

SRNT 2023

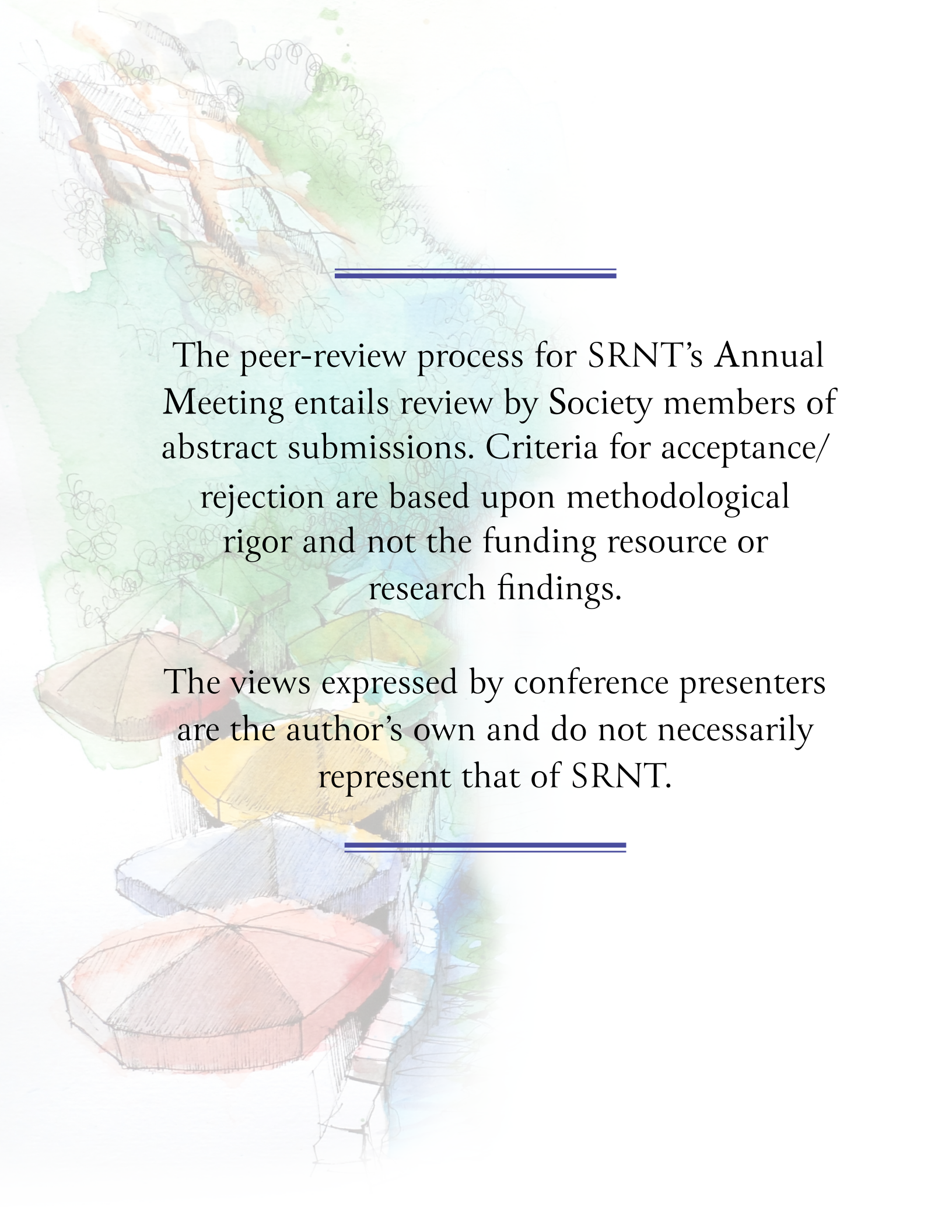
29th Annual Meeting

Rapid Response
Abstracts



March 1 - 4, 2023

Marriott Rivercenter Hotel
San Antonio Riverwalk

A watercolor illustration of a park scene. In the upper left, there are trees with green and brown foliage. Below them, several large, colorful umbrellas (brown, yellow, blue, and red) are open, suggesting a picnic or outdoor gathering. The background is a mix of soft green and blue washes.

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 author's own and do not necessarily represent that of SRNT.

CONTENTS

Thursday, March 2, 2023

Podium Presentation 1: Rapids Paper Session 1: E-Cigarettes	5
Podium Presentation 2: Paper Session 5: Rapid Submissions	8
Podium Presentation 2: Paper Session 7: Rapid Submissions	10
Podium Presentation 2: Paper Session 9: Rapid Submissions	12

Friday, March 3, 2023

Podium Presentation 3: Rapids Paper Session 2: Rapid Fire	14
Podium Presentation 4: Paper Session 17: Rapid Submissions	18

Saturday, March 4, 2023

Podium Presentation 5: Rapids Paper Session 3: Rapid Fire	20
Poster Session 1: Rapid Submissions	24
Poster Session 2: Rapid Submissions	35
Poster Session 3: Rapid Submissions	47
Poster Session 4: Rapid Submissions	59
Poster Session 5: Rapid Submissions	70
Author Index	115

Podium Presentation 1: Rapids Paper Session 1 E-Cigarettes



E-CIGARETTES

RAP1-1

RECENT CHALLENGES IN THE TOBACCO PRODUCT WASTE STREAM: EXAMINING HOW YOUNG DISPOSABLE E-CIGARETTE USERS DISPOSE OF THEIR E-CIGARETTES

Emily Donovan, Kathleen Aarvig, Mona Azadi, Barbara Schillo. Truth Initiative, Washington, DC, USA.

Introduction: E-cigarette waste presents potentially greater challenges than cigarette butt waste, as e-cigarettes contain greater amounts of toxic chemicals, plastic, and metals. However, little is known about the scale of e-cigarette waste in the US. Currently, disposable (e.g. one-time use) e-cigarettes are the most popular e-cigarette device in the US - particularly among young people. Yet there is no clear guidance from manufacturers or Environmental Protection Agency on how to safely dispose of them. This analysis examines disposal behaviors among young disposable e-cigarette users. **Methods:** From August 10 to November 29, 2022, we administered a weekly national cross-sectional survey to approximately 300 15-24 year-olds. Respondents were asked about tobacco use behaviors, including disposable e-cigarette use and disposal habits. We present weighted descriptive statistics indicating the proportion of our sample (N=530) who reported disposing of their disposable vapes in the trash, regular recycling, electronic recycling (e-recycling), or something else. For bivariate analyses, we collapsed disposal behaviors into three categories: trash, recycle (regular recycling, e-recycling), and other. Among those who reported only one disposal method (N=427), we examined bivariate associations between e-cigarette disposal and individuals' demographics and tobacco use behaviors. **Results:** Preliminary results indicate that 67.6% of disposable e-cigarette users in our sample dispose of their products in the trash, followed by 20.8% who keep or collect them, 5.1% who put them in the regular recycling, and 3.7% who bring them to a facility for e-recycling. Census region was associated with disposal behaviors, with individuals in the South (67.8%) and Midwest (80.4%) throwing their disposables in the trash more than other regions (East: 56.0%; West: 58.1%; $p=0.002$). Ever cigar users also disposed of their products in the trash more (68.1%) and recycling less (5.0%) than non-ever cigar users (67.1%; 11.4%; $p=0.041$). Disposable e-cigarette users who reported using two or more e-cigarettes per month (compared with one) reported disposing of their products in the trash more (69.3% vs 64.2%) and recycling less (5.3% vs 14.4%) ($p=0.005$). **Conclusion:** Disposable e-cigarettes contribute substantial amounts of hazardous waste to landfills in the US. Further, as federal or state recycling systems are not equipped to properly deconstruct and recycle these products, many recycled e-cigarettes likely ultimately end up in the landfills as well. E-cigarette manufacturers must be held accountable to develop e-cigarette waste management processes and establish awareness of these processes among disposable e-cigarette users - particularly those in the South and Midwest, those who use two or more disposable e-cigarettes per month, and those who have previously used cigars.

FUNDING: Other: Truth Initiative

RAP1-2

ABNORMAL EXPRESSION PROFILE OF PLASMA EXOSOMAL MICRORNAS IN EXCLUSIVE ELECTRONIC CIGARETTE ADULT USERS

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Background: Electronic cigarette (e-cigarette) use is associated with increased risk of respiratory and cardiovascular symptoms. Exosomal microRNAs play critical regulatory roles in many inflammatory responses and disease processes such as cancer. Few studies have examined the expression profiles of exosomal miRNAs in exclusive e-cigarette users. We aim to compare the exosomal microRNAs expression profile between exclusive e-cigarette users and non-users who are not current established any tobacco product users. **Methods:** Using plasma samples from 15 exclusive e-cigarette users and 15 non-users in the Population Assessment of Tobacco and Health (PATH) Wave 1 study (2013-2014), we examined exosomal microRNAs expression levels through Illumina NextSeq 500/550 sequencing. The differences in exosomal miRNAs between exclusive e-cigarette users and non-users were examined using the generalized linear models in the DESeq2 package in R/Bioconductor after adjusting for the significant

confounding effect from the race. Gene enrichment analyses were conducted on target genes regulated by significant exosomal microRNAs. **Results:** We identified four microRNAs with significantly higher expression levels in exclusive e-cigarette users than non-users, including hsa-miR-100-5p, hsa-miR-125a-5p, hsa-miR-125b-5p, and hsa-miR-99a-5p. GO enrichment analysis of the target genes regulated by the four microRNAs showed that dysregulation of the four microRNAs in exclusive e-cigarette users involved in multiple cellular processes such as regulation of cell population proliferation, cell cycle, cell differentiation, and apoptosis. KEGG pathway enrichment analysis found the four significant miRNAs involved in many cancerous pathways, such as non-small cell lung cancer, small cell lung cancer, pancreatic cancer, Hippo signaling pathway, ErbB signaling pathway, p53 signaling pathway, and MAPK signaling pathway. **Conclusions:** Four plasma exosomal microRNAs involved in cancer development had significantly higher expression levels in exclusive e-cigarette users than non-users, indicating a potentially elevated risk of cancer among exclusive e-cigarette users.

FUNDING: Federal; FDACTP

RAP1-3

YOUTH ELECTRONIC CIGARETTE USE AND SUBSEQUENT CIGARETTE SMOKING: DOES SMOKING PERSIST AFTER ONE YEAR?

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Significance: The popularity of electronic cigarettes (e-cigarettes) has raised public concern due to their potential to serve as a gateway to cigarette smoking. Many studies have reported a positive association between e-cigarette use and subsequent smoking initiation, but little is known whether e-cigarette use is associated with continued smoking post initiation. **Methods:** The Population Assessment of Tobacco and Health (PATH) Study is a nationally representative cohort study of youth and adults. Our study included 8,671 adolescents in PATH who were cigarette-naïve in wave 3 (10/2015-10/2016) and also participated in wave 4 (12/2016-01/2018) and wave 5 (12/2018-11/2019). We constructed four measures of continued smoking, based on smoking initiation in wave 4 and current smoking in wave 5. E-cigarette use at wave 3 was measured using ever and current (past 30-day) use. We conducted multivariable logistic regressions to assess the association between e-cigarette use and continued smoking, controlling for sociodemographic variables, environmental factors, other substance use, cigarette susceptibility, and mental health measures. **Results:** Overall, regardless of e-cigarette use status, few adolescents (4.1%) initiated cigarette smoking at wave 4 and fewer ($\leq 2.5\%$) continued smoking at wave 5. Controlling for multiple covariates, the adjusted odds ratio (aOR) of baseline ever e-cigarette use, compared to never e-cigarette use, was 1.81 (95% confidence interval [CI], 1.03 to 3.18) for continued smoking measured as past 30-day smoking at wave 5. However, the adjusted risk difference (aRD) was small and not significant at $p<0.05$. The aRD was 0.88 percentage point (95% CI, -0.13 to 1.89) for continued smoking, with the absolute risk being 1.19% (95% CI, 0.79% to 1.59%) for never e-cigarette users and 2.07% (95% CI, 1.01% to 3.13%) for ever e-cigarette users. We found similar results using an alternative measure of continued smoking (lifetime ≥ 100 cigarettes and current smoking at wave 5) and using baseline current e-cigarette use as the exposure measure. **Conclusion:** Absolute and relative measures of risks may yield findings suggesting very different interpretations of the association. While there were statistically significant odds ratios of continued smoking between baseline e-cigarette users and non-users, the minor risk differences between them, along with the small absolute risks, suggest that few adolescents are likely to continue smoking post initiation regardless of baseline e-cigarette use.

FUNDING: Federal; FDACTP

RAP1-4

IMPACT OF SES AND RACE ON RELATIVE RISK PERCEPTIONS AND TOBACCO USE PATTERNS AMONG OLDER ADULTS WHO SMOKE CIGARETTES

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Significance: Research on older adults who smoke cigarettes is limited, even though this age group faces the greatest risk of tobacco-related disease. This study examined the relationship between nicotine relative risk perceptions and behavioral intentions and how they differ based on SES or race among adults 55 years or older. **Method:** Analyses included data from 2,242 older adults across all 5 publicly available waves of the PATH



Study and smoked within the past 30 days. Longitudinal logistic models estimated associations between higher vs lower socioeconomic status (SES) ("low-SES" = less than a high school diploma/GED/annual household income <\$24,999) and race (White/Caucasian vs Black/African American; AA) and 1) e-cigarette/cigarette relative risk perceptions, 2) intention to quit smoking and/or switch products, and 3) e-cigarette use. Models were adjusted for selected sociodemographic characteristics, cigarettes per day, nicotine dependence, and a time trend. **Results:** Greater perceptions of relative risk for e-cigarettes were associated with lower odds of intentions to quit smoking or switch to e-cigarettes and past 30-day e-cigarette use ($p < 0.001$). Low-SES adults were more likely to report that e-cigarettes were very/extremely harmful to health (AOR: 2.06, $p < 0.001$) and less likely to report that e-cigarettes were less harmful than cigarettes (AOR: 0.60, $p < 0.01$). Likewise, Black/AA adults were more likely to report that e-cigarettes were very/extremely harmful to health (AOR: 1.57, $p < 0.001$) and less likely to indicate they were less harmful than cigarettes (AOR: 0.50, $p < 0.001$) compared to White adults. Black/AA adults also had lower odds of considering switching to e-cigarettes ($p < 0.05$) and past 30-day e-cigarette use ($p < 0.001$). Race moderated associations between risk perceptions and quitting, such that Black/AA adults with perceptions of greater risk were likelier to report attempts to reduce rather than quit smoking (AOR: 1.54, $p = 0.02$). **Conclusion:** Perceptions of greater relative risk of e-cigarette use among older adults who smoke were associated with behaviors that could increase rather than reduce harm, including less intention to quit smoking or to switch to e-cigarettes. These patterns were more likely for low-SES and Black/AA older adults compared to high-SES or White/Caucasian adults, respectively. Perceptions of greater relative risk may influence efforts to shift individuals at higher risk of disease and death from smoking to e-cigarettes.

FUNDING: Federal; FDACTP

RAP1-5

USING BIOMARKER RATIOS TO DISTINGUISH BETWEEN EXCLUSIVE AND DUAL USE OF TOBACCO PRODUCTS

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Significance- Biomarkers that distinguish between types of tobacco product use are vital to identifying potentially associated health effects, as well as to inform tobacco product reviews and regulatory actions. This study measured nicotine and anatine, minor tobacco alkaloids associated with tobacco smoke particulate matter, in urine biospecimens from US adults who exclusively use cigarettes, smokeless tobacco (SLT), or electronic nicotine delivery system (ENDS), as well as adults who use SLT + cigarettes or ENDS + cigarettes from Wave 1 of the PATH Study. We hypothesized that the ratio of these alkaloids, and/or their ratios with other biomarkers of tobacco exposure, would differentiate types of tobacco product use. **Methods-** Nicotine and anatine were quantified by liquid chromatography tandem mass spectrometry. Receiver Operating Curve (ROC) characteristics of different biomarker ratios and Youden's J-index were used to determine the best threshold for distinguishing between use groups. **Results-** The anatine/nicotine ratio by tobacco use group ranked highest to lowest: exclusive SLT (55.2 (95%CI: 47.2-64.5), dual SLT + cigarette (18.2 (95%CI: 13.2-25.1), exclusive cigarette (12.1 (95%CI: 10.3-14.1), dual ENDS + cigarette (10.0 (95%CI: 8.2-12.3), and exclusive ENDS (4.8 (95%CI: 3.6-6.4); $p < 0.001$). ROC analyses indicated that the anatine/nicotine ratio was very good at distinguishing between exclusive cigarette and SLT use at a threshold of 2.9 (AUC = .90; Sensitivity = 89%, Specificity = 86%), and exclusive e-cigarette from SLT use at a threshold of 2.6 (AUC = .90; Sensitivity 96%, Specificity = 76%), but not exclusive cigarette from ENDS nor dual use from single product use. Ratios of nicotine and other biomarkers had improved sensitivity and specificity for distinguishing exclusive cigarette and ENDS (e.g., Nicotine/Cotinine ratio threshold = 2.5 (AUC = .84; Sensitivity 91%, Specificity = 76%)) and exclusive SLT vs. dual SLT + cigarettes (Nicotine/NNAL ratio threshold = .84 (AUC = .82; Sensitivity 74%, Specificity = 81%)). **Conclusions-** Anatine and nicotine can create biomarker ratios that distinguish between types of exclusive and dual tobacco product use.

FUNDING: Federal; FDACTP

RAP1-6

EFFECT OF NICOTINE MOUTH SPRAY ON URGES TO VAPE: A RANDOMIZED, PLACEBO-CONTROLLED, PHARMACODYNAMIC CLINICAL TRIAL IN EXCLUSIVE E-CIGARETTE USERS

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Introduction: Most exclusive vapers are former smokers, and many vapers express a wish to also quit vaping. This study was designed to determine whether nicotine mouth spray provided significant and rapid relief of urges to vape in exclusive e-cigarette users. **Methods:** This randomized, parallel group, double-blind, placebo-controlled trial compared nicotine mouth spray versus placebo in 216 volunteer exclusive vapers (no conventional cigarettes smoked in the last 7 days) who used their e-cigarette within 30 minutes of waking. Participants were admitted to the clinic the day before treatment and abstained from vaping during the night. Two sprays of either 1 mg nicotine mouth spray or placebo were administered. Urge to vape was rated before and repeatedly over the first 2 hours after a single treatment administration. The primary outcome measured average change from baseline during the first hour. **Results:** Nicotine mouth spray achieved significantly greater reductions in urges to vape than placebo during the first hour post administration. The estimated mean treatment difference of nicotine mouth spray and placebo mouth spray was 11.9 mm (95% CI [6.86, 16.95], $p < 0.001$) on a 100 mm visual analogue scale. There was a significant difference observed between the treatments starting at the first assessment point of 30 seconds. The safety profile was in line with that seen when used in smokers. **Conclusions:** Nicotine mouth spray is safe and provides a significant and fast relief of urges to vape in exclusive vapers.

FUNDING: Pharmaceutical Industry

RAP1-7

ASSOCIATION OF E-CIGARETTE USE WITH TOBACCO CESSATION IN YOUTH CIGARETTE SMOKERS ENROLLED IN A YOUTH QUITLINE: A PROSPECTIVE STUDY

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Significance Evidence on the role of electronic cigarette (e-cigarette) use in youth cigarette smokers interested in tobacco cessation has remained limited. We examined the association of current e-cigarette use with tobacco abstinence in youth cigarette smokers attending a cessation service. **Methods** The HKU Youth Quitline is a community-based tobacco cessation service offering multi-sessions telephone counselling to tobacco users aged 25 years or younger in Hong Kong. We analyzed data from 1,295 current (past 30-day) cigarette smokers (80.8% male; 32.3% aged <18 years; 64% smoked daily) who enrolled in the service from December 2016 to February 2022. The exposure variable was current (past 30-day) use of e-cigarettes at baseline. The main outcome was biochemically validated tobacco abstinence at 6 months after baseline. Covariates included sex, age, cigarette dependence (assessed by the Fagerström Test for Nicotine Dependence), any previous quit attempt, and risk of depression (assessed by the Center for Epidemiological Studies Depression). Poisson regression with robust variance was used to estimate the relative risk (RR) of abstinence outcomes by baseline e-cigarette use. Participants with missing outcomes were assumed to have no change in tobacco use behaviors from baseline. **Results** At baseline, 252 of 1295 (19.5%) participants currently smoked e-cigarettes. The most common reasons for initiating e-cigarette use among 241 current users were "curiosity" (37.8%), followed by "influenced by peers/others" (30.3%), "to quit or reduce smoking" (27.8%), and "flavoring" (13.3%). Compared with non-users, current e-cigarettes users were more likely to be underaged (<18) smokers ($P < 0.001$), female ($P = 0.04$), full-time students ($P = 0.001$), smoke daily (vs non-daily) ($P = 0.049$), and at risk of depression ($P = 0.001$). At 6-month follow-up (retention rate = 69.9%), current e-cigarette use at baseline was not associated with biochemically validated tobacco abstinence (7.1% vs 9.3%; adjusted RR 0.76; 95% CI 0.44-1.31; $P = 0.32$). Self-reported 7-day point prevalent abstinence at 3 months (20.0% vs 20.6%) and 6 months (20.2% vs 21.1%) were similar between current e-cigarette users and non-users. Subgroup analyses showed that the associations did not differ by sex, age groups (<18 vs ≥18), cigarette dependence (mild vs moderate/heavy) and between daily and non-daily cigarette smokers and those with or without risk of depression (all P for interaction > 0.05). **Conclusions** We did not find evidence that current e-cigarette use was prospectively associated with tobacco cessation in youth cigarette smokers enrolled in a youth cessation service.

FUNDING: Nonprofit grant funding; Other: Tobacco & Alcohol Control Office, Department of Health, Government of Hong Kong (2016-20); Sir Robert Kotewall endowed Professorship in Community Medicine (2020-21)

Podium Presentation 2: Paper Session 5
Rapid Submissions



TRENDS IN SMOKING AND E-CIGARETTE USE

PPS5-6

PREVALENCE OF MENTHOL USE AMONG ADULT CIGARETTE SMOKERS FROM THE UNITED STATES (US) BY CENSUS DIVISION AND DEMOGRAPHIC SUBGROUP, 2002-2020: FINDINGS FROM THE INTERNATIONAL TOBACCO CONTROL (ITC) PROJECT

Pete Driezen¹, Shannon Gravely¹, Karin A. Kasza², Mary E. Thompson¹, K. Michael Cummings³, Andrew Hyland², Geoffrey T. Fong¹. ¹University of Waterloo, Waterloo, ON, Canada, ²Roswell Park Comprehensive Cancer Center, Buffalo, NY, USA, ³Medical University of SC, Charleston, SC, USA.

Significance: Targeted marketing of menthol cigarettes in the US influences disparities in the prevalence of menthol smoking across demographic groups. Although menthol use increased nationally since 2004, there are no sub-national data documenting differences in use across demographic subgroups. This study estimated trends in the prevalence of menthol use among current adult smokers for the nine US census divisions by sex, age group, and race/ethnicity from 2002-2020. **Methods:** Data from 12 waves of the US ITC Survey (2002-2020) were used to estimate the prevalence of menthol use across census divisions and demographic subgroups using multilevel regression and poststratification (n=12,020). Weighted multilevel logistic regression was used to predict the prevalence of menthol use in 72 cross-classified groups of smokers defined by sex, age, race/ethnicity, and socioeconomic status; division-level effects were fit with a random intercept. Predicted prevalence was weighted by the total number of smokers in each cross-classified group, estimated from the Behavioral Risk Factor Surveillance System and American Community Surveys, and aggregated to divisions within demographic subgroup. Estimates were validated against data from the Tobacco Use Supplement of the Current Population Survey (TUS-CPS). **Results:** Overall modeled prevalence of menthol use was similar to external TUS-CPS estimates (concordance correlation coefficient=0.932; precision=0.966, accuracy=0.965). Prevalence increased in each division from 2002-2020. In 2020, prevalence was highest in the Middle Atlantic (46.3%) and South Atlantic (43.1%) and lowest in the Pacific (25.9%) and Mountain (24.2%) divisions. Prevalence was higher among smokers aged 18-29 (vs. 50+) and females (vs. males). Prevalence exceeded 80% among Black smokers in the Middle Atlantic, East North Central, West North Central, and South Atlantic divisions in all years but was only 59.0% in the Mountain division in 2020. Prevalence varied most among Hispanic smokers, ranging from 26.5% in the Pacific to 55.3% in New England in 2020. **Conclusions:** There was significant variation in the prevalence of menthol use among current smokers across US census divisions from 2002-2020. Prevalence was highest among Black smokers, and varied the most among Hispanic smokers. Results suggest the proposed US FDA menthol ban may exert different effects across geographic and demographic subgroups, requiring tailored cessation support for smokers following the FDA ban.

FUNDING: Federal; FDA/CTP; Other: Canadian Institutes of Health Research (MOP-57897, MOP-79551, MOP-115016, FDN-148477); Robert Wood Johnson Foundation (045734); Ontario Institute for Cancer Research

PPS5-7

ADULTS' USE OF ENDS FLAVORS/DEVICES AND CIGARETTE CESSATION BEHAVIORS BEFORE AND AFTER THE 2020 US FDA ENDS FLAVOR/DEVICE ENFORCEMENT PRIORITY: LONGITUDINAL FINDINGS FROM THE PATH STUDY (2019-2020)

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Significance: The US FDA Center for Tobacco Products prioritized its enforcement efforts against non-tobacco, non-menthol ("fruit/other") flavored cartridge electronic nicotine delivery systems (ENDS) in February 2020. Concerns have been raised that limiting ENDS options may hinder cigarette cessation/facilitate cigarette relapse among adults who use ENDS. **Methods:** We analyzed PATH Study data collected in 2019 and 2020 from adults (aged 21+) who used ENDS and either currently smoked cigarettes or

quit smoking in the past year (n=3173). We evaluated prevalence of ENDS flavor/device combinations used in 2019 and 2020 (cross-sections); transitions in ENDS use in 2020 among adults who smoked cigarettes and used fruit/other flavor-cartridge ENDS in 2019 (n=149); and transitions in cigarette smoking in 2020 (cessation [no smoking in past 30 days; n=891] and reuptake [smoking in past 30 days; n=356]) as a function of ENDS flavor/device used in 2019. **Results:** Cross-sectional analyses: Among adults who used ENDS and smoked cigarettes (n=2754), prevalence of fruit/other flavor-cartridge ENDS use decreased from 13.9% in 2019 to 7.9% in 2020 (p=.01). Among adults who used ENDS and recently quit smoking cigarettes (n=419), prevalence of fruit/other flavor-cartridge ENDS use was 14.7% in 2019 and 7.4% in 2020 (p=.11). Longitudinal analyses: Among adults who in 2019 smoked cigarettes and used fruit/other flavor-cartridge ENDS (n=149), in 2020, 7.3% used fruit/other flavor-cartridge ENDS, 29.4% switched to another flavor/device, and 63.3% no longer used ENDS. Among those who in 2019 smoked cigarettes and used ENDS (n=891), cigarette cessation rates in 2020 were 26.4% for those who used fruit/other flavor-cartridge ENDS and 25.6% for those who used other flavor/device combination ENDS (OR=0.96, 95%CI:0.58-1.60). Among those who in 2019 recently quit smoking and used ENDS (n=356), cigarette reuptake rates in 2020 were 39.0% for those who used fruit/other flavor-cartridge ENDS and 26.3% for those who used other flavor/device combination ENDS (OR=0.56, 95%CI:0.19-1.67). **Conclusions:** Prevalence of fruit/other flavor-cartridge ENDS use among adult ENDS users in the US was nearly halved between 2019 and 2020. Cigarette quitting among smokers and relapse among quitters did not differ between those who used ENDS flavor/device combinations that were prioritized for enforcement vs. those who used other combinations, though sample sizes were small. Findings should be considered alongside potential impacts of ENDS enforcement priorities on youth. **Funding:** This work 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 R21DA053614. 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; FDA/CTP

Podium Presentation 2: Paper Session 7
Rapid Submissions



EMERGING ISSUES IN NICOTINE POUCH RESEARCH

PPS7-6

FDA HEALTH WARNING LABEL COMPLIANCE ON INSTAGRAM ADVERTISEMENTS OF SYNTHETIC NICOTINE PRODUCTS

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Background Synthetic nicotine is increasingly used as the primary ingredient in e-cigarette liquids. The Food and Drug Administration (FDA) was only recently granted regulatory authority over synthetic nicotine products in April 2022. Our study analyzed the extent to which brands promoting synthetic nicotine products on Instagram implement FDA-mandated health warnings and evaluated the association between health warnings and user engagement. **Methods** We analyzed Instagram posts (N = 2,138) shared by the leading 25 synthetic nicotine brands over a 14-month period (8/2021-10/2022). To identify the presence and properties of a health warning, we applied Warning Label Multi-Layer Image Identification (WaLi), a computer vision algorithm designed to detect the presence of health warnings and FDA guidelines dictating health warnings: 1) appear on the upper portion of the advertisement within the trim area and 2) occupy $\geq 20\%$ of the advertisement's area. The overall accuracy of WaLi to detect the presence of health warnings in our dataset was 99%. We examined the proportions of the presence of warnings and the extent of those meeting FDA requirements. We employed negative binomial regression analyses to evaluate the associations between health warnings and the number of likes and comments. **Results** Engagement metrics for each post, specifically the number of likes ($mean \pm standard deviation (SD) = 46.73 \pm 81.79$) and comments ($mean \pm SD = 3.81 \pm 9.06$), were recorded. Of the 2,083 sampled posts, 45% featured a health warning. Only 14% of posts met FDA requirements for health warnings. Among the 935 posts with health warnings, a health warning was detected in the upper portion of the image for 76% of posts and 34% of posts had a health warning that occupied $\geq 20\%$ of the pixel area. Results from follower counts adjusted negative binomial regression analyses reveal that posts with health warnings received fewer comments (incidence rate ratios = 0.75, 95% confidence intervals = 0.61, 0.91). Posts with a warning that occupied $\geq 20\%$ of the pixel area received fewer likes than posts with a warning that occupied $< 20\%$ of the area (incidence rate ratios = 0.89, 95% confidence intervals = 0.81, 0.97). **Discussion** Most synthetic nicotine brand Instagram posts (86%) do not adhere to FDA health warning requirements in tobacco marketing. Enforcement of health warnings on social media posts of synthetic nicotine products may reduce youth engagement with tobacco marketing on social media.

FUNDING: Federal; FDACTP

**Podium Presentation 2: Paper Session 9:
Rapid Submissions**



DEVELOPMENTAL EFFECTS OF TOBACCO AND NICOTINE EXPOSURE

results revealed that females displayed a larger increase in approach behavior to the nicotine port than males. Adolescents exposed to nicotine vapor displayed more total physical signs of withdrawal compared to controls, an effect that is likely related to higher levels of nosepoke responses in young rats. Adolescent females also displayed higher cotinine levels than all other groups. Lastly, adolescent females displayed greater withdrawal induced Fos expression in the IPN as compared to males. These results are an important first step in our understanding of the mechanisms that modulate age differences produced by nicotine withdrawal.

FUNDING: Other: DA021274, DA033613, DA052119

PPS9-7

MODELING HUMAN HETEROGENEITY UTILIZING DIVERSITY OUTBRED POPULATION TO ASSESS THE EFFECTS OF ADOLESCENT NICOTINE EXPOSURE TO ADULT SENSITIVITY TO NICOTINE

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Factors that contribute to nicotine use are complex. Behaviors induced by nicotine are highly heritable and can result in long-lasting effects. More importantly, adolescent exposure to nicotine in the form of ENDS has skyrocketed recently and alarmingly, there is little investigation of the potential for detrimental long-lasting effects of nicotine use during adolescence. The Diversity Outbred (DO) population is used for better assessment of phenotype variation due to genetic and environmental factors. For this study, we implanted osmotic minipumps delivering 24 mg/kg/day of nicotine or saline continuously for 12 days in adolescent male and female Diversity Outbred mice. After long abstinence to nicotine, mice were assessed on nicotine-induced locomotor activity as a measure of sensitivity to nicotine. On days 1 and 2, we administered s.c. sterile saline prior placing the animals in the locomotor chambers. On day 3, we administered an acute nicotine dose (0.81 mg/kg; s.c.) and recorded locomotor activity for 30 min. Locomotor activity on all 3 days was measured, as well as a difference score (Day 3 - Day 2) to assess nicotine-induced locomotion and account for baseline locomotor activity. A Generalized linear model with Sex, Treatment and Time bin as a repeated measure demonstrated that adolescent nicotine exposure decreases baseline locomotion ($F [1,258] = 10.70, p = 0.001$). On Day 3, we found an effect of sex ($F [1,258] = 7.39, p = 0.007$), with females having lower locomotor activity after an acute nicotine injection. The difference score revealed an adolescent nicotine treatment effect ($F [1,258] = 11.23, p = 0.001$), with adolescent nicotine treatment decreasing the effect of an acute nicotine dose. No effect of sex was seen on Day 3 - Day 2. We suggest that adolescent nicotine treatment results in decreased sensitivity to the effects of nicotine re-exposure on locomotion. Additionally, we conclude that sex is a crucial factor contributing to variability in nicotine-induced responses. Altogether, we conclude that adolescent nicotine results in long-lasting changes in sensitivity to nicotine in a mouse model that mimics human genetic diversity. Future experiments will assess genetic factors underlying nicotine susceptibility.

FUNDING: Federal; Academic Institution; Nonprofit grant funding

PPS9-8

ADOLESCENT SEX DIFFERENCES IN THE BRAIN MECHANISMS UNDERLYING THE BEHAVIORAL EFFECTS OF NICOTINE VAPOR

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Significance: The epidemic rise in electronic cigarette use is a major public health problem, particularly in adolescent females who are more susceptible to nicotine use. Preclinical studies are needed to provide a deeper understanding of the underlying mechanisms that promote age and sex differences in nicotine use, particularly with rodent models that mimic nicotine use patterns in humans. Emerging evidence in male rodents has revealed that the interpeduncular nucleus (IPN) modulates the behavioral effects of nicotine withdrawal. There are important unanswered questions regarding age and sex differences in the role of the IPN in modulating nicotine withdrawal. Therefore, this study compared neuronal activation within the IPN during withdrawal from nicotine vapor in adolescent female and male rats. **Methods:** The present study employed nicotine vapor methods involving passive exposure to nicotine vapor for 14 days. Adolescent sex differences in approach behavior (nosepokes) were assessed in a port that delivered nicotine plumes on Day 1 and 14 of our exposure regimen. Controls received ambient air. After the final exposure session, rats received an injection of the nicotinic receptor antagonist mecamylamine to precipitate withdrawal. Physical signs were assessed before rats were euthanized, and blood was collected to assess cotinine (a nicotine metabolite) levels across conditions. After blood collection, brain sections containing the IPN were processed for Fos immunofluorescence. **Results and Conclusion:** The

Podium Presentation 3: Rapids Paper Session 2: Rapid Fire



RAPID FIRE

RAP2-1

A QUALITATIVE EXPLORATION OF OLDER ADULTS WHO SMOKE CIGARETTES AND THEIR PREFERENCES AND CONCERNS FOR TECHNOLOGY-BASED TOBACCO CESSATION TREATMENT

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Background: While the prevalence of cigarette smoking has declined over the past 15 years, rates among older adults remain stable. Older adults are less likely to make quit attempts and to access cessation resources compared to younger adults. Given that older adults commonly report preference for in-person behavioral health treatment and have lower digital literacy than younger adults, the increasing prevalence of technology-based interventions may exacerbate age-related health inequities. This study qualitatively explored older adults' perceived benefits and concerns for cessation treatment via various modalities. **Method:** Semi-structured qualitative interviews and quantitative surveys were conducted over the phone with older adult (≥65 years) past month cigarette use (N=12; White [n=10], Black/African American [n=2]; 67% men; M age=70.1). Study compensation was \$50. This sample had high interest (M=7.9/10) and moderate confidence (M=5.4/10) in quitting. The Mobile Device Proficiency Questionnaire (Range: 16-80) measured digital literacy. Interviews included questions about benefits and concerns for cessation interventions via videoconferencing, telephone, text-messaging, and mobile health apps and prior experiences with technology and telehealth. Interviews were audio-recorded, transcribed, de-identified and analyzed using NVivo software. Thematic analysis identified common themes across interview question responses. **Results:** Digital literacy scores varied widely (Range: 16-80; M=55.2). Perceived videoconferencing benefits (vs. phone) included 1) circumventing transportation barriers, 2) improved treatment efficiency, and 3) possibilities for face-to-face conversation. Concerns for videoconferencing included 1) breach of privacy or security, 2) lack of personability (compared to in-person), and 3) frustrations with set-up and connectivity issues. Benefits of mobile health apps included 1) access to content 24/7 and 2) convenience. Concerns about mobile apps included 1) lack of proficiency and 2) limited interest in using smartphones. **Discussion:** This older adult sample had diverse experiences with technology and digital literacy proficiency, and mixed preferences for cessation treatment modality. Screening for low digital literacy and providing technical support, as well as easing concerns about privacy and security may improve ease of access to technology-based interventions for older adults and should be pursued in future research.

