vietnamese, or Arabic-speaking participants in Australia, America, Canada, New Zealand, or United Kingdom was included. Outcomes included improved knowledge, attitudes, beliefs, intentions, and successful tobacco cessation. We assessed 571 articles against inclusion criteria, and quality appraisal tools (National Health & Medical Research Council Levels of Evidence, JBI Critical Appraisal Tool). Evidence for effectiveness of intervention components was categorised as 'promising' if multiple studies reporting individual cultural group results supported use, 'aggregated' if findings were favourable but combined different cultural groups, 'mixed' for contradictory findings, or 'insufficient' for single studies. **Results:** Nineteen articles described 15 different intervention components, with written information resources being the most common (n=14). Promising evidence was found for 8/15 components targeting tobacco cessation among Chinese-speakers, with 1/15 for Arabic-speakers and none for Vietnamese-speaking people. **Conclusions:** Evidence for effectiveness of intervention components addressing tobacco cessation among Chinese-speaking people was promising, with low evidence for interventions with Vietnamese and Arabic-speaking people. Successful interventions comprised two or more components, with education enabled interventions the most effective, as these addressed low baseline knowledge in these culturally and linguistically diverse groups as a key reason for high tobacco use. Further barriers and enablers can then be addressed via secondary intervention components. Language was the most common barrier to cessation and was successfully met by including primary language supports. Continued research is needed to determine a core components framework for designing and delivering tobacco cessation initiatives to best meet cultural and language needs.

FUNDING: Federal; Nonprofit grant funding entity

POS2-99

ASSOCIATIONS BETWEEN YOUTH AND YOUNG ADULTS USE OF DIFFERENT SOCIAL MEDIA PLATFORMS AND EXPOSURE TO SOCIAL MEDIA E CIGARETTE INFLUENCERS

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BACKGROUND With high rates of both e-cigarette and social media use among adolescents and young adults (AYAs), social media influencers who promote e-cigarettes are particularly concerning. However, little is known about AYAs' exposure to social media e-cigarette influencers. We examined the association between AYAs' use of 11 different social media platforms and exposure to social media e-cigarette influencers. **METHODS** From November 2022-February 2023, we conducted an online, anonymous, national survey of US young adults (14-29 years) who endorsed past-30-day e-cigarette



use. Our analytic sample comprised participants who had valid data on the primary outcome: following e-cigarette influencers (i.e., "Do any of the social media influencers that you follow promote e-cigarettes/vaping products?"; no/yes; n=947). We also assessed frequency of use for each social media platform (i.e., Facebook, Twitter, Instagram, TikTok, Snapchat, Discord, Reddit, YouTube, Pinterest, Twitch, BeReal), with responses of "Never, Every few months, Every few weeks, 1-2 days a week, 3-6 days a week, Once a day, Several times a day, and Many times a day" (treated as continuous). We used logistic regression to assess the association between use of each social media platform and following e-cigarette influencers, controlling for sex, race, ethnicity, and frequency of e-cigarette use and substance use (e.g., other tobacco, alcohol, cannabis). The model was stratified by youth (14-17 years; n=293) and young adults (18-29 years; n=654). **RESULTS** The most frequently used social media platform was YouTube (Mean [SD]; 4.95, [1.98]), followed by Snapchat (4.66 [2.47]), TikTok (4.65 [2.49]), and Instagram (4.52 [2.23]). In adjusted models, following e-cigarette influencers was associated with more frequent use of TikTok (adjusted OR [95% CI]; 1.35 [1.07, 1.72]) and Pinterest (1.18 [1.02, 1.38]) among youth ages 14-17 years, and with more frequent use of Twitter (1.17 [1.06, 1.29]) and BeReal (1.13 [1.01, 1.26]) among young adults ages 18-29 years. **CONCLUSIONS** Different platforms were associated with exposure to e-cigarette influencers among youth and young adults. Study findings can inform tobacco regulatory policy, especially regarding age restrictions for social media e-cigarette influencers on platforms that are most popular among young platform users.

FUNDING: Federal

POS2-100

LONGITUDINAL TRENDS AND DISPARITIES IN WATERPIPE TOBACCO SMOKING AMONG US YOUTHS AND ADULTS: PATH STUDY 2013-2019

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Background: Waterpipe tobacco smoking (WTS), also known as hookah or shisha, is a centuries-old mode of tobacco use. This traditional practice poses health risks (e.g., cancer) and has become a public health concern in the United States (US), especially among young people. This study aims to analyze the patterns of WTS among US youth and adults to disentangle longitudinal trends and disparities in WTS over time. **Methods:** Data came from 32,320 adults (ages 18+ years) and 13,651 youths (ages 12-17) from Wave 1 (2013) of the Population Assessment of Tobacco and Health Study, who were followed through subsequent waves to Wave 5 (2019). The weighted prevalence of ever and current WTS among youth and adults was examined by sex, race/ethnicity, and age. Current use of waterpipe was defined as "used at least one day in past 30 days" for youth and "used on some days or every day for adults." All weighted frequencies represent the overall rate of WTS over time. **Results:** Among youth, the overall prevalence of ever and current WTS decreased by 72.7% and 83.6% (p<.001 for both trends) from 2013-2019, respectively. Across all waves, females experienced significantly higher rates of ever and current WTS compared to males (p<.001). Hispanics had the highest prevalence of ever WTS compared to other race/ethnicity groups over time (p<.001). Those aged 15-17 had a higher prevalence of ever and current smoking than 12-14 years old (p<.001). Among adults, no significant changes were observed in the prevalence of current WTS from 2013-2019, however, there was a 22.8% increase in the overall prevalence of ever WTS (p<.001 for all trends) over the same period, which was more pronounced in males than females (p<.001). Young adults aged 18-24 had the highest prevalence of ever and current hookah smoking compared to other age groups over time (p<.001). Racial patterns showed that Non-Hispanic Whites had the lowest prevalence of current WTS compared to other race/ethnicity groups (p<.001). **Conclusions:** This longitudinal trend analysis revealed demographic disparities in WTS among youth and adults in the US. Although WTS was plummeting over time, our findings highlight an upward trend among specific demographic groups which calls for developing effective policies and implementing targeted interventions to address and curb WTS in the US.

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POS2-101

UNCONTROLLED VAPING: SCALE DEVELOPMENT AND NATIONAL PREVALENCE ESTIMATE

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Significance: Anecdotes of people vaping uncontrollably have accumulated, yet the prevalence of this behavior is unknown. We sought to develop and validate scales to measure uncontrolled vaping and use of vaping restraint strategies. **Methods:** Study 1 participants were a national convenience sample of 950 US adults who vape, recruited in 2021. Study 2 participants were a national probability sample of 1,138 US adults and adolescents (ages 13-17) who vape, recruited in 2022. The cross-sectional surveys assessed evaluation of own vaping as uncontrolled and strategies to restrain use, with measures developed based on qualitative work and concepts from the Process Model of Self Control. We used factor analysis and validation analyses to identify 3-5 item scales for uncontrolled vaping and vaping restraint subscales. **Results:** In Study 1, reliable scales emerged for experiential and behavioral uncontrolled vaping (alpha=.89-.93). Uncontrolled vaping was common: 35% of users said their use was uncontrolled, and 30% reported behaviors with uncontrolled use. Reliable restraint strategy subscales aligned with dimensions hypothesized in the Process Model (situation selection, situation modification, distraction, reappraisal, and willpower; alpha=.82-.97). A new dimension also emerged for personal rules for restraining use (alpha=.76). The uncontrolled vaping scales were more strongly associated with use behaviors than the restraint scales were (median r=.65 vs. .39), but the converse was true for associations with measures of limiting use (median r=.44 vs. .51), supporting convergent validity of the scales. Discriminant validity was supported by weak and null associations with conscientiousness, neuroticism, and self-control (median r=.12). Study 2 found similarly high reliability and prevalence for the measures. **Conclusions:** Uncontrolled vaping is common, as shown by our new psychometrically sound scale. Understanding uncontrolled vaping and restraint strategies can inform e-cigarette regulatory actions by informing development of product standards for refill size and device features that would facilitate vaping restraint.

FUNDING: Federal

POS2-102

PARENTAL DISAPPROVAL AND THE ROLE OF PARENTAL WARMTH AND MONITORING ON YOUTH TOBACCO USE: FINDINGS FROM THE 2021 NATIONAL SURVEY ON DRUG USE AND HEALTH

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Significance. Despite strong evidence for the role of tobacco-specific parenting (e.g., parental disapproval of youth tobacco use) in youth tobacco initiation and continued use, less research has examined whether tobacco-specific parenting behaviors are differentially associated with youth tobacco use in the context of general parenting behaviors (e.g., warmth, monitoring). **Methods.** Participants were youth ages 12-17 who participated in the 2021 National Survey on Drug Use and Health (NSDUH) (34.0% ages 12-13, 33.3% 14-15, 32.7% 16-17; 48.9% female; 50.7% non-Hispanic (NH) White, 14.0% NH Black, 4.6% NH Asian, 7.7% NH another race, 23.1% Hispanic). Participants reported on their perceived parental disapproval of tobacco use (strongly disapprove vs. somewhat disapprove or neither approve or disapprove), parental warmth (e.g., "tells you they're proud of you"), and parental monitoring (e.g., "limits your time with friends") and their own tobacco use (i.e., any lifetime use, any past-year use, any past-month use of any tobacco product). Multivariable binary logistic regressions examined associations between parental disapproval of tobacco use and: 1) lifetime tobacco use; 2) past-year tobacco use; and 3) past-month tobacco use, moderated by parental warmth and monitoring; covariates included youth age, sex, and race and ethnicity. **Results.** Youth ages 16-17 (vs. 14-15) and those identifying as NH White (vs. NH Black, NH Asian, Hispanic) displayed higher odds of lifetime, past-year, and past-month tobacco use. Male (vs. female) youth displayed higher odds of lifetime tobacco use only. Parental disapproval of youth tobacco use, warmth, and monitoring were associated with lower odds of lifetime tobacco use. Moreover, parental disapproval was associated with lower odds of past-year and past-month tobacco use for youth who reported higher, but not lower levels of parental warmth. Parental monitoring did not moderate associations between parental disapproval and tobacco use outcomes. **Conclusions.** Findings among this nationally representative sample of youth suggest that parental disapproval of tobacco use is differentially associated with past-year and past-month tobacco use based on youths'



report of parental warmth. Findings place emphasis upon the importance of intervening on not only tobacco-specific parenting behaviors, but also additional characteristics of the family climate, particularly parental warmth, in family-based tobacco interventions.

FUNDING: Federal; State

POS2-103

DOES THE EXPERIENCE OF DEPRESSIVE SYMPTOMS MODERATE THE IMPACT OF TOBACCO RETAIL MARKETING OF CIGARS AND CIGARILLOS ON THE INITIATION OF CIGAR AND CIGARILLO USE AMONG YOUNG ADULTS

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Introduction: Marketing at tobacco retail outlets (TROs) is an important risk factor for tobacco use, however, little research has examined the impact of TRO cigar/cigarillo (C/C) marketing on the initiation of C/C use among young adults. Further, the experience of depressive symptoms can exacerbate the impact of TRO marketing particularly for the initiation of cigarette use, suggesting depressive symptoms may be an important moderating variable. The purpose of this study was to examine if the relationship between C/C marketing exposure and C/C initiation is moderated by depressive symptoms among college students. **Methods:** Participants were 1821 students (71.4% female; 30.8% white; m age=19.9 [SD =1.86] at wave 1) from 24 colleges in Texas participating in a nine-wave longitudinal study (2014-2019) who never reporting using C/Cs at wave 2. C/C initiation after wave 2 was measured by classifying those who reported never C/C use at wave 9 as non-initiators; all others are considered initiators (18.6% of sample). Objective TRO C/C marketing exposure at wave 2 was measured with an index of objective counts of C/C marketing at TROs within a mile of each college $\times$ each student's weekly store visit frequency and dichotomized using a median split. Recall of marketing was assessed with an item that asked "When you visited [TROs], how often did you see signs marketing large cigars, cigarillo, and/or little filtered cigars?" (responses: 1=Never/not that I remember to 4=Every time). Generalized mixed-effects logistic regression analyses controlling for baseline sex, age, race/ethnicity, other tobacco use, and college type, examined the association between C/C marketing and subsequent C/C initiation with depressive symptoms as a moderator. **Results:** Depressive symptoms did not moderate the relationship between C/C marketing exposure and C/C use initiation, and did not predict C/C initiation for either objective or recall of marketing exposure. Recall of C/C marketing was a significant predictor of C/C initiation ($z = 2.02, p = .04$), however, objective marketing exposure did not predict C/C initiation. **Conclusions:** Although marketing assessed using objective methods did not predict initiation, recall of exposure to retail C/C marketing was an important risk factor for C/C initiation among young adults. Depressive symptoms do not appear to play a role in the exacerbating this relationship nor in predicting C/C initiation.

FUNDING: Federal

POS2-104

AMINOPEPTIDASE ACTIVITY OF LEUKOTRIENE A4 HYDROLASE IN NEUTROPHIL DERIVED EXTRACELLULAR VESICLES

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Significance: Leukotriene A4 hydrolase (LTA4H) is a dual-effect enzyme that acts as pro-inflammatory via generation of leukotriene B4, and anti-inflammatory via its aminopeptidase activity, breaking down the neutrophil attractant tri-peptide PGP. PGP has been shown to be generated during inflammation in the lung, like cigarette smoking, and is a product of breakdown of extracellular matrix (ECM). PGP acts as a neutrophil attractant in a similar process as IL-8. The breakdown of PGP, via LTA4H, is a critical mechanism to reduce inflammatory responses, and prevent unchecked, chronic inflammation. Neutrophil (PMN) derived exosome sized extracellular vesicles (EVs) are tiny 50-150nm particles released from PMNs and have been shown to harbor enzymes capable of causing inflammation in the lung during degranulation events. LTA4H is contained in these EVs, and converts LTA4 to LTB4, increasing inflammation and PMN influx. We will be demonstrating here that this LTA4H associated with these PMN derived EVs, once in contact with neutrophil elastase (NE), is also capable of acting in its aminopeptidase activity to breakdown PGP, thereby reducing inflammation. **Methods:** LTA4H was visualized from both quiescent and activated PMN derived EVs via western blots. Aminopeptidase activity of LTA4H in the EVs was measured using fluorescamine, which binds to the primary amino groups. Since PGP has no primary amines, only when the PGP is degraded to P and GP will the fluorescamine bind (to the G) and fluoresce, indicating

degradation of PGP. All degradation assay products were filtered with 3K filter columns to prevent larger non-PGP products from reacting with the fluorescamine. Inhibition of NE activity in the EVs was achieved using a small molecule NE inhibitor, NEI 2. **Results:** LTA4H was located inside the PMN EVs, not on the surface. The amount of LTA4H was relatively equal between the quiescent and activated EV groups, however they differed in degradation patterns caused by NE. In the activated PMN EV group, the LTA4H degraded by NE had the increased aminopeptidase activity, resulting in higher amount of PGP breakdown. If left unchecked, NE degraded LTA4H fully to stop PGP breakdown. If NE was inhibited from further action, PGP degradation was enhanced. **Conclusions:** LTA4H serves as a proinflammatory enzyme, when at full length, by converting LTA4 to LTB4. However, when in contact with elastase, the breakdown of LTA4H shifts its activity to an anti-inflammatory PGP breakdown mode. In a model of cigarette smoking, upon inflammatory signal, PMNs arrive in the lung, activate and release NE coated EVs, which in turn recruit more PMNs via LTA4H generating LTB4. The NE associated with these EVs continues to degrade the LTA4H, converting it from pro- to anti-inflammatory as it begins to break down the PGP generated from ECM degradation. Eventually, the NE will degrade LTA4H further, until it has no activity remaining.

FUNDING: Federal

POS2-105

OLD DOG, NEW TRICKS?: NRT USE AND EFFECTIVENESS FOR YOUNG ADULT VAPING CESSATION

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SIGNIFICANCE: The Centers for Disease Control and Prevention reports 11% of U.S. young adults (YAs) aged 18-24 are regular e-cigarette users, indicating a need for effective vaping cessation interventions. Nicotine replacement therapy (NRT) is an evidence-based intervention shown to be a safe and effective smoking cessation aid for adults. However, little is known about NRT use or effectiveness for vaping cessation. This analysis describes NRT use and acceptability among YAs and examines NRT use on vaping cessation outcomes. **METHODS:** 508 U.S. YA exclusive vapers aged 18-24 were recruited via social media to a vaping cessation study. Participants received up to 2 quitline calls and were randomized to receive up to 8 weeks of combination NRT (nicotine patch + gum or lozenge) (NRT group); or no NRT. NRT was dosed/sent in up to 2 shipments - 1 shipment after completing each of the 2 study calls. 346 participants self-reported their NRT use and vaping quit status (7-day point prevalence) on a 3-month outcome survey. **RESULTS:** At baseline, 35% of participants reported previous NRT use. 94% of participants in the NRT group accepted their NRT, and 82% received combination therapy of NRT. 68% of participants completed Call 2, resulting in 59% receiving the max of 2 NRT shipments. Most NRT group participants (83%) reported using at least 1 of 7 NRT medications during the study, with 82% using patch, gum, or lozenge. A majority (78%) used combination therapy, primarily patch + gum (69%), and 49% reported using NRT for more than 4 weeks. 20% of participants in the non-NRT study group reported using NRT purchased outside of the study. NRT group participants were satisfied with NRT (83%), found it helpful for quitting vaping (63%), and would recommend it (88%). Among those who completed the outcome survey, quit rates by study group were: 63% (NRT group) and 59% (non-NRT group, $p=0.52$). Respondent quit rates by selected use were: 59% (did use NRT) and 64% (did not use NRT, $p=0.39$). **CONCLUSIONS:** YAs had more prior NRT experience than anticipated. They were open to receiving and using NRT from the quitline. Those who used it had high satisfaction and found it helpful. Quit rates, while not significant, differed by study group vs. selected NRT use, suggesting uptake of NRT may indicate more challenges while quitting vaping. Further research is needed to understand YAs willingness to use and engage with NRT.

FUNDING: Nonprofit grant funding entity

POS2-106

COMBINED SMOKING CESSATION AND ALCOHOL ABSTINENCE TREATMENT FOR PEOPLE EXPERIENCING HOMELESSNESS: A RANDOMIZED TRIAL

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Significance: In the United States, 80% of the adult homeless population smoke combustible cigarettes. Current study, a randomized clinical trial, Power to Quit 2 (PTQ2), tested the efficacy of a combined smoking cessation (i.e. Intensive Smoking Plus Alcohol (IS+A)) versus usual care (UC) for adults experiencing homelessness. **Methods:** PTQ2 was conducted in two urban homeless shelters in the Upper Midwest of USA. Daily smokers and moderate to heavy alcohol users (AUDIT 5-26) (N=344) were randomized to IS+A (10 sessions of motivational interviewing and cognitive behavioral therapy for smoking and alcohol cessation plus nicotine replacement therapy [NRT], n=168) or Usual Care (UC) (i.e., with one educational session on smoking and alcohol cessation plus NRT (n=176)). The primary hypothesis was that the IS+A would result in more biochemically verified 7-day point-prevalent smoking abstinence 26 weeks post-intervention than UC. Our secondary hypothesis was that the intervention would show greater percent days reported alcohol abstinence in a 30-day window, 26 weeks post-intervention compared with UC. The primary endpoint analysis was unadjusted with multiple imputation for missing data. **Results:** At week 26, expired carbon monoxide-verified 7-day point-prevalent smoking abstinence was not significantly higher in the intervention group than in the UC group (16.6% vs. 12.8%, P=0.47). Mean self-reported percent days alcohol abstinence was not significantly higher for combined treatment than for UC (91.1% vs. 90.2%, P=0.75). **Conclusion:** The IS+A intervention did not result in significantly improved smoking or alcohol use outcomes than UC. Results show how challenging it is to design and deliver smoking and alcohol interventions in this population.

FUNDING: Federal

POS2-107

ORAL NICOTINE POUCHES IN SOUTH AFRICA: USE AND RELATIONSHIP WITH CESSATION BEHAVIORS.

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Significance: Nicotine pouches were introduced into South Africa (SA) around 2019. The introduction of these newer forms of nicotine products (i.e. nicotine pouches) has been accompanied by marketing claims of reduced harm and the potential of these products for smoking cessation. However, an understanding of the use behaviors, and specifically, as it pertains to cessation with traditional tobacco products (i.e. cigarettes) is needed to develop local policies that ensure a balance that reduces population-level harms and increased public health benefits. Thus, the aim of this study is to examine the use of nicotine pouches in SA. In addition, we examine quit behaviors among cigarette users who also report using oral nicotine pouches (ONP) in the country. **Methods:** The current study used a cross-sectional design to examine the use of ONPs and quit behaviors among dual ONP and cigarette-users who participated in an online survey in 2021. We quantitatively assessed adults (18+) who reported on their past-30-day (P30D) tobacco use behaviors. The primary outcome was ONP-use status, categorized as current (P30D) and non-current; while the primary exposure variable was cigarette use status (a. never, b. P30D, and former), and a secondary exposure was past-year quit attempts among ONP-users who used cigarettes. Multivariable logistic regression models were used to examine the association between ONP-use and cigarette-use and quit attempts, controlling for demographic factors (age, gender, education). **Results:** The analytic sample comprised 14295 respondents. The prevalence of ONP ever-use was 2.93% (95% CI: 2.65, 3.19), while P30D use was 0.73% (95% CI: 0.60, 0.88). Additionally, among current ONP users, a majority (77.88%) were current cigarette users, compared to 41.88% of never-ONP users who were current cigarette users ($p < 0.001$). Current use of ONPs in SA was associated with P30D non-daily cigarette use (aOR: 4.31; 95% CI: 2.33, 7.97), being male (aOR: 2.10; 95% CI: 1.39, 3.17) and having less than a high school education (aOR: 2.96, 95% CI: 1.61, 5.45), compared to educational attainment beyond high school. Further, there was no significant association between past-year cigarette quit attempts and current nicotine pouch use (aOR: 1.32; 95% CI: 0.81, 2.16) or ever use (aOR: 1.08; 95% CI: 0.81, 1.45). **Conclusion:** Our study findings suggest ever and current use of nicotine pouches in emerging markets like SA is comparable to other regions in the world. Similarly, use is closely associated with combustible cigarette use, although, not quitting behaviors. Based on these results, researchers and policymakers in SA, and similar settings where these products have more recently been introduced, need to closely monitor the concentrated use of these products among cigarette users and the potential benefits or harms that might accrue over time.

FUNDING: Academic Institution; Nonprofit grant funding entity

POS2-108

CHANGE IN RESIDENTS' EXPERIENCES OF COMMUNITY CONTEXTUAL FACTORS FOLLOWING IMPLEMENTATION OF A SMOKE-FREE RULE

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Significance: Smoke-free policies in federally subsidized housing communities may reduce disparities in secondhand smoke (SHS) exposure and associated chronic health problems among those who are socioeconomically disadvantaged. While smoke-free housing policies are an important driver of change in smoking behavior, there is limited information on how social and community contextual factors change following adoption of a property wide smoke-free housing rule. **Methods:** Harvard Chan School investigators, with property managers, developed an evidence-informed implementation framework to support adoption of a smoke-free rule in 12 federally-subsidized affordable housing properties in the US Appalachian region in 2019-2020. Residents were surveyed 1-month before, and 1-month and 8-months following adoption of the smoke-free rule. Social and community contextual factors assessed included personal rules on smoking in the home, community cohesion, and external stressors. Participants (n=260) were stratified by smoking status, and t-tests, chi-squared tests, and ANOVA were used to assess significant changes over time in contextual factors. **Results:** Following adoption of a property-wide smoke-free rule, the percentage of smoking residents who reported having a personal home smoking ban increased from 22.4% to 72.9% at 8-months ($p < 0.001$). Residents who smoke compared to nonsmoking residents were less likely to agree with statements indicative of community cohesion such as "People around here are willing to help neighbors" (35.7% vs 55.6%, $p < .01$). Residents who smoke also reported a greater burden of outside stressors (e.g., unable to control important things in life). Among both smoking and nonsmoking residents, measures of cohesion and stressors showed no change 8-months after policy adoption. **Conclusion:** Smoke-free rules can be effective in changing smoking behavior in a domestic setting but may have lesser impact on other contextual factors associated with smoking behavior. Current implementation approaches will be limited if they fail to understand or address contextual factors that are important for creating and sustaining policy adherence among residents who smoke in the long-term.

FUNDING: Federal

POS2-109

ASSESSING THE STRENGTH OF THE EVIDENCE SUPPORTING THE HEALTH EFFECTS OF SECONDHAND SMOKE EXPOSURE: A BURDEN OF PROOF STUDY

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Significance: Despite a gradual decline in smoking rates over time, exposure to secondhand smoke (SHS) continues to cause harm to non-smokers, especially women, children, and those in low- and middle-income countries. The evidence body concerning the relationship between SHS and health has greatly evolved, but existing meta-analyses do not formally assess the strength of the available evidence. We employed the Burden of Proof (BoP) methodology to conservatively estimate the association between SHS and nine health outcomes and assess the strength of the evidence supporting each of these associations. **Methods:** We conducted a systematic review according to PRISMA guidelines. We searched for observational studies published between Jan 1, 1970, to July 31, 2022, and indexed in PubMed or Web of Science that quantified the association between SHS and ischemic heart disease, stroke, chronic obstructive pulmonary disease (COPD), lower respiratory infection, asthma, lung cancer (LC), breast cancer, type 2 diabetes (T2DM), and otitis media. Cohort and case-control studies with a dichotomous SHS exposure definition were included. The BoP provides an alternative to conventional meta-analyses by fully accounting for the uncertainty evident in existing literature when computing the estimates of association. It summarizes the strength of associations and underlying evidence into a star-rating measure ranging from one star (weak evidence of an association) to five stars (consistent evidence of a strong association). **Results:** We identified 410 studies that were eligible for inclusion. Asthma (125) and LC (104) had the highest number of studies; COPD (21) and T2DM (9) had the lowest. We found SHS to have small to moderate impacts on health - effect sizes ranged from 1.12 for otitis media to 1.44 for COPD. When incorporating known and unexplained between-study heterogeneity, the strongest relationships were seen for cardiovascular conditions, T2DM, and LC; these associations were supported by evidence rated as weak (two stars). For the remaining outcomes, the evidence was weaker (one star). **Conclusion:** Heterogeneity and uncertainty in the data, small effect sizes, small numbers of studies, or a combination of these reasons contributes to the evidence being rated as weak. Yet,



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the increased risks observed for all outcomes reinforce the need to prioritize advancing efforts to reduce smoking and protect non-smokers. Source of Funding: Bloomberg Philanthropies and Bill & Melinda Gates Foundation

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POS2-110

MITIGATION OF POST-SMOKING CESSATION WEIGHT GAIN WITH GLP-1 RECEPTOR AGONISTS MAY DEPEND ON GENETIC VARIATIONS OF GLP-1 RECEPTOR

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Significance: The majority of people who quit smoking experience significant weight gain, which may partially attenuate the health benefits of smoking cessation. Glucagon-like peptide 1 receptor agonists (GLP-1RAs) are used to treat diabetes and obesity. In our recent trial, exenatide, a GLP-1RA, reduced post-cessation weight gain (PCWG). Building on this, the current study sought to examine the role of GLP-1R genetic variability in predicting the PCWG-mitigating potential of exenatide. This research is based on reports that GLP-1R polymorphism rs10305420 may be associated with a differential response to GLP-1RA obesity treatment. **Methods:** Blood samples were collected from participants (n=40) of the parent study, a double-blinded clinical trial that randomized (1:1) treatment-seeking smokers with prediabetes and/or overweight to once-weekly placebo or exenatide, 2mg subcutaneously. Both groups received nicotine patch (21 mg) and brief smoking cessation counseling. Seven-day point prevalence abstinence (CO ≤5ppm) and body weight were assessed after 6 weeks of treatment. Bayesian generalized linear modeling explored GLP-1R variant rs10305420 in moderating the efficacy of exenatide for PCWG attenuation. Models evaluated weight at week 6 as a function of the interaction between dichotomized polymorphism and treatment, controlling for constituent main effects and baseline weight. Posterior probability (PP) thresholds from the statistical literature were used to describe evidence in favor of model effects as moderate (75%-91%) or strong (>91%). **Results:** Nineteen participants received exenatide and 21 received placebo; 13 participants had CT/TT genotypes, and 27 had CC genotype. Treatment was moderated by rs10305420 (PP=81.1%) such that participants with CT/TT genotypes who received exenatide demonstrated 1.92% lower weight vs those who received placebo (PP=77.7%), while CC pair demonstrated no treatment differences (PP<75%). Within treatments, placebo demonstrated no evidence for polymorphism differences (PP<75%), while exenatide demonstrated moderate evidence, such that CC pair was related to lower weight vs CT/TT (PP=77.8%). This pattern was mostly retained when controlling for smoking abstinence. **Conclusions:** These preliminary findings suggest that GLP-1R variability may modify response to GLP-1RA therapy for limiting PCWG. Future research should confirm these results and examine the implications of determining genetic variations in GLP-1R in clinical decision making.

FUNDING: Academic Institution

POS2-111

TRENDS IN CIGARETTE SMOKING PREVALENCE IN CALIFORNIA WITH FORECASTS TO 2035

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Background: The California Department of Public Health's Tobacco Control Program seeks to end the state's tobacco use epidemic by implementing policies aimed at rapidly reducing all forms of tobacco use, particularly in vulnerable populations. In this analysis, we quantify trends in cigarette smoking in representative samples of the California population and among priority populations and we forecast future rates through 2035. **Methods:** Current cigarette smoking prevalence was estimated from 126,594 California adults between 1992-2022 from the Tobacco Use Supplement to the Current Population Survey (TUS-CPS). Prevalence estimates were also calculated for priority populations including racial/ethnic minority groups, low-income groups, and rural communities. Projected prevalence through the year 2035 was estimated using bootstrapped autoregressive integrated moving average (ARIMA) models on log-transformed estimates with missing data imputed using piecewise linear splines. **Results:** Between 1992 to 2022, current cigarette smoking prevalence declined from 19.7% (95%CI:18.8%, 20.7%) to 5.7% (95%CI:4.6%, 6.2%) in the California population and by similar amounts among all subpopulations. Forecast models suggest that smoking prevalence will continue to decline at an average rate of 0.17% each year culminating

in an estimated prevalence of 3.4% (95%CI=2.5%, 4.4%) by 2035. Yet, despite the major percentage point decline in prevalence in all groups, smoking-related disparities were still present among racial/ethnic minorities, low-income groups, and rural communities. **Conclusions:** California's tobacco control efforts have been associated with major reductions in smoking prevalence among all population groups. However, observable gaps remain among priority populations and projections suggest that new targeted interventions will be needed to narrow disparities.

FUNDING: State

POS2-112

EXAMINING THE IMPACT OF A REDUCED NICOTINE PRODUCT STANDARD FOR CIGARETTES AMONG AMERICAN INDIAN/ALASKA NATIVE ADULTS WHO SMOKE

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Significance: American Indian and Alaska Native (AI/AN) populations have the highest prevalence of cigarette smoking among any racial/ethnic group in the U.S. 2020 CDC data indicates that of the 27% of AI/AN adults smoke. There is a need to understand how potential tobacco policy changes of reduced nicotine cigarettes (RNC) would influence tobacco use among this population who are vulnerable to high rates of tobacco use and tobacco-related health disparities. **Methods:** Data were collected through an online survey in spring 2022 of 824 AI/AN adults in the U.S. who smoke cigarettes (78.7% males; 21.3% females; M age = 28.9, SD = 6.1). Survey items assessed the perceived impact of a RNC policy, including the likelihood of switching to another tobacco product or quitting smoking (rated not at all=1 to extremely=5). Multivariable linear regression was used to examine demographic factors (i.e., age, sex, location (i.e., Alaska, lower 48), nicotine dependence) as predictors of continuing, switching, or quitting. **Results:** AI/AN adults were more likely to report continued smoking (M=3.2, SD=1.0) or switching to a different tobacco product (M=3.1, SD=1.1), and less likely to report stopping smoking completely (M=2.8, SD=1.2) if a RNC policy were implemented. Nicotine dependence and age were positively associated with continuing smoking (p=.037); nicotine dependence was positively associated with switching (p<.001); and being in Alaska was positively associated with quitting (p=.024). **Conclusion:** The results suggest most AI/AN adults who smoke cigarettes would plan to continue smoking if a RNC policy were implemented. Although, many would switch or quit smoking. Those with higher nicotine dependence were more likely to continue smoking or switch to another tobacco product, which is salient given that literature has demonstrated that RNC decreases dependence and increases the likelihood of quitting. Thus, identifying strategies to maximize reductions in smoking and smoking-related harm are important for the health of the AI/AN population.

FUNDING: Federal

POS2-113

THE EFFECTS OF E-CIGARETTE PRICES, CIGARETTE TAXES, AND WORKSITE VAPE-FREE AIR-LAWS ON ADULT E-CIGARETTE DEMAND: EXPLORING HETEROGENEITY ACROSS SUBPOPULATIONS

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Background: In the United States, significant socioeconomic and demographic differences exist among the almost 11.1 million current adult e-cigarette users. In 2022, young adults ages 18-34 (12.3%), males (6.7%), White non-Hispanics (6.7%), and low-income individuals (5.9%) reported higher current e-cigarette use than any other groups. States and localities have regulated e-cigarettes in many ways, including youth access laws, flavor bans, vape-free air laws, and e-cigarette taxation. This study examines the effects of e-cigarette prices, vape-free air laws, and cigarette taxes among sub-populations of adult e-cigarette users defined by socioeconomic status, race/ethnicity, age, and gender. **Methods:** We used the 2016-2021 Behavioral Risk Factor Surveillance System data. Our dependent variable was current e-cigarette use dichotomized (every day/someday use vs not currently/have never used). Independent variables included personal characteristics including sex, age, and household income and state-specific characteristics such as vape-free air laws, cigarette excise taxes, and real quarterly state-level sales-weighted average prices for 1 mL of e-liquid. We used a three-way fixed effects approach to estimate the relationship between e-cigarette prices, vape-free air laws, cigarette taxes, and adult e-cigarette prevalence. **Results:** Increases in the price of e-cigarette e-liquid was found to be associated with decreases in prevalence of e-cigarette use for all adults



combined, males, individuals aged 18-29, 50-69, Hispanics, and individuals in income quintiles 1 and 3. The real state excise tax on cigarettes was found to be associated with increases in e-cigarette prevalence for males and non-Hispanic Whites, suggesting that e-cigarettes are substitutes for combustible cigarettes for these subpopulations. The prohibition of vaping in private worksites is generally found not be associated with prevalence of e-cigarette consumption. **Discussion:** Results indicate that e-cigarette vaping by adult subpopulations defined by gender, race/ethnicity, and socioeconomic status respond differently to changes in e-cigarette prices, combustible cigarette taxes, and private worksite vape-free air laws. These results should be considered when implementing tobacco regulations to ensure future policies don't contribute to widening tobacco disparities.

FUNDING: Unfunded

POS2-114

TOBACCO, CANNABIS, CO-USE AND EDUCATIONAL OUTCOMES IN CALIFORNIA HIGH SCHOOL STUDENTS

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Significance: Since returning from COVID-19 related school closures, youth have faced educational challenges, including increased absenteeism and lower test scores. In conjunction with these challenges, youth tobacco and cannabis use is a concern, as they are two of the most used drugs. In this study we examined the association between tobacco and cannabis use and educational outcomes. **Methods:** We analyzed data among high school students from the 2021/2022 California Healthy Kids Survey, one year after COVID-19 related school closures (n=289,817). Current (past 30 days) tobacco and cannabis use were combined into one variable: 1) tobacco and cannabis, 2) only tobacco, 3) only cannabis, and 4) neither substance. A similar variable was created for ever tobacco and cannabis use. Two educational outcomes were examined: self-reported absenteeism and grades. Absenteeism was defined as missing three or more days of school in the past 30 days. A continuous variable was created for past year academic performance, with higher numbers indicating better grades (range=1-8). Logistic regression models were used to examine the association between tobacco/cannabis use and absenteeism, and linear regression models were used for grades. Both models were adjusted for demographics, current alcohol use, depressive symptoms, school environment, and a school-level fixed effect term. To account for clustering of students within schools, SAS survey procedures were used. **Results:** Among high school students in California, 1.7% used only tobacco, 3.7% used only cannabis, and 3.7% used both. About 17.9% of students reported absenteeism and, among these, 1 in 6 reported current tobacco and/or cannabis use. In adjusted models, the odds of being absent were 1.40 times higher (95% confidence interval [CI]: 1.32-1.48) for students with current co-use of tobacco and cannabis relative to youth who used neither substance. Students with co-use were also more likely to have lower grades (-0.87, 95% CI: -0.92, -0.82). Students with co-use had a significant elevated risk of each outcome, compared to using tobacco alone. Similar results were found for students who ever used tobacco and cannabis. **Conclusions:** California youth who co-used tobacco and cannabis (either current or ever) were more likely to be absent and have lower grades. Initiatives should address both cannabis and tobacco in youth prevention and treatment efforts when addressing absenteeism and low academic performance.

FUNDING: Federal; Academic Institution

POS2-115

EXPLORING HARM PERCEPTIONS AND DRIVERS OF CESSATION AMONG ADULTS WHO SMOKE MENTHOL CIGARETTES

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Significance: In the U.S., there are nearly 17.5 million current smokers of menthol cigarettes. Menthol cigarette smoking disproportionately impacts certain populations, including those who are Black, low-income, young adults, and identify as LGBTQ+. This study fills a research gap by exploring harm perceptions, cessation experiences, and motivators and barriers of cessation among adults who use menthol cigarettes. Findings will inform cessation education interventions that support menthol smokers. **Methods:** We conducted 24, 90-minute virtual interviews with U.S. adults aged 21 and older who reported past 30-day cigarette smoking and menthol cigarette use. The sampling strategy overrecruited for: Black/African American, sexual minority, and low socioeconomic status populations. Transcripts were coded with a multi-tiered coding scheme based on research questions (first tier) and participant responses (second tier), ensuring Cohen's Kappa ≥ 0.70 , and thematic analysis was conducted

using NVivo. Participants also indicated their tobacco use behaviors by completing an online survey. **Results:** Most study participants reported initiation of menthol cigarettes prior to age 16 and reported at least one lifetime cessation attempt. Over half (54%) reported co-use of e-cigarettes. Reasons for e-cigarette co-use included: to substitute for cigarettes, to aid in cessation, and to socialize at events. Participants were familiar with the health risks of smoking, however, some had uncertainty and misperceptions about the risks of (a) menthol cigarettes compared to non-menthol cigarettes and (b) cigarettes compared to e-cigarettes. For example, some participants reported that e-cigarettes were more harmful than cigarettes, others expressed the opposite belief, and some reported uncertainty. Participants also noted motivators and barriers to menthol cigarette cessation. Top motivators included health, loved ones, and cost, while top barriers included stress, routine, and withdrawal symptoms. **Conclusion:** We identified key motivators and barriers to menthol cigarette cessation that were consistent with findings from previous research among users of non-menthol cigarettes. Uncertainty around the relative risks of combustible and non-combustible tobacco products suggests education opportunities to support smoking cessation. To reduce inequities in the burden of tobacco use, adults who smoke menthol cigarettes may benefit from education focusing on cessation and relative risk.

FUNDING: Federal

POS2-116

EFFECTS OF PICTORIAL WARNING LABELS DEPICTING LESSER-KNOWN VERSUS WELL-KNOWN RISKS OF SMOKING ON VIEWING PATTERNS, RECALL, AND KNOWLEDGE OF SMOKING HARMS

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Significance: In 2019, the Food and Drug Administration introduced 11 pictorial warning labels (PWLs) for inclusion on cigarette packages, created in compliance with a court mandate to increase public understanding of smoking harms. Several of the PWLs highlighted lesser-known risks of smoking (e.g., macular degeneration, bladder cancer, diabetes), as studies from other countries suggest including this content improves understanding of smoking risks. No behavioral studies have yet evaluated how these new FDA PWLs impact viewing patterns, recall, and knowledge of smoking harms. **Methods:** Seventy adult daily cigarette users (62.9% male, 57.1% African American, mean age = 50.3, mean cigarettes per day = 14.4) completed a single-session laboratory study. They were randomized to view one of two sets of four PWLs depicting either lesser-known (diabetes, bladder cancer, head and neck cancer, and cataracts) or well-known (lung cancer, harming children, low birthweight, and COPD) risks of smoking while having eye movements recorded, then completed post-exposure knowledge and recall measures. **Results:** Participants exposed to PWLs depicting lesser-known smoking risks viewed the text of the warning sooner and for longer than the image (p 's < .05); those exposed to PWLs depicting well-known risks viewed the image longer than text (p < .001) with no difference in how quickly image and text attracted attention. Recall was high for both text and image (>80%) and did not differ by PWL condition (p 's > .1). Those viewing lesser-known (vs. well-known) risks had greater knowledge of smoking causing lesser-known risks of bladder cancer, blindness, bloody urine, cataracts, diabetes, and head and neck cancer (p 's < .001); knowledge of other health conditions was similar between PWL conditions. **Conclusions:** Individuals viewing PWLs depicting lesser-known (vs. well-known) smoking risks visually engaged with the PWL text more than image, had similarly high recall of PWL content, and had greater knowledge of lesser-known risks of smoking. Findings suggest including lesser-known risk information on PWLs improves overall understanding of smoking health risks.

FUNDING: Federal

POS2-117

IDENTIFYING COMMON FLAVORING CHEMICALS IN TOBACCO-FLAVORED E-LIQUIDS

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Significance: E-cigarette manufacturers market a variety of tobacco-flavored e-cigarette liquids. As these products do not contain tobacco-derived material, flavoring chemicals are added to e-liquids to create tobacco flavor. This study aimed to identify and quantify common flavoring chemicals used in commercially available tobacco-flavored e-liquids. **Methods:** Sixteen different e-cigarette brands, with 24 unique e-liquid labeling



descriptors of tobacco flavors, were collected from participants in an observational study between 2019 and 2023. Four products contained additional explicit flavor descriptors other than tobacco (e.g., "Vanilla Custard Tobacco" and "Sweet Caramel Tobacco"). We also purchased three tobacco-flavored e-cigarette products authorized by the FDA as of 2023. Frequency and concentrations of twenty-two highly popular flavoring chemicals previously identified among e-liquid formulations were compared between participant tobacco-flavored e-liquids, e-liquids with additional explicit descriptors, and FDA-authorized products, using gas chromatographic/mass spectrometry techniques. **Results:** Thirteen flavoring chemicals were identified across all products, including ethyl maltol (45.8%), benzyl alcohol (37.5%), trimethylpyrazine, vanillin, and ethyl vanillin (33.3%, each), with average concentrations ranging from 0.1 ± 0.2 – 7.3 ± 5.9 mg/mL. Four products contained chemicals with known cooling effects, such as menthol and WS-23 (0.02 – 1.4 mg/mL). Among products with explicit tobacco flavor descriptors ($n=17$), 11 flavorings were detected, including ethyl maltol (47.1%), benzyl alcohol (41.2%), trimethylpyrazine, and vanillin (29.4%, each), ranging in average concentrations from 0.03 ± 0.0 – 7.7 ± 6.6 mg/mL. Among products with additional explicit flavor descriptors other than tobacco ($n=4$), three contained vanillin and ethyl vanillin, while only 1 product contained trimethylpyrazine. Among FDA-authorized products, trimethylpyrazine was detected in 2 products (0.04 ± 0.0 mg/mL), while ethyl vanillin (0.7 mg/mL) and ethyl maltol (11.1 mg/mL) were each identified in one product. **Conclusions:** Sweet and creamy flavoring chemicals, including benzyl alcohol, ethyl maltol, and vanillin appear to be important ingredients in tobacco-flavored e-liquids, along with the earthy flavoring trimethylpyrazine. Surprisingly, coolants appear in some brand formulations, despite a lack of explicit cooling packaging claims.

FUNDING: Federal

POS2-118

ADULTS WHO USED E-CIGARETTES HAD LOWER SUCCESS IN QUITTING CIGARETTE SMOKING: SECONDARY RESULTS FROM AN APP-DELIVERED BEHAVIORAL INTERVENTION RANDOMIZED TRIAL FOR SMOKING CESSATION

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Background: Many adults use e-cigarettes to help them quit cigarette smoking. However, the impact of self-selected use of e-cigarettes on cigarette smoking cessation, particularly when concurrently receiving app-based behavioral interventions, remains unexplored. **Objective:** This study used data from a randomized trial of two smartphone apps for smoking cessation to compare cigarette abstinence rates between participants who used e-cigarettes on their own ("adopters"; $n=465$) and those who did not ("non-adopters"; $n=1097$). **Methods:** The study population included all participants who did not use e-cigarettes at baseline. "Adopters" were those who self-reported using e-cigarettes on their own at either the 3-month or the 6-month follow-ups. "Non-adopters" were those who self-reported no use of e-cigarettes at 3- or 6-months. The primary cessation outcome was self-reported complete-case 30-day abstinence from cigarette smoking at 12 months. Secondary outcomes were missing-as-smoking and multiple imputation analyses of the primary outcome, prolonged abstinence, and cessation of all nicotine and tobacco products at 12 months. In logistic regression models, we initially examined the potential interaction between e-cigarette use and treatment arm assignment (i.e., iCanQuit, based on Acceptance and Commitment Therapy, and QuitGuide, based on the US Clinical Practice Guidelines) on the primary cessation outcome. Subsequently, we compared rates of cigarette smoking cessation between adopters and non-adopters separately for each app. **Results:** There was suggestive evidence for an interaction between e-cigarette use and treatment arm on cigarette smoking cessation ($P = .058$). In the iCanQuit arm, 12-month cigarette smoking cessation rates were significantly lower among e-cigarette adopters compared with non-adopters (21% vs. 35%, OR=0.55; 95% CI: 0.37 to 0.81, $P = .003$). In contrast, in the QuitGuide arm, 12-month cigarette smoking cessation rates did not differ between adopters and non-adopters (19% vs. 20%, OR=0.91; 95% CI: 0.62 to 1.35, $P = .640$). **Conclusions:** Adults who used e-cigarettes on their own while concurrently receiving an app-based smoking cessation intervention had either a lower or an unimproved likelihood of quitting cigarette smoking compared to non-use. Future research on behavioral treatments for smoking cessation should further investigate this finding and consider including education on the potential consequences of e-cigarette use.

FUNDING: Federal

POS2-119

OPTIMIZING FOR BEHAVIORAL HEALTH EQUITY IN A MULTICOMPONENT QUITLINE-DELIVERED VAPING CESSATION PROGRAM FOR YOUNG ADULTS

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SIGNIFICANCE: E-cigarette (EC), alcohol, and cannabis use disparately impact those living with anxiety, depression, and stress. To inform equitable component optimization of a quitline vaping cessation program, we identified differences in quit success by mechanisms hypothesized to be less controlled among those with behavioral health issues. **METHODS:** We recruited 508 18-24 year-old exclusive EC users willing to quit. Participants were offered 2 calls and randomized to receive nicotine replacement therapy (NRT) (8 weeks vs. none) and a text-delivered mHealth program (yes vs. no). The outcome was 7-day point prevalence vaping abstinence (7dpp-a) reported at 3 month follow-up. Depression, anxiety, and stress were assessed with the Patient Health Questionnaire, Generalized Anxiety Disorder Assessment, and Perceived Stress Scale. Baseline mechanisms hypothesized to be concentrated among those with behavioral health struggles and impact quit success by NRT and mHealth component exposure included: past 30 day cannabis (any) and alcohol (# days) use, affect dysregulation (Structured Interview of Disorders of Extreme Stress subscale), and self-regulation and distraction (Multidimensional Assessment of Interoceptive Awareness subscales). A $p < .01$ was set for effect measure modification tests. **RESULTS:** Many participants reported alcohol use on >2 days (56%), cannabis (59%), and daily EC (78%) use in the 30 days before baseline and screened positive for depression (44%), anxiety (53%), and stress (75%). As predicted, more dysregulation and distraction and less self-regulation were found among those with behavioral health concerns. The effect of NRT on 7dpp-a approached difference by baseline alcohol use ($p=0.013$)—with greater effect for those using on >2 days. There was some suggestion that mHealth may be more effective for cannabis users on 7dpp-a ($p=0.054$)—17.4 percentage points (pps) higher (95%CI: -0.3 to 35.2), and mHealth may be more effective among those with increasing dysregulation ($p=0.051$)—improving effect by 12.1 pps (95%CI: 0 to 24.4) for each dysregulation point (range: 0-4). No other interactions were suggested ($p > 0.15$ for all). **CONCLUSION:** Findings suggest NRT and mHealth do not create further cessation inequity among those struggling with behavioral health; rather, NRT may promote quit equity for those with more frequent alcohol use and mHealth may promote equity among cannabis users and those impacted by affect dysregulation. Validation is needed.

FUNDING: Nonprofit grant funding entity

POS2-120

HOSPITAL UTILIZATION AMONG AMBULATORY PATIENTS WITH COVID-19 AND HISTORY OF TOBACCO USE

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Significance Tobacco use is a risk factor for COVID-19 severity, corresponding to greater use of emergency department (ED) and inpatient hospital services. However, previous studies did not include ambulatory COVID-19 patients, leading to an incomplete picture of tobacco use related outcomes. This study explores an association between tobacco use and COVID-19 linked all-cause health care utilization in ambulatory patients. **Methods** Among 49,588 University of Maryland Medical System patients who tested positive for COVID-19 between February 1, 2020 - October 31, 2021, 30,066 ambulatory patients at first presentation were analyzed. An ordinal multivariable logistic regression model was used to test the impact of tobacco use on hospital and ED utilization, with COVID-19 severity, comorbid diagnoses, sex, race, age, and social vulnerability index included as covariates. **Results** Of the 30,066 patients, 2,030 (6.75%) were current tobacco users, 4,586 (15.25%) were former users, 14,005 (46.58%) never used tobacco, and 9,445 (31.41%) had unknown status. 25,815 (85.86%) patients remained ambulatory during their COVID-19 illness, 1,885 (6.27%) utilized the ED, and 2,366 (7.87%) were admitted to the hospital. Both former (aOR=1.276; 95% CI=1.123, 1.450; $p=0.0002$) and current tobacco users (aOR=1.458; 95% CI=1.252, 1.697; $p<0.0001$) were more likely to visit the ED compared to never users. However, only former users were significantly more likely to be hospitalized compared to never users (aOR=1.324; 95% CI=1.191, 1.471; $p<0.0001$). **Conclusion** Tobacco users with COVID-19 are more likely to have increased health care utilization compared to those who never used tobacco, with current users more likely to use the ED and former users more likely to utilize the hospital. Ambulatory patients who use tobacco should receive closer COVID-19 quarantine management to prevent severe outcomes and health care overutilization. **Health Equity** Patients with higher



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COVID-19 severity and greater number of comorbid diagnoses, as well as females, Non-Hispanic Blacks, Hispanics, and those with higher social vulnerability are more likely to have increased health care utilization. Tobacco use compounds this effect in the previously mentioned populations. New patient centered clinical workflows, as well as evaluations of tobacco use and social determinants of health, are necessary to ensure that care delivery is sensitive to the needs of each individual and enhances health equity.

FUNDING: Federal; Academic Institution

POS2-121

CORRESPONDING COGNITIONS ABOUT NICOTINE, CANNABIS, AND ALCOHOL AMONG SUBSTANCE-NAÏVE YOUTH AT BASELINE IN THE ABCD STUDY

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Significance: Polysubstance use (PSU) has been identified as a key concern among youth, and has garnered greater attention in the context of recent shifts in legality of cannabis and the proliferation of non-cigarette nicotine products. Some studies suggest youth polysubstance users outnumber single substance users. Previous studies have evaluated patterns and predictors of PSU among adolescents, but to our knowledge no previous work has evaluated susceptibility to multiple substances among younger populations of never-users. **Methods:** We utilized baseline data from the multi-site ABCD study to evaluate the correspondence between youth perceptions and cognitions about alcohol, cigarettes, e-cigarettes, and cannabis. Data were collected in 2019-20 from a nationally representative sample of 11,876 native youth (mean age 9.9 years, 48% female) via in-person assessment. **Results:** We found strong positive associations regarding perceived risks of alcohol, cigarettes, e-cigarettes and cannabis; curiosity about using alcohol, tobacco and cannabis; perceived use of cigarettes, e-cigarettes, and cannabis by participants' friends; and perceived peer approval for experimental, occasional, and regular use of alcohol, cigarettes and cannabis (all $p < .001$). **Conclusion:** Findings suggest that cognitions about use of these substances may be more general than substance-specific, and imply that interventions that address them together may be most effective.

FUNDING: Federal

POS2-122

ACCEPTABILITY OF A TELEHEALTH SMOKING HARM REDUCTION INTERVENTION USING E-CIGARETTES AMONG CIGARETTE SMOKERS WITH SUD: A QUALITATIVE ANALYSIS

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Background: Individuals with substance use disorder (SUD) have high rates of smoking and nicotine dependence but encounter significant difficulty in quitting. Addressing cigarette smoking can improve substance use treatment and quality of life in this vulnerable population given the links between smoking, substance use relapse and premature mortality. This study examined the feasibility of using E-cigarettes (EC) and telehealth counseling as a form of harm reduction among smokers with SUD. **Methods:** Semi structured interviews were conducted between March and April 2021 with a sample of individuals who had participated in a pilot randomized controlled trial (cigarette smokers [21 years or older] with SUD, N=17). Interviews examined the experiences of participants with the intervention to inform on its acceptability. The recordings from these interviews were transcribed and the transcripts coded using the Quirkos software program. Data were analyzed thematically and mapped to the constructs of the theoretical framework of acceptability (TFA). **Results:** Three main themes were identified from the analysis and interpreted within the most relevant TFA construct: 1) Attitude towards the intervention; with two further subthemes - 1a) Individuals felt the intervention made them more accountable towards quitting cigarette smoking 1b) Participants expressed improved behavioral control towards cigarette smoking (Affective attitude & Self-efficacy constructs); 2) Positive impact of the intervention on participant health outcomes/lifestyle (Perceived effectiveness & Intervention coherence constructs); 3) Participant experiences regarding the delivery of intervention included favourable and unfavorable experiences (Burden of telehealth interactions while some enjoyed the experience & reported opportunity cost). **Conclusion:** Participants found EC with telehealth counseling

acceptable and helpful for reducing cigarette consumption and in some cases smoking abstinence. Participants recommended continued communication with counselors and a flexible communication schedule (including options on weeknights and weekends) to improve acceptability and enhance engagement.

FUNDING: State

POS2-123

THE ASSOCIATION BETWEEN THE HETEROGENEITY OF SMOKE-FREE LAWS AND SMOKING PREVALENCE AND QUIT ATTEMPTS WITHIN THE TOBACCO NATION

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Significance: Tobacco Nation are states characterized by high smoking rates and weak policies. The strength of smoke-free laws differ among these states, but it is unclear if stronger laws have better outcomes within this weak policy context. This research explores the connections between policy strength, smoking status, quit attempts, and sociodemographic differences across the outcomes. **Methods:** Data source for tobacco use, quit attempts, and sociodemographic variables (race/ethnicity, age groups, education, and sex) was the Behavioral Risk Factor Surveillance System. Smoke-free policy data was from the Center for Disease Control and Prevention which grouped laws based on indoor smoking restrictions. Weak, medium, and strong laws were denoted by smoking bans in one (Arkansas-AR), two (Indiana-IN), and three (Ohio-OH) locations respectively. All three states banned smoking in private worksites. Pre- (0) and post-policy (1) periods were calculated in 3-month intervals for AR, IN, and OH. Smoking status was 1 if respondents smoked ≥ 100 cigarettes and smoked every day or someday, and 0 if not. Quit attempt was 1 if respondents stopped smoking ≥ 1 day in the past year with plans to quit, and 0 if not. For the analyses, we computed the average pre- and post-policy smoking and quit attempt rates. Using separate logistic regression models, we estimated the association between smoking status, quit attempts and pre-post-policy and their interaction with the sociodemographic variables. **Results:** Average smoking rates changed pre- to post-policy: IN (25% to 20%), OH (21% to 19%), AR (22% to 20%). Quit rates increased: IN (58% to 60%), AR (54% to 56%), but decreased in OH (55% to 54%). Regression models revealed significantly lower smoking odds post-policy across IN (OR=0.73; CI=0.73-0.84), OH (OR=0.91; CI=0.83-0.99), AR (OR=0.87; CI=0.82-0.93), but these associations were no longer significant once we included covariates in the models. IN saw age-related effects (40-54 years vs. 18-24 years, AOR=1.32; CI=1.00-1.77), AR showed race disparity (Non-Hispanic Blacks vs. Whites, AOR=1.47; CI=1.14-1.89), while there was no significant interaction with any of the sociodemographic variables in OH. AR had increased odds of quitting post-policy (AOR=1.66; CI=1.04-2.65), but this relationship was not modified by any of the sociodemographic variables. There was no significant association between smoking and the policy periods or modified by any sociodemographic variable in IN or OH. **Conclusion:** The findings show that smoke-free policies can contribute to curbing smoking prevalence even in regions with historically weak tobacco control policies but this might be affected by sociodemographic factors. It is vital for states to adopt diverse approaches that integrate policies and targeted interventions to create a comprehensive strategy for combating high smoking prevalence in the tobacco nation

FUNDING: Unfunded

POS2-124

LGBTQ+ YOUNG ADULTS' ENGAGEMENT WITH CULTURALLY TAILORED ANTI-TOBACCO COMMUNICATIONS: A QUALITATIVE FORMATIVE EVALUATION TO INFORM EXPERIMENTAL RESEARCH

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Significance: Lesbian, gay, bisexual, transgender, and queer young adults (LGBTQ+ YA) report high rates of cigarette smoking and nicotine vaping. Mass-reach anti-tobacco communications can increase public knowledge of tobacco harms and decrease use, yet they may not engage LGBTQ+ YA. We conducted a formative evaluation to inform culturally targeted (CT) anti-tobacco communications. **Methods:** We reviewed existing CT anti-tobacco campaigns before conducting in-depth focus groups of N=22 LGBTQ+ YA (18-35) ever dual users to assess best practices for message design (visuals, semantics). We applied findings to develop 9 CT and 9 non-targeted (NT) messages, which an expert panel (N=7) of LGBTQ+ community partners, scientists, and LGBTQ+ YA reviewed. Messages are being experimentally tested in a remote eye tracking study with LGBTQ+ YA. **Results:** LGBTQ+ YA were skeptical of CT anti-tobacco campaigns



featuring stereotypical representation of LGBTQ+ individuals and questioned the motive of cultural targeting, "Are you genuinely [...] advertising to me, or are you advertising to some, like, monolithic LGBT group that you think exists?" (FG34, Queer, he/him). Communications featuring naturally posed models and a diversity of LGBTQ+ people engaged participants more than overly posed models and oversaturated colors: "If I was scrolling, [the natural ad] would actually make me stop... but the second I see those saturated blue, purple looks, I'm like 'That's an ad', and I just scroll right past it." (FG23, Bisexual, he/him/she/her). Personal stories were well received: "I also like the quotes, and that it has the people's name there. It makes it feel more personal...they're reaching out to you with their story." (FG21, Bisexual, they/them). Unclear visuals and slogans were negatively received. We applied findings to develop CT anti-tobacco communications featuring naturalistic LGBTQ+ models of diverse races, ethnicities, and genders. We paired harms messaging with personal stories and subtle cultural cues (e.g., "our health", pronouns). The expert panel confirmed that messages were culturally and scientifically relevant. Conclusions: LGBTQ+ YA were distrustful of CT communications that leveraged "stereotyped" LGBTQ+ imagery. As authenticity is important to LGBTQ+ YA, co-creating CT anti-tobacco communications may enhance acceptability, engagement, and effectiveness. Future experimental studies with objective measurement are needed to assess the effect of CT (vs NT control) communications on engagement and effectiveness.

FUNDING: Federal; Academic Institution

POS2-125

TOBACCO TREATMENT BILLING AND TOBACCO USE DISORDER DIAGNOSIS IN THE COMMUNITY HEALTH SETTING: AN ANALYSIS OF SOUTH CAROLINA MEDICAID CLAIMS

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Significance: Smoking remains the leading cause of preventable death in the United States. The burden of smoking-related morbidity and mortality, however, is not equitably distributed. Smoking rates are higher and tobacco treatment rates are lower among socioeconomically disadvantaged, under-resourced groups. While Medicaid expansion is associated with increased smoking cessation, it remains unclear as to the extent to which Medicaid beneficiaries are receiving tobacco treatment counseling services. The current study examined the prevalence of tobacco treatment counseling among individuals enrolled in South Carolina Medicaid with a tobacco use disorder diagnosis, and to synthesize the type of providers delivering counseling services. **Methods:** We used South Carolina Medicaid claims data (2019-2022) and created a cohort of fee-for-service Medicaid beneficiaries with a smoking diagnosis. We used descriptive statistics to characterize who received counseling (i.e., age, sex, race, rurality, and region of the state) and used Chi-squared tests to determine if there are between-group differences in the proportion of individuals who received counseling. We then conducted a thematic analysis of provider types who were delivering counseling. **Results:** Results suggested differences between people from different racial backgrounds ($\chi^2=34.54, 23.51, 8.54, 12.02$ from 2019 to 2022, $p<0.001$), age groups ($\chi^2=81.43, 117.45, 83.25, 78.98$ from 2019-2022, $p<0.001$), and between rural versus urban residents ($\chi^2=12.44, 4.05, 5.07, 0.54$ from 2019-2022, $p<0.05$). Black (5.90%-7.86%) and younger (3.80%-5.27%) beneficiaries received a smaller proportion of counseling across all four years compared to their White (8.09%-9.86%) and older (9.94%-11.67%) counterparts, respectively. Additionally, individuals in rural areas (5.94%-8.05%) received a smaller proportion of counseling compared to those in urban areas (7.98%-9.45%) in all years of the study. The thematic analysis revealed that physicians, dentists, and therapists in inpatient and outpatient hospital settings were most often delivering cessation counseling interventions. **Conclusion:** This study reveals the opportunity for a strategic clinical and public health intervention, including a focus on increasing the availability of cessation counseling services to Medicaid beneficiaries, tobacco treatment counseling training for providers in specific regions and settings, and how to bill for these encounters.

FUNDING: No external funding reported

POS2-126

E-CIGARETTE COUNTER-MESSAGING CONTENT ON INSTAGRAM: A CONTENT ANALYSIS

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Background: One contributing factor to adolescents' perceptions and decisions to use e-cigarettes is exposure to e-cigarette social media content. Exposure to e-cigarette

counter-messaging on social media has been associated with lower e-cigarette use. However, much is still unknown about what types of e-cigarette counter-messaging content exists on social media and who are disseminating these messages. We present a content analysis of e-cigarette counter-messaging on Instagram. **Methods:** We searched for 52 e-cigarette hashtags (e.g., #vaping) and 29 anti-vape (e.g., #stopvaping) or counter-messaging (e.g., #therealcost) hashtags, exporting up to 100 posts and metadata per hashtag depending on number of available posts, for 2836 posts total without duplicates. Posts were first confirmed for counter-messaging content (e.g., health information or negative perceptions about vaping, encouragement to quit) resulting in 1646 applicable posts. The team developed a codebook by iteratively viewing posts and defining codes to capture core content areas, including uploader type (e.g., influencer, medical provider), message framing and emotional salience (e.g., fear, hope, humor), and whether evidence was provided to support claims about e-cigarettes and their health effects. We randomly selected 50 posts to code using the final codebook. **Results:** 20% (n=10) of coded posts came from influencers (i.e., users with over 1000 followers). 58% (n=29) were disseminated by either national or local government-funded tobacco prevention initiatives. 50% (n=25) of posts included positively framed messages (e.g., encouragement to quit) to promote hope and/or self-efficacy. 14% (n=7) of posts were negatively framed and used fear (e.g., health risks). 34% (n=17) of posts were neutrally framed and included information about e-cigarette contents. 12% (n=6) had over 100 likes (range 597 to 28168), 5 of which were disseminated by media outlets (e.g., HuffPost), with one disseminated by a doctor influencer. Remaining posts (88%) had between 0 and 51 likes. 7 (14%) posts cited evidence, including references to empirical studies and sources, to support their claims. **Implications:** Results highlight the potential value of disseminating e-cigarette-related information on social media via news outlets and influencers, including medical providers. More research is needed to understand how different messages and messengers are perceived and their impacts on individuals' decisions to use e-cigarettes.

FUNDING: Federal

POS2-127

NICOTINE USE IN COLLEGIATE YOUNG ADULTS IS ASSOCIATED WITH GREATER CO-USE OF ALCOHOL AND CANNABIS

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Background: After years of decline, nicotine use among young adults has increased primarily due to the popularity of vaping devices. Nicotine use is also strongly associated with co-use of alcohol and cannabis, at least among adolescents. We examined the prevalence of nicotine and tobacco use in a collegiate sample and explored its relationship with co-use of alcohol and cannabis. Hypothesis 1 predicted that similar to findings in adolescents, nicotine use in college students would portend greater use and problems with alcohol and cannabis. **Methods:** As part of recruitment for an ongoing human laboratory study, a confidential survey examining nicotine, alcohol, cannabis and other drug use was sent via email to over 6000 21-to-25-year-old students enrolled at a large, West Coast, public university between March 2021 and July 2023. Participants answered questions about the quantity and frequency of substance use and whether they experienced problems with either alcohol or cannabis (past 6 months versus lifetime). Nicotine users were further categorized into infrequent (lt 1 day per week), occasional (1-4 days per week), and daily user (gt 4 days per week) groups. Analyses compared a) non-nicotine vs. nicotine users, and b) the nicotine user subgroups, on alcohol and cannabis quantity, frequency, and problems using general linear analyses. **Results:** Of the 1044 respondents (59% female, 31% Caucasian), 270 students (25.9%) reported using nicotine products in the past 6 months. Compared with non-users, nicotine users imbibed alcohol in greater quantities and frequencies ($t=10.2, p=0.001$), used cannabis more frequently ($t=5.7, p=0.001$), and experienced more problems with alcohol ($t=10.6, p=0.001$) and cannabis ($t=7.2, p=0.001$). Effect sizes were medium to large for all findings (Cohen's d 0.41-0.76). Daily nicotine users also reported significantly more alcohol ($p=0.041$) and cannabis ($p=0.036$) problems than less frequent nicotine users. Increased alcohol problems were explained by a significant sex X alcohol interaction; male daily nicotine users reported more alcohol problems than other nicotine users ($p=0.017$). **Conclusions:** The high rate of nicotine and tobacco use in this sample of students at a major public university is striking but not wholly unexpected given the recent increase in nicotine use among high school students. Nicotine users also used alcohol and cannabis at higher rates, and daily users tended to report more problems with alcohol and cannabis.

FUNDING: Federal



POS2-128

CHARACTERISTICS OF SMOKERS BY EXTENT OF WANTING TO QUIT: FINDINGS FROM THE ITC-4 COUNTRY SMOKING AND VAPING SURVEY

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Significance: The extent of wanting to quit smoking is a very strong predictor of subsequently making quit attempts. However, among those who make quit attempts it is associated with lower chances of success. This persists even when controlling for conventional measures of dependence and has been postulated as an independent measure of dependence (Continuing to do something you really don't want to do). This study explores characteristics of smokers as a function of extent of wanting to quit. **Methods:** Data are from daily smokers ages 18+ surveyed in the 2022 ITC-4 Country (USA, Canada, England & Australia) smoking and vaping survey (n=5045). We compared patterns with those from the three previous waves (2016, 2018 & 2020) and only report findings consistent across all waves and significant at < 0.001 in the 2022 wave. Analyses are on daily smokers divided into categories of wanting to quit: not at all, A little, Somewhat, and A lot (plus Don't know) and crosstabulating this with sociodemographic, smoking dependence measures, self-efficacy, vaping behaviour and perceptions. **Results:** Overall, 12.6% said they didn't want to quit at all, 18.4% a little 33.0% somewhat, and 33.3% a lot with 2.7% saying don't know. Validating the measure, wanting was very strongly associated with reported plans to quit. Extent of wanting to quit was higher for males and those reporting financial stress, but among the countries, lower in the English. Those reporting higher levels of wanting included those with stronger urges to smoke, and those who perceive themselves as "very addicted". By contrast it was lower among the heaviest quintile of smokers, and among those who had never regularly vaped. More complex patterns were found for age with older participants both more likely to report "a lot" and "not at all" with a similar pattern among those who were confident that they would succeed. We did not find consistent effects for perceived utility of vaping for quitting or for its perceived harmfulness vs cigarettes. **Conclusions:** Wanting to quit (more) was associated with negative experiences around smoking (perceived addiction and strong urges to smoke), while being a heavy smoker showed the opposite pattern. A complex pattern of associations with other measures was identified. Given its strong independent predictive capacity for both making quit attempts and failing, it is important to better understand its determinants.

FUNDING: Federal; State; Academic Institution

POS2-129

WORKING TOWARDS 100% SMOKE-FREE MOSQUES IN INDONESIA - RESULTS OF A QUALITATIVE STUDY WITH RELIGIOUS LEADERS

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Significance: Indonesia is the world's most populous Muslim-majority country, with approximately 231 million adherents. It is estimated that there are between 800,000 and one million mosques in Indonesia. Nearly two thirds of men (65%) and 2% of women smoke tobacco which is the highest smoking prevalence in Southeast Asia and among the highest in the world. In Indonesia, smoking is prohibited in places of worship. Findings from studies (observational and interviewing people who regularly attend mosques) report that most mosques are not compliant with smoke-free (SF) policies. We sought to understand challenges associated with implementing SF policies in mosques. **Methods:** In Dec 2022 to May 2023, we conducted individual or group interviews with religious leaders from mosques in 3 cities in Indonesia: Surabaya, Makassar and Banda Aceh. Study participants were asked about their mosque's SF policy, the implementation of their mosque's SF policies, and any lessons that could be shared to support the implementation of 100% SF mosques. Interviews were conducted by interviewers in Bahasa; sessions were video recorded and transcribed, then translated to English. Transcripts were coded by two researchers using a priori themes. **Results:** The study included 34 participants. Some participants explained that their mosque did not have a formal SF policy, rather leaders in mosques made an appeal to the congregation and community for SF. This stemmed from discomfort with the idea of directing individuals in a manner that could be seen as paternalistic. Some participants discussed their belief in individual autonomy which they felt could be in conflict with SF policies. Many participants

described social norms around being hospitable to visitors, and the challenge with supporting SF policies when tourists or guests smoke in their mosque since addressing the behavior could be seen as unwelcoming. Some participants discussed challenges with other members of the congregation's leadership who smoke in the mosque (e.g., senior administrators) which was viewed as a reason for lacking or poorly enforced SF practices. It was reported that outdoor spaces on properties were less likely to be 100% SF. Some participants designated outdoor smoking areas on their properties as a way to support indoor SF spaces, even though these spaces are not allowed. Some mosques engaged security staff to clean cigarette waste and/or "reprimand" those smoking in violation of current policies. Participants described how they value their role as counsel to the community and individuals in the congregation, and a few leaders identified themselves as potential role models for not smoking. **Conclusions:** Mosques, like other environments, face challenges in implementing 100% SF policies and could benefit from more comprehensive SF policies in other environments. Social norms related to respect present specific challenges.

FUNDING: Nonprofit grant funding entity

POS2-130

A MIXED METHODS STUDY ASSESSING ACCEPTABILITY OF A TOBACCO TREATMENT PROGRAM FOR RELATIVES OF CANCER PATIENTS AT A CANCER CENTER

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Significance: Tobacco use is linked to almost half of cancer deaths. Cancer centers routinely provide smoking cessation services to cancer patients, but few offer cessation support to relatives who smoke. The goal of this pilot study was to establish the acceptability of a tobacco treatment program for relatives of cancer patients within an established US cancer center in a state with high cancer and smoking rates. **Methods:** Between 9/2020 and 12/2021, we recruited 25 relatives of cancer patients in person at a cancer center or via Research Match, a participant recruitment panel, (n=9 phone interview only participants, n=12 survey only, and n=4 interview and survey participants). Interviews and surveys used McBride's Teachable Moments model and assessed: perceived personal risk of cancer; emotional impacts of relative's cancer diagnosis; self-image since relative's cancer diagnosis; motivation to quit and feedback on a potential tobacco treatment program. **Results:** Respondents were mostly women (64%), White, non-Hispanic (76.5%), and with household income of \$24,999 or less (68.8%). Interviews showed support for Teachable Moment constructs of higher perceived risk of smoking since their relatives' cancer diagnosis, high emotional impact like guilt for the inability to quit, and reflections on their own self-concept about using tobacco. Interview participants were motivated to quit, but lacked confidence. Most interview respondents were interested in a smoking cessation program through the cancer center and those interested suggested phone counseling was preferable to in-person or online. Most wanted multiple sessions delivered over weeks or months; preference for duration varied from 15-45 minutes. Survey data suggested most intended to quit in either the next six months (37%) or next 30 days (44%). Survey respondents noted high levels of program interest (mean 8.4 of 10, sd=1.7). Many survey participants preferred a smart phone app (50%) or phone counseling (19%) and were split on interest in an individual (56%) vs family-centered approach (44%). Similar to interview respondents, most wanted multiple sessions (75%), albeit slightly shorter in duration (10-30 minutes; 81%).

FUNDING: Federal; Academic Institution

POS2-132

RESPONSES TO A HYPOTHETICAL BAN ON OPEN-SYSTEM ELECTRONIC CIGARETTES AMONG PEOPLE WHO USE ELECTRONIC CIGARETTES

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Significance: Electronic cigarettes (ECIGs) heat a liquid containing propylene glycol, vegetable glycerin, nicotine and chemical flavorants for user inhalation. "Open-system" ECIG devices allow people who use ECIGs to adjust ECIG device or liquid characteristics, whereas "closed system" ECIGs limit the ability to modify these characteristics. This study's purpose was to examine anticipated reactions to a policy limiting prohibiting the sale of open-system ECIG devices among people who use ECIGs. **Methods:** In January



and February of 2020, we used concept mapping, a mixed method approach, to describe anticipated reactions to a hypothetical ban on open-system ECIGs among people who currently use ECIGs in the United States (U.S.). People who currently use ECIGs (past-30 days) were recruited by posting advertisements at Craigslist locations from 24 randomly selected U.S. states. Participants ($n=71$; 45.1% women; mean age=33.0, $SD=10.6$) brainstormed statements that completed a prompt: "If open-system vaping devices were no longer sold in the U.S. and only closed-system vaping devices were available, what is a specific reaction or response you would have?" Researchers reviewed participant generated statements and identified content themes using multidimensional scaling and hierarchical cluster analyses. **Results:** The most common ECIG devices used were "pod mods" (42.3%) and mechanical/box mods (40.8%). Participants generated 85 unique statements describing reactions to a hypothetical ban on open system ECIG devices. Thematic analysis identified content themes: Closed System Cons, Psychological Responses, Policy Outcome Concerns, Legal Approaches to Access Open-Systems, Switch to Closed-System ECIGs, Switch to Non-ECIG products, ECIG use Cessation, and Loopholes to Access Open-System ECIGs. The Psychological Responses ($n=21$) and Loopholes ($n=20$) clusters had the largest number of statements, suggesting strong negative reactions to the hypothetical policy and many planned strategies to avoid being impacted by the policy. The highest rated statements related to strong negative emotions about the policy, while lower rated statements related to switching to other non-ECIG products or quitting. Those who used box mods rated statements related to finding Loopholes to Access Open-Systems higher than those who used pod mods, but lower on the ECIG use Cessation cluster ($ps<0.05$). **Conclusion:** This study shows that a ban on open system ECIG devices may result in strong negative psychological responses, but may also have a positive impact on public health. Policy implementation for a ban on open-system ECIGs may require enforcement efforts to prevent industry and consumer efforts to undermine the policy.

FUNDING: Federal

POS2-133

KEY RISK FACTORS ASSOCIATED WITH ELECTRONIC NICOTINE DELIVERY SYSTEMS USE AMONG ADOLESCENTS

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Introduction: The prevalence of electronic nicotine delivery systems (ENDS) use among US youth has significantly increased during the past decade. As such, identifying key factors highly associated with ENDS use is essential in monitoring and preventing this harmful behavior among youth. This study aims to identify the most important risk factors in the wave 4.5 PATH data that are highly associated with current ENDS use status in wave 5 among tobacco-naïve adolescents at baseline. **Methods:** We analyzed waves 4.5-5 from the PATH Youth data (wave 4.5 was from December 2017 to December 2018, and wave 5 was from December 2018 to November 2019). After eliminating irrelevant and highly correlated survey variables, we employed random forest paired with recursive feature elimination (RF-RFE) to extract the most informative factors associated with ENDS use in wave 5 among all wave 4.5 PATH variables. The dataset was divided into training and testing data (80%:20%). The training data were used to train an eXtreme Gradient Boosting (XGBoost) model and to fine-tune its hyperparameters. The performance of the XGBoost model with the optimized hyperparameters was then evaluated on the testing data. **Results:** RF-RFE, a feature selection method, resulted in 44 most important variables in wave 4.5. With these selected risk factors, the XGBoost model classified current ENDS use status in wave 5 with high accuracy (AUC: 77% (95% CI: 71%-82%)). We found that the likelihood of using ENDS if offered by a best friend, the number of best friends using e-cigarettes, household tobacco usage, curiosity about ENDS use, future intention to use ENDS, total average weekly earnings, perceptions of tobacco product safety emerged as the most important risk factors of ENDS use in wave 5 among tobacco-naïve adolescents in wave 4.5. **Conclusions:** Our results revealed significant effects of family and peer influence on current ENDS use after one year of follow-up among tobacco naïve adolescents at baseline. Given the popularity of ENDS use in the past years, the prominence of these risk factors raises concerns about their potential contribution to the widespread use of ENDS. Furthermore, our findings also underscored the pivotal role of education in shaping adolescents' awareness of tobacco-related matters, serving as protective measures against these detrimental products.

FUNDING: Federal

POS2-134

BELIEFS ABOUT E-CIGARETTES AMONG ISRAELIS - RESULTS FROM THE WAVE 1 (2022) INTERNATIONAL TOBACCO CONTROL (ITC) / ISRAEL PROJECT

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Significance: Use of e-cigarettes has risen exponentially over the last decade. Research has concluded that although e-cigarettes are not harmless, completely switching from cigarettes to e-cigarettes greatly reduces exposure to several toxicants, including carcinogens. This study examined beliefs about the benefits/harms of e-cigarettes in the Israeli population. **Methods:** Part of the International Tobacco Control Policy Evaluation (ITC) Project, Wave 1 telephone survey was conducted from March-May 2022, among a random sample of the adult population. 659 respondents (107 current smokers) completed the survey. Respondents answered three questions on their beliefs about e-cigarettes. Data were weighted to reflect population distributions. **Results:** 31% of respondents believed that completely switching from cigarettes to e-cigarettes would improve smokers' health, 33.5% considered it would have no effect, 17% believed it would worsen health, 19% replied "don't know". Regarding emissions, 34% believed e-cigarette vapour to be less harmful than cigarette smoke, 26.5% equally harmful, 11.5% more harmful, while 28% were uncertain. Current smokers were more likely to consider e-cigarettes more harmful than combustibles compared to non-smokers (21% vs 16%), while non-smokers were more likely to consider the two equally harmful (35% vs 26%). In a logistic regression, those who believed e-cigarettes were as harmful/more harmful were more likely to be Arabs vs Jews (OR 2.8, 95% CI 1.5-5.2; $p=0.002$) and aged over 30 (OR 1.9, 95% CI 1.15-3.17, $p=0.012$). 61% of respondents thought that pack inserts should include information comparing health effects of cigarettes and e-cigarettes. **Conclusions:** About a quarter of Israeli adults were uncertain of the relative harms of e-cigarettes compared to combustibles, and more than one-third believe that e-cigarettes are at least equally as harmful as cigarettes. Current cigarette smokers were more likely to consider e-cigarettes as more harmful than combustibles, a misperception not backed by prevailing scientific evidence. This finding, found in other ITC countries, is not surprising given the conflicting information available. Better information, including pack inserts, should be provided to help smokers make informed choices. Broader policy approach must consider the potential negative impact of e-cigarettes to non-smoking youth; the complexity of creating policies to benefit adult smokers while protecting non-smoking-youth remains a challenge.