FUNDING: Federal; Other: Carpenter and Dahne MUSC discretionary funds, K23DA045766 (Dahne), NIDA T32DA007288-31 (Fahey)

RAP2-3

CONSTRUCTING A MEASURE OF CIGAR-YEARS AND EXAMINING DIFFERENCES IN MEASUREMENT BY CIGAR TYPOLOGY

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Significance: Cigar consumption continues to rise among US adults, compelling research into the health impacts of these products. However, cigars lack the same level of standardization as cigarettes, as they vary by type, size, nicotine level, and price, making it difficult to construct a single measure of lifetime duration and intensity of cigar use. We reviewed previous measures of lifetime cigar use, descriptively analyzed lifetime duration and intensity of cigar use by cigar type, and provide directions for future work. **Methods:** We used Wave 4 of the Population Assessment of Tobacco and Health (PATH) data and restricted the study sample to adults (18+ years) who reported ever using traditional cigars, cigarillos, or filtered cigars fairly regularly. We generated a measure of lifetime cigar use - cigar-years - based on the duration of cigar use (in years) and the average number of cigars smoked per day, separately for each cigar type. This variable was interpreted as the average number of cigars smoked per day since first regular use. We conducted a descriptive analysis of median cigar-years and examined the variation

in average cigar-years based on sex, race/ethnicity, educational attainment, and annual household income. **Results:** Median cigar-years was highest among respondents who ever used filtered cigars fairly regularly (n=448; median=5, IQR=0.67-35), followed by cigarillos (n=797; median=1.48, IQR=0.27-6.5) and traditional cigars (n=680; median=1, IQR=0.23-6.93). By sex, cigar-years was higher among males who ever used traditional and filtered cigars fairly regularly relative to females, while for cigarillos, it was higher in females. By race/ethnicity, cigar-years was highest among non-Hispanic Black respondents who ever used traditional cigars and cigarillos fairly regularly, while for filtered cigar use, it was highest among non-Hispanic White respondents. Median cigar-years was highest among college graduates who ever used cigarillos fairly regularly, while for traditional and filtered cigars, it was highest among adults who had some high school education or had completed high school, respectively. Across all products, median cigar-years was higher among respondents who reported a household income lower than \$50,000 in the past year, relative to respondents with a household income of \$50,000 or more. **Conclusion:** Lifetime use of cigars as measured by cigar-years varied across cigar product types and by sociodemographic groups, indicating that measures that aggregate across cigar type might not account for this heterogeneity. Future work should capture detailed measures of cigar products to inform research on tobacco-related health disparities.

FUNDING: Federal

RAP2-4

COOLING FLAVORS USE AND E-CIGARETTE NICOTINE DEPENDENCE AMONG YOUTH

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Significance: Cooling sensations in e-cigarettes have been associated with reductions in nicotine harshness and enhanced e-cigarette appeal among youth. Typically, cooling sensory experience has been associated with menthol or mint flavored e-cigarettes, but many non-menthol e-cigarette flavors (e.g., fruit, candy) contain cooling components as well. Previous research from our team found that use of flavors that produced cooling sensations was associated with greater rates of nicotine vaping and frequency of use among youth, however literature on cooling flavor use and nicotine dependence is scarce. This study aims to examine the association between use of cooling e-cigarette flavors and nicotine dependence among youth. **Methods:** In Fall 2022, Connecticut high school students (N=4,855) completed a survey about tobacco product use. Participants were asked about past-month e-cigarette use, if their e-cigarette flavors produced a cooling sensory experience in the past-month, what e-cigarette flavor types they used (e.g., fruit, candy, vanilla) that produced cooling sensations in the past-month, and e-cigarette nicotine dependence (assessed using the 4-item PROMIS® measure). Analyses were restricted to those who used e-cigarettes in the past-month (n=409). A multivariable linear regression was run to examine the association between cooling sensory experience and nicotine dependence (ranged from 0-16), adjusting for age, sex, race/ethnicity, and e-cigarette use frequency. **Results:** 60.3% reported using e-cigarette flavors that produced cooling sensations, 22.0% reported no cooling sensations, and 17.7% did not know whether the flavors they used produced cooling sensations. Of those reporting use of cooling flavors, 53.1% used mint and 47.4% used fruit, followed by menthol (20.9%) and candy (13.3%). After controlling for covariates, reporting use of cooling flavors was significantly associated with greater e-cigarette nicotine dependence compared to reporting no use of cooling flavors (beta=1.07, SE=0.40, p-value=0.018). **Conclusion:** To our knowledge, this is the first study to assess flavors with cooling sensations on e-cigarette nicotine dependence among youth. Results found that use of flavors with cooling sensations was associated with greater nicotine dependence. As efforts are made to regulate menthol flavored tobacco products, it is also important to consider flavors that may produce cooling sensations but are not traditional menthol products. Regulating flavors with cooling sensations in tobacco products may help reduce nicotine dependence among youth.

FUNDING: Federal; FDACTP

RAP2-5

CREATING A GLOBAL TOBACCO CONTROL SURVEILLANCE PLATFORM

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Significance The *Global Tobacco Control Progress Hub* is an online data analytics platform and is the first comprehensive, interactive and independent treaty surveillance system created for the WHO Framework Convention for Tobacco Control (FCTC). **Methods** Over 180 countries have been reporting their progress on treaty implementation since 2008. However these important datasets have not been consolidated, assembled and organized in an online, functional, user-friendly manner that can be readily accessed by all tobacco control stakeholders. The absence of a consolidated surveillance platform has constrained treaty monitoring, reporting and implementation. To address this challenge, ASH Canada and the Institute for Global Tobacco Control at Johns Hopkins Bloomberg School of Public Health created a robust, interactive, online treaty monitoring platform. The platform was developed with the guidance of an advisory committee consisting of international tobacco control experts. The contents, capabilities, features and functions of the platform were determined in consultation with the advisory committee based on the availability and contents of reporting datasets and the capabilities and limitations of the chosen data analytics software application (Tableau). **Results** The *Global Tobacco Control Progress Hub* contains over 300 tobacco control indicators from over 180 countries spanning 12 years of reporting and representing over 400,000 datapoints. The FCTC country reporting dataset includes 248 binary indicators submitted by each Party (n=181) to the FCTC Secretariat. The MPOWER dataset contains 42 binary indicators with data supplied by each reporting country (n=195) to the WHO Tobacco-Free Initiative as well as the scoring data for each reporting country. The platform includes four dashboards that allow for various data groupings, breakdowns and comparisons by country, WHO region, national personal income level and human development index gradients. The platform also includes national scoring, ranking and longitudinal results for each reporting country. The Progress Hub allows for the creation of independent FCTC shadow reports for each country. **Conclusion** The Global Progress Hub provides a new window on the world of FCTC implementation by providing tobacco control stakeholders with online access to the major treaty implementation datasets with the ability to compare, group and analyze national FCTC reporting data. This platform allows for enhanced monitoring surveillance, reporting and implementation of the treaty. More datasets, features and functions will be added to the Progress Hub in 2023. The surveillance platform will be used to support independent national treaty reporting in the lead up to the FCTC COP10 summit in November 2023.

FUNDING: Nonprofit grant funding

RAP2-6

RETAILERS' COMPLIANCE WITH FEDERAL AGE OF CIGARETTE SALES POLICIES -- PITT COUNTY, NORTH CAROLINA, JANUARY-MARCH 2022

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BACKGROUND: Interventions to reduce youth access to tobacco remain important and require additional attention to address an increase in the federal age of sale for tobacco products. In December 2019, the federal age of sale increased from 18 to 21 years of age. This study aimed to evaluate the implementation of federal tobacco 21 policies by conducting multiple purchase attempts for cigarettes in Pitt County, North Carolina (NC), a top tobacco-growing state that has not yet increased its state age of sale policy. **METHODS:** The study used an underage purchasing protocol and a validated method of identifying tobacco retailers in NC. Stores in Pitt County that sold cigarettes were randomly sampled and visited by up to six underage (18-20) buyers who attempted to buy cigarettes from January through March 2022. Buyers documented whether they were asked for identification and whether they were able to successfully purchase cigarettes at each visit. Buyers visited 49 stores and made a total of 217 cigarette purchase attempts. Analyses were conducted using SPSS Complex Samples (v.28/ Macintosh) and estimate retailer prevalence of requesting identification (ID) and selling to underage buyers across multiple purchase attempts. **RESULTS:** On average, retailers failed to request ID in 15.4% of purchase attempts (95% CI: 9.4%-21.3%) and sold to an underage buyer 34.2% of the time (95% CI: 27.0-41.4%). Additionally, 75.5% (95% CI: 63.4%-84.6%) of retailer locations sold to an underage buyer at least once. Excluding one buyer who made just two purchase attempts, the percentage of attempts per buyer that resulted in a sale ranged from 11.1% to 48.0% with a median of 30.0%. Retailers sold to three buyers over 40% of the time. **DISCUSSION:** These findings suggest the need for stronger laws in NC including a state tobacco retailer licensing system, a strong civil enforcement program that does not require law enforcement presence, and an increase in the state legal age of sale from 18 to 21. Our findings are also substantially higher than the most recent state Synar rate (11.8% weighted rate for NC Synar fiscal year 2023 compared to 34.2% in these data). Measuring compliance at the store level

through repeated attempts instead of from a single purchase attempt shows much higher non-compliance. Federally, the FDA should consider maximizing its enforcement of No-Tobacco-Sale Orders for retailers who routinely sell to underage buyers.

FUNDING: Federal

RAP2-7

TOBACCO MARKETING, CEREMONIAL USE, AND TRADITIONAL HEALING: IMPLICATIONS FOR CULTURALLY RELEVANT CESSATION AMONG AMERICAN INDIAN/ALASKA NATIVE ADULTS WHO SMOKE CIGARETTES

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Significance: American Indian and Alaska Native (AI/AN) communities have disproportionately higher rates of commercial tobacco smoking compared to other racial/ethnic groups in the U.S. While tobacco ceremonial use has historically been a cultural practice, commercial tobacco companies have targeted AI/AN people by appropriating cultural symbols and practices to increase commercial tobacco use. As a counterpoint, culturally embedded practices, such as traditional healing, may aid in tribally-led smoking cessation. It is important to understand how cultural factors influence perceptions of commercial tobacco, use of tobacco, and tobacco cessation. **Methods:** Data were collected in spring 2022 through an online survey of 824 AI/AN adults (78.3% male; mean age=28.9, SD=6.1) who smoke cigarettes. Survey items assessed whether participants were familiar with a cigarette brand that uses AI/AN imagery in marketing (Natural American Spirit [NAS]), tobacco marketing perceptions, traditional healing, and ceremonial use. **Results:** Most participants (70.7%) reported seeing NAS ads; 34.4% have used tobacco ceremonially; and 31.8% saw a traditional healer in the past year. Of those who saw a traditional healer, 68.6% were asked by their healer if they smoked cigarettes; 70.8% were advised to quit; and 83.2% were advised to use a traditional quitting method (e.g., herbs, sweat lodge). Compared to those who did not, those who saw a traditional healer in the past year were significantly more likely to agree that tobacco companies should not be allowed to market products to tribal communities ($t(810)=3.91, p<0.01$; should not be allowed to send emails or mail coupons, $t(809)=4.30, p<0.01$; and felt unfairly targeted by tobacco companies, $t(810)=5.07, p<0.01$). Most of the sample (76.8%) were neutral or against tobacco companies sponsoring tribal events. **Conclusion:** The results suggest most AI/AN adults who smoke are being exposed to targeted tobacco marketing. Traditional healing practices offer a culturally congruent method of engaging with AI/AN adults who use commercial tobacco. Cultural practices like traditional healing may be a key strategy for decolonizing and indigenizing cessation methods and developing tribally-led culturally salient anti-tobacco marketing messaging and campaigns.

FUNDING: FDACTP

RAP2-8

WHOSE SYSTEM, WHOSE GOALS? MAORI PERSPECTIVES ON ADDRESSING (COMMERCIAL) TOBACCO HARM IN AOTEAROA/NEW ZEALAND

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SIGNIFICANCE: Recreational use of commercial tobacco is a leading cause of premature death and often closely associated with colonisation due to the disproportionate impact on many Indigenous peoples. Paradoxically tobacco remains easily accessible in most countries. This paradox can be attributed to competing stakeholder agendas within the tobacco system, (e.g. health vs profit) and differential access to power and resources to take action on priorities. Māori, the Indigenous peoples of Aotearoa/New Zealand (A/NZ), have advocated for a 'tobacco free' nation since the mid 2000's. This played an influential role in their government's recent passing of legislation that aims to end commercial tobacco use in A/NZ. This study explored perspectives and values about who currently does and who should hold power and influence related to tobacco use in A/NZ. We also explored Māori values underpinning perspectives on tobacco use. **METHOD:** Ten key informant interviews were conducted with Māori stakeholders involved in tobacco control programmes services, policy and advocacy. Interview questions were



guided by critical systems heuristics. **RESULTS:** Participants discussed the pervasive impact of colonisation on commercial tobacco use among Māori and how this harmed whakapapa (genealogy, kinship ties). When reflecting on power and what the system ought to look like, participants prioritised obligations under Te Tiriti o Waitangi (a Treaty signed between Māori and the Crown in 1840), highlighting the importance of equity and self-determination in terms of: defining how health is understood; and enabling Māori governance, leadership and mātauranga Māori (Māori knowledge systems). In terms of Māori perspectives on health and commercial tobacco use this was discussed in the context of broadening definitions of tobacco harm from a narrow focus on physical harm to also include economic, cultural and social harms. Centering these understandings have been an important feature of A/NZs journey to becoming a smokefree nation.

CONCLUSION: Māori participants were acutely aware of the determinants of health and the failings of the tobacco system for Māori. At a broader level these failings can be seen as breaches of Te Tiriti o Waitangi that guaranteed government protection of Māori interests, sovereignty, and freedom from discrimination. Advocating through the lens of a Māori worldview and the application of values that uplift, enhance, and include those impacted most by commercial tobacco would go some way toward achieving the rights and aspirations that have been central to Māori led tobacco control in Aotearoa.

FUNDING: Federal

RAP2-9

RURAL APPALACHIAN DISPARITIES IN TOBACCO USE ACROSS VIRGINIA: WHAT ROLE DOES SOCIAL VULNERABILITY PLAY?

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Significance: Disentangling the drivers of tobacco use disparities is vital towards promoting health equity. While individual and socioeconomic factors have been studied to explain smoking patterns across U.S., less is known about the role of environmental factors on community-level smoking rates, particularly in rural Appalachia which has the highest smoking rates in the U.S. In the current study, we examined smoking prevalence in Virginia counties between 2011-2019 by rurality and Appalachian status, and how these rates can be explained by the social vulnerability index (SVI). The SVI was developed by the CDC to evaluate community vulnerabilities across four dimensions: socioeconomic; racial and ethnic composition; housing type and transportation; and household composition. **Methods:** The Virginia Behavioral Risk Factor Surveillance System restricted data was analyzed using Small Area Estimation methods to estimate county-level smoking prevalence. Multiple regression analysis was used to investigate the impact of SVI and its four dimensions on the tobacco use prevalence in counties in Virginia by rurality and Appalachian status. Community-level predictors such as tobacco retailer density, medical care provider shortages, indicators for counties with coal mining and tobacco agriculture were controlled for in the analyses. **Results:** The prevalence of current smoking declined across Virginia from 16.68% to 14.78% yet remained remarkably high in rural Appalachian areas (mean=23.10%, SD=7.35). Further, rural non-Appalachian (mean=0.63, SD=0.27) and rural Appalachian (mean=0.55, SD=0.23) counties had the highest levels of SVI followed by urban Appalachian (mean=0.45, SD=0.23). However, there was no statistically significant impact of SVI on tobacco use prevalence in the stratified sample analysis at 5% significance level. Interestingly, in rural non-Appalachia, none of the SVI or community-level factors were associated with tobacco prevalence. Meanwhile, among rural Appalachians, the only significant predictor was the shortage of medical providers (p=0.03). **Conclusion:** These findings reveal that SVI does not adequately capture the unique social vulnerability characteristics of rural Appalachia that are driving high rates of tobacco use. There is a need for better measures to capture the unique vulnerabilities of this region, especially in the context of smoking behaviors.

FUNDING: Federal; Academic Institution; Nonprofit grant funding

Podium Presentation 4: Paper Session 17
Rapid Submissions



THE DRIVING FACTORS: NEUROBIOLOGICAL MECHANISMS UNDERLYING DRUG USE AND NOVEL THERAPEUTIC APPROACHES

PPS17-7

EFFECTS OF TREATMENTS FOR METABOLIC SYNDROME ON EXCESSIVE NICOTINE INTAKE OBSERVED IN A RODENT MODEL OF DIABETES.

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Significance: Nicotine use in persons with diabetes is a major public health concern due to compounded health consequences. Clinical evidence suggests that individuals with diabetes often continue to use nicotine despite negative health effects and they have more difficulty quitting than their non-smoking counterparts. This problem appears to be worse in women with diabetes who report more anxiety during withdrawal and lower cessation rates as compared to their male counterparts. Diabetes is characterized by a disruption in insulin signaling that leads to the development of insulin resistance (IR). To date, it is unclear the development of insulin resistance coincides with an increase in nicotine intake. Further, it is unclear whether medications that reduce metabolic syndrome normalize the excessive nicotine intake observed in IR rats. **Methods:** To address this issue, female and male Wistar rats received a high-fat diet (HFD) or a regular diet (RD) for 4 weeks. Then, the rats received a low dose of streptozotocin (STZ) that damages pancreatic beta cells and rapidly induces IR. Rats were then given extended (23-hour) access to self-administration of increasing doses of nicotine with 3 intermittent days of abstinence. We then tested the efficacy of 3 different medications used clinically to alleviate IR. Nicotine self-administration behavior was assessed for one week following daily administration of bromocriptine (Cycloset®; 10 mg/kg, IP), then dapagliflozin (FARXIGA®; 10 mg/kg, IP), and then insulin (0.75 U/kg, IP). The injections were administered daily at 6 pm at the onset of their night cycle within the operant chamber. **Results:** The results revealed that the highest level of nicotine self-administration was evident in HFD-fed female rats that displayed IR as compared to obese female and male rats that did not display IR. Our results also revealed that both bromocriptine and dapagliflozin increased nicotine self-administration behavior in female and male rats. In contrast, the increase in nicotine intake observed in the IR female and male rats was normalized to control levels following insulin administration. **Conclusion:** This work suggests that a disruption in insulin signaling promotes nicotine intake in a sex-dependent manner. Also, our findings suggest that the medications used to treat diabetes may reduce nicotine intake (insulin); however, some drugs (dapagliflozin and bromocriptine) may have an unexpected consequence of increasing nicotine use.

FUNDING: Federal

Podium Presentation 5: Rapids Paper Session 3: Rapid Fire



RAPID FIRE

RAP3-1

NICOTINE YIELD AND FLUX IN POD AND DISPOSABLE E-CIGARETTES IN CANADA

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Significance: Chemical surveillance studies are necessary to generate baseline datasets and elucidate the links between chemical composition, e-cigarette device characteristics and ultimately user exposures. Moreover, such studies are useful in monitoring the design changes and trends that result from specific restrictions placed on products, such as nicotine limit. **Methods:** Electronic cigarettes (e-cigarettes) are alternative nicotine-delivery products whose popularity has rapidly increased in Canada. Prior to 2018, products on the Canadian market were almost exclusively formulations that rarely exceeded 20mg/mL. Starting in 2018, with the introduction of nicotine salts, higher nicotine (>20mg/mL) closed systems became popular, particularly among youth. In June 2021, Canada established the maximum nicotine concentration of 20 mg/mL for e-cigarettes. In this study, closed system e-cigarette types, disposables and pods, were evaluated in order to establish and monitor changes in nicotine yield and flux, pre- and post nicotine limit. Ten popular brands that included 155 and 88 individual pod and disposable products, respectively, in various flavour and nicotine concentrations, were tested. E-cigarette aerosols were generated using the vaping machine and standardized puffing methodology from International Standardization Organization, ISO20768:2018. Nicotine was quantified in e-liquids and captured aerosols using the gas chromatography coupled with a flame ionization detector (GC-FID). In addition, pH of e-liquids and aerosols were measured for all products. **Results:** Based on the study results of products with 20mg/mL and below, the average nicotine flux has significantly increased in disposable (135%) and pod (81%) e-cigarettes in Canada, post-nicotine limitation. The current average nicotine flux for the pods and disposables operating with 20mg/mL and below is similar to that of the pod products with high concentrations (>20mg/mL) tested prior to nicotine limit. Modern disposable products in our study were highly efficient in the nicotine yield and flux. They have significantly more nicotine delivered per single puff and more rapidly (41% higher flux) compared to the pods. **Conclusion:** Studying the nicotine flux and yield of various e-cigarettes will help in better understanding products' potential abuse liability as well as efficiencies to replace cigarettes and provide desired satisfaction for those adults looking to quit smoking by using e-cigarettes.

FUNDING: Federal

RAP3-2

NICOTINE DEPENDENCE AND SUBJECTIVE EFFECTS VARY BY ENDS DEVICE TYPE AMONG COLLEGE STUDENTS

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Significance: Current prevalence rates of electronic nicotine delivery systems (ENDS) use is estimated to be 75.7% among US college students. ENDS device specifications and vaping experience are customizable according to individual preference (wattage, battery type, liquid, flavoring), which has been reported as a significant advantage of ENDS devices and a motivating factor in use. It is critical to determine dependence risk and properties compelling use associated with various devices among college students to develop effective prevention and intervention strategies. **Methods:** College students endorsing ENDS use in the past 30 days ($N = 243$) completed an online survey including [E-Cigarette Fagerstrom Test for Nicotine Dependence (e-FTND), Penn State E-cigarette Dependence Index (PS-ECDI), E-Cigarette Wisconsin Inventory for Smoking Dependence Motives (e-WISDM), Risks and Benefits of E-Cigarettes (RABE)]. Participants received course extra credit for completing the study. **Results:** Participants were 75% female, 75% White, 19.2 ($SD = 1.3$) years of age, with medium nicotine dependence level on the e-FTND and PS-ECDI. Most ($n = 193$, 79.4%) reported a preference for disposable devices. Specifically, 59% preferred Alto/Vuse, 17.7% Hyde, 15.6% 'other' disposable (e.g., Fume, Geek Bar), 8.6% Air Bar, 8.6% 'any disposable,' and 3.7% Puff Bar. Among non-disposables, 17.3% favored Juul and 4.1% Novo. There were significant differences across device type for nicotine dependence on the e-FTND [$F(7, 237) = 1.79, p = .04$] and PSECDI [$F(7, 237) = 1.94, p = .03$], with Novo consistently having the highest levels.

Non-disposable devices were associated with higher e-WISDM Cue Exposure/Associative Processes scale scores ($M = 3.17; SD = 1.3$) vs. ($M = 2.8; SD = 1.4$), $F(1, 242) = 2.67, p = .04$, and e-WISDM Weight Control scale score differences approached significance, $F(1, 242) = 1.79, p = .08$, ($M = 2.31; SD = 1.4$) vs. ($M = 2.0; SD = 1.4$). Significantly higher RABE Benefits scores were associated with disposables ($M = 3.5; SD = 1.0$) vs. ($M = 3.3; SD = 1.1$), $F(1, 242) = 1.98, p = .04$. **Conclusions:** Findings indicate a strong preference and greater perceived benefits of disposable devices, but higher nicotine dependence and certain smoking motives for Novo pod devices (typically hold up to 2 ml nicotine cartridges with 6W to 25W power capability). ENDS prevention and intervention efforts with college students may benefit by incorporating this information.

FUNDING: Academic Institution

RAP3-3

STRATEGIES TO QUIT NICOTINE VAPING IN CURRENT AND EX-VAPERS IN NEW ZEALAND

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Significance: In New Zealand (NZ) e-cigarettes are endorsed as a smoking cessation treatment option. However, given the long-term health effects of e-cigarette use remain uncertain, and that not vaping or smoking is ideal from a public health perspective, it's important to also offer support to people who wish to switch from e-cigarettes to no product use. However, little evidence exists on the best way to support people to quit vaping, particularly for vapers over 25 years of age, and no NZ-specific information exists. **Methods:** A web-based cross-sectional survey was undertaken in NZ to gain insights from vapers and ex-vapers about their vaping cessation efforts, including their motivations and strategies for attempting to quit vaping, and triggers for relapse back to vaping. Participants were ex-smokers and never-smokers living in NZ, aged ≥ 16 years, and either currently vaped (but had tried before to stop vaping) or were ex-vapers. Participants were recruited through market research survey panels. **Results:** Overall 1,119 participants completed the survey (975 ex-smokers, 144 never smokers; 401 current vapers, 718 ex-vapers). Most participants (89%) were aged >25 years, 63% were female, 16% identified as indigenous Māori, 5% were of Pacific ethnicity, and 79% were of non-Māori non-Pacific ethnicity. The three main reasons for trying to quit vaping were: current/future health concerns (47%, 95% CI: 44%-50%), they didn't like feeling dependent on them (39%, 95% CI: 36%-42%), and the cost of vaping (27%, 95% CI: 24%-30%). The three main strategies participants used to become vape-free were: nothing - they just stopped (54%, 95% CI: 51%-57%), reducing the nicotine strength over time (23%, 95% CI: 21%-26%), and support from friends/family (19%, 95% CI: 17%-21%). The three main triggers for relapse back to vaping among current vapers were: feeling stressed (49%, 95% CI: 44%-54%), being around people who were vaping (42%, 95% CI: 37%-47%), and nicotine withdrawal symptoms (37%, 95% CI: 33%-42%). The above findings will be discussed within the context of demographics and smoking/vaping history and beliefs. **Conclusions:** Due to NZ's unique tobacco and vaping regulatory context and ethnic composition, it is vital that evidence-based vaping cessation guidance specific to NZ is available, as NZ moves towards a smokefree future. Data from this survey will inform development of tailored vaping cessation advice, to be evaluated formally in a clinical trial.

FUNDING: Academic Institution

RAP3-4

MOMS QUIT: A PILOT RANDOMISED TRIAL OF A TAILORED TEXT MESSAGE PROGRAM TO SUPPORT POSTPARTUM SMOKING ABSTINENCE

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Over half of women who smoke quit while pregnant. However, most return to smoking by one year postpartum. Peripartum smoking interventions typically focus on either cessation or relapse prevention - enrolling current smokers or successful quitters. We evaluated the feasibility of a tailored text-message intervention to support smoking abstinence among postpartum women regardless of whether they quit or not during pregnancy. This text message intervention (Moms Quit) delivered supportive messaging for caring for a new baby and messages tailored to smoking status and interest in quitting/staying quit. Our primary outcome was the number of days abstinent at the end of treatment (EOT; 12-week follow-up). Participants ($n = 30$) were recruited from obstetrics and pediatric clinics and during hospitalization for delivery. Persons were eligible if they: smoked at any point during pregnancy, owned a cell phone, and were age 18 years or older. We excluded persons who had no intention to quit or were more than one-month postpartum. We consented patients by phone and, after completion of a baseline survey, enrolled and randomized them to Moms Quit or Text4Baby (i.e., control), a publicly available text message program that provides general peripartum information. Random assignment (1:1 to Moms Quit or control) was stratified on current smoking status (i.e., quit vs. active smoking). Analyses included descriptive statistics and regression models. We used ordinary least squares and logistic regressions to estimate the effect of treatment arm controlling for baseline smoking status. Most participants were non-Hispanic White (60%) and the mean age was 29.2 years ($SD = 6.0$). At baseline, 63% were current smokers; 10 of 16 (63%) assigned to Moms Quit and 9 of 14 (64%) in the control arm smoked in the past 30 days. At 12-week follow-up, 80% completed the outcome survey (intervention: 13/16; control: 11/14). Among completers, participants enrolled in the intervention arm smoked a mean of 10.4 days in the past month ($SD = 13.6$) compared to 22.5 days ($SD = 12.1$) among those in the control arm ($p = 0.03$, 2-sided). There was no statistically significant difference on past 7-day self-reported abstinence at EOT between Moms Quit (54%) compared to control (18%). Conclusions: Delivering a tailored text message program for postpartum individuals at risk for continued smoking or relapse is feasible, reduced self-reported tobacco use, and could potentially increase smoking abstinence.

FUNDING: Federal

RAP3-5

REDUCED NICOTINE CIGARETTES: EFFECTS ON LEGAL AND ILLEGAL PURCHASES IN THE EXPERIMENTAL TOBACCO MARKETPLACE

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Significance: Nicotine is central to the reinforcing effects of tobacco products. Substantial decreases in nicotine in tobacco products as a low nicotine standard of cigarettes would likely lead to dependent users seeking nicotine from alternative sources. One such source could be an illicit marketplace. **Methods:** We developed an experimental model to examine the effects of different policies, the Experimental Tobacco Marketplace (ETM). Recently we have extended the ETM to examine illicit purchases. In a series of studies, we demonstrated the impact of different policies on illicit purchases and the impact of penalties for illicit purchases on psychological distress. In this presentation, we present two studies examining the effects of a reduced-nicotine cigarette standard on preference for conventional, regular-nicotine cigarettes available illegally. Study 1 ($N = 52$) investigated the probability of purchasing illicit regular-nicotine cigarettes. Study 2 ($N = 49$) examined the demand for legal reduced nicotine cigarettes and substitution for illegal regular-nicotine cigarettes. These studies systematically increased the price of reduced-nicotine cigarettes to examine price effects in the ETM. **Results:** Our findings show that under a reduced-nicotine standard, when reduced nicotine cigarettes were the only legal cigarette alternative, participants were more likely to purchase from the illegal marketplace (Study 1), and spent a proportionally higher budget on illegal regular-nicotine cigarettes than on legal products (Study 2) at lower legal cigarette prices. **Conclusion:** Collectively, these studies suggest that both price and product standards can alter substitutability between legal and illegal products. Moreover, the illicit ETM, a methodological extension, supports the continued utility and flexibility of the ETM framework in tobacco regulatory science.

FUNDING: Federal; Tobacco Industry; Other: Fralin Biomedical Research Institute at VTC

RAP3-6

EXAMINING DAILY SYMPTOMS OF NICOTINE DEPENDENCE AND ASSOCIATIONS WITH DAILY ENDS USE BEHAVIORS AND ENDS CHARACTERISTICS AMONG YOUTH

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ENDS are the most used tobacco product among youth in the U.S. Youth ENDS users are more likely than non-ENDS users to initiate and become regular users of tobacco cigarettes and are at greater risk of dependence. Few studies have examined dependence symptoms among youth who primarily use ENDS. Yet, this research is critical to better understand the unique risk associated with ENDS use. We examined symptoms of nicotine dependence and withdrawal and associations with ENDS use behaviors among 35 youth (ages 16-20) who primarily use ENDS when using tobacco products. An initial survey collected data on demographics and past tobacco product use. Daily ecological momentary assessment (EMA) data were collected for 14 days on ENDS use behaviors, ENDS characteristics, and symptoms of dependence and withdrawal. Dependence was defined as vaping nicotine within 30 minutes of waking (adapted from the Fagerström Test for Nicotine Dependence). Withdrawal symptoms were assessed based on the Minnesota Nicotine Withdrawal Scale. On average, EMA data were provided on 12.71 days per participant (i.e., 445 of 490 possible observations; 91% completion rate). Nearly all participants had used ENDS in the past year (97%), with an average of 150 days in the past year and 12 days in the past month. Around half (51%) of participants smoked cigarettes in the past year, with an average of 31 days in the past year and an average of 2 days in the past month. EMA data showed youth reported non-nicotine use on 54% of days, exclusive vaping on 38%, and exclusive smoking on 7%. Participants vaped nicotine on an average of 7 occasions per day and took a maximum of 2 total puffs of nicotine per use occasion over the course of the day. Youth reported symptoms of dependence on 25% of days and at least a mild level of withdrawal symptoms on 17%. Using random intercept mixed model regressions, main results showed that on days where youth reported symptoms of dependence, they also reported (a) a greater number of vaping occasions, (b) higher maximum number of vaping puffs, (c) fewer millimeters of e-liquid, (d) use of the JUUL brand, (e) use with their own ENDS device, and (f) use with ENDS devices other than disposables. On days where youth reported symptoms of withdrawal, they also reported a greater maximum number of puffs. These findings can inform ENDS policy and regulation and highlight the importance of strategies to prevent youth initiation of ENDS use and progression to regular use.

FUNDING: Federal; FDACTP; Nonprofit grant funding

RAP3-7

THE ASSOCIATION BETWEEN USE OF E-CIGARETTE FLAVORS AND CIGARETTE ABSTINENCE AMONG DUAL USERS WHO INTEND TO QUIT SMOKING

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Significance: Longitudinal cohort studies indicate that use of non-tobacco flavored e-cigarettes (eC) may be associated with long term abstinence from combustible cigarettes (CCs) among adult dual users of CCs and eCs, but little is known regarding day-to-day use patterns among this population. This prospective natural history study provides a fine-grained description of daily associations between eC flavor use and CC smoking. **Methods:** Adults who smoked CCs daily, used eCs daily or non-daily, and desired to quit smoking CCs in the next 3 months ($N = 60$) completed nightly text message delivered surveys regarding their CC and eC use for 56 consecutive days, for a total of 3,360 potential days of data collection across all participants. eC flavors were reported as text responses and coded according to previously published flavor categories. These preliminary findings report the mean proportion of days of CC abstinence when participants used each of the five most commonly-used eC flavors in the study, and on days that multiple flavors were used. **Results:** Participants were 37.4 ($SD = 12.2$) years old, 50% female, and 65% non-Hispanic white. At baseline, 55% of participants endorsed using eCs daily (vs nondaily). During the study period, participants were abstinent from CCs on 32% ($SD = 38\%$) of the 1,160 days that eCs of any flavor were used. Participants achieved CC abstinence on 79% ($SD = 31\%$) of the 114 days that candy flavors were used, 69% ($SD = 47\%$) of the 151 days that dessert flavors were used, 30% ($SD = 39\%$) of the 659 days that fruit flavors were used, 30% ($SD = 39\%$) of the 139 days when multiple flavors were used, 28% ($SD = 41\%$) of the 301 days that menthol/mint flavors were used, and 18% ($SD = 30\%$) of the 290 days that tobacco flavored eCs were used. **Conclusion:** Preliminary findings from this fine-grained natural history study of dual users indicate that CC abstinence appeared most common on days of candy and dessert flavored eC use.



and least common on days of tobacco flavored eC use. These descriptive findings are consistent with prior nationally representative cohort studies and support the possibility that use of sweet flavored eCs are associated with a greater likelihood of achieving CC abstinence among dual users. **Funding Statement** Supported by National Institute on Drug Abuse (NIDA) and U.S. Food and Drug Administration (FDA) grant U54DA036114

FUNDING: Federal; FDACTP

RAP3-8

PERCEIVED BENEFITS, COSTS, AND REASONS OF VAPING AMONG SEXUAL AND GENDER MINORITY ADOLESCENTS: A MIXED METHODS STUDY

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Significance: E-cigarette use (i.e., vaping) is the most common type of tobacco use among US youth. Sexual and gender minority (SGM) adolescents are more likely to vape than cisgender heterosexual youth, which increases their risk for tobacco-related health issues. This study examines perceived benefits, costs, and reasons for vaping among SGM youth. **Methods:** A sequential explanatory mixed methods approach was used. Two consecutive phases included an online survey (n=295) followed by online interviews (n=24) and focus groups (5 groups, n=10). Participants were US youth ages 13 to 18 and were recruited via Instagram. Online survey participants were both SGM and non-SGM youth. All participants in the qualitative phase identified as SGM youth. A subset of participants engaged in both phases. Transcripts were coded using a team-based and flexible coding approach, followed by inductive secondary coding. Quantitative analysis focused on assessing perceived benefits and costs of vaping, and qualitative analysis expanded on these findings by exploring perceived benefits, costs, and reasons for vaping in greater depth. Results were stratified by participant characteristics (i.e., age, vaping initiation). **Results:** In the online survey, most common benefits of vaping across SGM and non-SGM youth were mental (48.1%), such as better mood, stress relief, and feeling good. Social benefits (e.g., fitting in, looks cool, vaping as a social activity) were reported second most often (21.7%). The only significant finding was that initiated SGM youth reported fewer social benefits than susceptible SGM youth and non-SGM youth, $X^2(1) = 8.4$, $p = .004$. The most common costs of vaping were health issues (37.6%) and addiction (19.6%). Similarly, in the qualitative analyses (SGM participants only), the most common costs were addiction (needing to vape constantly, not realizing long term negative health effects of addiction, and withdrawals) and physical health (damage to lungs, and uncertainty regarding physical harm). The most common benefits were social (looking cool, social acceptance, and vaping as a social activity) and mental (reduce stress and anxiety). The most common reasons for vaping were social (looking cool, peer influence, and vaping as a social activity) and mental (coping with stress and mental health). **Discussion:** Youth tended to perceive both social and mental benefits and reasons of vaping. SGM youth may initiate vaping for social reasons and benefits and continue vaping for mental benefits. Lack of understanding of addiction potential and skepticism of health consequences may pose prevention challenges. These results are important for advancing the development of interventions that can better prevent vaping among at risk youth.