FUNDING: Nonprofit grant funding entity

POS2-135

EVALUATION OF A COMPREHENSIVE SMOKE-FREE HOUSING IMPLEMENTATION FRAMEWORK

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Significance: Smoke-free housing policies provide an opportunity to reduce longstanding disparities in exposure to secondhand smoke (SHS) among people from low-income communities living in multi-unit dwellings. While effective implementation of those policies is needed to ensure optimal impact, few evidence-based resources exist. We evaluated the effectiveness of an evidence-informed, smokefree housing implementation framework designed to be tailored to the needs of low-income housing communities.

Methods: Research was conducted among 12 affordable housing communities in the northern Appalachian region as they adopted a smoke-free rule for the first time. A randomized, adaptive intervention was used in which three "waves" of N=4 properties received basic exposure to the implementation framework, or an iteratively enhanced implementation intervention, based on Property Manager and resident feedback. Indoor SHS was assessed at baseline, and at 1-month and 8-months following adoption of a smoke-free rule, using airborne nicotine dosimetry and resident self-reported exposure, together with smokers' self-reported smoking behavior. Longitudinal analyses were conducted using weighted generalized estimating equation (GEE) models to examine associations between implementation wave and outcome measures. **Results:** We observed marked improvements in objective measures of indoor SHS, coupled with lowered perceived exposure to SHS among residents and an overall reduction in cigarettes consumed, one month after the policy went to effect, which were sustained through eight months post-adoption. No substantial differences were observed between the three waves of iteratively enhanced implementation interventions. **Conclusions:** These findings provide empirical support for a smoke-free housing implementation



framework which has the capacity to be tailored to meet the needs of diverse housing communities. The framework may be advantageous to low-income housing communities as they seek to initiate or improve existing smoke-free housing implementation efforts.

FUNDING: Federal

POS2-136

NON-TARGETED SCREENING AND IDENTIFICATION OF INGREDIENTS IN E-LIQUIDS BY GC-MS ANALYSIS

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Significance: Flavors are a major aspect for the attractiveness of tobacco and nicotine products for both young people and adults. To prevent young people in particular from starting to use these products, more and more restrictions are following on the use of flavorings. Chemical analytical methods are important to elucidate the composition of tobacco and nicotine products and enforce legislation. Although commonly targeted methods are developed, sometimes a non-targeted approach is required. For example when monitoring the market for flavorings used or in case of regulations with a limitative list of allowed flavorings in e-liquids. Therefore, we developed a non-targeted screening method for flavorings in e-liquids. **Methods:** E-liquids were diluted in acetonitrile, containing an internal standard, and were directly analyzed by a gas chromatography-mass spectrometry (GC-MS) method. The method uses reference libraries, such as that of the National Institute of Standards and Technology (NIST). We used a signal to noise ratio of 10/1 to obtain a list of positive hits. The highest probabilities from the NIST library are used for reporting and verification. For verification authentic reference standards were used. International validation of the method was performed by laboratories participating in the EU Joint Action on Tobacco Control and WHO Tobacco Laboratory Network. **Results:** Results from an international validation study confirmed the applicability of the non-targeted screening SOP for e-liquid ingredients. Twenty-five e-liquids with tobacco flavor from the Dutch market were screened. Results on the 16 allowed tobacco-related flavorings and non-permitted flavorings are presented in this study. **Conclusion:** A non-targeted, internationally validated, screening method for e-liquid ingredients was developed. The non-targeted screening method for e-liquid ingredients is easy to perform and provides a fast overview of ingredients present. Non-targeted screening methods can be developed for other matrices as well, such as tobacco products or nicotine pouches.

FUNDING: Unfunded; Federal; State

POS2-137

COMPARATIVE HARM PERCEPTION AND E-CIGARETTE INITIATION AMONG US TOBACCO-NAÏVE YOUTH AND YOUNG ADULTS: FINDINGS FROM THE PATH STUDY WAVES 1-5

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Objective: The use of e-cigarettes has sparked interest in tobacco harm reduction, with widespread claims that "e-cigarettes are less harmful than combustible tobacco products." However, this perception may encourage tobacco-naïve individuals to start vaping. This study explores how comparative harm perceptions (CHP) impact e-cigarette initiation among young US tobacco-naïve individuals. **Methods:** We used five waves (2013-2019) of the Population Assessment of Tobacco and Health Study and created separate longitudinal datasets for youth (12-17 years) and young adults (YAs, 18-24 years) with no prior use of any tobacco products at Wave 1 (2013-2014). Participants who had never heard of e-cigarettes and had missing values for the CHP question "Is using ENDS less harmful, about the same, or more harmful than smoking cigarettes?" in any wave were excluded, resulting in 2,819 youth and 1,739 YAs in our analysis. CHP was assessed as a time-varying variable. Initiation was defined as transitioning from never use of e-cigarettes at Wave 1 to ever use in any subsequent wave. Kaplan-Meier survival and Cox proportional hazards regression models were employed to assess the impact of CHP on e-cigarette initiation, adjusting for covariates including demographics (e.g., age, sex, race, education), tobacco-related attitudes, peer influence, health status, and other tobacco (e.g., cigarettes, cigars) and substance use (e.g., marijuana, alcohol). **Results:** In our analytic sample, 62.9% of youth and 12.7% of YAs initiated e-cigarette use. Among those who initiated use, 56.8% of youth and 47.4% of YAs perceived e-cigarettes as less harmful than cigarettes. This perception predicted e-cigarette initiation in both groups (Youth: aHR=1.15; 95%CI:1.01-1.31; YAs: aHR=2.08; 95%CI:1.44-3.00). Additionally, youth identified as Black or Hispanic (vs. White) and younger (12-14 vs. 15-17 years)

had higher risks of e-cigarette initiation, while YAs of Hispanic ethnicity (vs. White) and who had ever used cigarettes, other tobacco products or alcohol were associated with an increased likelihood of e-cigarette initiation in subsequent waves (p-values<0.05). **Conclusions:** Youth and YAs with no history of tobacco use, who perceived e-cigarettes as less harmful than cigarettes, were more likely to initiate e-cigarettes than those who perceived them as equally or more harmful. These findings emphasize the need for targeted prevention strategies, including risk communication interventions, to prevent e-cigarette use among young tobacco-naïve individuals.

FUNDING: Unfunded

POS2-138

THE EFFECTS OF SMOKERS SWITCHING BEHAVIOR ON HEALTH-RELATED SYMPTOM BURDEN AND QUALITY OF LIFE: ANALYSIS OF US PROSPECTIVE LONGITUDINAL COHORT STUDY DATA FROM 2013 TO 2019

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Background: There has been a significant increase in the number of users of e-cigarettes (ECs) over the past decade. However, evidence on the long-term effects of conventional cigarette (CC) smokers switching to using ECs and their health-related quality of life is lacking. **Objective:** This study aimed to examine the effects of switching from smoking to using ECs on health-related symptom burden (i.e., fatigue, pain, emotional problems) and quality of life (QoL) from 2013 to 2019. **Methods:** We included 7,122 U.S. adults who were exclusive CC smokers at Wave (W) 1 and followed up at any of waves W2-5 in the US Population Assessment of Tobacco and Health (PATH) study. At the follow-up waves, we categorized respondents into four groups based on their smoking switching behaviors: (1) full switching (switching to exclusive EC use); (2) partial switching (switching to dual use of CCs and ECs); (3) quit (smoking cessation); (4) non-switching (exclusive CC smoking). Linear mixed-effect models controlling for baseline scores, age, sex, race, and level of education were used to calculate adjusted mean difference (MD) with 95% confidence interval (CI) in symptom burden and QoL between non-switching and switching groups. **Results:** In 2019, the weighted rates of full and partial switching were 0.39% and 1.09%, respectively, while the weighted rate of non-switching group was 5.79%. Compared to non-switching, full switching was significantly associated with less fatigue (adjusted MD, -0.092; 95% CI, -0.167 to -0.017; $P = 0.016$), less emotional problems (adjusted MD, -0.089; 95% CI, -0.175 to -0.002; $P = 0.044$), better QoL (adjusted MD, -0.124; 95% CI, -0.193 to -0.056; $P < 0.001$), but similar pain (adjusted MD, -0.156; 95% CI, -0.351 to 0.038; $P = 0.108$). No significant difference was observed between partial switching and non-switching groups on fatigue (adjusted MD, -0.004; 95% CI, -0.04 to 0.033; $P = 0.843$), pain (adjusted MD, 0.078; 95% CI, -0.017 to 0.174; $P = 0.115$), emotional problems (adjusted MD, 0.016; 95% CI, -0.027 to 0.058; $P = 0.47$) and QoL (adjusted MD, -0.025; 95% CI, -0.059 to 0.008; $P = 0.142$). Moreover, quitters constantly reported lowest fatigue, pain, emotional problems and best QoL among the four groups (all $P < 0.001$). These patterns remained consistent across W2-5 (P for all interactions between wave and group > 0.5). **Conclusions:** Smokers who fully switched to using ECs had less symptom burden and better QoL than those who continued smoking CCs. The identified long-term possible benefit of smokers switching underscores an urgent need to rectify gaps in ethics, legislation, and practice to help smokers switch and further improve their quality of life.

FUNDING: Unfunded

POS2-139

CHANGES IN MATERNAL POLYSUBSTANCE USE OF CANNABIS AND NICOTINE PRODUCTS DURING PREGNANCY AND RISK OF SMALL-FOR-GESTATIONAL-AGE BIRTH

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Significance: Polysubstance use of marijuana and nicotine products is common, with growing use in young women. Pregnancy can be a unique opportunity to quit using marijuana and/or nicotine products. We aimed to examine the effects of changes in maternal polysubstance use of marijuana and nicotine products during pregnancy on the risk of small-for-gestational-age (SGA) birth. **Methods:** We analyzed phase 8 data from the U.S. Pregnancy Risk Assessment Monitoring System (PRAMS, 2016-2019).



Postpartum mothers reported their use of marijuana and nicotine (cigarette and e-cigarette) products during the 3 months before pregnancy and the last 3 months of pregnancy. Based on data from birth certificates, SGA was defined as birth weight below the 10th percentile by sex and gestational duration. We used multivariable log-binomial regression to estimate the relative risk (RR) for SGA associated with the changes in maternal marijuana and nicotine use during pregnancy, adjusting for socio-demographic and pregnancy confounders. **Results:** Discontinuation was common (range, 60%-85%) among all groups of polysubstance users of marijuana and nicotine products. Among marijuana and cigarette polysubstance users, continuing both substances was associated with a high risk of SGA (confounder-adjusted RR, 2.43[95% confidence interval, 1.86-3.18]), while discontinuing marijuana only (1.54 [0.95-2.50]), cigarettes only (1.15 [0.65-2.04]), or both substances (1.38 [0.89-2.13]) was not associated with a high risk of SGA, compared to non-users. Among marijuana, cigarette, and e-cigarette polysubstance users, continuing all three substances (2.28 [1.23-4.22]) or discontinuing e-cigarettes only (2.76 [1.51-5.03]) was associated with a high risk of SGA, while discontinuing both cigarettes and e-cigarettes (0.82 [0.28-2.43]) or all three substances (0.87 [0.34-2.23]) was not associated with a high risk of SGA, compared to non-users. **Conclusion:** The high risk of SGA associated with polysubstance use of marijuana and nicotine products may be largely reduced by discontinuing these substances, especially cigarettes.

FUNDING: Federal

POS2-140

THE INCLUSION OF E-CIGARETTES AND HEATED TOBACCO PRODUCTS IN SMOKE-FREE HOME AND CAR RULES: A CROSS-SECTIONAL SURVEY OF ADULTS IN ARMENIA AND GEORGIA

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Significance: Assessing whether smoke-free rules in private settings include e-cigarettes and heated tobacco products (HTPs) is crucial, particularly in countries like Armenia and Georgia where tobacco use rates are high and national smoke-free laws have been recently implemented. This study explored correlates of including e-cigarettes and HTPs in smoke-free home and car rules and likelihood of implementing home rules including e-cigarettes and HTPs among Armenian and Georgian adults. **Methods:** We analyzed 2022 survey data from 1,468 adults (avg. age=42.92, 48.6% male, 31.6% past-month smokers). Multilevel analyses identified correlates of having home rules and car rules, respectively, including e-cigarettes/HTPs among participants with home or car rules (binary logistic regressions) and self-reported likelihood of implementing home rules including e-cigarettes/HTPs in the next year (1=not at all to 7=extremely) in those without such rules (linear regression). Correlates of interest were: country, age, sex, education, smoking status, children <18 and other smokers in the home, e-cigarette/HTP use intentions, and perceived e-cigarette/HTP risk and social acceptability (1=not at all to 7=extremely). **Results:** Among participants with home rules (n=1,070), 13.5% did not include e-cigarettes/HTPs. Correlates of including e-cigarettes/HTPs were being from Georgia (aOR=4.14, 95%CI[CI]=1.15, 14.96), having full (vs. partial) smoke-free home rules (aOR=6.42, CI=3.94, 10.74), lower e-cigarette/HTP use intentions (aOR=0.75, CI=0.63, 0.88), and greater perceived e-cigarette/HTP risk (aOR=1.28, CI=1.08, 1.50). In those who owned vehicles and had car rules (n=498), 18.7% did not include e-cigarettes/HTPs. Correlates of including e-cigarettes/HTPs were having children (aOR=2.64, CI=1.44, 4.84), no other smokers in the home (aOR=0.40, CI=0.21, 0.76), having full (vs. partial) car rules (aOR=5.95, CI=3.03, 11.68), and greater perceived e-cigarette/HTP risk (aOR=1.46, CI=1.14, 1.87). In those without home rules including e-cigarettes/HTPs (n=540), correlates of more likely implementing such rules were having children (β=0.42, CI=0.02, 0.82), no past-month smoking (β=-0.82, CI=-1.40, -0.23), and greater perceived e-cigarette/HTP risk (β=0.38, CI=0.25, 0.50). **Conclusions:** The study highlights gaps in effectively including e-cigarettes and HTPs in home and car rules. Interventions should focus on increasing perceived risk and fully addressing tobacco use in these personal settings.

FUNDING: Nonprofit grant funding entity

POS2-141

SOCIAL NETWORK ANALYSIS OF E-CIGARETTE-RELATED SOCIAL MEDIA INFLUENCERS ON TWITTER

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Significance: Recently, e-cigarette use (vaping) has been widespread, especially among youth and young adults. With the increasing popularity of social media especially among youth, it is important to understand how social media influences e-cigarette use. As one of the most popular social media platforms for users to share their activities and connect, Twitter is an ideal resource for examining how social network influences health behaviors. This study aims to understand the effects of social media influencers and social networks on vaping-related behavior through social network analysis. **Methods:** Through the Twitter streaming application programming interface (API), we identified 3,617,766 unique Twitter accounts posting e-cigarette-related tweets from May 3rd, 2021, to June 10th, 2022. From them, we identified 33 e-cigarette influencers. Furthermore, we identified and grouped the followers of these influencers into e-cigarette followers and non-e-cigarette followers. We randomly sampled 100 follower accounts from e-cigarette followers and non-e-cigarette followers respectively and created corresponding social networks for each e-cigarette influencer. We compared different network measures (such as the clustering coefficient) between e-cigarette follower networks and non-e-cigarette follower networks. Finally, topic modeling was applied to examine tweets from those e-cigarette follower networks in the past 12 months. **Results:** For identified 33 social media e-cigarette influencers, on average, their e-cigarette follower networks have significantly higher clustering coefficients than their non-e-cigarette follower networks, 0.398 vs 0.098 (P-value < 0.0001). In addition, the average number of followers of e-cigarette followers is significantly higher than that of non-e-cigarette followers (322 vs. 201, P-value = 0.0002). The average number of tweets posted by e-cigarette follower networks is significantly higher (93 vs. 43, P-value < 0.0001) than that for non-e-cigarette follower networks. Two major topics discussed in e-cigarette follower networks include promoting e-cigarette products or vaping activity and discussing the e-cigarette flavor policy. **Conclusion:** Our study showed that e-cigarette followers of e-cigarette influencers are more closely connected than non-e-cigarette followers on social media, providing a potentially practical intervention approach for future anti-vaping campaigns.

FUNDING: Federal

POS2-142

CLASS MATTERS: HOW CLASSISM IS ASSOCIATED WITH TOBACCO USE AMONG ADOLESCENTS

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Significance: This study investigated the association between classism and tobacco use among adolescents. Classism refers to interpersonal discrimination that is based on social class. For adolescents, social class includes their parent's education, household income, and occupation. Adolescents who are low in social class are almost twice as likely to smoke cigarettes or vape as those who are high in social class. Although there is substantial research showing how social class is associated with tobacco use, there is a notably large gap in our knowledge about how the bias experienced because of social class is associated with tobacco use. The limited research available on the relationship between classism and tobacco use has predominantly focused on adults, with comparatively fewer investigations conducted among adolescents. **Methods:** This cross-sectional study examined the relationship between classism and tobacco use among adolescents in grades 9-12, living in the Western region of the United States. Data were collected through anonymous surveys administered in two public high schools. The sample comprised 1,678 adolescents (Mage = 15.97, SDage = 1.23). Social class was measured with a six-item scale of maternal education that ranged from no high school diploma to a doctorate (M = 2.98, SD = 1.64). We chose maternal education as an indicator of social class because it is a valid indicator of social class and is reliably reported by adolescents. Classism was measured using a 13-item scale (Cronbach's alpha = 0.95) with a prompt "How often have you experienced each of the following because of the money, schooling, or jobs your parents have?" The items included instances, such as "Hassled by the police" and "Called insulting names." Response options ranged from 1 (rarely) to 5 (often). Tobacco use was measured by summing items that assessed lifetime, past year, and past month use for various products, such as cigarettes, vape devices, and non-water pipes. **Results:** Findings from hierarchical regression analyses indicated that adolescents who experienced more classism also reported more tobacco use, even after including social class (maternal education) as a covariate. **Conclusion:** This research represents a novel line of inquiry that provides insights into the intricate interplay between classism and risky health behaviors, spe-



cifically tobacco use. These findings underscore the need for targeted interventions to address class-based disparities and classist attitudes, potentially improving the well-being and health behaviors of adolescents.

FUNDING: State

POS1-143

BUILDING A HEALTHBOT TO HELP PEOPLE ADHERE TO THEIR VARENICLINE PRESCRIPTIONS WITH THE USE OF PATIENT PERSPECTIVES

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More than 8 million people die yearly due to tobacco use. Despite major efforts worldwide to aid in the cessation of tobacco use, smoking remains the main cause of preventable death and disease. Varenicline, an $\alpha 4\beta 2$ nicotinic receptor agonist, is the most effective approved smoking cessation medication available. Providing individualized behavioral support helps improve adherence to smoking cessation medication. Using web-based programs to provide tailored care has become popular due to the wide transition to various online platforms over the last decade. Additionally, incorporating patient perspectives in the development of treatments makes patients more excited about the implementation and dissemination of research. Highlighting diverse perspectives can also make the treatment more acceptable in different communities. To build a patient-centered, theory informed, evidence-based healthbot that helps people adhere to their varenicline prescriptions. Using the COM-B model and Behaviour Change Wheel as a guide, we conducted 20 interviews with people who were either recent or current varenicline users trying to quit smoking. We asked participants about the barriers and facilitators they experience adhering to varenicline and features they would want in a healthbot. Out of the 20 participants, 55% (n=xx) were women and 45% (n=xx) men, 20% (n=xx) were 18-40 years of age, 40% (n=xx) were 41-60, and 40% (n=xx) 61 or older. The most common reported barrier to adhering to varenicline was people's lack of preparedness regarding side effects (95%, n=19). The most common reported facilitator for adhering to varenicline was receiving social support from friends, family, or their healthcare provider (95%, n=19). The most common features participants wanted implemented into the healthbot were being able to ask general questions (95%, n=19), receiving positive feedback messages (80%, n=16), and being reminded to take their medication (80%, n=16). We learned how patients want behavior change techniques focused around problem solving, prompts and cues, and social support when taking varenicline. These features can mitigate the barriers people experience to adherence by providing more information on what to expect from varenicline, while also reinforcing common facilitators. We plan to use these data to build and improve our evidence-based and individualized healthbot that will aid in the cessation of smoking and encouragement of varenicline adherence.

FUNDING: Federal; Other

POS2-144

HEALTHCARE PROVIDER PERSPECTIVES ON THE ROLE OF HEALTHBOTS IN DELIVERING CARE TO PATIENTS TAKING VARENICLINE FOR SMOKING CESSATION

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Varenicline, one of the most effective smoking cessation medications, has high rates of non-compliance, with over 30% of people nonadherent by their second week of treatment. Healthbots, which simulate human conversation, can provide tailored medication support to individuals on a large scale and act as a supplemental agent for healthcare providers. An important step in understanding implementation success of interventions is assessing context; however, context is often not reported or only cursorily described. Our study aimed to describe context-specific characteristics of healthcare providers' perspectives prior to the implementation of a healthbot to improve varenicline adherence for smoking cessation. In this study, we interviewed 19 diverse healthcare providers (e.g., physicians, nurses, etc.) from varying geographical areas (e.g., rural, small, medium, and urban) in Ontario, Canada to determine if location and/or rurality affect healthcare providers' willingness to recommend technology. The interviews explored the barriers and facilitators of (1) healthcare providers' decision to prescribe healthbots to their patients; and (2) healthcare providers' ability to provide adequate care for varenicline adherence. The interviews were based on Capability, Opportunity, Motivation, and Behaviour

(COM-B) model of behaviour change and the Theoretical Domains Framework, a guide made up of the social, mental, and environmental influences known to elicit behavioural change. The most common barriers of improving varenicline adherence were staffing levels, inadequate time and resources, and lack of patient follow-up. The most common barriers to recommending healthbots were technological barriers and concerns about the impact on the patient-physician relationship. Healthcare providers from rural areas were more likely to have negative perceptions about the use of technology in healthcare, such as a general fear of artificial intelligence, and a lack of confidence in the healthbot's capabilities. The most common facilitator for recommending healthbots was healthcare providers' belief that healthbots can reduce workloads and increase patient follow-up. We are using this information to select features of a healthbot that may help healthcare providers to provide accessible care to patients for varenicline adherence. This project will help develop a healthbot that can increase patient compliance with varenicline and one that healthcare providers may willingly recommend.

FUNDING: Federal; Other

POS2-145

USING THE WIZARD OF OZ METHODOLOGY WITH AN INTERSECTIONALITY LENS TO DEVELOP AN ACCESSIBLE HEALTHBOT FOR VARENICLINE ADHERENCE

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Healthbots, computer programs designed to emulate conversations with users and provide information and support, can be beneficial for increasing adherence to medications. The Wizard of Oz method is a cost-effective chatbot development method where a user interacts through a textual interface with a human pretending to be a computer to quickly gather data about user experiences with a planned chatbot. In this study, we demonstrate how we employed the Wizard of Oz method to develop a healthbot to increase varenicline adherence for smoking cessation. More specifically, we used the Wizard of Oz method with an intersectionality lens to grow a library of questions that participants ask the healthbot. Thirty-two participants were purposefully recruited by age (18-40 years, 41-60 years, >61 years) and gender (man, woman, non-binary/intersex) to interact with the healthbot for 10-30 minutes per day for three days/ask five questions per day for three days. An online survey was administered to collect sociodemographic characteristics including sexuality, marital status, family income, education level, race, and ethnicity. Interviews were conducted after the healthbot interactions to assess participants' experiences (i.e., which features they liked and disliked). Data from the interview were analyzed to determine trends and patterns associated with sociodemographic characteristics (e.g., age, gender, race, ethnicity, socioeconomic status). Regardless of age, gender, race, ethnicity or socioeconomic status, participants liked goal setting, feedback on medication adherence and smoking cessation progress, medication reminders, and answers to questions. Through the Wizard of Oz interactions, the library of responses was expanded to include answers about side effects, logistical questions about the healthbot itself, information about the efficacy of varenicline, and information about the mechanism of action of varenicline. The findings from this study will be used to facilitate the development of an accessible and inclusive healthbot to improve varenicline adherence for smoking cessation.

FUNDING: Federal; Other

POS2-146

A TECHNOLOGICAL APPROACH FOR VARENICLINE ADHERENCE: INTEGRATING HEALTHBOT FEATURES FOR ENHANCED OUTCOMES

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Background: In order to improve the effectiveness of interventions targeting non adherence to varenicline, one of the most effective monotherapy treatment for tobacco dependence, a systematic approach to program design is needed. In this presentation we describe how we used the APEASE criteria (Acceptability, Practicability, Effectiveness, Affordability, Side-effects, Equity) to select features for the design of a healthbot, developed to help people adhere to their varenicline regimen. Methods: We created a list of behavior change techniques (the 'active ingredients' in an intervention designed to bring about change) that: 1. Have been found effective in the published literature (based on our rapid review where we extracted data from 61 studies); 2. Health care providers find useful and recommend (based on interviews with 19 health care providers who prescribe varenicline); and 3. Varenicline users would like to receive (based on interviews



with 20 varenicline users). We assessed each behavior change technique listed in terms of: •Affordability (can it be delivered based on the budget?) •Practicality (is it feasible to deliver?) •Effectiveness and cost-effectiveness (does it work? Is it worth the funds being invested in it?) •Acceptability (is it acceptable to those receiving/delivering it?) •Side-effects/safety (are there any unintended side-effects or safety issues?) •Equity (does it advantage some groups over others?)ResultsSix intervention components were selected to be included in the healthbot to help people adhere to their varenicline regimen: (i)Problem Solving, (ii) Goal setting , (iii)Self-monitoring and Feedback, (iv) Action Planning, (v)Social rewards(vi)Social support.Conclusion The APEASE criteria provide a systematic framework for determining the intervention components to be included in the healthbot. This ensures that the healthbot's design is grounded in both evidence and theory, employing a comprehensive approach that prioritizes user needs and preferences. The intervention is now ready for testing in a feasibility study with patients. It is hoped that sharing and documenting the intervention content, design and process will allow for a better interpretation of the future findings of this work.

FUNDING: Federal

POS2-147

MEASURING ATTENTIONAL BIAS TOWARDS SMOKING CUES IN E-CIGARETTE USERS WHO FORMERLY AND CURRENTLY SMOKE CIGARETTES

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Introduction: Attentional bias (AB) is an automatic allocation of attention towards substance related cues, and develops as an important behavioural feature of substance use disorders. AB towards smoking cues is a well-documented aspect of tobacco use disorder, however there is limited information on the effects of e-cigarettes on AB among current and former smokers. This study evaluated the differences in AB towards smoking cues among four distinct groups: 1) cigarette smokers (n=59); 2) e-cigarette users who currently smoke cigarettes (dual users; n=34); 3) e-cigarette users who formerly smoked cigarettes (full-switchers; n=27), and; 4) healthy controls (n=65), using eye-tracking technology. We hypothesized that participants who had partially or completely switched to e-cigarettes would have decreased AB towards smoking cues than cigarette smokers.Methods: Eligible participants attended a single study session where they were presented with a series of slides displaying 4 images on the screen at once competing for attention. Images were selected to act as either smoking, sensation seeking, affective or neutral cues. Eye-movements during the slide show were tracked and recorded using Visual Attention Scanning Technology (VAST). The primary outcome measured was mean relative fixation time (mRFT) directed towards smoking cues minus mRFT directed towards neutral cues. Participants also completed self-reported questionnaires of craving before and after the task.Results: Independent sample t-tests were used to compare AB among the groups. mRFTs towards smoking cues were significantly higher ($p<0.05$) than healthy controls (0.012 ± 0.096) for cigarette smokers (0.092 ± 0.116), full-switchers (0.092 ± 0.091) and dual users (0.099 ± 0.102), with no significant difference between cigarette smokers and e-cig users. There were no statistically significant sex differences within or between groups.Conclusions: The findings show that switching to e-cigarettes (either completely or partially) does not significantly change AB towards smoking cues among former and current smokers suggesting a continued vulnerability to smoking relapse. Additionally, there was no evidence of significant sex differences with respect to AB towards smoking cues among cigarette smokers, full switchers or dual users.

FUNDING: Academic Institution; Nonprofit grant funding entity

POS2-148

TRACKING YOUTH AND YOUNG ADULT TOBACCO-RELATED ATTITUDES IN REAL-TIME SINCE 2014

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Significance: Since 2014, Truth Initiative has implemented a continuous tracking study online (CTO) with Crux Research. The CTO provides a foundational dataset used to track, in real-time, what works when communicating with today's youth and ensure we are reaching the intended audience of 15-24-year-olds. The CTO adapts as Truth Initiative tackles challenging issues, including youth smoking, opioid misuse, and vaping. **Methods:** At the inception of the CTO, online data collection was unique. All major national data collection surveys involving tobacco use relied on in-person or telephone interviews. The truth campaign replaced previous cross-sectional pre-post awareness studies with this continuous tracking method. This method was designed to be nationally representative

through strict recruitment with quotas set to US Census targets for demographics. Data quality is at the forefront of every decision made. The CTO sample is 300 weekly/15,600 annually. Crux Research provides programming using Forsta and SPSS software and recruitment. Several automated checks prevent speeders, straight-liners, and unreliable respondents. The nature of online survey research has evolved significantly over the span of this project. Sample coverage of targeted audiences has changed, response rates have fallen, and weighting methodologies have become more sophisticated. We apply a best practices approach to the data collection. **Results:** The CTO is robust, and during the COVID-19 pandemic, it was one of the only national risk behavior tracking systems that continued without changing methods. The study has interviewed more than 110,000 unique respondents over nine years. The survey is nimble, with items being added or taken out weekly. This innovative approach of continuous data collection allows the team to view data as trends over time, compare data as precise as the weekly level to previous years to understand potential seasonal effects, and overlay policy variables to determine trends before and after policy implementation (i.e., flavor bans). **Conclusion:** The CTO has proved adaptable to the changing generations, the threats to youth health (tobacco, opioid, vape), and the evolving media landscape. It services the public health field, keeping one of the nation's most extensive youth public health campaigns relevant and efficient over time and providing monthly data to external partners. This presentation will deep dive into data collection methods and lessons learned along the way.

FUNDING: Other



 SRNT₂₀₂₄

POSTER SESSION 3



POS3-1

AN OVERVIEW OF SYSTEMATIC REVIEWS ON PREDICTORS OF SMOKING CESSATION AMONG YOUNG PEOPLE

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Significance: Understanding the factors that influence smoking cessation among young people is crucial for planning targeted cessation approaches. The objective of this review was to comprehensively summarize evidence for predictors of different smoking cessation related behaviors among young people from currently available systematic reviews. **Methods:** We systematically searched PubMed, MEDLINE, PsycINFO, CINAHL Plus, Scopus, and Google Scholar databases for systematic reviews summarizing predictors of intention to quit smoking, quit attempts and smoking abstinence among young people aged 10-35 years. We excluded reviews on effectiveness of smoking cessation intervention; smoking prevention and other smoking behaviors; cessation of other tobacco products use, dual use, and polysubstance use. We used Joanna Briggs Institute checklist for systematic review for quality assessment and corrected covered area (CCA) to assess overlapping between the reviews. Article screening, data extraction and quality assessments were duplicated by two independent reviewers. **Results:** A total of 10 systematic reviews were included in this study; all summarized predictors of smoking abstinence/quit attempts and two also identified predictors of intention to quit smoking. We found 4 predictors of intention to quit smoking and 111 predictors of smoking abstinence/quit attempts. Of these 111 predictors, we categorized 35 as 'probable', 31 as 'possible', 30 as 'insufficient evidence', 4 as 'probably unrelated', and 11 as showing significant but 'inconsistent direction' of association. The 'probable' predictors include a wide variety of socio-demographic factors, level of nicotine dependence, attitudes and beliefs related to smoking, mental health and psychological factors, behavioral factors, peer, and family smoking and supports, and jurisdictional policies. Six reviews had a critical appraisal score of at least 70% and there was minimal overlap in the studies included in the reviews (CCA 0.01). **Conclusion:** The 'probable' predictors of smoking abstinence/quit attempts can be used for personal behavioral adjustment to improve probability of successful quitting as well as improvement of existing smoking cessation interventions or planning of new targeted intervention programs for high-risk populations. We also identified several 'possible', 'insufficient evidence', 'inconsistent direction' predictors which need further testing by future research.

FUNDING: Academic Institution

POS3-2

FACTORS ASSOCIATED WITH HIGH INTEREST IN QUITTING AND HIGH CONFIDENCE IN SUCCESS AMONG U.S. ADULTS WHO SMOKE CIGARETTES WITH OR WITHOUT OTHER TOBACCO PRODUCTS

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Significance: Interest in quitting and perceived likelihood of success, quitting confidence, are key epidemiologic measures in smoking cessation success. The study aimed to assess levels of interest and confidence in quitting, and determine the characteristics associated with high interest and high confidence in U.S. adults, aged ≥ 18 years, who reported current cigarette smoking. **Methods:** Population Assessment of Tobacco and Health (PATH) study wave 5 adult data were used. Sample (N=2,682) included those who have smoked 100 cigarettes in lifetime and currently smoked cigarettes and had information on their interest in quitting and perceived likelihood of succeeding if tried to quit smoking in the next 6 months (confidence). Quit interest, measured on a 10-point scale (1 not interested at all and 10, extremely interested), was combined with confidence responses (1 not at all likely and 4 very likely). We developed four levels of quitting interest/confidence: LOW Interest (1-5)/LOW Confidence (Not at all /A little /Somewhat Likely), LOW Interest (1-5)/HIGH Confidence (Very Likely), HIGH Interest (6-10) /LOW Confidence (Not at all /A little /Somewhat Likely), and HIGH Interest (6-10) /HIGH Confidence (Very Likely). Type of cigarette use included cigarettes only, dual cigarettes+cigars, dual cigarettes+electronic cigarettes (ECIG), cigarettes+smokeless, and poly tobacco. Nicotine dependence (ND) was based on responses to 16 items. Weighted multivariable logistic regression was constructed. **Results:** Overall, 49.1% of the study sample reported HIGH Interest in quitting/LOW Confidence in succeeding, 34.5% expressed HIGH Interest/HIGH Confidence, 9.0% and 7.4% indicated LOW/LOW and LOW/HIGH levels, respectively. Majority (69.1%) reported using cigarettes only, 5.5% dual cigarettes+cigars, 9.7% dual cigarettes+ECIG, 2.8% cigarettes+smokeless, and 12.9% poly tobacco. Dual cigarettes+smokeless use was positively associated with HIGH/HIGH, OR 1.9 (95% CI: 1.1, 3.1) compared to using cigarettes only. Compared

to White, Black adults, those with higher income, and those who have used cessation assistance had higher odds reporting HIGH/HIGH. ND was negatively associated with interest and confidence, OR .58 (95% CI: .53, .64). **Conclusion:** A third of the adults who smoked were interested in quitting and believed success was very likely, but have not quit yet, suggesting the need for cessation intervention access. Research is warranted to uncover the barriers to abstinence in this highly motivated group.

FUNDING: Federal

POS3-3

SUBSTANCE USE AND CARDIOVASCULAR DISEASE AMONG U.S. ADULTS: FINDINGS FROM THE NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY, 2017-2018

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Significance: Despite increases in the prevalence of cardiovascular disease (CVD) among young and middle aged adults in the United States and the continued, and in some cases growing, use of substances, such as tobacco, cannabis, and illicit drugs, the relationships between these substances and CVD are not fully known. This study evaluated the associations between substance use and CVD diagnosis among adults aged 20-59 years. **Methods:** We used cross-sectional data from the 2017-2018 National Health and Nutrition Examination Survey, focusing our sample on adults aged 20-59 years (N=2,934). CVD was defined as ever receiving diagnosis of coronary heart disease, stroke, or high blood pressure from a health care provider. Substance use was defined as ever use of e-cigarettes, cigars, smokeless tobacco, cannabis, or illicit drugs (i.e., cocaine, heroin, methamphetamine): yes or no. Each substance was analyzed as a separate exposure. Associations between substance use and CVD diagnosis were examined using three logistic regression models, one for each CVD outcome, with each adjusted for age, gender, race/ethnicity, education, health insurance, and cigarette smoking status. **Results:** Among the sample, 1.2% adults were diagnosed with coronary heart disease, 1.5% with stroke, and 22.9% with high blood pressure. Cannabis (61.1%) was the most used substance, followed by cigars (44.5%), e-cigarettes (30.1%), smokeless tobacco (23.5%), and illicit drugs (18.6%). In the adjusted analysis, adults who used cannabis had higher odds of coronary heart disease (OR=4.78, 95% CI: 1.59-14.35), and adults who used cigars had higher odds of stroke (OR=2.40, 95% CI: 1.06-5.46). Further, increased odds of high blood pressure were associated with e-cigarette (OR=1.32, 95% CI: 1.04-1.68) and smokeless tobacco (OR=1.46, 95% CI: 1.03-2.08) use. Age, gender, race/ethnicity, education, health insurance, and smoking status influenced CVD diagnosis. **Conclusions:** Substance use was associated with CVD diagnosis among U.S. adults aged 20-59, with the spectrum of disease varying based on type of substance used. CVD prevention among young and middle aged adults should involve screening for substance use, advising against such use, and health messaging regarding cardiovascular risks. To help young and middle age adults offset the risks of CVD, especially those disproportionately affected by CVD, public health policies and interventions that ensure substance use control are key.

FUNDING: Federal

POS3-4

EVALUATING THE IMPACT AND EQUITY OF A NOVEL POLICY INTERVENTION TO REDUCE TOBACCO RETAILER DENSITY IN NEW YORK CITY

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Significance: High levels of tobacco retailer density in communities is associated with a range of tobacco use behaviors and is a key structural driver of tobacco-related disparities. This study evaluates the impacts of New York City's (NYC) novel policy intervention to cap tobacco retail licenses on tobacco retailer density and neighborhood inequities in tobacco access. **Methods:** Using geocoded tobacco retail licensing data from 2010 to 2022, Bayesian conditional autoregressive Poisson panel models estimated the association between policy implementation in 2018 and retailer density per 1,000 population, controlling for neighborhood-level sociodemographic factors. Data were analyzed in 2023. **Results:** The number of tobacco retail licenses decreased from 9,304 in 2010 to 5,107 in 2022, with the rate of decline significantly accelerating



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post-policy (-14.2% versus -34.2%). Policy effects were strongest in districts with lower income and greater proportions of non-Hispanic Black residents. **Conclusion:** NYC's policy substantially reduced tobacco retailer density and appeared to close and even reverse patterns of inequity, serving as a rare example of a tobacco control policy that effectively reduces tobacco-related disparities. This emergent approach to reduce tobacco retailer density may reach populations that have not benefitted from traditional tobacco control policies and should be considered by other localities.

FUNDING: Federal

POS3-5

E-CIGARETTE EDUCATION MESSAGE PERCEPTIONS AMONG CURRENTLY VAPING AND NOT VAPING YOUNG ADULTS: A REMOTE EYE-TRACKING STUDY

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Significance: Despite efforts to communicate the health harm of using e-cigarettes, young adults may avoid or reject current e-cigarette education messages. The presentation of messages (one-sided: informing the health harm of vaping vs. two-sided: both acknowledging reasons for vaping and informing the health harm of vaping) may influence young adults' message perceptions. The current study examined the impact of message presentation. **Methods:** Between December 2022 and March 2023, an online convenience sample of young adults (18-30-years-old) in the U.S. reporting current vaping (past 30-day; n=50) and not currently vaping (n=50) were recruited from a crowdsourcing platform to participate in a remote eye-tracking study. First, participants completed a pretest eye-calibration and then viewed 18 messages about the health harm of using e-cigarettes in a random order. Each message was formatted as a one-sided message (area of interest 1; AOI1) and two-sided message (AOI2) and presented in juxtaposition. During message exposure, participants' dwell time and number of revisits to each AOI were measured. Afterward, participants completed self-reported measures of vaping attitudes and demographics. All one-sided messages and two-sided messages were combined within each message group for analysis. Paired sample t-tests were first conducted to examine the differences in the average dwell time and revisits between AOI1 and AOI2 for each vaping status. Next, multiple regressions were run to examine the associations between dwell time and revisits for each AOI on self-reported perceived message effectiveness (PME), vaping attitudes, and vaping intentions for each vaping status, while controlling for demographics. **Results:** Young adults in both vaping groups had a significantly higher dwell time ($p < .001$) and number of revisits ($p < .001$) to two-sided messages (AO2) compared to one-sided messages (AOI1). Among participants who currently vape, revisits to two-sided messages (AO2) were significantly associated with positive vaping attitudes ($p < .05$) but not PME ($p = .740$) or vaping intentions ($p = .116$). **Conclusions:** Regardless of their vaping status, young adults spent more time looking at two-sided messages. However, those who currently vape and who revisited the two-sided messages reported more positive attitudes toward vaping. Our findings suggest that a message presentation type may influence young adults' attention to e-cigarette education messages, and consequently their attitudes.

FUNDING: Federal

POS3-6

IMPACT OF IQOS MARKETING ON CURRENT TOBACCO OR NICOTINE PRODUCT USER BEHAVIORS

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Significance: Marketing of IQOS on social media is prevalent, and exposure to tobacco product marketing could affect user behaviors. Our study examines the impact of IQOS marketing on current tobacco or nicotine tobacco product user behaviors. **Methods:** Using a cross-sectional anonymous online survey study conducted through the Amazon Mechanical Turk (MTurk) online crowdsourcing marketplace run by Amazon in August 2022, we examined the impact of IQOS marketing on user behaviors on 5,199 participants who were 21 years or older and tobacco or nicotine tobacco product users. Frequency distributions were used to examine the impact of IQOS marketing on tobacco or nicotine product user behaviors. Multivariate logistic regression models were used to identify factors associated with different user behaviors after the IQOS marketing exposure. **Results:** Among the 5,199 tobacco or nicotine product users, 1,830 (35.20%) participants plan to switch to IQOS from smoking, vaping, or other tobacco products, 1,453 (27.95%) participants are curious about IQOS and want to try it, 1,408 (27.08%) currently use IQOS and will continue using it, 508 (9.77%) participants will quit or not use IQOS. Non-Hispanic Asian was more likely to switch to IQOS than non-Hispanic White (OR = 2.29, 95% CI: 1.81 - 2.88). Daily (OR = 1.52, 95% CI: 1.13 - 2.06) or someday

(OR = 2.22, 95% CI: 1.67 - 2.95) electronic cigarette users were more likely to switch to IQOS. Men (OR = 1.16, 95% CI: 1.01 - 1.33), unmarried (OR = 1.33, 95% CI: 1.06 - 1.68), or participants with more restricted tobacco use inside home rules (OR = 2.64, 95% CI: 2.16 - 3.22) were more likely to try IQOS. Current daily or someday smokers (OR = 3.15, 95% CI: 2.14 - 4.63) or vapers (OR = 2.09, 95% CI: 1.46 - 3.00), or participants with more restricted tobacco use inside home rules (OR = 1.42, 95% CI: 1.20 - 1.68), or participants perceived IQOS not harmful (OR = 2.13, 95% CI: 1.49 - 3.03) or slightly harmful (OR = 1.92, 95% CI: 1.50 - 2.46) were more likely to continue using IQOS. Participants with lower education levels were more likely to quit or not to use IQOS (OR = 2.13, 95% CI: 1.53 - 2.96). **Conclusion:** IQOS marketing could impact the user behaviors of current tobacco or nicotine product users. Race/Ethnicity, education level, marital status, smoking, vaping, and tobacco product use inside home rules were all associated with the user behaviors after IQOS marketing exposure.

FUNDING: Federal

POS3-7

EMOTIONAL REACTIONS, PSYCHOLOGICAL REACTANCE, AND PERCEIVED MESSAGE EFFECTIVENESS OF VERY LOW NICOTINE CIGARETTE MESSAGES

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Significance: The FDA proposed reducing nicotine content in cigarettes to minimally or non-addictive levels. This policy needs to be accompanied with effective messaging to reduce misperceptions and clarify the reasons for the policy. We assessed reactions to 5 messages about very low nicotine cigarettes (VLNCs) conveying that VLNCs are still harmful but will make it easier to quit smoking. **Methods:** In the context of an online experiment with a nationally representative sample, 737 current exclusive smokers, 346 dual users, 329 young adult non-smokers were exposed to 1 or 2 of 5 VLNC messages (effects of experimental conditions on perceived harm and behavioral intentions are reported in another abstract). After exposure to each VLNC message, participants reported: negative (7 items, $\alpha = .92$) and positive (3 items, $\alpha = .86$) emotions, reactance (3 items, $\alpha = .86$), and perceived message effectiveness (PME; 3 items, e.g., "This message discourages me from wanting to smoke", $\alpha = .88$). Participants rating for all items were on a 1-7 scale. We used mixed model analysis, with message type and covariates as fixed factors. Participant ID was included as a random factor to account for the clustering effect of exposures. **Results:** Negative (means: 2.67-3.01, $p < .001$) and positive (2.61-2.86, $p < .01$) emotions differed between the messages and across the smoking groups, with dual users reporting higher levels of both positive (3.39-3.66, $p < .001$) and negative (3.20-3.86, $p < .001$) emotions than other groups across messages. Ratings on reactance was 2.98-3.34 ($p < .001$). PME did not differ between messages and was consistently rated above the mid-point of the scale (4.53-4.77, $p = .08$). Overall, young adult nonsmokers gave significantly higher ratings of PME (4.98-5.36, $p < .001$) than other groups. **Conclusion:** The VLNC messages evoked both negative and positive emotional reactions, while resulting in relatively low reactance and moderate perceived effectiveness. These factors serve as potential mechanisms and indicators for behavioral influence. Emotions play a vital role in information processing and decision making. Although the reported values of emotions are relatively low, they are typical for this type of study. Low reactance suggests that participants did not feel that their freedom was threatened by the messages. Past studies showed that PME ratings are indicative of actual effectiveness. Overall, our results suggest that these messages would be good candidates to communicate about VLNCs to the public.

FUNDING: Federal

POS3-8

VALIDITY OF NICOTINE WITHDRAWAL MEASUREMENT IN THE US POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY

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Significance: The PATH Study included a Tobacco Dependence (TD) index that can be used to assess users of different tobacco products. However, the withdrawal syndrome, a core TD symptom, was not similarly reflective of TD across product users. In the cur-



rent study we used methods based in item response theory and model-based recursive partitioning to identify whether characteristics of product users or product use patterns impacted comparability and interpretation of tobacco withdrawal severity scores. **Methods:** Participants were Wave 4 cohort adults ($n=10,449$) with past year Cigarette Only, E-Cigarette Only, Cigar Only, Hookah Only, Smokeless Only, Cigarette+E-Cigarette, or Multiple Product users who completed assessments at Wave 5. Partitioning of subgroups with Differential Item Functioning (DIF) evaluated influences from age, sex, racial/ethnic group, and product use group. Wave 5 quit attempt status was ordered as no attempt, an attempt with 6-months or less of self-reported abstinence, and a longer attempt. All models used complex survey weights. **Results:** Significant non-uniform DIF ($p<0.01$) was identified among seven unique demographic and product use subgroups. Reports of affective withdrawal symptoms and sleep disruption were reported at lower levels and resulted in scores that were 4% (95%CI 2.4-4.8) higher among Black compared White users with the same level of withdrawal severity ($p's < 0.01$). Withdrawal scores were highest among E-Cigarette+Cigarette (mean=1.8, 95%CI 1.7-2.0), and Multiple Product users (mean=1.5, 95%CI 1.3-1.6). Concurrent validation supported relationships between frequency of use ($p<0.01$), time to first use ($p<0.01$), and TD ($p<0.01$) with higher withdrawal scores. Covariate adjusted ordered logistic regression with cumulative link models suggested that lower TD, longer time to first use, and withdrawal symptoms at Wave 4 predicted a higher Wave 5 quit attempt category ($b=0.04$, $se=0.02$, $p=0.01$). The interaction between withdrawal and quit attempts suggested this relationship was significantly attenuated ($b=-0.07$, $se=0.04$, $p<0.05$) for Black relative to White tobacco users. There were no additional interactions of withdrawal scores with sociodemographics. **Conclusion:** The PATH Study provided valid assessment of tobacco withdrawal symptoms. Differences across specific race, age and product user groups suggests a need to understand user characteristics when assessing withdrawal symptoms or differential risk for cessation outcomes.

FUNDING: Unfunded; State

POS3-9

YOUNG PEOPLE ENROLLED IN VAPING CESSATION ARE MORE DEPENDENT, LESS RACIALLY DIVERSE THAN PEERS WHO INTEND TO QUIT

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Significance: Over half of current e-cigarette users (aged 15-36 years) report intentions to quit. Quitting vaping is very difficult. Evidence based cessation programs increase the likelihood of success, but only a subset of users seek treatment. Research is needed to elucidate which young people seek treatment and which do not, to ensure cessation resources promote health equity. This study examines characteristics of young people enrolled in a vaping cessation trial and compares them to a nationally representative sample with expressed intentions to quit. **Methods:** Data was obtained from 697 treatment-seeking participants from a vaping cessation trial conducted between March to April 2023 with This Is Quitting, and 665 participants who expressed intent to quit vaping in the Truth Longitudinal Cohort, a nationally representative longitudinal study of youth and young adults (collected Oct 2022 to Feb 2023). Comparisons were made using two-sample chi-square and t-tests. **Results:** Treatment seeking young people were younger, less racially diverse, more diverse in sexual orientation, and reported higher frequency of e-cigarette use, psychological distress, and nicotine dependence, relative to the nationally representative sample of young people who expressed intentions to quit vaping. **Discussion:** Differences in characteristics across the samples suggest that reporting intentions to quit may not be sufficient to move young people to seek treatment. Results may have implications for public education campaigns or intervention programs, as communications may need to be adjusted to appeal to young people to participate in vaping cessation programs.

FUNDING: Unfunded

POS3-10

POPULATION COVERAGE OF FLAVORED TOBACCO PRODUCT SALES RESTRICTIONS IN THE UNITED STATES

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Background: As of March 31, 2023, 388 US jurisdictions have enacted flavored tobacco product (FTP) sales restrictions. These laws vary in the products, retailers, and flavors they apply to, and more research is needed to understand their impacts on tobacco use and disparities. Estimates of the proportion of the population covered by FTP sales

restrictions over time can be used to evaluate the effects of these laws. We sought to generate quarterly estimates of the effective population covered by FTP sales restrictions of varying comprehensiveness. **Methods:** We used Truth Initiative's FTP sales restriction database, which tracks US local and state FTP sales restrictions and classifies them into six comprehensiveness levels (level 6 being most comprehensive) using a peer-reviewed scheme which considers product, retailer, and flavor inclusions and exclusions. We merged FTP sales restriction data with population estimates from the Census Vintage 2020 Population Estimates for City and Town Population Totals for 2010-2020. We computed state-level population coverage from 2010 to 2023 by determining the total number of people in the state covered by local, county, and/or state FTP sales restrictions for each comprehensiveness level, divided by the total state population at the corresponding year-quarter period. We report quarterly population coverage for FTP laws that include 1) any product(s), 2) e-cigarettes, and 3) cigarettes. **Results:** From 2010 quarter 1 to 2023 quarter 1, US population coverage by any FTP sales restriction increased from 3.1% to 28.3% (coverage by FTP laws that include e-cigarettes and cigarettes increased from 0 to 27.9% and 0 to 15.7%, respectively). As of 2023 quarter 1, laws classified as level 2 comprehensiveness covered the greatest number of people (11.5%). Only 2.9% of US residents were covered by laws classified as level 6 comprehensiveness. Most states had <1% population coverage by FTP laws applying to any products (37 states), e-cigarettes (37 states), or cigarettes (45 states). Few states had 100% population coverage by FTP laws applying to any products (eight states), e-cigarettes (seven states), or cigarettes (two states). **Conclusions:** The proportion of the US covered by FTP sales restrictions is increasing over time, but over 70% US residents remain uncovered by any FTP law and nearly 85% are uncovered by FTP laws applying to menthol cigarettes. Population coverage estimates may be used to longitudinally evaluate the impacts of existing laws on youth tobacco use and health disparities.

FUNDING: Federal

POS3-11

GENDER DIFFERENCES IN DUAL USE AND SMOKING CESSATION IN THE UNITED STATES: LONGITUDINAL FINDINGS FROM THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH STUDY

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Significance: Monitoring differences in tobacco use by gender is critical to effective tobacco control and regulation. Cigarette smoking is more prevalent among US men than women, but this disparity is decreasing over time due to a greater reduction in smoking among men than women. A growing number of US adults who smoke also use another tobacco product, with dual use of cigarettes and e-cigarettes the most common combination. Evidence is mixed regarding the impact of dual use on smoking cessation. However, little is known regarding whether or how dual use and subsequent smoking cessation differ by gender in the US. **Methods:** Wave 4 (W4) adult dual users (current regular users of cigarettes and e-cigarettes) in the Population Assessment of Tobacco and Health (PATH) Survey were followed up in Wave 5 (W5). Weighted percentages were computed for tobacco use characteristics at W4, and weighted univariate logistic regression was used to assess the association between women vs men who were dual users at W4 and subsequent cigarette cessation at W5. **Results:** Among W4 adults who smoke, 14.5% (95% CI=13.6-15.3) also used e-cigarettes (i.e., dual users) with no difference in prevalence by gender. The most common reason for e-cigarette use among both women and men dual users was "They might be less harmful to people around me than cigarettes" (78.6%; 76.6-80.6), though, notably, 74.0% (70.4-77.5) of women vs 66.3% (62.2-70.5) of men used e-cigarettes because "They don't smell." Compared to men, women were more likely to use cigarettes daily and e-cigarettes non-daily (i.e., predominant smokers; 60.5% (56.2-64.7) vs 48.8% (44.3-53.2)) and less likely to achieve smoking cessation at W5 (15.8% vs 21.8%; OR=0.67, 95% CI=0.50-0.92). **Conclusions:** Though the prevalence of dual use is similar among US women and men, women dual users smoke more frequently, use e-cigarettes less frequently, and are less likely to achieve smoking cessation than men. Further, women appear more likely than men to endorse factors associated with social acceptability for e-cigarette use. These findings suggest a disparity in the effect that dual use has on women vs men and demonstrate a need for further research on gender differences in dual use, including non-binary and transgender individuals, to inform tobacco control and regulatory efforts.

FUNDING: Federal



POS3-12

ELECTRONIC NICOTINE PRODUCT CHARACTERISTICS USED BY PREGNANT PEOPLE: DATA FROM THE PATH STUDY

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Significance: Electronic Nicotine Products (ENP), such as e-cigarettes, may be used during and/or in the time surrounding pregnancy. ENPs vary on important characteristics such as nicotine level, flavor and device type, which could impact their appeal, addictive potential, and health risks. Understanding the characteristics of the products being used could inform efforts to support pregnant people who are interested in cessation or harm reduction. **Methods:** Using a nationally representative study of US adults (Population Assessment of Tobacco and Health (PATH) Study Wave 5, we assessed which ENP characteristics were commonly used during and in the time surrounding pregnancy and how frequently ENPs were used. The sample reflects the N=175 participants who were currently pregnant at the time of the assessment or reported having been pregnant in the past year, and who reported ever ENP use, including in the past year and past month. **Results:** Within both the sample overall (N=175) and the subsample who reported using ENPs within the last trimester of pregnancy (N=45), substantial proportions reported using nicotine-free (20% and 9%) or low-nicotine ENPs (40% and 45%), however, there was also notable use of high nicotine ENPs (10% and 18%) as well as substantial proportions who individuals who reported not knowing whether their product contained nicotine and/or not knowing how much nicotine it contained (21% and 13%). Within both the sample overall (N=175) and the subsample who reported using ENPs within the last trimester of pregnancy (N=45), the refillable tank was the most commonly reported device type (49% and 51%), fruit was the most common flavor category (44% and 46%). Although there was a substantial range in terms of frequency of ENP use, among those who reported any ENP use within the three months prior to pregnancy, 40% reported daily use, and among individuals who reported using e-cigarettes during the last trimester of pregnancy, 44% reported every day ENP use. **Conclusions:** Pregnancy is a time when many people are open to cessation or harm-reduction attempts, although not always successful in such attempts. Understanding what ENP characteristics they are using during and around the time of pregnancy could inform clinical or regulatory approaches to support pregnant people in their harm reduction or cessation goals.

FUNDING: Federal

POS3-13

NEW YORK STATE QUITLINE (QL) WEB CHAT: USER INTERACTIONS AND ENGAGEMENT

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Significance: Web chat has been used to engage individuals visiting a website in real time via a familiar pop-up chat window with live chat, chatbots, or a hybrid approach. Web chat delivered on a Quitline website is a novel way to anonymously answer questions, direct visitors to different services, provide support and information, and keep users engaged with content, but little is known about the nature of visitor interactions. This qualitative study examined the content and nature of chat messages received from the QL website. **Methods:** We conducted a Thematic Qualitative Analysis (TQA) and a Linguistic Analysis (LA; LIWC2016) on n=1,628 chat messages received by the New York State Quitline website from 01Jan2023 to 09Mar2023. The LA assessed analytic thinking (logical thought), clout (expertise, confidence), and authenticity (honest, disclosing) with standardized scores were converted to percentiles (PCTL); as well as the percentage of words that reflected temporal orientation, affect (positive, negative), and drives/needs such as affiliation (need to connect with others), achievement (need for success), power (superiority), reward (prize, benefit), risk (danger, doubt). **Results:** Messages included a mean of 34.5 (SD=53.7) words. The TQA revealed 11 thematic categories with more than 70% of messages reflecting requests for general support to quit a tobacco product (33.1%); "I need help quitting smoking;" 13.3% "Trying to quit vaping" or for nicotine replacement (25.1%); "How can I get free nicotine patches?"). Of those who requested help to quitting vape products (n=217), 29 (13.3%) volunteered that they were under 18 years of age. Messages were in the 45th PCTL for analytic thinking, clout, and authenticity; 14% of messages were present-, 2% past-, and <1% future-focused; 7% reflected positive and <1% negative affect; 11% were driven by affiliation and 5% by achievement. **Conclusion:** Website visitors who engaged in web chat on a Quitline website sought general assistance to quit smoking cigarettes or to quit vaping with nearly 1 in 4 seeking free nicotine replacement. Messages were logical, authentic, thoughtful, and focused on meeting an immediate need. One in 10 messages were driven

by a need to connect with others, and 1 in 20 by a need for success. Web chat might be particularly helpful for adolescents seeking help to quit using vaping. More research is needed to understand how use web chat to help people who visit a Quitline website.

FUNDING: No external funding reported

POS3-14

ADOLESCENTS' AND YOUNG ADULTS' PERCEPTIONS OF NICOTINE AND TOBACCO PRODUCT CONTENT ON SOCIAL MEDIA

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Significance: Exposure to and engagement with tobacco-related social media content is prevalent among adolescents and young adults (AYA) and is associated with nicotine and tobacco product (NTP) use. Understanding nuances of tobacco content exposure and engagement (e.g., content valence, sources, formats, platforms) as perceived by AYA may inform policy and public health messaging. **Methods:** AYA aged 13-26 (N=1,163) who use social media 5+ days per week were recruited through Qualtrics Research Services, oversampling for past-month NTP use. Participants reported social media platform use frequency, ever and current NTP use, exposure to and engagement with pro- and anti-NTP social media content (i.e., frequency, source[s], format[s], platform[s]), and sociodemographic characteristics. Bivariate analyses examined differences in NTP content exposure and engagement by current NTP use status. **Results:** The sample (M_{age} = 19.5 [SD=3.6], 79.3% girls/women) was racially and ethnically diverse (38.8% non-Hispanic White, 30.4% Hispanic/Latinx, 18.7% non-Hispanic Black, 12.1% another race or ethnicity) and 70% heterosexual; 25.4% reported past-month NTP use. NTP users (vs. non-users) were significantly more likely to have seen both anti-NTP content (90.8% vs. 79.1%; p<.001) and pro-NTP content (76.9% vs. 59.9%; p<.001). The most prevalent content sources were companies/brands (46.6%) and influencers (44.4%); the most prevalent content formats were video (65.4%) and image (50.7%). Pro-NTP content exposure was most prevalent on TikTok (47.4%), with anti-NTP content exposure most prevalent on YouTube (77.5%). Among those reporting content engagement (i.e., liking, commenting on, or sharing an NTP post; 34.6%), engaging with influencer content was most common (57.2%). Engagement with pro-NTP content was most prevalent on Instagram (42.8%); engagement with anti-NTP content was most prevalent on YouTube (55.5%). Participants with (versus without) current NTP use were significantly more likely to use most social media platforms and to be exposed to and engage with NTP content (p-values < .05). **Conclusions:** Anti-NTP content exposure was pervasive among AYA; however, pro-NTP marketing (including influencer marketing) continues to reach AYA on popular platforms such as TikTok, indicating a need for strong policies and enforcement. Anti-NTP messaging on platforms where pro-NTP messaging is common (e.g., TikTok, Instagram) may help counteract pro-NTP messaging.

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POS3-15

YOUTH AND YOUNG ADULT TOBACCO BEHAVIOR AND PERCEPTIONS IN AREAS WITH AND WITHOUT FLAVORED TOBACCO POLICIES

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Significance and Background: An increasing number of U.S. states and cities restrict the sale of flavored tobacco products. The comprehensiveness of these policies vary greatly. Evaluation efforts have been limited by data availability, with studies focusing on changes in sales of flavored tobacco products or changes in behavior within a single city, county or state. This study assesses differences in youth and young adult behavior and perceptions in areas across the U.S. with and without flavored tobacco restriction policies. **Methods:** Data come from Tobacco Epidemic Evaluation Network (TEEN+) Study, a national probability-based cohort of youth and young adults (aged 13-24) (N=10,255 at Wave 1), fielded from July-October 2022. Respondents were recruited from an address-based household sampling frame; the survey was administered online. Respondents were geocoded for state, city and locality based on latitude and longitude to determine if they lived in an area with an active flavored tobacco restriction policy.



Using a strength of policy coding scheme developed and tested previously, each respondent living in an area with a policy was coded for the strongest policy on a scale of 1-6 with 6 being the most comprehensive. All analyses were conducted in SAS 9.4 and SUDAAN 11.0. **Results:** Overall, 25.4% of TEEN+ Wave 1 respondents (n=2,032) lived in an area with at least one flavored tobacco product restriction policy in effect during the time of data collection. Respondents living in an area with no policy had 1.52 times the unadjusted odds of current tobacco product use compared to those living in an area with at least one policy in effect (CI: 1.26-1.82, p<0.001). The majority lived in areas with policies with major exemptions (Levels 1, 2 or 3, n=1,042, 49.0%). Those living in an area with a policy had lower unadjusted odds of current tobacco use with comprehensive policies having the strongest impact (OR=0.58, CI: 0.45-0.76); however, even policies with major exemptions lowered the odds of current use (OR=0.74, CI: 0.59-0.94) (p<0.001). **Conclusions:** In unadjusted analyses, the odds of tobacco use were significantly lower among youth and young adults residing in a jurisdiction that restricts flavored tobacco sales. Evaluating sub-national flavored tobacco product policies is critical; future work can incorporate contextual policy factors and individual-level sociodemographic characteristics to build a robust base of scientific evidence.

FUNDING: Nonprofit grant funding entity

POS3-16

CIGARETTE SMOKING CESSATION AMONG ADULT USERS OF NON-TOBACCO-FLAVORED ENDS: LONGITUDINAL ANALYSIS OF PATH STUDY

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Significance: Electronic nicotine delivery systems (ENDS) have been shown to be associated with cigarette smoking cessation in randomized trials and some observational studies, but the impact on flavors is less clear. This study examines the effects of flavored ENDS on cigarette smoking cessation. **Methods:** Using the Population Assessment of Tobacco and Health (PATH) Study Waves 3-6 data (2016-2021), we examined the association between non-tobacco-flavored versus unflavored or tobacco-flavored ENDS use and smoking cessation among established adult cigarette smokers aged 25+ using discrete-time survival models. Current regular ENDS use was measured as a categorical time-varying covariate, lagged by one wave with the following groupings: 1) never or non-current regular use, 2) regular exclusive unflavored or tobacco-flavored ENDS use, and 3) regular non-tobacco-flavored ENDS use, and was distinguished by past-30 day and frequent (10+ days used in past-30 days). Current established smokers at baseline were classified as having quit in subsequent waves if they reported 1) not currently smoking every day or some days and 2) having completely quit cigarette smoking. We adjusted for baseline demographics (age, sex, race/ethnicity, education), tobacco dependence, and menthol cigarette smoking. **Results:** Of the 6,568 established smokers at Wave 3, 1,481 (22.5%) reported smoking cessation by Wave 6. Non-tobacco-flavors were reported by 76.6% of regular ENDS users. For past-30 days use, non-tobacco-flavored ENDS use was significantly associated with smoking cessation (adjusted hazard ratio [aHR] 1.48, 95% CI 1.24-1.77), but unflavored or tobacco-flavored ENDS use was not (aHR 0.97, 95% CI 0.61-1.56) compared to never or non-current regular ENDS users. When restricted to more frequent ENDS use, the aHRs became larger for both non-tobacco-flavored use (aHR 1.74, 95% CI 1.40-2.16) and unflavored or tobacco-flavored ENDS use (aHR 1.45, 95% CI 0.80-2.62), although the latter was not statistically significant. **Conclusions:** Non-tobacco-flavored ENDS use was associated with increased adult smoking cessation. Unflavored or tobacco-flavored ENDS use was not associated with smoking cessation, but more frequent use showed a positive, although insignificant, association with cigarette smoking cessation. Further research is needed to understand the role of specific flavors and type of flavored ENDS devices in supporting cigarette smoking cessation in adults.

FUNDING: Federal; Nonprofit grant funding entity

POS3-17

PRIMARY CARE REFERRAL TO A QUITLINE VS. A TOBACCO CESSATION NAVIGATOR FOR SOCIOECONOMICALLY DISADVANTAGED PATIENTS: IMPACT ON PATIENT ENGAGEMENT AND RECEIPT OF CESSATION MEDICATIONS

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Significance: Evidence-based smoking cessation interventions are generally underused in primary care settings serving socioeconomically disadvantaged patients. We developed a novel, multi-component intervention in which a tobacco treatment navigator (TTN) discusses and facilitates connections with cessation resources. We compare the engagement with and use of tobacco cessation resources for patients referred to the TTN vs. those referred to a state tobacco quitline (QL). **Methods:** Prospective observational study conducted July 2021-June 2023. The sample includes adult patients seen at one of 11 primary care practices within a U.S. safety-net medical system who were electronically referred to the TTN or QL for tobacco cessation assistance. An electronic referral is an order placed in the electronic health record that sends a message such that the recipient proactively calls the patient to engage in services. The TTN offers assistance options and places referrals and/or orders for cessation counseling, medication and technological supports. The QL offers five telephonic counseling sessions and two weeks of free NRT. Outcomes include receipt of 1) cessation counseling and 2) cessation medication. Analyses compare outcomes for TTN vs. QL groups using binary and ordinal multivariable logistic regression modeling with general estimating equations methods to account for clustering within clinicians. **Results:** A total of 951 patients were referred during the 24-month study period; 318 to the TTN and 633 to the QL. Sex, race and Hispanic ethnicity were similar between groups. Patients referred to the TTN were more likely to be younger and to have commercial insurance. The TTN reached 45.4% of patients vs. 20.2% reached by QL. Among those who accepted a referral to counseling, 18.4% vs. 7.7% received 2+ sessions; 6.1% vs. 6.9% received one, and 75.5% vs. 85.4% received no counseling (AOR=2.1, 95% CI 1.0-4.4) for TTN and QL respectively. Receipt of tobacco cessation medications was 20.8% vs 9.0% (AOR= 2.8, 95% CI 2.0-3.9) for the TTN and QL respectively. **Conclusion:** Primary care referrals to the TTN resulted in greater reach and engagement with tobacco cessation resources than referrals to a QL. The TTN approach shows promise for improving receipt of tobacco cessation support, however reach was lower than 50% and patient engagement in counseling and receipt of cessation medications was modest. It is critical to identify additional strategies to increase the reach and engagement of primary care patients in tobacco cessation support.

FUNDING: Nonprofit grant funding entity

POS3-18

A SYSTEMATIC REVIEW AND META-ANALYSIS OF THE RELATIONSHIP BETWEEN SMOKING AND INTELLIGENCE MEASURES

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Introduction: It is unclear if smoking influences cognitive/ intellectual abilities, assessed by intelligence quotient (IQ) test scores. In this study, we systematically reviewed and synthesize results of studies concerning the association between tobacco smoking and IQ. **Method:** We systematically searched PubMed, Embase, Scopus, Web of Science and PsycINFO and employed an AI research tool to conduct additional search for publications on the association between tobacco smoking (including second-hand exposure) and IQ, published up to 23 April 2022. Data on study details, measurement of smoking and measurement of IQ were extracted from each article. Quality was assessed using the Newcastle-Ottawa Quality Assessment Scale. A meta-analysis using a random effects model was also conducted. **Results:** A total of 15 publications (out of 1,030 identified) were included. The studies had low appraisal scores (average of 5.5 over 10). Eleven cross-sectional papers concerned young adults, adolescents and children. Among three studies that focused on second-hand smoke, two reported significant negative influence of second-hand smoking on IQ. Meta-analysis of four methodologically comparable cross-sectional studies found a significant association between smoking and lower IQ



(pooled mean difference = 4.79, 95% CI: 3.11 - 6.48, I² = 47.7%). Findings were robust to sensitivity analyses. Four longitudinal studies concerned older adult populations (aged 64 to 80). All found significantly lower IQ scores among people who currently smoke. **Discussions and Conclusions:** We found a modest association between tobacco smoking and lower IQ, when measured through standardised testing. Further studies are warranted to investigate suggestive evidence of cognitive recovery after quitting smoking and to explore whether the difference is explained by residual confounding or reflects adverse cognitive effects of cigarette smoking.

FUNDING: State; Academic Institution

POS3-19

TOBACCO PRODUCTS USE AMONG US ADULTS WITH EPILEPSY: 2021 NATIONAL HEALTH INTERVIEW SURVEY

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Objectives: To examine the prevalence of tobacco product use among people living with epilepsy (PLWE) compared to non-epileptic people, and to explore the risk factors associated with their use of these products. **Methods:** Data were drawn from the 2021 National Health Interview Survey (NHIS). Our analytic sample included 29,482 adults aged 18 or above with (n=511) and without (n=28,951) epilepsy. We performed a weighted multivariable regression model to explore the association between epilepsy and tobacco use status (never, former, and current use) adjusting for several confounding factors including sex, age, race, etc. All analyses were weighted to adjust for non-response and to be representative of the US population. **Results:** PLWE were more likely to be former (vs never smokers, AOR=1.4; 95%CI: 1.1-1.8; p=.006) or current smokers (vs never smokers, AOR=2.0; 95%CI: 1.5-2.7; p<.001) compared to non-epileptic individuals. Similarly, PLWE were more likely to be former e-cigarette users (vs. never users, AOR=1.4; 95%CI: 1.1-1.8; p=.02). In addition, we did not observe significant differences in former or current use of other tobacco products (i.e., cigars, pipes, smokeless tobacco) between epileptic and non-epileptic individuals (all p>0.05). **Conclusions:** Our findings showed that PLWE continue to be at greater risk of smoking compared to non-epileptic adults. They were also more likely to be former users of e-cigarettes. This indicates that this vulnerable population has not benefited from the harm reduction feature of e-cigarettes to quit smoking. These findings are important to inform regulatory bodies and clinicians in expanding tailored cessation programs to epileptic patients.

FUNDING: Unfunded

POS3-20

EVALUATING THE CAUSAL EFFECT OF COVID-19 "LOCKDOWN" POLICIES ON TOBACCO-USE

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Background: In March 2020, state governments in the United States began to institute "lockdown" policies to curb the spread of the novel coronavirus. There were concerns these policies would affect mental health and substance-use. The goal of this research was to quantify the impact of COVID-19 "lockdowns" on tobacco use, particularly among those with poor mental health. **Methods:** We analyzed Behavioral Risk Factor Surveillance System (BRFSS) data from 2014 onwards using a novel difference-in-difference framework. This framework allows for the quantification of the causal effect of these policies while accounting for the staggered timing within each state. We created an intensity indicator for each state's "lockdown" based upon the presence of statewide mandates and different facets of policies: stay-at-home orders, non-essential business closures, and public masking mandates. Policies were modeled using dates enacted and dates ended. State-specific effects were calculated and aggregated using inverse-variance weighting. Mental health impairment was defined as 14 or more days in the past 30 days of poor mental health. Analyses control for age, education level, sex, and race of individual respondents, as well as state and annual linear trends. **Results:** The probability of being a current combustible-tobacco user declined during the lockdown period. However, there was only evidence of a decline among those with mental health impairment (MHI). In states with the highest intensity index, there was a 4.3% reduction in the probability of smoking among those with MHI (95% CI: -2.9 to -5.8). In the post-lockdown period of 2020, there was a 3.1% reduction in the probability of smoking among those with MHI who lived in a state with any stay-at-home order (95% CI: -2.0 to -4.2). Similarly in 2021, there was a 3.8% reduction in smoking probability compared to no-lockdown states. Among those without MHI, there was no evidence of any difference in the probability of smoking during lockdowns. However, there was a slight decrease (-0.3%) in the post-lockdown period of 2020 (95% CI: -0.01 to -0.5). There was a 0.4% decrease in

2021 among those without MHI living in states that enacted a lockdown policy (-0.15 to -0.65). **Conclusions:** While smoking prevalence decreased due to lockdown policies, those with mental health impairment appear to be driving this decline. Further research is needed to understand the mechanism of these observed changes.

FUNDING: No external funding reported

POS3-21

EXPOSURE TO MARKETING OF CIGARETTES, HEATED TOBACCO PRODUCTS, AND NICOTINE VAPING PRODUCTS AND SUPPORT FOR TOBACCO ADVERTISING AND DISPLAY BANS IN THE REPUBLIC OF KOREA: FINDINGS FROM THE 2020 AND 2021 INTERNATIONAL TOBACCO CONTROL (ITC) KOREA SURVEY

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Significance: Tobacco marketing increases initiation of combustible cigarettes (CCs) and heated tobacco products (HTPs) and interferes with cessation. The Republic of Korea was bound by Article 13 of the WHO Framework Convention on Tobacco Control (FCTC) to implement a comprehensive tobacco advertising ban by 2010 (5 years after FCTC ratification). Korea's 5th National Health Plan (HP2030) aims to ban point-of-sale (POS) displays and advertising of tobacco products (CCs, HTPs, nicotine vaping products (NVPs)) in retail establishments. This study measured (1) reported exposure to the marketing of CCs, HTPs, and NVPs, and (2) support for CC and HTP marketing bans by people who use these products in Korea. **Methods:** Data are from the ITC Korea Wave 1 (2020) and 2 (2021) Surveys—web-based cohort surveys of Koreans aged 19+. Respondents (N=7298) were those who smoke CCs (N=5771), and/or use HTPs (N=2889), and/or NVPs (N=1313) ≥ weekly. Weighted logistic regression models examined (1) reported exposure to CC/HTP/NVP marketing in the last 6 months, and support for CC/HTP marketing bans among respondents who use these products and (2) support for marketing bans among all respondents (those who quit/never smoked CCs (N=1527), and those who do not use or use <weekly HTPs (N=4409) and NVPs (N=5985). **Results:** Store windows/shops that sell tobacco products (CCs, HTPs, and/or NVPs) were the highest reported sources of advertising for CCs (64.5%), HTPs (74.8%), and NVPs (46.3%) in 2021 among respondents who use these products, followed by websites/social media for HTPs (52.0%) and NVPs (37.6%), and posters/billboards for CC advertising (31.8%). Between 2020 and 2021, HTP advertising increased via websites/social media (p<0.001) and email/text (p<0.05). CC advertising increased on store windows/inside/outside stores that sell tobacco (p<0.05). Bans on CC and HTP advertising were supported by about half of respondents who use these products in stores (CC=55.3%, HTP=50.4%) and POS displays (CC=42.6%, HTP=46.9%), with higher support among all respondents (stores: CC=76.0%, HTP=65.5%; POS displays: CC=67.8%, HTP=63.7%). **Conclusion:** Tobacco product advertising in retail establishments and online channels is high and increasing in the Republic of Korea. Strong support for bans on CC/HTP advertising and POS displays, including among those who use these products, suggest that Korea's HP2030 policies will be well-received.

FUNDING: Federal; State; Academic Institution; Nonprofit grant funding entity

POS3-22

IMPACT EVALUATION OF THE SUPPORTING INDIGENOUS SMOKERS TO ASSIST QUITTING TRIAL APPLYING FAIT FRAMEWORK

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Significance: The "Supporting Indigenous Smokers To Assist Quitting"(SISTAQUIT) study conducted a cluster randomized controlled trial within mainly Aboriginal Medical Services (AMS), with a primary objective of assessing the comparative effectiveness of evidence-based culturally appropriate smoking cessation care training in contrast to standard care. This intervention aimed to improve cessation rates among Aboriginal and Torres Strait Islander pregnant women (Australian Indigenous people). **Method/ Approach:** This study employed the Framework to Assess the Impact from Translational Health Research (FAIT), which offers a comprehensive approach for evaluating the



diverse impacts of translational health research initiatives. Including a program logic model, document analysis and narrative description. Results: The study yielded relevant outcomes across various impact dimensions, including capacity building, knowledge enrichment, practice transformation, and enhancement of the health system. A total of 22 services participated in the trial, involving the training of 116 healthcare professionals. This training not only heightened awareness about the efficacy of Nicotine Replacement Therapy as a means of supporting quitting during pregnancy within the intervention arm but also bolstered confidence in delivering appropriate treatment. The integration of carbon monoxide monitors into consultations with pregnant women demonstrated proactive practice implementation. Moreover, the trial fostered collaborations among organizations and active community engagement, thereby securing major funding for subsequent phases. Identification of both challenges and facilitators during the trial was pivotal. While obstacles such as staff turnover, time constraints, and the need for additional research-oriented training were recognized, enablers like effective engagement with pregnant women were highlighted. Recommendations, including alternative training delivery approaches and data collection training, were proposed. Conclusion: By implementing the FAIT framework, this study effectively showcased the diverse areas of impact achieved throughout the trial. This approach provides a comprehensive evaluation of the project's influence, highlighting its potential to shape future interventions and initiatives.

FUNDING: Federal

POS3-23

IMPROVING ADOLESCENTS' TOBACCO KNOWLEDGE THROUGH A GAME-BASED SOCIAL PROGRAM: A PILOT PRE-POST TEST

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Introduction: Communicating the dangers associated with tobacco use to adolescents can prove to be difficult, even when the tobacco risks are well-documented. This is particularly the case, given the tobacco industry's efforts to attract youths through carefully crafted advertisements and misinformation. We developed Storm-Heroes, a game-based social intervention for adolescent tobacco education. Storm-Heroes communicated the risk of a comprehensive list of tobacco products while abiding by the transtheoretical model of behavior change. The goal of this study was to test the impact of the program on adolescents' tobacco knowledge. **Approach:** We implemented Storm-Heroes, targeting 59 students aged 13-14 years over the course of one semester. Moderated by a teacher, Storm-Heroes included a social intervention merged with a series of entertainment-education videos. For this sample, among other measures, we assessed students' tobacco knowledge at baseline and post-test. We conducted a mixed effects linear model with time predicting tobacco knowledge. Knowledge was measured through an index of 22 items that ask knowledge questions regarding a variety of products (i.e., vaping products, cigarettes, cigars, little cigars, hookah, and smokeless tobacco), with multiple-choice answers. **Findings:** The results indicated a significant improvement in tobacco by post-test ($p < 0.001$), with scores increasing from an average of 12.3 ($SD=3.1$) to 14.4 ($SD=3.5$). The median score also improved from a score of 13 at baseline to 15 by post-test. **Discussion:** This study presents an initial short-term test of Storm-Heroes' ability to improve tobacco knowledge among teenagers. While the results indicate short-term improvement, it is crucial to assess if tobacco knowledge can be maintained in the long term. Our plan is to also dig deeper into the cognitive and emotional mechanisms that facilitate information retention, thereby improving tobacco knowledge.