FUNDING: Federal

RAP3-9

PROFILES OF BLACK ADOLESCENTS WITH UNIQUE PATTERNS OF FACTORS RELATED TO TOBACCO USE

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SIGNIFICANCE: Black individuals are disproportionately affected by death and disease caused by tobacco use compared to White individuals. These health inequities are most likely due to the intersection of multiple social determinants of health. One approach to reducing these inequities is to focus tobacco use prevention on adolescents because

tobacco use is primarily initiated during this developmental period. However, the intersection of factors associated with tobacco use among Black adolescents specifically are rarely investigated. **METHODS:** This study examined emerging combinations of sociocultural, environmental, psychological, and behavioral factors that together explain differences in tobacco use within Black adolescents. Analyses were based on data from a nationally representative sample of 12 to 17 years-old non-Hispanic Black participants (N=1,295) of the Population Assessment of Tobacco and Health (PATH) Study. Latent Class Analysis classified adolescents into three distinct groups whose combinations of sociocultural, environmental, psychological, and behavioral factors highlighted differences in risks for tobacco use, and were labeled as Low-Risk (66%), Moderate-Risk (21%), and High-Risk (13%). **RESULTS:** Adolescents in the Low-Risk group were younger, female, perceived tobacco to be somewhat or very difficult to buy at a store by someone their age, did not discuss tobacco abstinence with parents in the past year, and had not tried any tobacco, alcohol, or other substances. Those in the Moderate-Risk group were also female, but were older, had discussed tobacco abstinence with parents in the past year, perceived tobacco to be somewhat or very easy to buy at a store by someone their age, and had tried alcohol as well as other substances. As in the Moderate-Risk group, adolescents in the High-Risk group were also older, perceived tobacco to be somewhat or very easy to buy at a store by someone their age and had used alcohol and other substances. However, they differed from the Moderate-Risk group in that they were male, did not discuss tobacco abstinence with parents in the past year, believed that tobacco use would help reduce stress and calm anger, and had used tobacco. **CONCLUSION:** These findings indicate that to mitigate tobacco-related health disparities among Black individuals, prevention programs should be tailored to address unique combinations of factors that demarcate differences in the risk of tobacco use among Black adolescents.

FUNDING: Federal

RAP3-10

QUALITATIVE STUDY OF THE BARRIERS TO SMOKING CESSATION AND HARM REDUCTION AMONG BLACK WOMEN SMOKERS AGED 18-35

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Significance: Compared to white people, Black women are more likely to start smoking after age 18 and continue smoking after age 35. Moreover, Black women experience increased smoking cessation difficulty compared to Black men and bear a disproportionate burden of tobacco-related morbidity and mortality. This study aimed to 1) understand barriers to smoking cessation and harm reduction and 2) inform the development of an educational feasibility intervention among Black women aged 18-35 who currently smoked cigarettes or little cigars/cigarillos. **Methods:** We conducted 4 online focus groups and a survey (n=31) from March to May 2020. Interviews were transcribed verbatim and coded in NVivo 20 and univariate survey analyses were conducted in SAS 9.4. **Results:** The mean age was 31 and most participants had an annual household income ≤\$20,000 (61%), were single (58%), had children (71%), and were heterosexual (71%). Common reasons for current smoking were coping with stress and discrimination and managing mood and chronic disease symptoms. Most participants had tried to quit smoking (64% past year cigarette/cigar quit attempt). The most common quit method was cold turkey (cigarettes: 94%, cigars: 71%) and many experienced great difficulty quitting. Few had used evidence-based cessation aids such as nicotine replacement therapy (≤ 13%) or pharmacotherapies (Chantix, Wellbutrin; ≤12%) and common barriers to use were poor side effects, cost, and access. Flavors, especially menthol, were cited as a major contributor to current smoking and barrier to cessation ("Cigarettes shouldn't exist if it doesn't have menthol in it."). Some expressed that they would be interested in cessation aids that tasted like their preferred brand and would quit smoking if flavors were banned in cigarettes or cigars (18%). Harm reduction products such as e-cigarettes, IQOS, and low nicotine cigarettes were unappealing and participants were skeptical of their addiction potential and ability to help them quit or reduce smoking. Many had ever used e-cigarettes (71%) commonly to quit or reduce smoking, but fewer currently used e-cigarettes (31.8%) due to concerns related to safety, long-term health effects, and device maintenance. We will also discuss implications for interventions and disparities. **Conclusion:** Targeted research efforts are needed to address barriers to cessation and harm reduction among Black women smokers to improve early age cessation and eliminate tobacco-related disparities.

FUNDING: Federal; Academic Institution

Poster Session 1: Rapid Submissions



RAPID SUBMISSIONS: POSTER SESSION 1

POS1-110

INTENTIONAL VS. INCIDENTAL MOVEMENT: HIGHLIGHTING THE NEED FOR SPECIFICITY IN ACTIVITY TYPE BETWEEN SMOKERS AND NON-SMOKERS

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Background: People who smoke cigarettes have previously been found to be generally less active than people who do not smoke. As such, the use of moderate-to-vigorous physical activity (MVPA) has been studied regarding smoking cessation, with studies finding that intentional exercise regimens can reduce nicotine cravings and offset withdrawal symptoms. However, these effects appear to only be present if the exercise is perceived as voluntary (i.e., for recreation) or mandatory but moderate (i.e., as part of work duties). The current study aimed to further investigate the association between overall physical activity experienced daily and smoking status. **Methods:** Participants were adults recruited from Birmingham, Alabama ($n = 556$) who completed self-report measures related to smoking status and physical activity (i.e., the International Physical Activity Questionnaire) among other measures. Multiple ANCOVAs that controlled for age, gender and race were conducted to investigate the connection between smoking status and overall physical activity as well as light, moderate, and vigorous physical activity. **Results:** Overall physical activity was found to be significantly higher in individuals who reported current smoking than those who did not. Results also showed significantly higher rates of physical activity for each level of physical activity (i.e., walking, moderate, and strenuous) for smokers compared to non-smokers (all results, $p < 0.001$). **Conclusions:** The current results suggest that smokers may be more active than previously reported and emphasize the potential importance of a delineation between intentional exercise and overall physical activity. Additionally, work-related activity may confound the current study suggesting that overall physical activity may not reduce smoking urges. Prior research suggests the perception of the type of physical activity may play into the effect exercise has on smoking cravings and withdrawal. Future research should continue to explore the differences between the role of daily physical activity and exercise in smoking cessation and studies investigating use of exercise may wish to include a delineation between intentional and incidental physical activity.

FUNDING: Federal

POS1-111

DEVELOPMENT OF A BRIEF ALCOHOL CONTROL INTERVENTION FOR SMOKING CESSATION SERVICES: A QUALITATIVE STUDY ON DRINKING SMOKERS AND HEALTH CARE PROFESSIONALS

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Background: Alcohol use induces smoking relapse in quitters. An intervention guideline of alcohol control (AC) in smoking cessation (SC) services is needed. **Objective:** This study aimed to explore the perceived importance of AC during SC in smokers and health care professionals (HCPs), and to develop the mode and content of AC intervention that should be included in SC services. **Methods:** We conducted semi-structured individual online qualitative interviews with purposive sampling. Participants were 20 smokers with drinking habits and 14 HCPs specialized in SC. Participants were recruited from SC services operated by the government, non-governmental organizations, hospitals, and universities. All interviews were audio-recorded and transcribed verbatim. We analyzed the transcripts using inductive thematic analyses. **Results:** Three main themes were identified. Both smokers and HCPs considered alcohol consumption as a barrier to successful SC, and AC as a crucial component in SC services. Some smokers who self-identified as social drinkers did not prioritize AC because of their low alcohol consumption level. The HCPs agreed to motivate these smokers to attempt AC by explaining the relationship between alcohol consumption and SC. The HCPs in this study

routinely used Alcohol Use Disorders Identification Test (AUDIT) as an assessment and intervention tool, but there was no standardized assessment on co-use behavior, and how drinking influences SC. The HCPs suggested several AC intervention components, including personalized and brief AC advice, emphasis on self-determination, and text-messages reminders. In addition, the HCPs suggested that staff training covering common alcoholic drinks in Hong Kong, drinking culture in Hong Kong, and association between AC and SC would be useful for intervention delivery. **Discussion:** We developed a new AC intervention protocol for smokers, including a screening tool for co-use behavior of tobacco and alcohol, a short video on the association between alcohol consumption and SC, a counseling protocol including personalized AC goal setting and advice, text-messages reminders, and a training package for HCPs. An evaluation for the feasibility, acceptability, and efficacy of the AC intervention during SC is warranted.

FUNDING: Academic Institution; Nonprofit grant funding

POS1-112

DEVELOPMENT AND INITIAL APPLICATION OF AN ELECTRONIC HEALTH RECORD LUNG CANCER SCREENING SELF-REFERRAL TOOL: AN ADDITIONAL OPPORTUNITY FOR REFERRAL TO TOBACCO TREATMENT

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Significance: Approximately 15 million individuals in the U.S. are eligible for lung cancer screening (LCS), but only 5.8% of those qualifying have been screened. Given the low uptake despite the potential great health benefit of LCS, interventions aimed at increasing uptake are warranted. The utilization of a patient-facing electronic health record (EHR) patient portal direct messaging tool offers a new opportunity to both engage eligible patients in preventative screening and provide a unique referral pathway for tobacco treatment. **Methods:** An EHR-delivered engagement message, infographic, and self-referring survey were developed to address constructs of the Health Belief Model (e.g., knowledge, self-efficacy) associated with LCS uptake. The survey submits eligible self-reported patient information to a scheduler for the LCS program at an academic medical center. The materials were pretested using an interviewer-administered mixed-methods survey captured through venue-day-time sampling in five network-affiliated pulmonology clinics. Materials were then integrated into the EHR system secure patient messaging feature. Next, a one-group posttest quality improvement pilot test was implemented. **Results:** Seventeen patients completed the pretest survey. More than half were newly referred for LCS ($n=10$, 58.8%), and the remaining were returning patients ($n=7$, 41.2%). When asked if they would use the self-referring tool through their EHR messaging portal, 94.12% ($n=16$) reported yes. Fifteen participants provided oral feedback when gauged about their perceptions of the tool during the pretest survey; key themes alluded to high self-efficacy and some key barriers identified in the infographic depiction. When these materials were distributed in the pilot to a selection of 150 random patients, 12% ($n=18$) opened the self-referring survey. Of the 18, 55.56% ($n=10$) were eligible for LCS based on self-reported smoking data. Half ($n=5$) reported current smoking, while the other half ($n=5$) reported former smoking. **Conclusion:** Pretest and pilot data suggest this tool is a positive stimulus to trigger the decision-making process to engage in an LCS referral among eligible participants. Half of the patients eligible for screening reported current smoking. Additional referral pathways could be built into this EHR tool to not only refer patients who currently smoke to LCS, but also simultaneously trigger a referral to clinical tobacco treatment.

FUNDING: Academic Institution

POS1-113

LEARN2QUITNY (L2QNY) TEXT MESSAGING CESSATION PROGRAM PILOT STUDY: PARTICIPANT CHARACTERISTICS AND CIGARETTE SMOKING OUTCOMES

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Significance: Nearly all Quitlines (QLs) in the US now offer automated text messaging cessation programs, but little is known about the appeal and effectiveness of these programs in this clinical context. L2QNY is a 6-week, automated text messaging program developed from a cognitive behavioral tobacco 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:** As part of a pilot study, we invited 509 consecutive cigarette smokers with recent contact with the NY Quitline to enroll in L2QNY via an opt-out invitation text. We re-contacted participants who maintained enrollment 7 months later to assess changes in cigarette consumption. Most participants completed an intake assessment within 6 months of the recent contact, but some did not accept or receive coaching. During the recent contact 6% were seeking follow-up coaching, moral support; contacted the QL for another reason or contacted the QL via the web. **Results:** Participants were 58% female, middle-aged (M=55 years), and smoked heavily by recent standards (M=18, Mdn 20 cigarettes per day); 57% were White, 24% Black, and 12% Hispanic; 63% were Medicaid and/or Medicare beneficiaries. Most reported lower income and educational levels; 12% had used cannabis and 20% had used alcohol in the past 30 days; 10% reported serious psychological distress. Nearly all (95%) were eligible for free nicotine replacement therapy at the time of the intake. The majority (92%; n=470) maintained enrollment in L2QNY. Most opt-outs (n=39) occurred within the first 2 weeks (M=12 days) of enrollment. One-quarter (25%; n=116) of those who maintained enrollment (n=470) were successfully re-contacted for cigarette consumption outcomes, 79.2% of whom had quit or reduced cigarette consumption; 71% decreased consumption by a mean of 7 cigarettes per day, 28% were abstinent from cigarettes. **Conclusion:** In this clinical context, among participants who contacted a QL for different reasons, L2QNY seems to have appealed to participants even though they were not actively seeking a text messaging cessation program. In addition, the majority of those who were re-contacted for outcome assessment reported significant clinical progress toward long-term abstinence. Future research should examine the optimal roles of text messaging cessation programs in this clinical context.

FUNDING: Academic Institution

POS1-114

MULTICOMPONENT CESSATION TREATMENT FOR MEDICAID BENEFICIARIES WITH SMI

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Introduction: People with serious mental illness (SMI) smoke at a higher rate than the general population and are less likely to quit. Evidence-based treatment for this population increases cessation but few studies have used community treatment providers nor incorporated available apps into treatment. We conducted a pilot study of an enhanced version of a smoking cessation intervention tailored for disadvantaged Medicaid beneficiaries with SMI that we evaluated in a prior study, Breathe Well Live Well (BWLW). BWLW includes an 8-session CBT; NRT starter pack or medication referral; incentivized use of NCI's QuitStart app (\$10 vs. 30); and a brief social support intervention, Care2Quit. During periods of the COVID-19 pandemic, the intervention and assessments were conducted remotely, thus planned biologically-conformed abstinence incentives were omitted. **Methods:** Between October, 2019 and July, 2022, 54 daily smokers enrolled, completed baseline assessment and initiated BWLW provided by bachelors level mental health staff, supervised by an expert clinician. At 4-months, participants were assessed for biologically confirmed 7-day abstinence, as well as smoking behavior and treatment engagement. **Results:** 38 participants (70.4%) completed the 4-month assessment and were included in analyses. Six (15.8%) were abstinent; 21 (55.3%) self-reported a quit attempt of at least one week. Among non-abstinent participants, the number of cigarettes per day (CPD) was significantly lower at follow up (8.3 ± 9.3) than at baseline (14.1 ± 7.9 ; $t=3.5$, $p=.001$). Participants engaged in 2.13 (SD = 1.17) intervention components; 71.1% attended 5 or more counseling sessions, 71.1% initiated cessation medications (81.5% NRT), 57.9% used the app 9 or more weeks (n.d. based on incentive level), and 13.2% received Care2Quit. 73.3% of 202 sessions occurred via telehealth. Use of more components was associated with more quit attempts ($t=2.12$, $p=.041$). **Discussion:** Engagement in the study and interventions was likely impacted by pandemic conditions, yet among those assessed, SMI participants achieved abstinence at a rate similar to previous trials of behavioral interventions with NRT. Engagement in telehealth counseling by nonspecialized community staff, medication, and app use was high. Few participants chose to use the social support intervention. Further research is needed to assess cessation interventions that can be easily used in community settings.

FUNDING: Federal

POS1-115

BEHAVIORAL TECHNIQUE "CUE RESTRICTED SMOKING" REDUCES CIGARETTE CONSUMPTION IN SMOKERS UNDERGOING A SMOKING CESSATION PROTOCOL REGARDLESS OF WHETHER TREATMENT IS ACTIVE OR PLACEBO

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A randomized, double-blind, placebo-controlled study was performed on 100 smokers who wanted to quit smoking. The main objective of the study was to evaluate whether Deep Transcranial Magnetic Stimulation (dTMS) would be superior to placebo stimulation (Sham) in the treatment of smoking. The hypothesis would be that stimulation could produce a magnetic field directed to the frontal and parietal regions of the brain, releasing neurotransmitters, and thus decreasing nicotine withdrawal symptoms. **Methods:** Randomized 1:1 study, treatment for 12 weeks, with 21 stimulation sessions. Of the 100 participants, 50 received true stimulation, and 50 received sham stimulation. All were instructed to try to stop smoking from the 2nd week onwards, and if they were unable to do this, they were instructed to do the "Cue Restricted Smoking technique", which consists, of when there is an intense desire to smoke, to do only in an isolated area, standing, looking at the wall, without any stimulus except the cigarette itself. **Results:** After 12 weeks of treatment, the cessation rates were similar in both active and sham groups, with 14% in each one ($p=0.99$). There was a significant reduction in cigarette consumption among all participants during the protocol, in both groups, confirmed by **self-reported consumption** (Sham: first week mean 17.8 (15.2 a 20.4 cigarettes/day) vs 12 weeks mean 8.9 (6.3 - 11.5 cigarettes/day) $p<0.001$; dTMS: first week mean 20.6 (18 - 23.2 cigarettes/day) vs week 12 mean 11 (8.4 - 13.6 cigarettes/day), **carbon monoxide levels** (Sham - first week mean 9.5 (7.8 - 11.2 ppm) vs week 12 mean 6.4 (4.8 - 8.1 ppm) $p<0.001$; dTMS: first week mean 11.6 (9.9 a 13.3 ppm) vs 12 weeks mean 8.4 (6.8 a 11.1 ppm) $p<0.001$, and **serum cotinine** (Sham: the first week mean 229.5 (186.4 - 272.6 ng/ml) vs 12 weeks mean 142.2 (97.0 - 18.5ng/ml) $p=0.001$; dTMS: first week mean 248.9 (204.5 - 293.4 ng/ml) vs 12 weeks mean 169.8 (125.2 a 214.4 ng/ml) $p=0.001$. **Conclusion:** This behavioral technique "Cue restricted smoking" allowed the reduction of cigarette consumption and enabled smoking cessation in 14% of the participants, regardless of whether or not the coadjutant therapy was effective. In Portuguese this technique is nicknamed "Fumar de Castigo"

POS1-116

IMPROVING OUTCOMES FOR THOSE IN DISADVANTAGED AREAS: EFFECTS OF EXTRA CESSATION CAPACITY-BUILDING MESSAGES AND COMMUNITY SUPPORT DURING A STATE-WIDE TOBACCO CONTROL CAMPAIGN

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Significance: People who smoke who live in disadvantaged areas attempt to quit at the same rate as those from more advantaged areas but tend to have greater difficulty staying quit. Supplementing motivational tobacco control state-wide campaigns with messages delivered to disadvantaged areas that aim to build the quitting self-efficacy of people who smoke and messages to help the community support people to quit, may help reduce relapse. **Methods:** Capacity-building social media, out-of-home and digital messages were delivered across disadvantaged areas within Victoria, Australia during a state-wide campaign. To evaluate the capacity-building campaign, people who smoke living in disadvantaged areas completed an initial survey (n=803, during weeks 4-6 of the state-wide campaign) and a follow-up survey (n=542, 2-4 weeks after the initial survey). Prevalence ratios estimated through generalised linear models with log-link (Poisson regression) and robust standard errors compared those aware of the capacity-building plus state-wide campaign, to those only aware of the state-wide campaign, and to those not aware of either campaign, after adjusting for heaviness of smoking, past year quit attempts and e-cigarette use. **Results:** Over a quarter (28%) were aware of the capacity-building campaign plus the state-wide campaign at the initial survey and this rose to 44% at follow-up (31% were not aware of either campaign at initial survey; 20% at follow-up). At the initial survey those exposed to both campaigns were significantly more likely to report being confident to resist urges to smoke in the first month after quitting (59%), confident to stick with quitting in the face of stress, boredom or during social situations (55%) and agree leaders in their community would support them if they tried to quit (63%), compared to those only exposed to the state-wide campaign (48%, 44%, 49%, respectively), and those with no exposure (46%, 42%, 44%, respectively). At follow-up, those exposed to both campaigns were significantly more likely to have quit for at least five days between post-campaign and follow-up surveys (15%) compared to those only exposed to the state-wide campaign (7%) and to



those with no campaign exposure (6%). **Conclusions:** These findings are promising and suggest that supplementary exposure to messages that increase capacity to quit and community readiness to assist people to quit may improve quitting outcomes among those from disadvantaged areas.

FUNDING: State; Nonprofit grant funding

POS1-117

"MY ACCOUNT IS ALL ABOUT MY NIC ADDICTION": NOVEL APPROACHES AND FINDINGS FROM AN INVESTIGATION OF E-CIGARETTES, IDENTITY, AND OTHER EMERGENT THEMES IN USER-GENERATED VIDEOS ON QUEERTOK

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Significance: Sexual and gender minority (SGM) adolescents and adults use tobacco and nicotine products, including electronic nicotine delivery systems (ENDS), at disproportionate rates compared to heterosexual and cisgender groups. Exposure to online tobacco content can affect an individual's attitudes, perceptions, and intentions to use. Given social media's popularity among SGM AYA, positive e-cigarette content online might promote further normalization of tobacco within SGM AYA culture and ultimately exacerbate existing tobacco-related disparities. **Methods:** This qualitative study delineated perceptions and experiences depicted in SGM user-generated messaging about e-cigarettes on TikTok, a popular video-based social media platform that displays user-created content in an endless feed (the 'For You Page' (FYP). Videos on a user's FYP are based on an algorithm's perception of that user's identities and interests. We leveraged two collection strategies, 'static' keyword searches and a novel 'dynamic' algorithmic-training protocol. From static searches, we iteratively sorted 303 unique videos into 32 *a priori* and emergent codes and identified themes in SGM videos and comparison videos. From dynamic engagement, we analyzed data and analytic memos to identify themes of e-cigarette videos pushed to the FYP, as well as patterns in the algorithm's response. Young adults led research efforts which contributed to an inclusive, level, and collaborative approach that increased validity of the findings. **Results:** SGM AYA frequently described themselves as addicted to nicotine, and some even implied their addiction is a salient identity component (e.g., "being gay sad and a nic addict is what I like to call a triple threat"). Others described the negative health implications of nicotine use while simultaneously dismissing its severity. Algorithm training is a viable data collection method, and youth engagement is essential to these methods. The content of the FYP can be influenced through subtle interactions that reflect the focus population of study; more work is needed to establish replicable protocols. **Conclusion:** Our findings emphasize the need for continued, focused, and contextualized intervention for SGM groups in the pursuit of health equity; studying video-based social media platforms using a qualitative, young-adult-engaged lens allows for nuanced understanding that can inform these interventions. Team science with a co-learning approach not only contributes to valid knowledge of AYA culture, but also inspires the next generation of researchers.

FUNDING: Federal; Academic Institution; Nonprofit grant funding; Other: OK Tobacco Settlement Endowment Trust

POS1-118

METABOLISM-INFORMED CARE TO AID ALASKA NATIVE PEOPLE TO QUIT SMOKING

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Improving tobacco cessation treatment is important to addressing Alaska Native and American Indian (ANAI) health disparities. In Alaska, two-thirds of people who use tobacco want to quit, and over half tried to quit in the last year. However, tobacco quit rates are lower among ANAI adults than the general population of adults in the state. Nicotine replacement therapy (NRT) remains the most used pharmacologic treatment for tobacco cessation, despite evidence that varenicline would be more effective for many patients seeking to quit tobacco. The nicotine metabolite ratio (NMR) can be used to tailor pharmacologic treatment by indicating which medication will be more effective for

an individual. Our previous research suggests that most ANAI patients at Southcentral Foundation (SCF), a Tribal health system in Alaska, would have greater quit success if they used varenicline rather than NRT. We also identified a preference among SCF patients for using the NMR and tailored pharmacologic treatments for smoking cessation. In the current study, we used a community-based participatory research approach (CBPR) and semi-structured interviews with ANAI patients, providers, and leaders to explore the acceptability and feasibility of a proposed NMR implementation strategy. We used content analysis to identify themes related to clinical workflow, patient-provider communication, and other domains related to implementation of NMR in the Tribal health system. Our preliminary results confirmed broad endorsement among all participant groups for using the NMR in tobacco cessation treatment. Several barriers to treatment were also identified, such as delays in the current referral process and medication refill accessibility. Leveraging cultural values and strengths in clinical communication (e.g. storytelling and well established provider-patient relationships) could increase treatment initiation and retention, streamlining the process for providing care. We will discuss how these results were used to refine the proposed NMR implementation strategy, which will be evaluated in a future pilot study. Funding for this study comes from the National Institutes of Health.

FUNDING: Federal

POS1-119

FORMATIVE RESEARCH ON THE PREFERRED QUITTING METHODS AMONG HISPANIC/LATINO SMOKERS: DIFFERENCES BY AGE, SEX, AND AN ACCULTURATION PROXY

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Background: Health equity gaps have been identified among different ethnic groups, including Hispanic/Latino populations. Although smoking prevalence among Hispanic/Latinos is lower than the general US population, Hispanic/Latinos experience tobacco-related disparities related to cessation care. Previous research indicates that Hispanic/Latinos are less likely than Whites to use counseling and nicotine replacement therapy (NRT) as a method to quit, two evidence-based cessation interventions. Data on preferences related to services among Hispanic/Latino smokers is still limited. This study aims to provide data on preferred quitting methods among Hispanic/Latino smokers and examine its associations with age, sex, and spoken language. This information will help guide cessation offerings for this population. **Method:** Participants were Hispanic/Latinos who smoke and had symptoms of depression and/or anxiety (N=42). Participants were English or Spanish speaking individuals enrolled in one of two pilot projects. One project was an intervention study among English-speaking Hispanic/Latinos attempting to quit smoking; the other was a mixed-method study examining cultural factors relevant for a smoking intervention among Spanish-speaking individuals. Data was obtained from the baseline assessment of these studies. Variables of interest included self-reported preferred quitting methods (cold turkey, self-help resources, NRT, medication, individual counseling [face to face, phone, or text] or group counseling), age [22-39 & 40-61], sex [male/female], and spoken language [Spanish/English]. Descriptive analysis and Chi-Square tests were performed. Results: Participants were men (35.7%) and woman (64.3%), ranging from 22 to 61 years old (47.6% from 22-39 and 52.4% from 40-61). The three reported preferred cessation methods were: NRT (66.7%), face to face individual therapy (45.5%), and telephone counseling (38.1%). Preference for NRT was significantly related with age [χ^2 (1, N=42)=8.066, p<.01], but not with sex or spoken language. Preference for face to face individual therapy was significantly related with age [χ^2 (1, N = 42) = 6.645, p = <.05], but not with sex or spoken language. Preference for other methods was similar across age, sex, and spoken language. **Conclusion:** This formative research among Hispanic/Latino smokers showed a general preference for NRT and face to face individual therapy as a preferred quitting method for both English and Spanish-speaking men and women. Findings, implications, and future directions for research and clinical practice will be discussed.

POS1-120

ECOLOGICAL MOMENTARY ASSESSMENT OF TOBACCO MARKETING EXPOSURE AMONG CHINESE ADOLESCENTS

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Significance. Exposure to tobacco marketing can increase youth interest in trying tobacco. Limited data are available to characterize the extent to which youth in countries with the highest tobacco burden, like China, are exposed to tobacco marketing. In the



current study, we estimate how much and where Chinese youth are exposed to tobacco displays and ads. Results can inform how well current restrictions on cigarette and e-cigarette advertising in public places in China, are working and identify future areas for policy intervention. **Methods.** In June 2022, we conducted a seven-day ecological momentary assessment (EMA) study with 96 adolescents (ages 15-16) across seven Chinese cities that were part of a previous point-of-sale assessment study in 2021. Participants completed up to 42 EMA surveys (6 per day). Surveys were sent to participants at random intervals outside of school-hours. Each survey was identical and included images of recent Chinese displays and online/physical ads as examples. In each survey, we asked participants to indicate whether they saw any 1) tobacco displays (none, cigarette, e-cigarette, both) and 2) tobacco ads (none, cigarette, e-cigarette, both) in the past hour. We also captured location of tobacco ads. We conducted a descriptive analysis of exposure outcomes and used negative binomial regression to model demographic and tobacco use predictors of exposure. **Results.** The mean number of EMA surveys completed per person was 37 (range: 19-42; 88% compliance). On average, participants were exposed to 6 cigarette ads (range: 0 to 30) and 8 cigarette displays (range: 0 to 34) over the seven-day period. For e-cigarettes, participants were exposed to 4 e-cigarette ads (range: 0 to 24) and 3 e-cigarette displays (range: 0 to 25) over the seven days. Exposure to both cigarette and e-cigarette ads or displays in the past hour was rare. The most common locations of cigarette ad exposure were public places like kiosks and retail stores; the most common locations of e-cigarette ad exposure were social media/internet and retail stores. There were no significant differences in exposure to displays or ads by demographics, current or ever tobacco use, and susceptibility to tobacco use. **Discussion.** This study suggests that exposure to tobacco marketing among Chinese adolescents is commonplace. Findings highlight the need to enhance enforcement of current restrictions on tobacco ads in public places and extend restrictions to ban tobacco displays.

FUNDING: Nonprofit grant funding

POS1-121

LITTLE CIGAR PACK WARNING EXPERIMENT

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Significance: An estimated 47.1 million US adults currently use any tobacco product, and almost 9 million currently smoke cigars. Industry litigation has delayed the implementation of mandated cigar warnings on cigar packs in the US. Little cigars are packaged and sold as singles, 2-3 packs, and 5-20 packs (i.e., a box). This experiment fills a critical gap by providing evidence on the effectiveness of warnings printed on little cigar packaging among adult cigar users. **Methods:** We recruited 809 US adults who reported current use of cigars (i.e., little cigars and cigarillos) from a probability-based panel and enrolled them in an online survey. Participants were randomly assigned to view the warning: "WARNING: Cigar smoking causes oral, lip, and tongue cancer" in one of four conditions in a two-by-two experiment. Participants viewed a fictional little cigar 20-pack with a: 1) text-only warning at 30% size, 2) text-only warning at 50% size, 3) text + image warning at 30% size, or 4) text + image warning at 50% size. After viewing the little cigar pack with the warning, participants were asked about how much they thought they would enjoy the little cigar, the perceived effectiveness of the warning, their negative affect toward the warning, how much the warning gave them a better understanding of the consequences of cigar smoking, and how much the warning made them think about the risks of cigar smoking. Outcomes by condition were assessed with a linear regression model for main effects with the size and format of the warning as predictors. **Results:** Perceived warning effectiveness ratings were significantly higher for the text + image warning compared to a text-only warning ($p < .001$), but there was no effect of warning size. Participants in the warning text + image condition were more likely to report that the warning made them think more about, and better understand, the consequences of cigar smoking compared to participants in the text-only conditions ($p=0.03$ and $p=0.005$, respectively); there was no significant effect of warning size. **Conclusions:** Adding images to warnings on little cigars was perceived as more effective than text-only statements. Importantly, adding images increased cognitive processes such as thinking about and understanding the consequences described in the cigar warning, which may decrease cigar use.

FUNDING: Federal; FDACTP

POS1-122

A PLETHORA OF BRAND VARIANTS FLOODING A KRETEK-DOMINATED MARKET: FINDINGS FROM THE TOBACCO PACK SURVEILLANCE SYSTEM IN INDONESIA, 2022

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Significance: Indonesia is one of the few countries not to have ratified the Framework Convention on Tobacco Control, and its tobacco consumption is one of the highest in the world. About 73% of Indonesians who smoke consume kreteks (clove-mixed cigarettes) which are taxed at lower rates than standard cigarettes. While Indonesia has limited regulations on tobacco packaging, it does require pictorial health warning labels (HWL) on cigarette packs (40% coverage on the front and back). This study examines the variation in Indonesian tobacco packs' prices and features in 2022. **Methods:** In September 2022, tobacco packs were systematically collected in three of the most populous cities in Indonesia: Jakarta, Medan, and Surabaya, using the standardized protocol of the Tobacco Pack Surveillance System (TPackSS). We visited multiple neighborhoods in each city and used a standard walking protocol for vendor selection. We purchased "unique" tobacco packs, i.e., packs with at least one difference in an exterior feature of the pack (e.g., brand, stick count, color), aiming for a census of all brand variants on the market. Packs were assessed for product type, price, brand family, and the presence of an HWL, excise tax stamp, and capsule image. We calculated median prices, and their lower (Q1) and upper (Q3) quartiles. **Results:** Of 317 unique packs collected, the majority (82%; $n=260$) were kreteks, followed by cigarettes (17%, $n=54$) and small cigars ($n=3$). On average, kreteks were the cheapest product type, with a median price of IDR 19,000 or ~1.21 USD (Q1-Q3: ~0.89-1.47 USD), and cigarettes had a median price of IDR 29,540 (~1.89 USD; Q1-Q3: ~1.47-2.30 USD). Of the international brands ($n=51$), most were kreteks ($n=30$), such as Marlboro, Esse, and Camel. All packs had the country's HWL, but one had no tax stamp. Twenty-four kretek packs (9%) and seven (13%) cigarette packs had capsule images that included different symbols (e.g., power switch, play button), colors, flavors (e.g., mango, caramel), and concept descriptors (e.g., tropical sensation, option yellow). Of the 31 packs with capsules, 20 were international brands, of which 14 were kreteks. **Conclusion:** In one of the largest global tobacco markets, a great variety of unique tobacco packs were found, predominantly kreteks, and the price range was broad. Transnational tobacco companies have adapted to the local market by producing kretek versions of popular brands and including capsules in kretek products.