FUNDING: Federal

POS3-24

FEASIBILITY AND ACCEPTABILITY OF INSPIRED: A GAME-BASED SMARTPHONE SMOKING CESSATION INTERVENTION

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The majority of smokers express an interest in quitting and about half attempt to quit, but about 90% of quit attempts fail (Babb et al., 2017). Videogame-based interventions have the potential to address common barriers to evidence-based smoking cessation treatment including cost, lack of access to healthcare settings, and engagement (Twyman et al., 2014). The purpose of this study was to evaluate the feasibility and acceptability of a videogame-based smoking cessation intervention called *Inspired*. U.S. adults ($n=48$) were recruited online to use *Inspired* on their smartphone for 7 weeks; the final 6 weeks of which comprised the cessation phase. The object of the game was to grow and defend

one healing tree per level against attackers, by allocating different colored gems from their bank to activate either healing or defensive structures. Participants were required to enter in the number of cigarettes they smoked twice a day in a smoke report to unlock levels of the game. Completion of the levels awarded them in-game currency, which was used to strengthen their structures. Participants received additional in-game rewards from their smoke reports, consisting of gem prisms (used to power their structures for longer) and larger amounts of in-game currency. Participants were 56.3% female, 8.3% Hispanic, 77.1% white, 56.2% employed, 54.2% earning less than \$40,000 a year, and had an average age of 39.79 ($SD=10.72$). Geographically, 29.2% of the sample lived in non-urban areas (e.g., rural, suburban; United States Census Bureau, 2023). Participants had large variation in engagement, reaching a mean highest level of 10.71 ($SD=8.43$). Participants reported abstinence on 31.36% ($SD=38.16\%$) of all cessation phase reports and averaged 5.40 samples of continuous abstinence ($SD=9.78$). For every one-standard deviation increase in highest level achieved, there was a 27% increase in the percentage of abstinent samples and a 405% increase in longest continuous abstinence. On an 11-point scale, participants rated the intervention moderately favorably: if they had to do it again, they would use *Inspired* to help them quit ($M=6.43$, $SD=3.44$) and *Inspired* was helpful in this current attempt to quit ($M=5.37$, $SD=3.57$). These results support the feasibility and acceptability of *Inspired* for a geographically diverse population. Scalable and accessible smoking cessation interventions could be the key to addressing the number one cause of preventable morbidity and mortality in the U.S.

FUNDING: Federal

POS3-25

MODIFICATION OF ELECTRONIC NICOTINE DELIVERY SYSTEMS (ENDS) AMONG ADOLESCENTS AND YOUNG ADULTS

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Significance: Evidence suggests that the ability to modify or "hack" electronic nicotine delivery systems (ENDS) appeals to adolescents and young adults (AYAs). However, scientific understanding of awareness and perceptions of, information sources about, and engagement in modifying ENDS among AYAs is lacking. Thus, we examined these factors among AYAs in the U.S. **Methods:** AYAs ($N=1018$) who endorsed past-month ENDS use completed an online survey (November 2022-February 2023). We assessed awareness and use of the following modifications: 1) refilling rechargeable or 2) disposable cartridges/pods; 3) re-wicking or 4) recharging disposable pods; 5) modifying nicotine e-liquids (e.g., changing PG/VG, nicotine), 6) combining nicotine and cannabis to be vaped simultaneously; and 7) putting cannabis in ENDS designed to vape nicotine. We used logistic regression to assess how perceptions and sources of information about ENDS modifications (e.g., friends, social media, websites, vape shops) related to engaging in each modification. **Results:** Refilling (69.0% heard, 40.1% tried) and recharging the battery (66.4% heard, 35.8% tried) of disposable pods were most common. Friends (64.4%) and social media (46.7%) were the most common sources of information. Significant associations between information sources and modifications were: (1) non-social media websites and vape shops with re-wicking and recharging disposable devices and modifying nicotine e-liquid, (2) non-social media websites with refilling rechargeable pods/cartridges, and (3) friends with recharging disposable devices. Perceptions of reduced harm and "coolness" were significantly associated with various modifications. **Discussion:** AYAs are aware of and modify ENDS for purposes unintended by manufacturers. Prevention efforts should focus on educating AYAs about potential harms of ENDS modifications, focusing on retailers like vape shops and digital media. Furthermore, policies regarding ENDS should consider unintended ENDS use by AYAs to maximize public health benefit.

FUNDING: Federal

POS3-26

SELF-REPORTED EXPOSURE TO ANTI-SMOKING MESSAGES AMONG INDONESIAN YOUTH: A DESCRIPTIVE ANALYSIS

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Significance: Numerous anti-tobacco campaigns have been developed to counteract tobacco advertising campaigns among Indonesian youth. This study describes self-reported exposure to anti-smoking messages in various media among Indonesian youth. **Methods:** We conducted a cross-sectional structured survey in four Indonesian districts. In each district, we selected three subdistricts, randomly sampled schools, and randomly



selected two classes to interview all students. Students were asked about smoking behavior and anti-smoking messages they had seen or heard and the message media, conventional media, TV, radio, outdoor advertisements, paper/magazine, and/or new media, the internet, and social websites. **Results** We interviewed 6,786 students, 3,460 male students, and 3,326 female students. The percentage of ever smokers was 42.2%, males 36.9%, and females 5.3%. The study showed that the average percentage of exposure to conventional media was 24.55%, TV 32%, radio 5.6%, outdoor advertisements 45.8%, and paper/magazines 14.8%. The average exposure to new media was 30.75%, the internet 30.1%, and social websites 31.4%. **Conclusions** Exposure to anti-smoking messages among Indonesian youth varied by media type. The highest exposure was to outdoor advertisements. The Indonesian government can increase the intensity and expand the coverage of the exposure to anti-smoking messages among Indonesian youth.

FUNDING: Nonprofit grant funding entity

POS3-27

LUNG CANCER SCREENING ADHERENCE AND OUTCOMES OF PEOPLE WITH HIV WHO SMOKE IN A SOUTH CAROLINA HEALTHCARE SYSTEM

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Significance: Lung cancer (LC) is the leading cause of death among Americans and tobacco use is a major contributor. People with HIV (PWH) often have multiple risk factors for lung cancer, including high rates of tobacco use. Lung cancer screening (LCS) may identify lung cancer (LC) at earlier, more treatable stages, yet the uptake of LCS among PWH is as low as 14% in contemporary studies. This is a priority population for tobacco researchers, as all LCS patients have a smoking history, with PWH experiencing higher rates of tobacco use and LC than the general population. **Methods:** Through chart extraction, PWH who had attended a LCS shared decision-making visit at the Medical University of South Carolina from 2015 to May 2023 were identified. Patients were stratified into current smoking or quit smoking (last 15 years) at baseline. Demographics from the baseline scan and descriptive statistics were evaluated and used to examine adherence to LCS recommendations (i.e., annual screening if eligible) and outcomes. **Results:** Since 2015, an LCS shared decision-making visit was completed by 61 PWH. Of those, 59 (96.7%) completed the low-dose CT scan. At baseline, average age was 61 (SD:5.4), 56% (N=33) identified as Black, 73% (N=43) were male, 66% (N=39) were current smokers and average pack year smoking history was 41 (range: 20-160). When stratified by smoking status, average pack year history in current smokers was higher than in former smokers (mean 45 versus 35 respectively). At the baseline LCS, 31% had a positive screen (lung nodule ≥ 4 mm). Of all screenings completed in the 8-year data analysis period, 42% were positive. There were 2 lung cancer diagnoses: one individual currently smoking and one who formerly smoked. **Conclusions:** The findings support the benefit of LCS in PWH, as 2 lung cancers were identified, and the nodules can be monitored for LC. Further, our findings demonstrate higher rates of positive screenings and higher smoking rates than the National Lung Screening Trial (27% and 48%, respectively), which highlights the health burden of risk factors for PWH attending LCS. LCS may present a prime opportunity to intervene on smoking in PWH. There is a need for further research into integrating smoking cessation at the point of LCS as well as screening eligibility criteria, timing, and impact of LCS for PWH.

FUNDING: Federal

POS3-28

SELF-REPORTED REASONS FOR AND AGAINST ORAL NICOTINE POUCH UPTAKE AMONG CIGARETTE SMOKERS IN OHIO

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Significance: Oral nicotine pouches (ONPs) may be an attractive alternative to traditional tobacco products given their low toxicant burden and reduced cancer risk. However, ONP initiation and uptake among cigarette smokers is low compared to non-combustible tobacco users. In a sample of cigarette smokers who had enrolled in a human laboratory clinical trial that involved sampling ONPs, we examined reasons participants chose to continue or discontinue using ONPs at the 6-month follow-up. **Methods:** Exclusive adult cigarette smokers (N = 41) with no recent ONP use or intentions to quit or switch products participated in one of two human laboratory clinical trials assessing the abuse liability of ONPs. As part of the trials, participants sampled 2 ONPs for 30 minutes each. Six months later, participants completed an online follow-up survey to assess ONP uptake and reasons participants chose to continue or discontinue ONP use following

trial participation. We descriptively analyzed participant characteristics and reasons for and against continuing ONP use. **Results:** Nearly half (46.3%) of participants (63.4% men, 85.4% white non-Hispanic, mean age=39.6 years; 85.4% response rate) reported any ONP use at the time of 6-month follow up. Among those participants who used ONPs at the time of follow up, primary reasons for continuing ONP use included using ONPs at times when smoking is not possible (68.3%), to help cut down or quit smoking (63.2%), convenience (47.4%), discretion (42.1%), and reduced harm (32.0%). Primary reasons for not using ONPs after trial participation included ONPs do not replace the feeling of smoking (63.6%), ONPs deliver too much nicotine (18.2%), disliking the feeling of ONPs (18.2%), no interest in quitting cigarettes (18.2%), and dislike of the taste of ONPs (13.6%). **Conclusion:** Uptake of ONPs among this sample was primarily related to use when smoking is not possible and cessation, whereas the primary reason for lack of ONP uptake was related to ONPs not replacing the feeling of smoking. Given the reduced risk offered by ONPs, future studies should explore what factors would maximize ONPs' appeal relative to cigarettes.

FUNDING: Academic Institution; Nonprofit grant funding entity

POS3-29

SUPPORT2QUIT: A COGNITIVE DISSONANCE MOBILE APP FOR SMOKING CESSATION

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Significance: New and innovative, theory-driven approaches are needed to increase the reach of effective interventions and improve the overall abstinence and long-term quit rates. Cognitive dissonance approaches have shown success in treating substance use and improving smoking cessation but has never been delivered via a mobile app. **Methods:** We have developed a cognitive dissonance-based mobile app that relies on video interactions between group members to aid in the quitting process. Development of the app included 6 video-based modules, each of which presented instructions for a smoking cessation "activity" that users were required to record using their phone and then post within the app. Modules included instructions for choosing a quit date, outlining pros and cons of their smoking, drafting a letter to loved one stating their commitment to quit, and telling an adolescent the reasons they should avoid starting to smoke. Each participant in the group could view posted videos of other group members. **Results:** Pilot data (N = 60) demonstrated the efficacy of the program. Decreases in smoking from pretest to posttest showed significant increases in cognitive dissonance after downloading and watching content in four of five content areas. Readiness to quit scores increased significantly and 72% of participants reported lower daily smoking rates at posttest. Increased cognitive dissonance was highly related to decreases in smoking and smoking cessation. Based on the positive outcomes of the pilot study we are currently testing the cessation outcomes in a randomized clinical trial (RCT) with 500 adult daily smokers in the USA. The participants are recruited via Facebook ads and after consenting, they are randomized to either the Cognitive Dissonance program, Support2Quit, or an app that provides daily prompts and support via Tips for Quitting. Outcomes related to the short-term effectiveness of the app in decreasing smoking and increasing cessation will be presented, as well as recruitment procedures, and participant engagement and retention. Data from a pilot study and preliminary outcomes related to changes in quit attempts, number of days without smoking (smokefree days), changes in smoking attitudes and behavior, and cessation from the RCT will be presented. **Conclusion:** Cognitive dissonance can be induced via a mobile app and this innovative program has high potential public health impact via the ability to reach high risk, underserved populations of smokers.

FUNDING: Federal

POS3-30

COMPARISON OF TOBACCO PRODUCT USAGE AND MOTIVATIONS TO QUIT BETWEEN COMMUNITY/TRADE SCHOOL AND FOUR-YEAR UNIVERSITY STUDENTS

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Significance: Few studies have evaluated differences in tobacco use in the contemporary landscape, or differences in motivating factors to quit tobacco, between four-year university students and community college/trade school students, ultimately limiting our ability to create targeted prevention/intervention programs best suited for each unique college campus environment. Thus, the present study aimed to examine differences in tobacco and synthetic nicotine product use, and motivating factors for quitting between university students and community college/trade school students. **Method:** Participants were a convenience sample of 16939 students from 22 Texas



colleges/universities during Spring 2023. Participants were an average age of 21.9 (SD=5.0); 65.3% female; 27.9% non-Hispanic white, 37.2% Hispanic/Latino, and 34.9% were of another race/ethnicity. Chi-squares were conducted to assess differences in the past 30-day use of five tobacco products (cigarettes, cigars, hookah, smokeless, and ENDS), two types of synthetic nicotine products (disposables and oral pouches/toothpicks/lozenges), and motivating factors for quitting tobacco, between students from a university vs community college/trade school. **Results:** A larger proportion of university students reported past 30-day use of cigarettes (chi-square=15.6, $p<.001$), cigars (chi-square=4.0, $p=.044$), hookah (chi-square=8.3, $p=.004$), smokeless tobacco (chi-square=5.7, $p=.017$), and disposable vape synthetic nicotine (chi-square=4.6, $p=.032$), but not ENDS or 'other' synthetic nicotine. A larger proportion of university students reported personal health concerns (chi-square=9.2, $p=.002$), dating someone who disapproves of tobacco (chi-square=4.0, $p=.045$), and money/costs of products (chi-square=4.7, $p=.031$) as motivating factors for college students to quit tobacco. No other significant differences were observed. **Conclusions:** Interventions to reduce tobacco use should not be one-size-fits-all. Different educational institution types will require varying approaches based on the specific patterns of use and motivations identified. With higher prevalence of tobacco use among four-year university students for most surveyed products, universities should remain the focus of initiatives for college students. Additionally, for this demographic, reported key motivating factors to quit - personal health reasons, partner disapproval, and financial costs - should guide the development of targeted messaging and support services.

FUNDING: State

POS3-31

ASSOCIATIONS OF HEALTH LITERACY WITH PARTICIPANT CHARACTERISTICS, TREATMENT ENGAGEMENT AND CESSATION OUTCOMES AMONG CIN AND CERVICAL CANCER SURVIVORS

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Significance: In the general population, lower (vs. higher) health literacy is associated with poorer cessation outcomes. No known studies have examined these associations among cancer survivors. This study involves a secondary analysis of a 2-group smoking cessation RCT comparing Motivation And Problem Solving counseling (MAPS) to Standard Treatment among women with a history of CIN or cervical cancer. **Methods:** Lower versus higher health literacy differences in demographics, psychosocial characteristics, assessment completion, MAPS treatment engagement, and abstinence at end of treatment were examined among participants alive at 18-months ($n=194$). Given that lower health literacy is a marker of lower SES and generally associated elevated stress and psychological distress, exploratory analyses were also conducted to examine potential indirect effects of health literacy on cessation outcomes via stress and psychological distress at the end of the treatment period (12 months). **Results:** 16.5% ($n=32$) of participants had lower (vs. higher) health literacy. Those with lower (vs. higher) health literacy reported initiating smoking at a younger age (14.5 vs. 17.5 years, $p=.02$), greater financial strain ($p=.03$), higher perceived stress ($p<.001$) and greater psychological distress ($p<.001$). Participants with lower (vs. higher) health literacy were less likely to complete all follow-up assessments (50% vs. 73.9%, $p=.01$). However, within the MAPS condition, those with lower (vs. higher) health literacy were significantly more likely to complete the full 6-session counseling protocol (63.6% vs. 28.7%, $p=.02$). Although there was no significant zero-order correlations between health literacy and abstinence, exploratory analyses indicated that lower health literacy was indirectly associated with a lower likelihood of smoking abstinence via increased stress ($p=.03$) and psychological distress ($p=.02$). **Conclusions:** Findings highlight that survivors of CIN or cervical cancer with lower health literacy have elevated levels of psychosocial stress that may lead to decreased engagement in research studies. However, the MAPS treatment engagement results are encouraging and highlight holistic, flexible counseling approaches, like MAPS, may be particularly well-suited to this population. Further research is needed to better understand the mechanisms through which health literacy may influence tobacco treatment engagement.

FUNDING: Federal; Academic Institution

POS3-32

TRENDS IN PRESCRIPTION OF NICOTINE REPLACEMENT THERAPY FOR HOSPITALIZED TOBACCO USERS

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Significance: Use of nicotine replacement therapy (NRT) has been found to increase cessation rates by 50-60%. Prior studies have shown wide variations in nicotine replacement prescribing baseline rates for hospitalized smokers (5-21%). This study aims to add to this literature by defining the current rate of nicotine replacement therapy prescriptions for smokers during and after hospitalization at a large academic medical center. **Methods:** *Study Sample* A single center retrospective cohort study was conducted to evaluate prescriptions of nicotine replacement therapy and other smoking cessation medications during admission and time of discharge. Patients who self-identified as smokers and had at least one admission to a Medical University of South Carolina (MUSC) hospital over a 3-year period (January 1, 2019 to January 1, 2023) were included. Results were gathered via SlicerDicer within the Epic Electronic Health Record (EHR). *Measures* The primary outcome of interest was the number of patients with a prescription for NRT during an inpatient admission. NRT prescriptions included nicotine patches, gum, and lozenges. The secondary outcome was the number of prescriptions written for nicotine replacement at time of discharge. **Results:** A total of 20,575 patients who smoke with at least one hospitalization within the study period were included. Of included patients, 41% were age 45-64, 36% were age 19-44, 21% were age 65-84, 1% were age 85 or over, and <1% were age less than 18. Of the cohort, 60% identified as White, 37% identified as Black, and 4% identified as other races. In the study population, 56% were males. Of the cohort, 7,240 (34.9%) received at least one prescription for NRT while they were admitted to the hospital. Of those prescribed NRT, 94.5% were prescribed patches, 25.6% were prescribed gum and 7.7% were prescribed Lozenges. Patients receiving an inpatient prescription for NRT were more often White, age 19-44 or 45-64 and male. At discharge, 2,625 (12.6%) received a prescription for NRT. NRT was prescribed as patches for 94.6% of patients, gum for 12.7% of patients and lozenges for 6.9% of patients. **Conclusions:** Hospitalization presents an opportunity for healthy lifestyle modification. For smokers, nicotine replacement therapy increases the likelihood of smoking cessation, with higher rates of compliance when started during a hospitalization. This study found baseline rates of nicotine replacement therapy prescribing to patients who smoke who have an admission to the hospital are low. These low rates present an opportunity for inpatient providers to engage in tobacco cessation treatment.

FUNDING: No external funding reported

POS3-33

HEATED TOBACCO PRODUCT USE AND METABOLIC SYNDROME: A CROSS-SECTIONAL STUDY

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Significance: Since the introduction of IQOS in 2014, heated tobacco products have gained global popularity, but their health effects remain largely unknown. This study aimed to investigate the association between heated tobacco product use and metabolic syndrome. **Methods:** This cross-sectional study utilized data from the Epidemiological Study of Health Effects in Fukushima Nuclear Emergency Workers. We analyzed information from 3,321 male participants who completed the first follow-up survey between 2020 and 2022, during which heated tobacco product use was initially collected through a questionnaire. Participants were categorized into five groups: never smokers ($n=950$), past smokers ($n=1,527$), exclusive cigarette smokers ($n=439$), exclusive heated tobacco product users ($n=288$), and combined users of cigarettes and heated tobacco products ($n=177$). Metabolic syndrome was defined by the Joint Interim Statement definition. Logistic regression models were used, adjusting for demographic and lifestyle factors, to investigate the association between heated tobacco product use and metabolic syndrome. **Results:** Among the 3,321 participants, the mean age was 57.5 ± 9.9 years, and 29.2% had metabolic syndrome. The prevalence rates of exclusive cigarette smoking, exclusive heated tobacco product use, and combined use were 13.3%, 8.7%, and 5.3%, respectively. Multivariable adjusted odds ratios (95% confidence intervals) for metabolic syndrome were 1.43 (1.18, 1.74), 1.60 (1.23, 2.08), 1.61 (1.18, 2.20), and 2.13 (1.40, 3.25) for past smokers, exclusive cigarette smokers, exclusive heated tobacco product users, and combined users, respectively, compared to never smokers. **Conclusion:** This study found an association between heated tobacco product use and an increased likelihood of metabolic syndrome. Prospective studies are needed to confirm this cross-sectional association.

FUNDING: Federal



POS3-34

CIGARETTE AND E-CIGARETTE USE AMONG CANCER SURVIVORS: A CROSS-SECTIONAL STUDY AMONG US ADULTS

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Introduction: While the causal link between cigarette smoking and cancer risk is well-established, research on e-cigarette use and cancer is in its infancy. This study assessed e-cigarette and cigarette use among cancer survivors and how it differs from the general population. **Methods:** Data came from 29,482 US adults who participated in the 2021 National Health Interview Survey. Weighted multivariable logistic regression was performed to examine the patterns of tobacco use by cancer status accounting for confounders including age, race, education, sex, sexual orientation, and income. Adjusted odds ratios (AORs) with 95% confidence intervals (CI) were reported. Tobacco products use patterns were reported as never, former (used in the past but not now), and current (use some days or every day). **Results:** In 2021, 9.8% (estimated 25 million) of the US population were cancer survivors. Overall, 18.3% of reported cancers were smoking-related (e.g., lung cancer). Compared to the general population, cancer survivors were more likely to be former users of e-cigarettes (AOR=1.28; 95% CI:1.07-1.52, p<0.006) and cigarette (AOR=1.33; 95% CI:1.21-1.47, p<0.0001). No significant difference was observed in the current use of these products. Nevertheless, cancer survivors with smoking-related cancers (vs. non-smoking-related) were more likely to be current (AOR=2.3; 95% CI:1.55-3.41, p<0.0001) and former cigarette smokers (AOR=1.61; 95% CI:1.25-2.07, p=0.0002). They also had higher odds of being current e-cigarette users (AOR: 2.19; 0.88-5.45, p=0.09) than non-smoking-related cancer survivors. **Conclusions:** The high rates of former smoking among cancer survivors highlights the need for continued support for cessation, even after a cancer diagnosis. Relapse prevention intervention programs should target cancer survivors. In addition, smoking cessation interventions should be integrated into cancer care, especially for patients with smoking-related cancers where continued tobacco use can adversely impact outcomes. Also, further research on e-cigarette use among cancer survivors is warranted given the potential risks/benefits of this emerging product for the cancer population, considering long-term studies on the efficacy and safety of these products.

FUNDING: Unfunded

POS3-35

AN EVALUATION OF THE EFFECTIVENESS OF THE INDIAN GOVERNMENT'S POLICIES TO STRENGTHEN HEALTH WARNING LABELS ON SMOKELESS TOBACCO PRODUCTS: FINDINGS FROM THE 2010-2019 TOBACCO CONTROL PROJECT INDIA SURVEYS

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Significance: Smokeless tobacco (SLT) packaging in India had a single symbolic (a scorpion) health warning label (HWL) in 2009 covering 40% of the front surface. In 2011, it was replaced with four pictorial images. In 2016, HWLs were enlarged to 85% on the front and back. This study aimed to assess the effectiveness of the old (symbolic and smaller images) and new larger HWLs. **Methods:** Data were from the Tobacco Control Project India Survey, and included respondents aged 15 and older, who used SLT in Wave 1 (2010-11, n=5911), Wave 2 (2012-2013, n=5613), and Wave 3 (2018-19, n=5636). First, using a repeated measures design, weighted logistic regression models assessed whether there were changes in seven HWL effectiveness measures within the domains of awareness, salience, cognitive, and behavioural responses. Second, a cohort design was employed to test whether HWL effectiveness in Waves 1 and 2 was associated with quitting SLT among those followed up in Waves 2 and 3, respectively. **Results:** The 2011 HWL revisions did not result in any changes in HWL effectiveness. The 2016 revisions resulted in no change in HWL awareness (Wave 2= 73.4%, Wave 3=71.1%, p=0.91). There was no change in salience, measured by the percentage noticing HWLs (Wave 2=37.2%, Wave 3=35.8%), p=0.21) or the percentage reading HWLs "often" or "regularly" (Wave 2=44.6%, Wave 3=32.8%, p=0.08). Cognitive measures improved; respondents were more likely to consider SLT health risks (Wave 2=17.9%, Wave 3=33.6%, p<0.001) and quitting SLT (Wave 2=18.9%, Wave 3=36.5%, p<0.001). Behavioural effects were mixed; there was no change in HWLs stopping SLT use (Wave 2= 36.6%, Wave 3=35.2%, p=0.829), however, respondents were more likely to avoid looking at HWLs (Wave 2=10.1%, Wave 3=40.2%, p<0.001). HWL effectiveness in Waves 1 and 2 was not associated with quitting SLT in Waves 2 and 3 respectively. Respondents who were single, female, and with higher SES were more likely to quit SLT. Having intentions

to quit and lower SLT dependence were strongly associated with quitting. **Conclusion:** There was no change in HWL effectiveness following the revision from a symbolic to a pictorial image, but enlarging pictorial images resulted in some improved cognitive and behavioural effects. This study utilises a tobacco dependence index, shown to be strongly predictive of quitting SLT, appropriate to the future study of SLT control in India.

FUNDING: Federal; Academic Institution; Nonprofit grant funding entity; Other

POS3-36

A PILOT TRIAL OF E-CIGARETTES FOR HARM REDUCTION AMONG SMOKERS WITH OPIOID USE DISORDER ON BUPRENORPHINE

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Significance. Smokers with opioid use disorder (OUD) present particularly high rates of smoking and are especially vulnerable to cigarette smoking and its adverse effects, making them a priority population for addressing cigarette smoking. Research on the effectiveness of e-cigarettes for smoking reduction among smokers with OUD on maintenance treatment is scarce but promising. This ongoing single-arm trial aims to explore the feasibility and preliminary efficacy of e-cigarettes as a harm reduction approach among smokers on buprenorphine in office-based buprenorphine clinics. **Methods.** In this trial, thirty daily cigarette smokers with OUD on buprenorphine treatment will receive an e-cigarette with a 4-week supply of e-liquid along with training on the proper use of the e-cigarette. During the 4-week study, participants will complete daily assessments via text message for 28 days and remote research visits every week. Daily outcomes include self-reported daily cigarette smoking, drug use, and craving for both cigarettes and drugs. Weekly assessments include carbon monoxide (CO) and saliva toxicology tests. **Results.** To date, twenty-one smokers with OUD on buprenorphine have been screened and 12 have been enrolled and initiated the study. The current sample is 41.7% female and average 44.5 years of age. On average, participants reported having smoked for 23.1 years, smoking 15.5 cigarettes per day, and having had 2.1 quit attempts. At baseline, most participants (66.7%) reported having tried an e-cigarette, 33% have used them fairly regularly, and 16% have used them in the past 30 days for an average of 1.5 days. **Discussion.** This trial is ongoing, but it is expected to add knowledge to the current literature on the feasibility and preliminary efficacy of e-cigarettes as a harm-reduction strategy among smokers with OUD on outpatient maintenance treatment. If the results show that the protocol is feasible and provides preliminary evidence of e-cigarettes as an effective harm reduction strategy, it will have the potential to reduce smoking-related morbidity and mortality among individuals with OUD.

FUNDING: Academic Institution

POS3-37

QUALITATIVE REPORTS ON FIRST USE EXPERIENCE OF CIGARETTES, E-CIGARETTES, AND CANNABIS

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SIGNIFICANCE: Understanding one's first experience with a substance has important implications for identifying risk factors for product initiation. We examined first nicotine (e.g., cigarette, e-cigarette, etc.) or cannabis product (e.g., edible, vape, blunt, etc.) use by undergraduate students and used a mixed-methods approach to describe first use experiences. **METHODS:** 641 undergraduate college students were recruited in five unique cohorts from spring 2020-2023 from a mid-sized, urban-engaged college in the northeast U.S. to complete an online survey assessing a range of substance use and mental health variables. Descriptive statistics characterized quantitative data on age of first use and first product used. Students were asked to respond to an open-ended question, "Provide a brief description of your first experience with [cigarettes, e-cigarettes, cannabis]." For the qualitative responses, we identified categories to represent the themes participants gave about their first experience with each substance and iteratively refined these into 10 codes. **RESULTS:** Average age of first use was: 15.8 (cigarettes), 16.5 (cannabis), and 17.1 (e-cigarettes). Among ever nicotine users (n=262), first product used was most commonly e-cigarettes (56%) and cigarettes (23%). Among ever cannabis users (n=358), first product used was most commonly smoking without tobacco (44%) and smoking with tobacco (24%). In qualitative responses about first experiences with cannabis, cigarettes, and e-cigarettes, the most common themes centered around with whom first use happened and feelings associated with first use. Most students, for all products, described being with friends (36-43%). Among all respondents, feelings associated with



first use varied by product, with first cannabis use almost equally described as positive (18%), negative (16%), or neutral (20%). First time vape experiences were nearly equally described as positive (22%) or negative (20%). Alternatively, first time cigarette use was described almost universally negative (31%; 6% positive). **CONCLUSIONS:** Monitoring first use experiences with nicotine and cannabis products can help to inform tailored prevention messaging and harm reduction strategies. In this data, qualitative responses indicate most first experiences occurred with a friend, suggesting a direction for which future interventions to focus. Future research may wish to examine whether qualitative data on first use ultimately predicts future product use.

FUNDING: Unfunded

POS3-38

A QUALITATIVE ANALYSIS OF E-CIGARETTE SUPPLY ROUTES USED BY UNDERAGE YOUTH IN AOTEAROA NEW ZEALAND

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Significance: Although many countries have set a minimum legal sales age for electronic cigarettes (ECs), underage youth continue to access these devices. Evidence of rising youth vaping prevalence in many countries suggests existing regulations have serious loopholes; research exploring how underage young people develop and sustain EC supply routes could inform more robust and comprehensive policy. **Methods:** Using in-depth interviews, we explored EC supply routes used by 30 adolescents aged 16-17 who reported vaping at least once a month and who lived in Aotearoa New Zealand. Our semi-structured interview guide probed how participants developed social, quasi-commercial, commercial and personal supply routes to access ECs. We used an inductive reflexive thematic analysis approach to interpret the data. **Results:** We identified four core themes: first, sharing as a rampant and opportunistic social phenomenon. Nearly all participants shared ECs with peers and, among those who vaped less than daily, sharing was typically their primary access route. Second, participants used proxies, such as older siblings, other relatives, or people they knew socially, to purchase ECs for them. Some cultivated relationships with previously unknown people they identified via social media or saw outside vape retailers and asked these people to purchase ECs for them. Third, some used entrepreneurial quasi-commercial networks that existed within schools and, more particularly, via social media where older peers supplied ECs on commission. Finally, participants relied on peer intelligence to identify smaller retail outlets with lax ID practices and purchased on their own behalf. **Conclusions:** Disrupting the comprehensive social supply channels young people use to obtain ECs poses challenges. Nonetheless, reducing ECs' availability, appeal, and affordability could make social supply, including sharing and proxy purchasing, more difficult. Reports that youth purchase ECs from commercial retailers known to waive age verification, suggests policy makers need to fund more comprehensive monitoring and enforcement, along with escalating retailer penalties.

FUNDING: Federal

POS3-39

USE OF ELECTRONIC CIGARETTES IN PEOPLE WHO SMOKE AND RECENTLY QUIT SMOKING IN AOTEAROA NEW ZEALAND: FINDINGS FROM THE 2022 ITC NEW ZEALAND (EASE) SURVEY.

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Significance: Daily smoking prevalence is 8% in Aotearoa New Zealand, but higher among Māori (20%) and Pacific peoples (18%). Vapes (also known as electronic cigarettes) could reduce smoking prevalence by helping people to quit smoking or being used as an alternative to smoking. We analysed data from the 2022 International Tobacco Control New Zealand (ITC NZ; EASE) Survey aiming to describe patterns of vaping among people who smoke or who recently quit smoking. **Methods:** We used data from 1478 participants (698 who smoke daily, 342 who smoke less than daily, and 438 who had quit smoking in the last 2 years), including 597 Māori (indigenous population of Aotearoa New Zealand) and 314 Pacific peoples. Data were weighted to represent the national profile of people who smoke or recently quit smoking. We asked participants whether they currently vaped at least monthly or daily. Participants who had quit smoking or who had attempted to quit in the past 2 years were asked whether they had vaped to help them quit. "Don't know" and "Refused" responses were excluded. **Results:** 45.1%

(95% CI 41.3-49.0%) of people who smoked currently also vaped, with 26.5% (95% CI 23.3-30.0%) vaping daily. 59.2% (95% CI 53.5-64.7%) of people who smoked, and attempted to quit in the past 2 years, vaped during their quit attempt. Vaping was most common in people who smoked less than daily (67.0% (95%CI 60.6-72.8%) currently vaping and 43.4% (95%CI 37.1-49.9%) vaping daily), followed by people who smoked daily and intended to quit (41.1% (95%CI 35.4-47.0%) currently vaping and 22.6% (95%CI 17.9-28.0%) vaping daily). In people who smoked daily and did not intend to quit, 26.4% (95%CI 20.2-33.7%) were currently vaping and 14.2% (95%CI 9.8-20.3%) were vaping daily. 53.8% (95%CI 47.3-60.1%) of people who quit smoking were currently vaping, and 46.5% (95%CI 40.2-52.9%) reported vaping daily. 65.4% (95%CI 57.8-72.3%) of people who quit smoking in the previous 2 years reported vaping as part of their quit attempt. **Conclusion:** High rates of vaping, particularly among people who intend to or who have recently quit smoking and during quit attempts, suggest vapes are commonly used smoking cessation aids and alternatives for people who want to stop smoking but are unable to quit nicotine use. The findings suggest vaping may support forthcoming endgame measures, such as mandated denicotinisation, in Aotearoa New Zealand to rapidly reduce smoking prevalence.

FUNDING: Federal; State; Academic Institution

POS3-40

COTININE URINARY LEVEL IN ELETRONIC CIGARETTES USERS (E-CIGARETTES). SERIE CASES IN SÃO PAULO-BRAZIL

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In Brazil, the sale of electronic cigarettes (E-cigs) has been prohibited since 2009. Despite this, illegal trade persists through street vendors and online platforms. As the number of consumers rises, concerns about the high level of dependence E-cigs induce have surfaced. **Methods:** We conducted a case series involving 26 exclusive users of electronic devices from July 2022 to June 2023, aged between 13 and 49 years. This group included five adolescents under 18 years old. Out of the participants, 20 were male, and 15 had previously smoked conventional cigarettes before transitioning to E-cigs. To verify the absence of conventional cigarette use, we measured carbon monoxide levels in their exhaled air (COex). E-cig use duration varied from 3 months to 6 years. Most users reported using nicotine salt formulations, with nicotine doses ranging between 35mg and 50mg. The usage was daily. Younger participants preferred disposable products, while ex-smokers opted for refillable ones. We assessed urinary cotinine levels using a semi-quantitative test, offering results that denote the absence of nicotine or levels of 50 ng/ml, 200 ng/ml, or 600 ng/ml. **Results:** Strikingly, all 26 exclusive E-cig users exhibited cotinine levels of 600 ng/ml, which is equivalent to the nicotine intake from over 20 conventional cigarettes daily. COex levels were between 1 and 2 ppm, confirming the non-use of traditional cigarettes. **Conclusion:** Our findings draw attention to the substantially elevated cotinine levels in E-cig users, regardless of age, gender, or duration of use. Such levels are typically seen in traditional cigarette smokers after many years of usage. Given the cardiovascular implications of nicotine, this increased exposure might elevate the cardiovascular risk for E-cig users, even in younger demographics. These findings underscore the importance of applying tests to identify the nicotine levels in E-cig users to raise awareness of the high addiction potential of electronic cigarettes

FUNDING: Academic Institution

POS3-41

THE RELATIONSHIP BETWEEN SMOKING RATE AND PSYCHOPATHOLOGY AMONG US ADULTS

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Significance: A large body of research documents smoking is associated with elevated rates of psychopathology relative to the general public. Unfortunately, literature on this topic has often been fractured, with many papers focusing on single disorders. Moreover, this literature has principally focused on binary smoking status, with limited exploration of differences in smoking rates across different types of psychopathology. **Methods:** We analyzed data from the National Epidemiologic Study of Alcohol and Related Conditions - III (NESARC-III), a nationally representative study of US adults (N = 36,309; 60.1% response rate). Participants were categorized as never-smokers, former smokers, non-daily smokers, light smokers (1-5 CPD), moderate smokers (6-10



CPD) or heavy smokers (11+ CPD). Psychopathology diagnoses were made using the Alcohol Use Disorder and Associated Disabilities Interview Schedule-5 (AUDADIS-5). Logistic regressions examined whether differences in smoking status and smoking rate related to the likelihood of meeting diagnostic criteria for (1) Mood Disorder; (2) Anxiety Disorder; (3) Post-Traumatic Stress Disorder (PTSD); (4) Substance Use Disorder; (5) Borderline Personality Disorder; and (6) Conduct Disorder or Antisocial Personality Disorder. **Results:** Overall, smoking status and rate had a robust positive association with psychopathology across all disorders (all p 's < .001). Relative to never smokers, heavy smoking was associated with twofold (Mood Disorders OR = 2.3, p < .001) to fourfold (Conduct Disorder/Antisocial Personality Disorder OR = 3.8, p < .001) higher disorder rates. For mood, anxiety, PTSD, and personality disorders these effects were driven by higher rates of psychopathology for current smoking relative to individuals that formerly or never smoked, with only minor differences across smoking rates. However, non-daily smoking was associated with substantially higher rates of substance use disorders relative to light, moderate and heavy smoking (all p 's < .05). **Conclusions:** Individuals that smoke exhibit elevated rates of psychopathology, but the exact nature of this relationship differs by diagnostic category. Although heavy smoking was associated with the highest rate of psychopathology for most disorders, differences across smoking rates were generally small relative to differences as a function of smoking status. Surprisingly, non-daily smoking was associated with the highest rate of substance use disorders.

FUNDING: Federal; State

POS3-42

UNDERSTANDING THE MOTIVATIONAL DYNAMICS FOR SMOKING AND VAPING AMONG DUAL USERS AND EXCLUSIVE SMOKERS

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Understanding the motivational processes that influence acute use of e-cigarettes through analysis of real-time use patterns and experiences may help understand motivation for vaping among dual users. This is key to understanding the maintenance of dual use and transitions from dual use to exclusive smoking, which has significant public health implications. Secondary analyses were conducted on data from exclusive smokers ($N=47$) and dual users ($N=88$) who underwent a laboratory *ad lib* use session. Following overnight abstinence from all nicotine products, participants were given 10 minutes to smoke (exclusive smokers) or vape (dual users) as much as they wanted. Sessions were video recorded and coded for average puff duration and number of puffs. Withdrawal was assessed pre- and post-use. Person-level predictors included positive cigarettes/e-cigarette expectancies, demographics, and cigarette/e-cigarette use and dependence. Smoking and vaping status was assessed at Year 1 using self-reported 30-day point prevalence. Associations between person-level predictors, puff topography, and withdrawal scores were assessed using general linear models. Predictors of smoking and vaping status were analyzed using logistic regressions. Dual users and exclusive smokers did not differ on average puff duration or number of puffs ($ps>.16$). Both dual users and exclusive smokers reported reductions in withdrawal, but dual users had higher total withdrawal scores. Dual users who puffed more on their e-cigarette and who reported greater positive e-cigarette expectancies reported greater reductions in cigarette craving ($ps<.05$). Continued dual use ($n=44$), instead of transitioning to exclusive smoking ($n=25$), was associated with positive vaping expectancies, pre-session e-cigarette craving, reduction in negative affect after vaping, vaping events per day, and relative dependence (ORs<0.97, $ps<.05$). In this sample, dual users used e-cigarettes in a manner similar to how exclusive smokers used cigarettes. This may be because most dual users in this sample smoked cigarettes prior to initiating e-cigarette use. E-cigarette use alleviated withdrawal in dual users in a dose-dependent manner, especially when participants had positive vaping expectancies. In addition to e-cigarette dependence, greater positive e-cigarette expectancies, e-cigarette craving pre-use, and reductions in negative affect after vaping illustrate mechanisms that support sustained e-cigarette use.

FUNDING: Federal

POS3-43

FLAVORED TOBACCO PRODUCT USE AMONG YOUTH AND YOUNG ADULTS IN A NATIONAL PROBABILITY-BASED COHORT

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Significance: Flavors are a primary reason youth report using e-cigarettes; most youth who use e-cigarettes first initiate use with a flavored product. It is critical to understand the role flavors play in youth and young adult tobacco use. **Methods:** The Tobacco

Epidemic Evaluation Network Study (TEEN+) is a probability-based cohort of youth and young adults (13-24 years) in the US. Data were drawn from Wave 1 (fielded July-October 2022) and assessed prior and current flavored tobacco product use. Current use of flavored products was defined as past 30-day use of any non-tobacco flavor, including fruit, mint, menthol, candy, desserts or other sweets, chocolate, spice, alcoholic drinks or non-alcoholic drinks. Weighted multivariable logistic regression models were fit to examine associations of flavored tobacco use with sociodemographic characteristics. All analyses were conducted in SAS 9.4 and SUDAAN 11.0. **Results:** Among 10,255 respondents, the most commonly used product was e-cigarettes, with 13.7% reporting current use of e-cigarettes ($n=1,430$). The majority of respondents who reported current use of tobacco products used flavored products including e-cigarettes (95.5%), cigars (61.2%), hookah (92.5%), smokeless tobacco (79.7%) and nicotine pouches (97.7%). Ever users of e-cigarettes most commonly reported initiating with fruit flavored e-cigarettes (49.3%). Among those who currently use e-cigarettes, fruit was the most common flavor (64.0%), followed by candy, desserts or sweets (24.9%). Young adults both under (18-20 years old, AOR=2.75, 95% CI 2.17-3.48) and over (21-24 years old, AOR=4.11, 95% CI 3.34-5.05) legal tobacco purchase age had higher odds of using flavored e-cigarettes in the past 30-days compared to youth (13-17), after adjusting for gender, race/ethnicity, perceived financial situation and household tobacco exposure ($p<0.0001$). Moreover, 18-20 year olds (AOR=3.26, 95% CI 2.60-4.08, $p<0.0001$) and 21-24 year olds (AOR=5.49, 95% CI 4.51-6.68, $p<0.0001$) had elevated odds of using any flavored tobacco product in the past 30-days compared to youth (13-17). **Conclusion:** In a nationally-representative sample of youth and young adults, the majority of respondents who reported current use of tobacco products used flavored products. Young adults had significantly higher odds of using flavored tobacco products in the past 30-days compared to youth. Understanding patterns of flavored tobacco use is necessary to inform prevention efforts.

FUNDING: Nonprofit grant funding entity

POS3-44

DUAL USE OF ELECTRONIC CIGARETTES AND VERY LOW NICOTINE CONTENT COMBUSTIBLE CIGARETTES DURING A PRODUCT EXPOSURE CLINICAL TRIAL

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Significance: The U.S. Food and Drug Administration has recently stated its intention to regulate the nicotine content of combustible cigarettes. While several studies have shown that reduced nicotine cigarettes decrease cigarette consumption and nicotine dependence, it is largely unknown how smokers exposed to these products would respond if alternative sources of nicotine were available. This study evaluated the impact of providing smokers with both very low nicotine content (VLNC) combustible cigarettes (CCs) and electronic cigarettes (ECs) of varying nicotine content and flavors on product use, exposure, liking, risk perception, and withdrawal measures. **Methods:** Participants ($n=176$) were non-treatment-seeking adult CC users. They smoked their usual brand (UB) CC during phase 1 (Baseline; week 1) and were provided with and encouraged to exclusively use the study VLNC CCs (0.4 mg/ml nicotine; menthol or tobacco flavored) during phase 2 (weeks 2-4). During phases 3 (weeks 5-7) and 4 (weeks 8-10), participants received and were instructed to freely use VLNC CCs and/or ECs (eGo-C atomizer; tobacco, fruit, cream, or menthol flavored). The order of exposure to EC nicotine dose (high [36 mg/ml] and low [8 mg/ml]) was counterbalanced during Phase 3 and 4 between participants. **Results:** We found no differences in cigarettes per day and expired carbon monoxide between UB and VLNC CC (phases 1 & 2), but VLNC CCs resulted in lower nicotine exposure (total nicotine equivalents) and were liked less. Participants used fewer combustible products during the EC phases (3 & 4) compared to the UB and VLNC CC phases (1 & 2). EC liking ratings were lower and withdrawal ratings higher than UB ratings, and VLNC CCs were less liked and produced higher withdrawal scores than UB CCs or ECs. The study ECs were rated as less risky than UB or VLNC CCs, but VLNC CCs and ECs were rated as equally risky for addiction. Comparing EC nicotine doses, we found no significant differences on any of the measures. Neither VLNC nor EC flavor influenced the use of the study nicotine products. **Conclusions:** These results suggest that even when given higher nicotine content ECs, adults who smoke cigarettes may still use VLNC CCs, albeit at a reduced rate, which would continue to expose them to



the health risks associated with combustible products. However, this study was brief, and longer-term studies are needed to evaluate the likelihood that lowering CC nicotine would lead to exclusive EC use.

FUNDING: Federal

POS3-45

IF YOU BUILD IT, WILL THEY USE IT? FEASIBILITY & ACCEPTABILITY OF A MOBILE HEALTH APP FOR HIV+ SMOKERS AMBIVALENT ABOUT QUITTING

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Background: More smokers living with HIV die from tobacco-related disease than from HIV, but most are ambivalent about quitting: they want to quit someday, but not yet. Novel strategies are needed to reach, engage, and support them through the quit process. **Objectives:** To assess the acceptability of a mHealth app designed for ambivalent smokers living with HIV (ASLWH) and the feasibility of a future, large-scale randomized effectiveness trial. **Methods:** Using a variety of recruitment strategies, ASLWH who wanted to quit someday, but not in the next month, were invited to enroll in this pilot. Participants were randomized to a standard care (SC) control app with no HIV content and standard advice for people ready to quit or an enhanced care (EC) app designed for ASLWH. Feasibility and acceptability outcomes included: recruitment success, app utilization, use of additional provided treatment (free phone counseling and nicotine replacement [NRT]), and change in smoking at 3-month follow-up. **Results:** After 8 months of multi-modal advertising, 23 of a planned 50 people were enrolled. Direct outreach to known HIV+ patients appeared more effective than social media or clinic flyers. Of the enrolled sample, 3 failed to install the app and one was withdrawn due to fraudulent activity. Of the remaining analytic sample (n=7 SC, n=12 EC), 10.5% were female, 68% white/non-Hispanic, 47% had incomes <\$45,000 and 58% had less than a college degree. Mean age was 49 years. Participants smoked an average of 11 cigs/day. At follow-up, most said they would recommend the app to others (87.5% EC vs 75% SC). Utilization trended higher in the EC group: mean=8.2 sessions (SD=6.9) vs. 4.9 (SD=1.3) for SC users. EC users earned an average 5.5 (SD=3.9) utilization badges vs. 1.8 (SD=2.1) for SC users. Only EC users (n=7, 58%) earned free NRT (contingent on receiving 6 utilization badges), but none requested it. Only one participant (EC) used the in-app feature to access free counseling. 20% of SC vs. 37.5% of EC's reported a 50% or greater reduction in cigs/day at follow-up, but no participants reported abstinence. **Conclusion:** Consistent with other recent research with SLWH, recruitment was difficult. App utilization appeared better in the EC arm, but indicators of behavior change were less robust than in a recent pilot of a similar app with ambivalent smokers not known to have HIV. Additional work is needed to better understand how to reach, engage, and support ASLWH using mHealth tools.

FUNDING: Federal

POS3-46

HIV STATUS AND MENTHOL USE AMONG A NATIONALLY REPRESENTATIVE SAMPLE OF CURRENT SMOKERS

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Significance: Studies of people living with HIV in the U.S. have reported smoking rates two to three times that of the general population. Smokers living with HIV exhibit similar motivation and quit attempts as smokers without HIV but demonstrate significantly lower rates of quitting. One factor that has not been examined among smokers living with HIV is use of menthol cigarettes, which is associated with increased addiction and decreased cessation. This study examines whether smokers living with HIV are more likely to smoke menthol cigarettes than smokers without HIV. **Methods:** We used pooled data from the National Survey on Drug Use and Health 2015-2019 to examine HIV status and menthol cigarette use among current cigarette smokers age 18 and above who had complete data on HIV status and menthol use (n=14,157). Weighted estimates indicated that 37% of current smokers used menthol cigarettes and 1% of smokers had ever been diagnosed with HIV/AIDS. We calculated adjusted prevalence ratios (aPR) using weighted poisson models and eliminated variables with p-values greater than .05 in backward stepwise regression. All models included year and initial models included age, race/ethnicity, sex, sexual identity, poverty, serious psychological distress (SPD) in the past year, and past-year drug or alcohol abuse. **Results:** The final

model demonstrated an aPR=1.20 (CI: 1.01, 1.42) for menthol use among smokers living with HIV compared with smokers without HIV, with all covariates in the final model statistically significant at p<.05 (age, race/ethnicity, sex, and past-year SPD). Sexual identity, poverty and past-year drug or alcohol abuse were not statistically significant at p<.05 in any model and were eliminated in backward stepwise fashion.

Conclusions: Smokers living with HIV demonstrate persistent difficulty achieving long-term smoking abstinence. Results from this nationally representative sample find that menthol cigarette use is significantly higher for this group even after controlling for potential confounders associated with HIV status and menthol use. Research on the implications of menthol use for smoking cessation among smokers living with HIV is urgently needed given the strong association between menthol use, greater nicotine dependence, and unsuccessful quitting.

FUNDING: Tobacco Industry

POS3-47

SALES OF CIGARETTES WITH MENTHOL SUBSTITUTES NATIONWIDE AND IN AREAS WITH MENTHOL SALES RESTRICTIONS

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SIGNIFICANCE: The tobacco industry is marketing "non-menthol" cigarettes with natural and synthetic cooling compounds (like WS-3); these compounds may act as menthol substitutes by imparting a cooling sensation without the minty taste or odor. Some locations, including California, prohibit the sale of menthol cigarettes as part of restrictions on characterizing flavors. Data on the sales of cigarettes with potential menthol substitutes, particularly in areas that restrict the sale of menthol cigarettes, are limited. **METHODS:** We searched NielsenIQ Retail Measurement Service data for the UPCs of the products identified by the California Attorney General as being in violation of the state's "flavor ban." Using weekly aggregated cigarette sales through March 25, 2023, we identified 2 brands with 19 sub-brands that are marketed as "non-menthol" and known to include WS-3 or another cooling compound that could serve as a menthol substitute. For the period of January 1 to March 25, 2023, we estimated sales of these cigarettes relative to all combustible cigarette unit sales nationwide and in the Pacific region (California, Oregon, and Washington). **RESULTS:** Nationwide, retailers sold approximately 4,000 cartons of the 19 sub-brands, representing approximately 0.003% of all cigarette sales during this time period. Of the cartons sold, almost all were sold in the Pacific region. During the relevant time period, sales of the 19 sub-brands constituted approximately 0.04% of all cigarette sales in the Pacific region. **CONCLUSION:** Legal complaints by tobacco companies acknowledge that they produced "non-menthol" cigarettes with cooling compounds as a direct result of anticipated demand in California before the menthol restriction went into effect in December 2022. Although sales of the sub-brands of "non-menthol" cigarettes with cooling compounds like WS-3 represented only a small proportion of combustible cigarette sales during the window of time examined, the location of sales is consistent with the observation that tobacco companies are changing production and marketing in response to restrictions of characterizing flavors. Whether individuals who smoke cigarettes, particularly menthol cigarettes, actually perceive "non-menthol" cigarettes with potential menthol substitutes like WS-3 as similar to menthol cigarettes is unknown.

FUNDING: Federal

POS3-48

ENCOURAGING PRIMARY CARE PROVIDERS TO OFFER PROACTIVE SMOKING CESSATION SUPPORT FOLLOWING LUNG CANCER SCREENING - A PRAGMATIC TRIAL IN THE VETERANS HEALTH ADMINISTRATION

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Significance. Smoking cessation is often inadequately addressed among current smokers participating in lung cancer screening (LCS) although this may be an optimal time to provide support. We tested a proactive, opt-out approach to integrating cessation support that included providing medications to all current smokers combined with proactive centralized telephone counseling. **Methods.** Primary care providers at two urban VA Medical Centers were randomized to have their patients receive proactive cessation support (n=49) or usual care (n=31). The study team reviewed treatment histories



and entered a study note for the PCP encouraging guideline-based medications to be proactively mailed with screening results. Patients in the proactive arm also received centralized telephone outreach that employed a motivational interviewing approach to discuss mailed medications, provide education about LCS, and increase readiness to quit smoking. Total cessation medication use, participation in behavioral treatments and changes in smoking status were extracted from the VA electronic medical record and mailed surveys. Results. A total of 790 current smokers participated in LCS during the study and met eligibility criteria including no suspicious findings; 378 patients were seen by PCPs randomized to the proactive arm. More LCS participants in the proactive arm received cessation medications, 57% vs 39%; OR 1.68 (1.21 - 2.37); $p=0.003$, and there was a trend toward increased use of behavioral counseling beyond intervention activities; OR 1.57 (0.93 - 2.63); $p=0.09$. Quit rates were not substantially different in the proactive arm at 12-months; 16% (51/322) vs 14% (50/359); OR 1.05 (0.67 - 1.64); $p=0.80$. More patients in the proactive arm were accurate in risk assessment knowledge items: 61.5% of patients indicated that quitting smoking was more effective than LCS at preventing early deaths due to smoking compared to 53.4% in the usual care arm. The cost of medications and behavioral counseling in the usual care arm averaged \$34 per person over the study period. Based on study time tracking, the proactive intervention as delivered would cost \$144 (95% CI: \$121 -165) per patient more than usual care, primarily due to increased personnel costs of proactive activities. Conclusions. While our proactive intervention increased provision of cessation support, adoption of the proactive nudge varied considerably by provider with cessation poorly integrated into care for many LCS participants and the goal of the trial - to reduce variation among providers and eliminate barriers to cessation support for current smokers participating in LCS was only partially achieved. Continued efforts to effectively integrate smoking cessation into lung cancer screening are needed. This pragmatic trial suggests that centralized proactive approaches are feasible although increased efficiency is needed for scaling.

FUNDING: Federal

POS3-49

THE EFFECT OF TOBACCO TAX ON NON-COMMUNICABLE DISEASES BURDEN: EVIDENCE FROM PANEL DATA OF 159 COUNTRIES

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Introduction Globally, about 74% of deaths are attributed to non-communicable diseases (NCDs), which kill more than 41 million people annually. More than one-third of these deaths occur in the population aged below 70 years. Although various risk factors such as physical inactivity, harmful or overuse of alcohol, unhealthy diets, and nutritional imbalance contribute significantly to NCDs, tobacco use is one of the key risk factors responsible for causing NCDs. Implementing tobacco control policies will likely reduce the burden of NCDs. However, how increasing tobacco taxation may reduce NCD burdens is not well studied. **Methods** The study uses country-level panel data from 2008 to 2020 collected from various sources including the World Health Organization, World Development Indicators (WDI) of the World Bank, and other sources. Annual NCD burden was measured by the proportion of death due to NCDs before age of 70 in each country. The tax rate on cigarettes—both specific and total tax rates—was used as a key independent variable along with other control variables—MPOWER score net of taxes, tobacco prevalence, and other country-level characteristics. Panel data regressions with various combination of country and year fixed effects were applied to estimate the effect of tobacco taxation on NCD burden. **Findings** There was a statistically significant relationship between tobacco tax and NCD burden, with a 1% increase in tobacco tax associated with a 4% decrease in NCD burden. Access to health care, obesity prevalence, and clean fuel and cooking technology were also found to be associated with a statistically significant reduction in NCD burden. The results are robust to various model specifications. In addition, the effect of taxation on NCD burden occurred within one year. **Conclusion** The study provides important evidence that increasing tobacco taxation could be an effective tool in reducing NCD burden. Countries aiming to reduce the NCD burden should consider raising their tobacco taxes.

FUNDING: Nonprofit grant funding entity

POS3-50

MAPPING OF US TOBACCO INDUSTRY: COMPANIES, PRODUCTS, HISTORIES, AND MARKET SHARES

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Data visualization is a way to deliver information efficiently through graphical means. We developed a tool to help tobacco regulatory scientists and policy makers understand a high-level overview of the US tobacco industry. This graphic depiction provides a useful reference tool for tobacco product regulatory science with an 'at-a-glance' view of the regulated US tobacco companies, as well as information about their products, histories, and market shares—an industry landscape. The data and information are collected, gathered, and analyzed from various sources, including Euromonitor, Wikipedia, websites of tobacco companies, and published literature on tobacco market analysis. This industry landscape overview can be easily updated when business relationships change, and products enter and exit the market. Data visualization can provide useful tools to communicate information clearly and effectively to regulatory scientists and policy analysts through graphical means. This kind of mapping of the market data and deep visualization of companies and their products benefits regulatory science and public health policy in supporting potential knowledge gaps of the regulated industry.

FUNDING: Unfunded

POS3-51

CHALLENGES TO STOPPING SMOKING IN INDIVIDUALS WITH MENTAL ILLNESS

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Significance. Smokers with mental illness want to quit, yet little is known about specific barriers to quitting that may interfere. **Methods.** We investigated barriers to quitting smoking using the Challenges to Stopping Smoking (CSS-21) scale, which includes unique barriers not contained in other surveys. The CSS-21 consists of 9 intrinsic, or personal, barriers to quitting, such as boredom and fear of withdrawal symptoms, and 12 extrinsic, or environmental, barriers, such as lack of support from health professionals, cost of medications, and availability of cigarettes. We used the CSS-21 as part of an online survey of smokers with and without mental illness conducted from 2020-2022. Participants needed to be 18 years or older, reside in New Jersey, and have smoked cigarettes all or most days in the past month. The survey was approximately 10 minutes in length, administered through Qualtrics, and participants received a \$20 gift card. Results. Of the 549 smoking participants, 397 (72%) reported being diagnosed or receiving treatment for a mental health (MH) condition and 152 (28%) controls did not. Participants did not differ in smoking characteristics, such as time to first cigarette smoked. More in the MH group attempted to quit smoking in the past year (71 v 62%; $p<0.05$). Smokers with MH had higher mean scores on both the intrinsic (22.9 v 19.7) and extrinsic subscale scores. (25.0 v 22.3; both $p<0.001$). These results remained significant even when we controlled for severity of dependence (using variable of TTFC <5 min). Smokers with MH also had higher rates than controls of endorsing a moderate or major challenge to quitting on such individual items as withdrawal symptoms, feeling lost without cigarettes, getting bored when they tried to stop, lack of encouragement or help from friends and families, and fear of failure to stop smoking. Thirty percent of smokers with MH reported that family members and friends encouraged smoking versus 17% of controls. All results were significant ($p<0.05$). **Conclusion.** The results indicate the greater challenges that smokers with mental illness experience. These results have clinical utility and could be used to develop tailored treatment approaches to improve quitting outcomes, including better withdrawal management, education for smokers and their families and greater tobacco-free support and peer services. Counseling approaches that include addressing fears around quitting could also be helpful.

FUNDING: State; Academic Institution; Nonprofit grant funding entity

POS3-52

NICOTINE AND CANNABIS COUSE PATTERNS AND PREDICTORS AMONG RACIAL MINORITY ADULTS: A SYSTEMATIC REVIEW OF ECOLOGICAL MOMENTARY ASSESSMENT STUDIES

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Significance: Although co-use of nicotine and cannabis is common and may be associated with greater addiction severity than single substance use, few studies have addressed co-use among Black, Indigenous, People of Color (BIPOC) adults. Ecological momentary assessment (EMA) is a useful method to measure co-use and related within-person contexts. Because co-use is associated with increased dependency, exposure to toxicants, synergistic drug effects, and hindrance in cessation, we conducted a systematic review of studies using EMA methodologies to assess co-use that involved BIPOC adults.



Methods: We began with 5,950 records from various search engines; 37 articles were screened for relevance. We identified 10 EMA studies that focused on tobacco products and cannabis co-use that involved BIPOC adults. We extracted study characteristics and summarized the findings. **Results:** The mean study length was 21.4 days (SD=8.5; range: 7-30). The average sample size was 177.6 (SD=192.8; range: 43-686), with the average 45.7% BIPOC participants (SD=21.6%; range 29%-100%), and the average 47.9% female (SD=4.5%; range 41%-54%). The mean participant age was 21.3 years (SD=1.0; range 19.8-22.8). The effects of momentary predictors on co-use were examined in 7 studies; the within-person effects of co-use on affect, cognitive and subjective effect outcomes were assessed in 4 studies. Alcohol co-use was also included in the analytic models in 8 out of 10 studies. Due to concerns of over-burdening respondents, temporal ordering of co-use patterns were rarely examined. Subgroup variations by ethnic/racial groups were not reported. **Conclusion:** The current review demonstrates that the body of research on daily co-use of nicotine and cannabis is growing but particular focus on high-risk BIPOC users is inadequate. To address this gap, we recently launched a project entitled Acute Discrimination and Polyuse Trends (ADAPT), an exploratory-sequential mixed methods study involving adults from BIPOC communities. We will examine how daily variations in acute perceived discrimination-related stress influence poly-substance use (PSU) among BIPOC minoritized adults, with an emphasis on evaluating momentary predictors of resilience to stress. Our findings will deliver an integrative approach that emphasizes the multilevel nature of co-use and will identify pathways through which cultural resilience protects against stress-related PSU.

FUNDING: Federal

POS3-53

E-CIGARETTE BRAND USE BY RACE/ETHNICITY IN A U.S. SAMPLE OF YOUTH AND YOUNG ADULT E-CIGARETTE USERS, 2022-2023

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Background. Differences in cigarette brand use among demographic subgroups have implications for nicotine and smoke exposure that contribute to health disparities. Less is known about subgroup differences in e-cigarette brand use. The purpose of this study is to determine whether usual e-cigarette brands vary, and whether brand use is changing at similar rates, among subgroups of young people. **Methods.** Data were drawn from a convenience cross-sectional online survey of respondents aged 15-24, fielded weekly (Jan 2022-Jun 2023; 350 unique respondents/week). Sampling quotas and survey weights were used to approximate a national sample. The analytic sample was restricted to past 30-day e-cigarette users (N=6,387). Respondents selected their usual brand from a list of 29 brands. Bivariate analyses were conducted on usual brand and age, socioeconomic status (SES), or race/ethnicity. **Results.** Usual brand rankings varied between white (JUUL, Elf Bar, Hyde, Vuse), Black or Hispanic (JUUL, Puff Bar, Elf Bar), and other (JUUL, Puff Bar, Elf Bar, Vuse) e-cigarette users. One-quarter of Black (26.0%; 95% CI: 22.8-29.1) and 22.2% (95% CI: 20.0-24.3) of Hispanic e-cigarette users reported JUUL as their usual brand, significantly more than those who are white (15.9%; 95% CI: 14.7-17.2) or another race (16.3%; 95% CI: 12.9-19.7). Puff Bar was the second-most frequently reported brand among Black (14.8%; 95% CI: 12.2-17.4) or Hispanic (16.9%; 95% CI: 14.9-18.8) e-cigarette users, significantly more than 7.9% (95% CI: 7.0-8.8) of white e-cigarette users. By month, Elf Bar grew at a similar rate among all racial/ethnic groups (white: $r=1.84$, $p<0.001$; Black: $r=1.48$, $p=0.002$; Hispanic: $r=1.55$, $p=0.007$; other: $r=1.43$, $p=0.006$). JUUL declined among Hispanic ($r=-1.23$, $p<0.001$), Black ($r=-0.94$, $p=0.004$), and white ($r=-0.69$, $p=0.004$) e-cigarette users. Puff Bar did not change among Black e-cigarette users, but declined among those who are white ($r=-0.61$, $p<0.001$), Hispanic ($r=-0.96$, $p<0.001$), or another race ($r=0.60$, $p=0.030$). Variations were not found for SES or age group. **Discussion.** Brand use varies by race/ethnicity among young e-cigarette users. JUUL and Puff Bar are reported more frequently by Black or Hispanic e-cigarette users. Elf Bar is rapidly growing as the usual brand among all racial/ethnic groups. Surveillance of targeted advertising and brand availability in communities of color, and validation of survey terminology among diverse groups of respondents, are needed.

FUNDING: Unfunded

POS3-54

SELF-REPORTED EFFECTS OF VAPING ON HEALTH AMONG YOUTH IN CANADA, ENGLAND, AND THE UNITED STATES: FINDINGS FROM THE ITC YOUTH TOBACCO AND VAPING SURVEY

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Significance: Despite concerns about the potential risks of vaping among youth, little is known about health effects experienced by youth who vape, including less-serious side effects that may go unreported to medical authorities. This analysis examined self-reported health effects from vaping among youth in Canada, England and the US.

Methods: Data were from 6 waves of the repeat cross-sectional ITC Youth Tobacco & Vaping Surveys, conducted with national samples of youth aged 16-19 in Canada, England, and the US from 2019 to 2022. Respondents who had ever used e-cigarettes (N=31,526) were asked about negative side effects they had experienced, and whether they had sought or considered medical attention. In 2022, respondents were also asked if vaping had affected their physical and mental health, and to describe the effects. Reporting side effects ('any' and specific) and seeking medical attention were examined over time and by country, and open-ended physical and mental health effects were analyzed descriptively. **Results:** In all waves, over half of youth who had ever vaped reported ever experiencing negative side effects from using e-cigarettes (range 50.9%-58.6%). The most commonly reported side effects were cough (24.9%-30.3%), light-headedness (20.1%-24.4%), throat irritation (17.7%-20.7%), and headache (17.5%-20.6%). Among those who experienced side effects, around 1 in 10 reported seeking medical attention (8.8%-11.6%) and nearly as many considered doing so (8.1%-10.8%); these percentages were fairly stable over time. In 2022, most youth who had ever vaped reported that vaping made "no difference" to their physical health (70.8%), 16.3% reported that it had made it worse, while 3.3% said better. Similarly, most (67.5%) reported that vaping made no difference to their mental health, but with comparable proportions reporting worse (10.5%) and better (13.4%). Youth described a range of effects, notably effects on breathing, lungs, and exercise stamina for physical health, and on stress, anxiety, and coping for mental health. Associations with reporting side effects will be examined by socio-demographic and e-cigarette characteristics. **Conclusion:** The majority of youth surveyed in Canada, England, and the US who had ever vaped reported experiencing side effects from using e-cigarettes. While most reported that vaping had not affected their health, approximately one in five described effects (positive or negative) on their physical and/or mental health.

FUNDING: Federal

POS3-55

NICOTINE AND CANNABIS USE ACROSS A DIVERSE SAMPLE OF COLLEGE STUDENTS DURING COVID-19 AND BEYOND: RESULTS FROM A SERIAL CROSS-SECTIONAL STUDY

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SIGNIFICANCE: Increases in substance use behaviors among college students are often attributed to changing social environments (e.g., more time with peers, living away from home) and increased stress. University closures and social distancing measures associated with the onset of COVID-19 likely decreased access to peers but increased mental health symptoms within the college student population. As such, there is a need to understand changes in nicotine and cannabis use among students during and after the pandemic. **METHODS:** 641 undergraduate students from an urban college in the Northeast U.S. were surveyed online during the Spring '20 (n=210), Fall '21 (n=98), Spring '22 (n=80), Fall '22 (n=102), and Spring '23 (n=149) semesters. We examined period prevalence for lifetime and past year nicotine and cannabis use, as well as associations with mental health symptoms in each semester. **RESULTS:** Students on average were 21.5 years old (SD=3.4); the sample was diverse with 39.6% identifying as Black/African American, 13.6% identifying as Hispanic/Latino, and over half reporting that they were employed either full-time (13.7%) or part-time (48.8%). Nicotine and cannabis use were lowest in Spring 2020, during the closure of on-campus learning. An 18.1% increase (from 38.6% to 45.6%) was observed in the crude prevalence of lifetime nicotine use from Spring '20 to Spring '23; a 72.4% increase (15.2% to 26.2%) was observed for past year nicotine use. An 18.4% increase (51.0% to 60.4%) was observed for lifetime cannabis use from Spring '20 to Spring '23; a 14.0% increase (26.5% to 30.2%) was observed for past year cannabis use. The largest increases in the use of both substances were observed between Spring '22 and Fall '22. Symptoms of depression and anxiety did not significantly differ by semester and were not significantly associated with substance use behaviors. **CONCLUSIONS:** In a diverse sample of college students, symptoms of depression and anxiety remained stable, but nicotine and cannabis use increased in the years following the onset of COVID-19; increases in past-year nicotine use are particularly noteworthy. Future longitudinal research is needed to understand if changes in substance use behaviors spurred by the pandemic are acute or chronic in nature, as well as the specific mechanisms underlying these changes. Future research should also consider specific nicotine and cannabis product use over time (e.g., cigarettes, e-cigarettes, edibles, blunts, etc.).

FUNDING: Academic Institution



POS3-56

DEVELOPING A CONTEXTUALLY-APPROPRIATE TOBACCO CESSATION PROGRAM IN LEBANON'S PRIMARY HEALTHCARE SYSTEM: A QUALITATIVE STUDY

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Significance: Lebanon has one of the highest tobacco use rates in the world. Despite the high tobacco use burden, cessation services are not integrated into routine care. Lebanon is also experiencing an ongoing economic crisis that has severely strained its healthcare system. This study aimed to elicit tobacco user perspectives to inform modifications to a proposed telephone cessation program that will be tested in a subsequent trial. **Methods:** We conducted nine focus groups with adults who smoke cigarettes and waterpipe tobacco (n=61) in Lebanon to inform the implementation of a program consisting of primary care referral to a telephone-based cessation intervention. We provided an overview of the proposed evidence-based program components and presented draft program materials. We used a team-based framework analysis approach to inform intervention modifications. **Results:** Participant familiarity with cessation programs was low and often limited to programs in other countries. Participants felt the novelty of a formal tobacco cessation program in Lebanon could facilitate engagement, but more information on the program's effectiveness within the Lebanese context was needed to encourage participation. Participants described how the economic crisis has resulted in widespread anxiety and depression and that tobacco use is a common coping method. These issues were seen as primary barriers to engaging tobacco users and effectively supporting cessation. To address this challenge, they felt the program should include depictions of mental health challenges in materials, address mental health in cessation counseling, and be delivered by a psychologist. Participants explained that unreliable internet in the country would make telephone sessions difficult because many rely on internet-based calls to avoid high cellular service costs. They also noted some cessation strategies described in educational materials were not relevant to the Lebanese context (e.g., avoiding smokers is not feasible because tobacco use is highly prevalent). **Conclusion:** This work highlights the need to account for socioeconomic conditions in addition to individual needs and preferences when designing tobacco cessation programs. Our findings will inform the development and implementation of a contextually-tailored tobacco cessation program in Lebanon and can lead to a model for implementing population-based cessation programs that can be applied in other low-resource settings.

FUNDING: Federal

POS3-57

WHICH TOBACCO AND CANNABIS PRODUCTS DO PEOPLE WHO IDENTIFY AS LGBTQ+ PERCEIVE AS MOST HARMFUL AND ADDICTIVE?

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Background: Use of nicotine, cannabis, and non-nicotine e-cigarettes remains high, especially among people identifying as LGBTQ+. While studies have shown strong relationships between perceived risks and benefits and substance use, studies have not examined differences in such perceptions between those who do and do not identify as LGBTQ+. This study examined such differences in perceived harm and addictiveness across products. **Methods:** Survey of N = 6,131 participants 13-40 years old, who reported perceived harm and addictiveness for 11 tobacco and cannabis products, and self-reported their sexual orientation (heterosexual or straight, LGBTQ+ [lesbian, gay, bisexual, transgender, questioning, queer, intersex, pansexual, two-spirit, androgynous, or asexual], not listed above [please specify], and prefer not to say). Descriptive statistics summarized differences in perceived harm and addictiveness between participants who identified as heterosexual vs. LGBTQ+. Linear regression models, adjusted for age, gender, race/ethnicity, financial comfort, and product use status, examined associations between sexual identity with perceived harm and addictiveness for each product. **Results:** Among the study sample, 69.5% identified as heterosexual, 25.9% as LGBTQ+, and 4.2% indicated "Prefer not to say." Participants who identified as LGBTQ+ perceived cigarettes to be the most harmful (M: 3.18, SD: 0.94) and addictive (M: 3.13, SD: 0.98) among all products, and cannabis/THC (M: 2.57, SD: 1.06) and non-nicotine e-cigarettes (M: 2.57, SD: 1.01) to be the least harmful and non-nicotine e-cigarettes to

be the least addictive (M: 2.55, SD: 1.05). There were no differences in perceptions of harm among participants identifying as LGBTQ+ (vs. heterosexual/straight) for nicotine e-cigarettes, yet perceived harm was lower across other products compared to their heterosexual identifying peers (p's < .05), with the exception of perceived harm being higher for cigarettes (p=0.002). LGBTQ+ participants perceived higher addictiveness for cigarettes and nicotine lozenges (p's < 0.049) and lower for non-nicotine e-cigarettes (p=0.004). **Discussion:** Efforts should be made to educate the public, and especially LGBTQ+ identifying people, about the harms and addictiveness of cigarettes, and nicotine- and non-nicotine- e-cigarettes. Such efforts may help address the disparities in substance use among minoritized groups.

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POS3-58

PREVALENCE OF CIGARETTE SMOKING WITH AND WITHOUT TOBACCO USE DISORDER AMONG ADULTS IN THE UNITED STATES: 2010-2021

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Significance: Few national estimates are available on recent prevalence of tobacco use disorder (TUD) in the United States (US). Most clinical trials exclusively assess presence of daily smoking rather than TUD. We examined prevalence and trends in cigarette smoking among adults with versus without TUD. **Methods:** Data came from the 2010-2021 National Surveys on Drug Use and Health (n=483,982), a cross-sectional, US representative dataset. A TUD composite variable was created based on established definitions (e.g., the Diagnostic and Statistical Manual 5th edition symptoms; e.g., craving and withdrawal). Weighted prevalence of past-30-day cigarette smoking, daily smoking (30/30 days) and nondaily smoking (<30/30 days), with and without TUD, were calculated annually for individuals ages 18 and above. The chi square test for trend was applied to each outcome across survey years, and differences in TUD outcomes across demographic, smoking, and psychiatric factors were examined using chi square, applying the Bonferroni correction. **Results:** In 2021, the prevalence of past-30-day overall cigarette smoking was 17%; 11% reported daily cigarette smoking, whereas 6% reported nondaily cigarette smoking. Only 1% of the population reported daily smoking without TUD whereas 10% reported daily smoking with TUD. Two percent of the population reported nondaily smoking without TUD and 4% of the population reported nondaily smoking with TUD. Daily smoking with TUD and nondaily smoking with and without TUD decreased significantly from 2010 to 2021 (p's < 0.001 for all outcomes). US adults reporting TUD symptoms (vs. not) were more likely to be older, identify as White, have lower income and less education, and have a substance use disorder (SUD). Adults with nondaily (vs. daily) smoking were more likely to be non-White, use non-cigarette tobacco products (e.g., e-cigarettes, smokeless, pipes), and have alcohol use disorder. **Conclusions:** The prevalence of daily cigarette smoking with TUD was 10x higher than the prevalence of daily cigarette smoking without TUD. The majority of adults with nondaily smoking also reported TUD. These data demonstrate that daily smoking is not necessary nor sufficient for TUD. More research is needed on how best to treat TUD among individuals with nondaily smoking given the low cessation rates in this population.

FUNDING: Federal

POS3-59

ASSOCIATIONS OF MULTIMORBIDITY AND MENTAL HEALTH WITH SMOKING CESSATION OUTCOMES AMONG PATIENTS ACCESSING A HOSPITAL-INITIATED TOBACCO DEPENDENCE INTERVENTION

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Significance: The NHS Long Term Plan states that by 2024 all patients admitted to hospital who smoke will be offered tobacco dependency interventions. We estimated how mental health and Long-Term Conditions (LTCs) impact upon smoking cessation outcomes among patients accessing an adapted Ottawa Model of Smoking Cessation in two large acute hospitals in London. **Methods:** We analysed previous and current diagnosis data from 2067 patients who smoked, admitted over 12 months from July 2020. Multivariable logistic regression estimated the association of the number of LTCs (none, one, two, or three or more of: diabetes, cardiovascular disease (CVD), chronic



lower respiratory disease (CLRD), hypertension, and cancer) with accepting support during admission; successfully quitting smoking at 6 months after discharge; and death or readmission within 1 year, stratified by mental health diagnosis, and adjusted for age, sex, and ethnicity. Results: 58% of patients had at least one LTC, and 35% had at least two LTCs. A mental health diagnosis was recorded in 68% of patients. Compared to patients with no mental health diagnosis or LTC, patients with three or more LTCs were associated with lowest odds of accepting support, regardless of mental health diagnosis. Cancer was associated with decreased odds of accepting support in patients with no mental health diagnosis (AOR=0.49 [0.26-0.95]), but this association was not observed in patients with a mental health diagnosis. Compared to patients with no mental health diagnosis or LTC, a mental health diagnosis was associated with approximately 50% lower odds of quit success at 6 months in patients with no or one LTC. Odds of death or readmission within 1 year increased with each additional LTC, with a 12-fold increase in odds associated with three or more LTCs combined with a mental health diagnosis. For each number of LTCs, odds of death or readmission were 2-4 times higher when comorbid with a mental health diagnosis. CLRD was associated with increased odds of death or readmission in those with a mental health diagnosis (AOR=2.28 [1.66-3.15]), but not those without a mental health diagnosis. Conclusions: Among patients who smoke admitted to hospital, a mental health diagnosis appears to have little impact on odds of accepting a smoking cessation intervention, but is associated with attenuated odds of quit success in patients with fewer LTCs, and greater odds of death or readmission across all numbers of comorbid LTCs.

FUNDING: Academic Institution; Nonprofit grant funding entity

POS3-60

SMOKING CESSATION INTERVENTIONS FOR U.S. ADULTS WITH DISABILITIES: A SYSTEMATIC REVIEW

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Introduction: People with disabilities disproportionately use tobacco products. However, little is known about cessation interventions tailored for people with disabilities. The objective of this study was to conduct a systematic review of smoking cessation interventions for adults with disabilities. **Methods:** Six electronic databases (Cochrane, CINAHL Plus [EBSCOhost], Embase [Ovid], Medline [Ovid], PsycINFO [Ovid], and Web of Science) were searched to identify eligible interventions through July 2023. Two independent coders evaluated the records and extracted data from studies that met inclusion criteria. Qualitative synthesis was conducted on the included studies in 2023. **Results:** One randomized controlled trial and one nonrandomized study met the inclusion criteria. Both studies used mindfulness-based procedures to reduce cigarette use in adults with mild intellectual disability. The outcome was defined as self-reported cigarette use at follow-up, which ranged from 1 year to 3 years. Limited information was provided on how the interventions were tailored to meet the unique needs of people with disabilities in either study. **Conclusion:** Two interventions conducted in adults with mild intellectual disability showed promising results using mindfulness-based procedures; however, the studies did not address barriers reported by people with disabilities, nor tailor the interventions to meet the needs of the target population. Research is needed to address tobacco use disparities among people with a range of disabilities. Current cessation interventions would be enhanced by integrating disability identifiers alongside other demographic information in future studies and reporting subgroup analyses in adults with disabilities.