FUNDING: Nonprofit grant funding; Other: Bloomberg Philanthropies' Bloomberg Initiative to Reduce Tobacco Use

POS1-123

FAVOURABLE NET IMPACT OF THE TOBACCO ENDGAME ON GOVERNMENT FINANCES IF HEALTH-COMMENSURATE ADJUSTMENTS TO THE RETIREMENT AGE ARE MADE: MODELLED RESULTS FOR AOTEAROA/NEW ZEALAND

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Significance: In Aotearoa/New Zealand (A/NZ), recent modelling has predicted large population health gains from the tobacco endgame policies just passed into law. This health gain is met with reductions to healthcare spending, and increased population income, but also results in increased superannuation/pension payments by government due to the increased population over 65 years, as well as a reduction in tobacco excise tax income. While the negative loss of government revenue due to increased pension payments and reduced excise tax revenue may be unfavourable for other jurisdictions considering tobacco endgame strategies, they may be alleviated if the age of retirement increases alongside improvements to population health under endgame interventions. **Methods:** An existing model of tobacco endgame interventions (including a combined package of denicotinisation of cigarettes, mass media campaigns, retail restriction of tobacco products to 5% current outlets, and introduction of the tobacco free generation) is applied to the population of A/NZ alive in 2020. On top of this model, a theoretical social policy involving gradually increasing retirement age each year in line with the increase to prevalent Years Lived with Disability (pYLDs) under endgame is simulated. Cost outputs, measured in 2020 New Zealand dollars, are: yearly GST, excise tax, and income tax revenue, yearly health expenditure, and yearly superannuation payments, up to 2059, comparing endgame and endgame with an increasing age of retirement, to business-as-usual (BAU). **Results:** If the health gains of a package of tobacco endgame interventions were spread across the A/NZ population, by 2059 the average 65.86 year old would have the equivalent health (in pYLDs) of a 65 year old under BAU. This results



in an additional \$6.4 billion in income tax revenue and \$10.6 billion in superannuation savings made by 2059, on top of that under the tobacco endgame with no adjustments to retirement age. Under this scenario, the increase in government income outweighs government income lost due to loss of excise tax revenue, by 2042. **Conclusion:** A theoretical social policy under which there is a small increase in retirement age proportional to improved population health under the tobacco endgame, results in significant net economic gains for the A/NZ Government, with a saving of \$17.1 billion comparatively to endgame interventions with the persisting current age of retirement, by 2059.

POS1-126

VARIATIONS OF NICOTINE AND TOBACCO-SPECIFIC N-NITROSAMINES IN MENTHOLATED AND NON-MENTHOLATED CIGARETTE BRANDS

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Background: Menthol in cigarettes contributes to palatability of cigarette smoke by masking its harshness and adding a cooling sensation and flavor. It is also possible that mentholated cigarettes have different physico-chemical properties than non-mentholated cigarettes. For example, little is known about the potential differences in the tobacco filler blends used in mentholated and non-mentholated cigarettes. **Methods:** A total of 43 mentholated and 67 non-mentholated sub-brands of popular U.S. cigarette brands have been analyzed for nicotine, minor tobacco alkaloids, and tobacco-specific N-nitrosamines. We used liquid chromatography-tandem mass-spectrometry methods routinely applied in our laboratory for tobacco product analyses. Levels of the measured constituents, as well as their ratios and within-brand variability were compared between mentholated and non-mentholated cigarettes. **Results:** Levels of nicotine in mentholated and non-mentholated cigarettes averaged 12.6 ± 1.6 mg/g and 13.1 ± 1.6 mg/g tobacco, respectively. The sum of minor alkaloids nor nicotine, anatabine and anabasine constituted $19.5 \pm 3\%$ of nicotine content in mentholated cigarettes and $18.5 \pm 3\%$ in non-mentholated cigarettes. The carcinogenic nitrosamines NNN and NNK averaged 2.35 ± 0.97 and 0.63 ± 0.33 $\mu\text{g/g}$ in mentholated cigarettes and 2.19 ± 0.73 and 0.64 ± 0.26 $\mu\text{g/g}$ in non-mentholated cigarettes. Comparisons of standard deviations obtained upon analysis of three cigarettes per each variety indicates higher variability of nicotine, NNN, and NNK in mentholated than in non-mentholated cigarettes. **Conclusions:** There appear to be slight differences in the distribution and the variability of the measured constituents between mentholated and non-mentholated cigarettes included in this study. These observations suggest that there could be differences in the composition of tobacco filler that is used for making mentholated and non-mentholated cigarettes. The reasons for such differences and their implications for the addictive and carcinogenic potential of cigarettes are not known. Nevertheless, our study provides further support for the removal of mentholated cigarettes from the market, as has been proposed by the U.S. Food and Drug Administration.

FUNDING: Federal; Academic Institution

POS1-127

MISCLASSIFICATION OF PRIMARILY MARIJUANA VAPERS AS NICOTINE VAPERS AND THEIR ASSOCIATED SOCIODEMOGRAPHIC CHARACTERISTICS, BEHAVIORS, AND HARM PERCEPTIONS: RESULTS FROM THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) WAVE 5 DATA

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PURPOSE: Many people use similar devices to vape nicotine solution and cannabis concentrates. The purpose of this study was to 1) describe the degree of misclassification of primarily marijuana (PM) and only-marijuana (OM) users as past 30-day (P30D) electronic nicotine product (ENP) users; and, 2) describe the sociodemographic and tobacco use characteristics of P30D OM users misclassified as P30D ENP users. **METHODS:** Data were drawn from adult sample of Wave 5 (2018/19) of the Population Assessment of Tobacco and Health (PATH) Study. P30D ENP users (n=5,392) were asked if they have ever used marijuana with an ENP. Those who responded "yes" were asked how often they vaped marijuana with an ENP ("every time", "most of the time", "sometimes", "rarely", "never"). PM use was defined as using marijuana "every time" or "most of the time"; OM use was defined as using marijuana "every time." We report weighted prevalence estimates. **RESULTS:** In Wave 5, 8.6% (95% CI: 8.33, 8.94) of adults were P30D ENP users; when P30D PM users were removed, P30D ENP use prevalence dropped to 7.1% (95% CI: 6.79, 7.35). Among P30D ENP users, 9.0% (95% CI: 8.06, 9.95)

were OM users. Among P30D ENP users, 10.4% (95% CI: 9.29, 11.56) of 18–34 year-olds used marijuana "every time," compared to 6.2% (95% CI: 4.54, 8.38) of those 35–54 and 7.0% (95% CI: 4.18, 11.51) 55+. People who identified as LGBTQ were more likely to be marijuana-only ENP users (12.0% [95% CI: 9.69, 14.83]) than people who identified as straight (8.4% [95% CI: 7.42, 9.44]). More people who identified as Black 13.5% (95% CI: 10.82, 17.03) or Hispanic 13.7% (95% CI: 11.44, 16.37) were marijuana-only ENP users compared to people who identified as White (7.9% [95% CI: 6.95, 8.92]) or non-Hispanic (8.0% [95% CI: 7.01, 9.09]). Among P30D ENP users, more non-smokers were PM users (23.8% [95% CI: 21.58, 26.16]) than current smokers (16.4% [95% CI: 14.54, 18.43]) and former smokers (12.8% [95% CI: 10.66, 15.26]). **CONCLUSION:** Nearly 10% of P30D ENP users vape marijuana "every time" when they use an ENP, suggesting an overestimation of nicotine-only ENP use if marijuana vaping frequency is not assessed. Exclusive marijuana vaping varied by age, sexual orientation, race, and cigarette smoking status, suggesting the potential for a greater degree of misclassification by individual characteristics.

FUNDING: Academic Institution

POS1-128

USING AUTOMATIC CLUSTERING TO IDENTIFY THEMES FROM VAPE-RELATED CONTENT ON TIKTOK

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Background: TikTok continues to rise in popularity with 1.2 billion active monthly users, over 75% of which are youth and young adults. Previous content analyses found frequent vaping-related content on TikTok; however, manual human coding requires large numbers of human labor hours, limiting the application of manual content analysis to small-scale datasets. To address this issue, this study used machine learning (i.e., cluster analysis) to distill vape-related content on TikTok into categories. **Methods:** We searched for content related to vaping on TikTok using 16 vape-related words (e.g., "e-cigarette", "e-liquids") and 15 hashtags (e.g., #vape, #vapelifelife) and obtained a final sample of N=812 TikTok videos after removing non-English videos. We then selected one screenshot of vape-related images per video (e.g., vapor, vape devices) that most reflected the central vape content of the video. Next, we used a clustering algorithm called OPTICS, which finds high-density data points and clusters videos into different thematic sets (e.g., different types of vape tricks, presentation of vape devices in hand or on the mouth) based on the similarity of image contents. Researchers with experience in e-cigarette research then qualitatively analyzed the clusters for thematic integrity and coherence. **Results:** We identified 20 clusters, which we then grouped into 7 overarching themes. The themes include 1. Images of vape devices (n=3 clusters; e.g., top view or profile view of vape devices, vape device on hand or on the mouth), 2. Smoke rings (n=2 clusters; e.g., type of vape tricks), 3. Small clouds of vapor (n=2 clusters), 4. Videos edited by the user to have text overlay of vape-related text (n=3 clusters), 5. Vapor covering faces (n=4 clusters), 6. Videos with both text and vapor (n=1 cluster), and 7. Other (n=5 clusters) (e.g., people talking about vapes but no vapes present). **Conclusions:** Using an image clustering algorithm, we identified clusters of TikTok images into seven overarching qualitative themes: including the presence of vape devices, vape tricks featuring smoke rings, and videos with text added over the image. Image clustering provides a useful tool to identify key themes on social media. Further research is needed to understand how these themes impact vaping behaviors.

FUNDING: Federal; FDA/CTP

POS1-129

EVALUATION OF CARBONYL COLLECTION METHODS IN ELECTRONIC CIGARETTE AEROSOL

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INTRODUCTION: Popularity of electronic cigarettes (e-cigs) has been growing rapidly as a safer alternative nicotine delivery system. But harmful compounds have been reported in e-cig aerosols including the carcinogenic formaldehyde and acetaldehyde. There are discrepancies in carbonyl emissions reported by studies using different sampling methods (e.g., impingers and cartridges) because the methods are not designed to capture particle phase carbonyls which could be the major form of carbonyls in e-cig aerosols. Thus, this study evaluated carbonyl collection methods in e-cig aerosol. **METHODS:** For sample collection, two e-cigs (JUUL and MOD) at different flows (1 and 1.5 L/minute [LPM]) were used. To address the gas and particle-bound carbonyl discrepancy, we



tested the three most frequently used methods: DNPH Cartridge (C) (Waters Sep-Pack cartridge, 350 mg), DNPH-coated filter (DF), and Impinger (I). Glass fiber filter (GF) was also used to estimate the particle-bound carbonyl fraction. The sampling media were combined as follows: I-I, GF-I-I, C, DF-C, and GF-C. Collected samples were analyzed using high-performance liquid chromatography with UV detection (Waters Arc HPLC-PDA system). RESULTS: Carbonyl emissions varied between methods at different flows. For both devices, the highest emissions were measured with C and DF-C methods. The I-I method measured similar emissions for JUUL, but significantly lower for MOD. For example, MOD formaldehyde emissions measured with C were 0.11 ± 0.08 and 0.12 ± 0.08 microgram/puff for 1 LPM and 1.5 LPM, respectively. The I-I method, however, indicated 0.04 ± 0.02 and 0.05 ± 0.02 microgram/puff, 64% and 53% lower than C at the same respective conditions. This discrepancy between the cartridge and impinger methods generally followed the amount of liquid aerosol produced by the device. While C and DF-C were similar for formaldehyde, C indicated JUUL acetaldehyde emissions that were 46% lower than those measured with DF-C, while for MOD they were close to each other. This could be due to the larger particle-bound fraction of acetaldehyde and the smaller particles produced by JUUL that are apparently less effectively caught by the cartridge relative to the larger MOD particles. CONCLUSIONS: For sampling total, i.e., both gas and particle-bound carbonyls in e-cig aerosols, DF-C provides the best approach. If only formaldehyde emissions are measured, C could be used as it is simpler than DF-C.

FUNDING: Federal; FDACTP; Nonprofit grant funding

POS1-130

E-CIGARETTE TRIAL AND SUBSEQUENT E-CIGARETTE AND CIGARETTE USE AMONG GUATEMALAN ADOLESCENTS

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Background: Electronic cigarettes (e-cigarettes) are increasingly popular and their use among adolescents has surpassed that of conventional cigarettes. Furthermore, e-cigarette trial may also be associated with the transition from ever to current users yet limited data on adolescent use in low and middle-income countries (LMICs) is available. We sought to evaluate predictors of being a current smoker or e-cigarette user among those who tried e-cigarettes in the first and second wave of a cohort of Guatemalan adolescents. **Methods:** Data from 3 waves (2019, 2020 and 2021) of an adolescent (age range 13 to 17) cohort (n=3845) from 9 private schools in Guatemala City was used. E-cigarette trial was defined as those who were ever e-cigarette users at baseline (n=1058) in 2019. The primary outcome was current smoking or e-cigarette use at waves 2 or 3 (2020, 2021). Descriptive statistics were used to characterize the sample. A multivariate logistic model adjusted for repeated measures was used to regress the outcome to each covariate. Covariates included the use of other substances (cigarettes, heated tobacco products - HTP -, alcohol, and marijuana), peers' use of nicotine products (cigarette, e-cigarette, and HTP), own perception of e-cigarettes harm and addictiveness, exposure to e-cigarette advertising and sales, sensation seeking, and sociodemographic factors (gender, age, school average, highest educational attainment of either parent and family affluence). **Results:** Most respondents (63%) were 15 years of age or older and 52% of them were Female. 8.22% of ever e-cigarette users on wave 1 were current e-cigarette users or smokers at follow-up. In the adjusted analysis, the odds of being a current e-cigarette user were lower for males (OR = 0.9; 95% CI = 0.1-0.9) and who were older (OR = 0.96; 95% CI = 0.1-0.9). Additionally, those who consumed other substances (OR = 38.8; 95% CI = 12.5-89.7) or had friends that consume nicotine products had higher odds of being current e-cigarette users or smokers. (OR = 1.6; 95% CI = 1.1-7.4). **Conclusion:** In our sample, few e-cigarette users reported being current e-cigarette users or smokers and our results suggest these influences may vary by sex, gender, age, and other substance use. More research is needed to evaluate this dynamic in older populations. **Keywords:** electronic cigarettes; LMIC; adolescents; smokers

FUNDING: Federal

POS1-131

DEVELOPMENT OF SALIVA TOBACCO PRODUCT RELATED COMPOUND ANALYSIS METHOD TO STUDY DIRECT CHEMICAL EXPOSURES AFTER SMOKING

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INTRODUCTION: Cigarettes emit various toxic chemicals regardless of whether they are marketed as being "organic" or "natural." The misleading reduced harm messages conveyed through these descriptors could alter cigarette users' behavior and exposure to harmful chemicals. Saliva is a less-invasive sample, and it is the first body fluid that is exposed to tobacco smoke during smoking. Thus, tobacco product related compound concentrations in saliva (e.g., nicotine) could be a useful tool to study the user behavior change and resulting chemical exposures. To understand the impact of natural and organic expectancies on toxic chemical exposures, we developed and tested saliva tobacco and cannabis product related compound analysis method. **METHODS:** Saliva samples from cigarette smokers (n=17, 24-hours abstinence) were collected before and after four smoking sessions. Saliva samples from e-cigarette users (n=8) were collected and tested for method evaluation. Saliva nicotine, cotinine, 3-hydroxycotinine, TSNAs (NNK, NNN, and NNAL), cannabinoids (THC, CBD), and cannabinoid metabolites (oh-THC, cx-THC) were simultaneously analyzed using a Liquid Chromatography (LC)-Quadrupole Time-of-Flight (QTOF)-Mass Spectrometer (MS) system. **RESULTS:** The developed method can screen tobacco and cannabis related compounds successfully from the participant's saliva samples. Saliva nicotine, cotinine, and 3-hydroxycotinine concentrations (mean±SD) before smoking sessions were 14.5±52.1 ng/ml, 51.6±51.3 ng/ml, and 14.5±52.1 ng/ml, respectively. Mean saliva nicotine concentration was increased after smoking (2.2±2.9 microgram/ml), but as expected, nicotine metabolite, TSNAs, and cannabinoid metabolite concentrations before and after smoking were not changed. Saliva NNK, NNN, and NNAL concentrations were 0.056±0.188 ng/ml, 3.452±3.778 ng/ml, and 0.002±0.011 ng/ml, respectively. Mean saliva oh-THC concentration was 0.008±0.048 ng/ml and cx-THC was 2.267±5.737 ng/ml across the study participants. THC and CBD were not detected from the study participants. Saliva nicotine concentration of e-cig users (2.0±1.2 microgram/ml) were similar with the concentrations observed from the smokers. **CONCLUSIONS:** This study successfully developed a method to measure saliva nicotine, nicotine metabolite, and other compounds indicating cigarette and cannabis product use. Developed method can quickly screen tobacco and cannabis related product use status and chemical exposures immediately after the product use.

FUNDING: Federal; FDACTP

POS1-132

THE IMPACT OF OUTCOME GROUP ASSIGNMENT WHEN MODELING TOBACCO USE

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Significance. While the use of conventional cigarettes (CIG) has been decreasing in recent years, electronic cigarette (ECIG) use is on the rise. Ostensibly, the dual use of these products has also risen in recent years; however, studies of tobacco use may fail to capture dual use appropriately. We examine the potential for misclassification bias in the modeling of tobacco use using income level as an example. **Methods.** Data were drawn from wave 3 of the Population Assessment of Tobacco and Health study (N = 28,148). Past 12-month tobacco use was classified as either a 4-level (Non-user, dual user, or product specific user) or 2-level variable (non-user vs user). Multinomial and logistic regression were used to test the association between tobacco and income. **Results.** When modeling the data via multinomial regression, a significant relationship was found for CIG and dual use such that lower levels of income were associated with greater odds of use. No significant relationship was found for ECIG use and income level. However, when intentionally misclassifying the data and using the binary logistic regression model, a significant relationship was found for ECIG use such that lower levels of income were associated with greater odds of past 12-month use. **Conclusion.** Current research around ECIGs needs to utilize the appropriate outcome group assignment. These results suggest dual users may represent a novel group that should be accounted for when examining ECIG and CIG users for future associations. Utilizing multinomial regression, rather than logistic, is encouraged for all future studies of ECIG and CIG.



POS1-133

TOBACCO USE AMONG AFGHAN REFUGEES RESETTLED IN THE U.S.

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Though smoking rates in the U.S. have declined to 12.5%, less is known about the rates of smoking within specific immigrant groups. Oklahoma welcomed 1,800 Afghan refugees after the U.S. military withdrawal from Afghanistan in 2021. Research in Afghanistan shows extremely high rates of smoking (up to 40.6%) among males. Thus, the purpose of this study was to characterize tobacco use among Afghan refugees. A survey was developed and translated into Dari and Pashto and then disseminated using community-based participatory research methods. To date, 248 Afghan adults (of the 400 Afghan adults resettled in Oklahoma City) have completed the survey. A total of 65.3% of the sample completed the survey in Pashto, 27.4% in Dari, and 7.3% in English. Participants were 58.9% male, with a mean age of 32 years (SD=9.4; range=18-61 years), and 71.8% were married. Overall, 12.1% of the sample used any type of tobacco, (19.9% of males, 1% of females). Cigarette smoking was the most commonly used form of tobacco use (10.5% of the sample), followed by hookah and chewing tobacco (.8% of the sample for each). More males smoked than females (17.1%, n=25/146 vs. 1%, n=1/102). A total of 16.5% of respondents reported living with a current smoker (not including themselves). Participants who reported current smoking lived with an average of 5 children in their homes. The majority (71.9%) of the participants reported that they had been smoking for ten or more years. Importantly, 87.5% of those who reported smoking also reported wanting to stop smoking, on a scale of 1-6, (1 = I don't want to quit smoking, 6 = I really want to stop smoking and intend to in the next 3 months), participants who smoked rated their motivation to quit as 3.6 (equivalent to "I want to stop smoking but don't know when I will"), (SD= 1.3). Tobacco users and non-users were compared by socio-demographic characteristics, age, sex, preferred language, education, income, partner status, and ethnicity. Only current monthly family income was associated with smoking, those who smoked had significantly higher income, earning on average \$1,501-2,001 US dollars per month, compared to \$1,000-1,500. Overall, we find that smoking rates among Afghan men are nearly double the national rate in the U.S., which impacts not only their health but the health of those who live with them. Efforts are needed to promote tobacco cessation among Afghan men resettled in the U.S.

FUNDING: State

POS1-134

IMPLEMENTATION OF QUITLINE FINANCIAL INCENTIVES TO INCREASE COUNSELING SESSIONS AMONG SPECIFIC POPULATIONS IN VERMONT

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Medicaid or uninsured Vermonters use tobacco at nearly three times that of those privately insured. Among youth and young adults, nearly one-third of past 30-day smokers used menthol cigarettes. Pregnant/post-partum Vermonters use tobacco at twice the national average. In 2012, 802Quits adopted National Jewish Health's protocol for pregnant/post-partum people that provided up to \$65 in incentives. In 2021, new incentivized protocols were added to the quitline to better serve Vermonters. To increase quit attempts, and improve quitline engagement among disparate populations, the Vermont Tobacco Program implemented financial incentives protocols: **Medicaid members or uninsured Vermonters** are given incentives for completing calls (up to \$150) with \$20 for the first three completed calls and \$30 for calls four and five, with an additional \$30 bonus for completing all five calls; Vermonters who use **menthol** are incentivized with up to \$150 for completing calls, \$20 for the first three completed calls and \$30 for calls four and five, with an additional \$30 bonus for completing all five calls; **Pregnant Vermonters** who use tobacco are incentivized with \$20 for every completed call during pregnancy (up to \$100) and \$30 for every completed post-partum call (up to \$120). Vermont is the only NJH client using several incentives to increase quitline enrollment and engagement. Paid digital media campaigns, for both providers and the general public, have been used to increase awareness of the new incentives and drive enrollment. From March 2021 through May 2022, there were 818 quitline phone enrollees in Vermont. Of these enrollees, 44% qualified for an incentivized protocol through 802Quits (n=363), including 270 Medicaid or Uninsured Vermonters, 66 Menthol Tobacco users, and 12 Pregnant Vermonters. Incentivized protocols resulted in 41% of enrollees completing one coaching session, as compared to 29% of non-incentivized enrollees. This 12% difference in completing one coaching call suggests that incentivized quitline protocols increases the engagement of quitline enrollees. Through increasing completed quitline

coaching calls, incentivized quitline protocols can be used to improve engagement with state quitlines, leading to improved quit attempts, and hopefully improving quit success. While data is needed to evaluate the longer-term impact of these programs on smoking cessation and relapse prevention, preliminary findings from this program support that use of financial incentives can increase engagement with a state quitline. In July 2022, an additional incentive protocol was added for **Vermonters with any behavioral health conditions**. By providing incentives for these populations in Vermont, the Tobacco Control Program aims to reduce the burden of tobacco use on Vermont's public health.

FUNDING: Federal

POS1-135

ADULT SMOKERS' BELIEFS ABOUT THE HEALTH HARMS OF NICOTINE IN 16 COUNTRIES: FINDINGS FROM THE ITC PROJECT

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Significance: The emergence of new nicotine products (e.g., vaping and heated tobacco products) as well as proposed regulations on nicotine (e.g., reducing cigarettes to non-addictive levels) have intensified attention on nicotine, including its harmfulness. We assessed adult cigarette smokers' beliefs about the harmfulness of nicotine in 16 countries. **Methods:** Data are from the most recent survey in 16 ITC countries: Australia (AU-2020), Canada (CA-2020), England (EN-2020), France (FR-2019), Germany (DE-2018), Greece (GR-2018), Hungary (HU-2018), Japan (JP-2021), Malaysia (MY-2020), Netherlands (NL-2021), New Zealand (NZ-2020/21), Poland (PL-2018), Romania (RO-2018), Spain (ES-2018), Republic of Korea (KR-2021), and United States (US-2020). This question was asked in AU, CA, EN, FR, DE, GR, HU, PL, RO, ES, US: "How harmful do you think nicotine is to your health?" with response categories: not at all; slightly/moderately; very/extremely; don't know. This question was asked in AU, CA, EN, FR, JP, MY, NL, NZ, KR, US: "How much of the harm caused by cigarette smoking comes from the nicotine in tobacco?" with response categories: none/very little; some but less than half /half/more than half; all or nearly all; don't know. **Results:** The belief that nicotine is very/extremely harmful was held by 36% of smokers— highest in CA(45%), followed by FR(44%), GR(42%), RO(39%), AU(39%), US(38%), EN(34%), ES(26%), DE(23%), PL(21%), and HU(17%). The majority of smokers in most countries believe that nicotine is slightly/moderately harmful (Ave=55%: from 44%(RO) to 77%(HU)). Few smokers believe that nicotine is not at all harmful (Ave=4%: from 2% (GR) to 13%(RO)). The belief that nicotine causes all/nearly all the harm of smoking was held by 17% of smokers— highest in KR(29%), followed by JP(28%), MY(26%), NZ(20%), FR(18%), US(16%), NL(15%), CA(15%), AU(14%), and EN(10%). A majority of smokers believe that some/half/more than half of the harm of smoking comes from nicotine (Ave=59%: from 48%(NZ) to 64%(CA, KR)). Few smokers believe that nicotine causes none/very little harm (Ave=9%: from 3%(KR) to 14%(NZ)). **Conclusion:** Smokers in many countries believe that nicotine is harmful and is at least partially responsible for the harms of smoking, with large variability across countries. Such beliefs may contribute to reluctance to use nicotine replacement therapy (a proven safe cessation aid) or to switch to non-combusted alternative nicotine products.

FUNDING: Federal; Nonprofit grant funding



POS1-136

PREMIUM VS. NON-PREMIUM CIGAR USE AMONG A NATIONALLY REPRESENTATIVE SAMPLE OF REPRODUCTIVE-AGED WOMEN: FINDINGS FROM THE 2010-2019 NATIONAL SURVEY ON DRUG USE AND HEALTH (NSDUH)

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Introduction: Despite well-known deleterious effects of tobacco use during pregnancy, studies to date have not examined the prevalence, patterns, and correlates of premium vs. non-premium cigar use among reproductive-aged women. **Methods:** Using 2010-2019 data from the National Survey on Drug Use and Health (NSDUH), rates and trends in premium and non-premium cigar use were determined among women of reproductive age (18-49 years old). Weighted socio-demographic characteristics, other tobacco and substance co-use, patterns of use, and health indicators were also compared between women using premium vs. non-premium cigars. **Results:** A total of 5,651 women of reproductive-age reported smoking in the past 30 days, with 4.9% reporting use of premium cigar brands. The most commonly used premium brands were Romeo y Julieta, Cohiba, and Macanudos. Women who used premium vs non-premium cigars were more likely to be older, married, identify as non-Hispanic White, report some college education, and have an annual household income \geq \$50,000 compared to women who use non-premium cigar brands ($p < .001$). Women who used premium cigar brands were also less likely to be currently pregnant ($p = .009$), have used other smoking products in the past 30-days (e.g., cigarettes, blunts, marijuana; $p < .001$), or have used illicit drugs in the past year ($p = .007$). However, women who used premium cigars reported using alcohol more frequently in last 30-days compared to women who used non-premium cigars ($p < .001$). Trend analysis revealed that although rates of past 30-day premium cigar use remained consistent from 2010 (4.7%) to 2019 (4.9%), prevalence decreased from 6.6% in 2017 to 2.8% in 2018 before increasing to 4.9% in 2019. **Conclusion:** The current study revealed prevalence of ~5% premium cigar use in women of reproductive age who smoke cigars, and evidence for consistency in rates of premium cigar use in reproductive-aged women across time. Characteristics of reproductive-aged women also parallels characteristics of men who smoke premium vs. non-premium cigars. Understanding premium cigar use among reproductive age women, an understudied vulnerable population, will provide critical data to the FDA to inform policy and regulatory decisions.

FUNDING: Federal

POS1-137

WATERPIPE SMOKING: RESULTS FROM A POPULATION-BASED STUDY IN QATAR

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Significance: Waterpipe smoking is common in the Eastern Mediterranean region and is becoming more prevalent in Qatar. To better plan waterpipe smoking control strategies we aimed to 1) determine the prevalence of waterpipe smoking and explore its patterns in Qatar, 2) describe the knowledge, attitudes, and practices related to smoking behaviors, 3) recognize locations of waterpipe smoking and symptoms experienced during waterpipe sessions, 4) evaluate the frequency of waterpipe smoking and the initiation age. **Methods:** We analyzed the data of a 7921 population-based survey of adults aged 18 years and above (Qatari and non-Qatari residents), conducted in Qatar between March-December 2019. Out of 7105 surveys collected, 6904 were complete and included in the analysis. **Results:** Of the 6904, 8.3% (95% Confidence interval (CI): 7.7-9.0) were waterpipe tobacco smokers (10.6%; n=425 males and 5.1%; n=145 females). The highest prevalence of waterpipe smoking was reported among 18-24-year-olds (10.6%). Of the 575 waterpipe smokers 56.3% (n=324) were exclusive waterpipe smokers. Use of other tobacco products among waterpipe smokers was higher among Qataris (52.3%) than non-Qatari residents (37.7%). Shisha cafés were the most common location for waterpipe smoking however, females preferred restaurants. 83.3% reported that shisha smoking is harmful, while 39.3% considered that it is less harmful than cigarette smoking. **Conclusions:** Waterpipe smoking is considerably high in Qatar, the second form of tobacco used. The formulation of new policies and

enforcement of regulatory restrictions to waterpipe smoking are essential to reduce its uptake. Expansion in tobacco cessation services and increase in waterpipe awareness and outreach activities is needed.

FUNDING: Other: Medical Research Center in Hamad Medical Corporation

POS1-138

NRT USE AS A VAPING CESSATION AID AMONG YOUTH AND YOUTH ADULTS

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Significance: Vaping remains a public health concern among youth and young adults. Many vapers are looking for support to quit vaping. The use of nicotine replacement therapy (NRT) as a vaping cessation aid is not currently endorsed by any government or public health organization due to the limited available evidence. This study assesses the use of NRT as a vaping cessation aid within a large Canadian cohort sample of vapers. **Methods:** 2,164 Canadian youth and young adults (16-25) completed the Vaping Dependence Cohort Study 21-month follow-up survey (74% response rate). Respondents were asked a series of questions about their willingness to use NRT as a vaping cessation aid, past use of NRT as a vaping cessation aid, and the impact of using NRT on quit outcomes. Univariate statistics were conducted to produce estimates. **Results:** Survey respondents were predominantly Female (82.9%), Caucasian (72.4%), and resided in Ontario (50.6%). Three-quarters (75.9%) of current vapers reported that they intended to quit vaping within the next month, next 6 months or sometime in the future beyond 6 months. Of those, 58.1% expressed an interest in using NRT if it was offered for free. Among ever vapers, 11.9% reported using NRT as a vaping cessation aid in their lifetime and 2.9% reported using NRT in the past 3 months. Most ever vapers who used NRT to quit vaping did not find it helpful (43.8%). However, 34.4% reported that NRT helped them make a quit attempt, 28.1% reported cutting down on vaping, and 9.8% reported that they quit vaping. **Conclusion:** This analysis demonstrates that there is a willingness among vapers to use NRT as a vaping cessation aid with some vapers reporting moderate success. The effectiveness of NRT as a vaping cessation aid should be further explored to better inform practice guidelines.

FUNDING: Federal

POS1-139

LONGITUDINAL EXPERIENCES OF FOOD INSECURITY AND CIGARETTE SMOKING DAYS IN THE EARLY COVID-19 PANDEMIC, UNITED STATES

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Introduction: Although food insecurity is independently associated with cigarette smoking, much less is known about changes in food insecurity over time, and how that might impact smoking patterns. The COVID-19 pandemic contributed to wide-ranging impacts on food insecurity. In this population-based study, we examined 1-year patterns of food insecurity and their relationship with smoking patterns, measured as cigarette use days, during the first year of the pandemic. **Methods:** We analyzed data from a nationally representative longitudinal panel of U.S. adults (N=5,931) from the Understanding America Study (biweekly sampling from 22 waves, Apr 2020-Mar 2021). For the primary independent variable, we used latent class growth analysis to identify four trajectories of food insecurity over a 1-year period: "remained food insecure," "became fully food insecure" (i.e., increased food insecurity over time, reaching 100% probability), "became partially food insecure" (i.e., increased food insecurity over time, but not reaching 100% probability), and "remained food secure" (referent). We used generalized estimating equations to model the number of past-week smoking days (in # of days, range 0-7) with food insecurity trajectory, controlling for covariates including sociodemographics, mental health (depression, anxiety, and stress), and other concurrent substance use (cannabis and alcohol). **Results:** Smoking prevalence was 11.6% for those who remained food secure, 29.2% for became partially food insecure, 35.3% for remained food insecure, and 42.9% for became fully food insecure. Those who became fully food insecure maintained the highest average number of days smoked in the past week through the first year of the pandemic. Controlling for all covariates, those who became food insecure reported a significantly greater number of days smoked (B(SE)=0.44(0.20)) compared to those who remained secure. **Conclusion:** U.S. adults who became fully food insecure had a



significantly greater number of smoking days, even compared to groups who remained food insecure or became partially food insecure. This is the first study to our knowledge to identify how patterns of food insecurity impact patterns of cigarette smoking, during a period of high economic uncertainty. As socioeconomic disparities in tobacco use are now greater than ever, these results highlight the importance of preventing food insecurity as a potential strategy to reducing tobacco use disparities.

FUNDING: Federal

POS1-140

LONGITUDINAL CONTENT ANALYSIS OF TOP-SELLING CIGARETTE PACKS IN THE UNITED STATES IN 2018 AND 2021

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SIGNIFICANCE: Cigarette packaging features can increase product appeal and implicitly communicate health risk information to consumers. This study documented changes in the market share of pack characteristics among the top-selling cigarette products in the United States in 2018 and 2021. **METHODS:** The 50 cigarette products with the highest national unit sales in 2018 and 2021 were identified using Nielsen Scantrack sales data and subsequently purchased in 2019 and 2022. Packs were coded for features such as color, descriptive text, and promotions. Chi-square analyses, weighted by total unit sales, compared the market share of pack characteristics between years. **RESULTS:** Total pack sales decreased by 8% between 2018 and 2021, from 4.8 to 4.4 billion units sold. The packs in the sample constituted over 60% of the total cigarette market share each year. The presence of green coloring increased from 29.3% to 33.0% of pack sales ($p < .0001$), consistent with higher sales of menthol products. The market share of explicitly named colors (e.g., Marlboro Black) increased from 40.9% to 45.3% ($p < .0001$); increases were observed for Gold, Blue, Green, and Black. Packs with sensory descriptors, including "natural," "fresh," and "smooth," all had lower market shares in 2021 versus 2018. The display of promotional information on packs (e.g., rewards programs) was more common in 2021, increasing from 57.2% to 65.5% of pack sales ($p < .0001$). Two Camel Crush packs in the 2021 sample included promotional inserts for Vuse menthol e-cigarettes. **CONCLUSION:** The public health impact of the reduced popularity of packs with sensory descriptors may be overshadowed by the increase in explicitly named colors, which can also convey positive sensory and health-related attributes. Rewards programs, an increasingly common marketing strategy, may serve to retain consumers in the context of more restrictive tobacco control policies. Policies that regulate these pack features and marketing practices may help to reduce consumer appeal.

FUNDING: Federal; FDACTP

POS1-141

THE ASSOCIATION BETWEEN SNUS USE AND SLEEP PROBLEMS: A STUDY OF NORWEGIAN COLLEGE AND UNIVERSITY STUDENTS

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Significance: Several studies have shown an association between smoking and various sleep problems and illnesses. There are also findings strongly indicating a direct link between nicotine and altered sleep-wake cycle. Research on smokeless tobacco and sleep is rarer, and research on snus use related to sleep is scarce. Snus and smokeless tobacco do not affect lungs and respiratory systems the same way as inhalation cigarette smoke. However, snus users are exposed to nicotine over a longer period. Further, snus and other smokeless tobacco products may also be used in bed without risk of fire or second-hand smoke. Both the ability to snus in bed, and longer exposure to nicotine may especially affect sleep initiation and sleep duration differently than smoking. The aim of this study is to investigate snus use and smoking in association to various symptoms of sleep problems. **Methods:** Data based on the Students' Health and Wellbeing Study (SHoT study) collected in Norway 2018 (162,512 invited, 50,054 (30.8%)

completed). Demographics, smoking, snus use, and sleep problems were assessed using self-report. Associations were tested with chi-square and logistic regression. **Results:** 18.4 % of females used snus daily compared to 1.5 % females smoking daily. 22.1 % of males used snus daily compared to 2.0% of males smoked daily. Daily snus users had 1.6-fold increased odds (odds ratio (OR): 2.61, CI: 2.45-2.77), daily smokers had 1.3-fold increased odds (OR: 2.28, CI: 1.87-2.78), and dual users had 3.6-fold increased odds (OR: 4.61, CI: 3.18-6.70) for using two hours or more to fall asleep in weekdays. Daily snus users had 1.2-fold increased odds (OR: 2.24, CI: 2.04-2.46) for sleeping five hours or less in weekdays, compared to 2.2-fold increased odds for daily smokers (OR: 3.24, CI: 2.50-4.20) and 4.8-fold increased odd for dual users (OR: 5.77, CI: 3.62-9.21). **Conclusion:** Daily snus use and daily smoking have very similar association on long duration to fall asleep and sleeping shorter compared to students not using snus nor smoking daily. Snus is considered to be less harmful compared to smoking and in the US snus is allowed to be described as less harmful compared to smoking. However, these findings indicate in relation to sleep problems, snus appears to be just as harmful as smoking. Given the tenfold snus prevalence compared to smoking, snus is associated with far more sleep problems than smoking in absolute numbers, at least in this Norwegian student population.