FUNDING: Federal; Academic Institution

POS3-61

EXPANDING TOBACCO TREATMENT VIA AUTOMATED OUTREACH

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SIGNIFICANCE Patients seen for tobacco treatment need regular coaching to ensure they have medications, understand how to use them, and feel supported during their journey. Even when patients have coach's phone number, they might lose it, feel embarrassed about calling, or not understand appropriate reasons to call. Smaller teams can struggle to offer every patient adequate support. Here, we describe our early experiences implementing automated outreach to expand support for an underserved patient population in Baltimore. **METHODS** The clinic explored different platforms and chose TelASK based

on their responsiveness and available features. After patient is stabilized on treatment plan and understands how to use medications, coach notifies them they will be added to automated platform. Patients encouraged to call coach as often as needed. System makes 5 rounds of calls (up to 4 attempts per round) over 6 months. First, system confirms it has reached correct patient. It asks if patient is currently using tobacco, when they last used tobacco, how often they use controller/rescue medications, and if they want call back from coach. Patient uses keypad to select their answers. System flags the call if patient requests callback. **RESULTS** 60 patients enrolled. 122 rounds of calls made (does not include how many attempts were needed to reach patient). 81 (66%) calls complete. 7 (6%) partially complete. 19 (24% of completed calls) callback requests. Of completed calls, 39% reported stopping tobacco (includes early abstinence). 78% used controller every/some days. 70% used rescue every/some days. For both medications, the "not using" category included patients for whom treatment not/no longer indicated. Patient feedback was positive. They reported calls not feeling intrusive and taking just a few minutes to complete. Some patients reported callback requests made in error because they misunderstood the question. Of all patients offered TelASK enrollment, only 2 declined. **CONCLUSION** Automated outreach appears to be a feasible way to offer patients ongoing support regardless of staffing. It also offers additional flexibility for patients unavailable during business hours. Limitations: calls only collect basic data to ensure calls are short. It cannot report when patients have cut down but not yet quit. Data's accuracy depends on patients understanding questions and pressing correct button. Any platform will incur some cost and would benefit from institutional support.

FUNDING: State

POS3-62

THE ROLE OF RACE/ETHNICITY IN THE ASSOCIATION BETWEEN HAVING A PRIVATE OR MEDICARE HEALTH INSURANCE COVERAGE AND SMOKING PREVALENCE IN THE U.S.

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Significance. Health insurance coverage is associated with reduced smoking prevalence in the U.S. However, the extent to which this association differs by race/ethnicity is unknown. The goals of this study were to estimate smoking prevalence among U.S. adults (18+ years old) who have (and do not have) private or Medicare coverage and to investigate racial/ethnic differences in the associations between coverage type and smoking prevalence. **Methods.** We merged data (n=38,081, N= 204,606,674) from the Tobacco Use Supplement (January and May 2019) and the 2019 Annual Social and Economic Supplement of the Current Population Survey. First we assessed associations between each coverage type (private, Medicare) and smoking prevalence within non-Hispanic (NH) White, NH Black/African American (BAA), NH American Indian/Alaska Native (AIAN) and Hispanic adults using Rao-Scott chi-square tests. Then we modeled the odds of smoking using a logistic regression model with two interactions: between private coverage and race/ethnicity (NH White, BAA and Hispanic), and between Medicare coverage and race/ethnicity. The model controlled for sociodemographic factors, disability status, Medicaid coverage and several other factors. All analyses included survey weights and were conducted using SAS@9.4 package. **Results.** Both private and Medicare coverage (compared to no such coverage) were associated with lower smoking prevalence within each racial/ethnic group. However, only a few results were statistically significant: private coverage was associated with significantly lower prevalence among NH White (8.8% vs. 19.6%, p<0.001) and BAA (9.3% vs. 19.6%, p<0.001) adults, and Medicare coverage was associated with significantly lower prevalence among NH White adults (9.6% vs. 12.3%, p=0.002). In the model, the interaction between private coverage and race/ethnicity was significant (p=0.044): private coverage was significantly associated with lower prevalence among NH White adults only (AOR=0.59, 98.3%CI=0.48:0.73). The other interaction was not significant. **Conclusion.** Findings indicate that the association between private coverage and smoking prevalence differs by race/ethnicity, and that type of coverage is associated with lower prevalence among NH White adults only. The association between Medicare coverage and smoking prevalence was similar for the three racial/ethnic groups. The study points to possible underutilization of private coverage to enable smoking cessation among communities of color.

FUNDING: No external funding reported



POS3-63

INTERVENTIONS TO REDUCE LUNG CANCER AND COPD-RELATED STIGMA: A SYSTEMATIC REVIEW

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Significance: Evidence shows that individuals with lung cancer and chronic obstructive respiratory disease (COPD) experience high levels of stigma, attributed partly the strong association between these diseases and smoking behaviours. Stigma can be external in the form of discrimination or judgemental comments, or internalised in the form of self-blame or shame due to smoking behaviours. Stigma is linked to psychological distress, lower quality of life, and delayed help-seeking in patients with these conditions. Developing interventions to address stigma has been identified as a priority. This systematic review aimed to identify and describe existing interventions in peer-reviewed literature, and to synthesise evidence on their efficacy. **Methods:** PsycINFO, CINAHL, PubMed, and Scopus were searched for relevant records until December 2022. Studies were eligible for inclusion if they described an intervention designed to reduce internalized or external stigma associated with COPD or lung cancer. **Results:** We identified 427 papers, ten of which were eligible for inclusion, with nine interventions identified. Interventions included educational materials, guided behaviour change programs, and psychotherapeutic approaches to increase wellbeing and reduce self-blame associated with smoking behaviours. They were aimed at people with either a diagnosis or higher risk of COPD or lung cancer, or clinical staff. No interventions aiming to reduce stigma associated with lung cancer or COPD in the general community were identified. Most interventions yielded a statistically significant reduction in at least one measure of stigma, or a decrease in qualitatively reported stigma. Most were in a pilot stage and required further evaluation. **Conclusions:** The emerging literature on interventions to reduce stigma associated with lung cancer and COPD suggests that such interventions can reduce internalised stigma, but larger evaluations using randomised controlled trials are needed. Research is needed on campaigns and interventions to reduce stigma at the societal level to reduce exposure to external stigma amongst those with COPD and lung cancer.

FUNDING: Federal

POS3-64

DOES RURALITY MATTER WHEN EVALUATING THE EFFECTIVENESS OF PUBLICLY AVAILABLE SMOKING CESSATION RESOURCES?

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Mobile health (mHealth) tools provide smoking cessation interventions using mobile phone technology, expanding their potential reach. It is not known if people using the same cessation mHealth program but living in different areas (rural/non-rural) have similar outcomes and program satisfaction. The objective of this pilot study was to explore the impact of rurality on program outcomes of an existing publicly available cessation text messaging program, the National Cancer Institute's SmokefreeTXT. Eligible participants (N=46; n=20 rural, n=26 non-rural) were current smokers living in Virginia, with recruitment stratified by county-level rurality based on RUCA codes. Participants completed a 6-week research version of the SmokefreeTXT text message cessation program and completed surveys at baseline and immediately post-program. Descriptive statistics using Fisher's Exact Tests and t-tests as appropriate compared post-program seven-day point prevalence abstinence, smoking frequency, self-efficacy to quit smoking, and program satisfaction by rurality. Among participants who completed the post-program survey (N=37), abstinence was similar between rural and non-rural participants (47.6% vs 33.3% for rural and non-rural, respectively; p=0.37). Daily smoking was reduced among both groups, with a higher change reported in non-rural participants (86.4% to 40.0% among rural vs. 84.6% to 28.6% among non-rural). Post program, participants were least confident they would not smoke when they were angry, or when anxious or stressed. More than 97% of participants indicated that the program helped them quit smoking and a majority (83.3%) found the ability to reset their quit date after a slip useful, neither of which were statistically different by rurality. Non-Rural participants reported more often that real-time support messages for cravings (14.3% vs. 0%; p=0.05) and mood (19.1% vs 0%; p=0.047) were not useful. With improved mobile networks across the United States increasing the reach of mHealth interventions, it is important to assess outcomes and program satisfaction by rurality to understand the potential need for program modifications to enhance effectiveness. Our results indicate that SmokefreeTXT may be adequately addressing cessation needs among rural and

non-rural people making a quit attempt. Future updates to the program could include enhancing content related to mood, stress, and cravings to ensure adequate support is being provided in these domains.

FUNDING: Federal

POS3-65

A HOSPITAL-TO-HOME SMOKING INTERVENTION: DEVELOPMENT AND KEY ADAPTATIONS OF AN EXISTING TEXT MESSAGE PROGRAM TO MEET THE TRANSITIONAL NEEDS OF PATIENTS WHO SMOKE

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Significance: The transition from hospital to home can be challenging for patients who smoke but text messages can support patients during this time. Because there are few publicly available message systems designed for this purpose, we adapted an existing outpatient program, soliciting patient input on how to optimize frequency, timing, and message content for patients during this transition. **Methods:** Smoking cessation guidelines, social cognitive theory previously informed the text library, and included pre-written messages by patients who previously smoked. We added new messages to address emerging concepts found in the literature. We then conducted semi-structured longitudinal interviews (in hospital, 6-36 hours, 3d, 5d, and 7d after discharge) with patients hospitalized with cardiopulmonary disease at a large teaching hospital in Western, MA. We elicited suggestions on how text message interventions can best support smoking cessation post-discharge. Interviews explored preferences for message content and message frequency. Transcribed interviews were coded and analyzed using content analysis to identify major themes. **Results:** We completed 28 interviews with nine patients (5 men, 4 women, 58 years $\pm$ 3.6 yrs). Patients expressed generally positive reactions to receiving texts post-discharge. A majority of patients (6/9) were receptive to up to 7 texts per day. All recommended starting texts on the morning of discharge. Most (8/9) found that texts with tips to manage cravings/avoid triggers were helpful. They found the 35 texts adapted for the first week to be supportive, encouraging, and had some helpful tips. Texts about cost-saving benefit of quitting resonated strongly with patients, and some suggested to repeat this text in a few weeks. Tips for walking and exercising frustrated many as they could not do these activities because of physical limitations. They also found that overly scientific texts, e.g., lowering CO levels, or simply stating, "you can do this/you're strong" were not helpful. **Conclusions:** Patients leaving the hospital prefer early morning, upbeat, and frequent texts. We incorporated these findings into our program and are currently testing an updated system alongside a pharmacotherapy treatment for smoking cessation in a randomized trial (NCT05733767).

FUNDING: Federal

POS3-66

WHAT IS THE EFFECTIVENESS OF SMOKE-FREE UNIVERSITY CAMPUSES AND HOW CAN THEY BE EVALUATED? A SYSTEMATIC REVIEW OF THE LITERATURE

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Background: Smoke-free university campuses (SFC), that ban smoking (cigarettes, cigars and water pipes) and sometimes vaping anywhere on campus (buildings, grounds, vehicles and housing), are recommended in order to protect students. Our presentation will answer the following questions: what is the effect of SFC on the smoking behaviour/tobacco norms/beliefs/perceptions of users (students, teachers, administrative staff)? How can the impact of SFC be assessed, with which indicators? **Methods:** The PRISMA method was used. On the 403 papers published between January 2005 and December 2022 on SFC in general, 54 were included as they evaluate their impact after their deployment (inclusion criteria). The 54 papers were appraised using a checklist that combines items from the Critical Appraisal Skills Programs and the Joanna Briggs Institute Quality assessment tools in order to assess the risk of bias. **Results:** The total mean quality assessment score for the 54 papers was 5.38 out of 6, which stands for high quality level. The mean score was 5.40 for quantitative studies, 5.25 for qualitative studies and 5.33 for mixed method studies. Most studies were conducted in the USA and used quantitative methods. Five main categories of indicators are used to measure



the effect of SFC: 1/ attitude and acceptability of SFC, 2/ beliefs about smoking and health hazards, 3/ norms and social acceptability of smoking, 4/ exposure to passive smoking and pollution on campus (cigarette butts), 5/ smoking behaviours (reduction, cessation, vaping). The majority of papers reveals that SFC decrease favourable beliefs about tobacco and the social acceptability of smoking. The acceptability of SFC is quite high in general and increases over time. SFC also decrease smoking behaviour (initiation, quitting), reduce exposure to passive smoking and pollution linked to cigarette butts on campus, but increase vaping. Challenges and limitations of SFC are noted in studies: a lack of compliance of SFC by some smokers, the persistence of passive smoking around campuses, and the limited use of cessation services provided on campus by users and students. **Conclusion:** SFC are numerous in the USA, but still rare in Europe. This systematic review is useful for universities motivated to develop SFC and evaluate them. It provides indicators, and also highlights the variables (i.e., acceptability, norms, beliefs) that must be influenced to ensure that SFT influence smoking behaviours.

FUNDING: State; Nonprofit grant funding entity

POS3-67

AN INNOVATIVE APPROACH TO REDUCING SECOND HAND SMOKE EXPOSURE AND CHILD MALTREATMENT RISK: THE SMOKE-FREE HOME SAFECARE CURRICULUM

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Significance. Children growing up in low socioeconomic status homes are at an increased risk for experiencing second hand smoke (SHS) and child maltreatment (CM). Exposure to either has a strong association with numerous adverse health outcomes - many of which are lifelong; however, when these exposures are co-occur, the threat to child health is exponentially increased. Interventions exist to target one of the exposures, but not both thereby increasing the burden of participation for these vulnerable families. The Smoke-Free Home SafeCare curriculum uniquely fills this void to reduce exposure to SHS while bolstering parenting knowledge and skills to reduce risk of CM. This presentation will describe the innovative development of a systematically braided curriculum, results of a pilot study, and discuss intricacies of designing a randomized controlled trial among a vulnerable population. **Methods.** To develop the Smoke-Free Home SafeCare curriculum, a method called systematic braiding was used leveraging two evidence-based programs: *Smoke-Free Homes: Somethings are Better Outside* (to target SHS) and *SafeCare* (to target CM). We then conducted a pre-posttest pilot of the braided curriculum to assess acceptability and feasibility among caregivers (N = 8) and reviewed by SafeCare providers (N=7). Using these results, a type 1 hybrid study funded by the NCI using a two-arm randomized controlled trial was initiated to determine the efficacy of the braided curriculum. Qualitative feedback from providers engaged in the trial was collected to refine recruitment and retention protocols for the study focused on sensitive topics among a vulnerable caregiver population. **Results.** Caregivers who participated in the pilot enacted smoke-free home rules and a marked decrease in the parenting stress inventory was observed over the course of 8-weeks. The caregivers found the materials beneficial and informative, particularly regarding the effect of SHS on child health. One caregiver shared: "I felt as long as we don't smoke around the kids...then it shouldn't be a concern and that is not true." SafeCare providers felt the added SHS content complemented the goals of SafeCare, specifically the health and safety modules. Feedback from providers in the trial suggest the importance of focusing on provider engagement as a means to facilitate caregiver recruitment and retention. **Conclusion.** An intervention that efficiently and effectively targets two pressing public health concerns simultaneously - SHS and CM - has the potential to maximize child health outcomes. Focusing on two sensitive and deeply personal exposures requires extra planning in the design of an efficacy trial.

FUNDING: Federal

POS3-68

SMOKING INTENSITY PREVALENCE AND ASSOCIATIONS - A STUDY ON NON-DAILY, LIGHT, MODERATE, AND HEAVY CIGARETTE USE IN GERMANY, 2016-2023

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Introduction A large proportion of the German population smoke cigarettes (35%), and in recent years this prevalence has increased. However, the prevalence and the factors

associated with non-daily, light, moderate, and heavy smoking overtime is unknown, which is particularly salient as light cigarette smoking carry almost the same risk of cardiovascular disease as daily smoking but are less likely to trigger advice to quit smoking from a medical professional. **Methods** The aim of this study was to examine the prevalence and 95% confidence interval (95% CI) of non-daily, light (<10 cigarettes per day [cpd]), moderate (10 to <20 cpd), and heavy (≥20 cpd) cigarette use from 2016 to 2023 using data from the German Study on Tobacco Use (DEBRA), a repeated cross-sectional nationwide household survey. In addition, the relationships between smoking intensity groups (non-daily, light, moderate, heavy) and socio-demographic characteristics, and smoking-related cognitions (e.g., motivation to stop) and behaviors (e.g., smoking cessation attempt) were examined using regression models. **Results** From 2016 to 2023, moderate smoking gradually increased from 41.9% (95% CI: 39.4%, 44.3%) to 46.1% (95% CI: 44.0%, 48.3%), while heavy cigarette use went from 34.4% (95% CI: 32.1%, 36.7%) down to 29.0% (95% CI: 27.1%, 31.0%). Light smoking had a slight increase from 13.7% (95% CI: 12.1%, 15.5%) to 14.5% (95% CI: 13.0%, 16.1%), while non-daily smoking went mostly unchanged from 10.1% (95% CI: 8.7%, 11.6%) to 10.4% (95% CI: 9.1%, 11.7%). Older age, male sex, high frequency of urges to smoke, and strong urges to smoke were less likely among those with low cigarette smoking intensity (non-daily and light smoking) compared to those with heavy cigarette use. Those with higher education, currently using e-cigarettes, had at least 1 quit attempt in the past year, and highly motivated to quit were more likely among those with low cigarette use. **Conclusion** The prevalence of cigarette smoking by intensity varied over time. Specifically, the increasing smoking prevalence in Germany may be driven by moderate smoking rather than those who smoke heavily, which is contrary to the hardening hypothesis. Factors associated with smoking intensity differ, highlighting the importance of assessing for smoking history and implementing tailored smoking cessation interventions.

FUNDING: Federal; State

POS3-69

COMPARISON OF NIH TOBACCO/NICOTINE GRANTS AT MINORITY SERVING INSTITUTIONS

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SIGNIFICANCE: The National Institutes of Health (NIH) has recently revisited latent discussions about the significant differences in the number of underrepresented investigators who are funded by the NIH compared to white investigators. Communities of color have experienced unfavorable outcomes when seeking opportunities for funding at the NIH that are intensified by the challenges that Minority Serving Institutions (MSIs) face relative to Predominantly White Institutions (PWIs). Barriers such as environment (i.e., being underfunded, leading to a lack of proper infrastructure), reportedly contribute to weakening the prospect for otherwise highly qualified investigators at MSIs to obtain a favorable review and thus an NIH grant. In this analysis, we explore the gaps in NIH-funded tobacco/nicotine (Tob/Nic) research grants by investigators at MSIs versus PWIs, and address trends over time. **METHODS:** For this analysis, we used an internal NIH database to identify newly funded Tob/Nic grants awarded by the NIH over the last ten years. We then examined how the specific mechanisms were distributed among the NIH Institutes that administer Tob/Nic research portfolios. We also compared the results from these data against a list of MSIs as identified by the *NASA Minority University Research and Education Project (MUREP) for 2022-2023*. **RESULTS:** Between 2013 - 2022, there were 1230 NIH-funded Tob/Nic grants. Of those grants, a mean of 12% (range: 6 - 16%) was awarded to MSIs, with the remaining grants awarded to PWIs. Of grants awarded to MSIs, the most frequent mechanisms were: R01s (38%), R21s (18%), and F31s (13%). The NIH Institutes with the most awards to MSIs were: NIDA (12%), NCI (4.7%), NHLBI (6.5%), NIEHS (7.7%), and NIAAA (4.3%). **CONCLUSION:** Although the prevalence of Tob/Nic grants funded at MSIs is significantly less prominent than those awarded to PWIs, the results indicate some optimistic outcomes for the future. Most grants awarded to MSIs are for the extremely competitive R01 mechanism. More promising is the increasing trend of F31 training awards. Diversity, Equity, Inclusion, and Accessibility (DEIA) efforts implemented by the NIH in 2021 are encouraging strategies intended to increase diversity in funding for minority investigators over time through targeted funding opportunities.

FUNDING: Federal



POS3-70

STATE INEQUALITY EXACERBATES THE IMPACT OF DISCRIMINATION ON CIGARETTE SMOKING FOR TRANSGENDER ADULTS

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Significance: Over one-third of transgender adults (35.5%) report smoking cigarettes, a significantly higher rate than cisgender adults (20.7%). Smoking may be one method by which transgender adults cope with discrimination. The current study examined how different forms of discrimination due to gender-identity relate to smoking and whether state-level inequality exacerbates the impact of discrimination using data from the U.S. Transgender Survey (N=6,450). Although data were collected in 2008-2009, anti-trans legislation is on the rise emphasizing the importance of understanding the effect of different types of gender-identity based discrimination on cigarette smoking. **Methods:** Participants reported smoking and discrimination experiences. State-level structural stigma was measured using the Movement Advancement Project (MAP) ratings of state laws that address gender identity or expression in 2010. Exploratory factor analysis (EFA) examined discrimination factors and multinomial logistic regressions were used to evaluate whether these factors and state inequality interacted to predict smoking. **Results:** A 3-factor solution of discrimination experiences provided the best fit to the data [$\chi^2(18)=52.42, p<.001, CFI=1.00, RMSEA=.02, SRMR=.03$]. The three factors were comprised of mistreatment (i.e., denied services, employment discrimination, verbal assault, and harassment by teachers), assault (i.e., physical and sexual assault), and loss (i.e., family rejection, unhoused, and evicted) items. The item, 'Left school due to harassment' did not load on any factor. Controlling for income and race, loss [OR=6.86, 95% CI (2.94, 15.97)], state inequality [OR=1.18, 95% CI (1.07, 1.31)], and leaving school due to harassment [OR=1.53, 95% CI (1.07, 2.20)] were associated with greater odds of daily smoking relative to non-smoking in the logistic regression models. Loss [OR=2.58, 95% CI (1.09, 6.12)] and mistreatment [OR=2.06, 95% CI (1.04, 4.08)] were associated with greater odds of former smoking relative to non-smoking. Assault interacted with state inequality. At high levels of state inequality, assault predicted greater odds of daily smoking relative to non-smoking [OR=1.53, 95% CI (1.03, 2.28)], whereas at low levels there was no association [OR=0.71, 95% CI (0.48, 1.06)]. **Conclusion:** Transgender adults experience different types of discrimination across systems (e.g., school, home, community, state). Inequitable policies exacerbated the impact of assault, emphasizing the need for supportive state policies. Smoking prevention efforts should address different types of discrimination across multiple systems.

FUNDING: Federal; Nonprofit grant funding entity

POS3-71

BEHAVIORAL ECONOMIC DEMAND DATA FROM A CIGARETTE PURCHASE TASK IN A CENSUS-MATCHED SAMPLE OF US ADULTS WEIGHTED TO US ADULT CIGARETTE SMOKERS

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Significance: Behavioral economic measures commodity demand have become popular ways to quantify aspects of cigarette valuation. These tasks have been shown to correlate with severity or degree of unhealthy behavior, predict success with some behavior change interventions, and to reflect positive behavior change. Despite this wealth of research, the use of convenience samples in research and variability in task modality and format have made it difficult to judge if a specific demand metric collected in a single individual or study sample is 'normal', 'high', or 'low'. As behavioral economic measures move into the clinical realm, such individual-subject judgements will be of increasing value. **Methods:** In the present experiment, we commissioned a national sample of 587 adults who regularly use cigarettes recruited to match United States census data for age, gender, income, and race. Participants (n=33) reporting unrealistic (i.e., greater than 100 cigarettes consumed per day) purchasing patterns were excluded. Data were then weighted to epidemiological data for adult smokers based on sex, age, income, race, census region, education, ethnicity, and engagement in binge alcohol drinking. Data were fit with a nonlinear mixed effects model incorporating the population weights and compared across demographic categories. The overall weighted population average of demand intensity (i.e., cigarettes consumed per day when free) and demand elasticity (i.e., persistence of consumption in the face of increasing price) along with these demographic comparisons will be presented. **Results:** Variables that were associated with higher demand intensity include more binge drinking and middle

age. More binge drinking was also associated with lower demand elasticity (i.e., greater valuation of cigarettes). **Conclusions:** A reference sample of 'typical' cigarette purchase task demand will allow researchers and clinicians to make judgements about the relative level of demand observed in their own research or clinical sample. The utility of these matched and weighted behavioral economic measures will be discussed along with the limitations of our sample.

FUNDING: Federal; Academic Institution

POS3-72

CIGAR AND CANNABIS CO-MARKETING: IMPACT ON PRODUCT PERCEPTIONS AMONG YOUTH

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Significance: Cigars are explicitly and implicitly marketed with cannabis references. For instance, some cigars include the word "blunt" in brand names and on product labels and use cannabis-related flavor descriptors (e.g., kush). However, there is little research on the impact of cigar and cannabis co-marketing on product perceptions. **Methods:** Participants were a sample of 506 US youth (ages 15-20) recruited April through June 2023 using Qualtrics. Eligible participants include those who reported ever use of little cigars or cigarillos (LCCs) or were classified as susceptible to using LCCs. The survey first assessed ever blunt use (yes or no) and susceptibility to using blunts among those reported never using blunts. We then conducted a between-subjects experiment in which youth were randomized to view one of two cigarillo packages: 1) a package with cannabis co-marketing (i.e., the package included a cannabis-related flavor descriptor and the word "blunt" appeared in the brand name and product label) or 2) a package with no cannabis co-marketing. Outcomes included perceptions of product ingredients, perceptions of product addictiveness and harm, product appeal, susceptibility to using the product shown, and purchase intentions. **Results:** Overall, 17.8% of the sample reported never using blunts and were classified as not susceptible to using blunts, 30.3% reported never using blunts and were classified as susceptible to using blunts, and 51.9% reported ever using blunts. In the experiment, the presence of cannabis co-marketing on packaging increased perceptions that the product contained cannabis (OR: 5.56, 95% CI: 3.73, 8.27) relative to no cannabis co-marketing and decreased perceptions that the product contained tobacco (OR: 0.42, 95% CI: 0.25, 0.70) or nicotine (OR: 0.57, 95% CI: 0.40, 0.82). Cannabis co-marketing also increased susceptibility to using the product shown (B: 0.21, $p=0.02$) relative to no cannabis co-marketing. While no other main effects were observed, we did find a significant association between blunt status and experimental condition ($p=0.03$), such that cannabis co-marketing increased product appeal for those who were susceptible to using blunts and those who had ever used blunts, but not those who were not susceptible to using blunts. **Conclusions:** Cannabis marketing on cigar packages may change perceptions of product ingredients, increase susceptibility to using the product shown, and increase product appeal.

FUNDING: Federal

POS3-73

TOBACCO SMOKING, SMOKING CESSATION, AND LIFE EXPECTANCY AMONG PEOPLE WITH HIV ON ANTIRETROVIRAL THERAPY IN SOUTH AFRICA

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Significance: As access to effective antiretroviral therapy (ART) improves, tobacco-related diseases account for a growing proportion of deaths among people with HIV (PWH). **Methods:** We used a microsimulation model to project the impact of tobacco smoking and smoking cessation on life expectancy among PWH with initial virologic suppression in South Africa, stratified by sex, age (35y/45y/55y), and smoking status (current/former/never). We used South African data to estimate age-stratified mortality hazard ratios: 1.2-2.3 (females)/1.1-1.9 (males) for people with current versus never smoking status; and 1.0-1.3 (females)/1.0-1.5 (males) for people with former versus never smoking status, depending on age at cessation. We compared the contributions



of smoking, smoking cessation, and HIV to changes in individual and population life-years. We performed sensitivity analysis around smoking-associated and HIV-associated mortality risks. **Results:** Forty-five-year-old females/males with HIV with virologic suppression who smoke lose 5.3/3.7 life-years compared to PWH who never smoke. Smoking cessation at age 45y adds 3.4/2.4 life-years. Life expectancy losses from smoking are greater than those from HIV in this simulated population (females, 5.3 vs. 3.0 life-years; males, 3.7 vs. 2.6 life-years). The impact of smoking and smoking cessation increase as smoking-associated mortality risks increase and HIV-associated mortality risks, including disengagement from care, decrease. If 10-25% of virologically suppressed PWH aged 30-59y in South Africa stopped smoking now, 190,000-460,000 life-years would be gained. **Conclusions:** Among virologically suppressed PWH in South Africa, smoking decreases life expectancy more than HIV. Integrating smoking cessation interventions into HIV care, as endorsed by the World Health Organization, could substantially improve life expectancy.

FUNDING: Federal

POS3-74

IF VAPING E-CIGARETTES IS A GATEWAY TO CIGARETTE SMOKING, WHAT ARE THE IMPLICATIONS?

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Significance: Studies have consistently found that never-smoking adolescents who vaped had increased risk of trying cigarettes. Assuming this reflects a gateway to smoking - a controversial issue - we estimate the number of smokers the gateway could produce and the number of them and of non-smoking vapers who would eventually die as a result. **Methods:** Previously we assessed how much adolescents' baseline e-cigarette use in PATH wave 3 was associated with smoking in wave 4 and continued regular smoking two years later in wave 5 (defined as past 12-month use at wave 4 and, at wave 5, at least 100 lifetime cigarettes and 5 or more cigarettes/day in the past 30 days). We applied those findings to NYTS estimates of the number of US middle and high school students in 2021 (27.4 million). 25.2 million of them were never-smokers. PATH estimates that 10% of those never-smokers (2.5 million) vaped by wave 3. This produced an estimate of the number of additional youth who smoked due to vaping. We employed a microsimulation model to calculate the likelihood of smoking- and vaping-related deaths (SRD and VRD). Vaping risk was assessed at 10%, 15%, and 25% of the risk of smoking. Assuming that youth who smoke and those who vape persist in their habits as adults, we multiplied their respective populations by the SRD and VRD probabilities, producing estimates of the number of additional deaths ultimately resulting from vaping and vaping-induced smoking. **Results:** The risk of regular smoking among adolescents who had vaped is 0.68%, while the risk of smoking among never-vapers is 0.27%. These numbers translate into 78,290 smokers: 61,290 never-vapers and 17,000 vapers by wave 3. Absent vaping, there would have been 68,040 smokers. Vaping thus increases the number of smokers by 10,250, equaling 0.41% of never-smoking adolescents who vaped by wave 3 and 0.041% of all never-smoking adolescents. If the vaping mortality risk is 15% that of smoking, we estimated 1,502 vaping-associated lifetime deaths, including 1,207 smokers and 295 never-smoking vapers. Thus, vaping-associated mortality would affect 0.006% of the 25 million never-smoking adolescents in wave 3. Vaping-specific mortality varied from 200 to 491 depending on the mortality risk. **Conclusion:** Even if there is a gateway effect, the toll of vaping is extraordinarily small. Further, we likely overestimated vaping's potential toll. We ignored benefits for adolescents who smoked prior to vaping who now use e-cigarettes to quit smoking or substantially cut daily cigarette consumption. Adolescents who smoke or used to smoke are far more likely to be frequent vapers than are never-smoking youth.

FUNDING: Federal

POS3-75

MENTAL HEALTH SYMPTOMOLOGY AND E-CIGARETTE USE

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Background: 1.7 million (11.3%) middle and high school students within the United States are estimated to have used e-cigarettes in the past 30 days. Early evidence demonstrates mental health comorbidities with e-cigarette use among youth and young adults and is associated with internalizing (e.g., depression) and externalizing disorders (e.g., impulsivity). To prevent youth/young adult initiation, it is critical to identify the direction of effects between mental health and vaping. **Methods:** The current study uses longitudinal data from the Truth Longitudinal Cohort (TLC) to explore

bidirectional relationships between mental health symptomology and e-cigarette use. The TLC is a nationally representative, probability-based cohort which includes youth and young adults (N=3,921; 15-24 years). Respondents reported never having used any combustible, electronic, or other tobacco product and were under the age of twenty-six at baseline (spring 2018) and participated in follow up data collection (fall 2019). Mental health status was collected at baseline. Sadness/depression, attention issues, and sleep issues were measured with three items, "Indicate how often the following are true for you during the past six months: (a) "You are unhappy, sad, or depressed," (b) "You have trouble concentrating or paying attention," and (c) "You have trouble sleeping." Responses ranged from 'never' to 'often' on a 4-point scale. Anxiety was measured as, "Over the last two weeks, how often have you been bothered by the following problems? (a) "Feeling nervous, anxious or on edge" or (b) "Not being able to stop or control worrying." Responses ranged from 'not at all' to 'nearly all the days' on a 4-point scale. E-cigarette use was measured between baseline and follow up with the item "Have you ever used or tried any e-cigarettes or e-hookah?". Respondents who reported any e-cigarette or e-hookah use between these periods were coded as "ever" users. **Results:** Findings indicated that participants reporting sometimes experiencing mental health symptomology were 39% more likely to initiate ENDS and participants reporting often experiencing mental health symptomology were 61% more likely to initiate ENDS than participants who had not. **Contribution:** This is a significant contribution to the literature indicating that the association between mental health symptoms and vaping may be bidirectional

FUNDING: Other

POS3-76

HAS TOBACCO USE AMONG DRUG ADDICTS ALSO REDUCED IN BRAZIL?

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Background: Brazil has shown a reduction in tobacco prevalence in recent years. The country recorded significant drops of 46% between 1989-2008, 19% -2013 and 14% -2019. Little is known about smoking in vulnerable populations, such as Alcohol and other Drugs (AOD) addicts in treatment. This study evaluated the prevalence of Risky Use (RU) and Addiction (AD) of tobacco among AOD addicts undergoing treatment in specialized services over 13 years. Specifically, we analyzed the risk of smoking associated with the type of substance consumed. **Method:** Through a panel study of three cross-sectional multicenter studies, we assessed the Relative Risk (RR) of smoking of 693 patients in treatment. We used sociodemographic and ASSIST data from 2007 (n=393), 2014(n=100) and 2018(n=200) studies. **Results:** Participants were Age= 37±11.4; Men=74.7%; Income below \$200=62%. Prevalence of smoking was high in the three years 73.5% (2007), 49.5% (2014) and 74% (2018). Regarding the pattern in 2007, RU=52.6% and AD=20.9%. There was a reduction in the RU pattern but a progressive increase in tobacco dependence over the years. In 2018 the RU pattern fell by about 40% compared to 2007, with a linear average drop of 5% per year (p=0.10). AD increased 2.3 times with an average increase of 8% per year (p<0.0001). Regarding other drugs, in 2014 RU Alcohol dropped, and in 2018 AD increased 2.3 times. The RU of Crack peaked, increasing by 2.5 times in 2014 and falling by 55% in 2018. Both the RU and AD of Marijuana have fallen over the years—12% per annum for RU and 9% per annum for AD (both p<0.001). In the analysis of the association between the type of drug consumed and smoking, we observed that the use of Marijuana, at any level, was associated with an increased RR for Tobacco, mainly AD. Crack use followed a similar pattern but affected both the RU and the AD of Tobacco, with a reduction in 2018 RU. Alcohol was not associated with an increase in tobacco use. **Conclusions:** Tobacco AD remains high in AOD addicts, different from the reduction of smoking in the general Brazilian population. The RU pattern was associated with Crack and Marijuana users, which significantly increased in Brazil in the early 2010s. These were multiple users of AOD. In 2018, there seems to have been a change in the consumption pattern, with a lower proportion of crack AD, with a reduction in the RU of tobacco. On the other hand, the AD of tobacco increased association with Alcohol, Crack and Marijuana.

FUNDING: Federal; Academic Institution



POS3-77

PERCEPTIONS OF HARM AND ADDICTIVENESS OF ELECTRONIC CIGARETTES: OPPORTUNITIES FOR ACCURATE AND TAILORED MESSAGING

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Significance: Despite mounting evidence that e-cigarettes (ECs) are likely to be less harmful than combustible cigarettes, perceptions of greater harm persist. There is also growing concern about the perceived addictiveness of ECs. Both perceptions play a role in decision making related to initiation, switching and dual use. **Methods:** This analysis included annual cross-sectional survey data collected from 2021-2023 as part of the evaluation of the Tobacco Stops With Me health communications campaign. Across the three surveys, 2490 randomly selected Oklahoma adults participated via cell phone. Questions included sociodemographic characteristics, tobacco use behaviors, and two questions related to perceived harmfulness and addictiveness of ECs compared to combustible cigarettes. Responses to both questions were dichotomized as "more" and "equally, less or don't know." Weighted estimates were calculated and adjusted for non-coverage and non-response. Multiple logistic regression was used to determine what factors were associated with perceived harm and addictiveness. Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) are reported. **Results:** Overall, 24.5% of Oklahomans believe ECs are more harmful than combustible cigarettes, and 33.4% believe ECs are more addictive. More than a third of smokers believe ECs are more harmful (34.4%). After adjustment for all other covariates, current cigarette smokers (OR 1.96, 95% CI 1.07-3.59) and those who believe secondhand vape is very harmful (OR 3.03, 95% CI 2.26-4.04) had higher odds of reporting ECs are more harmful. Current users of ECs had a lower odds (OR 0.35, 95% CI 0.17-0.72). Other factors significantly associated with perceptions of greater harm for ECs include lower educational attainment, Black race, and Hispanic ethnicity. Factors associated with believing ECs are more addictive than combustible cigarettes include male sex, younger age, lower educational attainment and American Indian race. Those who believe secondhand vape is very harmful had a higher odds of reporting ECs are more addictive (OR 1.56, 95% CI 1.20-2.01), but current smokers and EC users did not. **Conclusion:** These findings highlight the need for accurate and tailored messaging of the relative risk of tobacco and nicotine products, as these perceptions have the potential to influence tobacco-related behaviors.

FUNDING: State

POS3-78

SMOKING AND E-CIGARETTE USE IN YOUNG ADULTS WITH BLINDNESS, DEAFNESS, OR SERIOUS VISION OR HEARING IMPAIRMENTS

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Significance: Minority populations including people with disabilities are frequently excluded from large-scale surveys which gather data on smoking, a leading contributory factor in health inequalities. People who are blind or have long-lasting serious vision impairment, or deaf or with serious hearing impairment (BSVI/DSHI) comprise such minority populations. Data on smoking prevalence in these groups are very limited worldwide and there is a scarcity in the scientific press. As a consequence, disability-related inequalities that these groups suffer may be exacerbated by lack of important health-related data necessary to understand tobacco use in these groups and also to develop appropriate health interventions where needed. Young adults with long-lasting BSVI/DSHI are particularly poorly represented in this regard. This study examines smoking and e-cigarette use in young adults (20-year-olds) in Ireland with BSVI/DSHI and compares them with non-vision/hearing impaired 20-year-olds. **Methods:** We used weighted data from Wave 4 of the national longitudinal study *Growing Up in Ireland* (GUI) Cohort '98 (n=5,190) when participants were 20 years old (2019). Ethical approval was granted by the GUI Research Ethics Committee, Department of Children and Youth Affairs. Participants were asked whether they had long-lasting "Blindness or a serious vision impairment" and/or "Deafness or a serious hearing impairment" (yes/no). Ever and current smoking and e-cigarette use were measured by whether participants responded yes to "ever" used and yes to "occasional" or "daily" use. **Results:** Among 20-year-olds, 1.9% (n=97) reported BSVI and 1% (n=49) DSHI. Ever-smoking was lower for those with these sensory impairments (69.5%, n=93) than for those without (74%, n=3,714). Prevalence for all other measures was higher for those with BSVI/DSHI than for those without. Ever e-cigarette use was 58% (n=78) vs 47.5% (n=2383); current smoking 42.1% (n=57) vs 37.4% (n=1889); and current e-cigarette use 16.9% (n=23) vs 13.2% (n=667) but only ever e-cigarette use was statistically significant (p=.01). **Conclusion:** Current smoking

and e-cigarette ever and current use is at least as high in 20-year-olds with BSVI/DSHI as it is in those without. Limitations are that numbers in our sample are small and our joint analysis may have occluded differences between the two groups. Nonetheless, targeted interventions for young adults with blindness, deafness or serious vision/hearing impairments are called for.

FUNDING: Nonprofit grant funding entity

POS3-79

CHARACTERIZING FEATURES OF US ORAL NICOTINE POUCH ADS (2021-2022)

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Significance. Oral nicotine pouches (ONPs) are a growing category of nicotine products in the US. Recently, expenditures on ONP advertising have exceeded traditional smokeless tobacco advertising expenditures. The manner in which tobacco companies market ONPs to consumers could influence risk perceptions and interest in use, particularly for youth and young adults. The present study assesses several features present in a sample of US ONP ads. **Methods:** We acquired a sample of 519 ONP ads from social media (n=395), mobile/online (n=107), and print/television/radio (n=17) that ran in 2021 (n=357) and 2022 (n=162). We purchased ads from market research firm Numerator for brands Zyn, On!, Black Buffalo, and Nordic Spirit, and downloaded ads monthly from brand-owned social media accounts for brands Black Buffalo and Niin. Ads were double coded for presence of the following features: presence and type of flavors promoted; descriptive terms (e.g., 'pure', 'tobacco-free'); broader claims of product attributes (e.g., discrete, convenient to use); product use in the ad; and use of promotions (e.g., coupons, discounts). **Results:** Approximately 84% (n=435) of all ads featured a flavored product; across the sample the most common flavors were mint (41.8%), fruit (36.9%), wintergreen (32.9%), spearmint (27.9%), and spice (27.7%). The most frequent descriptive terms present in the ads were 'tobacco-free' (67.2%), 'smoke-free' (49.1%), 'synthetic' (48.5%), and 'odor-free' (31.6%). Common claims included the consumer's ability to choose different nicotine strengths (42.9%), the availability of high-quality flavors (36.6%), lack of odor (28.1%), and how convenient products are to use (25.2%). 'Tobacco-free', 'smoke-free', and 'synthetic' terms, along with flavor, nicotine strength, and no odor claims, were significantly more prevalent in social media ads (all p's <0.001). Few ads in this sample featured product promotions (9.8%) or showed the product in use (5.0%). **Conclusions:** Results suggest that product flavor, nicotine formulation (e.g., 'tobacco-free', 'synthetic') and strength, convenience of use, and the lack of smoke/odor are key features of US ONP ads. These appeals have the potential to communicate lower risk from product use, especially for nicotine-naïve youth. Future research should test the effect of the features identified in this surveillance study to inform marketing regulations.

FUNDING: Federal

POS3-80

QUIT INTENTION AMONG POLY USERS OF TOBACCO PRODUCTS: HEATED TOBACCO PRODUCTS AND ELECTRONIC CIGARETTES FOR SMOKING CESSATION.

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Significance: Tobacco companies' sophisticated marketing strategies for Heated Tobacco Products (HTP) has exposed many smokers to advertisements claiming that HTP could replace combustible cigarettes. Additionally, using research results on the smoking cessation effects of e-cigarettes, smokers were led to believe that they could quit smoking by using e-cigarettes available in the market. Recently, many smokers in Korea have become dual or triple user by using e-cigarettes or HTP alongside conventional cigarettes. This study evaluated the relationship between intention to quit smoking and poly-use of tobacco products. **Methods:** Data of total 2,935 current smokers in the 8th Korea National Health and Nutrition Examination Survey (2019-2021) were analyzed. Current smokers were classified as combustible cigarettes user, dual user, or triple user based on additional use of e-cigarette or HTP. A multivariate logistic regression model was designed. Smoking cessation intention was assessed based on cotinine measured smoking intensity. Non-smoking group (<50ng/mL) based on urinary cotinine levels



was excluded. The smokers were categorized into quartiles (Q1, Q2, Q3, and Q4) for both male and females. Results: 17.3% of male smokers and 15.0% of female smokers reported planning to quit within one month. The highest smoking intensity group, Q4 (1787ng/mL for males, 1297ng/mL for females), showed an adjusted odds ratio (aORs) for quit intention of 0.48 (95% confidence interval (CI): 0.29-0.82) compared to the lowest intensity Q1 group. Dual users, regardless of nicotine dependence or smoking intensity, had a significant aORs of 0.47 (95% CI: 0.26-0.86) for quit intention compared to combustible cigarettes users. However, triple users showed no significant quit intention. Conclusion: The results of this study suggested that dual users are less likely to quit smoking. Therefore, HTP or e-cigarettes available in the market may have a limited role in transitioning to HTPs or e-cigarettes use or complete smoking cessation.

FUNDING: No external funding reported

POS3-81

HOW IS NICOTINE VAPING PRODUCT (E-CIGARETTE) USE MONITORED IN PRIMARY CARE ELECTRONIC HEALTH RECORDS IN THE UNITED KINGDOM? AN EXPLORATORY ANALYSIS OF THE CLINICAL PRACTICE RESEARCH DATALINK (CPRD)

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Background: Electronic health records (EHRs) have the potential to help identify long-term health effects of nicotine vaping. Evidence on vaping documentation in EHRs is limited. **Aim:** To characterise the extent to which vaping is recorded in primary care EHRs in the UK, on a population level. **Methods:** We conducted a descriptive analysis of Clinical Practice Research Datalink (CPRD), which contains primary care electronic health records of 25% of the UK population and is representative for the UK population. Patients aged 18+ years whose vaping status was recorded using a medical code between 2006-2022 were identified. We reported the frequency of vaping codes; their distribution by patient age, gender, and ethnicity; trends in vaping recording over time; and transitions in patient smoking status. **Findings:** Seven medical codes were indicative of current or former vaping, from 150,114 patients. When their vaping status was first recorded, mean age of patients was 50.2 (standard deviation: 15.0), 52.4% were female, and 82.1% were white. Vaping recording increased from September 2013, peaking in October 2019. Of those recorded as currently vaping at any point, almost all (98.9%) had records of their prior smoking status: 55.0% had been smoking, 38.3 had smoked and stopped, 5.6% had never smoked. Over a year after being recorded as vaping, over a third (34.2%) of people who were smoking prior to being recorded as vaping were still smoking, just under a quarter (23.7%) were indicated to have quit smoking, 1.7% received a 'never smoked' status, and there was no smoking status record for 40.4%. **Interpretation:** Few patients are being asked about vaping. Most who vape had smoked and, for those with information available, many quit smoking after starting vaping. To enable records to provide stronger evidence on health effects, we recommend improved completeness, accuracy and consistency.

FUNDING: Nonprofit grant funding entity

POS3-82

LOBBYING AGAINST TOBACCO TAXATION IN FRANCE. AN ANALYSIS OF THE ARGUMENTS DISSEMINATED IN THE FRENCH WEBSITE LEMONDEDUTABAC.COM

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Background: As long as the tobacco taxation exceeds an increase of 10%, it is one of the most effective measure in reducing smoking prevalence. French research on the lobbying against this measure and on the lobbying of the tobacco industry in general is very poor in spite of the specific context of this country: tobaccoists have a monopoly on tobacco sales, they are very closed to the tobacco industry (are considered as a front group), and tobacco prevalence is high (31.8% in 2022). This research aims to analyze the arguments on tobacco taxation disseminated in the popular and well-referenced French website "LeMondeduTabac.com" ("the world of tobacco") supported by tobaccoists and presented as an "exhaustive and informative approach, with no partisan bias". **Methods:** A documentary analysis of articles published on this website from 2019 to 2022 was conducted. A quantitative analysis was first performed (number of articles published, frequency, etc.). Then a manual thematic content analysis was conducted

in order to identify the arguments used by tobaccoists on the topic of tax increases in France. **Results:** In four years, 722 articles were published, presenting 2019 arguments dealing with taxation measure: 81.57% were against it (I), 12.23% proposed alternative options (II), and 6.19% were in favor (III). Most arguments of (I) were similar to those identified in the international literature on the lobbying against taxation measure: loss of incomes and jobs for manufacturers, ineffectiveness of the measure, increase of parallel market and illicit trade. Interestingly, "social" role of tobaccoists and their proximity to the French government were also pointed out to fight against tax increases. The alternative measure proposed (II) was the European harmonization of tobacco taxation (which is very complicated to implement). Regarding (III), some rare papers recognized the positive effects of the measure on tobacco prevalence. **Conclusion:** Contrary to the positioning displayed on the website "LeMondeduTabac.com" powered by tobaccoists ("without partisan bias"), the arguments relayed on tax increases are overwhelmingly opposed and very similar to those put forward by the tobacco industry and identified in the international literature. This research highlighted that this popular and well-referenced website may be a lobbying tool of tobacco economic actors to relay their arguments to French journalists, politicians and civil society.

FUNDING: State

POS3-83

ALCOHOL AVAILABILITY IN THE TOBACCO RETAIL ENVIRONMENT: EVIDENCE AND EQUITY CONCERNS

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Significance: Like tobacco, alcohol is a carcinogen with no safe level of use. Presence of alcohol in the tobacco retail environment increases opportunities to purchase/use both products (availability) and increases exposure to marketing (acceptability). One study determined that 39% of tobacco retailers in North Carolina sold alcohol, and a positive association with neighborhood disadvantage. Surprisingly, there is a dearth of evidence about the prevalence and location of alcohol-selling tobacco retailers. **Methods:** This is a secondary analysis of retail surveillance data conducted by all local health departments in California. From a list of all 31,100 licensed tobacco retailers, zip codes were randomly selected until a target sample size for each health department was reached. Trained data collectors visited all tobacco retailers in the 728 sampled zip codes and recorded the presence of beer, wine, and spirits in 7969 stores (completion rate=94%). A generalized linear mixed model (weighting variable applied) examined alcohol availability as a function of zip code demographics: % of residents under 21, % of residents who are racially or ethnically minoritized (e.g., % Hispanic/Latinx, % non-Hispanic Black, % Asian/Pacific Islander/Native Hawaiian) and median household income. Demographic variables were derived from American Community Survey estimates (2017-2021) and standardized. **Results:** Overall, 71.6% of tobacco retailers sold alcohol: beer or malt liquor in 70.2%, wine in 56.7%, and spirits in 40.2%. Beyond liquor stores, 97.2% of supermarkets, 84.2% of pharmacies, 79.3% of convenience stores, 68.4% of discount stores, and 4.1% of tobacco specialty shops sold alcohol. The likelihood of a tobacco retailer selling alcohol increased as the percent of residents under 21 increased (AOR=1.19, 95% CI=0.98,1.45), but the likelihood of a tobacco retailer selling alcohol decreased as the percent of residents who are Black (AOR=0.68, 95% CI=0.61,0.77), Asian/Pacific Islander/Native Hawaiian (AOR=0.82, 95% CI=0.74,0.89) and Hispanic/Latinx (AOR=0.76, 95% CI=0.65,0.89) increased. As median household income increased, the likelihood of a tobacco retailer selling alcohol decreased (AOR=0.68, 95% CI=0.61,0.77). **Implications:** A large proportion of tobacco retailers selling alcohol and greater likelihood in lower-income areas raises concerns about place-based disparities that encourage dual use. A greater likelihood of alcohol-selling tobacco retailers in areas with a higher proportion of youth raises concerns about initiation. The ubiquity of alcohol-selling pharmacies exacerbates this concern because pharmacies sell cigarettes at lower prices than other tobacco retailers and underage tobacco sales in US pharmacies persist. Stricter licensing schemes could address the health harms of alcohol-selling tobacco retailers and the health benefits of retailer reduction.

FUNDING: Federal; State

POS3-84

THREE-WEEK RTMS DOES NOT AFFECT WHITE MATTER INTEGRITY IN SMOKERS: A PRELIMINARY FINDING WITH DIFFUSIONAL KURTOSIS IMAGING

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Significance: Cigarette smoking causes approximately 8 million deaths and an economic loss of \$193 billion annually. Repetitive transcranial magnetic stimulation (rTMS), an FDA-approved therapy for smoking cessation, can enhance cognitive function, decrease cue-induced craving, and reduce cigarette consumption. Although the exact mechanism of rTMS for smoking cessation is unknown, it can be theorized that it alters neural circuitry by specifically targeting areas such as the dorsolateral prefrontal cortex (DLPFC), insula, and medial orbitofrontal cortex (mOFC). Diffusion Kurtosis Imaging (DKI) is routinely used in clinical settings to visualize white matter tracts and presents itself as an easy-to-use method that is clinically applicable in the fields of psychiatry and neuroscience. We hypothesize that DKI measurements will remain constant at the site of rTMS treatment (DLPFC or mOFC) and change in the reward network (NAc and mOFC). **Methods:** DKI data from 10 subjects pre-rTMS and post-rTMS was processed via PyDesigner. Kurtosis Fractional Anisotropy (KFA) files were then used to obtain measurements of the DLPFC, NAc, and mOFC via MRICron. The acquired measurements were analyzed via SPSS. **Results:** Paired sample statistics showed no significant changes in the mean values of the NAc (0.3410 vs 0.3066), DLPFC (0.2044 vs 0.2057), or mOFC (0.2812 vs 0.2708) pre- and post-rTMS. A significant correlation was observed between the pre-rTMS DLPFC and pre-rTMS mOFC measurements based on an R-value of 0.685 at $p < 0.05$. Measurements of the mOFC showed a significant correlation between pre-rTMS and post-rTMS conditions with an R-value of 0.746 at $p < 0.05$. **Conclusion:** Statistical interpretation of the KFA mean values suggests no damage occurs in the brain post-rTMS. A correlation was found within the regions of interest which should be further investigated via fiber tractography. Our next steps are to integrate DKI and fiber tractography to predict the therapeutic effect of rTMS for smoking cessation

FUNDING: Federal

POS3-85

TOBACCO INDUSTRY MARKETING REACTIONS TO IMPLEMENTATION OF COMPREHENSIVE PLAIN PACKAGING

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Significance Monitoring tobacco industry marketing strategies in countries that introduce plain packaging helps to document variations in the tobacco market during the transition period, and thus inform policy. This study describes changes in characteristics of tobacco products before and after comprehensive plain packaging implementation together with single presentation per brand requirement in Uruguay. **Methods** Data collection was carried out across fifteen neighborhoods of different socioeconomic areas in Montevideo, Uruguay before and after plain packaging implementation (June - August 2019 and May - July 2021, respectively). A high school or college was selected per neighborhood as the starting point of the walking protocol. Two stores were visited in each neighborhood. Tobacco products were purchased and then coded for the presence/absence of taste/sensation lexical and imagery, including capsules. **Results** The number of unique tobacco products increased from 2019 ($n=23$; $n=21$ cigarettes and $n=2$ roll-your-own [RYO]) to 2021 ($n=40$; $n=23$ cigarettes and $n=17$ RYO). Prior to plain packaging, all cigarette packs presented design features. After its implementation, 95.7% of cigarette packs complied with the regulations. 34.7% of all tobacco products were flavoured in 2019 compared to 50.0% in 2021. In 2019, all flavoured cigarette packs indicated this characteristic, and every cigarette stick had filters designs indicating possibility of changing or activating flavour. In 2021, only 4 cigarettes packs indicated flavour, while the majority of cigarette sticks still included a flavor capsule **Conclusions** We observed an increase in the number of flavoured tobacco products and in availability of RYO flavoured tobacco in retailers near schools, after the implementation of plain packaging in Uruguay. Other marketing strategies previously reported in other countries with plain packaging were not observed due to a more comprehensive regulation.

FUNDING: State; Nonprofit grant funding entity

POS3-86

YOUNG ADULT SMOKING BEHAVIOR FOLLOWING CHANGES IN STATE-LEVEL REGULATORY POLICIES IN CALIFORNIA

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SIGNIFICANCE: In 2016, California approved a \$2 increase in the tobacco excise tax (effective April 2017) and raised the age of tobacco purchase to 21 (effective June 2016) three years before the federal government's Tobacco 21 policy went into effect.

These policies were intended to increase smoking cessation efforts and prevent youth from tobacco initiation. **METHODS:** In 2014, we conducted a probabilistic household survey of young adults, 18-26, in Alameda and San Francisco Counties in California ($N=1363$), with whom we followed up in 2019-20 ($N=304$). Participants were asked about current and ever smoking status and other tobacco use. We identified participants who remained in California between 2014-2020 and those who had moved out of state to evaluate whether in-state participants had quit smoking after policy implementation. We compared smoking rates by year using t-tests, then performed a fixed-effects panel data Poisson regression in Stata with current smoker (yes/no) as the outcome and an interaction term for year and California residence at follow up. **RESULTS:** Among all participants, the weighted smoking rate in 2014 was 13.9% versus 11.4% in 2019-20, but the difference was not significant. However, there was a significant difference in smoking rates for those who were 18-20 in 2014 and would have been most impacted by Tobacco 21; the rate dropped from 12.8% to 6.4% for participants who continued to reside in California ($pval=.03$). There were insufficient observations of those residing outside of California to perform a separate regression for those who were 18-20 at baseline. In the full sample, there were no significant differences in smoking between those who remained in California and those who moved, nor was the interaction significant. However, participants identifying as Multiracial were 80% less likely to smoke, and those reporting greater smoking harm perceptions were 21% less likely to smoke. Alternatively, those reporting higher levels of peer smoking had a 7.7 higher smoking rate than others, those with serious psychological distress had a smoking rate 2.1 higher than those without, those who had consumed alcohol in the past 30 days had a 4% higher rate of smoking, and those who had ever used e-cigarettes had a smoking rate 5.2 times higher than those who had not. **CONCLUSION:** Current smoking among Bay Area young adults dropped between 2014-2020, with a significant reduction among those aged 18-20 in 2014 who were most likely to be impacted by the passage of Tobacco 21. For those who continued to smoke, e-cigarette use, alcohol consumption, psychological distress and greater perceived peer smoking were predictive of ongoing smoking. Alternatively, young adults who perceived smoking to be more harmful were less likely to smoke.

FUNDING: Federal; State; Nonprofit grant funding entity

POS3-87

TOBACCO SMOKING QUITTING BEHAVIOR AMONG WOMEN TRANSITIONING INTO PREGNANCY: A LONGITUDINAL ASSESSMENT FROM WAVES 1-5 OF THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH STUDY

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Significance: Understanding tobacco smoking quitting behavior among women transitioning into pregnancy is important to inform how and where support can be targeted. Using the longitudinal Population Assessment of Tobacco and Health (PATH) survey, this study assessed the association between transitioning into pregnancy and different measures of quitting behavior. **Methods:** Data were drawn from Waves 1-5 of PATH (October 2014-November 2019). The sample included women of reproductive age (18-44) who indicated they were currently smoking in Wave 1 and participated in all subsequent survey waves. Separate generalized estimating equations assessed the association between transition into pregnancy, and i) making a quit attempt in the past 12 months, ii) quitting smoking and iii) use of quitting aids, respectively, using variables constructed across four wave pairs (waves 1-2, 2-3, 3-4, and 4-5), and whether associations depended on household income. All models were adjusted for age and ethnicity. **Results:** An unweighted total of 1,976 women were included, with 3.3% (95% CI 2.9-3.7) transitioning into pregnancy between a baseline wave 1-4 and subsequent follow-up wave 2-5. The prevalence of quitting smoking was higher in those who transitioned into pregnancy (35.1%, 28.1-42.2; ARR=3.72, 95% CI 2.68-5.18) than in those who did not (8.7%, 7.9-9.3), and with increasing household income (ARR=1.12, 95% CI 1.07-1.16), but there was no interaction between pregnancy and income. There were similar rates of quit attempts (22.8% (17.2-28.4) vs 22.7% (21.3-24.1)) and using any quit aid (13.4% (9.7-17.1) vs 13.9% (12.9-14.9)) or specific quit aids in those who did or did not transition into pregnancy between waves. In terms of specific quit aids used, 7.3% (4.4-10.3) vs 6.8% (6.0-7.6) used an e-cigarette, 6.0% (3.3-8.8) vs 5.9% (5.2-6.6) used NRT, 2.4% (2.2-2.9) vs 2.6% (0.2-4.6) and 1.6% (0.3-3.0) vs 3.1% (2.6-3.5) used prescription medication such as varenicline, or bupropion. **Conclusions:** Women who become pregnant are more likely to quit smoking than those who do not become pregnant, as are those on higher incomes. There do not appear to be differences in attempts to quit or use of quit aids, according to transitioning into pregnancy or household income. Improving access to effective quit methods to women transitioning into pregnancy is necessary to boost quit rates in this priority group.

FUNDING: Federal



POS3-88

INDUSTRY MARKETING OF TOBACCO PRODUCTS ON SOCIAL MEDIA: CASE STUDY OF PHILIP MORRIS INTERNATIONAL'S IQOS

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Significance: Newer tobacco products might be particularly likely to use social media as they emerge in the global market. Little is known about the official use of social media in marketing heated tobacco products (HTPs). This study examined Philip Morris International's (PMI) social media marketing globally of its leading HTP, IQOS. **Methods:** PMI IQOS country-specific official websites were accessed (N=59) in May to September 2022 and social media accounts listed were recorded. Accounts were then coded for their number of posts in the past month and year and for their number of subscribers. Posts on online accounts with at least one past-month post were categorised to describe the post's function: instructional, general advertising, price promotions or event promotions. **Results:** Of the 59 country websites, 45 (76.3%) listed at least one social media account; of these, an average of 2.5 accounts (SD=0.8) were listed. Across websites, 111 accounts were identified: 42 Facebook, 23 YouTube, 21 Twitter, 19 Instagram, 2 Telegram, 1 LinkedIn, 1 KakaoTalk, 1 VK and 1 LINE. Across YouTube, Twitter and Instagram, accounts made 2550 past-year posts and had ~490 961 subscribers. Of the 165 past-month posts, 101 (60.1%) functioned as general advertising, 30 (17.9%) instructional, 29 (17.3%) event promotions and 8 (4.8%) price promotions. **Conclusion:** Social media posts were used to engage consumers with advertising, event promotions, product use instructions and price promotions. The study provides evidence of the company-sponsored official marketing of an HTP via social media globally, underscoring the need for monitoring and tobacco control regulatory efforts in the digital arena.

FUNDING: Unfunded

POS3-89

EXAMINING STUDENTS' PERCEPTIONS OF TOBACCO POLICY ENFORCEMENT ON COLLEGE CAMPUSES IN TEXAS

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Significance: Colleges/universities have made great progress in implementing tobacco-free policies, yet enforcing these policies remains challenging. Efforts to improve compliance with tobacco policies are emerging; however, research is sparse on the impact of enforcement efforts on college campuses. The purpose of this study was to examine if students' perceptions of tobacco policy enforcement on their college campus are associated with (1) lower odds of currently using electronic nicotine delivery systems (ENDS) and/or cigarettes on campus, and (2) lower odds of currently using ENDS and/or cigarettes in a public (e.g., classroom, outdoors, library) versus private (i.e., car, dormitory) location on campus. **Method:** Participants were 16939 college students from 22 Texas colleges/universities during Spring 2023. Participants were an average age of 21.9 (SD=4.9); 65.3% were female; 27.9% non-Hispanic white, 37.2% were Hispanic/Latino, and 34.9% were of another race/ethnicity. Logistic regressions were used to determine if campus tobacco policy enforcement is associated with lower odds of current ENDS and/or cigarette use on campus and if campus tobacco policy enforcement is associated with lower odds of current ENDS and/or cigarette use in a public (vs. private) location on campus. Age, sex, sexual gender minority status, race/ethnicity, and current other tobacco use were included as covariates. **Results:** Students who perceived their campus tobacco policy is enforced had significantly lower odds of using ENDS (OR=0.48, $p < .001$, 95%CI: 0.39, 0.59) and of smoking cigarettes on campus (OR=0.65, $p = .028$, 95%CI: 0.45, 0.95). Further, students who used ENDS on campus and perceived their tobacco policy is enforced had significantly lower odds of using ENDS in a public location on campus versus private (OR=0.61, $p < .001$, 95%CI: 0.53, 0.71). However, enforcement did not significantly impact the odds of cigarette smoking in a public versus private location on campus. **Conclusion:** Findings from this study suggest that even perceived tobacco policy enforcement serves as a deterrent against ENDS and cigarette use on college campuses. Findings also suggest that enforcing tobacco policies will assist in reducing tobacco use on campuses, thus creating a healthier environment for the entire campus community. Future longitudinal studies are needed to assess tobacco use on campus before and after implementing and promoting tobacco policy enforcement strategies.

FUNDING: State; E-cigarette/Alternative nicotine products Industry

POS3-90

CHANGES IN CURRENT TOBACCO USE AMONG ADULTS IN THE PHILIPPINES FROM 2015 TO 2021

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Background: Prevalence of current use of smoked and smokeless tobacco in the Philippines decreased from 29.8% in 2009 to 23.8% in 2015. No study has examined changes in tobacco use in recent years. This study describes changes in prevalence of current tobacco use from 2015 to 2021 among adults aged ≥ 15 years in the Philippines using Global Adult Tobacco Survey (GATS) data. **Methods:** GATS provides nationally representative estimates of tobacco use and related indicators for adults aged ≥ 15 years. Current tobacco use was defined as any current use of smoked tobacco, smokeless tobacco, or e-cigarettes. The analytic sample included 11,585 adults in 2015 and 18,466 adults in 2021. Approximately 0.5% of adults were excluded in 2015, and 0.3% were excluded in 2021 due to missing responses for tobacco use. Besides descriptive analyses, significant differences in adjusted prevalence (APD) from 2015 to 2021 were determined by $p < 0.05$ for marginal effect contrasts in multivariable logistic regression models. **Results:** Crude prevalence of current tobacco use decreased from 24.0% (95% CI = 22.9%, 25.1%) in 2015 to 20.7% (95% CI = 19.2%, 22.2%) in 2021 (decreased by 687 thousand adults; APD = - 3.5 percentage points [%]; $p < 0.001$). By tobacco product, crude prevalence of current tobacco smoking decreased from 22.7% (95% CI = 21.6%, 23.7%) in 2015 to 18.5% (95% CI = 17.1%, 20.0%) in 2021 (APD = - 4.6%; $p < 0.001$). There was no significant change in prevalence of current use of smokeless tobacco between the 2 years (1.7% in 2015 vs. 1.5% in 2021, $p = 0.618$). Crude prevalence of current e-cigarette use increased from 0.8% (95% CI = 0.6%, 1.0%) in 2015 to 2.1% (95% CI = 1.6%, 2.6%) in 2021 (APD = 1.4%; $p < 0.001$). Significant decreases ($p < 0.05$) in prevalence of current tobacco use were noted among men (APD = - 5.6%), women (APD = - 1.5%), adults aged < 65 years (APD = - 2.4% to - 6.2% across 3 age groups), residents in urban (APD = - 3.9%) or rural (APD = - 3.3%) areas, adults with a primary (APD = - 4.6%) or secondary (APD = - 3.8%) education, and those in the lowest (APD = - 5.3%), higher (APD = - 3.7%), or highest (APD = - 3.8%) wealth index. **Conclusions:** The study indicates progress in reducing tobacco use, especially tobacco smoking, among adults in the Philippines from 2015 to 2021. Opportunities exist for policymakers and public health officials to develop and implement evidence-based policies and strategies related to the use of e-cigarettes in the Philippines.

FUNDING: No external funding reported

POS3-91

DELAY DISCOUNTING IS ASSOCIATED WITH NICOTINE VAPING, INTENTIONS, AND DECISIONAL BALANCE SCORES

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Delay discounting (DD) describes the tendency to choose smaller immediate rewards over larger delayed rewards. DD has been shown to be greater among drug users than non-users and associated with indicators of dependence across various recreational drugs including cigarette smoking. Less is known about the relationship between DD and vaping nicotine. Young adults (YAs) have alarmingly high rates of vaping. A better understanding of the relationship between DD and vaping and associated features among YAs may provide insight into risk and protective factors that could be harnessed towards prevention and intervention efforts. In this study 982 YAs (18-30 years) completed a survey via Qualtrics that included demographics, nicotine and tobacco use, the 5-trial adjusting delay discounting task (5-ADT) and the 20-item Nicotine Vaping Decisional Balance scale (NVDB). Those who had never tried any form of nicotine ($n = 374$) were asked about their intentions to vape nicotine in the future. Those who had ever vaped ($n = 556$) completed the 4-item E-cigarette Dependence Scale (EDS). As predicted, DD (i.e., logK) was greater among ever vapers compared to never vapers, $F(1, 971) = 9.255$, $p < .002$ and was associated with the number of lifetime vaping episodes [$r(972) = .086$, $p < .007$]. DD was associated with the NVDB scale (pros of vaping minus cons of vaping) such that as DD increased so did the importance of positive aspects of vaping relative to negative aspects [$r(972) = .227$; $p < .001$]. Among those who never tried any form of nicotine, DD was associated with greater intentions to try vaping nicotine in the next year [$r(374) = 0.236$, $p < .001$], if a best friend offered [$r(374) = .293$, $p < .001$], and curiosity about vaping [$r(374) = .111$, $p < .05$]. Among ever vapers, DD was positively correlated with perceived addiction [$r(564) = .090$, $p < .05$] and dependence as measured by the EDS [$r(564) = .107$, $p < .05$]. These findings provide evidence that DD is associated with nicotine vaping and measures of dependence among a sample of young adults. Furthermore, DD predicted intentions to try nicotine vaping in the future. Greater DD also predicted a greater emphasis on the pros of vaping relative to cons,



providing additional validation of the newly developed NVDB scale. Future prevention and intervention efforts should consider targeting DD, a core feature of impulsivity, to curtail rates of nicotine vaping among young adults.

FUNDING: Academic Institution

POS3-92

PRELIMINARY EVALUATION RESULTS FROM A SMOKING CESSATION CAMPAIGN FOR SEXUAL AND GENDER MINORITY YOUNG ADULTS IN CANADA

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Significance: Research has suggested several reasons why cigarette smoking rates are high among sexual and gender minority (SGM) young adults: minority stress and stigma, discrimination, targeted marketing by the tobacco industry, and normative behaviours within the communities. This presentation will outline the preliminary evaluation results from a research project and campaign ('The Expand Project') aimed at changing the social climate around smoking through social marketing and tailored cessation services. **Methods:** From November 2020 until April 2021, a cohort of 1511 individuals across Ontario and Quebec Canada were recruited via social media to participate in a baseline online survey. Participants were compensated with a \$10 CAD electronic gift card. Eligibility for the online survey included: being between the ages 16 to 29, living in Ontario or Quebec, and identifying as SGM. The sample included participants who currently smoked, previously smoked, and never smoked. Follow-up surveys were conducted in 2022 and 2023 to assess the exposure to and impact of the campaign. **Results:** In the first follow-up survey launched in 2022 ($n=926$ for response rate of 61%), a total of 4.2% had heard of the Expand Project campaign. By the second follow-up ($n=851$ from baseline plus 253 replenished, for a total $n=1104$), 19.2% had heard of the campaign. Among those exposed to the campaign in the second follow-up survey, 53.3% somewhat or strongly agreed that the campaign grabbed their attention and 50.5% agreed that the campaign was informative. A total of 65.1% said the campaign increased their awareness of higher smoking rates among SGM young adults and 59.9% said the campaign increased their awareness of the relationship among smoking, stress, and stigma. Among current smokers at second follow-up, 10.5% said that the campaign impacted their intentions to quit smoking a lot or somewhat; 6.2% said the project impacted their behaviours in terms of smoking less, quitting smoking, or switching to vaping. **Conclusions:** So far, the campaign is resonating with the target audience and, for some, increasing their awareness of higher SGM smoking rates, their intentions to quit, and impacting their smoking behaviours. Lessons learned can be shared with other researchers looking to develop projects for potentially marginalized communities who have unique challenges and opportunities for smoking cessation.

FUNDING: Federal

POS3-93

EXCLUSIVE MENTHOL CIGARETTE USE, EXCLUSIVE FLAVORED CIGAR USE AND DUAL USE OF MENTHOL CIGARETTES AND FLAVORED CIGARS AT THE INTERSECTION OF SOCIODEMOGRAPHIC VARIABLES

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Significance: We examined patterns of flavored combustible tobacco use (menthol cigarette use and/or flavor cigars use) at the intersection of age, sex, race and ethnicity, and income to better understand the impact of the FDA-proposed flavor ban on sub-groups of the population. **Methods:** We used the 2018-2019 Tobacco Use Supplement to the Current Population Survey to calculate the prevalence and proportion of flavored combustible tobacco use at the intersection of age (18-34, 35-54, 55+ years), sex (male, female), race and ethnicity (non-Hispanic (NH) White, NH Black, Hispanic, and NH Other), and annual household income (<\$50,000, \$50,000-\$99,999, ≥\$100,000), resulting in 72 categories. We defined combustible tobacco use as the current use of cigarettes or cigars. We classified respondents into five categories: 1) no current use of cigars and cigarettes, 2) unflavored combustible tobacco use, 3) exclusive menthol cigarette use, 4) exclusive flavored cigar use, 5) dual use of menthol cigarettes and flavored cigars. Our analytic sample consisted of 135,781 observations. All estimates adjusted for the sampling design using replicate weights. We visually displayed these results using a visualization tool. **Results:** Flavored combustible tobacco use was higher among low-income NH Black adults. For example, the prevalence of combustible tobacco use among

male, low-income NH Black adults aged 35-54 was 26.3%, with a higher proportion of flavored combustible tobacco use (unflavored combustible tobacco use (8.6%), exclusive menthol cigarette use (15.2%), exclusive flavor cigar use (1.2%), and dual use of menthol cigarettes and flavor cigars (1.3%)). In contrast, unflavored combustible tobacco use was higher among low-income NH White adults. For example, the prevalence of combustible tobacco use among male, low-income NH White adults aged 35-54 years was 32.6%, but with a higher proportion of unflavored combustible tobacco use (unflavored combustible use (26.6%), exclusive menthol cigarette use (4.5%), exclusive flavor cigar use (1.2%), and dual use menthol cigarettes and flavor cigar use (0.2%)). **Conclusion:** Our study reveals the population groups disproportionality affected by the use of flavored and unflavored combustible tobacco products. The proposed FDA flavor ban has the potential to reduce tobacco use among low-income NH Black communities, given their disproportionate use of flavored combustible tobacco products. However, the FDA proposed ban would have a limited effect on reducing tobacco use among communities with high rates of unflavored tobacco use, highlighting the need to simultaneously implement other tobacco control policies, such as reducing nicotine in cigarettes.

FUNDING: Federal

POS3-94

MODELLING THE YOUTH ACCESS PREVENTION IMPACT OF OUTFITTING E-CIGARETTE WITH NEAR FIELD COMMUNICATION (NFC) TECHNOLOGY

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Significance: Underage use of Electronic Nicotine Delivery Systems (ENDS) continues to be unacceptably high in the United States and is rising in other countries. Preventing underage access is crucial for protecting public health. Near Field Communication (NFC) is a short-range communication protocol based on RFID technology, allowing devices to exchange data over short distances. ENDS outfitted with NFC can be locked by manufacturers and remain locked until close contact with an authorized NFC reader occurs after an ID has been checked at a point of sale. This novel use of NFC ensures an ENDS cannot be activated when purchased by an underage person at a retail location. After legal unlocking, metadata can assist track and trace of illicit sales or acquisition of ENDS through social sources. This study modelled the potential for NFC-enabled ENDS to prevent underage access. **Methods:** Models estimated the potential reduction of underage ENDS users in the United States under scenarios in which 5, 10, 15, 25, 50, 75, and 100% of marketed ENDS are outfitted with NFC technology, based on the success of the JUUL RACS point-of-sale technology, a system whose pilot program had reduced underage ENDS access to near zero levels. Published estimates of the proportions of youth who obtain ENDS directly through retail purchases and indirectly via social sources were used as input parameters. Social source acquisition was further segmented to estimate to a potential 'trickle-down' effect on underage ENDS users who typically obtain ENDS from other underage persons. **Results:** At 25% market penetration, NFC-enabled ENDS is estimated to prevent between 229,000 and 297,000 underage users of ENDS via direct sales. Considering the trickle-down effect, an additional 94,000 to 169,000 underage ENDS users would be prevented from accessing useable ENDS via social sources, for a total of 323,000 to 466,000 underage persons prevented. Under a scenario of a federal regulatory mandate of NFC-enabled ENDS, between 1,292,000 and 1,866,000 underage persons would be expected to lose access to ENDS. **Conclusions:** Outfitting ENDS with NFC technology has the potential to prevent much of the current levels of underage access in the US. Unlike other technologies, NFC does not carry data privacy concerns, and is a simple, easily accessible, and inexpensive solution for manufacturers to ensure that their products are not accessible to or useable by underage persons.

FUNDING: E-cigarette/Alternative nicotine products Industry

POS3-95

DIFFERENCES IN EXVAPER MAINTENANCE PERIOD LENGTH BY QUIT STRATEGY TYPE, RELAPSE TRIGGERS, AND PAST NICOTINE USE

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Background: Vaping is a significant public health concern among young people. However, it remains unclear whether quit strategies, relapse triggers, and past nicotine use are related to maintenance periods for ex-vapers. The current study sought to address this gap by examining how maintenance periods, in a sample of ex-vapers, with a past history of at least three months of regular use and a minimum abstinence period of 30 days at the time of participation, varies across the aforementioned variables.



Method: Canadian youth and young adult ex-vapers (N=772) participated in an online survey. Chi-square tests were used to assess differences in quit strategies, relapse triggers, and past nicotine concentration use across maintenance periods. **Results:** Chi-square results demonstrated that self-restriction ($p<.001$), quitting cold turkey ($p<.001$), distraction ($p=.02$), sensory vaping cues ($p=.02$), stress/anxiety ($p<.001$), and past nicotine concentration used ($p<.001$) differed across maintenance periods. Self-restriction and distraction strategies, sensory cues, and stress/anxiety triggers were overrepresented among ex-vapers with short maintenance periods. Quitting cold turkey was overrepresented among ex-vapers with long maintenance periods. Prior to abstinence, ex-vapers with a maintenance period of over 12 months were more likely to use very low nicotine concentrations (0-9 mg/ml) vs. 1-3 and 4-6 months, and those with a maintenance period of 1-3 months were more likely to use very high nicotine concentrations (50-60 mg/ml) vs. those with a maintenance period of over 12 months. Maintenance length periods did not differ by age, sex, cultural and racial background, province of residence, geographic location, employment status, or mental health status. **Conclusion:** Structuring quit strategies and trigger management in cessation programs, depending on ex-vaper input and emphasizing stepdown cessation, may enhance long-term maintenance. Demographic characteristics do not seem to influence maintenance length for ex-vapers, yet future studies should assess the accessibility of some strategies to e-cigarette users and the potential for equity considerations in affecting abstinence and maintenance length periods.

FUNDING: Academic Institution; Nonprofit grant funding entity

POS3-96

RELATIONSHIP BETWEEN PERCEPTIONS THAT SMOKING INCREASES THE SEVERITY OF COVID-19 ILLNESS AND REDUCTIONS IN SMOKING DURING THE COVID-19 PANDEMIC: FINDINGS FROM THE 2021 ITC KOREA SURVEY

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Significance: Among the many risk factors examined in the severity of SARS-CoV2 infection, an important risk factor is tobacco smoking, which has been found to increase the severity of COVID-19 illness. This linkage was communicated by public health authorities to highlight the importance of smoking cessation during the COVID-19 pandemic. Since smoking is already widely known to harm the respiratory system and immune function, messages that smoking increases the severity of COVID-19 illness could have particular credibility among those who smoke. This study examines whether belief that smoking increases severity of COVID-19 illness was related to changes in smoking attributed to the COVID-19 pandemic among a nationally representative sample of people who smoke cigarettes in the Republic of Korea. **Methods:** Data came from adult Koreans aged 19 and older (n=1909) who currently smoked cigarettes exclusively at least weekly and had smoked at least 100 cigarettes in their lifetime who participated in the 2021 wave of the International Tobacco Control (ITC) Korea Survey, a nationally representative cohort survey, which was conducted November-December 2021. The predictor variable was beliefs at the 2021 wave about whether smoking affects the severity of COVID-19 illness. The outcome variable was the reported change in smoking attributed to the COVID-19 pandemic (smoking less, smoking more, or no change) at the 2021 wave. Covariates included demographic factors and changes in smoking area accessibility, socioeconomic status, and mask-wearing during COVID-19. Logistic regression analysis was conducted on weighted data. **Results:** Among those who smoked cigarettes, there was a significant association between beliefs and behavior: those who believed that smoking increases the severity of COVID-19 illness were significantly more likely to report having decreased their smoking at that point of the pandemic (adjusted OR=2.62, 95% CI=1.05-6.57). **Conclusion:** This national study in the Republic of Korea documents the relationship between this additional risk of smoking during the COVID-19 pandemic and behavior, thus supporting models of health behavior that highlight the importance of perceived risk in influencing smoking and other risky health behaviors.

FUNDING: Federal; State

POS3-97

A PILOT STUDY INVESTIGATING THE CARDIAC AUTONOMIC EFFECTS OF CIGARETTES WITH VARYING DOSES OF NICOTINE

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Significance: Cardiac autonomic effects (CAEs), as measured by heart rate (HR) and heart rate variability (HRV), reflect the influence of the autonomic nervous system on the functioning of the heart. Exposure to nicotine can potentially alter these effects towards sympathetic predominance as manifested by reduced HRV and increased HR. Although smoking is linked to nicotine induced changes in CAEs, little research has examined such alterations following acute exposure to varying doses of nicotine from cigarette smoke. **Methods:** In this pilot study, 7 adult participants (mean age: 38.50 ± 9.35 years) were asked to abstain from nicotine and other drugs for 12 hours before their study visit. At the visit, after a 10-minute baseline period where they were instructed to sit quietly, participants took 8 puffs spaced 30 seconds apart from a plastic "cigarette" substitute (CS). They then sat quietly for 10 minutes, followed by a 5-minute break. This same puffing procedure followed by sitting quietly and a break was then repeated (within-participant) with a very low nicotine content cigarette (< 0.5mg/g; VLNCC), and one of their usual brand cigarettes (UBC). During the entire procedure, a three-lead ECG recording was taken. **Results:** Mean heart rate (HR; beats per minute, bpm) significantly increased after puffing on the UBC (78.75, SD: 8.65) relative to baseline (69.04, SD: 10.2), the CS (68.69, SD: 10.1) and VLNCC (69.91, SD: 9.6; p 's < 0.01). Heart rate variability, as measured by the average root mean square of successive differences between normal heartbeats (RMSSD) and the average standard deviation of the N-N interval (SDNN), was lower (p 's < 0.01) after using the CS, the VLNCC, and the UBC relative to baseline. Inspection of individual data revealed marked heterogeneity; puffing on the VLNCC appeared to increase HR compared to baseline and compared to the CS for some participants, but not others. **Conclusion:** Our findings replicate the effects that acute exposure to smoke from regular cigarettes increases HR and decreases HRV. Though preliminary, these results also suggest that although on average VLNCC failed to produce significant effects compared to CS, some people who smoke may experience changes in CAEs after using a VLNCC. The latter data indicate that even low doses of nicotine may produce biologically relevant effects in some people as altered CAEs can be risk factors for harmful cardiovascular events.

FUNDING: Academic Institution

POS3-98

INCIDENCE OF OPIOID MISUSE BY CIGARETTE SMOKING STATUS IN THE UNITED STATES

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Background: The combination of opioid misuse and cigarette smoking contributes to increased morbidity and mortality compared to each substance use alone. We estimated the incidence of opioid misuse for persons who currently or formerly smoked versus never smoked. **Methods:** Data came from the 2015-2020 National Surveys on Drug Use and Health cross-sectional surveys of US civilians aged 12+ (n=315,661). Weighted opioid misuse incidence and average time between cigarette use initiation and opioid misuse initiation were calculated annually by smoking status. Logistic regression models tested time trends in incidence by smoking status. **Results:** Overall, 0.75% of persons initiated opioid misuse per year; opioid misuse incidence was 1.35% for those who currently smoked cigarettes, 0.54% for those who formerly smoked, and 0.67% for those who never smoked. For persons who currently smoked and misused opioids (1.50%), 95.08% smoked prior to opioid use. The average time between smoking followed by opioid misuse was 12.93 years and for opioid misuse followed by smoking was 4.36 years. Persons who currently smoked were more likely to initiate opioid misuse than those who had never smoked (AOR=1.81, 95% CI: 1.60, 2.06). There was a decrease in the opioid misuse incidence over time (AOR=0.90; 95% CI: 0.85, 0.92), which did not differ by smoking status. **Conclusions:** Persons who currently smoked cigarettes, relative to those who never smoked, were more likely to initiate opioid misuse. As most individuals smoked before opioid misuse, it may be useful for primary prevention efforts to decrease opioid misuse initiation by focusing on smoking status.

FUNDING: Federal



POS3-99

VETERAN SOCIAL SUPPORT INTERVENTION FOR ENHANCING SMOKING TREATMENT UTILIZATION AND CESSATION: RESULTS FROM A RANDOMIZED CONTROLLED PILOT TRIAL

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Significance: Social support interventions may enhance access and use of evidence-based tobacco cessation treatments (EBCTs) to reduce tobacco-related health disparities. We piloted a social support intervention for Veterans who smoke cigarettes. The aims were: 1) to assess the feasibility of recruiting dyads comprised of Veterans who smoke and their support person (SP), and 2) to assess the preliminary intervention effects on Veteran use of EBCT and smoking abstinence. **Methods:** We conducted a randomized controlled pilot trial within the national VHA health system. Veterans who smoke cigarettes, regardless of level of readiness to quit, were identified nationally and proactively recruited. To enhance recruitment among Veteran women, we received feedback from the Women's Veteran Engagement Panel on recruitment strategies. Interested Veterans were asked to identify a SP who would enroll. Participants were randomized as Veteran-SP dyads to the SP intervention (based on Cohen's theory of social support) or control condition. All Veteran and SP participants received information on EBCTs. All SP participants received support tips. SP participants in the intervention group additionally received a 1-call coaching session to encourage the Veteran to use EBCTs. Follow-up survey assessments for dyads were conducted at baseline, 1-month, and 4-months post-randomization. Veterans who self-reported abstinence completed remote biochemical verification at 1-month and 4-months. **Results:** Of the 605 Veterans invited to join the study, 38 Veterans were interested in participating in the study, returned a baseline survey, and nominated a SP. 27 of the 38 nominated SPs consented to participate, resulting in 27 dyads randomized. A total of 14 dyads were randomized to the intervention group, and 13 dyads to the control group (18 women Veterans, 9 male Veterans). At 4-months, Veteran intervention participants reported a higher rate of cessation medication use (57% vs. 31%) and use of EBCT (64% vs. 38%) than control participants. Veteran intervention participants reported higher rate smoking abstinence than control participants (57% vs 15%). **Conclusion:** The recruitment methods were feasible, especially for women Veterans. The intervention may lead to higher Veteran use of EBCT and smoking abstinence. This project including women Veterans provides preliminary evidence that a social support intervention increases use of cessation treatment among Veterans who smoke.

FUNDING: Federal

POS3-100

IMPLICATIONS FOR REDUCED NICOTINE CONTENT POLICIES BASED ON BEHAVIORAL ECONOMIC DEMAND FOR OTHER DRUG AND DRUG-FREE COMMODITIES

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Significance: Recently, interest in nicotine-free products has increased due to federal calls in the United States to lower nicotine in cigarettes to decrease their usage. While lower nicotine content appears to decrease smoking, research suggests that reductions are not complete and may take time to manifest. Furthermore, how people might respond to nicotine-free cigarettes could differ to other nicotine (e-cigarettes) and non-nicotine commodities with the active drug removed (alcohol, caffeine, and marijuana). Understanding how different levels of drug content change the valuation of a product could better inform how current users might respond to drug-free alternatives, and whether drug and drug-free commodities show the same changes in valuation. Thus, the purpose of this study was to assess differences in hypothetical purchasing of drug and drug-free versions of tobacco-based products and other products. **Methods:** Workers from Amazon Mechanical Turk (mTurk) were recruited to complete hypothetical purchase tasks (HPTs) based on reported current substance use and consumption. For all substances with a recent history of use, participants completed a drug HPT and non-drug HPT for that substance (e.g., nicotine and nicotine-free cigarettes, caffeinated and decaffeinated drink). Data were analyzed using a simplified exponential demand equation using non-linear mixed-effects modeling to quantify demand metrics. **Results:** Demand for nicotine-free cigarettes trended lower than nicotine cigarettes. Demand for each of the other drugs was significantly lower for the drug-free version, including e-cigarettes. In some cases, only drug and drug-free consumption at low costs differed (i.e., marijuana), in other cases only price sensitivity changed based on drug and drug-free versions of a commodity (i.e., alcoholic drinks). **Conclusions:** There is not a consistent effect on

valuation of removing the active drug from common drug-containing commodities. These data suggest that restricting drug content may have a greater effect on reducing consumption for e-cigarettes than combustible cigarettes where demand was similar between versions. For cigarettes, harm reduction efforts beyond reducing nicotine content should be maintained.

FUNDING: Federal; Academic Institution

POS3-101

ENGAGING SMOKERS NOT YET READY TO QUIT IN A SMOKING CESSATION MHEALTH INTERVENTION: A QUALITATIVE ANALYSIS OF POST INTERVENTION INTERVIEWS

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Significance: Most people who smoke would like to quit but only 20% are ready to quit in the next 30 days. Project Phoenix was a 26-week pilot randomized controlled trial that tested a smartphone-based mHealth intervention that aimed to motivate and support smoking cessation attempts in those not ready to quit at baseline. **Methods:** Data was collected from 2018-2021. Enrolled participants (n=152) smoked at least 5 cigarettes a day, were 18 or older, not planning to quit in the next 30 days, and demonstrated current smoking status. Following randomization, participants received 2 daily messages that were tailored to their current readiness to quit (intervention group) or 2 daily trivia-type messages (control group) for 26 weeks. Participants completed weekly assessments (~ 5 minutes) of health behaviors and quit motivation. At 26 weeks, 100 participants completed an audio-only interview about benefits, barriers, and engagement with the app, most useful app features, and suggested app modifications. Transcribed interviews were read by 2 researchers who developed a codebook. Transcripts were coded by 1 researcher then checked by a second. Coded data was read independently by 7 researchers who identified themes independently then met to discuss themes within and across codes using a utilization-focused lens. **Results:** Participants (mean age =52, 70% white, 68% female) joined the study to gain new insights into their smoking to be ready when they decided to quit and to increase their motivation to quit smoking. Intervention participants identified the twice daily messages as the most useful feature, stating the messages provided smoking tips and statistics, motivation, and encouragement. Weekly assessments prompted self-reflection and greater self-awareness of smoking and smoking triggers for both intervention and control participants. About half of participants would continue using the app after the intervention to maintain their motivation and progress toward quitting. Participants found the app easy to use with few/no barriers. Suggested app improvements included more control over notifications and assessment timing and longer response windows, adding an interactive app component, reducing repetition of assessment questions, and increasing the variety of app messages. **Conclusions:** Participants experienced few barriers, liked the Phoenix smoking cessation app content, and reported an increased awareness of smoking behaviors and motivation to quit smoking.

FUNDING: Federal; State

POS3-102

COMPOUNDING ASSOCIATION OF INTERSECTIONAL MINORITY STRESS AND TOBACCO PROMOTIONS ON SEXUAL MINORITY WOMEN SMOKING CIGARETTES

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Background. Young adult sexual minority women (SMW) are significantly more likely to smoke cigarettes compared to young adult heterosexual women. This could be due, in part, to their unique daily experiences of being a SMW, which might be amplified when additional marginalized identities, like race, are considered. For example, SMW who belong to a marginalized racial or ethnic group have increased exposure to some forms of tobacco advertising, and they experience unique stressors due to having multiple marginalized social identities. The proposed study explores if the minority stressors SMW experience differ across racial identities, and seeks to investigate the relationship between minority stressors, exposure to tobacco marketing, and likelihood of smoking cigarettes. **Methods.** A national U.S. sample of young adult SMW 18-30 years (n=2214) stratified by smoking status (approximately half currently smoked cigarettes and half



did not) completed an online survey on Qualtrics. Participants were asked a series of questions related to demographics, smoking behavior and preferences, exposure to tobacco promotions, and experiences of minority stressors such as victimization or internalized prejudice linked to sexual orientation. **Results.** Black SMW are more likely to experience victimization due to their sexual identity ($b=0.24$, $p < 0.001$), as well as have more internalized homophobia ($b=0.14$, $p=0.03$) relative to non-Black SMW. SMW who experience more victimization ($b=0.17$, $p < 0.001$) and internalized homophobia ($b=0.13$, $p < 0.001$) are more likely to smoke cigarettes. Black SMW also report higher exposure to tobacco promotions ($b=0.07$, $p < 0.001$), and higher exposure to tobacco promotions is associated with current smoking ($b=0.93$, $p < 0.001$). Furthermore, minority stressors moderate the effect of exposure to tobacco promotions on smoking status. Such exposure to tobacco promotions amplifies the effect of victimization ($b=-0.25$, $p < 0.001$) and internalized homophobia ($b=-0.17$, $p < 0.001$) on smoking cigarettes. **Conclusion.** SMW face unique stressors due to their sexual and gender identity, and the results indicate their daily experiences also differ depending on their racial identity. Black SMW experience more stressors related to their sexual identity and are exposed to more tobacco promotions. The results also suggest that exposure to tobacco promotions may cue cigarette smoking as a way to cope with minority stress.

FUNDING: Federal; Academic Institution

POS3-103

DUALTOBACCO AND POLYTOBACCO USE PATTERNS ASSOCIATED WITH SLEEP PROBLEMS AMONG NON-HISPANIC BLACK AND HISPANIC MEN WITH CHRONIC CONDITIONS

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Significance: Cigarette smoking has been associated with poor sleep quantity and quality among U.S. adults. However, less is known about the association between dualtobacco and polytobacco use patterns and sleep problems among racially/ethnically diverse men with chronic health conditions. The objective of this study was to assess exclusive cigarette smoking, dualtobacco use, and polytobacco use with sleep problems among non-Hispanic Black and Hispanic men with one or more chronic conditions. **Methods:** Survey data were collected from non-Hispanic Black and Hispanic men ≥ 40 years old who had one or more chronic conditions and lived across the U.S. Tobacco use included nontobacco use (did not use any tobacco), exclusive cigarette smoking (smoked combustible cigarettes only), dualtobacco use (smoked combustible cigarettes and used one other tobacco product), and polytobacco use (smoked combustible cigarettes and used at least two other tobacco products). Other tobacco products included cigars, electronic cigarettes, hookah, pipes, and bidis. Sleep problems were defined as having trouble falling asleep, staying asleep, or sleeping too much over the past two weeks. Participants used a response scale of 0-10, with higher scores indicative of higher sleep problem severity. Based on the distribution, 5-10 scores were defined as experiencing sleep problems. Unadjusted and adjusted logistic regression models were fitted with the adjusted model including participants' age, race/ethnicity, education, marital status, insurance coverage, number of chronic conditions, and body mass index. **Results:** Of participants, 46% reported sleep problems in the past two weeks and 15% reported exclusive cigarette smoking, 8% reported dualtobacco use, and 5% reported polytobacco use. In the unadjusted model, when compared to those who reported nontobacco use, participants who reported dualtobacco use (odds ratio [OR]=2.21, 95% confidence interval [CI]=1.52-3.21) and polytobacco use (OR=2.46, 95%CI=1.53-3.95) were at increased odds of reporting sleep problems. In the adjusted model, participants who reported dualtobacco use (adjusted OR=1.95, 95%CI=1.32-2.89) and polytobacco use (adjusted OR=1.66, 95%CI=1.01-2.73) were at increased odds of reporting sleep problems compared to those who reported nontobacco use. **Conclusion:** Dualtobacco and polytobacco use increased the odds for reports of sleep problems among non-Hispanic Black and Hispanic men with chronic conditions. Future research should consider adding sleep health to tobacco cessation interventions.

FUNDING: Federal; Academic Institution

POS3-104

EVALUATING THE IMPLEMENTATION OF A TOBACCO-FREE WORKPLACE PROGRAM IN AGENCIES SERVING WOMEN WITH UNMET SOCIAL, ECONOMIC, AND BEHAVIORAL HEALTH NEEDS IN TEXAS

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Significance: Women with unmet social, economic, and behavioral health needs experience myriad disadvantages that place them at heightened risk for tobacco use and that lead to lower successful quit rates. Comprehensive tobacco-free workplace programs (TFWPs) are evidence-based interventions that reduce tobacco use through policy and provider behavior change. This work presents outcomes from the implementation of a TFWP called Taking Texas Tobacco Free (TTTF) within agencies serving women. **Methods:** From 2017-2019, TTTF enrolled 4 women-serving agencies (6 clinics) for program implementation (hybrid type II), which lasted 16 months on average (range: 9-23). Together, the 4 agencies with 344 employees (209 service providers) serve 3,462 women annually through >24,500 contacts across 5 Texas counties. Evaluation of TTTF implementation goals is presented according to the Reach, Effectiveness, Adoption, Implementation, and Maintenance framework. **Results:** Reach: TTTF provided tobacco education to 185 employees (53.8%; >60% goal not met) and motivational interviewing training to 23 providers (11.0%; >60% goal not met), and sent 10 providers to tobacco treatment specialist training (>1 per agency goal met). **Effectiveness:** Tobacco education facilitated a significant ($p < .0001$) knowledge gain of 36.2% (>50% goal not met). **Adoption:** Each enrolled agency completed implementation (100% goal met). By post-implementation, all agencies agreeing to implement a tobacco-free workplace policy did so (3 of 4, goal met). **Implementation:** By post-implementation, providers increased delivery of screening/intervention practices (goal >65% each partially met); 57.9-76.0% (all $ps < .02$) reported delivering each of the 5As (Ask, Advise, Assess, Assist, Arrange); 27.2% ($p < .04$) provided behavioral counseling; 54.3% provided nicotine replacement therapies (NRT; $p < .03$); and 3.7% provided non-nicotine medication or referral (n.s.). **Maintenance:** All agencies were compliant with screening/intervention (>80% goal met) during the 6-month sustainment period. **Conclusions:** TTTF's implementation within women-serving agencies affected both policy and provider behavior change consistent with best practices for tobacco control and intervention, despite that not all program goals were achieved. Results suggest that TTTF is a feasible model for future implementation in similar settings and point to areas that can be improved in those efforts.

FUNDING: Federal; State

POS3-105

THE HUMAN HEALTH RISKS ASSOCIATED WITH E-CIGARETTE WASTE: A HEALTH RISK ASSESSMENT AND EQUITY ANALYSIS

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Significance: While there is research regarding the benefits and harms of e-cigarette use, there is limited research on the potential risks to human health from exposure to e-cigarette waste. E-cigarettes are often littered, akin to waste from conventional cigarettes. E-cigarette waste, comprising plastics, circuitry and toxic chemicals, has the potential to cause significant harm to human health. An opportunity exists to characterise the human health risks associated with e-cigarette waste and explore its impact on health equity. **Aims:** To undertake: 1) a scoping review to ascertain the current knowledge base around the human health risks associated with e-cigarette waste, and 2) a human health risk assessment and equity analysis of e-cigarette waste. **Methods:** For the scoping review, we searched three databases (PubMed, Embase and Scopus) for literature published between 1st January 2004 and 10th October 2022 inclusive, on the human health risks associated with e-cigarette waste. Articles were screened by three reviewers in a blinded, sequential process. Data from included articles were used to inform a qualitative Human Health Risk Assessment and Health Equity Analysis of e-cigarette waste. **Results:** An initial 238 articles were identified, with three eligible for inclusion after screening. Excluded studies were largely not peer-reviewed articles but editorial, commentary, alert, correspondence material, or focussed on e-cigarette consumption rather than waste. The limited peer-reviewed literature (one review, and two original research articles) identified that e-cigarette waste could pose a serious risk to human health through nicotine ingestion, particularly among children, and through environmental exposure to heavy metals, batteries, liquids and cartridges. Key themes were the need for further research, electronic waste regulation and ensuring the safe



disposal of e-cigarette devices. The equity analysis identified that populations with higher smoking and/or vaping prevalence, or people living in areas of higher deprivation would likely have a disproportionate burden of harm from exposure to hazardous e-cigarette waste. **Conclusion:** E-cigarette waste is a neglected field of research, and could pose a serious risk to human health (and to health equity) if not appropriately managed. Early mitigation of potential health harms associated with e-cigarette waste is integral to the sustainability of e-cigarettes as a smoking cessation intervention.

FUNDING: No external funding reported

POS3-106

DEMAND FOR E-CIGARETTES BASED ON NICOTINE STRENGTH: EVIDENCE FROM RETAIL SALES DATA

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Background: Since their introduction to the US market, e-cigarettes have undergone many changes, including an increase in nicotine strength. The average nicotine concentrations in e-cigarette products sold in the US increased from 2.1% in 2013 to 4.3% in 2018. More recently, sales data for 2021 includes products with a nicotine strength as high as 6.8%. This research examines whether the demand for e-cigarettes varies by nicotine strength levels, whether products of different nicotine strengths are economic substitutes or complements to one another, and whether price elasticities of demand vary as more products are introduced in the market. **Methods:** We used State Line NielsenIQ Retail Scanner Data from 2015-2021 to construct four per capita dependent variables: overall milliliters of e-liquid sold as well as milliliters of e-liquid sold by nicotine strength for products with less than 3%, between 3% and 5%, and greater than or equal to 5% nicotine concentration. We estimated fixed-effect demand models controlling for tobacco policies and individual state characteristics. **Results:** Overall models show the price elasticities of demand range from -2.117 to -1.494. E-cigarettes with less than 3% nicotine are the least price elastic (-0.536 and -0.575); e-cigarettes with nicotine between 3% and 5% are more price elastic (-0.748 and -0.858); and e-cigarettes with 5% or greater nicotine are the most price elastic (-1.316 and -1.837). Products with the highest and lowest nicotine strength may be complementary goods to one another. **Discussion:** Our study finds that in a rapidly evolving e-cigarette market, demand for e-cigarettes varies considerably by nicotine strength. Demand for high-nicotine products with many close substitutes is much more responsive to price changes compared to the demand for lower nicotine strength products that have fewer alternatives. Our evidence also suggests that e-cigarettes with the lowest and highest nicotine concentration may be economic complements, suggesting concurrent use of products with different nicotine concentrations. Our findings suggest that tobacco policies that affect the price of e-cigarettes, such as excise taxes, should have a sizeable effect on the market and might be a valuable tool in curbing high youth e-cigarette prevalence.

FUNDING: Unfunded

POS3-107

DAILY PATTERNS OF NICOTINE AND CANNABIS VAPING AND FLAVORED PRODUCT USE IN A SAMPLE OF YOUNG ADULTS

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Significance: Use of electronic vaping products for consuming nicotine and cannabis (THC) is common among young adults. Prior work indicates that certain characterizing flavors (i.e., fruit, dessert, or other sweet flavors; mint/menthol) play an important role in young people's use of nicotine vaping products, but few studies have described flavored product use for THC vaping. The present study used ecological momentary assessment to examine daily use of nicotine and THC vaping products with different characterizing flavors in a sample of young adults. **Methods:** Young adults (n=196) who endorsed current use of nicotine and/or THC vaping products were recruited from an existing longitudinal cohort study of young people based in California, USA. Individuals completed up to five brief surveys each day over 21 days to assess vaping behavior, including type of substance vaped, quantity of consumption (number of puffs), and product flavors. Separate linear mixed models assessed day-level associations of sweet- and mint/menthol-flavored product use with THC and nicotine vaping quantity on use days. **Results:** Participants completed an average of 17.53 (SD = 6.37) monitoring days per person and reported vaping nicotine on approximately six days (M = 5.79 [SD = 7.57]) and THC on four days (M = 4.08 [SD = 5.76]). On average, individuals used sweet-flavored vaping products on 72% of nicotine vaping days and 31% of THC vaping days; mint/

menthol products were used on approximately 20% of days for nicotine and 0.4% of days for THC. Mixed models indicated that within-day use of sweet-flavored products was associated with increased number of puffs per day for nicotine (B = 6.04, SE = 2.45, p = .01) but not THC vaping (B = -0.33, SE = 1.67, p = .84). Mint/menthol flavors were not associated with number of puffs for either nicotine (B = 1.82, SE = 2.38, p = .45) or THC (B = 0.75, SE = 2.30, p = .75). **Conclusion:** Among young adults who use vaping products, use of sweet - but not mint/menthol - flavors may contribute to greater daily nicotine vaping, potentially increasing nicotine intake and related risks (e.g., nicotine dependence, difficulty quitting). In contrast, vaping product flavors were unrelated to daily levels of THC vaping. Regulatory efforts to restrict sweet characterizing flavors in vaping products may help to reduce young adults' nicotine vaping but may not affect THC vaping. Other strategies (e.g., limiting potency) may be needed to reduce THC vaping.

FUNDING: Federal

POS3-108

WHAT MOTIVATES E-CIGARETTE OR VERY LOW NICOTINE CIGARETTE USE DURING A SWITCHING STUDY?

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Background: People who smoke are able to use e-cigarettes and very low nicotine cigarettes (VLNCs) as substitutes for their usual brand cigarettes, but few are able to completely switch either in research or real-world settings. This research attempts to provide insight into what motivates use of a cigarette substitute. **Methods:** In this mixed design experiment, adults who smoked daily and were not motivated to quit were randomized to 4 weeks of using: 1) VLNCs, 2) e-cigarettes (tobacco or menthol flavor), or 3) no alternative product. During 2 Switch Weeks participants were asked to switch from their usual cigarettes and use only study products and were assigned, in double-blind fashion and counterbalanced order, to use either a placebo or active nicotine patch. Participants recorded each use of their own cigarettes or alternative product in real time via a smartphone. For a subset of use events, participants were also asked to report the contexts in which they use the various products (e.g., craving, a location where smoking is permitted) and the mechanisms that might drive product use (e.g., overall satisfaction, taste, withdrawal alleviation). **Results:** Participants (N=160; 60% female, 22% African American, 51.9 [SD=12.1] years old) reported 37,853 use events and completed 10,969 use context assessments. Binary logistic generalized linear mixed models were used to compare use contexts of real-time reports of study product use events compared to own-brand cigarette events during Switch Weeks and ratings of the products used. E-cigarette participants were more likely to vape at work or in a public place but more likely to smoke their own cigarettes when they were outside. When smoking their own cigarettes, they rated product use as more satisfying, enjoyable, and successful at alleviating craving than when they used e-cigarettes. VLNC participants were more likely to smoke their own cigarettes when they were around people vaping and reported obtaining more satisfaction from their usual brand than from VLNC use events. **Conclusions:** E-cigarettes serve as a substitute in locations where smoking is prohibited, but both e-cigarettes and VLNCs are limited as substitutes when participants view their usual brand cigarettes as particularly satisfying. This illustrates the public health complexity of trying to develop a satisfying substitute that does not draw non-nicotine users into using a product that produces dependence and potential negative health effects.

FUNDING: Federal

POS3-109

RECENT CIGARETTE AND HTP USE TRENDS IN JAPAN: A REVIEW

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Introduction: The use of heated tobacco products (HTPs) has rapidly emerged in Japan, providing a unique case study of the potential harm reduction role of HTPs relative to cigarettes. Studies have reported that the rapid rise in HTP sales in Japan since 2014 accompanied an accelerated decline in cigarette sales. However, these studies do not distinguish whether reductions in cigarette sales resulted from smokers switching to HTPs but continuing smoking as dual users or completely quitting cigarettes. To the extent that HTPs present lower health risks than cigarettes when used alone, monitoring current smoking prevalence trends will be crucial in gauging the public health benefits of HTP use. **Methods:** To evaluate if the marketing of HTPs has influenced smoking prevalence in Japan, we review the literature (26 studies) on recent HTP and cigarette use trends, including studies on sales, and nationwide in-person and online surveys.



Estimates were developed by the government, academic, and industry vs. other sectors. From a public health perspective, we focus on the degree to which HTPs replace or supplement cigarette use. **Results:** Our results indicate that HTPs were associated with reduced cigarette prevalence after their introduction to Japan's market. However, the role of HTPs in recent years (whether they complement or substitute cigarette use) is less clear. Among household and online surveys, the questionnaire's accuracy, interview method, type of questions asked, changes made to the questions over time, and different use measures could explain conflicting results by different studies. The role of HTPs may have also changed over time; smokers may have been more likely to switch to exclusive HTP use in earlier years (e.g., up to 2018) due to HTPs initially impacting those most likely to quit smoking cigarettes, leaving smokers less inclined to switch in later years. Over time, E-cigarette use, the COVID pandemic, weak smoke-free restrictions, tobacco taxes, advertising laws, and cigarette industry marketing have also impacted cigarette, HTP, and dual-use prevalence. **Conclusions:** While this study helps illustrate HTP and cigarette use patterns in Japan, it also shows the difficulties in distinguishing the impact of HTPs (and other newly emerging tobacco products) in an environment subject to rapidly evolving tobacco products, patterns of use, tobacco control policies, and other dynamic factors.

FUNDING: No external funding reported

POS3-110

CHANGES IN E-CIGARETTE CHARACTERISTICS ACROSS YEARS: QUANTIFYING TRENDS IN DEVICE TYPES AND LIQUID CHEMISTRY

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Significance: In recent years, e-cigarette characteristics have rapidly shifted from products that were highly modifiable by users to products that are less modifiable. Many popular brands of non-modifiable e-cigarettes are available with various nicotine strengths, PG:VG ratios, and flavors. With an evolving e-cigarette marketplace and recent regulatory actions, such as the FDA's enforcement discretion against JUUL in June 2020, quantified yearly trends are necessary to identify shifts in product popularity. **Methods:** Between 2019 and 2022, we conducted an observational study of 126 people who regularly use e-cigarettes. Device type and product chemistry were assessed for a total of 1,006 products collected each month from participants. Devices were categorized as open- or closed-systems (refillable vs. non-refillable). Nicotine concentration, PG:VG ratio, and concentrations of 4 flavoring chemicals commonly used in e-liquids (menthol, ethyl maltol, vanillin, and 2,3,5-trimethylpyrazine) were measured in collected e-liquids. Comparisons between products collected in different years were performed using Fisher's chi square and ANOVA tests. **Results:** The proportion of open-system devices collected in 2020 was greater as compared to 2019 (79.4 vs 62.1%, $p < 0.05$), while the proportion of closed-system devices increased between 2020 and 2022 (20.6 vs 57.3%, $p < 0.05$). Between 2019 and 2020, we detected a significant decrease in average nicotine concentration (29.3 ± 19.1 vs 22.9 ± 20.9 mg/mL, $p < 0.05$) followed by an increasing trend between 2020 and 2022. PG content did not change significantly over 4 years. No significant differences between years were measured among flavoring chemical concentrations, although the proportion of products containing each chemical increased from 2019 to 2022 (menthol: 6.7 vs 12.2%, ethyl maltol: 24.9 vs 42.2%, vanillin: 16.6 vs 37.8%, and 2,3,5-trimethylpyrazine: 0 vs 20%). **Conclusions:** Decreased proportions of closed-system devices and nicotine concentration between 2019 and 2020 products likely reflect the FDA's enforcement discretion actions against JUUL. The increasing trend among closed-system devices and nicotine concentration through 2022 may reflect the shift towards single-use disposable products. While flavoring concentrations were stable, increasing trends in the frequency of flavoring use may indicate increased taste appeal.

FUNDING: Federal

POS3-111

ASSOCIATIONS OF FAMILY SMOKING HISTORY INDICES WITH NICOTINE DEPENDENCE IN AFRICAN AMERICAN ADULTS WHO SMOKE CIGARETTES DAILY

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Significance: There is a lack of evidence on which measures of family smoking history may be optimal markers of heritable nicotine dependence risk, particularly in populations facing tobacco-related health disparities, such as African American adults. This study

computed several indices of family smoking history and assessed their correlations with nicotine dependence measures in African American adults who smoke cigarettes daily. **Methods:** Adults who smoked and self-identified as African American ($N=635$; M Age [SD]=48.8[11.3] years, cigarettes/day=15.4[7.6] cigarettes; 39.6% female) participated in a laboratory study exploring individual differences in tobacco addiction in Los Angeles, CA. At baseline, participants completed various self-report measures including personal smoking background and current status and smoking amongst biological relatives. We computed family smoking history scores informed by alcohol literature using 3-level (0=never-smoked vs. 0.5=formerly-smoked vs. 1=currently-smoke) and 2-level (0=never-smoked/formerly-smoked vs. 1=currently-smoke and separately, 0=never-smoked vs. 1=formerly-smoked/currently-smoke) markers for each biological relative. We included participants who reported data for at least 1 parent and 1 grandparent. Bivariate correlations tested the relation of each family history score with self-report measures of nicotine dependence and smoking history characteristics such as cigarettes per day and smoking initiation age. **Results:** The 2-level current vs. former/never smoking family history score using only parent data was most strongly correlated with nicotine dependence measures ($|r|s = .125-.166$, $p \leq .002$). These correlations were similar to scores that included both parent and grandparent data ($|r|s = .118-.164$, $p \leq .004$). Correlations with nicotine dependence measures did not improve with more complex 3-level operationalizations that coded current, former, and never smoking as separate values ($|r|s = .095-.157$, $p \leq .03$). **Conclusions:** Simpler indices of family smoking history considering only parent history may be more optimal for predicting nicotine dependence and other smoking history characteristics among African American adults who smoke. Because all family smoking history measures were only modestly correlated with nicotine dependence overall in this study, non-heritable factors including social determinants of health should be considered in understanding risk for nicotine dependence in African American adults.

FUNDING: Federal; Nonprofit grant funding entity

POS3-112

RE-CONNECT: DEVELOPING A PERSONALIZED SMARTPHONE APPLICATION FOR SMOKING CESSATION THROUGH INNOVATIVE NON-MONETARY APP-BLOCKING INCENTIVES

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Significance: Contingency management (CM), delivering financial incentives contingent on smoking abstinence, has been shown to be effective. However, the cost of financial incentives may prevent broad implementation. A potential solution could involve using non-monetary incentives that are personalized, engaging, and can be generated at a low cost. Given the reported increasing accessibility of smartphones and the reported time that adults spend engaged with smartphone applications, a CM intervention that capitalizes on existing smartphone-based reinforcement has the potential to be an effective alternative to financial incentives. We are developing Re-Connect, which is designed to block access to user-chosen, non-essential applications and restore access upon objective evidence of meeting cessation goals (remote breath carbon monoxide), consistent with evidence-based CM. In the first phase of development, we examined the acceptability of Re-Connect and app-blocking through structured feedback interviews. **Methods:** Participants in this study ($N=10$) were recruited from online advertising websites (e.g., Craigslist) and were provided a brief description of the Re-Connect application before answering questions about concept acceptability, goal setting, reward structure, device access, app blocking, gamification, and social components. **Results:** Using qualitative thematic analysis, we identified common themes such as user control preference, misunderstanding of reinforcement procedure, privacy concerns, and initial concerns about the idea of app blocking (i.e., loss aversion). All participants indicated a willingness to test Re-Connect for smoking cessation. **Conclusion:** The results from this study indicated that increased user autonomy, data privacy controls, and alternative framing of the app-blocking-based CM procedures would increase the acceptability of Re-Connect. These data were also used to develop a functional prototype of the Re-Connect application. In the current phase of development, we are conducting pilot tests to evaluate the functionality of Re-Connect and gather more feedback on the user experience. The next phase of Re-Connect development will include a randomized, controlled trial to evaluate the efficacy of Re-Connect for smoking cessation.

FUNDING: Federal



POS3-113

THE ASSOCIATION OF CANNABIS USE WITH SMOKING DEPENDENCE AND CESSATION AMONG TOBACCO HELPLINE CALLERS FROM PERSISTENT POVERTY COUNTIES

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Background: Cancer mortality rates in U.S. counties experiencing persistent poverty ($\geq 20\%$ poverty for ≥ 30 years) are notably elevated due in part to high rates of smoking. Concurrently, cannabis use has become increasingly prevalent, and the impact on smoking cessation remains unclear. **Method.** Oklahoma Tobacco Helpline (OTH) callers from 15 persistent poverty counties (PPCs) participated in a pilot randomized trial of a smoking cessation intervention that incentivized completed counseling calls. At baseline, participants reported cannabis and tobacco use, including the cannabis use identification test-short form (CUDIT-SF) and the Heaviness of Smoking Index (HSI). Self-reported past 7-day smoking abstinence was assessed at 4, 8, and 12 weeks after a scheduled quit date. Study enrollment was completed in May 2023. All participants have had the opportunity to complete the 8-week follow-up, while the final round of 12-week follow-up evaluations is scheduled for completion in August 2023. **Results.** Participants ($N=160$) were predominantly female (64%), and reported White (78.8%), American Indian (13%), Black (3%) or other (6%) races. At baseline, 36% ($n=57$) reported past 30-day cannabis use, reporting use an average of 16.5 days ($SD=11.6$). The dominant modes of cannabis ingestion were smoking (77%) and edible consumption (51%). Past 30-day cannabis users endorsed greater smoking dependence on the HSI than non-users ($p<0.05$). Descriptively, past 30-day cannabis users had lower rates of smoking abstinence than non-users at 4-week (25% vs. 34%) and 12-week follow-ups (40% vs. 46%, $n=150$ [results will be updated upon study completion for remaining 10 active participants]), but not at 8-week follow-up (42% vs. 42%). Among participants who completed the CUDIT-SF (self-identified "current" users; $n=52$), 37% screened positive for cannabis dependence (12% of all participants), and had descriptively lower smoking abstinence at all follow-ups than those who screened negative (21% vs. 24% [4 weeks]; 32% vs. 46% [8 weeks]; 21% vs. 48% [12 weeks, $n=50$]). **Conclusions.** Many adults from PPCs who participated in a smoking cessation intervention also used cannabis. Cannabis use was associated with greater smoking dependence, and cannabis use/dependence was descriptively associated with lower smoking cessation rates. Interventions that address cannabis use may be beneficial in the context of smoking cessation treatment for socioeconomically disadvantaged adults.

FUNDING: Federal; State

POS3-114

RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND SMOKING OUTCOMES IN PREMENOPAUSAL WOMEN ENROLLED IN A MENSTRUAL-PHASE TIMED SMOKING CESSATION TRIAL

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Introduction: Research suggests that engaging in physical activity is beneficial for smoking behavior change. Sex/ovarian hormones play a role in smoking outcomes in women. Response to physical activity varies by menstrual phase; however, we know little about how physical activity may influence smoking outcomes in women who quit during certain phases of their menstrual cycle. We completed a randomized control trial in which premenopausal women were assigned to quit smoking during the follicular menstrual phase (FP) versus standard of care (SC) with no menstrual cycle timing. This secondary data analysis examines the relationship between physical activity and smoking outcomes in this study sample. **Methods:** Females, aged 18-40 years, were recruited nationally in the United States. Upon enrollment and randomization, participants completed a standard telephone-based smoking cessation intervention (six weekly counseling sessions plus 2 weeks of nicotine replacement therapy). Level of physical activity (intensity and time engaging in physical activity) was assessed at baseline using the International Physical Activity Questionnaire (IPAQ). Number of cigarettes smoked, and 7-day point prevalence abstinence were assessed at 6-week end of treatment (EOT). **Results:** Participants ($N=76$; 44.7% assigned to FP) were, on average, 33.9 (± 4.9 SD) years old and smoked 14.7 (± 7.6 SD) cigarettes/day at baseline. Most participants had attended some college (42.1%); 72.4% identified as non-Hispanic white. On average, participants engaged in vigorous physical activity 1.8 days/week (± 2.1 SD) and moderate physical activity 2.4 days/week (± 2.2 SD). Regardless of intervention

condition, number of days engaged in vigorous activity significantly predicted reduced smoking at EOT ($B=-.33$, $p<.05$) after controlling for demographic covariates. Further, total time engaged in physical activity (vigorous and moderate intensity) was significantly associated with reduced smoking ($B=-.18$, $p<.01$) and showed a trend toward increased 7-day point prevalence abstinence at EOT ($B=.71$; $p=.08$). **Discussion:** Results show a positive impact of engaging in routine physical activity in smoking behavior reduction and promising trends toward smoking cessation in women, regardless of timing a quit date to the menstrual cycle phase. Additional research is needed to develop physical activity interventions tailored to address unique factors impacting cessation outcomes in premenopausal women.

FUNDING: Federal

POS3-115

ETHNIC/RACIAL DIFFERENCES IN THE ASSOCIATION OF MATERNAL PERCEPTIONS OF FAMILY FUNCTIONING AND SMOKING DURING PREGNANCY

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Introduction. Although socio-environmental factors are known to contribute to the maintenance of smoking behavior, few studies have examined the potential effect of family functioning on maternal smoking during pregnancy (MSDP). The current study examined relationship between maternal perceptions of family functioning and MSDP. **Methods.** Pooled data was used from three cohorts of non-treatment seeking, pregnant women ($N=345$, $M_{age}=25.7$ years, 59% ethnic/racial minority) over-sampled for prenatal smoking. Participants ($M_{gestation}=27.2$ weeks) completed the Family Assessment Device (FAD), a gold-standard self-report measure assessing perceptions of family functioning with cut-off scores for clinically-determined suboptimal levels of functioning. FAD response were scored on seven subscales: *General Functioning*, *Affective Involvement*, *Affective Responsiveness*, *Behavior Control*, *Communication*, *Problem Solving*, and *Roles*. We used multinomial logistic regressions to examine the association of each FAD subscale with cotinine-verified MSDP outcome groups (Smoking, Quit [i.e., ≥ 28 continuous days quit during pregnancy], Non-Smoking [NS]). Stratified analyses were then used to explore potential differences by ethnic/racial identity (non-Hispanic/White vs. racial/ethnic minority). **Results.** Overall, maternal perceptions of their family's *General Functioning*, *Affective Involvement*, *Affective Responsiveness*, *Behavior Control*, and *Roles* had a significant effect on MSDP, with participants reporting suboptimal levels of family functioning were more likely to be Smoking or Quit vs. NS ($ps<.05$). However, stratified analyses showed differing effects by ethnic/racial identity, where participants reporting suboptimal levels of *General Functioning* were significantly more likely to be Quit vs. NS among non-Hispanic/White ($p=.04$), but not ethnic/racial minority ($p>.05$), participants. Additionally, effects of maternal perceptions of *Affective Involvement* and *Behavioral Control* on MSDP were significant among non-Hispanic/White participants only, where participants were more likely to be Quit vs. NS if they reported suboptimal levels of *Affective Involvement* ($p=.01$) and more likely to be Smoking vs. NS for *Behavioral Control* ($p=.02$). Maternal perceptions of their family's *Roles* remained the only significant effect on MSDP found for both racial/ethnic identity groups ($ps<.02$). **Conclusions:** The current study highlights the possibility that maternal perceptions of family functioning may contribute to MSDP, but effects may differ based on domain of family functioning and by ethnic/racial identity.

FUNDING: Federal

POS3-116

TOBACCO USE AND MENTAL HEALTH AMONG TRANSGENDER AND NONBINARY VETERANS IN THE DESERT PACIFIC REGION

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Transgender describes individuals whose gender identity and expression differ from culturally held expectations for people who share their assigned sex at birth. Approximately 1.3 million U.S. adults identify as transgender. The most recent available data indicate there are over 15,000 transgender individuals in active military service, with another 134,000 being military Veterans. Being transgender is associated with increased and persistent stress, may lead to a myriad of negative health outcomes, and likely contributes to health and healthcare disparities. While studies are mixed, recent evidence suggests that trans individuals may be more likely to use tobacco or nicotine



products when compared to the general population. Prevalence of mental health concerns among trans populations is well documented, including higher rates of anxiety, depression, substance use, posttraumatic stress, serious mental illness, and suicidality. The Veterans Health Administration (VHA) has prioritized providing safe, accessible healthcare to all Veterans, including those who identify as transgender. Beginning in December 2021, VHA enabled Veterans to self-identify their gender in medical records, which reduces stigma, improves communication across healthcare clinics, and enables providers to have better informed discussions for gender related healthcare. This change has also allowed for better understanding of unique health factors, including health disparities, that affect this vulnerable population. The current study analyzed prevalence of tobacco use and mental health issues among self-identified transgender Veterans. Data were collected from medical records of 291 Veterans in the Desert Pacific VHA healthcare network, covering Southern California, Arizona, and New Mexico. We found that transgender men, transgender women, and Veterans who identified as nonbinary used tobacco at rates nearly twice that of general Veteran populations. Additionally, trans and nonbinary Veterans were less likely to have never used tobacco. Finally, our sample had higher rates of receiving treatment for mental health issues particularly anxiety and depression. These results signal that health disparities continue to exist among this population, and this study provides a foundation for inquiry, including the interaction effects of tobacco use and mental health issues, as well as a suggestion to explore these differences among racially and ethnically minoritized Veterans.

FUNDING: Unfunded

POS3-118

EFFICACY OF SMOKING CESSATION INTERVENTIONS FOR PEOPLE WHO ARE ADMITTED TO A HOSPITAL: COMPREHENSIVE UPDATE OF THE 2012 COCHRANE SYSTEMATIC REVIEW

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Background. Hospital admission provides people who smoke with a good opportunity to quit because illness can increase perceived vulnerability to the health risks of smoking; hospital no-smoking policies require temporary tobacco abstinence; and treatment can start in the hospital. A 2012 Cochrane systematic review found that hospital-initiated smoking interventions increased quit rates but identified evidence gaps. We updated the review, adding new evidence from trials in the past decade to inform healthcare practice and policy. **Methods.** We searched the Cochrane Tobacco Addiction Group Specialised Register in Sept. 2022 for randomized or quasi-randomized trials of behavioral and/or pharmacologic smoking cessation interventions. We included studies that enrolled people who smoked at hospital admission, started treatment in hospital, and reported abstinence at ≥ 6 months after discharge. We followed Cochrane methods for screening, data extraction, and assessing risk of bias and used the most rigorous outcome measure, preferring biochemically-validated abstinence. A random effects Mantel-Haenszel model calculated risk ratios (RRs) with 95% CI. Data were pooled for meta-analysis where appropriate. **Results.** We included 82 trials with 42,273 patients (pts); 36 were new since 2012. There was high-certainty evidence that smoking cessation counseling begun in hospital and continued for >1 month post-discharge increased abstinence by 36% vs. no counseling (RR 1.36, 95% CI 1.24-1.49; $I^2=34\%$; 28 studies, 8234 pts). In studies where all pts received in-hospital counseling, quit rates were higher if both counseling and pharmacotherapy continued after discharge (RR 1.23, 95% CI 1.09-1.38; $I^2=0\%$; 7 studies, 5610 pts). There was high-certainty evidence for NRT and moderate-certainty evidence for varenicline that starting drug in hospital increased quit rates vs. placebo or no drug (NRT: RR 1.33, 95% CI 1.05-1.67; $I^2=43\%$; 8 studies, 3838 pts; varenicline: RR 1.29, 95% CI 0.96-1.75; $I^2=29\%$; 4 studies, 829 pts). Little evidence supported starting bupropion in hospital (RR 1.11, 95% CI 0.86-1.43; $I^2=6\%$; 4 studies, 872 pts). There was insufficient evidence of quitlines' effectiveness for promoting post-discharge smoking abstinence vs. no intervention. Few studies have tested digital health tools for post-hospital cessation support. **Conclusions.** Strong clinical trial evidence supports the benefit of starting smoking cessation counseling and NRT or varenicline in hospital and continuing treatment for >1 month post-discharge. Research to identify effective strategies to implement this intervention in healthcare systems, especially to establish effective systems for connecting in-hospital interventions to post-discharge smoking cessation support, is a key next step needed to achieve population impact of this clinical trial evidence.

FUNDING: Federal; Academic Institution; Nonprofit grant funding entity

POS3-119

WHO SUPPORT OR OPPOSE THE CIGARETTE TAXATION INCREASE IN VIETNAM? FINDINGS FROM THE ITC VIETNAM SURVEY IN 2019 AND 2020

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Introduction: The aim of this study was to determine how smokers' reaction if cigarette taxation in Vietnam increases. **Methods:** Data were drawn from two waves of the International Tobacco Control (ITC) Vietnam Projects in 2019 and 2020. Of 1990 participants at Wave 2 in 2019, we successfully followed 1618 people at Wave 3 (12 months later). We asked participants if they supported or opposed the taxation increase in Vietnam at both waves. Based on their responses if the taxation increase, we categorized participants into one of the following groups: (1) "Remain supportive" (if they kept supportive in both waves); (2) "Newly supportive" (if they moved from oppose to support); (3) "Newly opposed" (if they moved from support to oppose); and "Remain opposed" (if they kept opposing both waves). Multinomial logistic regression was employed to identify factors associated with their response among current and former smokers. All results presented here were weighted using the longitudinal weight in Stata 18. **Results:** Of 1618 participants who successfully followed up in both waves, 60.4% remained supportive while others shared the rest equally (13.7% for newly supportive, 13.5% for remaining opposed, and 12.4% for newly opposed). Compared to those who remained opposed to the tax increase scenario, those who remained supportive and newly supportive were of the older age group, had health insurance care, lived in rural areas, had better knowledge about tobacco harm, and quit smoking. Meanwhile, newly opposed smokers were those who had lower knowledge of tobacco harm. **Conclusions:** This study determined smokers' characteristics across their reaction toward the cigarette taxation increase scenario. Our findings guide policymakers to distinguish different groups of smokers and how to deal if they disagree with the increase of cigarette taxation in the future.

FUNDING: State; Nonprofit grant funding entity

POS3-120

RELATIVE HARM PERCEPTIONS OF CIGARETTES COMPARED TO MARIJUANA IN A COHORT OF DUAL USERS IN NIGERIA: A MIXED METHODS STUDY

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Significance: Current evidence suggests that the dual-use of cigarettes and marijuana is influenced by individual (i.e. harm perceptions) and environmental factors (i.e. local regulations). However, understanding the perceptions of harm as one product relates to the other can help us deconstruct the context surrounding dual use and formulate effective policies that can stem the problematic use of both products. Therefore, this study aims to explore the harm-perceptions of cigarettes compared to marijuana among dual users, using a mixed methods approach. **Methods:** The study used a sequential mixed methods design. Quantitative assessments were conducted on a cohort of adults (18+) who reported current use of cigarettes and recreational marijuana in Lagos, Nigeria. Participants self-reported their relative harm-perceptions: "How harmful do you consider cigarettes compared to marijuana?" The primary exposure was use status, categorized as non-past-30-day (P30D), P30D non-daily, and P30D daily for both substances. Multinomial regression models were used to examine the association between use status and harm-perceptions. Next, we conducted qualitative interviews with a subsample of dual P30D cigarette and marijuana users ($n=21$) to explore contextual factors that inform their harm-perceptions. An iterative process was used, where qualitative responses were used to understand quantitative findings relating to harm-perceptions. **Results:** The analytic sample comprised 501 respondents. Among non-daily P30D dual-users, 36.1% believed cigarettes were less harmful than marijuana, compared to 16.9% who believed they were more harmful. Similarly, among P30D daily dual-users, a higher proportion (31.2%) believed cigarettes were less harmful than marijuana, compared to those who believed the opposite (23.5%). The regression models indicated that P30D non-daily marijuana-use (vs non-P30D) was associated with a higher likelihood of believing that cigarettes were less harmful than marijuana (RR:2.40; 95% CI:0.99,5.83). Likewise, P30D non-daily and daily cigarette-use (vs non-P30D) was associated with a reduced likelihood of believing cigarettes were more harmful. Qualitative findings indicated that cigarette warning labels framed the perceptions of those who believed cigarettes were more harmful. However, the illicit status (in Nigeria) and the perceived addictiveness of marijuana compared to cigarettes influenced the perception of participants' who believed cigarettes were less harmful. **Conclusion:** Our findings suggest P30D use of marijuana and cigarettes was



significantly associated with reduced harm-perceptions about cigarettes compared to marijuana. Additionally, our results highlight how policies such as cigarette package labeling and the illicit-status of marijuana can influence harm-perceptions of cigarettes compared to marijuana among adult dual-users.

FUNDING: No external funding reported

POS3-121

PARTICIPATORY DEVELOPMENT OF A GENDER-SPECIFIC SMOKING CESSATION SMARTPHONE APP FOR WOMEN

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Significance: Women experience lower success rates in quitting smoking compared to men, partly due to gender-related barriers to quitting. The majority of smoking cessation apps are designed in a gender-neutral manner, inadvertently contributing to gender disparities in quitting outcomes. A smartphone app with gender-specific content is needed to effectively tackle gender-related motives for smoking and barriers to quitting. **Methods:** From July 2022 and June 2023, we conducted semi-structured interviews with five women who smoked to understand how their motives for smoking and barriers to quitting relate to gender. We used gender theory to analyze the interviews and interpret them while considering gender identity, gender roles, and gender relations. Data collected in the interviews together with existing evidence-base knowledge on gender and smoking informed the development of gender-specific content to support women in quitting. This content was used by our interdisciplinary team of clinicians and researchers, to adapt a pre-existing gender-neutral smoking cessation app "My Change Plan" (MCP) and create a women-specific version, MCP-Woman (MCP-W). **Results:** The MCP-W smartphone app offers users content that addresses gender-related motives for smoking and barriers to quitting. It includes testimonials from women who smoked which present their struggles with quitting and how they managed to overcome them. For example, it provides the users with insights regarding the initial steps they took in their quit journey, how do cope with stress in healthy ways, the importance of receiving support from other women during the quit process, and how to handle the presence of smokers in their environment. To deliver this content effectively, we created four animation videos, each ranging from 3 to 4 minutes in length, that were embedded in the app. The topics of these videos focus on: 1) What may influence women's smoking behaviour? 2) Does smoking help cope with stress? 3) Women talk about their quit journey, and 4) Initiating change in my smoking (<https://youtu.be/IFZrJ14kzrk>). The MCP-W app also retained gender-neutral content available in the MCP app which helps users create a personalized quit plan, set goals, identify smoking triggers, develop coping strategies, recognize support systems, and track their cigarettes/cravings. **Conclusion:** The MCP-W app, co-created by women who smoked, is based on gender theory, thereby acknowledging prevalent gender-related barriers to quitting and providing support for women in recognizing opportunities for change. It holds great promise in reducing gender disparities in smoking cessation outcomes and ultimately improving women's health. Currently, the app is undergoing testing to evaluate its acceptability and feasibility among women who smoke.

FUNDING: Academic Institution

POS3-122

E-CIGARETTE EXPECTATIONS AND USE AMONG NON-TREATMENT-SEEKING VETERAN SMOKERS IN A SMALL NATIONWIDE VETERAN POPULATION

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The US Dept of Defense spends approximately \$2.7 billion on treatment of smoking related issues among the 22% of veterans who smoke cigarettes. As just one complicating factor, mental health issues are prevalent among veterans using tobacco products, which may undermine cessation efforts. As a harm reduction alternative, e-cigarettes may be an option for veteran smokers who remain unable or unwilling to quit. This secondary analysis evaluates e-cigarette expectations and the impact of e-cigarette provision on cigarette smoking behaviors among non-treatment-seeking veterans enrolled in a recently completed RCT (N=638) wherein smokers nationwide were randomized to sample e-cigarettes or not. Within the parent RCT, 427 were randomized to receive a 4-week supply of tank style e-cigarettes, allowing for ad-libitum (i.e., self-determined) use; 211 served as control participants. Of the entire sample, n=35 (5%) self-reported

previous military service (27 e-cigarette, 8 control). Slightly less than half (43%) reported prior use of an e-cigarette. Average motivation to quit at baseline was low (0-10 scale; M=3.9, SD=3.0). Using the PHQ-8 as an index of current depression symptoms (possible range 0-24), participants reported minimal/no depression (M=3.6, SD=4.0). These veteran smokers had positive expectations of e-cigarette use (1-10 scale), with the highest endorsed expectation that e-cigarettes would reduce urge for cigarettes (M=6.57, SD=1.82) and the least endorsed expectation that e-cigarettes would make them more nicotine dependent (M=3.75, SD=2.24). At week 4 of product sampling and within the e-cigarette group alone, 25.9% (n=7) had a 50% reduction in CPD, 22.2% (n=6) made at least one quit attempt (QA), and 2 self-reported 7-day point prevalence abstinence (PPA). At week 24, 18.5% (n=5) had a 50% reduction in CPD, 40.7% (n=11) had made at least one QA, and 3 had 7-day PPA. Of the 8 ppts in the control group, only 2 ever reported a QA: one had 50% reduction in CPD at week 4 and 7-day PPA by week 24; the other had 50% reduction in CPD at week 24 with no abstinence. Among a non-treatment-seeking sample of veteran smokers with minimal motivation to quit, e-cigarettes might be an advantageous and acceptable means for reducing exposure to the harmful effects of combustible cigarette smoking. Given that veterans are a high priority population for cigarette smoking cessation, it is important to consider ways to reach non-treatment-seeking veterans.

FUNDING: Federal

POS3-123

PUBLIC DISCOURSE ABOUT TOBACCO CONTROL: A SCOPING REVIEW

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Significance. Approximately 20% of US adults read/watch the news on their social media platform. While social media has been used to explore tobacco-related behaviors, marketing strategies, and exposure to tobacco content, research has only recently begun to use these data to examine public discourse about tobacco control policies that have been major news topics over the past several years. This study seeks to identify literature published in peer-reviewed journals that used social media to examine public discussions about tobacco control regulations. **Methods.** Following PRISMA-ScR guidelines, we searched PubMed, Medline, CHINAHL, Web of Science and tobacco specific journals for articles published since January 2000. Search terms included terms related to 1) tobacco products, 2) social media, and 3) policies. Inclusion criteria were data from a social media platform (including organic posts, promotional content, images) and discussion of a specific tobacco control regulation (not content where a policy theme emerged). Two reviewers screened article titles (n=1,467), abstracts (n=54), followed by a full-text review (n=22) where four final articles were removed. Extracted attributes included authors, year, location, social media platforms, number of posts, data collection period, and policy discussed. Study characteristics extracted were design, sampling method, data extraction strategies, coding [i.e., human, machine learning], analysis, and major findings. **Results.** Of the 17 articles published 2014-2023, nearly all (94%) used Twitter to analyze public discourse. Most articles were about US regulations, with 2 about Australia and the United Kingdom. Six articles explored discussions about flavor restrictions (including menthol), three were about FDA regulatory authority (i.e., heated tobacco products, e-cigarettes, and the pre-market authority deadline), and two were about the US Federal Tobacco 21 law. The other six articles were about taxes, local regulation of e-cigarettes, regulating e-cigarettes as a medical product, the WHO Framework Convention on Tobacco, smoke- and tobacco-free campus policies, and an import restriction on e-cigarettes. Although human annotation was the most common coding method, four articles used machine learning to analyze policy discussions. Most (70.6%) articles classified content by sentiment. **Implications.** Currently published research about tobacco control discussions on social media predominantly use Twitter to examine sentiment toward the policy. Sentiment and discourse about the policy is often categorized into time segments depending on the announcement and/or implementation dates of the regulatory action. Social media provides timestamped, organic data that can help those developing and implementing tobacco control policies to effectively amend or adopt practices to ensure compliance or improve efficacy.

FUNDING: Federal



POS3-124

COMPLIANCE TO TOBACCO RETAILER REGULATIONS MAY REDUCE THE EFFECT OF TOBACCO RETAILER ACCESS ON TOBACCO USE SUSCEPTIBILITY AMONG YOUNG ADOLESCENTS IN URBAN INDIA.

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SIGNIFICANCE: Regulatory compliance is critical to achieving the intended public health benefits of tobacco control policies. In urban India, compliance to tobacco retailer regulations is uneven despite high public access to tobacco retailers. We examined compliance to India's Cigarettes and Other Tobacco Products Act (COTPA) provisions regulating tobacco retailers and hypothesized that compliance would buffer the effect of adolescent tobacco retailer access on their tobacco use susceptibility. **METHODS:** We conducted population-based surveys of adolescents (n=843 in Mumbai and n=916 in Kolkata) and tobacco retailers (n=650 in Mumbai and n=579 in Kolkata) within 26 Mumbai and 26 Kolkata neighborhoods. A representative sample of adolescents completed a self-administered questionnaire, and anonymous compliance checks were conducted in a representative sample of retailers. Logistic regression with adjustments for survey design and weights was used to estimate associations between retailer compliance to COTPA policies, adolescent tobacco retailer access (frequency of visits to retailers that sell tobacco), and tobacco use susceptibility (perceived tobacco use norms, perceived ease of access to tobacco, and tobacco use intention). **RESULTS:** Compliance to COTPA policies was low overall. Only 1.3% in Mumbai and 0% in Kolkata posted the required signage indicating the ban on tobacco sales to minors. Compliance to the ban on tobacco sales within 100 yards of schools was better (78.8% in Mumbai; 83.8% in Kolkata), as was the ban on tobacco advertising at retailers (49.9% in Mumbai; 76.8% in Kolkata). Adolescent tobacco retailer access was high overall and associated with tobacco use susceptibility measures ($p < 0.05$). In Mumbai, neighborhood compliance to the tobacco sales ban near schools buffered the effect of tobacco retailer access on perceived tobacco use norms and perceived ease of access to tobacco. Neighborhood-level compliance to the tobacco advertising ban at retailers buffered the effect of adolescent tobacco retailer access on perceived tobacco use norms in Mumbai. Neighborhood-level compliance did not buffer the effect of tobacco retailer access in Kolkata. **CONCLUSIONS:** Improving tobacco retailer compliance to tobacco control regulations may reduce the impact of tobacco retailer access on adolescent tobacco use susceptibility. Further research is needed to understand the social and cultural contexts that may explain why findings differed between cities.

FUNDING: Federal

POS3-125

COGNITION AND MONOCYTE AND T CELL ACTIVATION AMONG PEOPLE WITH HIV WHO SMOKE COMPARED TO PEOPLE WITH HIV WHO DO NOT SMOKE

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Significance: Although anti-retroviral therapy (ART) enhances life expectancy and quality of life, people with HIV (PWH) are increasingly vulnerable to non-AIDS-related diseases including HIV-associated neurocognitive disorder (HAND). Inflammation, particularly activated monocytes/macrophages, is considered a key mechanism in the pathogenesis of HAND. Tobacco use may exacerbate inflammation and increase the incidence and severity of HAND. We hypothesized that PWH who smoke would exhibit worse cognitive function and higher levels of inflammation compared to PWH who do not smoke. **Methods:** We used baseline data from a randomized, placebo-controlled crossover study to evaluate the effects of galantamine on cognition and inflammation among PWH who do and do not smoke (NCT03384784). Cognitive measures were: cognitive flexibility (Color Shape Task), verbal learning & memory (Hopkins Verbal Learning Test), working memory (N-back Task), and response inhibition (Stop Signal Task). The primary outcome is a composite score of cognition. Inflammatory markers included monocyte activation and migration (proportion of CD14+ cells expressing CD16, CD163, and CCR2; plasma sCD14, sCD163 and CCL2 [MCP-1] levels) and T cell activation (proportion of CD8 cells co-expressing CD38/HLA-DR). **Results:** The 58 PWH (26 smokers; 32 non-smokers) who were randomized are included in the baseline analysis. Most subjects identified as men (45, 78%) and Black (40, 69%) and 90% had undetectable HIV viral loads (n=52). There was a non-significant difference on the cognitive composite score ($p = .09$) indicating that PWH who smoke had worse cognition (median [IQR] = -0.1 [-0.5, 0.2] vs 0.1 [-0.1, 0.4]).

This was driven by the response inhibition task ($p = .08$). PWH who smoke had higher plasma levels of sCD14 (median [IQR] = 1820.2 [1677.8, 2104.7], compared to those who don't smoke (1551 [1283.7, 1760.5], $p = .009$). There were no significant differences for monocyte expression of CD16, CD163 or CCR2; CD38+HLA-DR co-expression on CD8 T cells; or plasma sCD163 or CCL2/MCP-1 ($ps > .2$). There were also no significant differences between smokers and nonsmokers in post-hoc exploratory plasma hsCRP (marker of inflammation) or neurofilament light chain (NFL; marker of neuronal injury). **Conclusions:** In sum, there were no differences in cognition and sCD14 was the only inflammatory marker that differed by smoking status. Although these findings contrast with previous studies showing tobacco use adversely impacts both cognition and inflammation, our sample was small and restricted to PWH; most prior studies excluded this population. Future work should investigate how HIV and/or ART may alter the relationships among smoking, cognition, and inflammation.

FUNDING: Federal

POS3-126

TOBACCO 21 POLICY SUPPORT AS AN INTERVENTION TARGET TO REDUCE YOUNG ADULT TOBACCO USE

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SIGNIFICANCE: Some evidence indicates that, among adults, public support for a given policy is important for policy implementation. For example, adults' public support for smoking bans in bars and restaurants has been associated with greater policy success (i.e., less indoor smoking). Compared to research with adults, less work has examined the role of public support for implementation of youth policies. This study focuses on increasing youth support for Tobacco 21 (T21), a national policy prohibiting the sale of tobacco to anyone under the age of 21. Specifically, we aimed to determine whether youth support for T21 could be a viable target for interventions aimed at reducing youth tobacco use. **METHODS:** Using an online survey service platform (Prolific), we enrolled a sample of youth aged 18-20 years (N=600) from across the United States. All participants completed an online survey to assess T21 knowledge and attitudes, tobacco use history, and sociodemographic characteristics. In addition, half of the participants were randomized to view three messages supporting T21, which were based on youth anti-tobacco campaigns. The other half of participants viewed control messages. T21 support and tobacco-use intentions were assessed before and after message exposure and repeated-measures analyses were conducted to assess pre-post changes in cognitions. **RESULTS:** Overall, youth with higher support for T21 had lower odds of current tobacco use and reported lower intentions to use tobacco in the future. In addition, we found an effect of experimental condition, in the form of a significant Time (pre vs. post-message) x Condition (T21 vs. control message) interaction on T21 support, such that exposure to the T21 message (vs. control message) was associated with an increase in support for T21, $F(1, 596) = 12.13$, $p < .001$. In a second analysis, we found a significant Time x Condition interaction on use intentions, such that exposure to the T21 message was associated with a decline in intentions to use tobacco in the future, $F(1, 596) = 6.86$, $p = 0.009$. **DISCUSSION:** Consistent with the literature on policy messaging, this study found that youth-targeted messaging in favor of T21 can increase policy support and reduce use intentions. Youth support for T21 should be pursued as a target for interventions aimed at increasing the success of T21 upon its implementation.

FUNDING: Academic Institution



POS3-127

ALCOHOL AND TOBACCO CO-USE AMONG CANCER PATIENTS RECEIVING VIRTUAL TOBACCO TREATMENT: ECOG-ACRIN EAQ171CD

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Purpose: Alcohol use is a modifiable risk factor for smoking, and evidence suggests that treating alcohol and tobacco use among patients diagnosed with cancer can improve treatment outcomes. We describe patterns of high risk drinking among patients recently diagnosed with cancer enrolled in a tobacco treatment trial, comparing the AUDIT-C and national guidelines (American Cancer Society: ACS, National Comprehensive Cancer Network: NCCN). **Method:** The study is a secondary analysis of (N=306) recently diagnosed cancer patients within the ECOG-ACRIN NCORP from 30 sub-affiliate community and 7 minority/underserved practices. All patients enrolled in a tobacco treatment RCT and smoked cigarettes within the past 30 days. Cigarette dependence and alcohol use were assessed at baseline. High risk alcohol use was determined by 1) AUDIT-C score of ≥ 3 for women and ≥ 4 for men (out of 12) on 3 items assessing drinking frequency, quantity, and binges; 2) ACS recommend drinking level of > 1 drink/day for women and > 2 drinks/day for men; 3) NCCN recommend drinking level of > 1 drink/day for women and > 2 drinks/day for men and any drinking for survivors of liver, esophageal, kidney or head and neck cancers. **Results:** Participants were a median age = 57.51 years, 70.9% (n=217) were female, and 84.0% (n=257) White non-Hispanic. At baseline, participants smoked 14.6 cigarettes per day (sd=21.8) and 72.6% (n=220/303) smoked within 30 minutes of waking. Sixty-one percent of patients reported alcohol use in the past year. At baseline, 42.5% (n=130) of cancer patients who smoke reported high-risk drinking based on the AUDIT-C, 40.2% (n=123) based on the ACS, and 41.8% (n=128) based on the NCCN criteria. There was no significant association between median cigarettes per day at baseline or time to first cigarette (≤ 30 min vs. ≥ 31 min) and high risk drinking as defined by AUDIT-C or ACS and NCCN guidelines. **Conclusions:** Alcohol use is prevalent among cancer patients who smoke, despite guidelines that recommend reduced or no drinking for cancer survivors. Screening cancer patients who smoke using the AUDIT-C, ACS or NCCN guidelines will identify most patients who are at risk for high risk drinking. Future studies will examine the association between alcohol use and smoking outcomes during tobacco use treatment.

FUNDING: Federal

POS3-128

NICOTINE AND CANNABIS USE ARE COMMON AMONG ADOLESCENTS, BUT SO IS READINESS TO CHANGE

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Introduction: Use of e-cigarettes and cannabis products are common among adolescents, yet little is known about prevalence and predictors of intention to quit or reduce use. **Methods:** Students from 60 middle and high schools (24 middle schools, 34 high schools, and 2 combined middle/high schools) in Massachusetts completed a school-wide survey in September 2022 - February 2023. Primary outcomes were intention to quit and quit/reduce e-cigarette and cannabis use in the next 4-weeks. We computed the prevalence of intention to quit or reduce use in the next 4 weeks. Logistic mixed effects models identified predictors among those with past 4-week use. **Results:** 33,447 students began the survey and 23,915 (71.5%) completed $>60\%$ of the questions and passed at least one attention check (age range: 7-22 years, mean: 14.7 (SD = 1.9)). Of these, 5.7% reported e-cigarette use, 5.7% reported cannabis use, and 0.4% reported past 4-week use of both substances. Among those with past 4-week use e-cigarette use, 29.9% reported desire to quit and 57.3% to quit or reduce in the next 4-weeks. Among

those with past 4-week cannabis use, 9.5% reported desire to quit and 34.1% to quit or reduce in the next 4 weeks. Odds of desire to quit e-cigarette vaping were higher among those without past 4-week cannabis use ($p<0.001$), with less than daily or near daily e-cigarette use ($p<0.001$), and who denied past year use of drugs on school property ($p=0.005$). When intention to quit or reduce e-cigarette use were considered together, no unique predictors were identified ($p>0.20$). Odds of desire to quit cannabis use were higher among those with less than daily or near daily cannabis use ($p<0.001$). Odds of desire to quit/reduce cannabis use were higher in younger participants ($p=0.04$), those who did not crave cannabis within 60 minutes of waking ($p<0.001$), and those who denied past 4-week other tobacco use ($p=0.03$). **Conclusions:** Adolescent interest in quitting or reducing e-cigarette and cannabis use is high, particularly for e-cigarettes. More frequent use was associated with less interest in quitting both substances. Poly-substance use was linked with less interest in quitting or reducing. Effective, sustainable, and equitable school-based interventions are needed to support those ready to reduce use.

FUNDING: No external funding reported

POS3-129

TEMPORAL DYNAMICS OF PSYCHOLOGICAL AND SITUATIONAL FACTORS IN PREDICTING ABSTINENCE

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Background: While predictors of smoking cessation, such as urge to smoke, stress, cigarette availability, and motivation to quit are well-identified in the literature, their dynamic interplay over time remains understudied. This study addressed this gap by examining the temporal dynamics of psychological and situational factors and their influence on achieving abstinence on the target quit date (TQD). TQD abstinence was selected as the primary outcome considering its significance in predicting long-term cessation success and assessing the early efficacy of interventions, enabling timely adjustments as needed. **Aims:** This study utilized ecological momentary assessment (EMA) data to investigate how dynamic characteristics of urge, stress, cigarette availability, and motivation influence abstinence on the target quit date. **Methods:** Data for this study were from a large NIH-funded randomized controlled trial that compared the Smart-T3 and NCI QuitGuide smoking cessation apps. Urge, stress, cigarette availability, and motivation were each measured via single EMA items up to 5 times per day during a 6-day period prior to a TQD. The dependent variable was self-reported smoking status on the TQD. In Step 1, the intercept, slope, acceleration, and volatility of urge, stress, cigarette availability, and motivation to quit were derived using linear mixed models. In Step 2, a logistic regression was conducted to examine whether these characteristics predicted abstinence on the TQD, controlling for intervention conditions. **Results:** Participants (n=391) were 73.9% female, 63.7% White, and were 52 years old on average. Overall, 135 participants (34.5%) reported abstinence on the TQD. Controlling for intervention condition, increasing pre-quit stress (i.e., slope) predicted lower TQD abstinence ($\beta = -2.5, p < .05$). Further, higher pre-quit intercept ($\beta = -0.5, p < .05$), slope ($\beta = -3.3, p < .05$), and acceleration ($\beta = -26.2, p < .05$) of cigarette availability each reduced the likelihood of TQD abstinence. Finally, there was a positive relationship between initially high levels of cessation motivation (i.e., intercept) and TQD abstinence ($\beta = 0.7, p < .05$). **Conclusion:** Temporal dynamics of psychological and situational factors during the pre-quit period played pivotal roles in TQD abstinence. These insights underscore the importance of considering the temporal dynamics of these factors in designing effective interventions for smoking cessation.

FUNDING: State; Academic Institution; Nonprofit grant funding entity

POS3-130

NAVIGATING THE CIGARETTE PRICE DATA LANDSCAPE IN SUB-SAHARAN AFRICA

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Significance. Policymakers in sub-Saharan Africa (SSA), as in many countries, typically require local evidence before increasing tobacco taxes. Price data is needed to produce this evidence. The retail price of the most-sold brand is the region's most accessible source of cigarette price data, but this average price hides variation arising from brand variety, unit of purchase, and purchase location. No study has surveyed the cigarette price data landscape in SSA or compared the price estimates derived from these data-



sets. This study fills these gaps. **Methods.** We searched the websites of key funding agencies, studies available through EBSCOHost and Pubmed, and contacted informants, to locate freely available observational and survey datasets that provide cigarette prices in SSA. Datasets were classified by collection method, representativity, reliability, and accessibility. For each dataset, we report summary statistics, including the coefficient of variation, for the price of 20 cigarettes in constant international dollars. We compared these statistics for countries with more than one dataset collected in the same year (N=7). Prices from nationally representative surveys (N=18) are compared with the retail price of the most-sold brand reported by the World Health Organization (WHO). **Results.** Forty-five datasets provide cigarette price data in 23 of SSA's 46 countries. Thirty-three datasets (73%) come from East and Southern Africa. Twenty datasets (44%) are from self-response surveys reporting the cost and unit of the last cigarette purchase; 21 (47%) are from retail observations. Surveys asking about cigarette expenditure, but not the quantity purchased, are common. Prices collected through observation at retailers are generally higher, and exhibit fewer extreme outliers and less variability, than survey estimates. Mean prices derived from nationally representative surveys cluster around WHO's average price, with 8 mean prices (44%) below WHO's average price and 10 mean prices (56%) above it. **Conclusion.** While cigarette price data is available in SSA, generating research that influences policy requires intensified effort. Multisectoral collaborations are needed to secure the addition of questions on the quantity of cigarettes purchased in existing repeated surveys that only ask about expenditure. Expanding the coverage of observational data collection efforts at retailers can improve understanding of price/expenditure misreporting in self-response surveys.

FUNDING: Nonprofit grant funding entity

POS3-131

CHEMICAL DEPOSITIONS ASSOCIATED WITH ELECTRONIC CIGARETTE USE IN VEHICLES

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Significance: Policies have been implemented that prohibit smoking cigarettes indoors, including some policies in the U.S. that prohibit smoking in vehicles when children are present. However, these policies do not prohibit electronic cigarette (ECIG) use in vehicles. ECIG use can deposit ECIG-generated chemicals on surfaces. This study's purpose was to examine chemical depositions on interior surfaces associated with ECIG use in vehicles. **Methods:** People who reported current ECIG use and no combustible tobacco or other product use in their personal vehicle (n=60; 36.7% women; 83.3% white; mean age=20.5, SD=2.3) were recruited for an in-person field study. Participants arrived in their vehicles at the study location after abstaining from nicotine-containing products for >12 hours. Upon arrival, staff collected residue samples on individual standard alcohol wipes from the driver's side front window, driver's side rear window, and windshield (100cm², 10x10cm squares). Participants then completed an ECIG use session with their own ECIG device including a 5-minute directed bout followed by a 25-minute *ad libitum* bout, with total puff counts recorded. After the session, staff re-wiped the same driver's side front window location. Wipes (n=240) were prepared and chemically analyzed for propylene glycol, glycerin, and nicotine. **Results:** Propylene glycol, a relatively volatile compound, was not observed in any samples (limit of detection, LOD, 8400 ng/100cm²). Glycerin and nicotine were measurable in samples taken from each location before and after the sessions. For the surfaces wiped before the ECIG use session, glycerin was present above the LOD (3000 ng/100cm²) in 20.0% of the samples and found after the session in 38.3% of the samples. Among samples above LOD, the median glycerin concentration from samples collected from the driver's side window before the sessions (median=7320.0 ng/100cm²) was higher than those from the other samples collected before the sessions at all other collection locations and the driver's side window after the session (median range=5185.0-5490.0 ng/100cm²). Due to suspected contamination, nicotine could not be determined reliably in 78 of the 240 samples. Of the remaining 162 samples, 84.6% had nicotine levels above the LOD (1.8 ng/100cm²), including 100% of the samples collected after the session. Nicotine concentrations from the driver's side window wipes collected after the sessions (median=32.9 ng/100cm²) were higher than the samples collected before the session (median range=7.4-11.3 ng/100cm²). **Conclusions:** ECIG use in vehicles can deposit measurable amounts of ECIG-generated chemicals on glass surfaces. Future research is needed to examine the impact of bystander exposure to ECIG-generated residues in vehicles and other indoor spaces.

FUNDING: Federal

POS3-132

"ICY" FLAVOR COMPONENTS IN E-CIGARETTE IMAGES: INFLUENCE ON LIKING AND INTENTION TO USE AMONG YOUTH WHO ARE SUSCEPTIBLE TO E-CIGARETTE USE

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Background: "Icy"-flavored e-cigarettes, marketed in candy/fruit-cooling combinations, recently entered the US marketplace in both disposable and non-disposable forms. Advertisements that include attractive product images are one of the first avenues of exposure to e-cigarette marketing for youth initiation. This study aims to examine e-cigarette liking and intentions to use following exposure to e-cigarette images of sweet flavors, with and without cooling "icy" components, among youth who are susceptible to e-cigarette use. **Methods:** In January 2023, we conducted an online survey among 59 Connecticut high school students who provided consent and had never tried e-cigarettes but indicated susceptibility to future use. Participants were shown 14 disposable and 17 non-disposable e-cigarette images that featuring candy, fruit, and candy-fruit flavors. Each image had a paired image with "icy" word descriptions for disposable devices (e.g., blue razz vs. blue razz ice) or "icy" backgrounds for sweet flavors (e.g., candy vs. candy-cooling) to highlight the differences. After viewing each image randomly, the participants rated overall liking with the question "How much do you like this product that is pictured?" and intention to use in the future with the question "How likely will you try this product that is pictured in the future?" using a four-point scale (1-4, 4=higher liking/likelihood to use). Linear mixed models with fixed effects (flavor, cooling condition, and their interactions) were used for data analysis, reporting differences in least square means (LSM_{diff}). **Results:** Of the 59 susceptible individuals, with an average age of 16.3 (SD=1.3), 86.4% enrolled in high school, 59.3% were female, 61.0% were White, and 15.3% were Hispanic. Participants reported higher overall liking (LSM_{diff}=0.12, 95% CI: 0.05-0.19; p=0.002) and likelihood to use (LSM_{diff}=0.07, 95% CI: 0.01-0.13; p=0.03) when exposed to disposable images without icy conditions compared to the paired images with icy conditions. However, no significant differences were observed between the sweet flavors in non-disposable e-cigarette images with and without an "icy" background for overall liking (p=0.96) and likelihood to use (candy: p=0.09; fruit: p=0.15; candy-fruit: p=0.12). **Conclusions:** "Icy" images when combined with candy/fruit flavors did not increase liking or likelihood to use when compared with candy/fruit flavors alone among youth susceptible to e-cigarette use. This implies that advertisements incorporating "icy" images in e-cigarettes may not impact liking and use intentions among susceptible youth. Further investigation is needed to understand this association better and formulate appropriate policy responses.

FUNDING: Federal

POS3-133

BREASTFEEDING OUTCOMES ASSOCIATED WITH CHANGES IN E-CIGARETTE AND CIGARETTE USE DURING PREGNANCY

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Significance: Electronic cigarettes (E-cigarettes) have been increasingly used by pregnant women. We examined the associations between changes in e-cigarette and cigarette use during pregnancy and breastfeeding practices. **Methods:** We analyzed data from 206,080 U.S. women in Phase 8 of the Pregnancy Risk Assessment Monitoring System (2016-2020). They reported e-cigarette and cigarette use during the 3 months before pregnancy and the last 3 months of pregnancy. They also reported breastfeeding initiation and breastfeeding at 2 months postpartum. We used multivariable logistic regression models to estimate associations between changes in e-cigarette/cigarette use during pregnancy (e.g., discontinuation, switching, starting, and continuation) and breastfeeding practices, adjusting for socio-demographic and pregnancy confounders. **Results:** Before pregnancy, 81.4% were non-users, 1.5% were (exclusive) e-cigarette users, 14.2% were (exclusive) cigarette smokers, and 2.8% were dual users. Among e-cigarette users, those who stopped e-cigarettes during pregnancy were more likely to breastfeed at 2 months than continuous cigarette users (63.4% vs. 53.4%; confounder-adjusted odds ratio, 1.54 [95% confidence interval, 1.12-2.11]), although they were still less likely than non-users (63.4% vs. 71.6%; 0.86 [0.74-0.99]). Similarly, among cigarette users, those who stopped cigarettes during pregnancy were more likely to breastfeed at 2 months than continuous users (55.6% vs. 37.4%; 2.10 [1.93-2.28]). Women who completely switched from cigarettes to e-cigarettes had a much greater breastfeeding rate than continuous cigarette users (64.8% vs. 37.4%; 3.08 [1.72-5.50]), but women who



partially switched to e-cigarettes (new dual users) had a breastfeeding rate at 2 months close to continuous cigarette users (45.0% vs. 37.4%; 1.37[0.91-2.06]). Among dual users, those who quit both cigarette and cigarette use during pregnancy were more likely to breastfeed at 2 months than continuous dual users (61.0% vs 37.9%; 2.56[2.02-3.25]). Results on breastfeeding initiation were similar to those on 2-month breastfeeding. **Conclusion:** Quitting e-cigarettes and/or cigarettes is associated with higher breastfeeding rates. Completely switching from cigarettes to e-cigarettes also correlates with improved breastfeeding.