FUNDING: Federal

POS1-142

VALIDATING WAVE 1 (2013-2014) URINARY COTININE AND TNE-2 CUT-POINTS FOR DIFFERENTIATING WAVE 4 (2016-2017) CIGARETTE USE FROM NON-USE IN THE US USING DATA FROM THE PATH STUDY

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Significance: Results from Wave 1 (W1) of the Population Assessment of Tobacco and Health (PATH) Study identified sex and racial/ethnic identity specific cut-points for validating tobacco use consistent with the Society for Research on Nicotine and Tobacco Treatment Network recommendations published in 2019 (Benowitz et al., 2019). Given changes in tobacco use behaviors and product characteristics, it is not clear how often these recommendations should be revised. The goal of the current study is to establish predictive validity of the urinary cotinine and Total Nicotine Equivalents-2 (TNE-2) cut-points derived from W1 (2014) on Wave 4 (W4; 2017) tobacco use status. **Methods:** For exclusive and polytobacco cigarette use, weighted prevalence estimates were calculated based on W4 self-report alone and with exceeding the W1 cut-point to calculate the percentage missed without biochemical verification. Sensitivity and specificity of W1 cotinine and TNE-2 cut-points on W4 self-reported tobacco use status was reported. Lastly, we used Receiver Operating Characteristic (ROC) curves to determine the optimal W4 cut-point using urinary cotinine or TNE-2 levels to distinguish P30D users from non-users, to determine if the cut-points significantly differed from W1. **Results:** Agreement between W4 self-reported use and exceeding the cotinine or TNE-2 cut-point from W1 was high, overall (within 2%) and varied by demographic subgroup. When stratified by demographic subgroups, between 0.7 and 4.4% of cigarette use was missed if relying on W4 self-report alone. Overall, the predictive validity of using the W1 cut-points to classify exclusive cigarette and polytobacco cigarette use at W4 was high (>90% Sensitivity and Specificity, except among polytobacco Hispanic smokers). Cut-points derived using W4 data did not significantly differ from the W1 derived cut-points (e.g., W1 exclusive= 40.5 ng/mL cotinine [95% CI: 26.1-62.8], W4 exclusive = 29.9 ng/ml cotinine [95% CI: 13.5-66.4]), among most demographic subgroups. **Conclusions:** The W1 cut-points remain valid for biochemical verification of self-reported tobacco use in W4. Findings from this study can be used by researchers in clinical and epidemiological studies to reduce misclassification of cigarette smoking status.

FUNDING: Federal; FDACTP



POS1-143

THE INFLUENCE OF RACIAL IDENTITY AND BANDWAGON CUES ON TOBACCO HEALTH WARNING EFFECTIVENESS IN A SOCIAL MEDIA CONTEXT: AN EYE-TRACKING APPROACH

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Significance: Public health organizations increasingly rely on social media to deliver anti-tobacco messages, including graphic health warnings (GHW), to hard-to-reach young adults (YAs). However, there is limited evidence on how various social cues, such as identity cues (e.g., the race of the exemplars in GHWs), and bandwagon cues (e.g., the number of "likes" on social media posts), may influence the effectiveness of the GHWs. We used the eye-tracking method to capture YAs' attention to GHWs embedded in a mock-up Facebook setting with these cues varied, and linked it to downstream smoking-related intentions. **Methods:** A 2 (identity cues: White vs. Black exemplars) × 2 (bandwagon cues: high vs. low endorsement) between-subject experiment using a Tobii Pro Nano eye-tracker was conducted among 223 White, non-smoking YAs ($M=19.10$ yrs, $SD=1.19$). In each condition, participants viewed four Facebook posts each containing a GHW adapted from FDA's newly proposed cigarette GHWs, followed by self-report intentions. **Results:** Compared to racial outgroup identity cues, ingroup cues (i.e., White exemplars) elicited shorter total fixation durations to the GHWs (TFDs, $M=8.02$ s, $SD=2.33$ s; outgroup: $M=8.81$ s, $SD=2.86$ s, $p=.02$), but greater intentions to share the posts with a smoker ($M=2.31$, $SD=1.28$; outgroup: $M=1.91$, $SD=.99$, $p=.004$), and lower intentions to initiate smoking ($M=1.21$, $SD=.40$; outgroup: $M=1.41$, $SD=.57$, $p=.004$). For bandwagon cues, higher numbers of "likes" attracted longer TFDs ($M=.86$ s, $SD=.53$; low: $M=.53$ s, $SD=.58$; $p<.001$), leading to greater intentions to share the GHW posts with a smoker ($\beta=.15$, $p=.02$). **Conclusion:** Although the ingroup cues may have increased YAs' visual avoidance to the negative consequences vividly depicted in the GHWs, potentially due to YAs' natural reluctance to view sufferings experienced by exemplars similar to themselves, interestingly, such ingroup cues significantly increased YAs' intentions to share the post with a smoker and reduced their own intentions to initiate smoking. Higher, rather than lower, numbers of "likes" on the GHW posts significantly attracted YAs' attention, which in turn increased their intentions to share the posts with a smoker, but these bandwagon cues did not affect YAs' intentions to initiate smoking. Future message testing of GHWs may benefit from taking into account the influence of various social cues to optimize the efficacy of anti-smoking GHWs delivered through social media platforms targeting YAs.

FUNDING: Academic Institution

Conclusions Our findings indicate that automated computer vision methods accurately detected a wide range of e-cigarette-related content on video-based social media, which includes images of vape devices, including more difficult entities in images to detect (e.g., vapor clouds and people using e-cigarettes). Our methods may facilitate future research that examines e-cigarette content on video-based social media platforms at scale to understand e-cigarette use and promotional trends.

FUNDING: Federal; FDA/CTP

POS1-144

LEVERAGING COMPUTER VISION FRAMEWORKS TO AUTOMATICALLY IDENTIFY E-CIGARETTE CONTENT ON TIKTOK POSTS

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Background: The ubiquity of social media use has facilitated rapid spread of e-cigarette content. TikTok is a popular platform among youth. Previous work focused on textual elements of e-cigarette posts on TikTok, but few studies examine the image content in videos. TikTok is video-based, thus automated methods to identify e-cigarette content will facilitate enhanced surveillance of e-cigarette content on the platform. Therefore, we developed a computer vision model to identify e-cigarette content in TikTok videos. **Methods:** We used object detection, a computer vision technique utilizing a mathematical model, trained on human-labeled images to detect e-cigarette-specific images in TikTok videos. We first identified videos using e-cigarette-related hashtags (i.e., #vape, #vapestagram, #vapor, #vapecommunity, #vapenation). Next, we generated a corpus of images by creating a python script to take screenshots every 6 seconds from videos utilizing the hashtags. Object detection data obtained from images rather than videos yield equivalent results and conserve computational resources. Then two researchers employed the tool, "labelimg," to annotate images: drew bounding boxes where an e-cigarette was present (alone or in-use by hand or mouth) or smoke/vapor was present. We collected a total of 884 images from 254 unique posts (approximately a third representing the 3 classes: device alone, device in use, smoke/vapor). We deployed the YoloV7 model to detect objects (755 images used for training and 129 for testing-85:15 train:test split). **Results** Our model correctly classified an e-cigarette 92.9% of the time (device alone, in-use, and smoke (i.e., vapor) in an image with an average F1 score of 0.81. Our model recall value was 0.771 for all 3 classes: e-cigarette products (in whole and parts such as a coil) and use behaviors, and smoke/vapor emanating from a mouth.

Poster Session 2: Rapid Submissions



RAPID SUBMISSIONS: POSTER SESSION 2

POS2-111

PREDICTORS OF SETTING A QUIT DATE AMONG PEOPLE ORIGINALLY UNWILLING TO QUIT SMOKING ASSIGNED TO A MOTIVATIONAL APP

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Significance: Most people who smoke are unwilling to quit in the next 30 days. Given this, highly disseminable interventions are needed that can motivate them to try to quit. It is not known, however, which people may benefit from such interventions. **Methods:** This is a secondary analysis of data from a smartphone-based intervention trial with participants smoking ≥ 5 cigarettes/day and not interested in quitting in the next 30 days. Current analyses examined participants ($N=101$; 73.3% White; mean age=50.3, $SD=12.8$; mean years of education=13.2, $SD=1.5$) randomized to active treatment, meaning they received the Phoenix smartphone app which sent 2 automated messages a day designed to convince them to set a quit date. Messages focused on reasons to quit, dangers of smoking, and related topics. These messages continued through the 26 week study or until participants set a quit date, at which time the app provided other types of tailored messages. Logistic LASSO regression was used to predict who would benefit from the app (i.e., set a quit date in the app; quit for at least 1 day) based on their baseline demographics (i.e., age, sex, race, years of education) and other baseline variables (i.e., cigarettes per day, time to first cigarette, living with someone who smokes, having a smoke-free home, age started smoking, longest period smoke free, motivation to quit, quitting self-efficacy, days with poor physical or mental health, and financial strain). **Results:** Almost half of participants (41.6%) set a quit date in the app and 24.8% quit for at least 1 day. Among the 94 participants with 12 to 16 years of education, older age ($OR=1.06$, 95% CI [1.02, 1.11]), more years of education ($OR=1.74$, 95% CI [1.12, 2.85]), and greater financial strain ($OR=1.11$, 95% CI [1.04, 1.21]) were associated with setting a quit date. This model had 70% in-sample and 56% out-of-sample prediction accuracy. No predictors were associated with quitting for at least 1 day. **Conclusions:** Nearly half of Phoenix app users set a quit date within the 26-week study period, and the app appeared more effective at motivating quit smoking attempts in more educated, older people with greater financial strain. Smartphone applications have great potential to expand treatment reach to previously underserved populations. Efforts are needed to understand how to design mobile health interventions to produce effective and equitable outcomes and not reinforce existing disparities in intervention effectiveness.

FUNDING: Federal; State

POS2-112

EFFICACY OF GENETIC MARKERS IN CHOOSING A PHARMACOLOGICAL TREATMENT FOR SMOKING CESSATION WITH BUPROPION AND VARENICLINE, AND ITS IMPLICATIONS FOR COMBINING DRUGS: RANDOMIZED CONTROL STUDY - THE GENTSMOKING TRIAL

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Smoking cessation remains the best strategy to reduce morbimortality related to smoking. Our team has published two articles regarding genetic markers as related to better outcomes in treatment with bupropion and varenicline. The objective of this trial was to test if using genetic favorable markers to choose smoking cessation drug treatment could be better than using powerful smoking cessation drug (varenicline) to start treatment. Also, if this strategy could impact in necessity of combining drug for achieving smoking cessation after 4 weeks of starting treatment if monotherapy had failed. **Methods:** Partial blinded randomized control trial conducted from November

2017 to March 2022, in single center in São Paulo, Brazil. The total 361 participants who smoked 5 cigarettes/day, or more were randomized. All participants received smoking cessation counselling and were randomized to genetic group or control group, 1:1. The genetic group ($n=184$) started treatment with bupropion if the genotype AA for CYP2B6 (rs2279343) was present, if not, started with varenicline if genotype CT or TT for CHRNA4(rs1044396) was present, or if had not favorable to neither, started with both drugs. The control group ($n=177$) started with varenicline, independent of genetic markers. The drug treatment was for 12 weeks. The first endpoint was abstinence rate at week 4 and week 12, confirmed with carbon monoxide in exhaled air. In participants who did not achieve complete abstinence at week 4, was add another drug, so if participants were using varenicline 2mg/day we added bupropion 150mg/day, if was using bupropion 300 mg/day we added varenicline 2 mg/day and reduced bupropion to 150mg/day. **Results:** There was no difference between groups related to demographic, nicotine dependence, clinical and psychiatric characteristics ($p>0.05$). The abstinence rates in genetic group were 30.4% (Confident interval CI 95% 23 -37) versus 42.9% (CI 95% 36- 64) in control group, $p=0.01$ at week 4. The strategy to add another smoking cessation drug when monotherapy had failed increase smoking cessation rates in both groups but kept still superior in control group 74% (CI 95% 67-80) vs 52% (CI 95% 49-64), $p=0.01$ at week 12. There was no difference in abstinence rate between who added the other drug during treatment or started with both since the beginning ($p=0.72$). However, the odds ratio to interrupt treatment when started with bupropion was 3.54 (CI 95% 1.98 -6.3) higher than started with varenicline ($p<0.001$), independent of polymorphism. **Conclusion:** The best strategy to increase smoking cessation rates is start treatment with the powerful drug (varenicline) and add bupropion in smokers that do not achieve complete abstinence after 4 weeks of starting treatment. The use of polymorphism CYP2B6 (rs2279343) related to bupropion or CHRNA4(rs1044396) related to varenicline did not interfere in abstinence rates.

FUNDING: Other: FAPESP

POS2-113

PSYCHOMETRIC PROPERTIES OF THE BRIEF WISDM: SUPPORT FOR VALIDITY THROUGH FACTOR ANALYSIS AND ITEM RESPONSE THEORY

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Background: The Wisconsin Index of Smoking Dependence Motives (WISDM) and its Brief version are widely-used measures of smoking motivation. The Brief WISDM has been previously assessed to have 11 subscales in both clinical and non-clinical samples, though not all studies support the 11-factor structure. As such, the current study sought to further investigate the psychometric properties of the Brief WISDM among a sample of individuals involved in community correction programs in Alabama through the use of a factor-analytic and Item Response Theory (IRT) approach. **Method:** Brief WISDM data was analyzed from 516 criminal-legal system-involved, adult smokers from the American Southeast. Participants were involved in a larger smoking cessation study utilizing combination nicotine replacement therapy and the Brief WISDM was given at the baseline visit, prior to intervention. Confirmatory Factor analyses were conducted in R on both single-factor and 11-factor constructs of the Brief WISDM. **Results:** Results from the CFA showed inadequate fit for a single-factor score, but adequate fit for the previously proposed 11-factor model. Initial IRT investigations using the 11-factor model showed strong item discrimination, but non-ordered threshold parameters. Additionally, participants tended to prefer use of the extreme ends of the scale (i.e., selecting "1" or "7") rather than the full range of responses. Exploratory analyses re-coded the data to use a 3-point Likert scale rather than the full 7-point Likert scale. Using an additional CFA, stronger overall support for the 11-factor model was found using the recoded data. **Conclusions:** The 11-factor model for the Brief WISDM was supported in a criminal-legal population, suggesting continued support for the Brief WISDM measure overall. Additionally, exploratory analyses found potential support for a simplified Likert scale that may improve both the psychometric properties of the measure as well as reduced burden on participants in terms of measure complexity.

FUNDING: Federal



POS2-114

A CROSS-SECTIONAL SURVEY OF NICOTINE POUCH USERS: USE-MOTIVES, DEPENDENCE, AND CRAVING LEVELS ASSOCIATED WITH ORAL NICOTINE POUCH PRODUCTS

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Introduction: A category of oral nicotine pouches has emerged that contain a crystalized nicotine powder instead of tobacco leaves. These pouches come in a variety of flavors and are often marketed as "tobacco-free," but research on why individuals are motivated to use these pouches, as well as other relevant use-experiences, is limited. **Methods:** We conducted a cross-sectional, web-based survey from September to November 2022 and collected self-report data from 118 adults who endorsed past-month nicotine pouch use. Outcomes included self-reported use-motives, dependence and craving levels, and adverse events (AEs) from nicotine pouch use. **Results:** On average (SD), participants started using nicotine pouches at age 19 (5) and reported use on 13 (6) days during the past month, with Zyn being the most frequently used brand (27% of sample). Most respondents also endorsed use of tobacco- (74%) and/or electronic-cigarettes (53%) during the past month, with one participant reporting use of a different nicotine product ("snus"). On average (SD), participants reported using pouches for 11 (7) minutes on a given use-occasion, with most (~75%) indicating they normally place pouches in their lower lip. Regarding use-motives, "it comes in flavors I like" was the most frequently (31% of sample) endorsed motivation for initiating pouch use. Menthol and fruit were the two most preferred flavor categories (35% and 30% of sample, respectively). The sample demonstrated significant dependence levels (e.g., Fagerstrom, FTND-ST = 7, SD = 2) and responses to relevant items (e.g., "when I see other people using a nicotine pouch, I want a nicotine pouch") suggested the presence of cue-induced craving for oral nicotine pouches. The most common AEs (% of sample) included: mouth lesions (48%), upset stomach (39%), sore mouth (37%), sore throat (21%), and nausea (9%). **Conclusions:** Most participants reported placing pouches in their lower lip, which contrasts marketing indicating pouches should be placed in the upper lip. The availability of flavors was a key factor predicting the initiation and maintenance of nicotine pouch use in this sample of experienced pouch users; this important feature may warrant future regulatory action. Respondents reported significant dependence on nicotine pouches and a substantial number of pouch-related AEs. Given the growing popularity of oral nicotine pouches, large-scale nationally representative surveys should assess nicotine pouch use along with outcomes assessed by the current study (e.g., dependence, AEs).

FUNDING: Federal

POS2-115

APPLYING A NOVEL METHOD TO STUDY APPEAL AND SENSORY CHARACTERISTICS OF ORAL NICOTINE PRODUCTS

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Significance: Oral nicotine products (ONPs) are increasingly diverse with regard to flavor and product type (e.g., nicotine pouches). Of note, variants of commercial and medicinal gum are rapidly emerging and could disproportionately appeal to young adult vapers. Yet, regulatory science methods for determining the appeal and sensory features of novel ONPs are lacking. In this laboratory experiment of young adult e-cigarette users, we apply an appeal testing paradigm previously used for other nicotine/tobacco products to characterize the appeal and sensory experience of ONPs in various flavors, product types, and brands. **Methods:** Twenty-six ONP-naïve e-cigarette users aged 21-29 yr. participated in a within-subject single-blind study in which they rated 16 different 4mg nicotine ONPs that varied by flavor (fruit vs. mint) and ONP type (gum vs. pouch). After each 5-minute ONP administration, participants rated appeal (willingness to use again, liking) and eight sensory characteristics of the product on a 0-100 scale. Multi-level models examined the fixed effects of flavor and ONP type on each appeal and sensory outcome and comparisons of appeal of each individual ONP to the mean of the 15 other ONPs. Pearson correlations examined associations between appeal and sensory ratings, collapsed across all products. **Results:** On average, gum (vs. pouch) ONPs were rated sweeter (B[difference in means]=19.5, 95% CI=-4.3, 34.7), stronger in flavor (B=25.6, 95% CI=12.2, 39.0), and lower in tingling sensation (B=-14.0, 95% CI=-27.8, -0.2). Fruit (vs. mint) flavored ONPs were sweeter (B=12.9, 95% CI=6.1, 19.7) and produced less burning

sensation (B=-12.0, 95% CI=-19.5, -4.5). Comparisons among each of the 16 specific ONPs found that Nicorette White Ice flavor was most appealing, whereas Rogue Fruit and Nicorette Mint were least appealing. Correlation analysis showed that appeal was associated with all sensory ratings (e.g., higher sweetness, lower bitterness; $r_s = -.33-.54$), except for tingling and burning sensation. **Conclusions:** Nicotine gums may offer greater appeal and a more pleasant sensory experience than pouches for young adult vapers, with considerable heterogeneity in user experience across some brand/flavor variants. Additionally, this study provides initial evidence of the feasibility of an appeal paradigm for characterizing the user experience across a diversity of novel ONPs.

FUNDING: Federal; FDA/CTP

POS2-116

EXPLORING E-CIGARETTE USE & PREVENTION AMONG INDIGENOUS YOUTH: A COLLABORATIVE STUDY

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The use of e-cigarettes (vaping) among Indigenous youth is much higher than that of their non-Indigenous counterparts, which has raised the concerns of various Indigenous scholars and communities. To better understand the most salient constructs that influence Indigenous youth's decision-making around vaping, we co-created a qualitative research study with a Syilx First Nation community guided by the Unified Theory of Behavior (UTB). Through semi-structured interviews and a sharing circle, we gathered the perspectives and experiences of 16 Syilx youth in British Columbia, Canada. After an initial collaborative coding and training session, the interviews were transcribed and coded by Indigenous peer researchers using Nvivo. The final conceptual framework was collaboratively developed through both directed and conventional qualitative content analysis methods. Syilx youth reported that vaping decision-making is underpinned by colonialism and the disproportionate historical impact of the tobacco industry. The youth spoke to several individual determinants that influence intentions to vape (e.g., vaping helps you cope) and to not vape (e.g., family and community connectedness) and determinants that translate intentions to decision to vape (e.g., access to vaping). The youth suggested that prevention efforts must be informed by an understanding of why Indigenous youth use e-cigarettes and what strengthens their resolve to not vape. Vaping decision-making among Indigenous youth is determined by their cultures, contexts, and histories. To effectively address vaping among Indigenous youth and to best inform cessation methods, continued engagement with Indigenous youth in planning, developing, implementing, and evaluating prevention and policy efforts is necessary.

FUNDING: E-cigarette Company; Academic Institution; Nonprofit grant funding

POS2-117

DIFFERENCES IN SMOKING AND ALCOHOL BRIEF INTERVENTIONS BY SOCIOECONOMIC STATUS IN GREAT BRITAIN: CROSS-SECTIONAL ANALYSIS OF A POPULATION-BASED SURVEY

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Significance: British general practitioners (GP) should deliver brief interventions on tobacco smoking and alcohol consumption to patients during routine visits. These include feedback and structured advice to patients who smoke tobacco or drink at potentially harmful levels. Smoking prevalence is higher, and quit attempts are less likely to be successful in socioeconomically disadvantaged groups. Further, these suffer greater alcohol-related harm compared to socioeconomically advantaged groups despite drinking similar or lower levels of alcohol. The study aimed to assess: 1) prevalence of receipt of GP-based brief intervention among past-year smokers and increasing or higher risk drinkers in Great Britain; 2) associations between receipt of brief intervention and socioeconomic status; 3) differences among nations (England, Scotland, Wales) between brief intervention and socioeconomic status. **Methods:** The cross-sectional analysis was based on a representative survey in Great Britain. The data comprised around 2,450 households each month, collected between October 2020 and October 2022. Households were selected via a hybrid approach of random location and quota sampling. From each household, one adult was interviewed via phone. The outcome (receipt of brief intervention) was assessed for increasing or higher risk drinkers (≥ 5 on the Alcohol Use Disorders Identification Test-Consumption (AUDIT-C)) and past-year



smokers. Covariates included social grade, age, sex, nation, AUDIT-C score, and tobacco dependence. Participants with missing data were excluded. Descriptive analyses for objective 1 were performed on weighted data. Regression analyses for objectives 2 and 3 were based on unweighted data. **Results:** Overall, 47,604 adults were included in the study. Among these, 16.5% (95% CI 16.0, 16.9) were past-year smokers and 32.1% (95% CI 31.6, 32.5) were increasing or higher risk drinkers. Among past-year smokers, 51.7% (95% CI 50.3, 53.0) visited their GP in the past year, and of these, 30.8% (95% CI 29.1, 32.5) received a brief intervention. Among increasing or higher risk drinkers, 57.6% (95% CI 56.7, 58.5) visited their GP in the past year, and of these, 2.7% (95% CI 2.3, 3.1) received a brief intervention. There were no differences in receipt of a brief intervention between socioeconomic groups or nations. **Conclusion:** Approximately 1 in 3 smokers visiting their GP in the last year received a brief intervention between 2020 and 2022 in Great Britain. Yet, the equivalent figure for increasing or higher risk drinkers was only 1 in 33. The figures were similar between nations and socioeconomic groups. The results clearly show that brief interventions in general practice are a missed opportunity, independent of socioeconomic status.

FUNDING: Federal; Nonprofit grant funding

POS2-118

THE ASSOCIATION BETWEEN CUMULATIVE VULNERABILITIES AND CIGARETTE SMOKING IN THE UNITED STATES: A REVIEW OF NATIONALLY REPRESENTATIVE STUDIES

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Significance: Recent tobacco research has used a cumulative vulnerability (CV) framework to examine the number of social, demographic, or health disadvantages as an indicator of risk for cigarette smoking. We reviewed nationally representative studies on the association between CVs and tobacco smoking in the United States. **Methods:** We searched PubMed and our personal libraries for US nationally representative studies that reported the association between CVs and combusted tobacco use. Our search resulted in 816 papers, which were screened for inclusion in duplicate. Seven studies met criteria and were included in this review. **Results:** All seven studies examined socioeconomic status (poverty status, income, or employment), education, age, and race/ethnicity as vulnerabilities for smoking. Six studies (85.7%) also included gender/sex. Five of the seven studies (71.4%) examined psychopathology and comorbid substance use disorders and two studies (28.6%) included sexual orientation in their CV analysis. For primary outcomes: five studies (71.4%) used current established cigarette smoking, one used tobacco-related cancer mortality, and one reported preference for high nicotine/tar cigarettes. All seven studies found the risk for smoking or tobacco-related mortality successively increased with each additional vulnerability. Four of the seven studies (57.1%) examined the relative explanatory power of each included variable and all four found lower education was the single strongest risk factor for cigarette smoking. **Conclusions:** The CV framework is a useful approach to understanding emerging patterns of tobacco disparities. Findings from this review demonstrate a consistent graded effect in which more disparities are associated with successively greater risk for cigarette smoking in the United States.

FUNDING: Federal

POS2-119

EXAMINING THE CUMULATIVE PROTECTIVE EFFECTS OF SOCIOECONOMIC STATUS ON SMOKING IN RACIAL/ETHNIC SEXUAL GENDER MINORITIES

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Significance: The Minorities' Diminished Returns (MDRs) theory posits that certain resources are less protective on health outcomes for marginalized populations because of systems of oppression like racism. Given the higher use of tobacco and nicotine and experiences of discrimination among people of color (POC) and sexual gender minority (SGM) populations, it is imperative to understand tobacco use for individuals who are both POC and SGM. Further, it is important assess if SES has similar protective effects for this population. We hypothesized that the protective factor of SES will have a weaker effect for POC SGM individuals compared to their Non-Hispanic (NH) White SGM coun-

terparts. **Methods:** This paper used data from Wave 5 of the Population Assessment of Tobacco and Health (PATH) study. The primary exposure was a SES index that was a sum of educational attainment, household income, home ownership, and health insurance. The outcome variables included ever use of cigarettes, lifetime cigarette use, past 30-day cigarette use, average number of cigarettes use per day (CPD), ever use of e-cigarettes, past 30-day use of e-cigarettes, and average number of EC puffs. The moderator variable was a cross tabulation of racial/ethnic and SGM identities categorized as: SGM NH White = 0; SGM NH Black = 1; SGM Hispanic/Latinx/e = 2; and SGM NH POC Other = 3. We employed logistic regressions and negative binomial regressions to test the association between SES and tobacco use, as appropriate. Models included a two-way interaction between the SES index and racial/ethnic SGM identities. **Results:** In the two-way interaction, among SGM participants (N=2,670), Hispanic/Latinx/e SGM individuals had higher odds of ever use of cigarettes (OR=1.55; 95% CI: 0.11, 0.40), lifetime cigarette use (OR=2.23; 95% CI: 1.59, 3.13), past 30-day cigarette use (OR=1.72; 95% CI: 1.29, 2.28), average number of CPD (IRR=1.77; 95% CI: 1.11, 2.84), ever e-cigarette use (OR=1.89; 95% CI: 1.37, 2.62); past 30-day e-cigarette use (OR=1.95; 95% CI: 1.46, 2.60), and average number of puffs (IRR=1.79; 95% CI: 1.26, 2.53) compared to NH White SGM. **Discussion:** The protective effects of higher SES have weaker effects for SGM Hispanic/Latinx/e which suggests that these individuals may be exposed to factors that impact their tobacco and nicotine use such as discrimination, targeted tobacco advertising, and stressors.

FUNDING: Federal

POS2-120

DEMAND AND SUBSTITUTION OF CIGARETTES BY IQOS IN AN EXPERIMENTAL TOBACCO MARKETPLACE AS A FUNCTION OF IQOS NARRATIVE CONDITION, POST COVID-19 PANDEMIC

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Significance: Severe disease outcome for COVID-19 has been associated with smokers. IQOS recently approved for marketing with reduced exposure claims, may be attractive to smokers looking for less harmful alternatives. With a wide range of available tobacco and nicotine containing products, several factors can determine uptake of alternative tobacco products. We evaluated tobacco product purchasing and switching with introduction of a cognitive bias. **Methods:** 203 smokers recruited online answered questions about their tobacco use and risk perceptions from COVID-19. All participants were shown a brief introduction and picture of IQOS. Further, they were exposed to one of the four randomly assigned narrative conditions (2 test, 2 control), where test narratives advocated switching completely from cigarettes to IQOS for harm reduction by medical authority and peers. Participants made hypothetical purchases in an online Experimental Tobacco Marketplace (ETM). In 5 consecutive ETM sessions, the price of cigarettes increased with each session and price of all other products remained constant. Non-linear models were used to estimate demand and intensity. Simple linear regression models were used to assess substitution across narratives and ETM sessions. Data was analyzed using GraphPad Prism 9 and SPSS. **Results:** Overall cigarette purchasing decreased significantly with increasing cigarette prices in ETM sessions (Q=211, p<0.01). IQOS both tobacco and menthol flavor showed a significant substitution for cigarettes at higher price points in all narrative conditions (significant deviation of slope from zero). No significant differences were observed between findings from different narrative conditions. Within participant, significant differences observed for purchases by ETM sessions (F (df)= 17.75(4), p<0.01) and product type (F (df)= 76(2), p<0.01). Those reporting greater worry about contracting COVID-19 showed significantly higher purchasing of other alternatives in ETM (excluding IQOS) (F (df)= 18.45, p<0.01). **Conclusion:** IQOS showed a significant substitution at higher cigarette prices regardless of narrative condition. This suggests that IQOS may be appealing to cigarette smokers in United States and COVID-19 may not have a significant influence on tobacco purchase decisions.

FUNDING: Federal; FDACTP; Academic Institution

POS2-121

CIGARETTE, E-CIGARETTE, AND HEATED TOBACCO PRODUCT MARKETING AT POINTS-OF-SALE IN 10 CITIES IN VIETNAM

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Significance: Vietnam's Law on Tobacco Prevention and Control bans tobacco advertising and promotion, except for product display at points-of-sale (POS) which are restricted to displaying one unit of each cigarette brand. Retailers selling tobacco are banned within 100 meters of schools. However, low compliance with this ban has been reported. E-cigarettes and heated tobacco products (HTP) are unregulated. We examined advertising and promotion for tobacco and nicotine products at POS to assess compliance with existing regulations and describe the nature of advertising and promotion at POS. **Methods:** An observational study of cigarette, e-cigarette, and HTP advertising and promotion at retailers selling any of these products within 100 meters of a school or post office (n= 510) was conducted in ten cities of Vietnam, diverse in terms of socioeconomic, geography, and population size. A multistage sampling approach was used - urban and rural areas were randomly selected in each city and within those areas, schools and post offices were randomly selected while ensuring that the 100-meter radii around each venue did not overlap. Observations of retailers included types of products sold, types of advertisements and promotions for tobacco and nicotine products, and placement of products and advertising. **Results:** 1,470 retailers selling cigarettes and/or e-cigarettes were observed. 1,463 retailers sold cigarettes, 12 sold e-cigarettes, and no retailers sold HTPs. 35% (n=519) of retailers selling cigarettes displayed cigarette advertisements. Of these, 97% (n=506) displayed cigarette advertisements in the form of signage. 25% (n=3) of retailers selling e-cigarettes displayed e-cigarette advertisements and all were in the form of signage. 3% (n=52) of retailers selling cigarettes had a cigarette promotion; 67% (n=35) of these were price discounts and 2% (n=1) promoted a tobacco sponsored event. 8% (n=1) of retailers selling e-cigarettes had an e-cigarette promotion - this was in the form of a price discount and a gift. **Conclusions:** Non-compliance with regulations that prohibit sale of tobacco within 100 meters of schools is still an issue in Vietnam. Enforcement of current regulations are needed. While e-cigarettes have been reported to be widely sold in Vietnam, it does not appear that they are being sold through brick-and-mortar retailers or static street vendors. This should be considered as Vietnam considers e-cigarette regulations.

FUNDING: Nonprofit grant funding

POS2-122

COUNTRY-LEVEL POLICIES REGULATING NICOTINE STRENGTH AND LIQUID VOLUMES FOR ELECTRONIC NICOTINE DELIVERY SYSTEMS

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Significance: The amount of nicotine an ENDS user is exposed to is determined by many factors including frequency and volume of puffing, as well as nicotine formulation and quantity in the liquid. It is valuable to know what or how nicotine strength (mg/ml, or % nicotine) is being regulated for ENDS, and if/how policies limit the volume of liquid sold for ENDS. **Methods:** The Institute for Global Tobacco Control's E-cigarette Policy Scan tracks country-level policies regulating ENDS across the globe. The scan, which is updated twice a year, includes 130 countries. In-country contacts provide specific policy information and documents. Policy details were collected through November 2022. Countries with policies regulating nicotine strength and liquid volumes for ENDS were identified, and their regulatory approaches were reviewed. **Results:** Of the 130 countries, we identified n=36 countries regulating nicotine strength. Most of these (n=27) are EU member states, and follow the Tobacco Product Directive requirement of liquid used for ENDS having a nicotine strength of 20mg/mL, and single-use devices must not exceed 2mL, and refillable bottles must not exceed 10mL. Other countries outside the EU have adopted these regulations (UK, Albania, Moldova, Saudi Arabia); Iceland and Israel have a set maximum nicotine strength of 20mg/mL but their policies do not regulate liquid volumes. Jordan limits the nicotine concentration to max 20mg/ml for freebase and 25g/ml for products that use nicotine salts; refill bottle sizes are limited to a maximum of 10 ml, and refill tanks for e-cigarettes are limited to a maximum of 2 ml. Canada limits the concentration of nicotine in e-cigarette liquid to a maximum of 20 mg/ml. In Australia there is a maximum nicotine concentration limit for unapproved nicotine vaping products of 100 mg/mL (base form or equivalent base form concentration). **Discussion:** Most countries in our policy scan are not regulating nicotine strength or liquid volumes for ENDS. Of the countries that are regulating most are members of the EU or use the same standards as the EU. Very few countries regulate nicotine strength differently for products that use nicotine salts.