FUNDING: Federal

POS3-134

THE IMPACT OF A MENTHOL CIGARETTE BAN AND E-CIGARETTE FLAVOR RESTRICTIONS ON PRODUCT PURCHASING AMONG BLACK/AFRICAN AMERICAN AND WHITE SMOKERS: AN EXPERIMENTAL TOBACCO MARKETPLACE STUDY

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Background: If menthol cigarettes are banned in the US, menthol smokers may switch to other tobacco products. Concurrent tobacco control policies, like e-cigarette flavor restrictions, could impact product purchasing within the context of a menthol cigarette ban. Thus, we examined product purchasing when simulating a menthol cigarette ban and e-cigarette flavor restrictions using the Experimental Tobacco Marketplace (ETM), enrolling Black/African American (B/AA) and white menthol smokers. **Methods:** Menthol smokers (N=50; 66% B/AA; 54% Female; Mage=44.9) completed the ETM task in four visits. The ETM included menthol and non-menthol cigarettes, e-cigarettes, and nicotine gum to purchase. Across 9 shopping trips, the price of menthol cigarettes increased while other prices stayed constant. The 10th shopping trip did not include menthol cigarettes, simulating a ban. Across visits, we manipulated e-cigarette flavor availability - C1: fruit/dessert/mint/menthol/tobacco; C2: mint/menthol/tobacco; C3: menthol/tobacco; and C4: tobacco. Repeated-measures ANOVA compared the amount of non-menthol cigarettes, e-cigarettes, and nicotine gum purchased during the 10th trip in mg of nicotine with race as a covariate. Cross-price elasticities (i.e., slope of linear regression line) measured substitution for menthol cigarettes. **Results:** No significant main effects of condition or interactions by race were observed for non-menthol cigarette or nicotine gum purchasing. However, we found a significant interaction for e-cigarette purchasing. White participants purchased less e-liquid when only tobacco flavors (C4) were available vs when all flavors (C1) were available (M=35.0 vs 97.3 mg) relative to purchasing by B/AA participants (M=73.6 vs 98.3 mg), $p=0.02$. In all conditions, non-menthol cigarettes (C1: $\beta=0.31$; C2: $\beta=0.35$; C3: $\beta=0.31$; C4: $\beta=0.36$ $p's<0.01$) and e-cigarettes (C1: $\beta=0.16$; C2: $\beta=0.21$; C3: $\beta=0.29$; C4: $\beta=0.37$, $p's<0.01$) substituted for menthol cigarettes. Nicotine gum substituted for menthol cigarettes in three conditions overall (C1: $\beta=0.19$; C2: $\beta=0.10$; C4: $\beta=0.11$, $p's<0.01$) and in two conditions for B/AA participants (C1: $\beta=0.23$; C2: $\beta=0.15$, $p's<0.01$). **Conclusions:** A menthol cigarette ban could result in greater substitution of non-menthol cigarettes and e-cigarettes than nicotine gum, especially for B/AA smokers. Tobacco-only flavor restrictions could reduce the likelihood of switching to e-cigarettes, a potentially less harmful product, by white menthol smokers.

FUNDING: Federal

POS3-135

THE EFFECTS OF CIGARILLO WARNINGS ON CIGARILLO DEMAND AND ALTERNATE PRODUCT PURCHASING IN THE EXPERIMENTAL TOBACCO MARKETPLACE

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Background: Warnings are an effective policy intervention to educate consumers about product harms, but there is little research on cigarillo warnings. This study used the Experimental Tobacco Marketplace (ETM) to model whether pictorial cigarillo warnings are more effective than text-only warnings for reducing cigarillo and alternative product purchasing. **Methods:** We surveyed a national sample of US adults ages 21-35 who reported weekly cigarillo smoking in the past month and randomized them to one of three experimental conditions: pictorial, proposed FDA text (larger text + new statements), and current Surgeon General text warnings. Participants completed six shopping trips in a hypothetical ETM that included cigarillos (with assigned warning), cigarettes, and non-combusted products ([NCP]; e-cigarettes, nicotine pouches). We

derived mean milligrams (mg) of nicotine purchased for the products and assessed purchasing by warning condition. We also assessed purchasing by racial identity (Black/African American [B/AA] v other) and blunt use (never, infrequent, frequent). **Results:** Participants (N=1296) were 54.3% female, 47.2% B/AA; mean age 29 (SD=4.2). We found no difference in mean mg of nicotine by condition for all products. By race, B/AA participants purchased more mg of cigarillos (257.4 v 146.4) but less of cigarettes (73.5 v 195) and NCP (71.9 v 145.4) compared to all others, $ps<0.01$. No interaction was observed for condition x race. Frequent blunterners purchased more mg of cigarillos (251.3) compared to infrequent (143.9) or never (122.6) blunterners, $p<0.01$. Infrequent blunterners purchased more mg of NCP (164.2) than did frequent blunterners (86.9), $p<0.01$. Infrequent blunterners also purchased more mg of cigarettes (224) compared to never (99.6) and frequent (120.5) blunterners, $p<0.01$. We observed an interaction of condition x blunt use for mg of cigarettes purchased: infrequent blunterners in the pictorial condition purchased more mg of cigarettes, $p=0.01$. **Conclusions:** This study was the first to assess cigarillo warnings on cigarillo and alternative product purchasing using the ETM. No main effects were found for warning condition, but we found differences by race and blunt use. B/AA participants purchased more cigarillos but fewer cigarettes and NCP. Frequent cigarillo blunterners may not perceive warnings as relevant to the way they use cigarillos. Infrequent cigarillo blunterners may switch to other tobacco products if exposed to product with a pictorial warning.

FUNDING: Federal

POS3-136

AN EXPERIMENTAL TOBACCO MARKETPLACE APPROACH TO DETERMINING CIGARILLO ABUSE LIABILITY AMONG SEXUAL AND GENDER MINORITY WOMEN

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Introduction: Sexual and gender minority (SGM) women have far greater odds of using tobacco products compared to SGM males and heterosexuals. The disparity appears far greater for cigar products, including cigarillos. The aim of the current study was to compare SGM women and cisgender heterosexual (Cis-Het) women on measures of cigarillo and electronic nicotine delivery system (ENDS) abuse liability, or addictive potential, when varied flavor policies were in effect in a purchasing analog, The Experimental Tobacco Marketplace. **Methods:** Young adult (aged 21-28) SGM (n=88) and Cis-Het (n=162) women who reported past week use of 2 or more cigarillos were endowed with an account balance based off weekly tobacco product spending and allowed to purchase any of 12 products in the Experimental Tobacco Marketplace without exceeding their budget. Four purchase conditions were subsequently examined: flavored cigarillos and flavored ENDS available, flavored cigarillos and unflavored ENDS available, unflavored cigarillos and flavored ENDS available, and unflavored cigarillos and unflavored ENDS available. Data were compared across identity group, conditions, and prices with nicotine dependence and budget as covariates using a linear mixed effects repeated measures model. **Results:** The effects of condition and price on cigarillo purchasing were not significant though there was a decreasing trend as cigarillo price increased and more purchases in the cigarillo flavor availability conditions. There were significant interactions for SGM identity and budget on cigarillo purchasing, $F(1, 1079.414) = 6.655$, $p = .015$. When evaluating substitution profiles, there were significant differences by SGM identity. ENDS, both flavored and unflavored, functioned as complements for cigarillos in that purchasing decreased as cigarillo price increased. SGM women purchased more ENDS products (M=131.027, SEM=2.904) than Cis-Het women (M=108.127, SEM = 3.990; $F(1, 1713.314) = 49.752$, $p < .001$). For other potential substitutes, SGM women purchased significantly more than Cis-Het women. **Conclusions:** Abuse liability for cigarillos is greater among SGM women than Cis-Het women, and substitution of ENDS and other nicotine/tobacco products varies by SGM identity. Policy targeted toward sexual and gender minority women on flavor availability of cigarillos, could decrease the disparity.

FUNDING: Federal

POS3-137

YOUNG ADULT PERSPECTIVES ON SUPPORT FOR E-CIGARETTE QUITTING: CONSIDERATIONS FOR QUIT METHODS AND MODALITIES

Emma Brett. University of Chicago.

Significance: E-cigarettes are the most commonly used tobacco product in young people, with a large portion of users reporting interest in and difficulty with quitting vaping. Despite this, there are few effective treatment programs available. The current study



employed online focus groups in a mixed methods approach to understand perspectives on quitting vaping among young adults who vary on motivation to change their e-cigarette use. **Methods:** Young adult e-cigarette and dual (cigarette+e-cigarette) users (N=30) were recruited via social media platforms across numerous U.S. metropolitan areas to participate in a 90-minute focus group. Participants (48% female, 44% Black, 32% white, Mage=22.7) vaped on an average of 5.3 days per week and showed moderate e-cigarette dependence (M=11.7, SD=4.5). Over half the sample (56%) reported a history of cigarette smoking, and 20% reported weekly smoking. Each of the four focus groups followed a semi-structured guide on topics related to treatment modalities (e.g., mobile, in-person) and content (e.g., health information, peer support). The sessions were recorded, transcribed, and coded by two independent raters to identify themes. A post-interview survey assessed prior quit reasons, methods, and motivation to change vaping. **Results:** Participants reported an average score of 5.7/10 on motivation to change vaping. They also reported varied quit methods in past quit attempts, including cutting down on vaping prior to quitting (37%) and stopping cold turkey (23%). They endorsed a range of reasons for prior quit attempts, including health (33%) and freedom from addiction (17%). Participants were receptive to mobile health approaches but stressed the importance of personalized and customizable (e.g., setting their own quit day, specifying combustible smoking goals) and interactive components (e.g., peer support, chat features). They also stated preference for behavioral skills, such as deep breathing or substitution strategies. Use of pharmacotherapy received mixed support, with some expressing a hesitancy due to accessibility, cost, or concerns about discretion. **Conclusions:** Young adults (both motivated and ambivalent), demonstrated interest in interventions to help them quit or reduce e-cigarette vaping. Personalized approaches may increase engagement in interventions and success in quitting or reducing e-cigarette use.

FUNDING: Federal



This year, we received a large number of submissions which do not present empirical findings, but which the SRNT 2024 Program Committee Co-Chairs think would be of great value and interest to the SRNT audience. As a result, we have introduced a new area to our poster sessions for “Commentary Posters” which we think will educate, inform, and/or promote conversation. Enjoy!



COM3-1

UNDERSTANDING CONSUMER SURPLUS: MOVING TOWARDS "UNBIASED DEMAND"?

Patricia S. Hall. U.S. Food & Drug Administration, Silver Spring, MD, USA.

The concept of consumer surplus, or consumer utility, for smokers is premised on the assumptions that smokers are rational or unbiased in their decision-making about smoking, fully informed about risks associated with smoking, and derive benefit from smoking above the price they pay. However, these products are highly addictive and that presents a challenge for these assumptions of rationality. This addiction almost always starts during adolescence when the brain is not yet fully developed. Given these and many other issues, including those raised by behavioral economists such as time inconsistency, there is a lack of consensus in the economic literature regarding how to account for policy-associated changes in consumer surplus. Some economists suggest considering the highly-educated, adult initiator smokers as the only "rational smokers" for whom consumer surplus loss associated with regulation should be considered, raising possible equity issues with the "rationality" approach. An alternative method based on an "unbiased" demand framework may aid our understanding of changes in consumer surplus in the case of nicotine regulation. Minimally addictive tobacco products may be a way of shifting smokers from "biased" (addicted demand) toward "unbiased" or non-addicted demand. This presentation discusses questions that need to be answered for a potential path forward in consumer surplus estimation. Can a shift in consumption toward "unbiased" demand improve the welfare of users who quit as a result of a policy? What about those who switch to other tobacco products? Can an estimate of demand for those who continue to smoke after a nicotine reduction policy be used to estimate "unbiased" demand? Could estimates of withdrawal costs be used as a rough estimation of consumer surplus loss regardless of changes in smoking behavior? While a nicotine reduction policy addresses product addictiveness, there are several factors that complicate the measurement of expected utility changes. These include youth experimentation, the developing nature of public awareness of information about the health harms of tobacco use, and tobacco product demand based on demand for other perceived benefits such as peer acceptance. This discussion will help in understanding the complexities of estimating consumer surplus in the tobacco marketplace.

FUNDING: Unfunded

COM3-2

THE BEGINNING OF THE END: GLOBAL PROGRESS IN TOBACCO ENDGAME

Chris Bostic. Action on Smoking and Health, Washington, DC, USA.

The concept of tobacco endgame - defined here as policies that will lead to a complete ban on the sale of smoked tobacco products - has captured the imagination of the public health community. What was once nearly considered lunacy has become mainstream, with dozens of published articles and inclusion in most professional conferences dealing with tobacco. While only a few jurisdictions have endgame policies in place and implemented, these are reflective of a much larger movement working behind the scenes to build political will. This session will review progress in the passage of endgame policies, discuss the groundswell of support among health professionals and the general public, and shine a light on ongoing challenges and opportunities.

FUNDING: Unfunded

COM3-3

A U.S./FRANCE JOINT ROADMAP: SHARED CHALLENGES AND OPPORTUNITIES IN TOBACCO CONTROL

Jerome Foucaud¹, Carolyn Reyes-Guzman², Rachel Grana Mayne², Anne-Fleur Guillemin¹, Mark Parascandola², David Dean, Jr.², Amanda Klein³. ¹French National Cancer Institute (INCa), Boulogne Billancourt, France, ²National Cancer Institute, Bethesda, MD, USA, ³Stratigix Management, Washington, DC, USA.

Significance: Although there has been progress in tobacco control over the past several decades in the U.S. and France, smoking rates remain high, particularly in France (25.5%) and to a lesser extent in the US (14.0%). In both countries, these rates are more pronounced in certain populations, including those with low socioeconomic status and persons with mental health conditions and substance use disorders, while use of multiple tobacco products (MTP) (e.g., e-cigarettes, hookah) has become more common. Substantial research gaps remain regarding effective prevention approaches

and treatment of tobacco use in populations most burdened by tobacco. The French National Cancer Institute (INCa) and the U.S. National Cancer Institute (NCI) began a scientific collaboration to define a shared research agenda with respect to preventing and treating tobacco use in these priority populations and to create a cross-disciplinary partnership of U.S. and European scientists to advance innovative tobacco control strategies. Methods: INCa and NCI staff produced a white paper outlining the state of the science with respect to three domains: 1) tobacco use and co-behaviors; 2) tobacco use among health disparity populations, 3) MTP use. In November 2022, we convened a working group of 34 American and European researchers with tobacco prevention, treatment and/or policy expertise to present their research and discuss shared research gaps and priorities in these three domains. Members of the working group, along with INCa and NCI scientists, have continued to advance this work, and the two Institutes will present the results of this work together at the conference. Results: The collective reflections led to the development of a scientific roadmap of shared research priorities, including rapid surveillance of products, use behaviors, and establishing a global framework for sharing those data; common measures of tobacco product use and other substance use to facilitate understanding of dual and polyuse; approaches for "whole person care" and addressing tobacco use alongside other substance use and mental health issues; and strategies to improve reach and engagement with interventions in populations that experience health disparities. Conclusion: This collaborative roadmap presents a framework for a shared tobacco control research agenda and provides guidelines for other funding agencies and organizations to encourage and strengthen scientific cross-national collaborations. Going forward, cross-national collaboration to address common challenges for tobacco control in the U.S. and France can support future development and testing of innovative interventions and policies.

FUNDING: Federal



 SRNT₂₀₂₄

POSTER SESSION 4



POS4-1

CESSATION CONTINUUM AND TYPE OF CIGARETTE SMOKING IN LONGITUDINAL STUDY OF U.S. ADULTS WHO SMOKE CIGARETTES WITH OR WITHOUT OTHER TOBACCO PRODUCTS

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Significance: This study aims to describe proportions of U.S. adults, aged ≥ 18 years, who smoke on the smoking cessation continuum and identify characteristics associated with progression towards success, i.e. having tried to quit in past 12 months and interested in quitting (tried/interested). **Methods:** Population Assessment of Tobacco and Health (PATH) study wave 1-5 adult data were used. Sample (N=8,549) included those who have smoked 100 cigarettes in lifetime and currently smoked cigarettes and had information on their interest in quitting and past 12 month quit attempts. Two items were used to generate the cessation continuum: reporting trying to quit in past 12 months and interest in quitting (1, not interested at all vs. 2-10 interested). The cessation continuum consisted of four levels (categories) of use behavior: 0: not tried to quit/not interested, 1: not tried/interested, 2: tried/not interested, and 3: tried/interested. Type of cigarette use included cigarettes only, dual cigarettes+cigars, dual cigarettes+electronic cigarettes (ECIG), cigarettes+smokeless, and poly tobacco. Nicotine dependence (ND) was based on responses to 16 items. Weighted multivariable logistic regression was constructed to determine association of tried/interested and type of cigarette smoking adjusting for demographic characteristics, assistance in quitting, ND, and perceived mental health and quality of life. **Results:** At Wave 5, overall, 9.8% were not tried/not interested, 35.2% tried/not interested, 2.7% tried/interested, and 52.2% tried/interested. After controlling for demographic and other factors, cessation continuum varied significantly by type of cigarette smoking. Higher proportion of adults with dual cigarettes+ECIG use than those who only use cigarettes, reported tried/interested (61% vs. 51%). Black non-Hispanic (60.3%), compared to White non-Hispanic (50.2%), were more likely to report tried/interested ($p < 0.0001$). Higher income was associated with having tried/interested. ND (OR: 1.2, 95% CI: 1.1, 1.3) and use of assistance strategies when attempting to quit (OR: 4.0, 95% CI: 3.1, 5.2) were positively associated with tried/interested. **Conclusion:** Findings revealed demographic and other differences in the cessation components of this continuum. Half of the adults who smoke have tried to quit in past year and are interested in quitting.

FUNDING: Federal

POS4-2

DIFFERENCES IN DEPRESSION, ANXIETY, AND STRESS SUBSCALE SCORES BY CURRENT E-CIGARETTE USE AMONG A YOUTH AND YOUNG ADULT SAMPLE

Elizabeth K. Do, Shreya Tulsiani, Tyler Minter, Elizabeth C. Hair. Truth Initiative, Washington, DC, USA.

Significance: Youth and young adults report higher rates of e-cigarette use and symptoms of depression and anxiety, relative to other age groups. This study examines how symptoms of depression, anxiety, and stress differ according to reported current e-cigarette use. **Methods:** Data were obtained from Wave 12 of the Truth Longitudinal Cohort, a longitudinal sample of youth and young adults aged 15-24 ($n=1,667$). Participants reported on their past 30-day e-cigarette use, with use on at least 1 day of the past 30 indicating current e-cigarette use, and depression, anxiety, and stress scores using the 21-item Depression, Anxiety, and Stress Scale (DASS-21). Differences in depression, anxiety, and stress subscale scores by current e-cigarette use status were determined using t-tests. **Results:** Depression (mean = 8.9 vs. 7.7, p -value = 0.03) and anxiety scores (mean = 7.4 vs. 6.1, p -value = 0.01) were higher among those who reported current e-cigarette use, relative to those who did not use e-cigarettes in the past 30 days. There were no statistically significant differences for stress scores, in relation to current e-cigarette use. **Discussion:** Results indicate that current e-cigarette users scored higher on depression and anxiety, relative to those who did not report e-cigarette use in the past 30 days. Findings suggest the need to screen young adults for depression, anxiety, and e-cigarette use, in efforts to facilitate early detection and timely interventions for at-risk youth and young adults.

FUNDING: Unfunded

POS4-3

EFFECTS OF PRENATAL ELECTRONIC NICOTINE DELIVERY SYSTEM (ENDS) AEROSOL EXPOSURE ON IMPULSIVE BEHAVIOR IN RATS

Mark G. LeSage, Sarah Wilde, Andrew C. Harris. Hennepin Healthcare Research Institute, Minneapolis, MN, USA.

Use of electronic nicotine delivery systems (ENDS) in pregnant women is increasing. Cigarette smoking during pregnancy has well-established long-term developmental consequences in offspring, including increased risk of tobacco use disorder and impulsivity-related disorders such as attention deficit hyperactivity disorder (ADHD). These adverse effects are generally attributed to nicotine, but other toxicants in tobacco smoke may also play a role. Although ENDS contain lower levels of many of those toxicants, they can deliver as much or more nicotine as combustible cigarettes and contain chemicals that are relatively low or absent in cigarette smoke (e.g., propylene glycol). ENDS use during pregnancy may therefore pose many of the same risks as smoking, or could present unique risks. Although some animal studies of prenatal ENDS exposure have demonstrated adverse behavioral effects in offspring, none have studied impulsive behavior, a key facet of ADHD. The purpose of the present study was to establish a clinically relevant model of prenatal ENDS exposure and examine its effects on impulsivity in early adult offspring. Pregnant female rats were exposed to room air ($N=4$) or ENDS aerosol ($N=4$) from gestational day 1 to birth. Daily ENDS exposures were 100 3-sec (75 ml) puffs from an ENDS containing commercial e-liquid (18 mg/ml nicotine) delivered over 5 hr. Beginning on postnatal day 55, premature responding (impulsive action) was examined in offspring (2/sex/litter) under a differential-reinforcement-of-low-rate (DRL) schedule of food delivery over a range of DRL intervals (5-20 sec). Effects of s.c. nicotine (0 - 0.4 mg/kg) were then evaluated under DRL 20 sec. ENDS exposure produced clinically-relevant maternal serum nicotine levels (mean 23 ± 3.3 ng/ml) throughout pregnancy. Premature responding at stability did not differ between groups at any interval. However, female ENDS-exposed rats showed higher premature responding during initial transition to DRL 10 ($p < 0.05$) but not 20 sec. Nicotine increased premature responding at a lower dose (0.1 mg/kg) in ENDS-exposed rats compared to controls ($p < 0.05$). This study establishes a clinically-relevant model of maternal ENDS use during pregnancy and suggests that prenatal ENDS exposure can increase sensitivity to nicotine's impulsivity-related effects. These findings extend the current breadth of adverse effects of prenatal ENDS exposure in animal models and the potential risks of ENDS use during pregnancy in humans.

FUNDING: Federal; Other

POS4-4

INTEGRATIVE ANALYSIS OF GENETICS, EPIGENETICS AND RNA EXPRESSION DATA REVEAL THREE SUSCEPTIBILITY LOCI FOR NICOTINE DEPENDENCE IN CHINESE HAN POPULATION

Ming D. Li, Qiang Liu, Ying Mao, Zhongli Yang. Zhejiang University, Hangzhou, China.

Introduction: Despite numerous studies demonstrate that genetics and epigenetics factors play important roles on nicotine dependence (ND), our understanding of their functional relevance and coordinated regulation remains largely unknown. Here we present a multiomics study on ND for Chinese smoker population with the goal of not only identifying ND-associated functional variants but also deciphering the pathogenesis and mechanism underlying ND. **Methods and Results:** After whole-genome sequencing analysis of 1,329 Chinese Han male samples in discovery phase and OpenArray analysis of 3,744 samples in replication phase, we discovered that three novel variants located in *FOXP1* (rs7635815) and intergenic region between *DGCR6* and *RPODH* (rs796774020) and between *ARVCF* and *COMT* (rs148582811) were significantly associated with ND. Subsequently cis-mQTL and cis-eQTL analysis indicated that these variants correlated significantly with the differential methylation regions (DMRs) or differential expressed genes (DEGs) located in the areas where these variants are located. **Conclusion:** Our *in silico* multiomics analysis highlighted several hub genes, like *DRD2*, *PTPRD*, *FOXP1*, *COMT*, *CTNNA2*, to be synergistic regulated each other in the etiology of ND.

FUNDING: Federal; Academic Institution



POS4-5

RACE DIFFERENCES IN THE EFFECT OF OBESITY ON INFLAMMATION AMONG BLACK AND WHITE OLDER ADULTS WHO QUIT SMOKING

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Background: Compared to non-Hispanic White adults, Black adults have been shown to have persistently elevated levels of C-reactive protein (CRP), a biomarker of systemic inflammation and predictor of chronic disease development. CRP is closely associated with tobacco use, with smoking cessation resulting in decreases in CRP. Race differences in CRP have been attributed to higher body mass index (BMI); however, few studies have examined these differences longitudinally or in the context of smoking cessation. We sought to understand how longitudinal changes in obesity are associated with changes in CRP in a sample of Black and White older adults who formerly smoked. **Methods:** Data were drawn from the US nationally representative, longitudinal Health and Retirement Study of adults aged 51 and older. To control for the effects of social disadvantage, non-Hispanic Black (NHB) and White (NHW) participants who had quit smoking were matched on demographic, socioeconomic, and behavioral factors using propensity score analysis. Smoking history and demographics were self-reported; CRP (log-transformed), waist circumference, body weight, and BMI were assessed at three time points (2006, 2010, and 2014). Three independent linear mixed models were run to examine race differences in the effects of time-varying obesity (centered) on CRP change. **Results:** There were no differences in baseline characteristics between NHB (n=146) and NHW (n=245) participants, except for diabetes diagnosis (47% NHB vs. 22% NHW). Unconditional model results revealed significant declines in CRP over the eight-year period [$\beta = -0.23$ (SE=0.04), $p < .0001$], but no racial differences. Waist circumference, weight, and BMI positively predicted baseline CRP levels; however, only weight was associated with CRP change [$\beta = -0.002$ (SE=0.001), $p < .001$]. **Discussion:** In our matched sample, there were no differences in CRP decline among NHB and NHW older adults, and only body weight was associated with a lessened decline over time. Results suggest that observed differences in CRP among older adults who formerly smoked are likely influenced by social disadvantage, which is also directly linked to obesity. Future studies should examine how the type or storage of adiposity may impact inflammation following smoking cessation.

FUNDING: Federal

POS4-6

INDICATORS OF VAPING DEPENDENCE AND COMPARISONS WITH SMOKING: TRENDS BETWEEN 2017 AND 2022 AMONG YOUTH IN CANADA, ENGLAND, AND THE UNITED STATES.

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Significance. To date, most studies have examined nicotine dependence among current or former adult smokers. In addition, some studies find that people who regularly vape e-cigarettes also exhibit many of the core indicators of dependence as people who smoke tobacco. The current analysis examines trends in indicators of dependence among youth who vape and youth who smoke between 2017 and 2022, a period of rapid evolution in the e-cigarette market, characterized by a shift towards products with salt-based nicotine e-liquids and higher nicotine concentrations. **Methods.** Repeat cross-sectional data were analyzed from national online surveys of youth aged 16-19 in Canada, England, and the USA conducted between 2017 and 2022. Participants were 17,063 respondents who vaped and/or smoked in the past 30 days. Four dependence indicators were assessed for smoking and vaping (perceived addiction, frequent strong urges, time to first use after waking, days used in past month) and two for vaping only (use events per day, E-cigarette Dependence Scale). Regression models examined differences by survey wave and country, adjusting for sex, age, race, and exclusive/dual use. **Results.** Among youth who vaped in the past 30 days, all vaping dependence indicators increased between 2017 and 2022 ($p < .001$ for all). For example, more youth reported strong urges to vape 'at least most days' in 2022 than in 2017 (Canada: 26.5% to 53.4%, AOR 3.95, 95% CI 2.83-5.53; England: 25.5% to 45.4%, AOR 2.70, 2.00-3.64; USA: 31.6% to 50.3%, AOR 2.96, 2.16-4.06). In 2017, indicators of dependence for vaping were substantially lower than for smoking; however, in 2022, some dependence indicators were stronger for vaping versus smoking, including days used in past month (Canada,

USA), strong urges (Canada, USA), and time to first use (all countries). **Conclusion.** From 2017 to 2022, indicators of vaping dependence increased substantially among youth who vaped in the past month. By 2022, vaping dependence indicators were similar to or greater than those for smoking. **Learning objective 1.** To examine patterns of e-cigarette dependence over time. **Learning objective 2.** To compare levels of nicotine dependence between e-cigarettes and conventional cigarettes. **Learning objective 3.** To explore differences in indicators of nicotine dependence between youth in Canada, England and the US.

FUNDING: Federal; Academic Institution

POS4-7

MACHINE GENERATED TNCO LEVELS OVER A RANGE OF FILTER VENTILATION IN ISO AND MODIFIED CANADIAN INTENSE SMOKING REGIMES

Mollie Miller¹, Emma Sutherland¹, Carson Smith², Cheryl Triplett², Stephanie Daniels¹, Rachele Moore¹, Kathy Jackson¹, Eric Backlund², Steven Meredith¹, Wallace Pickworth².
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Significance: Although filter-ventilated cigarettes dominate the market, ventilation's impact on mainstream smoke constituents and consumers' smoking behavior remains unclear. Further, some researchers have linked filter ventilation in combusted cigarettes with lung adenocarcinomas. Combusted cigarette filter ventilation acts to dilute mainstream smoke when ambient air is drawn through very small holes around the cigarette filter. Among commercial cigarettes, ventilation levels vary between 0 and 80%. This study sought to investigate how cigarette filter ventilation impacts harmful and potentially harmful constituent (HPHC) yield and user behavior. **Methods:** Small holes were added to the filters of commercial, non-menthol, unventilated cigarettes to achieve 0, 10, 20, 40 and 60% ventilation levels that were machine-validated. The cigarettes were subsequently machine-smoked under ISO (35 ml, 2 sec duration, every 60 sec) or modified Canada Intense (mCI) (55 ml, 2 sec duration, every 30 sec) conditions. **Results:** Levels of tar, nicotine, and carbon monoxide (TNCO) were reduced linearly with increasing ventilation. Further, mCI levels of TNCO were always greater than ISO levels across all levels of ventilation. However, the percent difference was not constant. For example, nicotine yields (ISO) were 1.0 mg at 0% ventilation and 0.5 mg at 60% ventilation—a 50% decrease; nicotine (mCI) yields were 2.1 mg at 0% ventilation and 1.5 mg at 60% ventilation—a 29% decrease. **Conclusions:** These data provide assurance that laboratory-produced ventilated cigarettes produce orderly and expected decreases in TNCO yield. They also indicate that smoking intensity may diminish the expected TNCO reduction associated with filter ventilation. The amended cigarettes discussed here were tested for other HPHCs using machine-smoking methods and will be used in a clinical abuse liability study. **Regulatory implications:** These data can help elucidate how different cigarette characteristics may affect use behavior and subsequent toxicant exposure. As such, findings from this project could inform CTP application review of design changes in existing products or proposed new products. **Disclaimer:** This presentation is not a formal dissemination of information by FDA and does not represent Agency position or policy.

FUNDING: Federal

POS4-8

THE IMPACT OF AN INCENTIVE-BASED SMOKING CESSATION INTERVENTION AMONG MINORITIZED AND VULNERABLE ADULTS

Motolani E. Ogunsanya¹, Summer G. Frank-Pearce¹, Michael S. Businelle¹, Adam C. Alexander¹, Laili K. Boozary¹, Munjireen Sifat², David Wetter³, Darla E. Kendzor¹. ¹University of Oklahoma Health Sciences Center, Oklahoma City, OK, USA, ²Thomas Jefferson University, Philadelphia, PA, USA, ³University of UT, Salt Lake City, UT, USA.

Background: Although smoking rates have declined overall in the U.S., disparities in smoking cessation persist in several populations. This study aimed to evaluate the efficacy of an incentive-based smoking cessation intervention among vulnerable subgroups of adults who participated in a smoking cessation treatment trial. **Methods:** Participants were socioeconomically disadvantaged adults enrolled in a randomized controlled trial of usual care (counseling and pharmacotherapy) plus financial incentives (UC+FI) for smoking cessation versus UC alone. Four subgroups from the parent project were examined: racially/ethnically minoritized (including Blacks) individuals (n=126), Blacks (n=82), females (n=202), and individuals with depression (n=175). Incentives were earned for initial abstinence on the scheduled quit date (\$20), and this amount increased by \$5 per successive abstinent visit through 4 weeks post-quit (up to \$150), with \$50 incentives for abstinence at 8 and 12 weeks post-quit. Baseline (pre-quit) demographic and tobacco use characteristics (including the Heaviness of Smoking Index [HSI]) were



assessed. Baseline depression was measured using the Center for Epidemiological Studies-Depression scale (score >10 indicated depression). Biochemically-verified 7-day point prevalence smoking status was assessed at primary follow-ups (post-quit weeks 4, 8, 12, and 26). An autoregressive covariance structure was used to model the impact of the treatment group on repeated abstinence measurements within each subgroup. All models adjusted for covariates including gender, education, HSI, race/ethnicity, age, and time (where appropriate). **Results:** Participant demographics were largely similar across the subgroups, with a few exceptions. Descriptively, compared to the other subgroups, a higher proportion of females identified as sexual/gender minoritized, reported high smoking dependence (HSI >4), and had Medicaid insurance. Covariate adjusted analyses indicated that those assigned to UC+FI had significantly greater odds of achieving abstinence across follow-ups compared to those assigned to UC alone within each subgroup: racially/ethnically minoritized (OR=4.64, $p=0.0005$), Black (OR=2.98, $p=0.0493$), female (OR=2.37, $p=0.002$), and those experiencing elevated depressive symptoms (OR=4.66, $p<0.001$). **Conclusion:** Findings support the efficacy of incentive-based interventions for smoking cessation within minoritized and vulnerable populations. Plausibly, incentive-based smoking cessation interventions may be employed to address smoking-related health disparities and promote health equity.

FUNDING: Federal; State; Academic Institution

POS4-9

ASSOCIATION OF NON-DAILY HOOKAH TOBACCO SMOKING AND CARDIOVASCULAR DISEASE-RELATED EXPOSURE BIOMARKERS AMONG U.S. USERS: THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH STUDY

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Significance: Hookah smoking has grown to become a global tobacco epidemic. While cigarette smoking is a well-established cardiovascular disease (CVD) risk factor, the CVD risks of hookah smoking are unknown, particularly among regular U.S. adult hookah users who are predominantly non-daily users. Methods: We examined the association between hookah smoking and biomarkers of CVD risk among regular exclusive hookah smokers ($n=75$), compared to regular exclusive cigarette smokers ($n=1773$), dual hookah and cigarette smokers ($n=43$) and never tobacco users ($n=757$), using data from a nationally representative sample of adults from the Population Assessment of Tobacco and Health Study (2013-2014). Results: Whereas 84% of cigarette smokers reported daily use, only 8% of hookah smokers reported daily use, with more than a third reporting monthly use. Adjusting for age and sex and as compared to exclusive cigarette smokers, exclusive hookah smokers had significantly lower geometric mean concentrations in serum sICAM-1 and urinary F2-isoprostane ($p<0.05$). Although not statistically significant, a signal of increased oxidative stress was observed among hookah smokers as compared to never tobacco users (urinary F2-isoprostane). Conclusions: CVD-related harm biomarkers appear to be lower among hookah smokers than cigarette smokers. These findings represent patterns of hookah smoking predominantly shared among adult U.S. users who report non-daily occasional use and do not reflect solitary, daily use as is common in the Middle East. Future studies with longer exposure and longitudinal hookah use are warranted to explore the association between hookah smoking and CVD risk.

FUNDING: Federal

POS4-10

THE NEED FOR EQUITABLE TREATMENT WITH SMOKING CESSATION ADVICE AMONG SMOKERS WITH AND WITHOUT CHRONIC DISEASE(S) IN CALIFORNIA'S MEDICAID PROGRAM

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Introduction: Previous research has demonstrated that having a chronic disease and more frequent office visits were associated with receiving more smoking cessation advice from health professionals for Latinos covered by California's low-income public insurance (Medi-Cal). This study aims to compare health professional smoking cessation advice and assistance among all smokers with and without chronic disease(s) in Medi-Cal, as Medi-Cal transforms for improved population health on select health topics. **Methods:** This repeated cross-sectional study was conducted with the 2014 and 2016-2018 California Health Interview Survey. A total of 3,517 current smokers (age ≥ 18) who had Medi-Cal insurance and consulted a health professional in the past 12 months with or without a chronic disease were included. Chronic disease(s) was defined

as the diagnosis of at least one of the following: asthma, diabetes, hypertension, or heart disease. The outcomes were receipt of health professional advice or assistance to quit smoking in the past 12 months. Adjusted logistic regression models were run to examine the association between chronic disease and receipt of smoking cessation advice and assistance. All estimates were weighted to adjust for the complex survey design. **Results:** The population weighted estimate of smokers covered by Medi-Cal is 1,227,154. Over half (51.9%) had at least one chronic disease. Smokers with chronic disease(s) were more likely to receive health professional advice (63.9% vs. 33.7%, $P<.001$) and assistance (37.7% vs. 20.5%, $P<.001$) than those without. In the adjusted models, compared to smokers without chronic disease, smokers with chronic disease were almost twice as likely to receive advice (OR=1.97, 95% CI: 1.39, 2.78), and there was a trend for being 1.5 times as likely to receive assistance (OR=1.50, 95% CI: 0.94, 2.38). The associations for assistance were attenuated after adjusting for the number of office visits. **Conclusions:** Medi-Cal smokers who had a chronic disease had twice the adjusted odds of receiving advice than those who did not report having a chronic disease, even after adjusting for the number of office visits. As half of Medi-Cal smokers do not yet report a chronic disease, this highlights the urgent need for Medi-Cal population health efforts to prioritize equitable smoking cessation treatment to prevent, not just treat, tobacco-related chronic disease and its associated costs.

FUNDING: No external funding reported

POS4-11

COMMUNITY HEALTH WORKERS CAPACITY BUILDING IN TOBACCO CESSATION AMONG WOMEN: RESULTS AND LESSONS LEARNED

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The effectiveness of Community Health Workers (CHWs) participation in the delivery of health promotion interventions has been demonstrated. However, most of these interventions have involved single behaviors (e.g., cancer screening), and there is limited evidence on CHW capacity building to deliver intensive and more complex interventions such as tobacco cessation. The focus of this presentation will be on the development, implementation, and evaluation of a CHW capacity building program to promote acquisition of behavior change knowledge and basic skills to support women in the process of quitting tobacco use. The capacity building program was developed in collaboration with CHWs, patients, health professionals, and delivered using adult education principles. Its effectiveness assessed through a pre- and post-test design including knowledge about tobacco control/cessation and behavior change as well as participants' perception about their knowledge, basic skills and confidence to deliver a tobacco cessation program (Student's t-test). All comparisons between pre- and post-test were significant, indicating knowledge acquisition and improvement of the perceived skills and confidence to support women in tobacco cessation process ($p<0.05$). The results of a group randomized trial demonstrated the effectiveness of the tobacco cessation delivered by CHWs in promoting tobacco cessation among low-income Brazilian women through home visitation. We also learned a number of lessons: (a) The importance of CHWs having the opportunity to practice the required skills during the training period in the natural environment; (b) The need for intense technical assistance and supervision of CHWs beyond initial training; (c) The importance of buy-in and support by the public health system leadership at all levels (state, town, clinic) as well as the CHWs supervisors; (d) The importance of ongoing identification and implementation of positive reinforcement and engagement activities among CHWs (e.g., social events to share successes and challenges, incentives); and (e) Provision of ongoing feedback about the CHWs work as it was important for them to be valued for their expertise and knowledge of the communities they serve to the leadership. The results confirm that CHWs can play an important role in tobacco cessation and the knowledge and skills learned can be generalized to other behaviors (e.g., dengue prevention, breastfeeding).

FUNDING: Federal

POS4-12

USE OF FLAVORED AND MODIFIED RISK SMOKELESS TOBACCO PRODUCTS AMONG AMERICAN INDIAN ADULTS

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Introduction: The US Food and Drug Administration (FDA) banned the sale of flavored cigarettes excluding menthol in 2009 and recently proposed a tobacco product standard that would prohibit menthol as a characterizing flavor in cigarettes. Despite the high prevalence of flavored smokeless tobacco (ST) use, no such consideration is given to



the sale of flavored ST products. FDA has also authorized the marketing of Copenhagen Classic Snuff as a modified risk tobacco product (MRTP). Little is known about the use of MRTP and flavored ST products among American Indians (AI). Aim of this study is to evaluate differences in tobacco use characteristics, ST dependence, and cotinine levels according to the use of flavored products and MRTP among AI ST users. **Methods:** Study was based on cross-sectional data collected from a community-based sample of 120 adult male AI exclusive ST users in Oklahoma. Sociodemographic characteristics, tobacco use behavior, ST dependence, and characteristics of ST products were obtained through phone surveys. Saliva samples were collected to measure cotinine levels. Flavor of ST products was categorized as no flavor (original, natural, or straight) or flavored (mint, wintergreen, or fruit). MRTP users were defined as those who used Copenhagen snuff. Associations of each characteristic of ST product with tobacco use behaviors, cotinine, and ST dependence were evaluated. Odds ratio (OR) and 95% confidence intervals (CI) were calculated. **Results:** The majority of study participants (58.3%) used nonflavored ST products. 86% of the flavored ST product users used wintergreen flavored products. MRTP use was reported by 11.7% of the participants. Flavored product users had significantly lower number of dips per day ($p=0.04$), cotinine levels ($p=0.001$), and severity of dependence ($p=0.03$) compared to nonflavored product users. After adjusting for covariates, users of flavored products had significantly lower cotinine levels compared to nonflavored users (OR: 0.93, 95%CI: 0.87-0.98). MRTP users were significantly older in age ($p=0.024$) and had more years of ST use ($p=0.007$) compared to nonMRTP users. There were no differences between MRTP users and nonMRTP users for cotinine level, level of dependence, and past quit attempts. **Conclusion:** Unlike ST users in the general population, AI ST users have high prevalence of nonflavored ST product use. ST product that is recently granted the MRTP status demonstrated similar ST dependence and exposure to nicotine compared with other ST products.

FUNDING: Academic Institution

POS4-13

GAPS IN SMOKING CESSATION COUNSELING BY HEALTHCARE PROVIDERS TO BIPOC GAY MEN WHO SMOKE DAILY

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Nicotine product use is higher in sexual minorities (SM), Black, Indigenous, and People of Color (BIPOC), and male populations compared to their respective counterparts. Studies show disparities of provision of smoking cessation and harm reduction counseling from healthcare providers to SM and in BIPOC U.S. adults. Moreover, there is a lack of understanding if and how the intersectionality of one's sexual orientation and race/ethnicity may impact this trend. This study aimed to (1) examine experiences of BIPOC gay men in accessing smoking cessation and harm reduction counseling from healthcare providers, (2) understand facilitators and barriers, and (3) identify areas of counseling improvement for healthcare providers. **Methods:** We recruited BIPOC gay men who use cigarettes and/or Electronic Nicotine Delivery Systems daily from community organizations, social media, online forums, and physical flyers to participate in semi-structured one-on-one Zoom interviews. Participants were asked questions about their experiences of receiving smoking cessation or harm reduction counseling from their healthcare providers, how the intersectionality of their identities may have impacted their experiences, if at all, sources of smoking cessation information, and suggestions for improving smoking cessation and harm reduction counseling for BIPOC gay men. Interviews were recorded, transcribed, and de-identified. Using grounded theory and thematic analysis, two trained coders coded the transcripts independently, reconciled their codes until agreement has been reached, developed categories and sub-categories, and examined the relationships between categories to establish themes. **Results:** The following themes were identified from 15 unique interviews: (1) BIPOC gay men receive smoking cessation counseling most commonly through healthcare providers, their community, and advertisements, (2) receiving smoking cessation counseling from health care providers is dependent on the intrapersonal, interpersonal, and structural experiences of BIPOC gay men. Facilitators include positive relationships with their healthcare providers, the cultural humility of the healthcare provider, identity concordance, and accessibility of healthcare, while barriers include insufficient patient education and a fear of the consequences of quitting. (3) Finally, a multimodal approach, including psychosocial support, harm reduction, and practical suggestions may improve counseling provided by healthcare providers to BIPOC gay men. **Discussion:** BIPOC gay men who smoke face unique challenges, necessitating an individualized approach that acknowledges their intersecting experiences with healthcare providers to improve smoking cessation rates. Future studies should evaluate concrete practices and the feasibility of implementing such suggestions into practice.

FUNDING: Federal

POS4-14

OPPORTUNISTIC SMOKING CESSATION INTERVENTIONS AMONG ADULTS AND ADOLESCENTS IN FINANCIAL SUPPORT SETTINGS: A SCOPING REVIEW

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Significance: Tobacco use is expensive and higher among people experiencing socioeconomic disadvantage, thus causing health inequalities and potentially diverting household spending from essential resources. Opportunistic smoking cessation interventions delivered within healthcare settings are effective, but sparse in practice. Financial support services may provide additional avenues for such intervention. **Methods:** A scoping review examining the evidence for opportunistic smoking cessation interventions delivered within financial support settings. Bibliographic database search: March 2023. Studies investigating opportunistic smoking cessation interventions (implemented/hypothetical) within settings offering support for problems caused by financial hardship were eligible. 10% of titles/abstracts (remainder single screened) and all full-texts were screened in duplicate. Data were charted by one reviewer and checked by another. Findings were synthesised narratively. **Results:** We found 25 studies (6 RCTs; 3 service evaluations; 1 experimental; 7 interviews/focus groups; 2 surveys; 6 mixed methods); 16 conducted in the US, 5 Australia and 4 the UK. Eleven were conducted in homeless support services; 4 in women, infant, child programmes; 3 in social services; 2 in social housing; 2 in food banks, and 1 in each of: check cashing, the Salvation Army, and 2-1-1 community support services. Most staff supported opportunistic smoking cessation interventions in financial support settings, but had concerns about lack of resources, conflicting priorities, and some viewed smoking as preventing illicit substance use. Service users welcomed being asked about smoking and offered assistance to quit, but some had concerns about the cost of quitting aids. Four RCTs investigated quitting success. These studies compared less intensive with more intensive smoking cessation interventions. Two found more intensive interventions were more successful in mothers attending women, infant and child groups. Whereas two found no clear evidence of a benefit of more intensive interventions offered in social services and a food bank. In the former there were greater reductions in smoking with more intensive intervention. In the latter only one of 53 participants quit. **Conclusions:** People receiving support for financial hardship welcome opportunistic smoking cessation interventions embedded within financial support services, and service providers generally feel positive about delivering them. So far, RCTs have examined the effects of intervention intensity on quitting success; however, there is little evidence examining the benefits of providing opportunistic smoking cessation interventions versus no smoking cessation intervention in financial support settings. Trials addressing this, and examining improvements in financial wellbeing, as well as cessation, would be beneficial.

FUNDING: Nonprofit grant funding entity

POS4-15

THE IMPACT OF VIOLENCE ON RISK FOR CIGARETTE AND E-CIGARETTE USAGE AMONG RHODE ISLAND HIGH SCHOOL STUDENTS

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Introduction: Adverse childhood events, including forms of violence such as bullying, cyberbullying, domestic violence and sexual violence, may lead to a higher risk of drug use in adolescence. In the current study, we examined the relationship between these forms of violence and past 30-day cigarette or e-cigarette use using data from the 2019 Rhode Island high school Youth Risk Behavior Survey (YRBS). We hypothesized that each type of violence would independently increase the frequency of past 30-day cigarette and e-cigarette use. **Methods:** The 2019 RI YRBS surveyed $n=1,613$ high school students. Each substance use frequency was independently regressed onto each form of violence in a series of quasi-poisson survey weighted models. Analysis was conducted using the "survey" package within R version 4.3.1. **Results:** Among high school students, 4.2% used cigarettes in the past 30 days and 30.1% used e-cigarettes in the past 30 days. Past-year bullying was associated with a 4.9 and 1.8 times increase in the frequency of past-month cigarette and e-cigarette use, respectively. Past-year cyberbullying was associated with a 6.9 and 1.8 times increase in the frequency of cigarette and e-cigarette use, respectively. Past-year intimate partner sexual violence was associated with an 8.5 and 2.3 times increase in past 30-day cigarette and e-cigarette use frequency, respectively. Past-year domestic violence was associated with a 10.5 and 2.3 times increase in past 30-day cigarette and e-cigarette use frequency, respectively. **Conclusions:** Each form of violence was shown to increase frequency of past 30-day cigarette and e-cigarette use independently, with a greater impact on ciga-



rette use frequency compared to e-cigarette use frequency. These results suggest that violence prevention programs may have an additional effect of preventing substance use. Additionally, preventive interventions against substance use targeted at people who have experienced violence in late adolescence may be useful to lower the risk of using cigarettes or e-cigarettes as a coping mechanism.

FUNDING: Federal

POS4-16

DISPARITIES IN HEALTHCARE PROVIDER TOBACCO CESSATION PRACTICES FOR US ADULTS WHO SMOKE: AN EXAMINATION OF PATIENT DEMOGRAPHICS AND SUBSTANCE USE

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Background: Despite the availability of evidence-based smoking cessation treatments, healthcare providers face challenges in effectively reaching adults who use tobacco products during clinic visits. This study aims to assess the extent to which rates of tobacco screening and the receipt of quit advice vary based on patient demographics, substance use, and dependence on substances. **Method:** Data were drawn from a nationally representative sample of US adults (weighted N= 285,029,869) obtained from the 2015-2019 National Survey on Drug Use and Health. Analyses included US adults reporting any tobacco product use (i.e., cigarette, cigar, pipe, and smokeless tobacco) and having at least one healthcare visit in the past year. Weighted prevalence of tobacco screening and receipt of quitting advice at healthcare visits was estimated as a function of sociodemographic characteristics, insurance type, sexual identity, metropolitan area, other substance (i.e., alcohol, cannabis, illicit drugs) use and dependence. Multivariable logistic regression models were employed to identify correlates of tobacco screening and the receipt of quit advice. **Results:** Although the vast majority (83.4%) of US healthcare patients who used tobacco in the past year reported being screened for tobacco use, regression analyses indicated that male, racially or ethnically minoritized, low income, less educated, uninsured, and cannabis dependent patients were less likely to report tobacco use screening. Approximately half (52.2%) of patients reported receiving advice to quit tobacco, and this was less common among male, Non-Hispanic African American, Hispanic, urban resident patients, and those who reported alcohol or cannabis use in the past year. **Conclusions:** There are notable disparities in both tobacco screening and the receipt of tobacco cessation advice among diverse patient groups, with rates generally lower for patients from disadvantaged and racially or ethnically minoritized populations. Substance use and dependence are inconsistently related to tobacco screening and the receipt of quit advice.

FUNDING: Unfunded

POS4-17

ASSOCIATION OF TOBACCO PURCHASING BEHAVIORS WITH TOBACCO USE BY USER GROUPS DURING COVID-19 PANDEMIC: A MIXED METHOD ANALYSIS

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Significance: The study aims to understand the changes in purchasing behaviors and use of Electronic Nicotine Delivery Systems (ENDS) and cigarettes among different tobacco user groups during the COVID-19 pandemic using a mixed methods analytic approach. Previous studies have found that pandemic changed patterns of tobacco use differently for different tobacco user groups. However, little is known about how these tobacco user groups changed their purchasing behaviors. In addition, a mixed methods analysis reveals broader perspectives on factors that are perceived to influence the tobacco purchasing behaviors during pandemic. **Methods:** In October-November 2020, we conducted: 1) a quantitative online survey with a national probability sample of 1,640 US adults (1,080 exclusive cigarette smokers, 143 dual users of both cigarettes and ENDS, and 237 exclusive ENDS users); 2) ten online focus groups with 61 adults in the Atlanta, GA area (16 exclusive smokers, 22 current ENDS users who may be current smokers but not attempting to quit, and 23 transitioning smokers and/or ENDS users - recently quit or currently quitting smoking). **Results:** From the survey, dual users vs. exclusive smokers had higher odds of buying cheaper cigarette brands (adjusted odds ratio[aOR]= 2.50, 95% confidence interval [CI]= 1.49, 4.20), buying cigarettes online (aOR= 2.79; 95% CI= 1.02, 7.69), buying from Indian Reservations (aOR= 3.99; 95% CI= 2.07, 7.69), buying fewer cigarettes than normal (aOR= 4.01; 95% CI= 2.42, 6.65) and

buying other tobacco products (aOR= 4.44; 95% CI= 2.24, 8.79). The odds of increased smoking vs. no change were higher for those who bought more packs per store visit (aOR= 2.54; 95% CI= 1.57, 4.10) and those who were going to the store more frequently to buy cigarettes (aOR= 5.19; 95% CI= 2.95, 9.11). Most findings regarding tobacco purchasing behaviors from survey were consistent with those from the focus group study. Factors such as perceived reduced accessibility, fear of contracting COVID-19, rising prices, and convenience were reported to be influencing the purchasing behaviors and tobacco use among focus group participants. **Conclusions:** Exclusive and dual users differed in their tobacco purchasing behaviors during the early COVID-19 pandemic, such that dual users were more likely to change their purchasing behaviors than exclusive users. Educational campaigns and public health workers need to develop interventions promoting dual users to quit smoking or to switch to reduced-risk products, particularly during stressful societal situations such as COVID-19 pandemic.

FUNDING: Federal; Nonprofit grant funding entity

POS4-18

UTILIZATION OF VARENICLINE AMONG MEDICAID ENROLLEES IN KANSAS, 2013-2021

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Significance: Smoking prevalence among adults enrolled in Medicaid is twice as high as among privately insured adults. Many Medicaid programs cover cessation medications, but only one in ten enrollees who smoke enrollees receive pharmacotherapy to assist in quitting. Fewer receive varenicline, the most effective solo medication for cessation. **Methods:** Kansas Medicaid covers up to 24 weeks of varenicline per year without co-pay or pre-authorization. We used Medicaid claims data to assess trends in utilization of varenicline among Kansas Medicaid enrollees from 2013-2021. We limited our analysis to enrollees 18 or older, with at least 9 months of coverage during any year, who qualified for Medicaid through Title XIX or as Medically Needy. Because Kansas Medicaid does not universally screen for tobacco use, we used state-level estimates of tobacco use in Medicaid (32%) to calculate the percentages of enrollees who smoke and had claims for cessation medications. **Results:** Of 153,648 Kansas adult Medicaid enrollees identified, most (71.5%) were female, White (74.2%), and non-Hispanic, Latino/a or Spanish (80.7%). Mean age was 42.7 (SD 19.5). Among all enrollees from 2013-2021, 5,205 (3.4%) had at least one varenicline claim. Similar rates of women and men received claims (3.3% and 2.7%, respectively). Whites had a higher proportion of claims: 3.9% of all Whites in Medicaid had Varenicline claims versus 2.7% of Blacks, 2.4% of American Indians, 0.5% of Asians, and 2.5% of Hispanic, Latino/a or Spanish background. Assuming 32% of enrollees smoke, 10.6% of Medicaid smokers received at least one claim for varenicline. Of these, 4,487 (86.2%) received a starter pack at their first dispensed date. Among those who initiated treatment with a starter pack, 549 (13%) had sufficient claims to complete the standard 12 weeks of treatment resulting in an estimated 1.1% of Medicaid smokers completing a full 12-week course of varenicline treatment. Varenicline treatment peaked in 2018, with 764 initiating treatment, declining in 2021 to 391 enrollees starting treatment. **Conclusion:** Eleven percent of estimated smokers had at least one claim for varenicline and 1% completed the standard course of treatment as recommended by the FDA. Varenicline use declined in 2021 possibly due to drug shortages. Monitoring Medicaid claims for smoking cessation treatment could inform efforts to increase utilization and maximize smoking cessation.

FUNDING: No external funding reported

POS4-19

DIFFERENCES IN THE CHEMICAL COMPOSITION OF POPULAR DISPOSABLE E-CIGARETTE BRANDS WITH IDENTICAL FLAVOR DESCRIPTORS

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Significance: The current e-cigarette market in the United States is dominated by disposable devices. Although disposable devices are available under various brand names, they often contain flavored nicotine solutions with identical or similar implicit flavor naming conventions. While different brands of disposable devices are typically made in factories located in China, it is unclear if manufacturers and local distributors are filling them with different nicotine-containing liquids of distinct chemical compositions. This study aimed to compare the chemical characteristics of e-liquid in disposable e-cigarettes with identical flavor descriptors between brands. **Methods:** A convenience sample of multiple popular brands of disposable e-cigarettes with identical flavor names was purchased in Buffalo, NY, from a local distributor. The common flavor descriptors included



Blue Razz Ice flavor (6 brands), Clear flavor (5 brands), and Watermelon Ice flavor (8 brands). Extracted e-liquid from each device was analyzed for nicotine concentration, PG/VG ratios, pH, and density. We also performed quantitative and qualitative analyses of flavoring additives in each product. Using these chemical characteristics, a unique profile of 16 ingredients was made for each e-liquid. Chemical characteristics of disposable brands were compared within labeled flavors using Kruskal Wallis non-parametric tests and cluster dendrograms. **Results:** There were significant differences in product chemistry between all brands with Blue Razz Ice flavor descriptor, all brands with Clear flavor descriptor, and 62.5% (n=5) of brands with Watermelon Ice flavor descriptor. For example, the concentrations of ethyl maltol in Clear flavored products were significantly higher in Novo Bar brand than in HotBox brand (5.2 vs. 0.6 mg/ml, $p=0.03$). Additionally, the concentrations of menthol in Watermelon Ice flavored products were significantly higher in Lost Mary brand than in all other brands (1.2 vs. 0.1 mg/ml, $p<0.02$). Batch IDs or serial numbers were not identical between any brand among a single labeled flavor. **Conclusions:** These results suggest that e-liquids with unique chemical compositions were used across brands labeled with the same flavor descriptors. Additional research is needed to determine if products are filled at time of manufacturing or at local distribution, allowing regulators to focus their enforcement efforts.

FUNDING: Federal

POS4-20

THE IMPACT OF ORAL NICOTINE POUCHES ON PUBLIC HEALTH: A SCOPING REVIEW.

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Significance: Nicotine pouches (NPs), a new class of smokeless tobacco, are commercially available in the US and many other countries. Assessing the potential role of NPs in harm reduction and identifying unintended consequences of their use is essential for tobacco regulatory bodies in determining the net public health impact of NPs. This scoping review provides an initial summary of evidence on NP composition, toxicity, use prevalence, product awareness, susceptibility, industry marketing tactics, and sociodemographic trends of NP users. **Methods:** We carried out a structured literature search for empirical studies across three electronic databases through July 17, 2023. The review was conducted and reported in adherence with the guidelines for the Preferred Reporting Items for Scoping Reviews (PRISMA-ScR). **Results:** Sixty-four studies were included, and twenty were funded by the industry. US adult prevalence data on NP use were limited to those with a history of tobacco. Higher lifetime use was observed among young adults ages 18-44 (vs. older age groups), males, current and lifetime smokeless tobacco (SLT) users, current smokers, and dual cigarette and nicotine vaping product (NVP) users, while information on current users was scarce due to small samples sizes. Nearly 0.8% of US adolescents reported current NP use in 2021. Between 11%-37% of young adults were aware of NPs, and 19%-29% reported interest in NP use. The chemical composition of NPs suggests less harmful/potentially harmful compounds compared to cigarettes and snus, with formaldehyde levels comparable to snus. Toxicology studies, funded predominantly by the industry, show substantially less cytotoxicity compared to cigarettes, and generally lower cytotoxicity compared to snus. Industry tactics to market NPs potentially encourage initiation in youth and situational and dual use in adults rather than cessation of smoking or other tobacco product use. **Conclusions:** NPs appear to be less toxic than cigarettes and SLTs, and deliver adequate nicotine to smokers and SLT users, presenting a potentially satisfactory alternative to combustible and traditional SLT products. Future studies should assess the awareness, susceptibility, and initiation of NPs in a population with no history of tobacco/nicotine use. Independent research on the chemical analysis and toxicity of NPs is needed.

FUNDING: Federal

POS4-21

MULTIMORBIDITY AND TOBACCO USE PATTERNS AMONG ADULTS IN THE UNITED STATES

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Background: Multimorbidity, characterized by two or more chronic health conditions, poses a significant public health concern. Tobacco use, an established risk factor for chronic diseases, is associated with a higher prevalence of multimorbidity. The emergence of e-cigarettes may impact the prevalence of multimorbidity, but their long-term effects are uncertain. This study investigated associations between tobacco use patterns (including e-cigarette, cigarette, and dual use of both products) and multimorbidity

and whether age, sex, or race/ethnicity modified these associations among adults in the United States (US). **Methods:** We conducted a cross-sectional analysis involving 172,659 adults aged 18 or older, using pooled data from the 2020 and 2021 Behavioral Risk Factor Surveillance System. Multimorbidity was ascertained through self-reported chronic health conditions, including arthritis, asthma, cancer, chronic obstructive pulmonary disease, coronary heart disease, depression, diabetes, kidney disease, and stroke. Tobacco use patterns were categorized as non-tobacco users (did not use any tobacco product), current (used on some days or every day) e-cigarette users, cigarette users, or both (i.e., dual users). Multinomial logistic regression was conducted to investigate the associations and account for potential confounding factors (marital status, income, education, self-rated health, mental health distress days, smokeless tobacco use, and heavy alcohol consumption). **Results:** Overall, 24.3% of the study participants reported multimorbidity. Additionally, 7.9% reported e-cigarette use, 9.2% reported cigarette use, and 8.1% reported dual use. The results showed that individuals who reported using e-cigarettes (adjusted odds ratio [aOR]: 1.69 [95% CI: 1.43-2.00]), cigarettes (aOR: 1.54 [95% CI: 1.38-1.72]), or both (aOR: 3.07 [95% CI: 2.70-3.49]) had higher odds of having multimorbidity compared to non-users. Furthermore, the study found significant interactions between age and sex ($p<0.001$), where stronger associations were observed among younger adults and females ($ps<0.05$). However, no significant interactions were observed based on race/ethnicity ($p>0.05$). **Conclusion:** E-cigarette, cigarette, and dual use were associated with multimorbidity among US adults, particularly younger adults and females. The study findings underscore the need for future longitudinal research to establish potential causal relationships and design tailored interventions to reduce the burden of multimorbidity, particularly among specific demographic groups with tobacco use behaviors.

FUNDING: Federal

POS4-22

A WORKING MODEL FOR THE EFFECT OF MONOAMINE OXIDASE INHIBITORS IN TOBACCO SMOKE ON TOBACCO DEPENDENCE

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Introduction Tobacco dependence is driven by nicotine but, although many tobacco smokers find it very hard to give up, in the laboratory nicotine appears only mildly addictive. We have been working to test the hypothesis that monoamine oxidase (MAO) inhibitory activity in tobacco smoke can enhance nicotine's abuse potential and have developed a working model. **Methods** We used bioassay-directed purification to identify MAO inhibitors from tobacco smoke and characterised these using biochemical and *in silico* methods. The effect of these inhibitors was examined in cell culture, and in rat behavioural tests. The combined results were used to build a model for the ways in which these inhibitors could affect tobacco dependence, which we present here. **Results** We have identified 6 new significant MAO inhibitors using bioassay-directed purification. Two are reversible inhibitors of both MAO-A and -B, as shown by kinetic and *in silico* studies. In contrast, four others appear to be irreversible inhibitors. We have looked at the interaction of the mixed inhibitors with cultured cells, where the data obtained supports the hypothesis that direct inhibition by these inhibitors can explain the effects of the tobacco smoke preparation on MAO activity. In rats, behavioural studies (using nicotine self-administration, and conditioned place preference) strongly suggest that these inhibitors enhance the addictive properties of nicotine, although they are not addictive in themselves. **Conclusions** Consideration of our results has suggested a model for smoking dependence which incorporates MAO inhibition caused by smoking, as well as direct responses to nicotine. While much remains to be done, the potential implications of this model are far-reaching for our understanding of the interaction of smoking with a variety of mental health conditions. **Funding Information:** This project has been funded by the Institute of Environmental Science and Research Ltd Pioneer Fund, the University of Auckland Tobacco Control Research Tūrangā, Innovation Fund, the Massey University Research Fund, the New Zealand Health Research Council Explorer Fund (HRC 17/655), a Massey University PhD scholarship awarded to SW Hong, and a New Zealand Ministry of Business, Innovation and Employment Endeavour grant (MAUX1904).

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POS4-23

ALCOHOL USE AND ITS ASSOCIATION WITH NICOTINE AND CANNABIS VAPING ACROSS DAYS AMONG A NATIONAL SAMPLE OF YOUNG ADULTS WHO VAPE

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Significance: Both nicotine and cannabis vaping have increased among young adults (YAs), with cannabis vaping increasing dramatically in recent years. Identifying immediate factors related to both nicotine and cannabis can inform prevention and cessation efforts. Yet no research has considered day-to-day predictors of vaping among a national sample of YAs who currently vape, and most previous research has used retrospective, past 30-day measures. Although individuals who use alcohol are more likely to vape on average, little is known about how alcohol use on a given day is linked to nicotine or cannabis vaping on that same day. This study examined within-person predictors of nicotine and cannabis vaping across 14 days in a national sample of YAs, focusing on the role of alcohol use. **Methods:** Data came from the Monitoring the Future (MTF) Vaping Supplement. A cohort of 19-year-olds from MTF were sampled one year after their 12th-grade surveys. YAs who reported current vaping were invited to fill out daily surveys for 14 days. We analyzed data from 330 YAs, each of whom completed up to 14 daily surveys (n=3686 days). Measures of moderate drinking (1-3 drinks for women/1-4 for men), binge drinking (4+/5+ drinks for women/men), and vaping were included. Multilevel logistic regression models estimated whether daily variation in alcohol use was associated with nicotine vaping, cannabis vaping, and dual-substance vaping (i.e., both) on a given day. Survey weights accounted for the complex survey design and sampling procedures. **Results:** Within-person fluctuations in moderate and binge drinking on a given day were associated with nicotine vaping, and dual-substance vaping. Moderate drinking on a given day was associated with cannabis vaping, but binge drinking was not. These relationships remained after adjusting for demographics and other day- and individual-level factors, such as time spent with friends. **Conclusion:** Moderate drinking on a given day was associated with multiple types of vaping. However, binge drinking was only linked to same-day nicotine vaping, it was not associated with cannabis vaping. These findings corroborate the limited research that exists on day-level analyses of substance use and extend it using a national sample of YAs who vape. Nicotine and cannabis vaping among YAs are public health priorities, and disparities exist in vaping among YAs who drink alcohol. Research and interventions should focus on same-day use of alcohol and vaping.

FUNDING: Federal

POS4-24

"IT'S POLITE TO OFFER CIGARETTE TO OUR GUEST!" - A QUALITATIVE STUDY OF THE CULTURE NORM AND SMOKING IN VIETNAM.

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Introduction: Of countries with the highest smoking prevalence globally, Vietnam has a long cultural history link to tobacco smoking. The aim of this study was to explore the culture norms about smoking among Vietnamese men in Hanoi, Vietnam. **Methods:** Nine focus group discussions with former and current male smokers were conducted in mountainous, rural, and urban areas of Hanoi, Vietnam in December 2022. An inductive content analysis was applied, codes were yielded and formed into categories and subcategories. **Result:** Three themes were derived from the descriptive content analysis: (i) smoking as a socialization request, (ii) smoking together in social events, and (iii) smoking and beer/coffee drinking. Both smoking initiation and relapsing to smoking were all due to socialization requests. Gathering to smoke during special events like weddings, rituals, or ceremonies has existed for a long history but seems to be uncommon in urban areas recently. However, the combination of smoking and drinking leads to heavier smoking and hinders smoking cessation attempts. **Conclusion:** Smoking is perceived as a social habit that existed in Vietnam for long periods of time. In order to reduce the smoking prevalence, national tobacco control policy should consider the social norms and culture aspects when developing upcoming interventions and regulations.

FUNDING: Academic Institution

POS4-25

E-CIGARETTE USE, CIGARETTE SMOKING, AND THE RISKS FOR COVID-19 INFECTION AMONG YOUNG ADULTS: RESULTS FROM A PROSPECTIVE STUDY

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Background and Objective: The relationships between cigarette smoking, e-cigarette use, dual use of both products, and COVID-19 infection, are still not clear, especially among young people. Very few studies on the topic have focused on e-cigarettes and these have mostly been cross-sectional. A majority of the existing studies have focused on cigarette smoking among older adults and the findings of these studies have been mixed. This study intended to examine the prospective relationships between e-cigarette use, cigarette smoking, dual use and COVID-19 infection in a sample of young adults. **Methods:** Data were collected from 1905 multiethnic young adults [M age = 24.9; SD = 2.1; 56% women] pre-COVID (January, 2020) and at four time-points in six-month intervals post-COVID, beginning in March-May 2021. **Results:** Pre-COVID current (past-30-day) dual use of cigarette and e-cigarette (relative to non-use) significantly increased the risk of being tested positive for COVID-19 at the first post-COVID follow-up [OR = 2.92; 95% CI: 1.66-5.14], adjusting for demographic variables (age, sex, ethnicity, and SES). Similarly, pre-COVID current cigarette-only [OR = 2.78; 95% CI: 1.34 - 5.77] and e-cigarette-only [OR = 1.77; 95% CI: 1.07-2.92] use status predicted COVID-19 infection at the first post-COVID follow-up. During the pandemic, e-cigarette-only use status at an earlier time-point was a consistent predictor of increased COVID-19 infection at a subsequent time-point, with OR ranging between 1.66 [1.24 - 2.24] and 1.45 [1.01-2.20]. Results for cigarette smoking and dual use as predictors of COVID-19 infection during the pandemic were mixed. **Conclusions:** The current data indicate that tobacco product use may increase the risks for COVID-19 infection among young people. Potential biological and behavioral mechanisms for the relationships may need to be investigated in order to inform prevention and treatment programming in the context of COVID-19 or similar infectious, respiratory diseases.

FUNDING: Federal

POS4-26

MATERNAL SMOKED, SMOKELESS, AND POLY-TOBACCO USE IN RELATION TO INFANT MORTALITY IN CAMBODIA

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Maternal cigarette smoking during pregnancy is an established risk factor for adverse fetal and infant outcomes such as mortality, low birth weight, preterm birth, and a wide range of developmental outcomes. In contrast, maternal smokeless tobacco use (i.e., e-cigarettes, snus, betel quid, iqmik) during pregnancy has a more complex risk profile in the scientific literature due to the potential for use as a smoking cessation aid or to reduce the harm from smoking tobacco during pregnancy. In this study, our overall aim was to investigate the association between smoked tobacco, smokeless tobacco, and poly-tobacco (smoked + smokeless) use during pregnancy and infant mortality in a national sample of parous women in Cambodia. Our study used the data from the National Adult Tobacco Survey of Cambodia (NATSC) that in 2012 included a special supplement on reproductive health and birthing history. NATSC enrolled a sample of 15,615 adults (age 15 years and older) using methods and tobacco survey items from the CDC Global Adult Tobacco Survey. For our study, we selected the 5,342 women who reported complete data on at least one pregnancy, and our unit of analysis was the 15,998 pregnancies from these women. We conducted a multivariable logistic regression to relate tobacco use variables to infant mortality as an outcome up to one year after delivery. Taylor linearized variance estimators were used to account for clustering by sampling unit and mother. We found that among pregnant tobacco users, smokeless tobacco in the form of a betel quid was the most common form of tobacco used. In a multivariable logistic model, we found increased odds of infant death for all tobacco use categories but that the strongest effects were seen for habits that included smokeless tobacco (OR[95% CI] relative to never used tobacco in any form = 5.68[1.03, 31.46] for poly-tobacco use, 2.08 [1.15, 3.76] for smokeless only, 1.72 [0.51, 5.79] for smoked only). In more detailed analyses that considered the composition of the betel quid (tobacco, areca nut, slaked lime, areca leaf), we found that maternal chewing of tobacco quids without any other component (i.e. areca nut/leaf) was associated with a three-fold increase in odds of infant death (OR[95% CI] relative to never user = 3.05[1.45, 6.45]). Among parous Cambodian women, we found that all patterns of habitual smokeless tobacco use during pregnancy were associated with a potent increase in odds of infant death.

FUNDING: Federal



POS4-27

ASSOCIATIONS BETWEEN ENGAGEMENT WITH TOBACCO AND ELECTRONIC NICOTINE DELIVERY SYSTEM (ENDS) INFORMATION ON SOCIAL MEDIA AND COLLEGE STUDENTS' DEPRESSIVE SYMPTOMS: A CROSS-LAGGED ANALYSIS

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Significance: Depression is one of the most prevalent mental health issues among young adults, who are the heaviest social media (SM) users and who are vulnerable to persuasive tobacco marketing information. Although evidence indicates that passive exposure to and active engagement with tobacco and ENDS information on SM increases risk for the use of tobacco and ENDS products, which is associated with depression, no study has examined how such exposure and engagement are related to depressive symptoms. Therefore, this study examined the bi-directional associations between exposure to and engagement with tobacco and ENDS information on SM and depressive symptoms across a one-year period. **Methods:** Participants were from M-PACT, a multi-wave project that recruited students from 24 Texas colleges in fall 2014. Data in this study were from spring 2017 (T1; $M_{age}=23.29$, $SD_{age}=2.31$; 63.8% females) and spring 2018 (one year follow-up; T2). Only participants completing both waves were included ($n=4,267$). Longitudinal cross-lagged analyses were performed to examine the bi-directional associations between exposure to and engagement with pro- and anti-tobacco and ENDS information on SM and depressive symptoms (assessed by CES-D-10) using a path model. The model was adjusted for age, sex, and race/ethnicity as potential confounders, and included stability paths from all T1 variables to the same T2 variables. **Results:** The model fit the data well (CFI=.97, TLI=.92, RMSEA=.026, SRMR=.064). Stability paths from all T1 variables to the same T2 variables were all significant. Results from cross-lagged analyses indicated that depressive symptoms predicted a higher likelihood of exposure to (beta=.09, $p<.001$) and engagement with pro- (beta=.08, $p<.05$) and anti-tobacco and ENDS information on SM (beta=.08, $p<.01$) one year later. On the other hand, exposure to and engagement with tobacco and ENDS information on SM did not predict subsequent depressive symptoms. **Conclusion:** Findings establish a connection between depression and later exposure to and engagement with tobacco and ENDS information on SM. Considering that such exposure and engagement are associated with college students' subsequent smoking and vaping behaviors, those with more severe depressive symptoms may be at an elevated risk to smoke or vape because of that persuasive marketing information. Findings underscore the need to regulate tobacco marketing information on SM, especially for college students with elevated depressive symptoms, a vulnerable population.

FUNDING: Federal

POS4-28

PARENTAL INCARCERATION AND CIGARETTE SMOKING DIFFERENCES BY RACE/ETHNICITY IN YOUTH AND EARLY ADULTHOOD

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Significance: Adverse childhood experiences (ACEs) are highly stressful events associated with cigarette smoking in youths and adults. We tested if parental incarceration, an ACE characterized by stark racial/ethnic disparities, contributes to prevalence of cigarette smoking across the life course by race/ethnicity. **Methods:** We used data from the nationally representative National Longitudinal Survey of Youth-1997 Waves 4-17 (2000-2015) to assess the relationship between parental incarceration and cigarette smoking behaviors in youth and early adulthood (15-33 years), and if this association varied by race/ethnicity. We estimated weighted mixed effects multivariate logistic regressions for current smoking status (past 30-day cigarette use) and negative binomial regressions for number of cigarettes smoked/day on days smoked (among current smokers), while accounting for age, sex, mother's education, mental health, and survey wave. **Results:** Respondents identified as Black ($n=971$), Latino ($n=773$), and White (2190). The percent of respondents with a parent who had been incarcerated before their 16th birthday varied by race/ethnicity (12.1%, 6.9%, and 4.4% for Black, Latino, and White persons, respectively). Current smoking status was highest for White respondents across all survey years, from 39.6% in 2000 to 27.9% in 2015. Parental incarceration was associated with 2.4 higher odds of current smoking [95% C.I.=1.5-3.7] and, among current smokers, a 1.4 times greater number of cigarettes smoked/day [95% C.I.=1.2-1.5]. This relationship varied by race/ethnicity. White individuals who experienced parental incarceration had a 58% predicted probability of being a current smoker in youth or early adulthood, which was significantly higher than White persons

with no parental incarceration history (37%; $p<0.001$). They also smoked an average of 13.7 cigarettes/day compared to the 10 cigarettes/day for those without parental incarceration experience ($p<0.001$). In contrast, parental incarceration history did not predict current smoking or cigarettes smoked/day for Black or Latino respondents. **Conclusion:** Parental incarceration was associated with cigarette smoking status and heaviness in adolescence and early adulthood, but only for White individuals, for whom parental incarceration is a less common event. Research should continue to examine the social stressors, and counteractive protective factors, that contribute to disparate smoking behaviors over the life course by race/ethnicity.

FUNDING: Federal

POS4-29

ELECTRONIC CIGARETTES AND SUBSEQUENT CIGARETTE SMOKING IN YOUNG PEOPLE: RESULTS FROM A COCHRANE REVIEW

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Significance Young people vape but whether this deters or promotes subsequent smoking is contested. **Methods** In this Cochrane systematic review, we searched databases until April 2023. We followed Cochrane methods for screening, data extraction and risk of bias assessment. Our primary outcome was the association between e-cigarettes (EC) use/availability and change in population rate of smoking in young people. Secondary outcomes included associations between EC use and cigarette smoking behaviours within individuals. We synthesised data using effect direction plots because heterogeneity in study design precluded meta-analysis. **Results** Across the review, most studies were conducted in high-income countries with strong tobacco control regulations in place. Twenty-one population-level studies reported data on our primary outcome; of these, 16 had non-overlapping datasets and were included in our primary outcome analysis. Half (8 of 16) of the included studies found that increased use/availability of EC was associated with lower smoking prevalence in young people, 3 of 16 found that increased EC use/availability was associated with higher smoking prevalence, and 5 found no evidence of association. Risk of bias ranged between moderate to critical in population-level studies. Forty-six cohort studies assessed whether young people who vaped were at higher risk of subsequent smoking than young people who did not. Most found evidence that young people who vaped were more likely to start smoking than non-vaping peers. Risk of bias judgements flagged multiple critical issues. Many studies did not try to establish causality; of those that did, conclusions varied, sometimes linked to the confounders included in analyses. Our analyses were also unable to determine causality. There were insufficient data on associations between youth vaping and smoking cessation or relapse. **Conclusions** At a population level, data are mixed; half of the studies suggest that vaping could be causally associated with decreases in youth smoking. Most individual-level studies show vaping is associated with smoking in young people, but causality is unclear. There are critical limitations to all included data, including issues with risk of bias and very little data from low- and middle-income countries. Extreme caution should be taken in extrapolating data from settings with strong tobacco control regulations in place, to areas with less regulation or regulatory capacity. More work is needed to optimise study conduct and reporting in this field.

FUNDING: Academic Institution; Nonprofit grant funding entity

POS4-30

RACIAL DIFFERENCES IN CIGARETTE, ELECTRONIC CIGARETTE, AND TOBACCO TREATMENT PHARMACOTHERAPY

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Significance: Tobacco use is the leading cause of preventable disease and death in the United States. In 2021, 11.5% of American adults reported smoking cigarettes and over two-thirds of them express interest in quitting with about half of them trying to quit each year, but only 7% eventually succeed quitting. The low success rate suggests that alternatives to the traditional pharmaceutical approaches are worth investigating. A new approach may be the use of electronic cigarettes (ECIGs) - which is a rapidly growing trend. As of 2021, 4.5% of US adults report regularly using ECIGs. Interestingly,



initial studies have shown ECIGs to be more effective compared to traditional nicotine replacement therapies for smoking cessation. This preliminary study aims to characterize the demographics of combustible cigarette and electronic cigarette users that visited Family Medicine clinics from January 2000 to June 2023, as well as analyze the breakdown of pharmaceutical approaches used for smoking cessation. **Methods:** De-identified electronic health record data of patient demographic and treatment options from a large health system in central and northeastern Virginia were accessed and analyzed. **Results:** Data showed that in the selected Family medicine clinics, 16.8% of patients acknowledged either previous or current tobacco use. A greater proportion of Black/AA patients (53%, n=4030) reported cigarette use compared to White patients (43%, n=3276) ($X^2=65.71$; $p < 0.0001$). Conversely, more White patients reportedly used ECIGs (67%, n=41) compared to Black/AA patients (31%, n=19) ($X^2=8.07$; $p < 0.005$). 23.7% of our patient population (former or current tobacco smokers) used at least one kind of smoking cessation pharmacotherapy. White patients (40%, n=387) most frequently utilized bupropion, whereas Black/AA patients (43%, n=598) most frequently used transdermal nicotine patches for cessation. A greater proportion of Black/AA patients used gum or lozenges, or nicotine patches compared to Whites ($p < 0.005$), whereas bupropion use was reported more among White patients than Black/AA patients ($p < 0.005$). **Conclusion:** Understanding the use of different pharmacotherapies for smoking cessation among different racial populations can provide guidelines for clinicians in designing tailored recommendations related to patient pharmacotherapy choice that could possibly influence cessation efficacy. Overall, this project is useful in understanding the demographics of smokers in a large US health system and racial disparities in pharmacotherapy use for smoking cessation.

FUNDING: No external funding reported

POS4-31

DUAL USE OF E-CIGARETTE AND COMBUSTIBLE CIGARETTE AND RESPIRATORY SYMPTOMS IN THE PATH STUDY FROM 2016 TO 2019: A PROPENSITY SCORE METHOD ANALYSIS

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Objective: The study aimed to explore if individuals using both e-cigarettes and combustible cigarettes ("dual users") exhibited a lower risk of self-reported respiratory symptoms compared to those exclusively using combustible cigarettes. **Method:** Data from the Population Assessment of Tobacco and Health (PATH) study, covering Wave 4 (2016-2018, W4, Baseline) and Wave 5 (2018-2019, W5), was utilized. The analyses included established smokers aged 18 years and older at baseline with no established use of other tobacco products than e-cigarette and no self-reported prevalent respiratory conditions. Respiratory symptoms were self-reported at W5. Inverse probability weighting (IPW) was applied to control for confounding variables. **Results:** The analyses involved 3,844 established smokers without prior self-reported respiratory diseases, with 522 (13.6%) identified as current dual users. After applying IPW, dual use was not significantly associated with any self-reported respiratory symptoms (Odds ratio, OR=1.15, 95% CI: 0.82-1.60). For specific respiratory symptoms, the OR was 1.09 (95% CI: 0.81-1.46) for wheezing or whistling in the chest, 1.04 (95% CI: 0.72-1.50) for a wheezy chest during or after exercise, and 0.80 (95% CI: 0.59-1.08) for a dry cough at night not associated with a cold or chest infection. **Conclusions:** The findings suggest that the respiratory symptoms were not statistically different between dual users and exclusive cigarette smokers. This implies that e-cigarette use may not mitigate the health risks associated with combustible smoking.

FUNDING: Federal

POS4-32

DO DUAL USERS USE THEIR E-CIGARETTES MORE AFTER ACHIEVING SHORT-TERM COMBUSTIBLE CIGARETTE ABSTINENCE? FINDINGS FROM AN 8-WEEK OBSERVATIONAL STUDY

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Significance: E-cigarettes (ECs) have been shown to be effective combustible cigarette (CC) cessation tools in randomized trials, but findings from observational studies are mixed. A potential reason for this difference is that dual users outside of treatment trials may not view ECs as CC substitutes. We examined whether frequency of EC use differed before vs. after achieving CC abstinence among participants in a longitudinal observational study on EC and CC dual use. **Methods:** Adults who smoked CCs daily, used ECs daily or non-daily, and desired to quit smoking CCs in the next 3 months

completed nightly text message delivered surveys regarding their CC and EC use for 56 consecutive days. No intervention was provided. Twenty-eight participants achieved at least 7 consecutive days of CC abstinence during the observation period. We compared the percentage of days ECs were used prior to vs. during the abstinence period with a paired Wilcoxon Signed-Ranks test. We also compared the percentage of days participants indicated that they intended to quit ECs before vs. during the period of CC abstinence. **Results:** Participants who achieved abstinence during the observation period were 35.6 (SD=11.9) years old, 50% female, and 67.9% non-Hispanic white. At baseline, 71.4% of participants endorsed using their EC as a CC cessation aid. Between the start of their 7-day CC abstinence period and the end of the observation period, participants lapsed to CC use on a median of 0% (0%-1.4%) of days. Participants used their EC significantly more frequently on days prior to (mdn=100% [IQR=76.7%-100%]) vs. during their CC abstinence phase (mdn=78.3%, IQR=[4.6%-98%]; $Z=231$, $p < .001$). During their CC abstinence phase, participants endorsed intending to quit ECs significantly more frequently than before their CC abstinence phase (mdn=6% [IQR=0%-90%] vs. mdn=0% [IQR=0%-20.1%]; $Z=26$, $p=.02$). **Conclusion:** Dual users who achieve a week of CC abstinence outside of a treatment context do not appear to use their ECs as substitutes for CCs to sustain their CC cessation. After achieving short-term CC abstinence, their goals may shift to encompass cessation from all nicotine products. For individuals struggling to abstain from CCs, education and behavioral counseling may be necessary for them to implement ECs as an effective cessation aid.

FUNDING: Federal

POS4-33

CIGARETTE SMOKING SUSCEPTIBILITY MODIFIES THE EFFECT OF ENDS USE ON YOUTH CIGARETTE SMOKING INITIATION

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SIGNIFICANCE: Statistical associations between ENDS use and cigarette smoking are often attributed to the common cause hypothesis; those who initiate smoking after ENDS use would have done so if they had not used ENDS because of common predisposing factors. We examined the relationship between ENDS use and cigarette smoking initiation within subgroups of youth based on their level of cigarette smoking susceptibility. We tested the hypothesis that the effects of ENDS use on cigarette smoking would be greater with lower cigarette smoking susceptibility. **METHODS:** We used data from the Wave 2 (2014-15) youth cohort (12-17-year-olds) of the Population Assessment of Tobacco and Health Study who never tried or used cigarettes and followed them to Wave 5 (2018-19). Measures included ENDS use (any use in the past 30 days), ever cigarette smoking (ever trying a cigarette), established cigarette smoking (lifetime smoking of 100 or more cigarettes), and cigarette smoking susceptibility (based on intention to smoke, curiosity about cigarettes and the likelihood of use if offered by a friend). We analyzed data using discrete-time survival analysis, accounting for the complex survey design. Current ENDS use, and cigarette use susceptibility were lagged by one wave. The analysis was adjusted for a comprehensive set of covariates (age, sex, race/ethnicity, school grades, household income, parental educational attainment, sensation seeking, household combustible use, other combustible tobacco use, alcohol use, and marijuana use). **RESULTS:** By Wave 5, 34.9% and 11.8% of the youth cohort reported ever and established cigarette smoking, respectively. ENDS use increased from 4.4% at wave 2 to 7.9% at wave 4. Those classified as having low cigarette smoking susceptibility decreased from 24.1% in Wave 2 to 20.2% in Wave 4. Among those with low cigarette use susceptibility, previous wave ENDS use was associated with the initiation of ever (HR=2.8; 95%CI=2.2, 3.6) and established smoking (HR=3.9; 95%CI=2.0, 7.7). There was no association between ENDS use and initiation of ever (HR=1.0; 95%CI=0.6, 1.5) and established smoking (HR=1.2; 95%CI=0.4, 3.4) among those with high cigarette smoking susceptibility. **CONCLUSIONS:** Our findings supported the study hypothesis. ENDS use did not influence the initiation of cigarette smoking among youth with high susceptibility to cigarette smoking but did increase cigarette smoking initiation among those who reported low smoking susceptibility.

FUNDING: Federal



POS4-34

TELL YOUR FRIENDS: RECRUITMENT AND REACTIVITY OF ADOLESCENTS IN VIRTUAL VAPING CUE RESEARCH

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Significance: Exposure to electronic nicotine delivery systems (ENDS) use acts as a cue that elicits desire to vape ENDS and smoke cigarettes. This research has been conducted solely in adults. Despite the high prevalence of youth ENDS use, there is a paucity of vaping cue research in adolescents. To address this, we modified our adult ENDS cue reactivity protocol for adolescents to determine safety, feasibility, and cue reactivity in a pilot study. **Methods:** Adolescents ages 15-18 yrs were enrolled from April to August 2023. They were recruited nationally for this virtual Zoom-based confederate-delivered cue study via social media ads (e.g., Instagram) and word-of-mouth referrals. Study adaptations for adolescents included receiving parental consent (but no background characteristics or cue responses from the adolescent were divulged), removing vaping or smoking as possible randomization behaviors, providing harm reduction education at debrief, and adding measures regarding study acceptability. Participants completed measures on tobacco and cannabis use history as well as 100 mm visual analog scales on desire for smoking a cigarette, vaping an e-cigarette, and vaping cannabis at intervals before and after exposure to the water (control) and ENDS (active) cue. **Results:** Of the 202 study candidates, 8.9% (N=18) were eligible and enrolled (M=16.1 yrs, 56% female, 67% white). They were equally split on recruitment by Instagram or word-of-mouth referral (44% each, vs. 4% word-of-mouth in past studies in adults) with 12% Other (Reddit, Facebook). The study was acceptable as evidenced by high ratings of "being comfortable" (8.1 out of 10) and low ratings on "stressed" (1.8/10). Notably, while 6% reported a history of cigarette smoking, 39% reported past month nicotine and/or THC vaping. Among these vaping adolescents, baseline ENDS and cannabis desire was significantly higher ($M_{ENDS}=17$, $M_{cannabis}=34.7$) relative to those who do not vape ($M_{ENDS}=0.8$, $M_{cannabis}=7.6$; $ps<.03$), and the ENDS cue elicited greater desire to vape e-cigarettes and cannabis ($M_{ENDS}=+7.7$ and $M_{cannabis}=+5.7$), vs. non-vapers ($M_{ENDS}=+1.7$ and $M_{cannabis}=+0$; $ps<.05$). **Conclusions:** Adolescents can be successfully recruited in virtual ENDS cue research with ethical and safety issues addressed and word-of-mouth referrals given more online advertising restrictions than in adults. Adolescents who vape show high baseline e-cigarette and cannabis desire and greater cue reactivity than those who do not vape.

FUNDING: Federal

POS4-35

SUCCESSFUL METHODS OF SMOKING AND VAPING CESSATION AMONG YOUNG ADULTS WHO REGULARLY SMOKED CIGARETTES OR VAPED NICOTINE

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Background: Many who smoke cigarettes and vape e-cigarettes will develop nicotine dependence, and have challenges with quitting nicotine use. Little is known about methods that young adults are currently using to quit smoking and vaping that result in successful quit attempts. **Methods:** Self-report data were collected from young adults (M=22.9 years; N=3,287; 57.9% Female) enrolled in a prospective cohort study in Southern California in 2022. Participants were asked if they had ever attempted to quit smoking or vaping (assessed separately), whether they had ever successfully quit smoking (or vaping), and, if so, what methods were used to successfully quit. **Results:** In this sample, 3.4% reported ever regularly smoking cigarettes; of those, 85% had tried to quit (79.7% were successful). Methods used to quit smoking varied, but generally did not include approved cessation aids (<2%): 47.1% of participants used nicotine vaping to quit smoking, 45.1% reported an increase in healthy habits (e.g., exercise, practicing mindfulness), and 17.7% reported new or increased marijuana use. A larger proportion of the sample (13.4%) reported ever regularly vaping nicotine, and 74.1% said they had tried to quit (64.4% were successful). Of those who successfully quit vaping, most did not use an approved cessation aid (also <2%): 51.4% reported an increase in healthy habits, 10.7% reporting new or increased marijuana use, and 35% reported using another method. **Conclusions:** There is a high percentage of young adults who have tried to quit smoking and vaping, yet those who have tried to quit are typically using non-approved cessation methods. Development of additional cessation methods for this population are needed.

FUNDING: Federal

POS4-36

EARLY-ONSET ELECTRONIC CIGARETTE USE AND SUBSEQUENT FREQUENT OR DAILY USE

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Significance: Many studies have found that onset of substance use in adolescence, compared with initiation in adulthood, is associated with higher risk of developing dependence or abuse. There is evidence across multiple substances, such as alcohol, cannabis, cocaine, and cigarettes. However, little is known whether early-onset electronic cigarette (e-cigarette) use is associated with subsequent frequent or daily use. **Methods:** The Population Assessment of Tobacco and Health (PATH) Study is a nationally representative longitudinal cohort study of the civilian, noninstitutionalized population. Our study included 2,201 adolescents in PATH who were 1) e-cigarette-naïve in wave 1 (09/2013-12/2014); 2) participated in subsequent waves (waves 2, 3, 4, and 5); and 3) initiated e-cigarette use by wave 4 (12/2016-01/2018). Their initiation age was used as the age of onset. We identified early onset as e-cigarette initiation before age 18. Outcomes of subsequent frequent or daily e-cigarette use were assessed at wave 5 (12/2018-11/2019), using three binary measures: frequent use of 10+ days in the past 30 days, frequent use of 20+ days in the past 30 days, and daily use. We conducted multivariable logistic regressions to assess the association between early onset and subsequent frequent or daily e-cigarette use, controlling for sociodemographic variables, other substance use, and mental health measures at wave 1, as well as the number of years post e-cigarette initiation. **Results:** Around two thirds (65.6%) of baseline adolescents reported early onset of e-cigarette use before age 18, and the rest initiated after age 18. At wave 5, 28.4% of participants used e-cigarettes more than 10 days in the past 30 days, 22.8% used more than 20 days and 15.8% used daily. Early onset was associated with all three measures of e-cigarette use at wave 5. Controlling for multiple covariates, the adjusted risk ratio (aRR) was 1.71 (95% CI, 1.43-2.05) between early onset and wave 5 frequent use of 10+ days, 1.86 (95% CI, 1.50-2.32) for frequent use of 20+ days, and 1.45 (95% CI, 1.07-1.96) for daily use. The adjusted risk difference (aRD) between early onset and each measure of subsequent use were 13.18 percentage points (95% CI, 9.21-17.16), 11.85 percentage points (95% CI, 8.22-15.49), and 4.62 percentage points (95% CI, 1.00-8.23), respectively. We found similar results in our sensitivity analysis. **Conclusion:** E-cigarette users who initiated vaping during adolescence, compared with adult initiators, are at higher risk of subsequent frequent and daily use, implying an elevated level of dependence. This highlights the importance of promoting prevention and educational efforts toward adolescents.

FUNDING: No external funding reported

POS4-37

TRANSPARENT TOILET BLOCKS & VAPING QUOKKAS: FRAME & CONTENT ANALYSIS OF HOW THE AUSTRALIAN MEDIA HAS REPORTED ON YOUTH VAPING.

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Significance: In May 2023 the Australian Federal Government announced significant new restrictions on the sale and importation of Nicotine Vape Products (NVPs), differentiating Australia further from the commercial model prevailing in peer nations such as the UK and New Zealand. This was in the context of increased NVP use and also significant media coverage regarding youth and underage vaping. To understand the broader context of this announcement, our analysis aims to explore media reporting over the previous five years, including what framing devices were used by Australian media in the six months leading up to these announcements. **Methods:** A search of the Factiva database provided 456 news articles published from June 2018-May 2023, with 149 of these occurring in the six months prior to the announcement. We conducted a qualitative inductive frame analysis to explore how youth vaping was framed in these articles, and what aspects of the phenomena were legitimised and excluded. **Results:** Dominant framing devices identified through the inductive coding process include 'a poisonous epidemic': constructing youth vaping as alien, toxic, infectious, and escalating towards crisis. The second dominant frame was 'a failure of control', wherein youth vaping was considered primarily a disruption of control systems such as policing, school authority, and parenting. Subsidiary frames were 'a moral failure', either of individuals who vape, or corrupt companies and politicians; and finally, 'a health behaviour', with some media acknowledging NVP dependence as a health issue requiring treatment and support. **Conclusion:** These framing devices are discussed in the context of moral panic theory, and recommendations provided for how the issue of youth vaping can be responded to and discussed in a way that avoids stigmatisation and learns lessons from the illicit drug control field.

FUNDING: Federal



POS4-38

THE ROLE OF DESIRE OVER OBLIGATION IN EXPLAINING SUSTAINED SMOKING ABSTINENCE

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Significance: Theories of motivation distinguish between evaluations around an individual's belief they should quit out of a sense of duty ('obligation'), and the extent to which an individual wants to quit ('desire'). We assessed the role of self-reported desire over obligation in explaining quit success maintenance in recent ex-smokers. **Method:** A 12-month prospective study of 230 (45.2% female; mean age 45.4 years) adults in England who confirmed they had made a serious quit attempt and were not currently smoking at baseline. The independent variable assessed at baseline responses to the statement: "I am stopping smoking because I want to rather than because I feel I have to" on a Likert scale (1 'strongly disagree' to 7 'strongly agree'). The dependent variable was smoking status at 12-month follow-up. Covariates were baseline sociodemographic and smoking-related characteristics. Associations were assessed with logistic regression. **Results:** At 12-month follow up, 61.8% (n=136) reported they were still not smoking and 42.7% (n=94) had restarted smoking. Longer time since quit was positively associated with abstinence at 12-months (adjusted Odds Ratio (AOR) 1.28, 95% Confidence Interval (CI) 1.04-1.58). While being motivated by desire (vs obligation) to quit was negatively associated with remaining abstinent, it failed to reach significance (AOR 0.85, 95%CI 0.70-1.01). **Conclusion:** Desire does not appear to be positively associated with remaining abstinent from smoking at 12-month follow-up in people who have already quit. By contrast, our findings indicate that obligation may play a role in sustaining quit attempts, but more data across multiple time points are needed to understand this association.

FUNDING: Nonprofit grant funding entity

POS4-39

KNOWLEDGE AND ATTITUDES TOWARD THE HEALTH AND ENVIRONMENTAL IMPACTS OF CIGARETTE FILTERS: FINDINGS FROM A SURVEY OF THE AUSTRALIAN POPULATION

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Introduction: Most cigarettes smoked worldwide have cellulose acetate filters, which take many years to biodegrade. Calls to ban cigarette filters are increasing, however, limited research exists on public knowledge and attitudes toward cigarette filters, or on support for policies to address their environmental impact. We assessed knowledge and attitudes toward cigarette filters and support for policies to address tobacco product litter in Australia. **Methods:** A nationally representative online survey of Australian adults (N=1606: 520 people who smoke) assessed knowledge and attitudes to cigarette filters, tobacco product waste and smoking status differences. Support for policies to address the issue was explored, such as introducing a mandatory product stewardship scheme, banning the sale of cigarettes with filters, or requiring manufacturers to print anti-littering messages on cigarette sticks. **Results:** Almost all (97%) participants reported noticing cigarette butt litter in their daily lives. There was little difference between perceptions of environmental harm from cigarette butts between people who smoke (76.3%) and people that do not (83.8%). Only 46.3% of respondents knew cigarette filters are synthetic. Most participants (77.3%) supported the statement "Manufacturers should pay the full costs of disposal of tobacco product waste including littered cigarette butts". Respondents supported measures such as printing anti-littering messages directly onto cigarettes (77.3%) and increased enforcement of current laws (76.8%). Only 57.8% of respondents supported a policy of banning cigarettes with filters. **Conclusions:** Australians are highly aware of the environmental harms caused by discarded cigarette filters but do not clearly understand the type of materials cigarette filters are made from. They expressed support for anti-littering messages printed directly on cigarettes and increased enforcement of littering ordinances. They expressed strong support for a product stewardship scheme. There was no clear support for banning cigarettes with filters. **Implications:** This research will enable regulators in Australia to have a considered position in regulating the construction of tobacco products in Australia.

FUNDING: Academic Institution

POS4-40

THE INTERSECTIONS OF AGE, SEX, EDUCATION, INCOME AND REGION OF RESIDENCE IN RELATION TO MOTIVATION AND ATTEMPT TO QUIT SMOKING: A CROSS-SECTIONAL STUDY OF THE GERMAN POPULATION

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Significance: The inter-individual interplay between motivation to stop smoking (MTSS) and specific person attributes may lead to different probabilities of making a quit attempt (QA). The study conducts intersectionality research on tobacco cessation inequities by investigating whether age, sex, education, income, and region of residence intersect with MTSS and QA. **Methods:** Data from adult past-year smokers of the German Study on Tobacco Use (DEBRA, waves 1-22, n=13,245) were randomly divided into learning data (70%, 53.4% male, mean age 46.8 years, SD=16.7) and validation data (30%, 53.0% male, mean age 46.8 years, SD=16.9). Bootstrap resampling was applied to learn regression models of different complexity (MTSS scores 1-7; 1=no MTSS (=reference), 2-3=unspecific MTSS, and 4-7=high MTSS: multinomial regression, QA: logistic regression); complexity was determined by varying number of interactions and degrees of freedom of spline functions for continuous covariates. Model over-optimism was controlled by application of proper scoring rules in predictions of internal learning data. Best models were evaluated in validation data. **Results:** High versus low education was associated with increased odds of unspecific and high MTSS. Estimated marginal means (EMMs) for the probabilities of no and unspecific MTSS, stratified by household income, varied non-linearly over smokers' age from middle income groups vs. low income groups (OR 0.52, 95%CI=0.30; 0.92). In the model that included QA as dependent variable, being in the middle (OR 0.73, 95%CI=0.64; 0.83) or high (OR 0.62, 95%CI=0.52; 0.75) income group was associated with lower odds of reporting a past-year QA. Those with high vs. low education had 1.46 times the odds (95%CI=1.20; 1.78) of a QA. EMMs for the probability of a QA, stratified by education and sex, were highest among low to high educated females aged between 20-40 years. Similar probabilities in males were seen only among those with high education. In validation data, predictive accuracy reduced by 3.1%/ 3.4% for MTSS/ QA. **Conclusions:** Intersections formed by sex, education, and income were identified, some of which interacted non-linearly with smokers' age. Two episodes of age (30-40 years; 60-70 years) emerged in which the proportion of smokers with low MTSS decreases. Regardless of education level, females reported more QA than men; only with high education males' QAs are comparable to females.

FUNDING: State

POS4-41

PROBLEMATIC SOCIAL MEDIA USE AND CIGARETTE SMOKING AMONG YOUNG ADULTS A TEST OF DEPRESSION AND ANXIETY AS MEDIATORS

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Significance: Problematic social media use (PSMU) refers to use of social media that is compulsive, distressing, or interfering with daily functioning. Studies have found associations between PSMU and higher levels of depression and anxiety. Because depression and anxiety have distinct symptoms and features, screening for specific depressive or anxiety symptoms can allow clinicians to provide more targeted, individualized treatment. This longitudinal study investigated whether depression and anxiety played differing mediating roles in the relationship between PSMU and smoking behavior over one year in a large sample of young adults in Hawaii. **Methods:** This longitudinal study included 1,604 young adults ages 18-30 recruited from community colleges in Hawaii. Participants completed surveys at baseline, 6 months, and 12 months assessing PSMU (Bergen Facebook Addiction Scale), depression (Center for Epidemiological Studies Depression, CES-D), anxiety (Generalized Anxiety Disorder Scale, GAD-7) and past 30-day cigarette smoking. **Results:** Past 30-days cigarette smoking prevalence was 10.9%. Participants were experiencing potentially moderate levels of PSMU (13.4 ± 5.9) at baseline. Based on the cut-off score of 20 on the CES-D for subthreshold depression, the mean depression score was 39.1 (SD 9.7). Anxiety mean score was 13.3 (SD 5.6) indicating moderate symptoms with a cut-off point of 10 on a GAD-7 scale. PSMU at



baseline predicted increased depressive and anxiety symptoms at 6 months. Additionally, greater depressive symptoms were associated with higher cigarette smoking, but anxiety symptoms were not associated with higher cigarette smoking at 12 months. Mediation models showed an indirect effect of baseline PSMU on 12-month cigarette use through 6-month depression but no effect of anxiety symptoms on smoking. Conclusion: The results suggest that PSMU is a risk factor for increased depression and anxiety. Increased depression in turn may be prospectively associated with increased current cigarette smoking. Interventions that target PSMU and depression may prevent downstream smoking behavior. Future studies need to further examine the associations among PSMU, anxiety and cigarette smoking.

FUNDING: Federal

POS4-42

USE OF ENHANCED ENVELOPES TO IMPROVE RECEPTIVITY TO RECRUITMENT CALLS IN BIPOC PATIENTS WHO SMOKE

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Background: Clinical trials have inadequately sampled BIPOC participants, exacerbating health inequities. The Study for Smoking Cessation Outreach for Racial Equity (SCORE) investigates smoking cessation interventions for BIPOC populations. The current study investigates a strategy to improve recruitment for BIPOC patients. **Methods:** 377 English and Spanish-speaking BIPOC adult primary care patients who smoke from a healthcare system were mailed a study invitation letter and culturally tailored brochure, followed by a phone call. Potential participants were selected to receive their invitation in an enhanced envelope (N=183) or a standard envelope (N=194). The enhanced envelope contained a neon sticker that said, "Important information from your healthcare provider. This is not a bill." Study outcomes were the proportion who were reached by phone, agreed to screening, consented, and enrolled in the study. **Results:** 117/183 (64.0%) were reached in the enhanced envelope condition and 107/194 (55.2%) were reached in the standard condition (chi-square = 3.0, $p = .08$). Among those who were reached in the enhanced condition 35.9% (42/117) agreed to screening, 15.4% consented (18/117), and 13.7% (16/117) were randomized. Among those who were reached in the enhanced condition, 36.4% (39/107) agreed to screening, 14.0% (15/107) consented, and 13.1% (14/107) were randomized. **Discussion:** While results were not statistically significant in this small sample, effects were in the direction of the enhanced envelope improving recruitment outcomes. The enhanced envelope may have increased the credibility of the mailing and thus likelihood of opening the recruitment envelope, thereby increasing receptivity to calls. Rates of screening, consent, and randomization were similar among those reached. This method is promising for future studies trying to maximize BIPOC recruitment and will be tested in a larger sample to assess effectiveness.

FUNDING: Federal

POS4-43

DEPRESSIVE SYMPTOMS AND DIFFICULTIES INITIATING CESSATION ON THE TARGET QUIT DAY: A MECHANISTIC EVALUATION OF PRE-QUIT STRESS AMONG ADULTS WITH LOW INCOME

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Significance: Individuals with elevated depressive symptoms have significant disparities in smoking cessation success rates. Mechanisms accounting for this disparity are unclear, but may involve barriers that prevent successful initiation of a cessation attempt on the target quit day (TQD). Among general smoking samples, pre-quit stress elevations contribute to relapse. Individuals with depressive symptoms are more prone to stress in general and may be particularly susceptible to increased stress prior to quitting. **Methods:** Adults with low income enrolled in a smoking cessation trial comparing a just-in-time adaptive intervention (SMART-T3) to a standard smoking cessation app (QuitGuide) were assessed for depressive symptoms at baseline and stress via momentary assessments up to 5 times daily. Analyses examined if 1) depressive symptoms (total PHQ8 score) were related to TQD smoking status (any self-reported smoking on the TQD), 2) depressive symptoms were related to average stress levels and changes in stress leading up to the TQD, 3) stress was related to TQD smoking status. Latent

growth models examined changes in stress across the 6 days leading up to the TQD (i.e., stress slope). The relationship between depressive symptoms on TQD cessation, as well as the mediation of this effect through average stress levels and stress slope were examined controlling for treatment group. **Results:** Participants (N = 415) were primarily female (74%) and White (63%), and had average age of 52 (SD = 11.07) years. Overall, 57% of participants had elevated depressive symptoms and 43% self-reported TQD abstinence. On average, stress increased across the 6 days leading up to the TQD ($p < .001$). Higher depressive symptoms were associated with higher average stress ratings ($p < .001$), but depressive symptoms were unrelated to changes in stress (stress slope) during the 6-day pre-quit period ($p = .94$) or TQD cessation ($p = .93$). Steeper rises in stress during the pre-quit period were associated with a lower probability of TQD cessation ($p = .04$). **Conclusions:** Rising pre-quit stress, but not depressive symptoms, reduced TQD cessation rates among adults with low income. Additional research is needed to identify and target mechanisms linking depressive symptoms with greater difficulties initiating cessation and examine the impact of depressive symptoms on maintaining abstinence.

FUNDING: Federal; State

POS4-44

SIMILAR AND UNIQUE MOTIVATIONS AND BARRIERS TO QUITTING CIGARETTES AND E-CIGARETTES AMONG YOUNG ADULTS WHO USE BOTH TOBACCO PRODUCTS

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Significance: Use of both cigarettes and e-cigarettes (dual use) is common among young adults. We sought to compare perceived motivations and barriers to quit cigarettes versus e-cigarettes among young adult dual users to inform cessation interventions. **Methods:** We conducted semi-structured interviews during January-April 2023 to elicit tobacco cessation perspectives among 14 young adults (18-29 years old) using both e-cigarettes and cigarettes in the past 30 days. We conducted thematic analysis to identify motivations and barriers to quit each product. **Results:** Similar motivations for quitting both products were health (e.g., difficulty breathing, developing cancer or heart disease) and financial concerns (e.g., high cost). Motivations unique for quitting cigarettes were social stigma (e.g., social unacceptability of smoking, unpleasant smell of cigarette smoke) and inconvenience (unable to smoke in most locations). A unique motivation for quitting e-cigarettes was perceived negative influence on other people or family. Similar barriers to quitting both products included withdrawal symptoms (e.g., craving, irritability), lack of alternative means to cope with stress, peer pressure, and being unaware or unwilling to use available cessation resources. While there were no unique barriers to quitting cigarettes, unique barriers to quitting e-cigarettes were accessibility (convenience and ease of use), flavor sensation seeking, and mouth-hand gesture (oral fixation). **Conclusion:** While there were shared motivations and barriers to quitting for both cigarettes and e-cigarettes, we found unique motivations and barriers to quitting each tobacco product. Interventions to support young adult dual tobacco users quitting both tobacco products should address unique factors, including motivation to quit and perceptions of harm and benefit of each product.

FUNDING: Federal; Academic Institution

POS4-45

MENTAL HEALTH AS A MODERATOR OF THE RELATIONSHIP BETWEEN INTERSECTIONAL DISCRIMINATION AND TOBACCO USE

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Significance: Intersectional discrimination (e.g., discrimination across multiple social identities or positions), may be associated with cigarette and electronic nicotine delivery systems (ENDS) use among young adults. Mental health symptoms of anxiety, depression, or stress may moderate the effect of discrimination on tobacco use. This study aimed to determine if mental health moderated the associations between intersectional discrimination, measured by anticipatory and day-to-day discrimination, and current cigarette and ENDS use among young adults in the U.S. **Methods:** Participants were 1,630 young adults aged 18-25 (52% female; 39% white; m age=21.8) in a cross-sectional online survey from the Qualtrics panel (January-April 2022). Anticipatory and day-to-day discrimination were measured with 9 items each from the Intersectional Discrimination Index. Past 30-day cigarette and ENDS use were assessed with one item each (any use=1/no use=0). Logistic regression analyses, controlling for age, sex, race/ethnicity, SES, and student status were used to examine associations between anticipatory and



day-to-day discrimination and cigarette and ENDS use. Stress, anxiety, and depressive symptoms were tested as moderators of the relationships. **Results:** 25.4% and 21.2% of participants reported anticipatory and day-to-day discrimination, respectively. 44.9% reported cigarette and 48.5% reported ENDS use. Associations between anticipatory discrimination and cigarette (OR=1.05, 95%CI=[1.04,1.07]) and ENDS use (OR=1.04, 95%CI=[1.03,1.06]) as well as day-to-day discrimination and cigarette (OR=1.08, 95%CI=[1.07,1.10]) and ENDS use (OR=1.10, 95%CI=[1.08,1.11]) were significant. For models with stress as a moderator, day-to-day discrimination was associated with greater likelihood of cigarette and ENDS use, however, for those who experienced greater stress, the effect was attenuated. Similarly, anticipatory discrimination was associated with greater likelihood of cigarette use and showed an attenuated effect in those participants with higher levels of stress. For anxiety and depression, a similar effect was found; day-to-day discrimination was associated with greater likelihood of cigarette use but the effect on cigarette use was reduced in participants with greater anxiety or depression. **Conclusions:** Experiencing intersectional discrimination is associated with greater risk for current cigarette and ENDS use. However, under conditions of greater mental health challenges, while the experience of discrimination still results in greater risk for tobacco use, these associations are weakened. Future research is needed that examines these associations prospectively to determine how these variables interrelate. Learning Objective: To understand the association between intersectional discrimination and cigarette and ENDS use.

FUNDING: Academic Institution

POS4-46

TOBACCO CESSATION FOR PERSONS LIVING WITH HIV: FEASIBILITY STUDY IN BRAZIL

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SIGNIFICANCE: While it has been shown that combination of cognitive-behavioral therapy (CBT) and pharmacotherapy is the evidence-based treatment for nicotine dependence in the general population, there is limited evidence of which tobacco cessation interventions are effective/efficacious among persons living with HIV (PLWH), particularly in low- and middle-income countries. **METHODS:** In partnership with PLWH and providers, we developed and examined the feasibility and scalability of a theory-based, patient-centered, culturally relevant tobacco cessation intervention for PLWH receiving care through the public health system in a southern town in Brazil. The intervention was a combination of CBT with a Clinical Psychologist (CP) and pharmacological management by a Pulmonologist, which consisted of NRT and/or Bupropion since these are the pharmacological aids available through the Brazilian public health system. The primary outcome was 7-day point prevalence abstinence (defined as tobacco use in the past 7 days and verified through measurement of exhaled carbon monoxide levels [CO less than 4ppm] and salivary cotinine at 6-month follow-up. **RESULTS:** We enrolled 45 participants with a retention rate of 69%. The cessation rate at 6-month follow-up was 18% (8/45). We had 100% agreement between self-report, salivary cotinine and CO among patients who completed the 6-month follow-up. Most participants, regardless of whether they quit smoking, demonstrated great enactment of skills (particularly regarding dealing with withdraw symptoms) and indicated the counseling sessions as the most helpful component of the program followed by no cost pharmacological aid. The majority of participants who quit smoking did not experience any slips. When asked for suggestions to improve the program, participants, regardless of quitting status, indicated that they would like to have the support from the CP through phone or telehealth for a longer period, more in-person sessions, and establishment of a support group through WhatsApp. These suggestions were corroborated by the two CPs delivering the program who also reported that emotional regulation, social vulnerability, competing demands, lack of coping skills, and lack of social support as the main challenges faced by participants in quitting smoking. Another major deliverable of this study was the development and pilot testing of a tobacco cessation manual for CPs in Brazil who have been underutilized in tobacco cessation programs in Brazil.

FUNDING: Federal

POS4-47

VAPING CESSATION ACCESS FOR COLLEGE STUDENTS: AN OBSERVATIONAL AUDIT OF NORTH AMERICAN COLLEGE WEBSITES

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Background: More than half of young adults (YA, ages 18-24) express a desire to quit vaping, but just over a third report trying in 2021. This demographic is prioritized by the National Cancer Institute (NCI) as a vulnerable population requiring more interventions. The demographic of students who attend colleges (CS) specifically suffers from higher rates of drug misuse and increased experimentation with substances, yet fewer resources are targeted to this population. The present study assessed the availability of vaping information and cessation resources targeted to CSs on North American college and university websites. **Methods:** 64 North American college websites were chosen by their size and representativeness of their home territory in each of the 50 US States, the US Capital, and 13 Canadian provinces. Each one was observationally audited to locate CS-targeted vaping cessation resources. An audit checklist was used to assess websites on the presence or absence of cessation information and resources targeted to college students. Inclusion criteria for the audit included presence of the terms "ENDS, vaping, e-cigarettes," or "nicotine." **Results:** 23/64 (35.9%) of college websites surveyed had no observable information or support for CS-targeted vaping cessation resources. Of these twenty-three institutions, a further 4/23 (17.4%) of websites had no resources for smoking, vaping, or substance misuse altogether. However, the remaining 19/23 (82.6%) of websites did have dedicated pages for smoking cessation, although none of them mentioned vaping or ENDS. 41/64 (64.1%) websites had vaping cessation resources present on their websites, and of those forty-one, 24 (58.5%) websites had some discussion of the harms of vaping. 3/41 (4.7%) of websites mentioned vaping flavors, with no mention of the harms of said flavors. **Conclusion:** North American colleges, chosen for their size and ability to represent their State, currently offer little support for college students interested in quitting vaping, as just over one-third of websites lacked any mention of vaping. As we learn more about why CSs are unable to quit as much as they desire, colleges are encouraged to add resources targeted towards vaping to facilitate their journey toward quitting. Closing this information and support gap will improve our perception of the risks associated with vaping, leading to healthier decisions by young adults, college students, and other vulnerable populations. Supported by the National Cancer Institute (NCI) and the FDA (TCORS Grant U54CA228110).

FUNDING: Federal

POS4-48

A FUNCTIONAL APPROACH TO SMOKING CESSATION FOR INDIVIDUALS WITH INTELLECTUAL DISABILITIES

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Introduction: People living with Intellectual and Developmental Disabilities (IDD) are more susceptible to dangers posed by cigarette smoking, yet there is a serious lack of available smoking cessation research in this population. Function-based approaches rooted in Behavior Analysis have a long history of applications in IDD populations, although not in cigarette smoking. Recently a Functional Assessment for Smoking Treatment Recommendations (FASTR) was developed to understand variables that contribute to a person's smoking. This tool can help personalize a patient's treatment plan and provide them skills needed to decrease their smoking. Adapting this tool to be effective at identifying putative environmental variables that maintain cigarette smoking for people with IDD may improve modern smoking treatments. **Methods:** The purpose of this study was to introduce the FASTR to a sample of people with IDD who smoke cigarettes. The FASTR contains 30 statements that may apply to someone's smoking habits. During one-hour interviews participants described the extent they agreed with each statement using a Likert scale, each corresponding to one of five potential functions of smoking. Participants (n = 8) were interviewed to gauge comprehension of the FASTR and give input on potential modifications to make the assessment more inclusive for people with IDD. **Results:** 63% of participants endorsed statements categorized as automatic negative reinforcement (e.g., smoking to help with anger, frustration and disappointment, sadness, worry). **Comprehension Difficulties:** 88% of participants had difficulty with at least one specific word (e.g., *interact, demanding, boredom*). Five participants struggled with the Likert scale, which was modified to yes or no questions for two participants, and the middle answer "neutral" was changed to "in the middle." **Recommendations:** Several participants recommended the survey be done on vaping. Other participants recommended making the focus of each statement larger and in bold so respondents can understand the most important part of the statement. **Conclusion:**



Participants provided important recommendations on how the FASTR can be modified to be successfully used with people with IDD. The FASTR was modified based on their feedback and will be distributed to a larger sample of people with IDD who smoke cigarettes for validation. The FASTR will be an integral component to future patient-centered smoking cessation interventions in this group.

FUNDING: Federal; Academic Institution

POS4-49

ASSESSING THE PSYCHOMETRIC PROPERTIES OF SUSCEPTIBILITY TO USING TOBACCO PRODUCTS FOR YOUNG PEOPLE

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Significance: Susceptibility to using tobacco products in the future is commonly measured with a set of 3-items that assess the likelihood of using tobacco in the future, within the next year, and if a best friend offered the product. These items have been adapted for use with many emerging tobacco products and product flavors and will likely continue to be adapted as new products enter the marketplace. However, there is almost no standard for the number of items that should be administered, or which items should be administered for which products. It is therefore important to assess whether a brief, but psychometrically sound versions of these susceptibility items can adequately capture the construct being measured. This study fills that gap. **Method:** A sample of 451 young people (*Mean* age =16.5 years; 64% female; Caucasian=65%) completed three susceptibility items for each of three tobacco product classes (smokeless tobacco, vaping products and little cigarette/cigarillos) that come in three types of flavoring (unflavored, menthol, and sweet flavor); they also completed three items each for cigarettes that are tobacco-flavored and menthol-flavored. **Results and Conclusion:** Results from an intensive psychometric analysis of the items indicated that asking about likelihood of using each tobacco product when a best friend offered, recovers 98.5% of information from using the longer set of items; and if the best friend items are asked for each product by each flavor, this measure recovers 99.7% of the susceptibility estimated from all 33 questions. Thus, depending on research needs, a smaller set of items can be reliably administered to assess susceptibility to use tobacco.

FUNDING: Federal

POS4-50

SOCIODEMOGRAPHIC DIFFERENCES IN CESSATION SUPPORT USED AT LAST QUIT ATTEMPT BY ADULTS WHO CURRENTLY SMOKE OR QUIT SMOKING: FINDINGS FROM THE 2022 ITC FOUR COUNTRY SMOKING AND VAPING SURVEY

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Significance: Many people who try to quit smoking do so without using any forms of support. Whether use of cessation support varies by sociodemographics is unclear. We examined use of support during last quit attempt (LQA) among adults who smoke or recently quit smoking, and tested differences by country, smoking status, age, sex, race/ethnicity, income, education, and financial stress. **Methods:** Data were from the 2022 ITC Four Country Smoking and Vaping Survey. We included 2682 adults (aged 18+) residing in Australia (AU), Canada (CA), England (EN) and the US who reported making a quit attempt ≤ 2 years, and either smoked daily ($n=1466$), non-daily, but previously smoked daily ($n=426$), or had quit smoking (≤ 2 years, but previously smoked daily, $n=790$). Multivariable regressions were conducted on weighted data to assess the use of any support at LQA: nicotine replacement therapy (NRT), prescription medication (Rx med, Varenicline, Bupropion), nicotine vaping product (NVP), cessation services (Quitline, counseling), and/or 'other' (heated tobacco product, smokeless, Cytisine). **Results:** Use of any support listed herein was 45%. Adults with financial stress were more likely to use support than those without ($p=0.01$). There were no differences by country, smoking status or other sociodemographics (all $p>0.05$). By support type: 20% used NRT

(range: 23% AU to 16% US; country main effect: $p>0.05$); 8% used Rx meds (range: 12% CA to 4% EN; $p=0.001$); 18% used NVPs (range: 27% EN to 14% CA; $p=0.002$); 4% used cessation services (range: 5% EN to 3% US; $p>0.05$); 2% used 'other' (range: 5% EN to 1% AU; $p=0.01$). NRT use was higher among daily smokers (vs former, $p=0.02$) and those with financial stress (vs without, $p=0.004$). Use of Rx Med was lower among those aged 25-39 (vs 40+, $p=0.02$) and those without financial stress ($p=0.02$). NVP use was higher among younger adults ($p<0.001$), former smokers (vs. daily, $p<0.001$) and those with low education (vs high, $p=0.01$). Use of services was higher among males ($p=0.03$) and those with high/moderate education ($p=0.002$). Use of 'other' was higher among adults aged 18-24 (vs all other age groups, $p=0.003$) and those with high/moderate education ($p=0.01$). **Conclusion:** With the exception of NRT and cessation services, other forms of support differed by country, which could be in part attributed to their availability (e.g., Varenicline, NVPs). Some types of support differed by sociodemographics, particularly by age, but only those with financial stress were more likely to use support. Notably, both government-approved and other forms of cessation support that have been shown to be effective in supporting a quit attempt were grossly underutilized across all countries.

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POS4-51

(COMMERCIAL) TOBACCO REDUCTION IN INDIGENOUS COMMUNITIES ON TURTLE ISLAND

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Significance: Across Turtle Island (North America), First Nations, Inuit and urban Indigenous Peoples have high rates of commercial tobacco use and related chronic diseases. The reductions in commercial tobacco use in non-Indigenous populations over the last 3 decades has not been experienced by Indigenous communities, resulting in a marked health inequality. Adhering to the cultural significance of the traditional use of tobacco in indigenous communities, this research supported community efforts to identify, plan, and implement initiatives to reduce commercial tobacco use and associated harm. In this context, we examined factors contributing to effective program implementation and reporting, while maintaining the cultural integrity of communities. **Methods:** 7 indigenous communities located in Ontario, Canada participated including 3 First Nation communities, 1 Inuit organization, and 3 community organizations working with specific populations (2-spirited urban indigenous community members, pre- and post-natal women, and youth). We provided funds to these communities to implement programming with their members, while supporting indigenous knowledges, land-based methodologies and culturally centred perspectives. **Results:** We observed that the nature of commercial tobacco use differed in each community, and the acceptability and feasibility of implementing interventions to reduce commercial tobacco use also differed. Implementation factors contributing to knowledge/success included a flexible funding model in which a given community controls program decisions; project staffing allocations; reframing evaluation results as lessons learned; and community engagement. One thriving approach communities adopted, which engaged members, was organizing talking circles to reclaim traditional tobacco teachings on ceremonial use, seeding, re-planting, harvesting and distribution. This approach has led to fruitful discussions about the role of traditional tobacco as distinct from commercial tobacco and its associated harms. Many of our projects have had to adapt to Covid-19. One unintended but positive consequence in some projects was a growth in engagement when communities switched from in-person events to online social media due to more focused participants with fewer distractions. **Conclusion:** This initiative contributes to the development of an evidence base in how to design and implement community programs that promote health and health equity in an Indigenous context.

FUNDING: Federal

POS4-52

HOME LANGUAGE AND TOBACCO USE AMONG HISPANIC YOUTH IN THE U.S.

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Introduction: E-cigarette use is notably high among young Hispanic adolescents, raising pressing health concerns. Home language, indicative of acculturation, can influence such behaviors. As youth navigate between their heritage and mainstream culture, their e-cigarette choices may shift. Research consistently shows that acculturation, boosts smoking rates, particularly in Hispanic girls. Linguistic acculturation has been linked to both pro-drug norms and substance use. Therefore, in this study, we examined the association between home language and tobacco use among Hispanic youth. **Methods:** Data



from the 2022 National Youth Tobacco Survey included 5,907 Hispanic youth, focusing on home language as an exposure variable. Outcomes included current e-cigarette and cigarette use, monthly frequency, and e-cigarette susceptibility. Covariate adjustments included demographics, socio-economic indicators from the Family Affluence Scale, and social media engagement. Analytical methodologies involved SAS survey procedures, chi-square tests, and logistic regression. Results: Of the surveyed Hispanic youth, 7.11% reported e-cigarette use, 1.33% cigarette use, and 0.85% were dual users. E-cigarette use was significantly higher in non-English speakers (9.14%) than in English speakers (6.04%; $p=0.0012$). In adjusted models, non-English speakers had 1.53 times the odds (95% CI: 1.16-2) of using e-cigarettes compared to English speakers. Females reported a greater prevalence compared with males (8.31% vs. 5.88%; $p=0.03$). Adjusted for covariates, females had 1.51 times the odds (95% CI: 1.08-2.12) of e-cigarette use relative to males. Discussion: Non-English speaking Hispanic youth in the US were more likely to use e-cigarettes, contrasting previous studies. A potential reason is their limited access to health info in their native language, leading to misconceptions about e-cigarettes. The increased use in Hispanic girls might indicate cultural shifts in substance use, tied to changing gender roles in US-born Hispanic communities. Despite US birth, these students might grapple with cultural nuances, affecting substance abuse due to dual heritage.

FUNDING: Unfunded

POS4-53

DIFFERENTIAL CHANGES IN YOUTH TOBACCO USE BEFORE AND AFTER IMPLEMENTATION OF MASSACHUSETTS' STATEWIDE FLAVOR RESTRICTION POLICY

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Significance: Compared to the general population, prevalence of flavored tobacco product use is higher among certain sociodemographic groups such as youth, sexual and gender minorities (SGMs), and African Americans (AAs). Policies that restrict the sale of flavored tobacco products have been increasingly implemented at the local and state level, with Massachusetts being the first US state to restrict the sale of all flavored tobacco products in June 2020. Despite their increasing adoption, little is known about how these policies differentially impact the sociodemographic groups most affected by flavored tobacco. This study examined youth tobacco use (disaggregated by SGM identity and race/ethnicity) in Massachusetts before and after the state implemented a flavored tobacco restriction. **Methods:** Data for this analysis came from the 2019 and 2021 Massachusetts Youth Risk Behavior Survey (YRBS), a biennial, national survey conducted among high school students, provided by the Massachusetts Department of Elementary and Secondary Education. Changes in current use of cigarettes and e-cigarettes between 2019 and 2021 were examined for the entire sample and by SGM identity and race/ethnicity. Current use was defined as reporting any use in the past 30 days. **Results:** Between 2019 and 2021, current cigarette use and current e-cigarette use decreased for the entire sample (3.78% to 2.79% and 27.69% to 15.74%, respectively). Decreases were also observed after disaggregating results, but smaller changes were observed among minoritized groups (i.e., SGM and AAs), particularly for e-cigarettes. Current e-cigarette use decreased 25.56% among individuals identifying as SGM (28.14% to 20.95%) compared to a 49.33% decrease among non-SGM individuals (27.63% to 14.0%). Among all races, AAs had the lowest prevalence of current e-cigarette use in 2019 (15.10%), but also saw the lowest percentage decrease (17.68%). Among whites, current e-cigarette use decreased 45.75% from 32.33% in 2019 to 17.54% in 2021. **Discussion:** Our results suggest that after implementation of Massachusetts' statewide flavored tobacco restriction, current cigarette and e-cigarette use declined among Massachusetts youth overall and among groups that have been most affected by flavored tobacco. However, minoritized groups (i.e., SGMs, AAs) had lower percentage decreases compared to non-minoritized groups. Further research using robust methodologies is needed to understand if differential reductions in tobacco use are a result of flavor restriction policies or other coinciding factors (e.g., COVID-19 pandemic).

FUNDING: Federal

POS4-54

EFFECTS OF ACUTE ENDS USE ON ENERGY INTAKE AND ASSOCIATIONS WITH ABUSE LIABILITY AND DEPENDENCE

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Background: Weight control is a common motive for continued cigarette smoking, and weight concerns pose a barrier to quitting, with effects driven in part by nicotine's ability to reduce appetite and ultimately body weight. While there are similar perceptions regarding electronic nicotine delivery systems (ENDS) for weight control among current users, little controlled clinical laboratory evidence exists regarding ENDS use and appetite suppression. The present study tested the influence of ENDS on acute eating behavior and associations between appetite, abuse liability, and dependence measures. **Methods:** Current ENDS users ($n=34$; 18-65 years) completed baseline measures followed by two randomly-ordered clinical lab sessions after overnight abstinence from tobacco/nicotine/food/drinks (other than water). Baseline measures included a hypothetical purchase task for ENDS (E-CPT) and the E-cigarette Dependence Scale. Sessions differed by the product administered over 20 minutes: active ENDS (20 puffs of a JUUL with a 5% nicotine tobacco-flavored pod) or control (access to an uncharged JUUL with an empty pod). Forty minutes after product use, participants were provided an *ad lib* buffet meal with 21 food/drink items. Energy intake (kcal) was calculated using pre-post buffet item weights. Repeated Measures ANOVA tested differences in energy intake by condition, and Linear mixed models and Pearson correlations evaluated associations between energy intake, post-product-administration ratings of hunger and satisfaction, E-CPT indices, and ENDS dependence ($p<0.05$). **Results:** Energy intake (kcal) did not differ significantly between active ($M 1011.9$ (SD 576.1)) and control (939.8 (515.7)) conditions. Neither E-CPT indices, ENDS dependence, nor hunger or satisfaction ratings were significantly correlated with kcals consumed or with the difference in kcals consumed between conditions. **Conclusion:** Acute ENDS use did not influence energy intake during an *ad lib* buffet meal, and ENDS abuse liability indices, ENDS dependence, and subjective measures of hunger and satiety after product use were not associated with energy intake. The lack of ENDS-associated appetite suppression may be of value in designing ENDS prevention messaging. More work is needed to better understand the effects of ENDS on longer-term appetite and body weight as well as their perceived value as a weight management tool.

FUNDING: Federal

POS4-55

SOCIODEMOGRAPHIC DIFFERENCES IN RELATIVE PERCEIVED RISKS BETWEEN CIGARETTES, NICOTINE VAPING PRODUCTS, AND HEATED TOBACCO PRODUCTS AMONG ADULTS WHO SMOKE FROM FOUR HIGH-INCOME COUNTRIES: FINDINGS FROM THE 2022 ITC FOUR COUNTRY SMOKING AND VAPING SURVEY

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Significance: Many people perceive nicotine vaping products (NVPs) and heated tobacco products (HTPs) as equally harmful or more harmful than cigarettes, despite evidence that they produce fewer toxins. This study examined differences in perceived risks across sociodemographic groups in Canada (CA), United States (US), Australia (AU), and England (EN). **Methods:** Data were from the 2022 ITC Four Country Smoking and Vaping Survey (CA: $n=1578$; US: $n=1400$; EN: $n=1856$; AU: $n=1167$). Multivariable logistic regression examined perceptions of relative harm between NVPs, HTPs, and cigarettes across sociodemographic groups (sex, age, education, income, and ethnicity) among adults (aged 18+) who smoked cigarettes $\geq$ monthly. Separate models were fit for each country. **Results:** Adults who smoked and perceived NVPs as equally or more harmful than cigarettes or did not know (DK) ranged from 53% (EN) to 81% (US). This perception was more likely among those who were male (CA, US, AU; $p=0.01$) and



older (CA, US; $p=0.04$) and less likely among those (US) with moderate ($p=0.04$) or high education ($p<0.0001$). The perception that HTPs are equally or more harmful than cigarettes or DK ranged from 74% (EN) to 87% (AU). This perception was more likely among males (CA; $p=0.01$), EN; $p=0.001$) and less likely among those who were older (EN; $p=0.04$) and of non-White ethnicity (EN; $p=0.01$). Perceiving that NVPs are equally harmful (from 38% (EN) to 49% (CA)) or more harmful (from 10% (AU, US) to 19% (EN)) than HTPs, or DK (from 26% (CA) to 33% (AU)) was notable. The perception that NVPs were equally/more harmful than HTPs/DK was more likely among those (CA) who were older ($p=0.05$), of high income ($p=0.04$) and who did not state their income ($p=0.007$). Among adults who smoked but did not vape ($n=3593$), those who believed that their health would worsen or not change if they quit smoking and completely switched to NVPs, or DK ranged from 50% (EN) to 79% (US). This belief was more likely among those who were male (AU; $p=0.0002$), older (CA, EN, US, AU; $p<0.05$), and of non-White ethnicity (CA; $p=0.02$), and less likely among those (US) of moderate ($p=0.008$) and high education ($p=0.0002$), and of high income (CA, EN, US; $p<0.05$). **Conclusion:** These findings highlight the importance of examining perceptions of product harmfulness by subgroups in order to identify adults who smoke whose perceptions may discourage them from using reduced exposure products to transition away from cigarettes.

FUNDING: Federal; State

POS4-56

TOBACCO PREVALENCE IN 5 URBAN SLUMS OF DELHI: RESULT FROM A CROSS SECTIONAL SURVEY

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Significance: Slum areas exhibited a marked prevalence of elevated tobacco consumption rates, prompting the investigation to assess the extent and perspectives of tobacco usage among the residents in these regions. The present study aimed to evaluate the prevalence and attitudes towards tobacco use within five distinct slum localities in close proximity to the tobacco cessation center. **Methods:** During a house-to-house visit, a cross-sectional survey was conducted in five different slum areas, coding as Zone 1 to Zone 5. To ensure a representative sample, 20% of households (HH) were randomly selected from each slum. The survey utilized a pre-designed, pretested, and semi-structured questionnaire to collect relevant data. **Results:** A total of 274 households (HH) provided consent to participate in the survey. 62.6% (841) of the population in these households were adult. The Significant variations in tobacco prevalence were observed across all five slums, ranging adult tobacco prevalence from 9.6% to 21.4%. The mean age (standard deviation) of adult tobacco users in Zone 1 to Zone 5 was 44.87 (± 13.7), 47.4 (± 11.9), 38.2 (± 12.3), 43.7 (± 6.9), and 41.8 (± 11.5) years, respectively. Tobacco usage prevalence varied significantly by gender, with males accounting for 86.1% and females 13.9% of the tobacco users. Among tobacco users, smoking was the most preferred method, followed by smokeless tobacco use. Notably, 85 (43.8%) adult tobacco users expressed their willingness to quit tobacco usage out of which 22.3% were female. Surprisingly 70.4% of total adult women tobacco users showed their willingness to quit, while the corresponding percentage for men was only 39.5%. **Conclusion:** Despite the close proximity to the tobacco cessation center and the continuous display of pictorial warnings and the tobacco cessation helpline number on tobacco packets, tobacco users demonstrated a lack of awareness regarding tobacco cessation, despite being aware of the harmful effects of tobacco use. However, despite this lack of awareness, individuals still exhibited a strong interest in quitting tobacco consumption.

FUNDING: Academic Institution

POS4-57

MODELING CONTEXTUAL HETEROGENEITY IN YOUNG ADULT VAPING BEHAVIORS: A MULTILEVEL LATENT CLASS ANALYSIS OF DAILY DIARY DATA

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SIGNIFICANCE. Vaping nicotine is an ongoing public health concern in the US, with rates highest among young adults. A fuller understanding of the context of vaping in daily life is critical to guide behavioral interventions. Key contextual factors include the set of locations in which an individual vapes throughout the day and people with whom one vapes. Taken together, this information can contextualize types of vaping days and link types of days to same-day risk factors. We present multilevel latent class analysis (MLCA) applied to daily diary data to characterize contextual profiles of vaping and their associations with same-day use of cigarettes, cannabis, and alcohol and experiences of discrimination. **METHOD.** 318 young adults (69% female; 17% sexual/gender minority;

28% food insecure; 85% White; mean age 20.0 years) who participated in a 21-day study reported vaping nicotine on at least 1 day; collectively they reported 1,888 vaping days that were analyzed in this study. There were nine daily indicators of vaping context: five locations of use (home, friend's home, outdoors, restaurant/bar/club, car) and four indicating with whom they used (alone, with friends, with roommate, with romantic partner). Models were estimated using SAS PROC LCA with a clustering variable to accommodate the nested data structure. **RESULTS.** Seven contextual patterns were identified: Home Alone (35% of vaping days); Home & Outdoors Alone (16%); Hosting Friends at Home (22%); At Home with Roommate (10%); At Home with Partner (4%); With Friends who Host (9%); and Alone at Friend's Home (4%). Cigarette smoking was most common (21%) on days on of vaping At Home with Partner, with 8% or fewer smoking on all other types of vaping days. Cannabis use was most prevalent on vaping days when Hosting Friends at Home (33%) and least prevalent on days vaping Alone at Home or Outdoors (16%). Alcohol use was very common on vaping days when Hosting Friends at Home (76%) and With Friends who Host (82%); in contrast, it was least common on Home Alone vaping days (7%). Discrimination was reported most frequently on days when individuals used Alone at Friend's Home (26%). **CONCLUSION.** MLCA of daily data provides a comprehensive way to examine heterogeneity in the contexts of vaping behaviors and associated risk factors that could trigger intervention. Future work will examine person-level characteristics as moderators of the links between vaping context patterns and same-day risk factors.

FUNDING: Federal; Academic Institution

POS4-58

CIGARETTE SMOKING AND EMOTION PROCESSING AMONG INDIVIDUALS WITH SCHIZOPHRENIA SPECTRUM DISORDERS

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Significance Cigarette smoking is a leading cause of preventable death in people with schizophrenia and related disorders (SCZ). Compared to other clinical and non-clinical populations, people with SCZ have the highest prevalence of cigarette smoking and lowest successful smoking cessation. Previous reports have linked difficulties with emotion processing (e.g., emotion awareness and regulation) with smoking behavior. However, this putative link has not been investigated in people with SCZ. **Methods** One hundred and twenty-two individuals with a diagnosis of schizophrenia or schizoaffective disorder (65.6% male; 36.9% Black; 23.0% Latinx ethnicity) completed self-report measures on cigarette smoking status, emotion awareness and regulation, as well as symptoms of psychosis, depression, anxiety, and cognitive functioning. Data collection took place between 2012-2022. The average age of the sample was 36.03 years old and majority were unemployed or receiving public assistance, identified as single/never-married, and living with roommates, parents, relatives, or adult children. All clinical and demographic measures were assessed by smoking status. **Results** Thirty-six percent of participants reported current smoking. Employing linear regression analyses, higher use of suppression was significantly associated with smoking status when sex, education, living arrangements, and psychiatric diagnosis were considered ($p=.002$). Likewise, cognitive reappraisal was significantly associated with smoking status controlling for ethnicity, education, living arrangements, and psychiatric diagnosis ($p=.016$). Finally, when accounting for clinical and demographic characteristics, lower emotion awareness predicted smoking status ($p<.001$). **Conclusion** Our findings highlight the important links between emotion awareness and regulation and smoking status among individuals with SCZ. Future smoking cessation intervention studies among individuals with SCZ should examine the potential benefit of targeting emotion awareness and regulation to enhance efficacy of treatments.

FUNDING: Federal

POS4-59

EXPOSURE TO PUBLICITY AMONG EXPERIENCED AND NON-USERS OF TOBACCO PRODUCTS AND THEIR INTENTION TO USE FLAVORED TOBACCO IN THE FUTURE

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Significance Tobacco companies use various promotional methods for the purpose of selling cigarettes. Tobacco advertisements affect consumers' perceptions and attitudes



toward smoking, leading them to purchase tobacco products. According to previous studies, adolescents who had never smoked had a higher risk of starting e-cigarette smoking if they frequently visited convenience stores or were exposed to cigarette advertisements in convenience stores. This study analyzed the relationship between exposure to cigarette advertisements and intention to use flavored cigarettes in subjects aged 13 to 39 years. **Methods** A total of 10,030 people (5,106 men) agreed to participate in the study among the general public on the nationwide survey panel held by an online survey company (Gallup): 1,448 participants aged 13 to 18 years old, 3,699 aged 19 to 24 years old, 4,883 aged 25 to 39 years old, and the total number of tobacco product users was 6,374 people. Distribution of tobacco product users and non-users' exposure to tobacco advertisements were analysed. Logistic regression analysis was conducted on future smoking intentions, and their related factors. **Results** Among all tobacco product users, 4,435 (69.6%) were aware of exposure to advertisements, cigarette pack packaging, and promotional content for each type of tobacco product. The odds ratio for future intention to use flavored cigarettes in tobacco product users was 1.41 times (95% CI 1.17-1.69) in the 19-24 age group and 1.48 times (95% CI 1.25-1.76) in the 25-39 age group. The odds ratio for the intention to use flavored cigarettes when exposed to flavored tobacco advertisements or user experiences was 1.55 (95% CI 1.39-1.71) for tobacco product users, while it was 3.87 (95% CI 2.69-5.58) for non-tobacco product users. For both experienced and non-users of tobacco products, those who perceive that flavored tobacco products have 'good flavor' and 'reduce physical discomfort such as coughing and foreign body sensation in the throat' have a high intention to smoke, whereas 'have never heard of flavored tobacco products'. In the case of 'no', the intention to smoke was low. **Conclusion** Tobacco product users had a high intention to use flavored tobacco, and non-tobacco product users also had a high intention to use flavored tobacco when they were exposed to flavored tobacco advertisements or stories of use. It is necessary to strengthen regulatory policies such as improving awareness of the influence of tobacco advertisements, continuous monitoring and monitoring of flavored tobacco product advertisements, regulating exposure of tobacco product information and advertisements through youth media, regulating purchase channels, distributing preventive content in response to social media, and banning flavored additives.

FUNDING: State

POS4-60

EXAMINING DAILY ASSOCIATIONS BETWEEN CANNABIS AND E-CIGARETTE USE AMONG MEXICAN AMERICAN COLLEGE STUDENTS: AN ECOLOGICAL MOMENTARY ASSESSMENT STUDY

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Significance: The prevalence of cannabis and e-cigarette use among young adults in the U.S is increasing. However, little is known about the daily patterns of co-use of these two products. This study aims to address this gap by examining the daily associations between different modes of cannabis use and use of nicotine-containing e-cigarettes among Mexican American college students. **Methods:** Participants were 51 18-to-25-year-old (Mean age=21.04; SD=1.78) Mexican American college students who were past 30-day e-cigarette users. Participants were recruited from five Texas colleges in Spring 2023: 27.5% were male, 78.4% received Pell grants, and 94.1% were born in the U.S. Participants engaged in a 14-day Ecological Momentary Assessment (EMA) study using the LifeData RealLife app. Each participant recorded the number of times they used nicotine-containing e-cigarettes and cannabis via three modes (smoking combustible cannabis, vaping cannabis, and edible cannabis) on the previous day, over 14 days. Mixed effects regressions examined between- (i.e., person average) and within- (i.e., deviations from the person average) person effects of the cannabis use mode on nicotine-containing e-cigarette use. Sociodemographic variables of age, sex, Pell grant status, and U.S birth status were included in the regressions as covariates. **Results:** On average, participants used e-cigarettes for 5.71 days (SD=4.33), smoked cannabis for 1.06 days (SD=2.44), vaped cannabis for 0.92 days (SD=2.44) and used edible cannabis for 0.22 days (SD=0.67) over the 14-day period. Mixed-effects regressions showed that within-person combustible cannabis use was associated with a lower likelihood of e-cigarette use ($\beta = -0.46$, $p < .001$) whereas within-person cannabis vaping was associated with a higher likelihood of e-cigarette use ($\beta = 0.72$, $p < .001$). The consumption of edible cannabis was not associated with e-cigarette use, perhaps due to the low prevalence of edible consumption. **Conclusion:** The daily associations between cannabis and e-cigarette use vary based on the mode of cannabis administration. Young adults who use e-cigarettes appear to be more likely to vape cannabis than to smoke it. Findings suggest that there may be two different populations of young adults with

varying substance use behaviors and preferences. More research is needed to understand how cannabis and nicotine/tobacco products are co-used among young adults, the population at highest risk for using both products.

FUNDING: Federal

POS4-61

PROJECTED SMOKING PREVALENCE AND LUNG CANCER SCREENING ELIGIBILITY FROM 2020-2060 FOR THE OVERALL AND THE NON-HISPANIC BLACK US POPULATIONS

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Significance Due to inequities in lung cancer screening (LCS) eligibility, the United States Preventive Services Task Force (USPSTF) updated their screening recommendations to expand eligibility. However, concerns remain about whether these new criteria address unequal access to screening for key sociodemographic groups. Currently, the USPSTF recommends annual LCS for individuals aged 50-80 with ≥ 20 pack-years of exposure and ≤ 15 years since quitting. However, smoking history-based screening criteria may not best fit all populations; Non-Hispanic Black (NHB) Americans have higher lung cancer rates despite smoking at a lower intensity (cigarettes per day) versus the general (All Races) American population. It is also unclear if differences in eligibility between the NHB and All Races populations in the US will increase or decrease over time. **Methods** We projected population and smoking rates by age (50-80) and sex, and the corresponding annual percentage and number of US LCS-eligible individuals from 2020-2060 using a validated simulator of US smoking histories, the CISNET Smoking History Generator. We then compared projected smoking prevalence and screening eligibility between the overall and the NHB populations. **Results** As smoking continues to decrease, the number and percentage of LCS-eligible individuals will decrease progressively during the following decades, reaching under 10 million eligible by 2033 for the overall population and under 1 million by 2032 for the NHB population. In 2020, among individuals aged 50-80, 17.0% of overall men and 15.1% of NHB men were estimated to be eligible for screening. By 2040, 5.9% of overall men and 5.7% of NHB men were projected to be eligible. Similarly, the proportion of eligible women decreased from 12.3% (overall) and 8.6% (NHB) in 2020 to 4.5% (overall) and 3.5% (NHB) in 2040. **Conclusion** Differences in the LCS-eligible proportion by sociodemographic group will decrease considerably in the following decades. Additionally, the number of LCS-eligible individuals will decrease for both the overall and the NHB populations. This will lessen the impact of LCS on lung cancer mortality differences by sociodemographic group, unless eligibility criteria evolves.

FUNDING: Federal

POS4-62

SOCIODEMOGRAPHIC DIFFERENCES IN MENTHOL CIGARETTE USE IN THE UNITED STATES

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Background: Menthol cigarette use is associated with higher smoking initiation and reduced smoking cessation. We investigated sociodemographic differences in menthol and nonmenthol cigarette use in the United States. **Methods:** We used the most recent available data from the May 2019 wave of the nationally-representative Tobacco Use Supplement to the Current Population Survey. The survey weights were used to estimate the national prevalence of individuals who currently smoke among individuals who use menthol and nonmenthol cigarettes. Survey-weighted logistic regression methods were used to estimate the association of menthol cigarette use with formerly smoking cigarettes and attempting to quit within the past 12 months while adjusting for several sociodemographic factors associated with smoking. **Results:** The prevalence of current smoking in individuals who ever smoked menthol cigarettes was higher 45.6% (44.5%-46.6%) compared to 35.8% (35.2%-36.4%) in individuals who ever smoked nonmenthol cigarettes. Non-Hispanics Blacks who used menthol cigarettes had a higher likelihood of being an individual who currently smokes (OR 1.8, 95% CI: [1.6-2.0], P -value $< .001$) compared to Non-Hispanic Whites who used nonmenthol cigarettes. However, Non-Hispanics Blacks who used menthol cigarettes were more likely to make a quit attempt (OR 1.4, 95%CI: [1.3-1.6], P -value $< .001$) compared to non-Hispanic Whites who used nonmenthol cigarettes. **Conclusions:** Individuals who currently use menthol cigarettes are more likely to make attempts to quit smoking. However, this did not translate to successfully quitting smoking, as evidenced by the proportion of individuals who formerly smoked within the population which used menthol cigarettes.

FUNDING: Federal; State; Academic Institution



POS4-63

WATERPIPE USE IN GERMANY: PREVALENCE IN THE COURSE OF TIME, POLY-PRODUCT USE, AND PERCEIVED HEALTH RISKS OF CONSUMPTION (DEBRA STUDY)

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SIGNIFICANCE In Germany, rising sales figures for waterpipe (WP) tobacco indicate a strong increase in WP consumption among the population. As WP tobacco contains nicotine, there is a risk of developing an addiction. Especially young people who use multiple nicotine/tobacco containing products concurrently are more prone to nicotine dependence and to continue using tobacco as adults. This, and a potential underestimation of the health risks of WP consumption, might hinder efforts to reduce nicotine/tobacco use overall. Detailed data from Germany regarding these topics are lacking. **METHODS** We used data from the ongoing German Study on Tobacco Use (DEBRA): a cross-sectional, representative, face-to-face household survey in the population aged 14 years or older from Germany. Descriptive analyses regarding prevalence of current WP use over the period 2018-2022 and prevalence of concurrent use of further inhaled nicotine and tobacco products (cigarettes, heated tobacco products, e-cigarettes) based on data from 27 waves (07/2018-11/2022; N=1229 current WP users). Concerning the descriptive analysis of the perceived health risks of WP use compared to cigarette smoking data from our last four waves (01/2023-06/07-2023; N=174 current WP users) were included. **RESULTS** The prevalence of current WP use differed between age groups and was highest in 14-24-year-olds. In this age group in 2022 the prevalence was 9.8% (95%CI=7.9-11.9) in men and 8.7% (95%CI=6.8-10.9) in women. In contrast to men, an increase in prevalence was found among women across all age groups. 36.3% of current WP users (95%CI=33.8-38.9) reported exclusive WP use, 63.7% co-use. In the latter group, co-use of conventional cigarettes was most widespread (50.0%, 95%CI=47.3-52.7), and 9.8% (95%CI=8.3-11.5) used two further nicotine products in concurrent to WP use. Almost half of current WP users (51.7%, 95%CI=44.0-59.4) perceived WP less or much less harmful to health than cigarettes. **CONCLUSION** The high and increasing rate of WP usage and concurrent use of multiple nicotine/tobacco containing products in young people in Germany is of concern. It is important to continue monitoring the use of WPs and to inform users about the health risks of WP consumption.

FUNDING: Federal; State

POS4-64

COMPARATIVE ANALYSIS BETWEEN INSTAGRAM AND TIKTOK POSTS OF VAPE BRANDS

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Background E-cigarette brands, such as Juul, are heavily promoted on TikTok and Instagram, two of the most popular visual-based social media platforms for young adults. Influencer-posted promotional content can have an outsized impact on encouraging young adults to use e-cigarette products. Thus, it's imperative to understand TikTok and Instagram vape brand portrayals for tobacco regulatory purposes; however, there have been no comprehensive or comparative studies of these two platforms specific to e-cigarette brands. The current study will gain insights into vape brands on social media and contribute to vape-related health communication campaigns by examining how Instagram and TikTok posts overlap or differ. **Methods** We searched Instagram and TikTok for e-cigarette brand content (e.g., "elfbar", "escobars", "vuse", "pastelcartel", and "lostmary"), preprocessed the data, and obtained a final sample of 2,505 TikTok posts and 680 Instagram posts from 2022 to 2023. We used BERTopic, a computational topic modeling method, to identify clusters from our collected Instagram and TikTok posts. We first used BERTopic on our entire dataset. We then removed clusters that had irrelevant content and iterated BERTopic on our reduced dataset. Our final, selected topics were interpreted using qualitative thematic analysis and compared between platforms. **Results** We successfully identified four overarching (though somewhat differing) themes within two datasets. The Instagram themes include 1. General (n=1 cluster; keywords: aroma, puff), 2. Marketing (n=3 clusters; keywords: vapeshop, wholesale), 3. Quality/Perception (n=1 cluster; keywords: vusequality, impressionsthatlast), 4. Community (n=2 clusters; keywords: vapesociety, vapefam). Conversely, the TikTok themes include 1. General (n=2 clusters; keywords: vaping, disposable), 2. TikTok features (n=1 cluster; keywords: greenscreen, capcut), 3. Cessation (n=1 cluster; keywords: quitsmoking, stopvaping), 4. Product reviews (n=2 clusters; keywords: recommendation, review). **Conclusions** Using topic modeling and qualitative thematic analysis, we found four Instagram and

TikTok themes. Instagram was used more than TikTok to promote e-cigarette brands (30%) and connect e-cigarette users (19.3%). TikTok posts were more likely to include e-cigarette cessation (22.2%) and product review clusters (17.1%). The findings not only help us understand each platform's role in spreading e-cigarette content but shed light on platform-specific regulatory strategies.

FUNDING: Federal

POS4-65

CRITICAL APPROACH TO STUDIES ON EXPOSURE OF IN VITRO AND IN VIVO TO E-CIGARETTE AEROSOL

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The effects of exposure to e-cigarette aerosol on in vitro and in vivo systems provide useful information to assess the risk profile of vaping. These effects can be analyzed and evaluated by means of a computerized system manufactured by SCIREQ (Scireq®, Montreal, QC, Canada), generating aerosol by the InExpose equipment that incorporates the box mod of a high powered third generation tank device (JoyeTech® EVIC mini). We conducted laboratory tests to examine the calibration and ranges of functionality of this device operated in power, voltage and temperature control modes, using the nickel coil of 0.15 ohms supplied by SCIREQ and considering the puffing parameters consistent with the maximal instantaneous peak flow of 1.675 L/min allowed by the inbuilt controller in the InExpose. Our calibration tests show significant deviations between the nominal resistance, dial values of power, voltage and temperature and same variables measured in the laboratory. The emission tests show that the InExpose would necessarily generate an overheated and aldehyde loaded aerosol, above its Optimal Regime of operation, unless the JoyeTech® EVIC mini is puffed in restricted ranges of these variables. However, for a much higher airflow than that allowed by the InExpose the JoyeTech EVIC mini with the 0.15 ohms coil can generate aerosols much more efficiently, in much wider ranges of power, voltage and temperature, without overheating and with negligible aldehyde yields. This much improved performance with higher airflows is consistent with consumer usage of this type of devices for the "Direct to Lung" style. A revision of 15 recently published studies, using the InExpose under the same conditions of our tests, strongly suggest that all exposed cell lines and mice to overheated and unrealistic EC aerosols, thus providing a misleading assessment of the risk profile of ECs. The results of our laboratory testing suggests that in vitro and in vivo studies can only be relevant for stakeholders if they rely on appropriate and realistic aerosol generation procedures

FUNDING: Unfunded

POS4-66

EFFECT OF ELECTRONIC NICOTINE DELIVERY SYSTEMS FOR SMOKING CESSATION ON SLEEP QUALITY: SECONDARY ANALYSIS OF A RANDOMISED CONTROLLED TRIAL

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Significance: Evidence from randomized controlled trials (RCT) suggests that electronic nicotine delivery systems (ENDS, also called E-cigarettes) may help smokers quit smoking cigarettes. Cigarette smoking impairs sleep as often does quitting smoking. RCTs have not published evidence on the effects ENDS combined with standard of care (SOC) counseling may have on sleep. **Methods:** We conducted a secondary analysis of data from the Efficacy, Safety, and Toxicology of ENDS for smoking cessation trial (ESTxENDS), an RCT with adult smokers willing to quit. Adults who smoked at least 5 cigarettes per day were recruited (July 2018-June 2021) at 5 study sites across Switzerland. The intervention group received ENDS and 6 months e-liquids ad libitum plus SOC; the control group received SOC. At baseline and 6-month follow-up, participants self-reported sleep on the Pittsburgh Sleep Quality Index Questionnaire (PSQ-I) which ascends from 0 to 21 with increased Score sleep impairment becomes more likely; from this, we determined onset latency, overall sleep duration, number of nightly awakenings or arousals, and subjective quality of sleep at baseline and 6-month follow-up visit. Our linear regression models adjusted for baseline covariates; inverse probability weighting



accounted for attrition and multiple imputation accounted for missing data of the PSQ-I at baseline. Results: We included 1243 participants (intervention group 620, control group 623); mean age was 41.1±13.5. Of these, 829 participants (458 in the intervention group, 371 in the control group) completed the PSQ-I at 6-month follow-up; in the intervention group, 67.0% used ENDS, 48.5% did not smoke cigarettes and 18.5% smoked cigarettes (dual users); 6.2% of the control group used ENDS. Mean PSQ-I scores at baseline were 5.7±3.2 in the intervention group (5.0±3.1 at 6 months) and 5.7±3.4 in the control group (5.4±3.3 at 6 months). There was no evidence the intervention affected the PSQ-I score in the main adjusted model (coefficient -0.23, 95% CI -0.580 to 0.129, $p=.213$). The intervention did not appear to affect other PSQ-I sub-scores such as sleep onset latency, overall sleep duration, number of nightly awakenings or arousals, and subjective quality of sleep. Conclusion: Neither ENDS plus SOC nor SOC alone had an effect on the sleep quality of participants. This evidence indicates that ENDS can be employed for smoking cessation without any risk of causing or amplifying insomnia symptoms in patients.

FUNDING: Federal; Nonprofit grant funding entity

POS4-67

EFFECTS OF SUPPLEMENTARY CAPACITY-BUILDING MESSAGES AND COMMUNITY SUPPORT FOR DISADVANTAGED AREAS DURING A STATEWIDE CAMPAIGN

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Significance: People who smoke living in disadvantaged areas attempt to quit at the same rate as those from more advantaged areas but have greater difficulty staying quit. Supplementing motivational tobacco control statewide campaigns with capacity-building messages, delivered to people who smoke and their community in disadvantaged areas, may help reduce relapse. **Methods:** Capacity-building messages were delivered via social media, out-of-home and digital media across disadvantaged areas within Victoria, Australia during a statewide campaign. To evaluate the capacity-building campaign, people who smoke in disadvantaged areas completed a mid-campaign survey ($n=803$, beginning week 4 of the statewide campaign) and a follow-up survey ($n=542$, 2-4 weeks later). Prevalence ratios estimated through generalised linear models with log-link (Poisson regression) compared those who recalled both the capacity-building and statewide campaigns, to those who recalled the statewide campaign only, and those who did not recall any campaigns. **Results:** By mid-campaign, over a quarter (27%) recalled the capacity-building campaign plus the statewide campaign, and this increased to 36% by follow-up. At mid-campaign, those who recalled both campaigns were significantly more likely to report being confident to resist urges to smoke in the first month after quitting (58%), confident to stick with quitting in the face of stress, boredom or during social situations (55%), agree that leaders in their community would support them if they tried to quit (63%), discuss quitting with Quitline counsellor (24%) and use pharmacotherapy (43%) compared to those who recalled the statewide campaign only (48%, 44%, 49%, 8%, 22% respectively), and to those who did not recall any campaigns (46%, 42%, 44%, 8%, 17% respectively). At follow-up, those exposed to both campaigns were significantly more likely to have made a quit attempt (42%) and to be quit for at least five days between mid-campaign and follow-up surveys (17%) compared to those who recalled the statewide campaign only (28%, 7%, respectively) and to those who did not recall any campaigns (24%, 6%, respectively). **Conclusions:** These findings suggest that exposure to supplementary capacity-building messages aimed at people who smoke and their communities is a promising strategy to improve quitting outcomes among those from disadvantaged areas.