FUNDING: Nonprofit grant funding

POS2-123

QUANTITY AND TYPE OF ENDS DEVICES USED IN THE PAST WEEK AND THE PERCENTAGE OF PUFFS FROM THEIR MOST USED DEVICE: FINDINGS FROM WAVE 4 OF THE VAPER STUDY

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Significance: Electronic nicotine delivery system (ENDS) studies frequently report data on one device used by participants; however, users are known to regularly use more than one device. Understanding the quantity of ENDS devices used, the range of device types used, and the percentage of puffs from their most used device will better contextualize real-world use and help regulators better predict potential benefits and unintended consequences of future regulations. **Methods:** US adults (21+) who use ENDS 5+ days/week completed a survey between July and September 2022. Participants who used at least one ENDS device in the past week (N=1205) self-reported the number of devices used, the device type(s) used for their three most used devices, and the approximate percentage of puffs from their most used device. Descriptive statistics were used for analysis. **Results:** Just over half (57%, n=685) of the sample used one ENDS device in the past week, 28% (n=341) used two devices, 10% (n=126) used three, and 5% (n=53) used four or more. For the most used device in the past week, 31% (n=369) used a disposable device, 27% (n=330) used a refillable tank, 26% (n=313) used a refillable pod/cartridge, and 16% (n=193) used a disposable pod/cartridge. Of those who used at least two devices (n=520), the second most used device type from the past week was: 1. Disposable device (61%, n=316), 2. Refillable tank (13%, n=67), 3. Refillable pod/cartridge (13%, n=67), 4. Disposable pod/cartridge (10%, n=53), 5. Didn't know (3%, n=17). Among participants who used at least three devices (n=179), the third most used device type frequencies were similar to the second most used device. The median percentage of puffs coming from users' most used devices from the past week was 100%, 90%, 80%, 75%, and 63% from those using 1, 2, 3, 4, and 5+ devices, respectively. **Conclusion:** Using two or more ENDS devices in the past week was common (43%). Disposables were the most used device (31%) and an even higher proportion cited disposables as their second (61%) and third (58%) most used device type. The median percentage of puffs from the most used device decreased as the number of devices used increased, although most participants using multiple devices still appeared to use one device a majority of the time. These findings highlight the complexity of individual ENDS user behavior and suggest that regulations aiming to impact the use of select device types could displace use for many users.

FUNDING: Federal; FDA/CTP

POS2-124

TOBACCO INDUSTRY DENORMALIZATION BELIEFS WERE ASSOCIATED WITH GREATER SUPPORT FOR TOBACCO ENDGAME POLICIES: A POPULATION-BASED STUDY IN HONG KONG

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Background: Tobacco industry denormalization (TID) exposes misconducts 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 World Health Organization report were used: tobacco manufacturers ignore health, induce addiction, hide harms, spread false information, lure smoking, interfere with policies, and should be responsible for health problems. Score of each item were summed up and dichotomized based on median score 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:** Each TID belief 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



SRNT 2023 POSTER SESSION 2 • THURSDAY, MARCH 2, 2023, 4:30 PM - 6:00 PM

(ARR ranged from 1.13 to 1.35, all $P < 0.001$) and use (ARR ranged from 1.12 to 1.30, all $P < 0.001$). 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 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: Other: Hong Kong Council on Smoking and Health

POS2-125

PUBLIC PERCEPTION OF THE TOBACCO 21 AMENDMENT ON TWITTER IN THE UNITED STATES

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Significance: Following the signing of the Tobacco 21 amendment (T21) in Dec 2019 to raise the minimum legal sales age for tobacco products from 18 to 21 years in the US, there is a need to monitor public responses and potential unintended consequences. Social media platforms, such as Twitter, can provide rich data on public perceptions. This study adds to the literature using Twitter data to assess the knowledge and beliefs of T21. It utilizes more recent data and considers the topics of discussion within each sentiment group. **Methods:** Twitter data were collected from Nov 2019 to Feb 2021 using the Twitter streaming application programming interface with keywords related to vaping or e-cigarettes such as "vape", "ecig" etc. The longitudinal trend of the T21 discussion on Twitter was examined using the mean number of monthly T21-related tweets. Three authors with high interrater reliability used inductive methods to manually code the tweets into different sentiment groups (positive, neutral, and negative) based on the attitude expressed towards the policy. Topics discussed were examined within each sentiment group through theme analyses. **Results:** Among the collected 3197 tweets, 2169 tweets were related to T21, of which 444 tweets (20.5%) showed a positive attitude, 736 (33.9%) showed a negative attitude, and 989 (45.6%) showed a neutral attitude. Longitudinal trends showed a clear peak that occurred around Jan 2020 following the enactment of this legislation. A secondary peak occurs during Sep 2020, potentially due to Florida Governor DeSantis vetoing the Florida flavor ban, citing his reason as unscientific claims about vaping. For positive tweets, the most frequent topics were Avoidance of Further Regulation (27.0%), then Enforce T21 (24.8%), and Health Benefits (18.2%). For negative tweets, the most frequent topic was General Disagreement/Frustration (28.1%), then Will Still Use Tobacco (25.5%), and Other (19.3%). Neutral tweets were primarily PSA/News posts (79.1%). **Conclusion:** Overall, we observed a more negative attitude toward T21 during our study period. Many were frustrated with T21 and reported that underage consumers would still obtain products. Social media data provides a unique opportunity to monitor public perceptions and responses to regulatory actions. Continued monitoring can inform enforcement efforts and the potential unintended consequences of T21.

FUNDING: FDACTP

POS2-126

TESTING THE TIKTOK ALGORITHM: CAN UNDERAGED TIKTOK USERS ELICIT E-CIGARETTE CONTENT RECOMMENDATIONS?

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Background: TikTok is a video app popular with youth (60% of users are <18 years old). Recent studies examining the tobacco content on youths' "For You Page (FYP)", which contains recommended videos, revealed vape content. In response, TikTok updated its algorithm to factor in age to reduce vape content on FYP of youths' accounts. This study aims to assess whether engagement with vape content on TikTok leads to greater exposure to vape content. **Methods:** We designed two fictitious profiles (bots) aged 16 (underage minor) and 24 (young adults) to interact with vaping videos on TikTok. The bots watched 100 videos per day playing 60-80% of each video if it contained vape content or 10-30% if it did not. They only commented on videos featuring vape content. The bots selected videos with descriptions or hashtags containing a vape-related word (e.g., "vape", "e-cig", "e-juice"). We collected 492 and 483 FYP posts for the 16 and 24-year-old bots, respectively, in March 2022. We used a) topic modeling, an unsupervised

machine learning method that clusters documents into sets of topics, and b) object detection to identify vape-related themes (e.g., vape products, vape clouds). **Results:** A qualitative analysis of the underage minor data (492 posts) found that vape-related words occurred in 0.8% of hashtags. Posts containing these hashtags showed the manufacturing process for a specific brand of vape products and how to do vape tricks using household items. No words related to vapes were observed in the young adult's profile (483 posts). Object detection found one vape video in the underage minor's profile, depicting a subject refilling a vape pod and vaping. None were detected in the young adult's profile. **Conclusions:** Overall, we found very few cases of vape-related content on underage minor and young adult's FYP despite engaging with vape content, which may indicate that the TikTok's algorithm is indeed restricting vape content. Despite this, we did find some evidence that themes that appeal to youth such as vape tricks can still be found in the underage minor's FYP, which suggests the need to strengthen enforcement of policies to protect youth on this platform. Future studies can extend our methods to other tobacco products on TikTok to understand exposure to tobacco content based on the level of user engagement.

FUNDING: Federal; FDACTP

POS2-127

ANXIETY AS A PREDICTOR OF THE AGE OF INITIATION OF TOBACCO AND MARIJUANA USE IN YOUTH/EMERGING ADULTS

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Purpose: No studies have prospectively examined the impact of anxiety symptoms on the age of initiation of tobacco and marijuana use in adolescents and emerging adults, between 15 and 24 years of age. **Methods:** The study data were drawn from Texas Adolescent Tobacco and Marketing Surveillance System TATAMS for the years 2019-2021 (Waves 9-14). Participants were in 10th grade, 12th grade, and two years post-high school at baseline (Wave 9). Participants provided complete data on covariates and were never cigarette (n=1,776) or e-cigarette (n=1,353), or marijuana (n=1,334) users at baseline (Wave 9). Interval-censoring Cox proportional hazards models with a time-varying exposure were fit to examine the differences in the estimated age of initiation of tobacco and marijuana use by anxiety symptoms while adjusting for gender, race/ethnicity, family socioeconomic status (SES), and the survey wave. **Results:** We found among the 10th-grade cohort, youth with anxiety symptoms had a 129%, 53%, and 59% increased risk of an earlier age of cigarette (AHR=2.29; 95%CI=1.63-3.23), e-cigarette (AHR=1.53; 95%CI=1.17-2.00) and marijuana (AHR=1.59; 95%CI=1.23-2.05) initiation compared to those without anxiety symptoms, respectively. We found among the 12th-grade cohort, youth with anxiety symptoms had a 52% and 25% and 35% increased risk of an earlier age of cigarette (AHR=1.52; 95%CI=1.21-1.90), e-cigarette (AHR=1.25; 95%CI=1.01-1.60), and marijuana (AHR=1.35; 95%CI=1.09-1.67) initiation compared to those without anxiety symptoms, respectively. However, among 2 years post-HS cohort, anxiety symptoms predicted the age of initiation of ever marijuana use only (AHR=1.33; 95%CI=1.11-1.58). Importantly, between ages 18 to 19 years in the 10th-grade cohort, and between ages 20 to 21 years in the 12th-grade cohort, the hazard function (cumulative incidence) of cigarette, e-cigarette, and marijuana initiation doubled among youth with anxiety symptoms. **Conclusions:** The present longitudinal study provides the first evidence that anxiety symptoms predispose youth to earlier ages of substance use initiation, especially among the youngest adolescent cohort. This highlights the need for timely and early substance use interventions among anxious youth to delay or prevent the initiation of tobacco and marijuana use later in life.

FUNDING: Federal

POS2-128

ASSOCIATIONS BETWEEN SUGAR LEVELS IN TOBACCO FILLER AND HARMFUL CONSTITUENTS IN THE SMOKE OF POPULAR U.S. CIGARETTES

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Significance: Sugars in cigarette tobacco filler play an important role in the sensory appeal and palatability of cigarette smoke and may also contribute to its toxicity. In a previous study, we determined that levels of fructose, glucose, and sucrose vary greatly across popular U.S. cigarette brands. In this study, we investigated the associations between sugar levels in tobacco filler and levels of several harmful smoke constituents in the same cigarettes. **Methods:** Brands/sub-brands reported by the majority of smokers in the Wave 1 of the Population Assessment of Tobacco and Health (PATH) Study were analyzed, a total of 53 varieties. Each variety was smoked in triplicate by the Canadian Intense smoking regimen. Tobacco-specific nitrosamines NNK and NNN, nicotine, minor alkaloids, and a panel of volatile organic compounds (VOCs) were analyzed in the smoke by our routine methods. Pearson correlation coefficients were determined using R version 4.1.3 in RStudio version 22.07.1+554. **Results:** Total sugar level (the sum of glucose, fructose, and sucrose) was positively correlated with propionaldehyde ($r = 0.51$) and NNK ($r = 0.46$) and had moderate positive correlations with formaldehyde ($r = 0.40$), butyraldehyde ($r = 0.39$), acetaldehyde ($r = 0.36$), acrolein ($r = 0.36$), crotonaldehyde ($r = 0.35$), and total measured VOCs ($r = 0.37$). Fructose moderately negatively correlated with acetone ($r = -0.38$), butanone ($r = -0.35$), and crotonaldehyde ($r = -0.34$) and glucose had moderate negative correlations with acetone ($r = -0.33$), and butanone ($r = -0.31$). Sucrose had moderate positive correlations with NNK ($r = 0.36$), NNN ($r = 0.30$), propionaldehyde ($r = 0.39$), crotonaldehyde ($r = 0.39$), butyraldehyde ($r = 0.37$), acrolein ($r = 0.35$), acetaldehyde ($r = 0.32$), and total measured VOCs ($r = 0.35$). Total sugars and sucrose negatively correlated with nicotine ($r = -0.39$ for both). There was low or no correlation of sugar levels with minor alkaloids. **Conclusions:** Sugar levels in tobacco filler are associated with the levels of important toxicants and carcinogens in the smoke of popular U.S. cigarettes. Further research should be undertaken to better characterize the impact of sugars in tobacco filler on cigarette smoke chemistry, the association of sugar levels with pertinent exposures and effects in cigarette users, and the potential regulation sugar levels in cigarette filler with the purpose of protecting public health.

FUNDING: Federal

POS2-129

VAPING CESSATION RESOURCES FOR YOUNG ADULTS: AN OBSERVATIONAL AUDIT OF NORTH AMERICAN QUITLINE CONSORTIUM WEBSITES

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Significance: Over 55% of young adults (YAs, ages 18-24) express a desire to quit vaping, but only about 37% report trying. The National Cancer Institute (NCI) prioritizes YAs as a vulnerable population needing more interventions. Some support exists for youth (under 17), but fewer resources are targeted to YAs. The present study assessed the availability of vaping information and cessation resources targeted for YAs on North American Quitline Consortium (NAQC) Quitsites. **Methods:** NAQC Quitsites were observationally audited to locate vaping cessation resources for each of the 50 US states, the US Capital, and 13 Canadian provinces. An audit checklist was used to assess websites on the presence or absence of cessation information and resources targeted to YAs. Inclusion criteria for the audit included mentioning ENDS, vaping, e-cigarettes, nicotine, cessation, quitting, etc. **Results:** Five Quitsites were excluded (broken websites), and 32/59 (54.2%) of Quitsites had no observable information or support for YA-targeted vaping cessation resources. Forty-eight of fifty-nine (81.4%) Quitsites had no YA-targeted vaping cessation resources linked from the homepage or dedicated pages for the topic, while 18/47 (38.2%) of Quitsites had no mention of vaping or ENDS anywhere on their pages, whether concerning the cessation or general information - although all Canadian Quitsites contained vaping information. Forty-Seven of fifty-nine (79.7%) Quitsites had no YA representation in images or videos anywhere on the page. The 12 territories that did have image representation only had it in areas where YA demographics were observable, but not in sections targeting the general public. **Conclusion:** NAQC Quitsites currently offer little support for Young Adults interested in quitting vaping, as more than half lack YA-targeted vaping cessation resources. About one-third of Quitsites lacked any mention of vaping. As we learn more about why YAs are unable to quit as much as they desire, Quitsites are encouraged to add resources targeted to this demographic to facilitate their journey toward quitting vaping. Closing this information and support gap will improve our perception of the risk associated with vaping, leading to healthier decisions by Young Adults and other vulnerable populations. **Supported by** The National Cancer Institute (NCI) and the FDA (TCORS Grant U54CA228110).

FUNDING: Federal

POS2-130

EXPLORING THE EFFECTS SMOKELESS TOBACCO-RELATED SOCIAL MEDIA CONTENT ON SMOKELESS TOBACCO SALES IN THE U.S.

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Significance: Marketing of non-cigarette tobacco products through social media is proliferating. While advertising and health communication theories provide a strong rationale to expect that exposure to these messages will influence attitudes, beliefs, and behaviors related to tobacco use, to date very few studies have examined the extent to which the digital media environment influences tobacco use-related outcomes. Furthermore, research in this domain has so far relied on survey self-report data on marketing exposure and tobacco use, which are often unreliable due to endogeneity, inaccurate recall, and selection biases. In the present study, we use community-level tweet rate as an exogenous indicator of exposure to smokeless tobacco (ST)-related content and employ this measure to examine the influence of digital marketing environment on ST consumption. **Methods:** Keyword rules were used to collect tweets related to ST from the Twitter Historical Powertrack posted from February 2017 to June 2021. Multivariate logistic regression models tested the association between ST tweet rate and the association between the ST tweet rate (aggregated by four-week periods) and ST unit sales across time by product type (newer, snus, conventional). Autoregressive Error Model was used to address the autocorrelation in the ST unit sales across the resultant 57 periods. Interrupted time series approach was used to control for potential effects of policy change. **Results:** Results of regression analyses revealed that the amount of tweets was associated with ST unit sales of newer and conventional products, controlling for price, relevant policy events, and the COVID-19 pandemic. On average, one unit increase in the number of newer ST-related tweets was associated with 0.49 increase in log-unit sales [$p = .014$]; one unit increase in the number of conventional ST tweets was associated with 0.02 increase in log-unit sales [$p = .039$]. Average price was negatively associated with the unit sales. The impact of price appeared to be stronger for conventional (-0.7 in log unit sales [$p < 0.0001$] per tweet unit) and snus products (-0.25 in log unit sales [$p < 0.0001$]) than newer products (-0.08 in log unit sales [$p < 0.0001$]). **Conclusion:** Digital media marketing of ST products may influence ST use. Understanding the impact of exposure to ST social media content can provide meaningful insights for tobacco control as social media data can serve as valuable measures of population norms, targeted marketing, and other previously unmeasured contextual factors associated with health outcomes.

FUNDING: Federal; FDACTP

POS2-131

ASSOCIATION OF FINANCIAL STRAIN WITH TOBACCO USE CHARACTERISTICS AMONG SOCIOECONOMICALLY DISADVANTAGED ADULTS PARTICIPATING IN SMOKING CESSATION TREATMENT

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Background: Smoking rates among socioeconomically disadvantaged adults are much higher than in the general population, and socioeconomic disadvantage is associated with a return to smoking during a smoking cessation attempt. Financial strain (FS) refers to difficulty or inability to afford basic necessities and comforts, and has been linked to tobacco use characteristics including cigarettes smoked per day and dependence, as well as depression and negative affect in current smokers. The goal of the present study was to evaluate the association of FS with tobacco use characteristics and smoking cessation among socioeconomically disadvantaged adults. **Method:** Participants were uninsured or Medicaid-insured adults ($M_{age} = 48.9$ years, 63.1% female, 60.6% NH White; $N = 320$) and randomized to receive either standard care (SC; $n = 161$) or SC plus financial incentives ($n = 159$) in a smoking cessation program. They reported demographics, FS, tobacco use characteristics, and mental health at baseline (BL). Abstinence was biochemically-confirmed at weeks 1-4, 8, 12, and 26. Adjusted linear regression models examined associations of FS and average cigarettes smoked per day, years of smoking, Intolerance for Smoking Abstinence Discomfort Questionnaire (ISADQ), Heaviness of Smoking Index (HSI), Brief Questionnaire of Smoking Urges (QSU), Wisconsin Smoking Withdrawal Scale (WSWS), Center for Epidemiological Studies Depression (CES-D), and the negative affect (NA) subscale of the Positive and Negative Affect Schedule at BL. (covarying treatment group, HSI, race, sex, age, and education). Adjusted logistic regression models examined FS as a predictor of



SRNT 2023 POSTER SESSION 2 • THURSDAY, MARCH 2, 2023, 4:30 PM - 6:00 PM

abstinence at each follow-up (same covariates as above). **Results:** In adjusted linear regression models, FS was significantly associated with ISADQ scores ($B=.25, p=.002$), HSI ($B=.03, p=.001$), QSU (pos. reinforcement: $B=.15, p=.031$; neg. reinforcement: $B=.20, p=.004$), CES-D ($B=.50, p<.001$), and NA ($B=.35, p<.001$) at BL. FS was not associated with average cigarettes per day, years of smoking, or WWS at BL. In adjusted logistic regression models, FS at BL did not predict abstinence at any follow-up, except week 2. **Conclusion:** While BL FS was not predictive of abstinence at most follow-ups, FS was associated with tobacco-related characteristics and negative emotions at the beginning of a quit attempt. Findings suggest that adults with greater FS may experience more discomfort during a smoking cessation attempt, which may be addressable through targeted counseling approaches and pharmacotherapies.

FUNDING: Federal; State

POS2-132

UNIQUE TOBACCO FLAVOR NAMES IN A SAMPLE OF ENGLISH ENDS ADVERTISEMENTS

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Significance Flavors are an important design feature used by e-cigarette manufacturers to market their products. Many jurisdictions have enacted policies that ban flavored e-cigarettes; these policies often have exemptions for tobacco flavors. This study identified how many unique tobacco-flavored product names are present in a sample of English-language e-cigarette ads. **Methods** We acquired e-cigarette advertisements that ran from 2018 to the end of 2020. Ads were purchased from Numerator, a market research firm that monitors consumer advertising. A group of trained research assistants identified and classified e-cigarette flavors presented in each ad including flavor names presented on e-cigarettes, packaging, or in the text/spoken content of the ad. Flavor descriptors were also noted. We calculated the percentage of ads containing at least 1 tobacco-flavored product and the prevalence of different tobacco flavor names. **Results** Our sample included 2,966 ENDS advertisements. Almost one-half (47.9%, $n=1,420$) of these ads contained at least one flavored e-cigarette (including tobacco flavor); across the sample, we identified 4,451 flavored e-cigarette products. Across the entire sample, 28% ($n=836$) of ads contained at least one tobacco-flavored product and we identified 1027 examples of tobacco-flavored e-cigarettes within ads. We identified 60 unique "tobacco flavor" names; the most common were "Tobacco" ($n=392$), "Classic Tobacco" ($n=107$), "Original" ($n=59$), "Rich Tobacco" ($n=57$), "Toasted Tobacco" ($n=57$), "Virginia Tobacco" ($n=52$), and "Gold Leaf" ($n=44$). Some less common tobacco flavor names were associated with places where tobacco cultivation takes place, such as Carolina, Kentucky, Georgia, or Cuba. Other tobacco flavor names included physical features of tobacco such as "rough cut tobacco", and "bright leaf tobacco", while other tobacco flavors suggested a type of pipe or pipe tobacco like "Ironwood" or "Cavendish". **Conclusion** This study identified that tobacco flavor is a common flavor presented in our sample of English language ads, and that among our sample, we identified 60 different "tobacco" flavor names, highlighting the practice of describing the flavor beyond just "tobacco". Future research can investigate whether these different flavor names and descriptors influence consumers' perceived risks of ENDS products.

FUNDING: Nonprofit grant funding

POS2-133

TOBACCO PRODUCTS USE AND COVID-19 AMONG ADULTS – UNITED STATES, 2021

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Introduction Millions of Americans have died from smoking-related illnesses, and this preventable epidemic continues to threaten public health today in the era of COVID-19, a viral respiratory infection. We analyzed data from the 2021 National Health Interview Survey (NHIS) to examine the prevalence of COVID-19 cases, testing, symptoms, and vaccine uptake and how it correlates with tobacco products use among a nationally representative sample of U.S. adults aged ≥18 years. **Methods** NHIS is an annual, na-

tionally representative survey of the noninstitutionalized U.S. civilian population. The 2021 Sample Adult component included 29,482 adults with a response rate of 50.9%. We investigated COVID-19-related outcomes by tobacco product use status and reported national estimates. Multivariable models were performed with the COVID-19 measures as the outcome and each tobacco product use as the exploratory variable accounting for confounding factors. **Results** In 2021, 18.2 % of U.S. adults (46 million) used any tobacco product, of whom 12.5% (5.8 million) reported having COVID-19, 58.8% (27 million) ever tested for COVID-19, and 10.9% (5 million) ever tested positive for COVID-19. Among any tobacco users who provided information on the COVID-19 vaccine (34.1 million), 57.3% (19.6 million) ever received COVID-19 vaccine, with 84.9% of whom (16.6 million) received at least 2 doses of the vaccine. Among tobacco users who reported contracting COVID-19, 65.8% (3.6 million) and 61.7% (3.6 million) reported a loss of smell and taste, respectively. Almost all current exclusive tobacco product users were less likely to get COVID-19 vaccine compared to never-users. Of the COVID-19 symptoms, loss of smell was common among tobacco users, which was more pronounced among e-cigarette users compared to non-users. **Conclusions** Continued monitoring of tobacco product use amid the COVID-19 pandemic is crucial to inform public health policies and programs. In addition, efforts to promote COVID-19 vaccination among tobacco product users are warranted.

POS2-134

MULTIPLE TOBACCO PRODUCT USE, COTININE LEVELS, AND NICOTINE DEPENDENCE IN PEOPLE LIVING WITH HIV WHO USE TOBACCO IN INDIA

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Significance: Low- and middle-income countries, especially in South Asia, bear a disproportionate burden of harms related to tobacco use in its various forms. In India, for example, nearly 80,000 new cases of throat cancer are diagnosed annually. Yet, most research on multiple tobacco product use and cessation is conducted in high-income countries, where products and social contexts differ. We explored multiple product use and cessation behaviors in people living with HIV (PWH) who use tobacco in India. **Methods:** Among $n=154$ adult PWH who participated in a prospective study in Chennai, India, between October 2019 and December 2021 in PWH, 38% reported current tobacco use ($n=58/154$). Individuals were surveyed in English, Tamil, or Telugu about sociodemographic characteristics, specific tobacco products used, and nicotine dependence (Fagerström Test for Nicotine Dependence (FTND), smoking and smokeless versions). We also measured urine cotinine levels. We compared participant characteristics by single product vs multi-products use among those reporting current daily or less than daily use. **Results:** Half of PWH who use tobacco (84.5% male, 43.1% <primary school education, 46.6% self-employed) reported use of >1 tobacco product (29/58, 50%). On average, participants using multi-products combined 3.0 products (SD:1.2). The most common combination was manufactured cigarettes, hand-rolled cigarettes, and at least one form of smokeless tobacco (8/29, 28%). Compared to those reporting single product use, those using multi-products had higher cotinine levels (multi-products mean 417.0 ng/ml; SD 167.8 vs. single-product mean 253.0; SD 226.7, $p<.001$), higher nicotine dependence (multi-products mean FTND 3.7; SD 1.7 vs. single-product mean FTND 2.2; SD 2.6; p -value <0.01), and were more likely to report daily use (multi-products: 72.4% vs. single-product: 34.5%, p -value <0.01). **Conclusion:** Multiple product use in PWH in India is associated with more frequent tobacco use and greater nicotine dependence. Those using multiple products may face greater barriers to quitting compared to single-product users. Research in LMICs to identify the reasons and context for multiple product use is needed to inform the design of cessation interventions.

FUNDING: Academic Institution



POS2-135

AWARENESS AND PERCEIVED IMPACT OF FDA'S JUUL MARKETING DENIAL ORDER AMONG A NATIONALLY REPRESENTATIVE SAMPLE OF ADOLESCENTS

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Introduction: On June 23rd, 2022, the FDA issued a marketing denial order (MDO) to JUUL Labs and ordered JUUL products to be removed from shelves in US stores. While JUUL products remain in US stores due to a court stay on the order, research demonstrates that news stories about e-cigarettes may affect adolescents' perceptions of harm.

Purpose: We sought to examine awareness and perceived impact of the JUUL MDO among a nationally representative sample of US adolescents (ages 13-17). **Methods:** Data were collected in August 2022 using an online survey from $n=1,603$ adolescents. Adolescents were asked whether they had heard the about the JUUL MDO, and, if yes, where they heard the news. Those who had heard the news were asked about their perception of the MDO's impact on harm perceptions about JUUL products and vape products in general, on a 1-4 scale from (1) no more harmful than they thought to (4) a lot more harmful than they thought. We descriptively examined awareness of the MDO and harm perceptions of JUUL and vapes in general by participant characteristics and vaping status. We then conducted adjusted regression models to examine correlates of awareness and increased harm perception. **Results:** Twenty-seven percent of adolescents had heard about the MDO, and most heard the news from social media (33.5%), other people (29.7%), or TV/radio (26.8%). Those with significantly higher odds of having heard the news were older adolescents ($aOR=1.13$) and adolescents who identified as LGBTQ+ ($aOR=2.05$). The majority of participants indicated that they had higher harm perceptions about JUUL itself (77.9%) and vapes in general (79.6%) after hearing the JUUL MDO news. Current users and those susceptible to vaping were significantly less likely to report increased harm perceptions about JUUL ($B=-0.46$ and -0.34 , respectively) and vapes in general ($B=-0.43$ and -0.27) compared to non-susceptible adolescents. **Conclusions:** The results of this nationally representative survey demonstrate that more than 1 in 4 US adolescents heard about the JUUL MDO, and the majority of those youth indicated increased vape harm perceptions after hearing the news. Large-scale news events about vaping can reach youth audiences and may impact what youth think about the harms of vaping.

FUNDING: Federal; FDACTP; Academic Institution

POS2-136

E-CIGARETTE USE MEASUREMENT AND PREDICTORS OF NICOTINE DEPENDENCE

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SIGNIFICANCE Increases in e-cigarette use over the past decade has spurred the need to develop and validate new measures to assess e-cigarette use behaviors and nicotine consumption. The goal of the present study was: 1) test the feasibility of a questionnaire designed to assess individuals' recall of vaping behaviors and 2) identify the strongest behavioral indicators of nicotine dependence. **METHODS** A feasibility study was conducted using U.S. Amazon Mechanical Turk workers ($n=445$) in May 2020. Bivariate analyses and multivariable hierarchical regression models estimated the associations between the Penn State Nicotine Dependence Index (PSNDI), sociodemographics, and responses to a questionnaire developed to measure e-cigarette use behaviors. **RESULTS** Only 5.6% and 1.7% of individuals were unable to recall on how many days they vaped and how many puffs they took respectively, whereas 11.2% of participants did not know the nicotine concentration they use, 31.3% did not know whether they used nicotine salts or free-based nicotine. We also found that frequency of e-cigarette use in days/year and times/day, and years of vaping experience were associated with greater nicotine dependence ($B=.02$, $p<.05$; $B=.05$, $p<.05$; $B=.15$, $p<.05$). Two ranges of nicotine concentration, 18-24mg/mL and 31-40mg/mL were associated with greater nicotine dependence ($B=1.53$, $p<.05$; $B=2.94$, $p<.05$), all other concentrations, including higher concentrations (e.g. 50mg/mL) were not. 1st generation e-cigarette device use, but no

other device type, was associated with greater nicotine dependence ($B=3.41$, $p<.05$). **CONCLUSIONS** Our findings suggest that frequency and duration of e-cigarette use is likely to be the most effect way to assess e-cigarette consumption.

FUNDING: Academic Institution

POS2-137

LONGITUDINAL ANALYSIS OF PREDICTORS OF ELECTRONIC CIGARETTE USE AMONG ADOLESCENTS IN GUATEMALA

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Background: Electronic cigarettes (e-cigarettes) are increasingly marketed worldwide, yet limited data on adolescent use in low and middle-income countries (LMICs) is available. Guatemala is a LMIC where e-cigarettes are unregulated and vastly available, yet predictors of use are unstudied. This longitudinal study assessed the predictors of ever or current use of e-cigarettes among adolescents surveyed before and during the COVID-19 Pandemic. **Methods:** 3,845 students (age range 13-17) in 9 private schools in Guatemala City were surveyed on three occasions, each separated by 10-17 months: in 2019 before the Pandemic and in two follow-ups (2020 and 2021). The final analytic sample included those who had never tried e-cigarettes at baseline ($n=1,015$). The primary outcome was ever or current e-cigarette use at each follow-up. Each outcome was regressed using multivariate random effects logistic models adjusted for repeated measures for students followed at all waves. Covariates included the use of other substances (cigarettes, heated tobacco products - HTP -, alcohol, and marijuana), peers' use of nicotine products (cigarette, e-cigarette, and HTP), perception of e-cigarettes harm and addictiveness, exposure to e-cigarette advertising and sales, sensation seeking, and sociodemographic factors (gender, age, school average, highest educational attainment of either parent and family affluence). **Results:** 25.3% ($n=175$) of the students that had never tried e-cigarettes at baseline and participated in wave 2 or 3 tried or started vaping at follow-up. In the adjusted model, the odds of becoming an ever or current e-cigarette user were slightly lower for males ($OR = 0.3$; 95% $CI = 0.1-0.8$) and for students with higher grades ($OR = 0.2$; 95% $CI = 0.1-0.7$). Odds were higher with each unit increase in the family affluence scale ($OR = 1.4$; 95% $CI = 1.0-1.8$), as well as for students that use other substances ($OR = 3.8$; 95% $CI = 1.5-9.9$), or have friends that consume nicotine products ($OR = 2.7$; 95% $CI = 1.2-6.4$). **Conclusion:** Results suggest that adolescents' risk for trying or using e-cigarettes might vary by gender, school performance, and family affluence. Thus, stakeholders must take these differences into account when developing prevention and control interventions. We also found that personal or peer consumption of substances might be a significant risk factor and suggest the development of integral strategies that prevent substance use initiation in general.

FUNDING: Federal

POS2-138

TOBACCO PRODUCT USE AND COVID-19 AMONG HIGH SCHOOL STUDENTS IN CONNECTICUT

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Significance: As of December 2022, more than 101 million people in the United States have been infected with Coronavirus Disease 2019 (COVID-19) and 1 million have died. Research shows that smoking can damage the respiratory system and potentially increase the risk of developing severe symptoms following COVID-19 infection. However, little is known about other tobacco product use and the risk of contracting COVID-19, especially among youth. This study aims to assess whether youth tobacco use is associated with COVID-19 diagnoses and vaccination. **Methods:** 4,855 students from 8 Connecticut high schools completed a survey about tobacco use in Fall 2022 (response rate: 95%). Participants were asked whether they had been diagnosed with COVID-19 by a doctor or nurse in the past year and whether they received at least one dose of a COVID-19 vaccine. Participants also reported whether they had been told by a doctor, nurse, or other health professional that they had asthma in the past year, whether they had an asthma attack in the past year, and whether they had ever used the following tobacco products: e-cigarettes, heated tobacco, cigarettes, hookah, blunts, cigarillo/little cigars, large cigars, smokeless tobacco, and nicotine pouches. Multinomial logistic regressions examined associations between each tobacco product and



SRNT 2023 POSTER SESSION 2 • THURSDAY, MARCH 2, 2023, 4:30 PM - 6:00 PM

COVID-19 diagnosis or vaccination, adjusting for sex, race, ethnicity, and asthma status. **Results:** The most commonly used tobacco products were e-cigarettes (19.3%) and blunts (12.5%). Overall, 37.8% reported being diagnosed with COVID-19 in the past year and 76.2% received at least one dose of a COVID-19 vaccine. 10.4% and 6.3% reported being diagnosed with asthma or having an asthma attack in the past year, respectively. After controlling for covariates, lifetime hookah and large cigar use was associated with COVID-19 diagnoses (hookah: aOR=1.62, 95%CI: 1.02-2.55; large cigar: aOR=1.65, 95%CI: 1.05-2.59), whereas lifetime blunt and cigarillos/little cigar use was associated with decreased odds of receiving a COVID-19 vaccine (blunt: aOR=0.66, 95%CI: 0.48-0.90; cigarillo/little cigar: aOR=0.45, 95%CI: 0.24-0.86). Moreover, lifetime e-cigarette use was associated with decreased odds of unsureness of COVID-19 diagnoses (aOR=0.33, 95%CI: 0.14-0.79). **Conclusion:** Different types of tobacco product use was associated with COVID-19 diagnoses and vaccination among CT high school students. Specifically, combustible tobacco product use (e.g., hookah, large cigars) may be linked to COVID-19 infection risks. Future research is needed to further confirm these findings and explore their underlying mechanisms.

FUNDING: Federal; FDACTP

POS2-139

PROSPECTIVE ASSOCIATIONS BETWEEN SOCIAL MEDIA USE, FOLLOWING TOBACCO BRAND ACCOUNTS, AND TOBACCO INITIATION AMONG YOUTH

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Significance: Tobacco-related advertising on social media may alter perceived tobacco use norms and risk perceptions among youth. Prior social media exposure research among youth in the United States has predominately focused on cross-sectional associations or relied on data that preceded the large increase in e-cigarette uptake among youth (before 2016). **Methods:** We examined associations between measures of social media engagement (daily social media use and liking/following tobacco brands) and risk of tobacco initiation at follow-up, using data from Waves 4 and 5 (2016-2018) of the Population Assessment for Tobacco and Health (PATH) study, a nationally representative sample of youth. We used multiple imputation to account for missing data and adjusted for individual and familial confounders (e.g., youth age, youth mental health, and parental smoking). In separate models, the robust Poisson method was used to estimate the adjusted relative risk (aRR) of any tobacco initiation and poly-use (2+ products) initiation at 1-year follow-up. We additionally examined effect modification by age groups (12-14 vs. 15-17) and gender. **Results:** Among PATH youth age 12-17 years at Wave 4 with no prior tobacco use (N=11,534), 69.6% used social media at least daily and 2.2% reported liking/following at least 1 of 21 tobacco brands on social media. At follow-up, 28.2% of youth reported any tobacco initiation—most commonly electronic nicotine products (26.5%), cigarillos (8.9%), and cigarettes (8.8%); 11.5% reported poly-use initiation. Daily social media use (vs. less) was associated with increased risk of any tobacco initiation (aRR=1.51, 95% CI: 1.30, 1.77) and poly-use (aRR=1.34, 95% CI: 1.07, 1.69). Liking/following at least 1 tobacco brand was associated with increased risk of tobacco initiation (aRR=1.32, 95% CI: 1.12, 1.56) and poly-use (aRR=1.44, 95% CI: 1.02, 2.02). When stratifying results by gender, higher magnitude effect estimates were seen among girls (compared to boys). For example, the aRR for liking/following brands and any tobacco initiation was 1.35 (95% CI: 1.06, 1.72) for girls and 1.27 (95% CI: 1.01, 1.59) for boys. Results were overall consistent comparing younger (12-14 years) and older (15-17 years) youth. **Conclusion:** These findings add to a growing evidence-base describing the exposure of adolescents to tobacco-related social media content. Such content—often generated by tobacco companies—may increase the risk of youth engagement and subsequent use.

FUNDING: Federal; FDACTP

POS2-140

THE ASSOCIATION OF ALCOHOL USE AND BINGE DRINKING WITH E-CIGARETTE USE AMONG ADULTS

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Background: There is a well-established link between alcohol consumption and cigarette smoking. Smoking frequency, severity of nicotine dependence, and smoking relapse after a quit attempt are all associated with alcohol consumption. Further, the co-use of cigarettes and alcohol multiplicatively increase cancer risk, underscoring the need to identify other associated risky behaviors, such as e-cigarette use. Although cigarette smoking continues to decline, e-cigarette use has increased in recent years. According to national data, nearly a quarter of adult tobacco users report cigarette and e-cigarette use. However, less is known about the association between alcohol consumption and e-cigarette use. **Method:** A sample of N = 5,428 adults, 18 years and older from Oklahoma (56.7% female, 70.4%, Non-Hispanic White, $M_{age} = 40.30$ years) were recruited via an online research panel and completed a brief web-based survey of demographics; frequency of e-cigarette use, alcohol use, and cigarette use in the past 30 days; and number of drinks consumed per daily drinking episode. Hierarchical linear regression models examined associations of two indices of past 30-day alcohol use (number of days of use and any binge drinking, defined as ≥ 5 drinks) on past 30-day e-cigarette use frequency, controlling for demographics and any past 30-day cigarette smoking (yes/no). **Results:** One fifth (19.6%) of respondents reported any past 30-day e-cigarette use, 34.5% reported any past 30-day cigarette use, 49% reported any past 30-day alcohol use, and 22.6% of drinkers engaged in binge drinking. In linear regression models (controlling for any cigarette use in the past 30 days, race/ethnicity, sex, age, and income) greater frequency of alcohol use in the past 30 days ($B = 0.13, p < .001$) and any binge drinking ($B = 1.49, p < .001$) were both associated with greater frequency of e-cigarette use in the past 30 days. **Conclusion:** Frequency of current alcohol use and any binge drinking were positively associated with current e-cigarette use frequency, above and beyond a variety of other factors, including cigarette smoking, associated with tobacco use. Findings suggest that alcohol use may be uniquely associated with e-cigarette use. Prevention and intervention programs designed to prevent e-cigarette initiation or progression may consider targeting reductions in alcohol use. Associations between alcohol and e-cigarette use with cancer risk behaviors should be examined in more detail.

FUNDING: Federal; State

POS2-141

NICOTINE DEPENDENCE AND FREQUENT USE IN TEXAS: DO MEANINGFUL DIFFERENCES EXIST?

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Significance: Several recent publications have noted disparities in levels of nicotine dependence between dual users of both combustible cigarettes and ENDS, compared to exclusive ENDS users. Fewer studies have provided direct comparisons of nicotine dependence between exclusive ENDS users and exclusive cigarette users. Our objective is to compare nicotine dependence symptoms and frequency of use among exclusive ENDS users and exclusive cigarette users and whether such outcomes differ across sociodemographic factors including race/ethnicity, SES, and sex. **Methods:** The Texas Adolescent and Tobacco Marketing Surveillance System 'TATAMS' is a prospective study that measures tobacco product use behaviors and related sociodemographic constructs among young people in the largest metropolitan centers in Texas. The present study was a cross-sectional, complete case analysis of past 30-day ENDS and/or cigarette users (n=371), among respondents who were 19, 21, and 23 years of age (n=2,341), at Wave 14 (Fall 2021). Differences in symptoms of nicotine dependence (Hooked on Nicotine Checklist; HONC; scores 1-10) and frequency of use (infrequent use (1-19) vs. frequent use (≥ 20) days during the past 30 days) were considered between exclusive users of ENDS or cigarettes, in the past 30 days. Multivariable logistic regression was conducted to assess risk factors for frequent exclusive ENDS or frequent exclusive cigarette use. Risk factors assessed were race/ethnicity (non-Hispanic white vs. non-Hispanic black), sex, cohort, SES, and symptoms of depression. **Results:** At Wave 14, 71 participants were dual users of both ENDS and cigarettes in the past 30 days, 58 were exclusive cigarette users, and 242 were exclusive ENDS users. Past 30-day exclusive ENDS users, compared to exclusive cigarette users, had a greater average number of nicotine dependence symptoms, 3.62 and 2.21, respectively ($Pr(t)>0.002$). Relative to dual users, there was no significant difference in the proportion of exclusive ENDS users or the proportion of exclusive cigarette users who reported frequent use ($p>0.05$). Non-Hispanic blacks, compared to non-Hispanic whites, had 0.32 lower odds of frequent exclusive ENDS use after adjusting for covariates. ($p<0.05$, 95% CI: 0.11-0.96). **Conclusions:** In a young adult sample of a Texas cohort study, nicotine dependence was elevated among exclusive users of ENDS products, relative to exclusive users of cigarettes. Also, odds of frequent use, among exclusive ENDS users, differed by race/ethnicity.

FUNDING: Federal; Other: Research reported in this paper was supported by grant number [R01-CA239097] from the National Cancer Institute.



POS2-142

EXPERIENCES OF NICOTINE USERS MOTIVATED TO QUIT DURING THE COVID-19 PANDEMIC: A SECONDARY QUALITATIVE ANALYSIS

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Objectives: The COVID-19 pandemic has brought to light a variety of key factors that affect nicotine use, including behavioral patterns, social support and connection, and physical and mental health. What we do not know is how those motivated to quit were impacted by the pandemic. As such, understanding the unique experiences and needs of people motivated to quit smoking or vaping during the COVID-19 pandemic is critical. The aim of this study was to examine the cessation experiences of nicotine users during the COVID-19 pandemic. **Methods:** We conducted semi-structured interviews with individuals engaged in cigarette smoking, dual use, or e-cigarette use in British Columbia, Canada. Interview questions explored barriers and facilitators to quitting nicotine use. Relevant data were then drawn from 33 participants out of the primary study's 80-participant sample pool. We used an auto-driven qualitative secondary analysis approach to identify emergent themes and subthemes surrounding pandemic-specific barriers and facilitators to quitting, and unique needs for cessation support in the context of the COVID-19 pandemic. **Results:** Pandemic-specific barriers included lifestyle limitations and poor mental health due to isolation. Facilitators to quitting during the pandemic included reduced access and opportunities to use nicotine products, as well as time for personal reflection on nicotine use behaviors. Suggestions for cessation programming included a primary focus on enhancing social support features (e.g., discussion forums, support groups), followed by increasing awareness of the benefits of quitting, and enhancing visibility of resources available to support quitting. **Conclusions:** The findings identify unique vulnerabilities of nicotine users that were not previously emphasized, and establish the need for cessation supports to incorporate evolving psychosocial and socio-environmental factors, such as new and ongoing preferences for innovative online delivery of services, in an ongoing and post-pandemic context.

FUNDING: State; Nonprofit grant funding

POS2-143

FACTORS ASSOCIATED WITH WATERPIPE SMOKING HARM PERCEPTIONS AMONG YOUNG ADULT USERS

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Background: Although young adults tend to incorrectly view waterpipe (WP) smoking as less harmful than cigarette smoking, limited research has explored predictors of harm perceptions in this group. Graphic warning labels (GWLs) may be leveraged to increase WP-associated harm perceptions. We therefore examined 1) demographic and smoking-related factors associated with WP harm perceptions and 2) changes in harm perceptions after an acute laboratory WP smoking session in the presence of a GWL vs. blank label. **Methods:** Young adult, established WP smokers ($n=92$; mean age 26.2 years; 51% female) were randomized to one of two groups: 1) blank label + GWL or 2) blank label + blank label. In both groups, a label was attached to the WP hose below the mouthpiece. The GWL contained the text "Warning: Hookah smoke contains poisons that can cause mouth and lung cancers" paired with images of a diseased mouth and lungs. Prior to and following each smoking session, participants were asked how much people harmed themselves while smoking WP and how harmful WP is relative to cigarettes. Logistic regression models and chi-square tests were used to examine the participant-level characteristics associated with high absolute harm perceptions (> 6 on a 1-11 scale). Harm perceptions, both absolute and relative to cigarettes, following the second smoking session were compared between the two groups using a chi-square test. **Results:** At baseline (pre-smoking on visit 1), more years of education was associated with higher harm perceptions, although the result was only borderline significant ($p=0.048$). No other demographic variables were significantly associated with harm perceptions at baseline. There was no difference in the percentage of participants with high harm perceptions between groups after smoking in visit 2 (46.3% in blank vs. 46.2% in GWL, $p=0.99$). Harm perceptions relative to cigarettes were not significantly different between groups after the experimental group's one exposure to the GWL ($p=0.64$). **Conclusion:** High harm perceptions were significantly associated with more years of education in our sample. Compared to a blank label, one exposure to a GWL did not significantly change absolute or relative harm perceptions. Future studies

should examine this relationship, including strategies to increase harm perceptions in populations with lower educational attainment, and examine the effect of more frequent exposures to GWLs.

FUNDING: Federal; FDACTP

POS2-144

THE INTERACTION BETWEEN EMPLOYEES' AND LEADERS' CONCERNS ABOUT A TOBACCO-FREE WORKPLACE POLICY IMPLEMENTED AT SUBSTANCE USE TREATMENT CENTERS

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Significance: Tobacco-free workplace policy (TFWP) implementation in substance use treatment centers (SUTCs) is an underused evidence-based intervention to reduce the disproportionately high prevalence of tobacco use among employees and patients. A barrier to TFWP adoption is employees' anticipated concerns about resistance (e.g., complaints) from fellow employees, patients, and/or community stakeholders who could no longer use tobacco products on-site. However, if employees' initial concerns are overestimated relative to those that are actualized following the implementation of a TFWP, this information could be leveraged to allay fears and ultimately increase TFWP adoption in SUTCs. Furthermore, examining these potential discrepancies in the context of leadership concerns may inform future implementation strategies to increase TFWP acceptance. **Methods:** This study examined changes in employee-reported TFWP concerns arising from 3 respective sources (fellow employees, patients, and community members), from before to after TFWP implementation at their SUTC, using Chi-square/Fisher's exact tests. Pre-implementation leadership concerns about policy rollout were examined as moderators in generalized linear mixed models controlling for each center's annual patient census. Overall, 452 employees and 13 leaders provided data from 13 Texas SUTCs that together served $>82,000$ patients annually. **Results:** At both pre- and post-implementation, employees most frequently reported patient-related barriers (28.32% and 27.27%) followed by staff (18.81% and 13.50%) and community concerns (5.97% and 6.06%). Statistical analysis revealed significant decreases from pre- to post-implementation in employee-reported concerns about resistance from fellow employees (from 18.81% to 13.50%). Moreover, significant moderation effect posthoc comparisons indicated that employee-reported concerns about fellow employees and patients each significantly decreased over time ($\sim 10\%$) in SUTCs where leadership endorsed initial implementation concerns ($n=8$), whereas employee-reported patient concerns rose over time ($\sim 17\%$) in SUTCs where leadership had no implementation concerns ($n=5$). **Conclusion:** Results supporting the non-actualization of anticipated employee barriers following TFWP implementation can be used to engage other SUTCs for adoption. More research is needed, but moderation effects may contribute to the field of implementation science by suggesting that initial leadership concerns about TFWP implementation translate to greater attention to rollout, ultimately enhancing employee and patient TFWP acceptance.

FUNDING: Federal; State

POS2-145

REVIEW OF U.S. FDA PMTA APPLICATIONS, MDOS, AND ONLINE MARKETING AND AVAILABILITY OF UNAUTHORIZED ENDS PRODUCTS

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Significance: All Electronic Nicotine Delivery Systems (ENDS) products must be reviewed through the U.S. Food and Drug Administration (FDA) Premarket Tobacco Product Applications (PMTA) pathway before receiving authorization to market in the US. PMTAs are evaluated to consider whether marketing a new tobacco product would be appropriate for the protection of the public health, upon which a granting order is issued. Pending decisions are included on a publicly available PMTA list. Companies selling or distributing ENDS products that do not receive FDA authorization are issued Marketing Denial Orders (MDOs). **Methods:** The study sought to identify and characterize potentially unauthorized marketing and sale of ENDS products by cross-referencing ENDS products listed on company websites with products listed on the PMTA, granting order lists, and companies issued MDOs. These sources were manually reviewed to identify companies



that have received MDOs for specific ENDS products from the FDA and compile a list of potentially unauthorized ENDS products. Content analysis of manufacturer websites was also conducted to assess whether marketing and sale of potentially unauthorized products was occurring. **Results:** 361 companies were on the PMTA and granting order lists. 255 companies were issued MDOs. 245 were on both lists after accounting for irregularities in the recorded spelling of company names. 147 of the companies which received at least one MDO had functional manufacturer websites. Of these, 99 companies publicly advertised individual ENDS products on their website. Based on observations, 39 websites were identified as potentially marketing and selling hundreds of unauthorized products. Other relevant findings include references to FDA regulations (n=23), requests for purchase inquiries to be made over phone or email (n=16), and password protected website or catalog access (n=14). **Conclusion:** Unauthorized ENDS products pose a public health risk as they may be untested, contain harmful ingredients, or target younger populations. This study identified ENDS products that are likely prohibited as they are available on websites of ENDS manufacturers that have received an MDO, and these products were not reported on the FDA PMTA or marketing granting order lists, meaning they are likely not authorized for the US market. Future studies are needed to better characterize the extent of unauthorized product sales following FDA market authorization decision-making.

FUNDING: State; Academic Institution

POS2-146

CAN CIGAR WARNINGS DISCOURAGE BLUNT USE?

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Significance: Many cigar smokers report using cigars to smoke marijuana (i.e., blunts). The goal of this exploratory study was to determine whether cigar warnings discourage blunt use. **Methods:** Participants were 438 US adults who reported past 30-day cigar use and ever blunt use, recruited from a probability-based national panel to take an online survey. In a 2x2 experiment with a between subjects design, we manipulated different cigar warning characteristics: 1) **warning type:** text-only vs. text + image and 2) **warning size:** 30% (smaller) vs. 50% (larger) of the product package. Within their randomly assigned condition, participants then viewed 6 different warnings on a fictitious cigarillo package. The warnings discussed different health risks from smoking cigars that we developed from previous studies (e.g., WARNING: Cigar smoking causes pharyngeal and throat cancer). After participants viewed the 6 cigar warnings on packages, they were asked one item on how the warnings discouraged them from wanting to use cigars to smoke marijuana ("blunt perceived effectiveness"). Response options ranged from "not at all" coded as 1 to "a great deal" coded as 5. We used linear regression models to estimate main effects and an interaction of the experimental manipulations. To probe a significant interaction, we estimated and compared simple effects (i.e., the conditional effect of one of the experimental manipulations at specific levels of the other experimental manipulation). **Results:** We observed no main effects of warning type or size on blunt perceived effectiveness. However, there was a significant interaction between the two experimental manipulations (p=0.009). Whereas adding an image made no difference to the blunt perceived effectiveness of smaller warnings that were 30% of the product package (simple effect: -0.22, p=0.28), it mattered for larger warnings that were 50% of the product package. Specifically, adding images representing the warning health effects led to greater blunt perceived effectiveness of large warnings that were 50% of the product package (simple effect: 0.51, p=0.008). **Conclusions:** This experiment provides preliminary evidence that large, pictorial cigar warnings can potentially discourage blunt use. More research, including longitudinal research measuring behavioral outcomes, is needed to examine the impact of cigar warnings on blunt use.

FUNDING: Federal; FDACTP

Poster Session 3: Rapid Submissions



RAPID SUBMISSIONS: POSTER SESSION 3

POS3-110

PATIENT SATISFACTION SURVEY OF INPATIENT TOBACCO CESSATION TREATMENT

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Significance. While evidenced-based guidelines strongly recommend inpatient tobacco use counseling to all hospitalized patients who use tobacco, little evidence exists about inpatients' satisfaction with counseling, or their tobacco use plans after discharge. **Methods.** Based on a literature review on patient satisfaction with treatment and desired counseling outcomes, we developed a 10-item inpatient tobacco use counseling survey assessment. Construct items included self-reports of respect shown to patients, impact on hospital experience, discussions on nicotine cravings and availability of nicotine replacement therapy (NRT) while hospitalized, desire to reduce or quit tobacco and resource availability post-discharge, and changes in tobacco use post-discharge. A random sample of 239 inpatients admitted from 07/01/2022-09/30/2022 who received inpatient tobacco use treatment by a tobacco treatment specialist were selected for participation in a Likert scale Qualtrics survey, conducted via telephone and email in November, 2022. **Results.** A total of 30% (72) former inpatients participated in the survey. Respondent demographics showed: mean age of 54 (SD 14.7), 56.9% White/Caucasian, 34.7% Black/African American, 50% female, and 24% without insurance. Across multiple facets of satisfaction, a large majority voiced appreciation with and positive outcomes from the consultation service. For instance, 84-96% strongly agreed or agreed that the consultations improved their overall hospital experience; the treatment counselors were respectful; inpatients knew about NRT options when hospitalized, were more prepared to reduce or quit after hospitalization, and were given needed resources. Over half of respondents (56%) said they cut down on their tobacco use after discharge, and 34% said that they had quit. **Conclusions.** Inpatient tobacco cessation treatment with motivational interviewing, offers of pharmacotherapy support, and cessation resources post-hospitalization resulted in high inpatient satisfaction, including overall improved hospital experience. Impacts post-discharge on tobacco use were positive, consistent with evidenced-based approaches. Inpatient tobacco treatment programs appear to impact positively on multiple outcomes important to health system patients, providers and administrators. **Learning Objective.** Examine multiple constructs of satisfaction with inpatient tobacco use counseling.

FUNDING: Academic Institution

POS3-111

WHAT DO WE KNOW ABOUT TOBACCO USE AND MIGRAINE? A REVIEW

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Significance: Tobacco use is associated with a range of health consequences for all people who use tobacco with additional consequences for specific medical conditions (e.g., HIV, cancer). Migraine is one of the most common neurologic diseases and is among the most disabling diseases in the world. Although lifestyle strategies (e.g., sleep, diet) are commonly recommended as part of migraine treatment, strategies related to tobacco (e.g., smoking cessation) are rarely among these recommendations. This review aimed to elucidate what is known about tobacco use and migraine and to identify gaps in the research. **Methods:** A PubMed search was conducted for articles with full texts, that were published in English, and that contained words related to both "tobacco" and "migraine." **Results:** The majority of identified studies examined the prevalence of cigarette smoking among those with migraine and the odds of negative consequences of migraine and smoking (e.g., strokes). There is evidence that those with migraine versus without migraine have a higher prevalence of cigarette use and, conversely, those who smoke are more likely than those who do not smoke to report migraine attacks. Beyond the higher prevalence of smoking, there is also evidence that

smoking may exacerbate migraine-related consequences including further increasing the already elevated risk of stroke among people with migraine. Very few studies have examined other aspects of smoking and migraine though there are some preliminary findings that people with migraine believe that smoking precipitates migraine and increases migraine pain intensity. Self-report data also suggest that people with migraine may be less likely to succeed at smoking cessation than people without migraine. Few studies examined non-cigarette products and no studies were identified that examined smoking and migraine in a controlled laboratory setting or as part of a treatment study. **Conclusions:** The prevalence of smoking is higher among people with migraine and people with migraine believe that smoking makes migraine attacks worse. However, there are significant gaps in our knowledge of smoking and migraine including a lack of controlled studies examining how changes in smoking (e.g., quitting) relate to migraine symptoms. More research is needed to understand the benefits of adding smoking cessation efforts into migraine care and the best way to integrate such treatment (e.g., behavioral and/or psychopharmacological efforts).

FUNDING: Federal

POS3-112

AGE-SPECIFIC DIFFERENCES IN THE CONCURRENT VAPING AND OTHER TOBACCO USE IN PATIENTS FROM THE UNIVERSITY OF MARYLAND MEDICAL SYSTEM.

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Background: Increased use of E-cigarettes and Vaping has re-normalized cigarettes/cigar smoking in youth; and early advertising to older populations of smokers has increased the number of smokers who also vape. There is a need to better understand the use of e-cigarettes and vaping in smokers of all ages. **Methods:** A new E-cigarette/Vaping tool (EVAT) in the Epic EHR has allowed systematic capture of clinical data. From July 2020 to September 2022, we reviewed data on 346,179 unique patients who were screened using the EVAT. **Results:** A total of 346,179 patients were screened using the EVAT during clinical encounters and 21,179 patients were found positive for current or past e-cigarettes use. Among vapers, 5664 (26.7%) patients never used other forms of tobacco, 15,515 (73.3%) were dual users (vaped and used other tobacco). Among 5335 vapers age 10-24 years, 2757 (51.7%) never used other forms of tobacco, and 2578 (48.3%) were dual users. Among 9366 vapers age 25-44 years, 2164 (23.1%) vaped only, and 7202 (76.9%) both vaped and used other tobacco. Among 6478 patients age 45+ years who vaped, 743 (11.5%) only vaped, and 5735 (88.5%) were dual users. **Conclusions:** The likelihood of vaping was higher in younger ages (10-24 y/o) and the likelihood of using other tobacco is higher in 25+ y/o age group. Overall, the number of individuals who vaped and smoked was three times the number who only used vapes. There is a significant proportion of individuals who use vaping and smoke, in populations that are 45 years+. Prevention strategies need to address younger vape users to prevent the additional use of other tobacco; and older vape users who maybe dually exposed due to concurrent vaping and other tobacco use.

FUNDING: Federal

POS3-113

UNDERSTANDING TOBACCO USE & CESSATION AMONG PEOPLE IN HIV-CARE IN CHENNAI, INDIA

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Background: Tobacco use is the leading preventable cause of death and disproportionately impacts people with HIV (PWH). Engagement in HIV care offers an opportunity to intervene. Understanding of diverse tobacco use patterns, health beliefs, and attitudes towards cessation in low- and middle-income countries is needed to inform intervention strategies. **Methods:** This was a prospective, longitudinal study of PWH initiating HIV care in Chennai, India conducted between October 2019 to December 2021. Individual, in-person survey (n=154) in English, Tamil or Telugu was used to measure self-reported and biochemically confirmed (urine cotinine ≥ 50 ng/ml) tobacco use among adults. A subset of participants completed a 3-month telephone follow-up (n=77) to assess longitudinal tobacco use. **Results:** Of 154 adults, 37.7% (n=58) self-reported current tobacco use (13.6% [n=21] smoking, 17.5% [n=27] smokeless tobacco [SLT], 6.5% [n=10] dual smoking and SLT) and 7.8% (n=12) reported former tobacco use (5.8% [n=9] smoking,



1.3% [n=2] SLT, 0.6% [n=1] dual). Among those currently using tobacco, most were male (smoking: 95.2% male; SLT: 74.1%; dual: 90.0%), completed \leq primary school (smoking: 52.3%; SLT: 85.2%; dual: 70.0%), and many reported daily tobacco use (smoking: 52.4%, SLT: 48.1%, dual: 70.0%). Cotinine mean levels varied by tobacco use status. They were highest among those smoking tobacco (smoking: 66.7% had cotinine \geq 50ng/ml, mean detectable level 472.7ng/ml [SD 67.8]; SLT: 70.4% \geq 50ng/ml, mean 363.4ng/ml [SD 189.3]; dual: 80.0% \geq 50ng/ml, mean 462.0ng/ml [SD 107.6], no current tobacco: 44.8% \geq 50ng/ml, mean 221.3 ng/ml, SD 188.0], $p < 0.0001$). Adult PWH using SLT reported less interest in quitting (plan to quit within 30 days: smoking 66.6% vs. SLT 18.5%, $p=0.01$; dual 50.0% vs. SLT, $p=0.02$), fewer prior quit attempts (smoking 57.1% vs. SLT 14.8%, $p=0.03$; dual 40.0% vs. SLT, $p=0.06$), and less belief that tobacco has harmed their health some/a lot (smoking 85.8% vs. SLT 48.1%, $p=0.01$; dual 100% vs. SLT, $p=0.004$). No one currently using tobacco reported use of cessation medications; n=2 reported counseling. In the 3-month follow-up sample (n=77 [smoking: n=8, SLT: n=15, dual: n=6, non-user: n=48]), 37.5% of those smoking at baseline self-reported quitting, 60.0% quit SLT use, and 50% quit dual use. Conclusions: Tobacco use is common and underreported among PWH in Chennai and treatment is underused. Those using smokeless tobacco were less interested in quitting and perceived fewer harms compared to those who smoke and may have different needs for cessation support.

FUNDING: Federal

POS3-114

EXPLORING THE RELATIONSHIP BETWEEN CIGARETTE SMOKING AND OPIOID-RELATED TREATMENT OUTCOMES AMONG SMOKERS WITH OPIOID USE DISORDER ON BUPRENORPHINE

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Significance. Smoking places individuals with opioid use disorder (OUD) at disproportionately high mortality rates; $>50\%$ of people with OUD die from tobacco-related diseases. Smokers with OUD also smoke more cigarettes per day, exhibit more severe nicotine dependence, and experience more severe withdrawal symptoms than smokers from the general adult population, which are known to be partially caused by the pharmacological interactions between opioids and nicotine. **Methods.** The present study uses data from a clinical trial testing the effectiveness of an 8-week computer-assisted cognitive-behavioral therapy combined with recovery coaching versus treatment as usual to improve opioid treatment outcomes among people with OUD (NCT04824404). Thirty-three smokers with OUD on buprenorphine and past 30-day drug use were enrolled in the clinical trial. We collected data related to cigarette smoking (cigarettes per day and nicotine dependence), buprenorphine treatment, and drug use (self-reported and saliva toxicology screens). **Results.** Participants (57% male, age $M=37.4$) were on 20mg of buprenorphine and reported mild opioid withdrawal symptoms ($M=9.4$). Participants smoked on average 11.9 cigarettes per day and had moderate smoking addiction ($M=2.7$) based on the heaviness of smoking index (HIS). Smokers reported having used drugs 12 days during the past 30 days and 46.4% had a positive toxicology test. Cigarette smoking was positively associated with having a saliva toxicology test positive for buprenorphine ($r=.35$, $p=.04$), but not for buprenorphine dose, or illegal drug use (self-reported or saliva toxicology) ($ps>.05$). The number of cigarettes smoked per day did not differ between baseline ($M=12.3$) and at the end ($M=11.5$) of the 8-week intervention ($t=.449$, $p=.33$). **Conclusions.** These results provide additional information on the pharmacological interactions between cigarette smoking and buprenorphine, whereby having a positive toxicology test for buprenorphine is associated with a greater number of cigarettes smoked per day. This study further supports that receiving intensive treatment for OUD does not exacerbate daily cigarette smoking, even among OUD-dependent smokers with current illegal drug use.

FUNDING: State

POS3-115

CAREGIVER EFFORTS TO RESTRICT CHILD ACCESS TO TOBACCO PRODUCTS IN THE HOME AMONG BLACK WOMEN WHO SMOKE AND LIVE IN RURAL, LOW-RESOURCED AREAS

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Significance: Intergenerational smoking patterns are key drivers of lower life expectancy and higher cancer and cardiovascular disease morbidity and mortality in rural vs. urban populations, with greater inequities among rural Black families.¹⁻⁸ Qualitative data show that Black caregivers who smoke and live in rural areas believe that restricting children's access to tobacco could help prevent their children from smoking.⁹ Yet, these caregivers may face barriers that impede efforts to restrict children's access to tobacco in the home. Using the NIMHD Research Framework, this study aimed to identify multilevel factors associated with caregiver restrictions on children's access to tobacco in the home among Black women caregivers who smoke and live in rural, low-resourced areas.

Methods: Data were drawn from the baseline assessment of an environmental tobacco smoke reduction randomized controlled trial that included Black women caregivers who smoked cigarettes/cigarillos and lived in rural, low-resourced Arkansas counties (n=115 (subsample of those with complete data); PI: Fagan; #NCT03476837). Caregivers reported on marital status, financial security, time until first tobacco product (\leq or >5 mins), child factors (child ages, caregiver perceptions about how smoking affects child health), family factors (number of people living in the home who smoke, home smoking ban), and healthcare factors (regular primary care; healthcare provider discussed smoking with caregiver in past year). Caregivers reported on if they restricted children's access to numerous tobacco products in the home (0= tobacco accessible/ 1=tobacco not accessible). Logistic regression was used. **Results:** Almost 68% of caregivers who smoked restricted children's access to all tobacco products in the home. Caregivers with greater risk perceptions about how smoking affects children's health (OR: 2.71, CI: 1.60-4.59) and with a regular primary care provider (OR: 3.95, CI: 1.10-14.26) were more likely to restrict children's access to all tobacco products in the home. **Conclusions:** Most Black women caregivers who smoked and lived in rural, low-resourced areas restricted their children's access to tobacco; yet 32% did not. Multilevel interventions that address caregivers' risk perceptions and access to consistent primary care may support their efforts to prevent their children from smoking. This is critical given the tobacco-related inequities experienced across generations among rural, Black families.

FUNDING: Federal

POS3-116

PATTERNS OF CIGARILLO USE WITH AND WITHOUT MARIJUANA: INSIGHTS FROM A CONVENIENCE SAMPLE OF YOUNG ADULTS

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Significance: Cigarillos are the most popular cigar product sold in the US. National surveillance data show that cigarillo use peaks in young adulthood, with highest rates of initiation among Black young adults (YA). Modification of cigarillos with marijuana is particularly common among YA. Studies that measure cigarillo use are limited. We examine cigarillo patterns of use with marijuana ("modified cigarillos") and without marijuana ("unmodified cigarillos") among YA, with a focus on non-Hispanic Black YA. **Methods:** Data come from a convenience sample of US YA ages 18-24 (N=1,269) recruited through social media. Participants had ever used or were susceptible to use of unmodified or modified cigarillos. We aimed to recruit roughly equal numbers of non-Hispanic white, non-Hispanic Black, and Hispanic current cigarillo users. We calculated frequencies and proportions with 95% confidence intervals for all categorical variables and means with standard errors for all continuous variables. Chi-square tests and two-sample tests of proportions assessed for differences among Black YA compared to the rest of the sample. Use statistics should not be interpreted as population estimates. **Results:** Among this sample, over 75% of YA reported ever use of modified cigarillos while 48% ever used unmodified cigarillos. Among co-users of unmodified and modified cigarillos, most initiated with modified cigarillos. Black YA were significantly more likely to initiate with modified cigarillos (67.4%) compared to the rest of the sample (37.3%). Among current users of modified cigarillos, Black YA were significantly more likely to report smoking 2 or more modified cigarillos per day compared to the rest of the sample (41.8% v. 22.1%). Among modified cigarillo users, 38% had ever used these simultaneously with another tobacco product (43% with an unmodified cigarillo). Black YA were significantly less likely to say that daily use of unmodified and modified cigarillos was harmful and more likely to rate both products as less harmful than cigarettes and nicotine vapes compared to the rest of the sample. **Conclusions:** This research provides important insights about cigarillo use patterns and perceptions among Black YA. These findings should be interpreted in the context of broader socioecological and structural factors to develop solutions to address disparate use among Black YA. [This is not a formal dissemination of information by FDA/CTP and does not represent Agency position or policy].

FUNDING: Federal; FDA/CTP



POS3-117

FACILITATORS AND BARRIERS TO THE PASSAGE OF TOBACCO FLAVOR BANS: A REVIEW OF THE LITERATURE THROUGH A HEALTH EQUITY LENS

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Significance: Increasingly, U.S. states and localities are passing policies to restrict menthol and/or other characterizing flavors in commercial tobacco products ("flavor bans"). Given the disproportionate usage of flavored tobacco among historically marginalized populations, flavor bans have the potential to promote health equity. However, an equitable impact requires an equitable passage across communities. To better inform these efforts, we review the literature concerning potential facilitators and barriers to passing flavor bans across diverse communities. **Methods:** A search was conducted in PubMed to retrieve articles related to tobacco flavor bans (including cigarettes and/or e-cigarettes) in the U.S. To be eligible for this review, studies needed to report the sociodemographic characteristics of their sample and present outcomes disaggregated by historically marginalized groups. **Results:** Our search of the literature identified 14 articles meeting our inclusion criteria (13 quantitative and 1 qualitative). Race and ethnicity were the most common sociodemographic characteristics for which outcomes were presented in disaggregated form. Community support was the most common facilitator examined. Most studies indicated that Non-Hispanic African American respondents and Hispanic respondents were more likely to support flavor bans than Non-Hispanic White respondents; this was particularly true for studies concerning cigarette (rather than e-cigarette) flavor bans. Yet important local barriers were also identified, such as retail clerks encouraging African American smokers to oppose flavor bans and African American smokers not understanding the reasoning behind menthol bans. **Conclusions:** This review synthesizes a diverse literature to identify important patterns, research gaps, and targets for policy advocates. African Americans and Hispanics were more likely to support menthol cigarette bans compared to non-Hispanic Whites, but the results were mixed for e-cigarette flavor ban policies and no differences in support were reported for all tobacco flavor bans. However, the field has almost exclusively focused on race and ethnicity when considering sociodemographic differences in policy support; other historically marginalized groups (e.g., sexual and gender minorities) are also disproportionately impacted by flavored tobacco yet there is limited disaggregated outcome data on these populations.

FUNDING: Federal

POS3-119

"THAT'S NOT MY ENTIRE JOB TO WORK UP THIS PATIENT": A QUALITATIVE EVALUATION OF SMOKING CESSATION CARE COORDINATION IN THE VETERANS HEALTH ADMINISTRATION FOR PATIENTS SEEKING ELECTIVE SURGERY

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Significance: Smoking cessation has increasingly become a mandatory requirement prior to elective surgery in order to reduce the risk of postoperative complications. As little is known about care coordination between primary care clinicians (PCCs) and surgeons to satisfy this requirement, we examined how these clinicians navigated and coordinated smoking cessation services for veterans who use tobacco in preparation for elective surgery. **Methods:** We conducted semi-structured interviews with 10 VA orthopedic surgeons and 21 PCCs, including 11 VA PCCs from two Veteran Integrated Service Networks and 10 non-VA PCCs who provided community-based primary care for veterans. Interviews were transcribed and analyzed with content analysis. **Results:** There was little interaction or coordination between surgeons and PCCs about who would discuss the requirement to quit smoking preoperatively and support patients' cessation efforts. Some surgeons denied consultation referrals if a patient was currently smoking, leaving the PCC to discuss the surgical mandate and address treatment. When surgeons discussed the requirement with patients, their communication focused on how smoking impacted surgical outcomes. Few surgeons reported offering or aiding with smoking cessation. One surgeon explained, "I really think it needs to ... start at the primary care level where they [patients] should all be enrolled in the smoking cessation program." While PCCs reported educating, assessing readiness, offering options, prescribing medication, and setting up follow up appointments and other services (e.g., counseling, behavioralists, support programs), some felt that surgeons

could also play a more significant role in supporting cessation, as exemplified by, "You have a nurse care manager too. You can write for Chantix." Both VA and non-VA PCCs reported satisfaction with the smoking cessation resources available to VA patients. Both surgeons and PCCs reported patient frustration with the clinical workflows to meet this requirement. **Conclusion:** There were no clear guidelines as to who was responsible for ensuring that patients meet smoking cessation requirements before elective surgery, likely from poor communication and misunderstandings between PCCs and surgeons. To improve the veteran's experience and effectiveness of care, interventions are needed to clarify the roles and responsibilities of primary care and surgical teams in delivering preoperative tobacco use treatment.