FUNDING: Nonprofit grant funding entity

POS4-68

SETTING THE DISCOURSE: LESSONS FROM A TOBACCO TRADE ORGANIZATION'S RECRUITMENT AND USE OF LATINX ORGANIZATIONS TO ADVANCE ITS POLICY AND PUBLIC RELATIONS GOALS IN THE 1980S AND 1990S

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Significance: Untrusted and unpopular, the tobacco industry has repeatedly recruited third parties to advance its policy agenda. While studies have explored tobacco industry efforts to obtain support from minority, labor, and various special interest organizations to assist its policy agenda, little is known about its past targeting of Latinx organizations. **Methods:** Our case study was created by reviewing internal tobacco industry documents

in UCSF's Truth Tobacco Industry Documents Library. We examined activities, messaging, and strategies employed by the Tobacco Institute (TI), a former trade organization, to recruit and use prominent Latinx organizations in the United States to advance TI's policy goals. Relevant documents were produced between 1984 and 1999, and entered in Excel by keyword search, summarizing each for content. Documents were subsequently organized by chronology to determine the nature and growth of TI's efforts with Latinx organizations. Results: We found that TI recruited Latinx organizations to advance its agenda on advertising, excise taxes, smokefree policies, and youth prevention. To activate Latinx organizations, TI hired Latinx figureheads as consultants, utilized a public relations firm to coordinate efforts, and provided extensive assistance to Latinx organizations to develop partnerships. TI tailored messaging to persuade Latinx organizations to voluntarily advance its objectives. Latinx organizations subsequently advocated TI's arguments by framing towards their Latinx concerns and perspectives. Latinx organizations and TI Latinx consultants sent letters to lawmakers, submitted testimony, issued policy resolutions, and communicated to the public via media institutions, often using industry-drafted materials. TI's tactics led to the formation of a powerful network of Latinx allies that actively and successfully supported the tobacco industry's objectives. Conclusions: TI used tactics and arguments similar to tactics identified in previous research examining the industry's behavior in excise tax and smokefree policy battles, indicating its methods are universal, including for "minority"-representing allies. These Latinx organizations lent TI's arguments credibility while providing unique framing that enhanced their dimensionality. Since the industry may still target Latinx groups, our findings suggest that tobacco control advocates should proactively collaborate with and tailor messaging to Latinx organizations to counter industry influence attempts.

FUNDING: Federal

POS4-69

THIRDHAND SMOKE EXPOSURE IS ASSOCIATED WITH ALTERED FUNCTIONAL CAPACITY OF THE INFANT GUT MICROBIOME

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Significance: Emerging data support potential impacts from exposure to thirdhand smoke (THS; i.e., post-combustion tobacco residue) on the rapidly developing gut microbiome of hospitalized infants. Our prior research found significant associations for indices of THS exposure (e.g., urine cotinine) with 8 separate taxa (e.g., *Bifidobacterium*) and 2 indices of bacterial diversity in the guts of infants admitted to the neonatal ICU (NICU). Our current aim was to explore differences in functional gene content for biological pathways found in the gut of infants hospitalized in a NICU, based on exposure to THS. **Methods:** We recruited 40 postpartum people with an infant admitted to a metropolitan NICU ("dyads") who consented to an interview, a carbon monoxide-breath sample, infant urine collection for cotinine analyses, and infant stool collection for metagenomics sequencing. Dyads from homes with one or more individuals who smoke or use nicotine ("THS-exposed"; $n=28$) were over-recruited compared to dyads from homes with no individuals who smoke or use nicotine ("non-exposed"; $n=12$). Median time to stool collection after delivery was 12 days (IQR: 5-17 days; maximum=36 days). Sequencing provided a high-dimensional dataset representing a network of >9,000 taxa-associated molecular pathways implicated in the gut. Bayesian generalized linear modeling was used to identify the strongest pathways that discriminate non-exposed and THS-exposed infant samples. To handle the high dimensionality, wherein the predictor set p was far greater than sample size n ($p \gg n$), the horseshoe prior was employed. Follow-up analyses used projection predictive variable selection to emphasize parsimony. **Results:** For the most regularized (conservative) model, analyses identified 11 pathways of interest that best discriminated infant samples by THS-exposure status. *E. coli* was implicated in 5 of these pathways: in each case, non-(THS)-exposed infant samples demonstrated higher levels of functional potential (e.g., higher RNA degradation; DNA replication). Non-exposed infant samples also demonstrated higher levels of unclassified Vitamin B6 biosynthesis, *Citrobacter koseri* lysine degradation, and *Klebsiella* nucleotide excision repair. THS-exposed infant samples demonstrated higher *Enterobacter* biotin metabolism and *Streptococcus salivarius* cysteine metabolism. Cysteine is bactericidal to *Streptococcus salivarius*, which is an early gut colonizer involved in homeostasis and host inflammation regulation. THS-induced changes to cysteine metabolism may alter *S. salivarius* abundance and adversely impact infant health. **Conclusions:** This hypothesis-generating, preliminary work identified biological pathways in the infant gut microbiome that may be impacted by THS exposure and could alter the developmental trajectory of the gut microbiota and negatively impact infant health.

FUNDING: Federal



POS4-70

EXPOSURE TO E-CIGARETTE POSTS ACROSS SOCIAL MEDIA PLATFORMS AND THEIR ASSOCIATIONS WITH E-CIGARETTE USE: A COMPARISON OF HIGH SCHOOLERS IN JALISCO, MEXICO AND LOS ANGELES, USA

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Background: Teens around the world increasingly use a variety of social media platforms (SMPs), and exposure to e-cigarette (e-cig) content through SMPs is high and associated with e-cig use. Even when online marketing is banned, as in Mexico and the US, influencers and others share e-cig content through SMPs. In both countries, SMPs have been implicated in teens' growing use of e-cigs while smoking has declined. However, little research has systematically compared teens' SMP-specific exposures to e-cig content and their correlates across countries. **Methods:** In 2022-23, surveys of 25 high schools in Jalisco, Mexico (n=1,417) and 11 in Los Angeles, USA (LA; n=3,573) contained harmonized measures that queried: how often students use specific social media platforms (SMPs: Instagram, TikTok, YouTube, Facebook, Twitter, Twitch), and, if used, how often they see e-cig posts via each SMP. For models, e-cig exposure via SMPs was re-coded (i.e., don't use or use but no e-cig exposure; monthly or weekly exposure; exposure daily or several times a day); low e-cig exposures via Twitter and Twitch required re-coding to no vs any exposure. Country-stratified logistic models regressed current (last 30 days) e-cig use on exposure to e-cig posts via SMPs, assessed separately, while adjusting for age, sex, race/ethnicity (LA only), family affluence, friend e-cig use, and family e-cig use (Jalisco only). **Results:** Reported current e-cig use was higher in Jalisco (17.5%) than LA (5.3%). Any use of some popular SMPs was similar in both Jalisco and LA (i.e., Instagram=78%, 87%; YouTube=78%, 92%; TikTok=78%, 69%, respectively), as was weekly or more frequent self-reported exposure to e-cig content through these SMPs (e.g., Instagram=22%, 18%; YouTube=14%, 15%; TikTok=24%, 18%, respectively). Exposure to content on other platforms tended to be higher in Jalisco than in LA. Evidence for dose response associations between exposure levels and current e-cig use in Jalisco was found for Facebook, Instagram, and Tik Tok; elevated associations at the highest level of exposure (but not for monthly or weekly exposure) were observed in LA for Instagram and TikTok, but not Facebook. Both studies also observed elevated odds of e-cigarette use with exposure to content on Twitter, but not for YouTube or Twitch. **Conclusion:** Teen's self-reported social media use and exposure to e-cig posts varied by SMP, with similar patterns found across high schoolers in Jalisco and LA. Both countries ban commercial marketing via social media, though strategies are needed to limit SMP exposures that may lead to e-cig use.

FUNDING: Federal

POS4-71

BARRIERS AND FACILITATORS FOR HEALTHCARE PROVIDERS IN GIVING EFFECTIVE SMOKING CESSATION ASSISTANCE FOR VIETNAMESE PATIENTS LIVING IN THE UNITED STATES

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Significance: Assisting individuals in quitting smoking can be challenging due to various barriers that hinder their willingness to quit and engagement in discussions about their smoking habits. The aim of this study was to identify the barriers and facilitators observed by healthcare providers when assisting US Vietnamese individuals in quitting smoking. Ultimately, the study sought to improve strategies for supporting smoking cessation among the Vietnamese population in the United States (US). **Methods:** Ten in-depth interviews with 8 US Vietnamese healthcare providers - 2 of them were also past smokers. The interviewees were diverse in age, sex, profession, and specialty. Interviews were recorded and transcribed verbatim. Data were analyzed using the MAXQDA program. **Results:** The age range of the participants was 38-50 years old, with 88% females. Several barriers that hindered healthcare providers from effectively assisting US Vietnamese individuals in quitting smoking were revealed. Patients' unwillingness to quit or discuss their smoking habits posed a significant challenge. The cultural norm among US Vietnamese individuals of enduring illnesses until they become unbearable was identified as a primary factor contributing to patients' resistance in acknowledging or addressing their smoking-related health issues. Also, a lack of trust,

limited awareness of available resources, misconceptions about the effectiveness of nicotine replacement therapies, and demotivation due to previous unsuccessful quit attempts were identified as significant barriers. Conversely, healthcare providers highlighted three key facilitators in helping them. First, when patients received concrete test results indicating the impact of smoking on their health, healthcare providers found it opportune to address smoking cessation in the context of other health problems and emphasize the role of smoking in the recovery process. Second, assessing patients' readiness to quit and acknowledging their current stage of motivation were crucial before delivering smoking cessation advice. Finally, building trust and ensuring patients are aware of their healthcare providers' genuine concern for their well-being were essential prerequisites for effective intervention. **Conclusion:** This qualitative study identified barriers to helping US Vietnamese individuals quit smoking and highlighted key facilitating factors for healthcare providers to deliver more effective smoking cessation assistance.

FUNDING: Academic Institution; Nonprofit grant funding entity

POS4-72

THE IMPACT OF CANNABIS USE BY ADULTS ON THE DEMAND FOR CIGARETTES IN THE UNITED STATES

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Significance: Cannabis and cigarettes are commonly co-used, but few studies have examined the relationship between cannabis use and cigarette demand. This study compared the impact of cigarette price on cigarette demand by non-current vs. current cannabis users among adults in the United States (aged 18+). **Methods:** We used cross-sectional data from the National Survey on Drug Use and Health restricted-use files (2002-2019; weighted N= 3,711,835,494 adults aged 18+) to estimate a two-part econometric model of cigarette demand separately for non-current and current cannabis users, which was defined as people who had ever used cannabis and used any cannabis in the past 30 days. In the first part of the model, a multivariable logistic regression estimated the impact of cigarette price on the probability of being a current smoker among all adults (smoking participation equation). In the second part of the model, a multivariable linear regression estimated the impact of cigarette price on the number of cigarettes smoked per day among current smokers (smoking intensity equation). **Results:** Between 2002 and 2019, 7.6% were current cannabis users. Smoking prevalence among non-current cannabis users was 18.7% and they smoked an average of 11.5 cigarettes per day. Among current cannabis users, 50.8% were current smokers who smoked an average of 10.9 cigarettes per day. For non-current cannabis users, the price elasticity was statistically significant at -0.33 for smoking participation, -0.41 for smoking intensity, and -0.74 for total cigarette demand. For current cannabis users, the price elasticity was statistically nonsignificant at -0.34 for smoking participation, but significant at -0.71 for smoking intensity and -1.02 for total cigarette demand. Current smokers who concurrently used cannabis were more price-responsive in reducing smoking intensity than those who did not concurrently use cannabis. **Conclusions:** Increased cigarette prices was associated with reduced smoking prevalence for non-current cannabis users and reduced smoking intensity for both current and non-current cannabis users. Dual users of cigarettes and cannabis were more sensitive to cigarette price increases in reducing smoking intensity than smokers who did not concurrently use cannabis.

FUNDING: State; Academic Institution

POS4-73

ENHANCING CULTURALLY-TAILORED GROUP MOTIVATIONAL INTERVIEWING FOR LATINX/E YOUTH: ADDRESSING TOBACCO-RELATED OUTCOMES WITH PARENTAL INVOLVEMENT

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Significance: The study explores the efficacy of Group Motivational Interviewing for Teens (GMIT) in preventing substance and tobacco-related outcomes among Latinx/e youth. We culturally modified GMIT (e.g., linguistic translation, integration of cultural beliefs, norms, values) to make it more culturally relevant and to include a focus on alternative tobacco products (ATPs). This adaptation, known as the GMIT-ATP model, incorporates culturally relevant elements to engage Latinx/e youth and families effectively. **Method:** Latinx/e youth aged 10 to 16 years and their parents from a Southeastern state were randomized into two groups: GMIT-ATP (N = 23) and GMIT-ATP+P (N = 32). All youth attended youth-only GMIT-ATP sessions, while the GMIT-ATP+P group



included parent-only sessions. Parents and youth completed assessments at baseline, post-intervention, and three-month post-intervention, 90.9% of families attended at least one treatment session, and 60.0% completed all three sessions. **Results:** We found that across conditions improvements were observed in adolescents' knowledge of health effects related to tobacco and ATP products; this improvement was sustained at the three-month follow-up. Notably, parental communication difficulties exhibited statistically significant improvement, reflecting the intervention's positive impact on family dynamics. Additionally, satisfaction data revealed that the content was well-received by both parents and youth and the importance of cultural customization for the program was underscored by their feedback. **Conclusion:** Our findings emphasize the interest and engagement of Latinx/e adolescents and parents in culturally tailored substance use prevention programs. Strengthening the working alliance through cultural integration may enhance treatment outcomes and engagement, offering valuable insights that translate across professionals working with Latinx/e families. In conclusion, the study demonstrates the potential of GMIT-ATP to address substance and tobacco-related outcomes among Latinx/e adolescents. This research supports the importance of tailored interventions in public health and offers insights for future approaches that prioritize cultural relevance and equitable healthcare access.

FUNDING: State

POS4-74

CIGARETTE SMOKING, E-CIGARETTE USE, AND SOCIODEMOGRAPHIC CORRELATES OF MENTAL HEALTH AND TOBACCO-RELATED DISEASE RISK IN THE ALL OF US RESEARCH PROGRAM

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Significance Research on the conditions under which electronic cigarette (EC) use produces a net reduction in the population harm attributable to combustible cigarette (CC) use requires the triangulation of information from cohort(s) of smokers, non-smokers, electronic cigarette users and dual-users of all varieties. **Methods** This project utilizes data from the All of Us Research Program to contrast a panel of wellness and disease-risk indicators across a range of self-reported tobacco-use profiles, including smokers, current and former electronic-cigarette users and otherwise healthy never users. Participants in the present analysis completed a behavioral lifestyle survey with questions about ever and current CC and EC use, and consented to link their survey reports to their electronic health record (EHR). Controlled data release (CDR) version is being utilized, consisting of data from participants who enrolled in the program between May, 2017 and June, 2022. Data processing and analysis was performed on the All of Us Research workbench, utilizing Jupyter-notebooks and R statistical programming software, hosted within secure research buckets on the Google Cloud Platform. **Results** The present analytic sample included an unweighted total of N=331,303 individuals with information on ever-use of both CCs and ECs (N=199,386 woman [60.18%], mean [SE] age 54.30 years [16.99]), of which N=128,052 were ever CC users, N=56,981 were current CC smokers (17.20%), N=12,761 were current EC users (i.e., vapers; 3.85%), and N=167,286 were never users of either CCs or ECs (50.49%). Among Ever EC users (N=50,103), N=21,343 were also current CC smokers (42.60%), N=15,837 were Former CC smokers (31.61%), and N=15,571 were Never CC smokers (31.08%). EC use prevalence was greater only within the youngest (18-24) age group, whereas CC use was greater among older, lower educated and lower income subjects. Nevertheless, findings suggest that most EC users were either current or former cigarette smokers. **Conclusions** This work is expected to demonstrate the significance of the All of Us dataset for the purpose of behavioral health research, as well as enrich the All of Us dataset with interconnections to multi-level, policy-relevant sources of data about tobacco and other drug-use and health-risk behaviors.

FUNDING: No external funding reported

POS4-75

VAPING QUIT ATTEMPT AND ITS ASSOCIATED FACTORS AMONG VIETNAMESE E-CIGARETTE USERS

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Significance: E-cigarette cessation attempts among users have gained attention in high-income countries, but limited research exists in low- and middle-income countries (LMICs). This study aimed to determine the prevalence of e-cigarette quit attempts

and investigate associated factors among e-cigarette users in Vietnam. **Methods:** A provincial version of the Global Adult Tobacco Survey (called PGATS) was conducted in 34 provinces of Vietnam in 2020. This survey followed standardized approaches for questionnaire design, data collection, data management, and ethical considerations, consistent with the Global Adult Tobacco Survey guidelines. It was conducted by the Vietnam Tobacco Control Fund - Ministry of Health, Hanoi University of Public Health, and with technical support from World Health Organization and 34 Provincial Center for Diseases Control. The sample consisted of 557 current e-cigarette users aged 15 years and above. Sociodemographic characteristics, smoking-related variables, reasons for e-cigarette use, and motivations to quit e-cigarettes were assessed. Logistic regression models were used to analyze the relationships between these factors and e-cigarette quit attempts. **Results:** Among current e-cigarette users, 45.1% reported attempting to quit vaping within the past 12 months. Perceiving e-cigarette use as more harmful than smoking cigarettes was strongly associated with a higher likelihood of making a vaping cessation attempt. Notably, smokers who had previously been unsuccessful in quitting cigarette smoking using e-cigarettes had a significantly higher likelihood of quitting vaping. Conversely, using e-cigarette as an alternative tobacco product when unable to smoke cigarettes was associated with a lower likelihood of attempting to quit vaping. The most common reasons for wanting to quit vaping included perceiving e-cigarettes as more harmful than cigarettes, their cost, and friends' or family members' disapproval of e-cigarettes. **Conclusion:** This study provides novel information on the prevalence and factors associated with e-cigarette cessation attempts among e-cigarette users in an LMIC setting. The findings highlight the importance of harm perception, cost, and social influence in motivating individuals to quit vaping. Further longitudinal studies are needed to gain a comprehensive understanding of multiple quit attempts and successful vaping cessation, also emphasizing the need for a better understanding of the associated factors and the development of effective e-cigarette cessation programs.

FUNDING: Nonprofit grant funding entity; Other

POS4-76

COMPREHENSIVE BANS ON TOBACCO ADVERTISING, PROMOTION, AND SPONSORSHIP TO PROTECT YOUTH FROM TOBACCO AND NICOTINE PRODUCTS

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Significance: The tobacco industry is using various strategies and channels to attract adolescents into tobacco use. Exposure to tobacco advertising, promotion, and sponsorship (TAPS) is a risk factor for smoking among adolescents, and similar concerns relate to e-cigarette use. The World Health Organizations' Framework Convention on Tobacco Control (WHO FCTC) obligates its Parties to prohibit all TAPS. This two-phased project examined 1) the association between the implementation of TAPS bans and youth cigarette and e-cigarette use prevalence, and 2) the trends in youth smoking among the countries that are Parties to the WHO FCTC and have participated to the Global Youth Tobacco Survey (GYTS). **Methods:** Cross-sectional data from the GYTS were linked with the WHO FCTC implementation reports. Multi-level logistic regression was used to analyse the relationship between TAPS bans and youth cigarette and/or e-cigarette use, stratified by income level. **Results:** In the first study, TAPS bans on the Internet were associated with lower e-cigarette use prevalence. Exposure to promotions or advertisements of tobacco products at the point of sale increased the odds of e-cigarette use among youth. In lower-middle and low-income countries, bans on displaying tobacco products at the point of sale, bans on product placement, and strength of additional TAPS measures were associated with lower prevalence of youth who use e-cigarettes. In the second study, the percentage of students currently smoking decreased from 10.07% to 7.69% from first (2006 - 2015) to second (2017 - 2020) GYTS round ($p < 0.001$). In low and lower-middle income countries, the degree of decrease significantly differed between countries with vs. without bans on display, partial Internet TAPS ban, ban on depiction of tobacco products, and by number of TAPS measures, adjusting for age and sex of GYTS survey respondents. In high and upper-middle income countries, the degree of decrease significantly differed by presence of partial or full Internet TAPS ban, ban on product placement, and by number of TAPS measures. **Conclusions:** The findings elucidate that the TAPS bans are associated with decreased smoking among adolescents both in high and low-income countries. Additionally, the bans appear as protective of current e-cigarette use among youth residing in lower-middle and low-income countries.

FUNDING: Nonprofit grant funding entity



POS4-77

A SYSTEMATIC ANALYSIS OF TOBACCO LAWS THAT LIMIT LOCAL AUTHORITY IN U.S. STATES

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Significance: The tobacco industry has a long history of influencing state legislation to limit local control over tobacco regulation. As a result, many states have preemption laws that prohibit local governments from enacting tobacco policies that are more stringent than state laws. However, there is a lack of comprehensive analysis of the nature and extent of these laws, which leaves a significant gap in the existing literature. This study aims to fill this gap by systematically analyzing state tobacco preemption laws. **Methods:** We used the State Tobacco Activities Tracking and Evaluation System from the Centers for Disease Control and Prevention to gather relevant legal data about state tobacco preemption laws. We verified and reviewed each law and created an archive of the pertinent sections. We then developed a coding scheme to capture the most important legal aspects of these laws and applied it to all of them. **Results:** Our analysis showed that state laws varied considerably in scope, dimensions, and content. Preemption laws differed in their level of restrictiveness and the specific wording used to express preemption. States also differed in the kinds of local regulations that were preempted, such as licensing for retail sales, smoke-free indoor areas, youth access to vending machines, and others. Some states preempted both counties and cities, while others only preempted municipalities. Many states limited local authority over tobacco sales, but fewer limited local tobacco advertising regulations. **Conclusions:** This systematic analysis provides a more detailed and nuanced picture of state tobacco preemption laws' scope, dimensions, and content. By highlighting these features, we hope to inform public health decisions in the future. Our findings may help support efforts to reduce the harmful impacts of tobacco use by enabling local governments to regulate tobacco more effectively.

FUNDING: Federal

POS4-78

EFFICACY OF NARRATIVE VIDEOS AND MINI-VR GAMES FOR ENHANCING SMOKING CESSATION COUNSELING TRAINING FOR MASTER NURSING STUDENTS: A RANDOMIZED CONTROLLED TRIAL

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Significance: The tobacco epidemic is a major public health problem worldwide. WHO recommends that training on smoking cessation intervention be required in nursing education as nurses play an important role in tobacco control. Nursing students' self-efficacy of smoking cessation counseling skills and empathy towards smokers are two important competencies and predictors of smoking cessation counseling practice during their future career lives. With the development of e-learning, narrative videos, and virtual reality games have been proven as effective teaching tools but have not been implemented in smoking cessation training. To investigate the efficacy of smokers' narrative videos and mini-virtual reality (VR) games on self-efficacy in smoking cessation and empathy towards smokers in master nursing students. **Methods:** This study was a 2-arm, waitlist-control, randomized controlled trial. The first- and second-year master nursing students enrolled in the smoking cessation course during the 2021 spring semester at a university in Hong Kong. In a tutorial, all students were given reading materials on 4 smokers' scenarios and required to demonstrate smoking cessation counseling through a role-play. Students in the intervention group were provided with four narrative videos of smokers' real-life experiences and mini-VR games, then presented quit plans through a role-play, and read the same four smokers' textual materials. Students pre- and post-tutorial completed the Providers' Smoking Cessation Training Evaluation (ProSCiTE) self-efficacy subscale and the State Empathy Scale. Linear mixed models and effect size (Cohen's *d*) were used to assess the intervention effect on the outcomes. **Results:** 26 participants were recruited, with 13 students for each group. There was no significant difference in the change in students' self-efficacy of smoking cessation counseling between the two groups ($\beta = 4.846, P = 0.096$). The control group students' empathy towards the smokers was significantly higher post-training than that of students in the intervention group (Cohen's *d* = 0.814, $P = 0.049$). **Conclusion:** Narrative videos of real smokers' stories and mini-VR games did not increase students' self-efficacy of smoking cessation and reduced students' empathy for smokers, suggesting modifications to future teaching programs to increase self-efficacy and empathy are needed.

FUNDING: No external funding reported

POS4-79

INITIAL DEVELOPMENT OF AN MHEALTH SMOKING CESSATION INTERVENTION FOR SPANISH-SPEAKING SMOKERS

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Background: Hispanic/Latinx individuals ("Hispanics") face unique barriers to quitting smoking and have less access to and utilization of evidence-based cessation treatments. With 46% limited English proficiency among Hispanics, there is a great need to develop and validate culturally appropriate Spanish-language smoking cessation interventions. To expand the reach of our recently validated printed self-help intervention (*Libre del cigarrillo, por mi familia y por mí: Guía para dejar de fumar*), we have begun a multi-step systematic process to convert its content to a visually rich and interactive mobile application format. Following a user-centered app development process, we have conducted formative research with our intended audience to ensure the development of a future app prototype addresses the needs of this population. **Methods:** We held three Zoom focus groups with Spanish-speaking Hispanics who currently smoke to assess prior mobile app experience, and to obtain feedback on the app architecture and design. Sessions were recorded, transcribed verbatim, and analyzed for emerging themes by multiple reviewers. **Results:** The sample ($n=13$) was 46% women, had a mean age of 56 ($SD=14.9$), 42% had education $\leq$ high school, and 31% were married/cohabitating. All participants smoked daily, a mean of 14 cigarettes per day ($SD=16.9$), for 32 years ($SD=16.9$), and 54% smoked ≤ 30 minutes of waking. Participants reported using social media, news, shopping, and gaming apps, but few used mHealth apps. Salient barriers for app use were fears of privacy breach and disinformation. Participants proposed community-building features, valued app personalization, reward badges, and knowledge checks, and they highlighted a preference for audiovisual material. Participants disliked having a countdown to quit date, preferring an "I quit" button to initiate monitoring progress, and viewed sharing progress with support networks as a source of unwanted pressure, though a few saw it as motivational. Overall, participants liked the app design and indicated willingness to use it. **Conclusion:** Findings elucidate the perspectives of Hispanics on mobile app wireframes. These results will guide the next phases of a multistep systematic process to develop a smoking cessation app that will be tested in a randomized controlled trial.

FUNDING: Academic Institution; Nonprofit grant funding entity

POS4-80

SUPPORT FOR NOVEL TOBACCO CONTROL POLICIES IN GREAT BRITAIN 2021 AND 2022: POPULATION-BASED SURVEY

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Significance: The UK Government aims for a smokefree nation in England by 2030, with similar aims stated by Welsh and Scottish Governments. These are unrealistic unless new tobacco control plans are implemented. This study aimed to assess support for four novel policies among adults in Great Britain (GB): (1) a ban on the sale of tobacco products to everyone born after a certain year from 2030 onwards (smokefree generation); (2) raising the legal age of sale of tobacco from 18 to 21; (3) making e-cigarettes available on prescription as a smoking cessation aid for adults who smoke; and (4) restricting e-cigarette advertising to prevent uptake by young people. **Methods:** Data were drawn from adults included in the Smoking Toolkit Study, a large population-based monthly survey in GB, weighted to match the population. The policy support questions were asked in September 2021 and October 2022. Levels of support for each policy and year were reported as well as prevalence ratios (PR) comparing support in 2021 to 2022. **Results:** Complete data were available for 4,238 adults (2021 $n=2,156$, 2022 $n=2,082$). Among these, 71% were 35 years or older, 51% were female, 57% were from more advantaged social grade (ABC1), 28% had children in the household, 89% were from England, 8% from Scotland, and 4% from Wales. The highest level of support was for restricting e-cigarette advertising to prevent uptake by young people (2021: 74%, 95% Confidence Interval (CI) 72-76%; 2022: 79%, 95%CI 77-81%). Making e-cigarettes available on prescription was supported by 45% (95%CI 42-47%) in 2021 and 44% (95%CI 41-46%) in 2022, raising the legal age of sale of tobacco was supported by 49% (95%CI 47-52%) in 2021 and 58% (95%CI 55-60%) in 2022, and smokefree generation was supported by 34% (95%CI 32-37%) and 44% (95%CI 41-46%), respectively. The policies relating to restricting tobacco sales had a higher level of support in 2022 than in 2021 (smokefree generation PR 1.3, 1.2-1.4; raising age of sale PR 1.2, 1.1-1.2), while e-cigarettes on prescription (PR 1.0, 0.9-1.1) and restricted e-cigarette advertising (PR 1.1, 1.0-1.1) had similar levels of support. **Conclusion:** While the highest level of support



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across GB is for restricting e-cigarette advertising, increasingly people also support restricting the sale of tobacco to younger people. More people are in favour of increasing the age of sale than a smokefree generation policy, although both are popular with latter still receiving support from more than 4 in 10 adults.

FUNDING: Federal; Nonprofit grant funding entity

POS4-81

THE INTERACTION OF SMOKE-FREE WORKPLACE AND HOSPITALITY LAWS AND TOBACCO 21 LAWS ON SMOKING BEHAVIORS AMONG U.S. YOUTH

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Significance: Despite decades of strengthening tobacco control measures, 362,000 adolescents began smoking cigarettes in the United States in 2021. Numerous studies have demonstrated that smoke-free and Tobacco 21 laws (T21) can effectively reduce youth smoking. However, no studies have evaluated the effectiveness of T21 laws in areas with differing smoke-free policy environments. **Methods:** We examined the interaction of smoke-free workplace and hospitality laws and T21 on smoking intention, smoking initiation, and past 30-day smoking participation using a nationally representative sample of 10th and 12th graders from the 2014-2020 Monitoring the Future Study, while also evaluating differences by sex, race and ethnicity, parental education, and college educational expectations. We calculated the average marginal effects (AMEs) using grade-stratified modified Poisson regression models. **Results:** Among 10th graders, there was a lower probability of smoking initiation and participation when there was 100% T21 or smoke-free coverage in a given county compared to less than 100% for both T21 and smoke-free coverage. Among 12th graders, we found that having 100% of the county population covered by T21 and either hospitality or workplace smoke-free laws provided the greatest reduction in smoking participation; however, we did not find similar associations with smoking intention and initiation. Using triple interaction terms between smoke-free laws, T21, and key sociodemographic characteristics, the interaction between T21 and both hospitality and workplace smoke-free laws among 10th graders differed by sex and race and ethnicity when modeling smoking intention, by parental education for smoking initiation, and by sex and parental education for smoking participation. For 12th graders, differences by sex (for workplace laws only), parental education level, race and ethnicity, and college educational expectations were observed for smoking participation, but not other outcomes. **Conclusion:** These results provide evidence for the differential effects of combinations of multiple tobacco control policies on various youth populations. Future research is needed to explain the differential impacts across sociodemographic subgroups, as well as to investigate potential differences in policy enforcement across jurisdictions.

FUNDING: Federal

POS4-82

TOBACCO, NICOTINE AND COUNTER-MARKETING PROMOTIONS USING INSTAGRAM'S BRANDED CONTENT TOOL

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Significance: The social media conglomerate Meta has a policy prohibiting the promotion of tobacco products, vaporizers, electronic cigarettes, or any other products that simulate smoking via their branded content tools, suggesting that official paid partnerships featuring these products should be rare. However, it is unclear to what extent these self-regulatory efforts have succeeded. **Methods:** We analyzed the presence and content of tobacco and nicotine promotion, as well as counter-marketing, in a sample of 400 branded/paid partnership-labeled Instagram posts with tobacco and nicotine-related terms made between July 31, 2022, and March 31, 2023, gathered from Meta's Crowdtangle tool. **Results:** Of 217 active branded posts that mentioned or depicted tobacco or nicotine products, the majority promoted rather than countered the sale of tobacco or nicotine products (84.3% vs 15.7%, respectively). Posts originating from U.S. Instagram

users accounted for 43.6% of promotional content. After the U.S., posts originating from Indonesia (19.1%), Pakistan (9.8%), and India (8.2%) were most frequent. Most posts were fully in English (74.9%). Posts primarily featured hookah (39.4%), followed by electronic nicotine delivery systems (ENDS) accessories (17.5%), ENDS devices and e-liquids (16.9%) and various types of cigars (15.3%). Of the posts originating in the US, the majority promoted a venue or event where a tobacco or nicotine product was featured (71.8%). Almost half of all promotional posts (47.5%) were sponsored by tobacco industry accounts, with some sponsored by major industry participants. Velo was listed as the sponsor for 20 posts, all in partnership with non-U.S. accounts. Posts that encouraged cessation were primarily (47.1%) sponsored by non-government organizations (such as TobaccoFree New York State and the Ad Council). **Conclusion:** Despite attempts at self-regulation, paid partnership posts promoting tobacco and nicotine products are present on Instagram, especially posts promoting venues and events that feature tobacco and nicotine use. Posts comply with Instagram's sponsorship disclosure policy but violate platform prohibitions on tobacco promotion in branded content. Self-regulation of this content shows limited success, suggesting a need for federal oversight and additional counter-marketing in social media settings.

FUNDING: Federal

POS4-83

PREVALENCE OF UNASSISTED QUIT ATTEMPTS: FINDINGS FROM THE GLOBAL ADULT TOBACCO SURVEY IN 29 COUNTRIES, 2011-2018

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INTRODUCTION Affordable smoking cessation programs and services help increase the odds of success when attempting to quit smoking. However, the majority of adults who smoked cigarettes tried to quit without any assistance. This study examined the prevalence of unassisted quit attempts overall and by sociodemographic characteristics among adults aged ≥ 15 years in 29 countries. **METHODS** We analyzed 2011-2018 Global Adult Tobacco Survey (GATS) data from 29 countries. An unassisted quit attempt was defined as an attempt to quit smoking cigarettes without using any cessation method. Weighted prevalence with 95% confidence intervals (CI) was calculated. **RESULTS** Overall, prevalence of unassisted quit attempts ranged from a high of 93.1% (95% CI 87.5%, 96.3%) in Argentina in 2012 to a low of 52.2% (44.5%, 59.8%) in Qatar in 2013. The prevalence of unassisted quit attempts for women and men was as high as 88.3% (75.2%, 94.9%) and 96.4% (94.3%, 97.8%), respectively, in Argentina in 2012; while prevalence was 42.1% (23.5%, 63.3%) for women in Kazakhstan in 2014 and 52.1% (44.3%, 59.9%) for men in Qatar in 2013. In urban areas, the unassisted quit attempt prevalence ranged from 83.3% (79.3%, 86.6%) in Thailand in 2011 to 48.4% (38.5%, 58.5%) in Indonesia in 2011; in rural areas, it ranged from 89.0% (84.8%, 92.1%) in Thailand in 2011 to 48.3% (37.0%, 59.8%) in Botswana in 2017. Among those with no formal or primary education, prevalence ranged from 96.9% (94.0%, 98.4%) in Argentina in 2012 to 37.2% (21.7%, 55.7%) in Qatar in 2013; and for those with secondary education and higher, it ranged from 92.9% (82.2%, 97.3%) in Kenya in 2014 to 52.9% (34.3%, 70.8%) in Pakistan in 2014. The unassisted quit attempt prevalence among those in the low wealth index ranged from 92.4% (79.1%, 97.5%) in Argentina in 2012 to 42.8% (27.3%, 60.0%) in Pakistan in 2014; for those in the middle wealth index, it ranged from 91.2% (85.9%, 94.6%) in Thailand in 2011 to 48.0% (31.0%, 65.5%) in Nigeria in 2012; and for those in the high wealth index, it ranged from 89.5% (74.5%, 96.2%) in Kenya in 2014 to 50.3% (44.0%, 56.6%) in Russia in 2016. **CONCLUSION** Overall, attempts to quit smoking without assistance were prevalent in the countries examined and across sociodemographic groups. Previous studies show a low success rate of unassisted quit attempts; therefore, more efforts are needed to ensure cessation services are available, accessible, and affordable for persons who smoke.

FUNDING: No external funding reported

POS4-84

WHO IS PURCHASING SLIM CIGARETTES IN CHINA? EVIDENCE FROM THE GLOBAL ADULT TOBACCO SURVEY, CHINA, 2018

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INTRODUCTION Slim cigarettes were first introduced in the United States in the 1960s and primarily marketed to women. Since it was introduced in China in 2006, slim cigarettes have been promoted as a premier brand and also billed as harm-reduction products



to appeal to both men and women. Sales of slim cigarettes in China increased from 14.0 billion sticks in 2014 to 70.0 billion sticks in 2016. We examined the prevalence of slim cigarette purchase and its related sociodemographic factors in China. **METHODS** We analysed 2018 Global Adult Tobacco Survey (GATS) data collected in China. Slim cigarette purchase was defined based on the last type of cigarette purchased among adults who smoked manufactured cigarettes. We calculated weighted percentages and adjusted prevalence ratios with predicted marginal means to evaluate significant differences between groups using multivariable logistic regression models. **RESULTS** Overall, 32.7% (95% Confidence Interval [CI] = 28.4%, 37.3%) of adults who smoked cigarettes in China in 2018 purchased slim cigarettes. The prevalence of purchasing slim cigarettes was 32.5% (95% CI = 28.1%, 37.2%) for men and 38.6% (95% CI = 29.7%, 48.2%) for women. The prevalence ranged from 26.8% (22.7%, 31.3%) (among adults aged 45–64 years and ≥ 65 years, to 39.0% (33.6, 44.6) among those aged 25–44 years. In urban areas, 36.5% (95% CI = 31.3%, 41.9%) of adults who currently smoked manufactured cigarettes purchased slim cigarettes, while the proportion was 27.5% (95% CI = 20.5%, 35.8%) in rural areas. By education, the prevalence ranged from 25.4% (18.7%, 33.5%) among those with no formal education to 52.5% (44.5%, 60.4%) among those with above high school education. By wealth index, the prevalence ranged from 24.7% (95% CI = 19.5%, 30.8%) among adults in low wealth index to 48.1% (95% CI = 39.0%, 57.3%) among those in highest wealth index. Regression models showed that the purchase of slim cigarettes was more likely among females than males, adults aged 25–44 years than those 65 years and older, those with above high school education than adults with no formal education, and adults in the highest wealth index than those in the lowest wealth index. **Conclusion** Overall, 1 in 3 adults who smoked manufactured cigarettes in China reported their last purchase to be slim cigarettes. Among adults who smoked manufactured cigarettes in China, women, and adults aged 25–44 years, with above high school education, and from the highest wealth index were more likely to purchase slim cigarettes. The findings suggest an opportunity to focus tobacco prevention and control efforts on women and young adults. This could include ban on the use of branding on the cigarette and specifying the color of the tipping and cigarette paper such as slim cigarettes.

FUNDING: No external funding reported

POS4-85

REACTIONS AND PERCEIVED EFFECTIVENESS OF PICTORIAL WARNINGS VERSUS TEXT-ONLY WARNINGS FOR CIGARS - AN EXPERIMENTAL STUDY

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Significance: Considerable research has demonstrated the superior effectiveness of pictorial warning labels versus text-only warnings as tools for communicating about risks of cigarette use. However, such research is limited in the context of cigars, which are also combustible tobacco products with similar health risks and disproportionate use by youth and minorities. We aimed to examine the strengths of different pictorial warning options, which is important for informing policy and regulatory science. **Methods:** In August 2022, we embedded an experiment within an online mTurk survey of ~2500 adults in the US. Participants were randomized to view and rate three different warnings on Black & Mild cigar packs in one of four warning conditions: 1) text-only; 2) symbolic pictorial warnings (e.g., caution symbols); 3) new US FDA photo-realistic pictorial warnings; 4) traditional graphic pictorial warnings. We used regression analyses to compare pictorial versus text warning conditions on outcomes including perceived ability to grab attention, emotional reactions, and perceived message effectiveness, focusing on a subset of participants (n=1970) who were lifetime, past 12-month or susceptible cigar users. **Results:** There were no significant differences between the symbolic pictorial and text warnings on any outcome except ability to grab attention (x=3.40 vs. 3.24, respectively, p<.01). Both traditional graphic and FDA photo-realistic pictorial warnings resulted in higher mean ratings than text-only warnings in terms of ability to grab attention (x=4.17, 3.83, 3.24, respectively), emotional reactions (x=3.21, 2.91, 2.50), thoughts about cigar risks (x=3.95, 3.63, 3.37), and perceived message effectiveness (x=4.02, 3.67, 3.37) (all ps<.001). Results showed greater effect sizes for the traditional graphic (d=0.59-0.94) versus the photo-realistic warnings (d=0.28-0.60). Warning believability was rated somewhat lower for the photo-realistic (x=3.98) vs. text warnings (x=4.11)(d=.13, p=.01). No interactions were observed between warning type and cigar smoking status, meaning patterns of results were similar for all user subgroups. Results were also similar for Black, Hispanic and non-Hispanic white participants. **Conclusions:** Results provide supporting evidence that strong pictorial cigar warning labels are perceived as more effective than text-only warnings and may be superior in terms of evoking attention, emotional reactions and thoughts about cigar risks.

FUNDING: Federal

POS4-86

SUBSTITUTION OF MENTHOL- AND TOBACCO-FLAVORED HEATED TOBACCO PRODUCTS (IQOS) FOR MENTHOL CIGARETTES: INSIGHTS FROM A RANDOMIZED CLINICAL TRIAL AND THE EXPERIMENTAL TOBACCO MARKETPLACE

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Significance. Substitution from combusted to modified-risk tobacco products (MRTPs) is a potentially positive behavior for people who use cigarettes. Among people that use menthol cigarettes, interest in switching to an MRTP like the IQOS heated tobacco product (HTP) may increase following a menthol ban; but whether HTP flavor availability will influence post-ban substitution behaviors is unknown. **Methods.** Twenty-four individuals who smoke at least 5 menthol cigarettes/day were recruited for a parallel-group trial in Richmond, VA. During week 1, participants used their own-brand (OB) menthol cigarette at home (Tues-Thurs) and in the clinical lab (Mon, Fri); during week 2, participants were randomized to receive IQOS 2.4 in either the "Tobacco" (IQOS-T) (N=11) or "Fresh Menthol" (IQOS-M) (N=13) flavor and instructed to use it as a "substitute or complete replacement" for OB at home (Tues-Thurs) and in the clinical lab (Mon, Fri). Participants completed a hypothetical experimental tobacco marketplace (ETM) at each lab visit. Those in the IQOS-T condition could only purchase IQOS-T in the ETM, but those in the IQOS-M condition could purchase either flavor. T-tests evaluated differences in cross-price elasticity (CPE) of IQOS with respect to OB (ETM) and the percentage reduction in the average daily number of cigarettes from weeks 1 to 2 (at home) between the two experimental conditions. **Results.** At the last clinical lab session, those in the IQOS-M condition viewed IQOS as a substitute for menthol cigarettes (average CPE = 2.1 [Std Dev = 2.69]), and 94% of HeatSticks purchased across all price-points were menthol flavored. However, those in the IQOS-T condition reported hypothetical purchasing for IQOS as if it were an independent good with respect to OB (average CPE = 0.1 [Std Dev = 0.31]). During the at home use period, those in the IQOS-M condition reduced their average daily number of cigarettes by 72% (~8.6 cigarettes/day); those in the IQOS-T condition reduced their average daily number of cigarettes by 38% (~6.0 cigarettes/day) (p < 0.05). Those in the IQOS-M condition used more HeatSticks/day during week 2 than those in the IQOS-T condition (8.6 vs 4.0, p < 0.10). **Conclusions.** When menthol flavor IQOS was available, people who use menthol cigarettes appeared more likely to use IQOS as a substitute for OB. However, complete substitution away from OB to IQOS was uncommon in these hypothetical and short-term use paradigms regardless of HTP flavor condition.

FUNDING: Federal; Academic Institution

POS4-87

A SYSTEMATIC REVIEW OF PAST 30-DAY ELECTRONIC NICOTINE DELIVERY SYSTEMS (ENDS) USE BY GENDER AMONG TRANSGENDER AND GENDER-DIVERSE POPULATIONS IN THE UNITED STATES

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Significance. ENDS use among transgender and gender-diverse (TGD) populations is disproportionately high when compared to non-TGD populations. However, estimates from previous literature typically are not disaggregated by specific gender identities and may mask ENDS use disparities among TGD populations. The goal of this systematic review was to examine estimates of past 30-day ENDS use by gender among TGD populations. **Methods.** We conducted a search of PubMed, EMBASE, World of Science, and EbscoHost through October 2022 following PRISMA guidelines, and supplemented these results with forward, backward, and hand searches. Articles were selected following rounds of title and abstract review, and full-article review, with each phase having at least two reviewers using a priori criteria. Inclusion criteria were reporting past 30-day ENDS use for TGD participants, and study population located in the United States. **Results.** Twenty studies published between 2017 and 2022 fulfilled review criteria. Most studies did not disaggregate estimates by specific gender identity for TGD participants, though six studies reported disaggregated estimates for non-TGD participants only. Overall, past 30-day ENDS use estimates were 6.9% to 24.2% for adults with any TGD identity (n=5) and 8.5% to 27.8% for adults who identified as transgender (n=6). By gender, among adults, 4.1% to 23.4% of transgender women and transfeminine people (n=6), 12.1% to 26.3% of transgender men and transmasculine people (n=5), and 7.5% to 9.1% of non-binary or gender non-conforming people (n=3) reported past 30-day ENDS use. For adults with additional gender identities (n=5), past 30-day ENDS use ranged between 3.6% and 41.7%. Finally, estimates of past 30-day ENDS use were 12.8% to 30.4% for



transgender youth (n=4) and 9.4% for youth who were unsure of their identity (n=1). **Conclusion.** Past 30-day ENDS use likely differs between TGD populations, and it would be informative for future research to oversample specific populations to accurately assess ENDS use disparities. Research focusing on populations who identify outside of the gender binary (such as non-binary, gender non-conforming, and unsure) is warranted, given their diversity. Disaggregated estimates may be especially beneficial for understanding TGD youth use due to the relatively high proportion who identify as TGD, high levels of youth ENDS use overall, and identity-based marketing by tobacco companies.

FUNDING: Federal

POS4-88

PROSOCIALITY, RELIGIOSITY AND OTHER PROSOCIAL BEHAVIORS MAY BE PROTECTIVE AGAINST YOUNG ADOLESCENT SUSCEPTIBILITY TO TOBACCO USE IN ABCD DATA

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Significance: Most research on young adolescent susceptibility to tobacco use onset has focused on risk factors such as tobacco use by family members, peer smoking status and adolescent pro-tobacco attitudes. Less attention has been paid to prosocial factors that might protect youth from tobacco use onset, such as prosociality, overall religiosity, avoiding family conflict, positive school engagement and family supportiveness. **Methods:** Wave 1 data were obtained from 11,876 adolescents ages 9-10 enrolled in the Adolescent Brain Cognitive Development (ABCD) longitudinal cohort study. The 21 study sites were geographically selected to be representative of all U.S. adolescents. Data were also obtained from a parent/guardian. For this analysis, the outcome measure was a binary measure of adolescent susceptibility to tobacco use, defined as willing to consider future use of tobacco if offered by a friend or out of curiosity. Logistic regression models included a prosocial behavior scale, religiosity scale, school environment subscale, measure of adolescent-family conflict and measure of family supportiveness. Adolescent sex-at-birth, age in months and race/ethnicity were included as covariates. **Results:** A variety of adolescent-reported prosocial measures were associated with adolescent tobacco use susceptibility but comparable parent/guardian-reported prosocial measures were not. Odds ratios for all prosocial predictors concurrently were 0.67 (prosociality), 0.90 (overall religiosity), 1.11 (family conflict), 0.94 (positive school engagement), all P less than .001 except for 0.90 (family supportiveness), which was P equal to .023. Cumulatively, these measures explained 3.1% of the variance. Females registered higher scores on prosociality, avoiding family conflict, and more positive engagement with their school than males (all P less than .001). Blacks and Latinos were more religious than Whites (P less than .001). Asians avoided intra-family conflict but Whites avoided intra-family conflict more than Blacks (P less than .008 for both). Latinos reported more positive engagement with their school than Whites (P equal to .007). **Conclusion:** Young adolescent-reported prosocial behaviors were negatively associated with their susceptibility to future tobacco use. Comparable parent/guardian measures were less strongly associated. The data were observational and hence not conducive to inferring causal direction but suggestive of a (small) protective effect of involving young adolescents, especially female adolescents and Black adolescents, in prosocial behaviors such as religiosity and positive engagement with their school. Parent/guardian-reported measures for how their child is doing socially or in school may be less predictive of adolescent susceptibility to tobacco use than comparable young adolescent-reported measures.

FUNDING: State

POS4-89

EVOLUTION OF SMOKING EPIDEMIC ACROSS ASEAN COUNTRIES: 1990 TO 2021

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Background Tobacco smoking has long been a regional health priority in the Association of Southeast Asian Nations (ASEAN). Despite decades of commitment to implement tobacco control measures, the region continues to face significant challenges in reversing the epidemic. Reliable longitudinal data on smoking prevalence and attributable disease burden are crucial to understanding the epidemic trajectory and enabling effective policy planning. **Methods** We utilized data from the Global Burden of Diseases Study 2021 to evaluate the prevalence of tobacco smoking and its attributable disease burden in the 10 ASEAN member states by age and sex, from 1990 to 2021. Current and

former smoking prevalence was estimated using spatial-temporal Gaussian process regression models (ST-GPR) which synthesized data from 160 distinctive data sources specific to the ASEAN region and supplemented with 2646 unique data sources from other GBD countries. Dose-response risk for 36 health outcomes was derived using the latest Burden of Proof approach. Population attributable fraction (PAF) was subsequently calculated and applied to determine the attributable burden quantified by smoking-related mortality, years of life lost (YLLs), years lived with disability (YLDs), and disability-adjusted life-years (DALYs). **Findings** In 2021, there are approximately 137 million current smokers in the ASEAN region, with males making up the majority of this population. While smoking prevalence declined significantly in most of the ASEAN countries between 1990 and 2021, the absolute number of smokers increased by 60.5% (95% uncertainty interval 56.2 - 65.4). Smoking accounted for over 10% (3.13 - 18.2) of all-cause mortality across ASEAN. The total number of deaths and disability-adjusted life-years attributed to smoking were 519 000 (155 000 - 865 000) and 15.1 million (4.40 - 25.1) respectively. Death rates varied considerably across the region, especially among males. Death rates ranged from 71.7 per 100 000 males (19.7 - 126) in Singapore to 393 per 100 000 males (143 - 627) in Cambodia. **Interpretation** Tobacco smoking continues to be a public health threat in the ASEAN region. Driven by a growing population, the number of smokers has increased by 53.0 million (50.9 - 55.1) since 1990. Substantial variability exists in smoking prevalence and the attributable disease burden across the region. While remarkable progress has been made in some nations, others are lagging behind. Considering the mounting burden of non-communicable diseases, ASEAN countries must amplify their efforts to strengthen their tobacco control measures.

FUNDING: Academic Institution; Nonprofit grant funding entity

POS4-90

USERS' CHARACTERISTICS AND ABSTINENCE OUTCOMES OF A WHATSAPP CHATBOT FOR PROMOTING THE ACCESSIBILITY AND REACH OF A SMOKING CESSATION SERVICE

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Significance: Chatbots based on mobile instant messaging apps present as a modern but largely untested platform to publicize smoking cessation and recruit smokers into cessation treatment. "Dr Wise" is a WhatsApp chatbot designed to promote the Integrated Centre on Smoking Cessation (ICSC) of Tung Wah Group of Hospitals, a government-funded clinic-based cessation service in Hong Kong. This study examined the characteristics and abstinence outcomes of smokers who used the chatbot and enrolled in the cessation service. **Methods:** From May 2021 to May 2022, 3074 smokers (74.0% male, mean±SD age 43.3±11.7 years) enrolled in the ICSC, of whom 123 (4.0%) used the chatbot. The chatbot provides users with information on quitting smoking, a channel to register for smoking cessation services under ICSC, and a counselor-led live chat if needed. Baseline demographic and smoking-related characteristics were compared between chatbot users and non-users. Robust Poisson regression was used to estimate the relative risk (RR) of self-reported 7-day point prevalence tobacco abstinence (being completely smoke-free in the past 7 days) by chatbot use status. Those with missing outcome data were assumed as non-abstinent. **Results:** Chatbot users were younger (mean±SD age 38.0±10.5 vs 43.5±11.7; p<0.001) and more likely to receive pharmacotherapy (73.8% vs 59.5%; p=0.002) than non-users. No significant difference was observed in sex, employment status, nicotine dependence, self-efficacy to stop smoking, and previous quit attempt (p>0.05). The retention rates of chatbot users and non-users have no significant difference at 8 weeks (86.2% vs 85.6%; p=0.962), 26 weeks (78.9% vs 77.1%; p=0.726), and 52 weeks (73.2% vs 69.1%; p=0.388). Compared with non-users, chatbot users had significantly higher abstinence rates at 52 weeks (RR=1.38; 95% CI 1.05-1.81; p=0.022) but not at 8 weeks (RR=1.22; 95% CI 0.97-1.54; p=0.084) and 26 weeks (RR=1.18; 95% CI 0.91-1.52; p=0.215), adjusting for demographic factors, baseline predictors of quitting, and treatment received. Propensity score matching of chatbot users and non-users yielded similar results. **Conclusion:** The WhatsApp chatbot could increase the reach of the cessation service to younger smokers and those who need pharmacotherapy to quit smoking. Further trials are warranted to test the effectiveness of the chatbot in promoting cessation outcomes.

FUNDING: Other

POS4-91

CIGARETTE SMOKING ABSTINENCE AMONG PREGNANT WOMEN USING E-CIGARETTES OR NICOTINE REPLACEMENT THERAPY

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Significance: Smoking cessation during pregnancy improves maternal and child health. Electronic cigarettes (e-cigarettes) have been increasingly used by the young population, including pregnant women. Given the potential for harm reduction, e-cigarettes have been suggested as a smoking cessation aid. We addressed a research gap by assessing smoking abstinence rates among pregnant women who use e-cigarettes, compared to those who use nicotine replacement therapy (NRT). **Methods:** We conducted secondary data analysis within Phase 8 of the U.S. Pregnancy Risk Assessment Monitoring System (PRAMS, 2016-2020). We included 1,329 women who smoked combustible cigarettes within the 3 months before pregnancy and either used e-cigarettes (n=957) or NRT (n=372) during pregnancy. E-cigarette users included 67 new users starting during pregnancy and 890 existing users before pregnancy. NRT users included any users during pregnancy, as the timing of initiation was unavailable. Women self-reported smoking abstinence status during the last 3 months of pregnancy. We built weighted multivariable logistic regression models to examine the association between e-cigarette use (vs NRT) and smoking abstinence. A propensity score was used to control for confounding by socio-demographics, pregnancy characteristics, co-existing depression, use of behavior support, and baseline smoking intensity. **Results:** A majority of the 1,329 pregnant mothers were aged ≥ 25 years (60.2%, weighted), non-Hispanic Caucasian (79.8%), having education of high school or lower (61.4%), and having an annual household income $\leq \$48,000$ (81.5%). Compared to women who used NRT during pregnancy, women who used e-cigarettes had a higher rate of smoking abstinence in late pregnancy (50.8% vs 19.4%, weighted), with a propensity-score-adjusted odds ratio or OR of 3.86 (95% confidence interval or CI, 2.94-5.07; P -value <0.001). In the stratified analysis by the timing of initiation, new e-cigarette users starting during pregnancy had a similar smoking abstinence rate (20.6%) in late pregnancy to NRT users, but existing users of e-cigarettes before pregnancy had a substantially higher smoking abstinence rate (53.1%). The corresponding propensity-score-adjusted OR was 1.13 (95% CI, 0.22-5.87; P -value=0.882) for new e-cigarette users and 2.61 (95% CI, 1.23-5.51; P -value=0.012) for existing e-cigarette users, respectively. **Conclusion:** Initiation of e-cigarette use before pregnancy was associated with a higher smoking abstinence rate during late pregnancy, compared to new e-cigarette use starting during pregnancy or NRT use. Randomized controlled trials are needed to confirm our findings.

FUNDING: Federal

POS4-92

CHANGE IN E-CIGARETTE USE DURING PREGNANCY AND POSTPARTUM DEPRESSION

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Significance: E-cigarette use has been increasing among pregnant women. Pregnancy is a critical time period when mothers change their patterns of e-cigarette use. It remains unknown how changes in e-cigarette during pregnancy may impact risk of postpartum depression. **Methods:** We conducted secondary data analysis with Phase 8 of the Pregnancy Risk Assessment Monitoring System (PRAMS, 2016-2021). Postpartum mothers reported their use of e-cigarettes (EC) and combustible cigarettes (CC) use during the 3 months before pregnancy as well as during the last 3 months of pregnancy. Postpartum depression was identified as frequently experiencing feelings of sadness, depression, or hopelessness and a lack of interest or enjoyment in activities since birth delivery. We used multivariable logistic regression models to examine the association between changes in e-cigarette and/or cigarette use during pregnancy and postpartum depression while adjusting for potential confounders including pre-existing/pre-pregnancy depression, socio-demographic, pregnancy, and substance use characteristics. **Results:** Among 232,409 eligible participants, 1.9% were exclusive EC users, 12.6% were exclusive CC users, 2.8% were dual use of EC and CC before pregnancy. Among pre-pregnancy exclusive e-cigarette users, in comparison to those who continued e-cigarette use during pregnancy (811, 7.3%), discontinued e-cigarette users during pregnancy (3,339, 6.3%; confounder-adjusted odds ratio or aOR, 0.96, 95% CI 0.59-1.55, $P=0.853$) was not significant. Among pre-pregnancy CC users, a significant association was observed for those who discontinued cigarette use during pregnancy (16,405, 4.8%; aOR, 0.77, 95% CI 0.65-0.91, $P=0.002$), compared with continuous cigarette users (15,254, 7.8%). Among pre-pregnancy dual users, compared with continued dual users during pregnancy (1,526, 11.0%), the associations for those who discontinued use of cigarettes only during pregnancy (437, 13.2%; aOR, 1.52, 95% CI 0.83-2.78, $P=0.173$), and discontinued users of both during pregnancy (3,138, 8.0%; aOR, 0.87, 95% CI 0.60-1.27, $P=0.481$) did not show a significant association. **Conclusion:** Maternal cigarette use before pregnancy is a risk factor for postpartum depression, which may be largely reduced by quitting cigarette use during pregnancy. However, discontinuing e-cigarette use, either among exclusive users or dual users, is not associated with the risk of postpartum depression.

FUNDING: Federal

POS4-93

CHARACTERIZING THE HOME ENVIRONMENTS OF SMOKERS AND NONSMOKERS USING COMPUTER VISION

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Significance: Computer vision has been used to identify environmental correlates of smoking, but results have focused on specific environmental features rather than on collections of features comprising distinct, interpretable scene types (e.g., workstation, personal vehicle). Moreover, differences between the home environments of smokers and nonsmokers have not been explored. This information could provide an automated, scalable method to identify key environmental risk factors for smoking initiation and relapse. **Methods:** Smokers (≥ 1 cigarette per day; $N=539$) and nonsmokers ($N=562$) recruited via Amazon Mechanical Turk took pictures of common locations (e.g., sleeping location, eating location) in their residential setting. Smokers also took pictures of places where they commonly smoke, and where they spend time but rarely smoke. A Faster R-CNN model was used to detect objects present in each image, and a Latent Dirichlet Allocation was fitted to identify scene types composed of distinct combinations of co-occurring objects (e.g., sofa, fireplace, lamp). Hyperparameters were tuned to optimize the coherence score, and scene types were named by manually inspecting images. Differences in rates of each scene type were compared between locations and between smokers versus nonsmokers using Fisher's exact tests and random intercept mixed models to control for effects of demographics. **Results:** Across all locations, 25 distinct scene types were identified. Scene types more common in smoking environments included Patio/Porch (OR=7.85), Trees (OR=5.98), Window (OR=3.44), Personal Vehicle (OR=2.70) (p 's <0.001). Those more common in nonsmoking environments included Person/Clothing (OR=0.57), Bed (OR=0.47), Desk/Computer (OR=0.45), Couch (OR=0.40), and Kitchen (OR=0.28) (p 's <0.001). Scene types more common among smokers included Drawer/Nightstand (OR=3.97), Patio/Porch (OR=2.38), and Clothing/Person (OR=1.46); those more common among nonsmokers included Couch (OR=0.78) and Shelves (OR=0.65; all p 's <0.05). Mixed models uncovered interactions between smoking and other factors that were associated with rates of scene types (e.g. Personal Vehicle more commonly observed as a nonsmoking location in individuals with higher education level). **Conclusion:** These results validate previous research on smoking vs. nonsmoking environments. Moreover, results show that scene types found in home locations not explicitly tied to smoking differ between smokers and nonsmokers. Computer vision can be used to characterize and understand smokers' home environments, which could in turn be used to promote personalized, environment-aware smoking cessation strategies.

FUNDING: Unfunded

POS4-94

HOW PRODUCT FEATURES ARE ASSOCIATED WITH THE PRICES OF DEVICES SOLD IN ONLINE VAPE SHOPS?

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Significance: Open system E-cigarette (EC) product features, such as battery capacity, maximum output wattage, etc., are major components that drive product costs and may influence use patterns. Moreover, continued innovation and monitoring of product features and prices will provide critical information for designing appropriate taxation policies and product regulations. **Methods:** From April to August 2022, we conducted a study on open-system EC device products from five popular US-based online vape shops to examine how product features are associated with the prices of devices. We examined starter kits, device-only products, and e-liquid container-only products. We implemented a linear regression model with store fixed effect to examine the association between device attributes and prices. **Results:** The price of EC devices, irrespective of device type or whether they come as starter kits or device-only products, increased as the battery capacity and output wattage increased. For mod kits and vape pens, the price was positively associated with the volume size of the e-liquid container. On the other hand, the price of pod kits was positively associated with the number of containers. **Conclusions:** Given that higher volume size of the e-liquid container, battery capacity, and device wattage are associated with higher prices of EC devices, *ad valorem* taxes will increase the relative prices of devices with higher volumes as compared to lower volumes; and increase the relative prices of EC devices with greater battery capacity and output wattages as compared to lower capacity and lower wattage devices. Policymakers could manipulate tax rates by device type to discourage the usage of certain device products.

FUNDING: Academic Institution



POS4-95

DIFFERENCES IN USE PATTERNS OF FLAVORED AND UNFLAVORED CIGARS AND CIGARETTES BY AGE AMONG US ADULTS

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Significance The FDA recently proposed new regulations to ban flavored cigars in the US. It is essential to generate valid input parameters of flavored and unflavored cigar use to support the development of cigar use simulation models to project the potential public health impacts of cigar flavor bans. **Methods** Using the Population Assessment for Tobacco and Health (PATH) Study Waves 1-4, average 1-year transition rates between cigarettes and flavored vs unflavored cigar use were estimated among adult respondents by age (18+, 18-34, 35+) and sex. Seven cigar/cigarette use states were considered: Never regular, Non-current, Exclusive unflavored cigar, Exclusive flavored cigar, Exclusive cigarette, Dual use of unflavored cigars and cigarettes, and Dual use of flavored cigars and cigarettes. Current regular cigar use was defined as smoking any cigars fairly regularly for at least 5 days in the past 30 days (summing the number of days used for each cigar type in PATH; traditional cigars, cigarillos, and filtered cigars). Traditional cigar use was restricted to non-premium cigars. Current established cigarette users were defined as lifetime smoking 100 or more cigarettes and currently smoking daily or some days. We also calculated longitudinal transition rates of flavored or unflavored cigar and cigarette use across Waves 1-5. **Results** About 47% and 51% of exclusive unflavored and flavored cigar users aged 18-34 quit by the following year. In contrast, only 31% of exclusive unflavored and flavored cigar users aged 35+ quit. Similarly, about 64% and 56% of dual unflavored and flavored cigar users with cigarettes aged 18-34 became exclusive cigarette users in the following year, but only 37% and 40% of dual unflavored and flavored cigar users aged 35+ did so. In those aged 18-34, only 14% and 24% of dual unflavored and flavored cigar users remained as such the following year, but 39% and 34% of dual unflavored and flavored users aged 35+ remained as such the following year. Most exclusive flavored/unflavored cigar users in Wave 1 either quit or became exclusive cigarette users by Wave 5. Transition patterns were similar for both sexes. **Conclusion** Cigar use is more persistent in older versus younger adults regardless of flavor. The estimated prevalence and transition rates of flavored and unflavored cigar and cigarette use can be used to inform simulation models to project the potential public health impacts of the proposed cigar and cigarette flavor bans.

FUNDING: No external funding reported

POS4-96

ASSOCIATIONS OF CARDIOPULMONARY HEALTH STATUS WITH SMOKING AND QUITTING BEHAVIORS IN CHINESE SMOKERS: A POPULATION-BASED CROSS-SECTIONAL STUDY

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Significance: Having diseases may change smoking behaviors, but the evidence is scarce. We examined the associations of smoking and quitting behaviors with cardiopulmonary health status in adult smokers in Hong Kong. **Methods:** Two population-based landline and mobile surveys were conducted using random digit dialing methods in 2021-2022. Current smokers were oversampled (response rates: both 33.3%) due to the low smoking prevalence (9.5% in 2021). Overall, 3412 current smokers (85.3% male; 37.0% aged 60+) reported health status, previous quit attempts, use of smoking cessation services and intention to quit within 30 days. Daily cigarette consumption and time to the first cigarette after waking up in a day were assessed to calculate the Heaviness of Smoking Index (score 0-6) for nicotine dependence. Cardiopulmonary health status was assessed by questions on cardiovascular or heart diseases, respiratory symptoms or diseases (including cough or sputum, sore throat, asthma, pneumonia and COPD) in the past 12 months. Ordinal and binary logistic regressions were used to calculate adjusted odd ratio (aORs) for smoking and quitting behaviors by cardiopulmonary health status, adjusting for sex, age, educational attainment, marital status, employment and monthly household income. **Results:** Of 3412 smokers, 1426 (41.8%) reported having a history of cardiopulmonary diseases. Compared with smokers without any of such diseases, those with the diseases had higher daily cigarette consumption (aOR 1.43, 95% confidence interval 1.23-1.67), higher odds of smoking within 5 minutes after waking up in a day (1.27, 1.12-1.44), and a higher level of nicotine dependence (1.45, 1.26-1.67). Having cardiopulmonary diseases were associated with higher odds of previous quit attempts (1.12, 1.06-1.19) and use of smoking cessation services (1.57, 1.33-1.85). No significant association was found for intention to quit within 30 days (1.28, 0.97-1.69).

Conclusion: Smokers with cardiopulmonary diseases had higher nicotine dependence, higher odds of quit attempts and use of smoking cessation services. Tailored smoking cessation interventions for this group are needed.

FUNDING: Nonprofit grant funding entity

POS4-97

IS IT TIME TO BAN FLAVOURED CIGARETTES IN ASIA PACIFIC COUNTRIES?

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Significance Cigarettes with menthol, clove, and other added flavours encourage youth smoking and deter quitting. No country in Asia Pacific, a region with some of the world's highest smoking rates, has regulated tobacco flavours. This scoping review describes what is known on flavoured cigarettes in the Asia Pacific region. **Methods** We examined market data from the Euromonitor Global Market Information Database and searched in the academic and grey literature for any reports or studies of flavoured cigarettes in Asia Pacific countries. We retrieved 31 articles and synthesized data into a narrative. **Results** Of the 12 countries for which market data was available, 10 had substantial flavoured cigarette market shares ranging from 10% to 97%. With no regulations and growing markets for flavour capsule variants, the ongoing promotion of flavoured cigarettes is expected to drive further increases in smoking prevalence. The tobacco industry's main targets for flavoured cigarettes in Asia Pacific countries are youth and women, who are attracted to the diverse flavours, novelty, and milder taste and smell of flavoured cigarettes. There are significant research and monitoring gaps on the industry's marketing tactics and use of flavoured cigarettes in the region. **Conclusion** The Asia Pacific region has some of the world's largest flavoured cigarette markets. While no Asia Pacific country has banned added tobacco flavours including menthol, these countries stand to benefit substantially from such a ban.

FUNDING: Federal; Academic Institution

POS4-98

PHYSICAL ACTIVITY AND TOBACCO SMOKING IN THE GERMAN ADULT POPULATION

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SIGNIFICANCE Physical inactivity and tobacco smoking remain leading causes of morbidity and mortality worldwide. In Germany, smoking prevalence is high at around 30%. Additionally, only 45% of the population achieve the recommendation of the World Health Organization for physical activity (PA). Understanding the extent to which PA and smoking co-occur within individuals can inform interventions targeting these behaviours. Detailed data from Germany regarding this topic are lacking. **METHODS** We used data from the German Study on Tobacco Use (DEBRA): a cross-sectional, representative, face-to-face household survey in the population aged ≥14 years from Germany. This analysis included data from two waves: 04/2022-07/2022 (N=3,921). We analysed the prevalence of PA level during leisure time (not/low/medium/very active) for the German adult population, stratified by person characteristics. Multinomial regression was used to understand the association between PA levels (not active=reference) and smoking status (current, ex, never smoking=reference). In the subgroup of current smokers, we assessed associations between PA level and number of cigarettes smoked per day (linear regression with bootstrapping); time spent with urges to smoke; strength of urges to smoke; and motivation to stop smoking (ordinal regressions). **RESULTS** 29.9% (95%CI=28.49;31.38) stated not being active. This rate was higher in people with low educational attainment (45.3%,95%CI=42.38;48.20). The odds being a current smokers vs. never smoker decreased with increasing PA level (OR=0.74,95%CI=0.69;0.79). Increasing PA level was associated with lower number of cigarettes per day (β=-0.13,95%CI=-1.39;-0.56,p<0.001). Furthermore, increasing PA level was associated with lower strength of urges to smoke (OR=0.81,95%CI=0.74;0.89) and higher motivation to stop smoking (OR=1.13,95%CI=1.02;1.24). The association with time spent with urges to smoke was not statistically significant (OR=0.93,95%CI=0.85;1.02). **CONCLUSION** Almost every third person in Germany stated to be physical inactive during their leisure time. PA level seems to be associated with smoking behaviour. However, our study design does not allow any causal influence. Further research would need to show whether PA could influence the motivation to stop smoking and leads to prolonged smoking abstinence through a reduction in urges to smoke.

FUNDING: Federal; Academic Institution



POS4-99

DAILY SMARTPHONE-ASSESSED DISCRIMINATION IS ASSOCIATED WITH A DECREASED LIKELIHOOD OF ABSTINENCE AMONG ADULTS PARTICIPATING IN SMOKING CESSATION TREATMENT

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Introduction: Previous research has indicated that past experiences of discrimination may decrease the likelihood of smoking cessation. The current study evaluated the relationship between prospective daily reports of discrimination experiences and smoking cessation. **Methods:** Participants were socioeconomically disadvantaged adults enrolled in a randomized trial of an incentives-based smoking cessation intervention. Participants completed baseline surveys and 4 weeks of daily smartphone assessments of smoking and discrimination following a scheduled quit attempt (M=21 completed per participant). Carbon monoxide (CO)-verified abstinence was assessed at 4, 8, 12, and 26-week post-quit. Generalized Linear Mixed Modeling (GLMM) analysis evaluated relations between daily discrimination experiences (DDE; yes/no per day) and daily self-reported smoking status (yes/no). Logistic regression analyses evaluated relations between reports of any DDE (0 vs. =1) during the first 4 weeks post-quit and CO-confirmed abstinence at all follow-ups. All models were adjusted for the treatment group, baseline nicotine dependence, race, sex, and income. **Results:** Participants (n=254) were 48.9 (SD=11.7) years of age on average, 39.4% racially/ethnically minoritized, 64.6% female, and 58.3% had an annual household income <\$11,000 US. Of these, 25.6% (n=65) endorsed =1 discrimination event over the 4-week smartphone assessment period, and 217 total events were reported among these participants (M=3 events per participant). The most commonly perceived reasons for discrimination included: 1) smoking (27.3% of events), 2) race/ethnicity/nationality (25.5%), 3) gender (7.9%) and 4) physical disability (7.4%); and 13.4% endorsed "other" reasons. In the GLMM model, the main effect of DDE on the likelihood of daily abstinence approached significance (p=0.09), and the time by DDE interaction was significant (p=0.02), such that the negative impact of daily discrimination on daily abstinence became larger as time progressed. Additionally, experiencing any DDE during the 4-week smartphone assessment period predicted a lower likelihood of CO-confirmed abstinence at the 4, 8, and 26-week post-quit follow-ups (all p's<0.05). **Conclusion:** Prospectively assessed DDE during the first 4 weeks of a smoking cessation attempt was associated with a decreased likelihood of smoking cessation.

FUNDING: Federal; State

POS4-100

CANNABIS USE PREDICTS LONGITUDINAL TRANSITIONS IN E-CIGARETTE USE ACROSS A 4.5-YEAR PERIOD IN YOUNG ADULTHOOD

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Significance. Recent evidence indicates that cannabis use may precede, rather than follow, the onset of cigarette use in adolescence, and that cannabis use may subsequently interfere with quitting cigarettes among adults. Little is known, however, about the role of cannabis use in stages of electronic nicotine delivery systems (ENDS) uptake and progression across young adulthood, a period marked by volatility in use. The present study fills this void by examining past 30-day cannabis use in ENDS use transitions across a 4.5-year period in young adulthood. **Method.** Participants were 5,018 initially 18-29-year-old students (Mean age=21.0, SD=2.3; 64.2% female; 36.1% non-Hispanic white, 30.9% Hispanic, and 32.9% another race/ethnicity) recruited from 24 Texas colleges. Students completed up to eight waves of online surveys, with at least six months between each wave, across a 4.5-year period. A multi-state, continuous time Markov model assessed the role of time-varying past 30-day cannabis use on three ENDS use transitions, spanning at least six months 1) never to current use, referred to as initiation; 2) current to non-current use, referred to as desistance; and 3) non-current to current use, referred to as re-uptake. The model was adjusted for participant sex, race/ethnicity, 4-year (vs. 2-year) college attendance, baseline age, and time-varying sensation seeking, depressive symptoms, other tobacco use, current alcohol use, and peer ENDS use, risk factors for ENDS use. **Results.** Most participants did not use ENDS during the 4.5-year study period, and transitions from current use to non-use (desistance) were more prevalent than transitions from never to current use (initiation) or from non-current to current use (re-uptake). Further, findings indicated that after adjusting for all covariates, current cannabis use increased the probability of

ENDS initiation [adjusted Hazard Ratio (aHR)= 1.25; 95% CI=1.16-1.32] and decreased the probability of desistance (aHR=0.95; 95% CI=0.92-0.98), but did not impact ENDS re-uptake. **Conclusion.** Findings extend existing research by indicating that although the probability of transitioning to ENDS use is relatively low, cannabis use during young adulthood contributes to ENDS initiation and discourages discontinuation. Additional research examining trajectories of dual cannabis and ENDS use is needed to determine who is at elevated risk for continued use of one or both products.

FUNDING: Federal

POS4-101

SMOKING CESSATION MESSAGE TESTING TO INFORM APP-BASED INTERVENTIONS – AN ONLINE EXPERIMENT

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Background: To inform mobile smoking cessation intervention development and efficacy, it is important to determine message acceptability with the target population, especially among racial/ethnic minorities and those with lower education. The current study compared message ratings for smoking cessation and urge reduction content based on Cognitive Behavioral Therapy (distraction themed) and Acceptance and Commitment Therapy (acceptance themed). **Methods:** A total of 124 intervention messages were rated by an online Qualtrics panel of N=301 diverse young adults (18-30 years) who endorsed current cigarette smoking (Age M=26.6 years; 54.8% male; 48.5% Non-Hispanic White). Each participant rated 10 randomly selected messages (3,010 total message ratings; 24.3 ratings per message) on dimensions of content, design, helpfulness for in-the-moment urge reduction, and helpfulness for quitting smoking. Mixed models examined message category (distraction vs. acceptance) and participant level predictors (sociodemographics; readiness and motivation to quit; daily smoking; psychological flexibility) of message acceptability. **Results:** Overall message ratings ranged from M=3.9 (SD=1.0) on content to M=3.6 (SD=1.3) on helpfulness for quitting smoking (scale from 1-5), with no differences between distraction and acceptance messages. Mixed models showed that men, participants with higher education, and those with higher motivation to quit rated messages significantly more favorably across the majority of dimensions (all p<.05). Those who smoked daily rated messages as more helpful for reducing urges (p<.01) and quitting smoking (p=.01). Few interactions were found between message theme and participant characteristics. Hispanic participants preferred distraction messages on the dimension of design (p<.05). Participants with a Bachelor's degree preferred distraction over acceptance messages on dimensions of design (p<.05), reducing urges (p<.05), and support for quitting smoking (p<.05). Psychological flexibility did not moderate participant preferences for distraction vs. acceptance messages. **Conclusions:** Distraction and acceptance messages showed similar acceptability among young adult smokers. Message revisions may be needed to increase appeal to women, those with lower education, and those less motivated to quit. Messages will be refined and used in an ongoing micro-randomized trial to investigate their real-time impact on smoking urges and behaviors.

FUNDING: Federal

POS4-102

ESTABLISHING SMOKE-FREE HOMES IN EGYPT: RESULTS OF AN INTERVENTION TO TRAIN CLINICAL PROVIDERS TO COUNSEL PREGNANT WOMEN ON SECOND-HAND SMOKE AVOIDANCE

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Background: Exposure of pregnant women to secondhand smoke (SHS) is a significant public health concern, especially in developing countries with relatively high adult male smoking rates. There is an urgent need for interventions to create smoke-free home environments. We present results of an intervention targeting pregnant women SHS exposure through training clinical providers on counselling pregnant women on SHS avoidance in Greater Cairo, Egypt. **Methods:** We present survey data for pregnant women conducted pre- and post-intervention implementation (2018 to 2022). We surveyed a total of 2003 pregnant women attending maternal care clinics (N=24) across different regions



in Great Cairo, Egypt (1002 pre-intervention sample and 1001 in post-sample). Up to three months after the intervention, a follow-up survey was conducted to compare receipt of SHS avoidance counselling and SHS smoke exposure with that of pre-intervention. **Results:** Between the pre-and post-surveys, there were no differences between participant characteristics; 53.8% (pre) and 57.8% (post) were aged between 21 to 30. Similarly, 72.4% (pre) and 69.2% (post) have had a primary or secondary education. Among the whole sample, 85% of participants answered all six knowledge-related questions about SHS and smoking harms correctly. Regarding SHS exposure, 65% had smokers in their households. Overall, 46% reported being exposed to secondhand smoke at home, leaving 19% not exposed despite living with smokers albeit in smoke-free homes, while there were 35% living with no adult smokers in the household. Participants who lived with current smokers who smoked at home experienced an average SHS exposure for 18 hours per week, while those living in smoke-free homes (whether there was a smoker in the household) reported less than 8.3 hours per week on average. Regarding counseling against SHS exposure, those reporting being asked about SHS exposure increased from 22.81% to 54.98% ($p < 0.001$), and receiving SHS avoidance advice increased from 28.46% to 60.32% ($p < 0.001$). **Conclusion:** While pregnant women in our study seemed knowledgeable about harms of smoking and SHS exposure, those living at homes with a current smoker reported being exposed to twice the SHS level indicating a high risk for pregnant women and babies. However, the intervention's results demonstrated success in changing providers' behavior in counseling pregnant women's on SHS avoidance. Whether this helped change the behavior of pregnant women needs further follow-up. To realize the objective of establishing smoke-free households, more widespread implementation of this type of intervention is essential.

FUNDING: Federal





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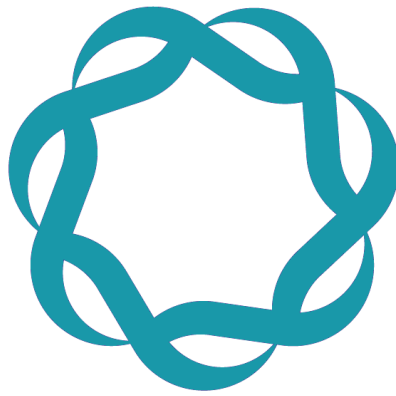
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