FUNDING: Federal

POS3-120

REACTIONS TO A LOW NICOTINE PRODUCT STANDARD FOR SMOKED TOBACCO AMONG NEW ZEALANDERS WHO SMOKE: PRELIMINARY FINDINGS FROM ONLINE SURVEYS

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Significance: On 13 December 2022, the New Zealand (NZ) Parliament passed a comprehensive tobacco control bill that includes a provision to drastically reduce nicotine in smoked tobacco as one strategy for achieving its Smokefree Aotearoa/NZ 2025 goal. In October 2022, we began constructing a cohort of New Zealanders who smoke to explore their perceptions of and anticipated responses to the pending nicotine reduction policy. **Methods:** A NZ market research firm identified potential cohort participants. To be eligible for the cohort, panel members answered a brief survey indicating their NZ citizenship or permanent residency, English language proficiency, and current use of smoked tobacco. Those who qualified completed two online surveys containing both quantitative and qualitative questions to establish the cohorts' demographic characteristics, tobacco use behaviors, and policy opinions. **Results:** As of 30 November 2022, 70 people had completed both online surveys, with 23% identifying as indigenous Māori and 2% identifying as Pasifika peoples, groups with relatively higher smoking prevalence than the overall population prevalence (daily smoking in those aged ≥15 years in 2021/22: Māori 19.9%, Pasifika 18.2%, Asian 2.6%, European/Other 7.2%). When asked why the NZ government would implement a nicotine reduction policy, participants reported a variety of reasons including: to reduce addiction (n=23, 33%), to reduce smoking (n=9, 13%), to facilitate cessation (n=8, 11%), for control (n=8, 11%), to improve health (n=6, 9%) or to prevent smoking (n=5, 7%). When asked about potential difficulties resulting from the policy, the most frequently reported concerns were compensatory smoking (n=32, 46%) and increased expenditure on tobacco (n=14, 20%). When asked about their anticipated behavior if the policy was introduced, 69% of participants thought they would smoke the same amount or more, 40% said they would be somewhat or very likely to obtain illicit market cigarettes, and 26% would be somewhat or very likely to grow their own tobacco. **Conclusions:** A concern that a low nicotine product standard will lead to compensation was common despite clinical trials of very low nicotine content cigarettes consistently reporting reductions in smoking. Health messaging about expected behavioral outcomes (e.g. smoking reduction and cessation) will be important prior to policy implementation to alleviate such concerns and to encourage quit attempts.

FUNDING: Federal; FDACTP

POS3-121

"IF YOU JUST TELL ME YOU'RE 18, I'LL STILL SELL TO YOU": A QUALITATIVE STUDY OF UNDERAGE TOBACCO PRODUCT PURCHASING EXPERIENCES IN A TOBACCO 21 COMPLIANCE STUDY

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BACKGROUND: Tens of thousands of underage tobacco purchase attempts are conducted each year for research, compliance, and public health surveillance. However,



little research has qualitatively examined the experiences of underage buyers. We sought to understand underage buyers' experiences and gather recommendations for protocol improvement. **METHODS:** We used semi-structured interviews to assess experiences with underage product purchasing. Participants (N=19, 58% male, 42% white) were data collectors aged 18-20 in New Jersey (n=6), New York (n=6), or North Carolina (n=7) who participated in a Tobacco 21 policy compliance purchasing research study. The interview guide focused on experiences they encountered and how external factors like store type and location, internal factors such as race/ethnicity and gender, and training influenced their experiences. Interviews were conducted in September-November 2022 by a trained research assistant and professionally transcribed. We used thematic coding with deductive and inductive codes in NVivo v.12/PC. **RESULTS:** We identified three overarching themes: (1) non-chain stores (vs. chain) created more unpredictable experiences for buyers with out of ordinary conversations, variability in the process for verifying age, and verbal harassment from store patrons; (2) data collectors' unpredictable experiences varied based upon identity, especially gender; (3) focusing on confidence and colloquial language to request products during training may lead to increased research validity. Buyers recommended a focus on slang for requesting tobacco products, natural language, role plays, practice buys, and strategies for deflecting direct questions about age without seeming adversarial. **DISCUSSION:** There are discrepancies between chain and non-chain stores in their process for requesting ID of underage buyers. Implementation of ID scanners and training on vertical licenses may increase compliance with age of sale policies as well as reduce variability in stores' age verification. Female buyers are more subject to unwanted attention during buys, and future protocols can include gender differences in their training. Having confidence in one's ability to make a purchase attempt after training and use of natural language likely change improve measurement. Future analysis of experiences of underage buyers may strengthen research, compliance protocols, and public health surveillance of underage access to tobacco products.

FUNDING: Federal; Academic Institution

POS3-122

THE ECONOMIC RELATIONSHIP BETWEEN SMOKELESS TOBACCO AND ALCOHOL USE AMONG US YOUTH

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Aims Youth in the US use smokeless tobacco (SLT) and alcohol simultaneously to a high degree. Therefore, we investigate whether US youth consider smokeless tobacco (SLT) and alcohol as economic substitutes or complements using tax and non-tax price measures. **Methods** Alcohol and SLT use among youth reported in the Centers for Disease Control and Prevention's (CDC's) Youth Risk Behavior Survey (YRBS) from 2007-2019 was linked to state-level taxes on moist snuff and beer and state-level beer and SLT minimum pricing laws data. We implemented a logit model to explore the relationship between SLT and alcohol. A multinomial logit model was used to examine the association between user types and pricing policies. **Results** The odds of drinking decreased by 5% with each additional dollar increase in SLT taxes, indicating beer is a complement to SLT. In contrast, the odds of drinking were 49% higher with each additional point increase in the SLT minimum pricing laws strength score, indicating beer is a substitute for SLT. The odds of SLT use increased by 1.7 times with each additional dollar increase in beer taxes, indicating that SLT is a substitute for beer. Beer taxes were significantly associated with all user types. However, SLT taxes were only significantly associated with exclusive SLT users and dual users. **Conclusions** Beer is both a substitute for and a complement to SLT, but SLT is only a substitute for beer. When designing control measures for the use of one substance, policymakers may also need to consider the simultaneous side effect on the other substance. The effectiveness will be magnified if regulatory policies for both substances are in place.

FUNDING: Academic Institution

POS3-123

ASSOCIATIONS BETWEEN COMPREHENSIVE VERSUS LESS RESTRICTIVE TOBACCO-FREE WORKPLACE POLICIES IN BEHAVIORAL HEALTH TREATMENT CENTERS IN TEXAS AND POLICY COMMUNICATION, ENFORCEMENT, AND AWARENESS

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Purpose: Adults with behavioral health needs and their care providers use tobacco at high rates. The presence of tobacco-free workplace policies (TFWP) at behavioral health treatment centers can reduce smoke/vape exposure and engender quit attempts, but they are effective only inasmuch as their presence is known (eg, through signage) and enforced. Without these conditions, TFWPs may be less effective due to non-compliance. Moreover, comprehensive TFWPs that ban tobacco use anywhere on site are more effective than less restrictive TFWPs that allow use on a designated area on the property. While states may mandate TFWPs at the behavioral health treatment centers they financially support, their nature is not prescribed. Adopting less restrictive TFWPs may signal a center's ambivalence about embracing tobacco control, and thus be accompanied by lower likelihood of policy communication, enforcement, and awareness efforts, subverting their potential benefits. Here, we examine this possibility. **Methods:** In Texas, 39 Local Mental Health Authorities (LMHAs) provide non-profit behavioral healthcare statewide. In 2021, employees from 30 LMHAs responded to our survey on their tobacco-related policies and practices. Independent proportion tests were used to determine associations between comprehensive vs less restrictive TFWP status and indicators of policy communication, enforcement, and awareness, using $p < .10$ due to the small sample size. **Results:** Most LMHAs (21) had a comprehensive TFWP. Relative to their counterparts, employees at LMHAs with comprehensive TFWPs were more likely to report clear tobacco-free signage (95.2% vs 71.4%, $p = .078$); consistent TFWP enforcement (95.2% vs 71.4%, $p = .078$); and patient (95.2% vs 71.4%, $p = .078$), contractor (95.2% vs 71.4%, $p = .078$), and visitor (95.2% vs 57.1%, $p = .013$) awareness of their TFWP. **Conclusion:** Behavioral health centers with non-comprehensive TFWPs had weaknesses in communication, enforcement, and awareness; presenting several opportunities by which to improve their effectiveness. State-level mandates for comprehensive TFWPs in all Texas LMHAs could circumvent less restrictive policies that are adopted by potentially ambivalent LMHA leadership. LMHAs with comprehensive TFWPs using best practices in communication, enforcement, and stakeholder awareness can be models for the others. Policy implications include incentivizing the use of best practices to reduce known tobacco-related health inequities in these settings.

FUNDING: Federal; State

POS3-124

THE IMPACT OF PRODUCT CHARACTERISTICS ON THE CONSUMPTION OF CIGARILLOS AMONG YOUNG ADULTS

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Background: The US Food and Drug Administration (FDA) has the authority to regulate the packaging characteristics of cigarillos. However, there is limited evidence on how best to regulate package characteristics of little cigars and cigarillos (LCCs) to advance public health. **Methods:** We conducted a volumetric choice experiment (VCE) among a national sample (N=473) of young adults aged 18-34 who are currently smoking LCCs. The experiment was conducted as a part of the C'RILLOS Project. Respondents reported quantities that they would like to purchase for each of the following brands: White Owl, Dutch Masters, Black & Mild, and Swisher Sweets, in response to LCC packaging features, including flavors, quality descriptors, pack sizes, and prices. We provided different purchase scenarios, including purchasing a product to use alone vs. purchasing a product to use with friends. **Results:** We estimated the impacts of flavors, health claims, sensory descriptors, quality descriptors, pack sizes, and prices on the quantities and brands that LCC users would like to purchase. Increasing prices, restricting menthol/mint and sweet/fruit flavors, removing "Mild" and "Pure tobacco" health claims, and removing "finest" and "premium" descriptors will reduce either LCC



smoking participation, or the number of sticks purchased, or both. Removing sensory descriptors and increasing pack sizes will reduce consumption but also will increase smoking participation, whereas removing "quality" descriptor will reduce smoking participation but will increase consumption. Future studies are needed to quantify the net impacts of these possible regulatory actions. **Relevance to Tobacco Regulatory Sciences:** Study findings will provide data on young adult consumers' cigarillo product purchase behaviors. Study findings may be used to inform the FDA's Center for Tobacco Product's regulatory decisions about cigar product marketing and advertising.

FUNDING: Federal; FDA/CTP

POS3-125

THE ROLE OF WEIGHT CONTROL MOTIVES ON NICOTINE DEPENDENCE AND ORTHOREXIA NERVOSA SYMPTOMS AMONG COLLEGE STUDENTS

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Significance: There is debate about the diagnostic criteria, symptoms, and core traits of Orthorexia Nervosa (ON), a condition characterized by obsessive thoughts and compulsive behaviors around what one considers healthy eating. Even less is known about outcomes related to behavioral vulnerability in this population, including use of tobacco products such as electronic nicotine delivery systems (ENDS). **Methods:** We compared ENDS use between college students who are low-risk and high-risk for ON (as determined by the Orthorexia Nervosa Inventory (ONI)). We hypothesized (1) individuals who are high-risk for ON would report lower rates of ENDS use and lower levels of nicotine dependence than those who are low-risk for ON because of their hyper-fixation on engagement in health-conscious behaviors; and (2) ENDS users who are high-risk for ON would be more likely to endorse weight-centered motives for ENDS use than their low-risk counterparts. Participants were college students ages 18-24 who completed an online survey to earn course extra credit. **Results:** Participants ($N = 796$) were mostly female (79.3%), and 67.4% White/16.1% Black. Three percent of participants had scores of 71 or above on the ONI, placing them at high-risk for ON. Twenty-eight percent of participants endorsed current ENDS use, with E-cigarette Fagerstrom Test for Nicotine Dependence (e-FTND) scores ($M = 3.8$; $SD = 2.3$) indicating low nicotine dependence, and Penn State E-cigarette Dependency Inventory (PS-ECDI) scores ($M = 9.4$; $SD = 4.1$) indicating medium nicotine dependence. Contrary to predictions, high-risk ON individuals had higher levels of nicotine dependence on the e-FTND (p less than .001) and PS-ECDI ($p = .009$) compared to low-risk ON individuals. High-risk ON individuals also had higher weight-centered motives for ENDS on the PS-ECDI ($p = .01$), and weight-centered motives mediated the association between ON and ENDS use (p less than .001). The same pattern was observed with E-cigarette Smoking-related Weight and Eating Episodes Test (E-SWEET) scores. **Conclusions:** These findings indicate the association between ON and ENDS use is consistent with existing literature on body image/weight concern constructs and nicotine use, despite the obsessive thoughts and compulsive tendencies for healthy eating and health-conscious behavior as defining characteristics of ON. Findings also signify that high-risk ON individuals are vulnerable to ENDS use, nicotine addiction, and related adverse health effects.

FUNDING: Academic Institution; Other: Louisiana State University Department of Psychology internal funds to Amy Copeland

POS3-126

CAPSULE CIGARETTE USE IN THE ITC NEW ZEALAND (EASE) 2020-21 SURVEY: WHO IS USING THEM?

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Significance Tobacco companies have introduced crushable capsule cigarettes and filters for roll-your-own cigarettes that release appealing flavours (e.g., menthol) as a design innovation. Capsule cigarettes have been shown to increase the appeal of smoking, particularly among young people and people who smoke occasionally. Smoking prevalence among young people (15-24 yrs) remains high in Aotearoa/New Zealand (A/NZ), with 12.4% current smoking prevalence in 2019/20, but 26.4% among Māori (Indigenous people). **Methods** Data were from Wave 3 of the ITC A/NZ (EASE) study, conducted online from October 2020 to February 2021. Participants were 992 current

smokers (408 Māori and 197 Pacific peoples) of whom 71% were daily smokers. We included recontacted Wave 2 participants and additional participants recruited from an online survey panel, social media advertising and community networks. We oversampled Māori and Pacific peoples and young adults aged 18-24 yrs. We asked participants whether their usual or current cigarette brand had a capsule in the filter that releases a flavour when crushed. Data were weighted to reflect A/NZ's population of current smokers. "Don't know" and "Refused" responses were excluded. **Results** 10.5% (95% CI: 8.5 to 13.0%) of participants reported smoking capsule cigarettes. There was high prevalence of use among non-daily smokers (15.0%, 95% CI: 10.5 to 20.9%), people aged 25-44 yrs (17.6%, 95% CI: 13.8 to 22.3%), males (12.8%, 95% CI: 9.5 to 16.9%), and Māori (12.8%, 95% CI: 9.4 to 17.2%). Use among people aged 18-24 yrs was 9.1% (95% CI: 7.2 to 14.3%). **Conclusion** To achieve goals like Smokefree Aotearoa 2025, it is logical that smoked tobacco products should be regulated to minimise their appeal. The 2021 Smokefree Action plan includes proposals to restrict design features that increase tobacco product appeal, and powers to introduce this measure were included in Smokefree legislation passed by the A/NZ Parliament in December 2022. We found evidence of high use of capsule cigarettes among people who smoke less than daily, and also among Māori. The findings underline the potential importance of prohibiting capsule cigarettes to help reduce smoking uptake, especially among Māori, and hence contribute to achieving the Smokefree 2025 goal equitably for all peoples.

FUNDING: Federal

POS3-127

NATURE AND EXTENT OF COUNTRY-LEVEL POLICIES REGULATING FLAVORS IN ELECTRONIC NICOTINE DELIVERY SYSTEMS

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Significance: The use of flavors in electronic nicotine delivery systems (ENDS) is pervasive. Flavors enhance the appeal and facilitate initiation of the use of these products, including among youth. The current study reports the nature and extent of country-level policies regulating flavors in ENDS. **Methods:** The Institute for Global Tobacco Control's E-cigarette Policy Scan tracks ENDS policies across the globe. The scan, which is updated twice a year, includes 130 countries. In-country contacts provide specific policy information and documents. Policy details were collected through November 2022. Countries with policies regulating flavors in ENDS were identified, and their regulatory approaches were reviewed. **Results:** Of the 130 countries, we identified 8 countries with policies that address flavors in ENDS. Five of the 8 countries ban flavors in ENDS except those specified: (1) Denmark, (2) Estonia, and the (3) Philippines ban flavors except for tobacco and menthol, and (4) New Zealand prohibits retailers from selling flavored vaping products other than tobacco, mint, or menthol; and, (5) Finland bans certain additives and characterizing flavors, as defined as a smell or taste other than one of tobacco in both nicotine-containing and nicotine-free liquids. (6) Canada prohibits the promotion of confectionery, dessert, cannabis, soft drink, and energy drink flavors on the packaging of vaping products (although products can be flavored); and (7) Saudi Arabia prohibits specific flavors namely: cocoa, vanilla, coffee, tea, spices, candy, gum, cola, and alcohol but allows fruit and menthol flavors. (8) Jordan's policy differs in that any flavoring materials used in ENDS must be food grade and permitted in inhalation devices. **Conclusion:** Most countries in our policy scan are not regulating flavors in ENDS. Of the countries that are regulating flavors most restrict ENDS flavors to a limited number of specified flavors. Only one country identified in our scan regulates flavoring materials based on a set standard.

FUNDING: Academic Institution; Nonprofit grant funding

POS3-128

TOBACCO USE AND UPTAKE OF COVID-19 VACCINATIONS IN FINLAND: A GENERAL POPULATION STUDY

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Significance. Smokers are at higher risk of COVID-19 hospitalizations and deaths and might benefit greatly from higher vaccination coverage against COVID-19. Evidence of vaccine hesitancy among smokers is mixed, while studies on vaccine uptake in the general population are lacking. We examined the association between tobacco use and COVID-19 vaccine uptake and between-dose spacing in Finland. **Methods.** We



SRNT 2023 POSTER SESSION 3 • FRIDAY, MARCH 3, 2023, 11:30 AM - 1:00 PM

will use data from 42,935 participants from two nationally representative surveys in Finland (FinSote 2018 and 2020). Survey data was linked to COVID-19 vaccination data derived from the Register of Primary Health Care visits (AvoHILMO). Primary outcome was the uptake of at least two doses of a COVID-19 vaccine. Secondary outcomes were the uptake of one COVID-19 vaccine dose; three COVID-19 vaccine doses; proportion of participants with more than 7 months between first and second dose and between second and third dose. We will examine exposure to tobacco use and smokeless tobacco (snus). We will use Poisson regression models adjusted for sociodemographic confounders. We will carry out mediation analyses of the effect of having a COVID-19 infection. **Results.** Preliminary analyses with FinSote 2020 data (n=28,199) show that current smokers had 25% lower risk of receiving two doses of a COVID-19 vaccine (relative risk 0.85, 95% confidence interval (CI) 0.79; 0.93). Current snus use was associated with a relative risk of 1.05 (95% CI 0.85; 1.29). We did not find evidence of an association between current occasional smoking, former smoking and former snus use with the uptake of two doses of COVID-19. We obtained similar results for the uptake of one COVID-19 vaccine dose. **Conclusions.** Our findings suggest that current smokers have a lower uptake of COVID-19 vaccines. Smokers appear to be a crucial target group of public health efforts to increase COVID-19 vaccinations. **Registration.** ClinicalTrials.gov identifier NCT05479383. **Funding.** The Tobrisk-CoV study is funded by NordForsk (Project No. 105544). **Competing interests.** The authors declare no competing interests.

FUNDING: Nonprofit grant funding

POS3-129

BELIEFS ABOUT NICOTINE, SWITCHING TO NONCOMBUSTIBLES, AND THE POTENTIAL FOR MISPERCEPTION MISCLASSIFICATION

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Introduction: Many Americans believe nicotine is a major cause of cancer. This misperception may reduce intention to switch to noncombustible tobacco products among adult smokers. Those who cannot or do not want to quit nicotine might benefit from reduced toxicant exposure if they completely switch from combustible tobacco to noncombustible products. However, existing questions on national surveys do not assess whether people believe nicotine is a direct carcinogen or whether people believe nicotine indirectly leads to cancer via addiction to a product that contains carcinogens. This qualitative analysis seeks to ascertain if questions about nicotine causing cancer are prone to misclassification and to describe how adult smokers think about the harms of nicotine and the prospect of switching to a noncombustible. **Methods:** An online survey fielded from November 2021-January 2022 of established smokers who believed nicotine causes cancer asked participants if and why they thought nicotine was harmful and why they were or were not interested in switching to a noncombustible product. A combination of inductive and deductive coding was employed, then thematic analysis was conducted. **Results:** Nearly all participants mentioned one or both elements of abuse liability (addiction and toxicity) when discussing nicotine harms. Some participants had an accurate understanding of the indirect pathway by which nicotine causes cancer, but inaccurate beliefs that nicotine was a direct cause of disease was nonetheless more common. Inaccurate harm perceptions were not the only deterrent to switching to noncombustible products, although many participants expressed doubt or confusion about the potential for noncombustibles to be less harmful than cigarettes. Accurate beliefs (e.g. that smoke from cigarettes is very harmful) often cooccurred with inaccurate beliefs (e.g. nicotine is a major direct cause of disease). **Discussion:** Some level of misclassification is likely when asking participants if nicotine causes cancer. Although many smokers demonstrated either accurate relative harm perceptions or accurate nicotine beliefs, very few demonstrated both, indicating a substantial knowledge gap on topics that might influence decisions about continued smoking versus switching to a less harmful product.

FUNDING: Federal; Academic Institution

POS3-130

VISUAL ATTENTION WITHIN CIGARILLO PACKAGING AMONG YOUNG USERS AND NONUSERS

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Introduction: The purpose of this study was to examine visual attention to attributes in cigarillo packaging among adolescents and young adults. **Methods:** Cigarillo users and non-users were recruited to participate in an eye tracking experiment displaying cigarillo product packaging. Eligible participants (age 17-28) were shown a set of 12 cigarillo products with standardized pricing information from popular cigarillo brands. Eye tracking data were captured for the health warning label (one of the 4 of the 7 FDA-approved text-only warnings), pricing information, brand, and flavor. Participants were shown cigarillo packages for a fixed duration of 6 seconds; each unique brand had standardized pricing information (2 for 99 cents) drawn from popular cigarillo brands. Eye tracking data were captured using a SmartEye Aurora to measure visual attention (in milliseconds) to the health warning label (one of the 4 of the 7 FDA-approved text-only warnings), pricing information, brand, and flavor. After viewing the product packages, participants self-reported demographics, recall and responses to the product packaging. **Results:** The study sample (n=36) were 62.9% female, heterosexual (88.6%), 20 or younger (52.8%), and cigarillo non-users (69.44%). On average, participants spent 1.7 seconds of dwell time on the health warning label (27.8% of dwell time), with 1.1 seconds of that time spent at the first fixation; in contrast, pricing information, which was located at the top of the package attracted 0.74 seconds of visual attention (12.4% of the total viewing time.) Only 13.9% of participants correctly identified all four health warnings displayed during the experiment. Most (57.1%) ranked "Cigars are not a safe alternative to cigarettes" as the most effective of the 4 FDA cigar-specific warning messages. **Discussion:** Adolescents and young adult users and non-users paid attention to the health warning messages on cigarillo packages. While correct recall was low, both users and non-users viewed the cigar-specific health warnings. Strategies to attract greater visual attention to cigar health warnings may be necessary to improve recall and inform harm perceptions.

FUNDING: Federal; FDA/CTP; Other: This work was funded by the National Institute for Drug Abuse and the FDA Center for Tobacco Products (CTP) under grant numbers R01DA048529 and R01DA048529-02S1.

POS3-131

CHARACTERIZATION OF TOTAL AND FREE NICOTINE CONTENT IN NICOTINE POUCH PRODUCTS

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Significance: Nicotine pouch products, oral smokeless products that contain nicotine but no tobacco leaf material, have recently entered the U.S. marketplace. Available data indicate sales of these products in the U.S. have increased since 2018. **Methods:** To assay the chemistry of these emerging tobacco products, we analyzed 37 nicotine pouch brands from 6 total manufacturers. Almost all of the products had flavor descriptors (36 of 37), such as mint, licorice, coffee, cinnamon, and fruit. **Results:** Nicotine pouch products varied in pouch content mass, moisture content (1.12 – 47.2%), alkalinity (pH 6.86 – 10.1), and % free nicotine (7.7% – 99.2%). Total nicotine content nicotine ranged from 1.29 – 6.11 mg/pouch; whereas, free nicotine ranged from 0.166 – 6.07 mg/pouch. **Conclusion:** These findings indicate that nicotine and pH levels found in some of these nicotine pouches are similar to conventional tobacco products, such as moist snuff and snus. Although these products likely lack many tobacco-related chemicals, each product analyzed contained nicotine, which is both addictive and can harm human health. Given that nicotine pouches may appeal to a spectrum of users, from novice to experienced users, it is important to include these emerging tobacco products in tobacco control research, policy, and practice. **Disclaimer:** The findings and conclusions in this report are those of the author(s) and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

FUNDING: Federal

POS3-132

PREVALENCE AND CORRELATES OF ELECTRONIC CIGARETTE USE AMONG YOUTH AGED 13-15 YEARS IN THE PHILIPPINES - GLOBAL YOUTH TOBACCO SURVEY, 2019

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Background: Studies show that youth may be more susceptible to electronic cigarette (e-cigarette) use because of their flavor additives and positive social acceptance. Most e-cigarettes contain nicotine. Nicotine is highly addictive and can harm which poses risks to brain development. The present study examines the prevalence and correlates of e-cigarette use among youth aged 13-15 years in Philippines in 2019. **Methods:** Our study used data from the 2019 Philippines Global Youth Tobacco Survey (GYTS). The analytic sample includes 6,670 youth. We calculated unadjusted prevalence estimates and 95% confidence intervals (CI) for current use (i.e., past 30-days), ever use, and ever heard of e-cigarettes. We used multiple logistic regression models, controlling for sociodemographic covariates, to examine correlates associated with current use, ever use, and ever heard of e-cigarettes. Adjusted odds ratio (aOR) and 95% CI were reported. The correlates assessed included age, sex, grade level, school type (public/private), money spent on self, region, secondhand smoke exposure at home, and secondhand smoke exposure at school or other public places. **Results:** Among students aged 13-15 in the Philippines, the prevalence for current e-cigarette use was 14.0% (95% CI = 12.4%, 15.8%), ever use of e-cigarettes was 24.6% (95% CI = 11.4%, 27.0%), and 75.6% (95% CI = 73.0%, 77.9%) of youth ever heard of e-cigarettes. Girls had lower odds of current (aOR = 0.24, 95% CI = 0.14, 0.41) and ever (aOR = 0.25; 95% CI = 0.14, 0.45) e-cigarette use. **Conclusion:** The findings indicated that approximately 1 in 7 and 1 in 4 youth in the Philippines report currently and ever using e-cigarettes, respectively. This study highlights the importance of reduction and prevention of e-cigarette use among school-aged youth. **Funding:** None **Keywords:** E-cigarettes, Prevalence, Youth, Global Youth Tobacco Survey, Philippines **Disclaimer:** The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the CDC.

FUNDING: Federal

POS3-133

SOCIAL & FAMILY INFLUENCES ON E-CIGARETTE & CIGARETTE USE AMONG MEXICAN ADOLESCENTS DURING COVID-19 PANDEMIC

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Significance: Little is known about the correlates of cigarette and e-cigarette use among adolescents during COVID-19, including the role of the social environment and violence. We studied this issue among Mexican middle and high school students. **Methods:** Data come from a Sept-Dec 2021 online survey of 3,046 students aged 12 to 19 in the state of Jalisco, México. Report of ever and past 30-day use of cigarettes and e-cigarettes were used to derive outcomes for each product: never user (reference), non-current ever user, and current user. In separate multinomial logistic regression models for each product, use categories were regressed on experience of victimization by violence in the prior year (physical, psychological, sexual, and digital media), cigarette and e-cigarettes use among family and friends, family structure, the Family Affluence Scale (FAS), and parental rules about using videogames and the Internet, adjusted for sociodemographics. **Results:** In our sample, 9.2% were non-current ever users of cigarettes, 3.8% were current cigarette users, 9.1% were non-current ever users of e-cigarettes, and 8.5% were current e-cigarette users. Non-current ever use of cigarettes was correlated with having at least one friend who smokes (aRRR=2.63; CI=1.9-3.6), experience of digital media violence (aRRR=2.22; CI=1.5-3.2), and higher FAS (aRRR=0.51; CI=0.3-0.8). Current cigarette use was correlated with having at least one friend who smokes (aRRR=5.50; CI=3.3-9.2) and having experienced physical or sexual violence (aRRR=2.32; CI=1.4-4.0 & aRRR=2.69; CI=1.4-5.2, respectively). Correlates of non-current ever use of e-cigarettes included living in a single-parent household (aRRR=1.48; CI=1.1-2.1), having at least one friend or family member who use e-cigarettes (aRRR=4.83; CI=3.6-6.5 & aRRR=2.93; CI=2.0-4.4, respectively), higher FAS (aRRR=2.70; CI=1.8-4.1), stricter parental rules (aRRR=0.52; CI=0.4-0.8) and having experienced psychological violence (aRRR=1.45; CI=1.0-2.0). Similarly, correlates of current e-cigarette use were living in a single-parent household (aRRR=1.59; CI=1.1-2.3), having at least one friend or family member who uses e-cigarettes (aRRR=10.65; CI=7.4-15.3 & aRRR=3.50; CI=2.3-5.3, respectively) and higher FAS (aRRR=2.49; CI=1.6-4.0). **Conclusions:** Social contexts, including victimization by different types of violence, were associated with both cigarette and e-cigarette use, which may be key to proposing new strategies for tobacco prevention.

FUNDING: Federal; State; Academic Institution

POS3-134

DEMOGRAPHIC DIFFERENCES IN EXPOSURE TO TOBACCO-RELATED CONTENT ON SOCIAL MEDIA AND E-CIGARETTE USE AMONG ADOLESCENTS: A CROSS-SECTIONAL SURVEY ANALYSIS

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Background: Exposure to tobacco-related social media posts is a known predictor of adolescent e-cigarette use, but demographic differences in this association have not been extensively studied. The present study measured differences by assigned sex at birth and sexual identity in frequency of exposure to tobacco and nicotine-related content on TikTok, Instagram and YouTube, as well as associations with e-cigarette use among adolescents in Los Angeles, California. **Methods:** Data for this study were collected from cross-sectional surveys administered to socioeconomically- and racially-diverse high school students in January-June 2022 (N=5,802). Pearson's chi-square tests and multivariate logistic regression models with fixed effects and clustered standard errors were used to examine associations of sex and sexual identity with frequency of exposure to nicotine/tobacco-related content on social media and lifetime (ever) and current (past 30-days) e-cigarette use. **Results:** Compared to males, females were more likely to report using TikTok and Instagram several times per day, but less likely to report using YouTube. Males were less likely to report seeing nicotine/tobacco posts on TikTok at least weekly compared to monthly or less frequently (adjusted odds ratio [AOR] = 0.77; CI: 0.67;0.94), but more likely to report seeing nicotine/tobacco posts on YouTube at least weekly (AOR = 1.27; CI: 1.02;1.44). Compared to their heterosexual counterparts, sexual minority adolescents were less likely to report seeing nicotine/tobacco posts on YouTube (AOR = 0.77; CI: 0.64;0.93) and Instagram (AOR = 0.72; CI: 0.55;0.91) at least weekly. Seeing nicotine/tobacco posts on TikTok at least weekly was associated with e-cigarette ever-use among females (AOR = 1.65; CI: 1.10;2.25), and with e-cigarette ever-use (AOR = 1.78; CI: 1.30;2.42) and past 30-day use (AOR = 2.09; CI: 1.22;3.58) among heterosexuals, but not among male and sexual minority students. **Conclusions:** Compared to males, females reported more frequent exposure to tobacco/nicotine content on TikTok, but less frequent on YouTube. Sexual minorities reported less frequent exposure to tobacco/nicotine content on YouTube and Instagram than heterosexuals. Frequent exposure to nicotine/tobacco posts on TikTok was associated with e-cigarette use among both female and heterosexual students. Future research should continue exploring the effects of tobacco product social media marketing on adolescent tobacco use patterns.

FUNDING: Federal; FDACTP

POS3-135

PERCEPTIONS OF HEALTH WARNING MESSAGES TARGETING WOMEN AND PREGNANCY

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Introduction: While women smoke at lower rates than men, persistence of smoking prior and during pregnancy and infancy remains a public health concern. Despite the unique risks of smoking during pregnancy, few messages have been evaluated on female smokers to identify which messages are perceived as most effective. The purpose of this study was to measure perceptions of gain- and loss-framed health warning messages targeting women of reproductive age among a sample of Australian female smokers. **Methods:** A sample (n=142) of Australian women of reproductive age (18-44) who currently smoke cigarettes were recruited using an online panel (Qualtrics.com). Participants were shown a set of four health warning message themes featuring women on talking to their doctor about smoking cessation, the body repairing itself after cessation, secondhand smoke exposure for children, and smoking during pregnancy; each theme included a gain- and loss-framed message paired with imagery. After viewing each message/image, participants were asked for each message if it was believable, convincing, "put thoughts into their mind to quit," "would help my friends quit," and helped "feel more confident about quitting," rated on a 6-point scale of strongly agree to strongly disagree. **Results:** Among the study sample (n=142), 65.5% were 18-35 years of age, and half (49.6%) had at least one child living at home, with 12.0% were currently pregnant. Most (64.1%) smoked cigarettes every day, and 26.8% planned to quit in the next month. Overall, Australian female smokers rated the loss-framed messages significantly more believable (t=-10.7, p<0.01) and helped them feel confident in quitting (t=-7.44, p<0.01) compared to the gain-framed messages. The highest rated messages: "Smoking hurts unborn babies", "quitting smoking protects unborn babies," and "talk to your doctor about quitting smoking or you are less likely to quit for good." **Discussion:** Loss framed messages were rated as more positively compared to gain-framed messages among Australia female smokers. Pregnancy-specific messages about smoking and unborn babies were the highest rated overall messages, followed



by a message regarding encouraging talking to a doctor about cessation. Testing health messages that are effective in reaching and motivating cessation behaviors are important, especially during the high-risk period of pregnancy.

FUNDING: Other: Australian Fulbright Commission

POS3-136

REASONS FOR E-CIGARETTE USE BY RACE AND ETHNICITY IN ADULTS FROM CALIFORNIA: THE MODERATING ROLE OF YEARS LIVED IN THE U.S.

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Significance: The increased use of e-cigarettes warrants further investigation as to U.S. adults' reasons for use, as well as examining these reasons by race/ethnicity. While studies have evaluated how length of stay in the U.S. has influenced combustible cigarette use, there is little data evaluating whether this phenomenon is also seen in e-cigarette use. Our study examines 1) whether reasons for e-cigarette use vary by race/ethnicity, and 2) whether years lived in the U.S. moderates the relationship between race/ethnicity and reasons for e-cigarette use. **Methods:** We analyzed data from the 2020 California Health Interview Survey collected between September 2019 and November 2020. The 12 outcomes, reasons for e-cigarette use, included to *cut down smoking, because they are less expensive, to reduce stress, anxiety or pain*, and others. Independent multivariable logistic regressions examined the association between race/ethnicity and each reason for e-cigarette use controlling for age, gender, smoking, general health, education, poverty, marital status, and years lived in the U.S. Interactions between race/ethnicity and years lived in the U.S. were included to test for moderation in each model. **Results:** Among N=2,512 adults in the study, Hispanic individuals had increased odds of using e-cigarettes out of curiosity (aOR: 1.65, CI: 1.20, 2.27), decreased odds of using e-cigarettes to replace smoking (aOR: 0.69, CI: 0.50, 0.96), using e-cigarettes because they are less expensive (aOR: 0.19, CI: 0.07, 0.51), or using e-cigarettes to reduce stress, anxiety or pain (aOR: 0.65, CI: 0.44, 0.97) relative to White non-Hispanic individuals. Relative to White non-Hispanics, African American/Black individuals had increased odds of using e-cigarettes to quit smoking (aOR: 4.01, CI: 1.23, 13.09), and Asian and other race individuals did not have increased nor decreased odds of any reason for e-cigarette use. There was a significant interaction between race/ethnicity and years lived in the U.S. for the following reasons for e-cigarette use: to quit smoking ($p=0.03$), because they come in many flavors ($p<0.001$), and for enjoyment or social reasons ($p<0.001$). **Conclusion:** The differences in reasons for e-cigarette use by race/ethnicity have implications for product-switching behaviors within racial/ethnic populations, particularly within the Hispanic and African American/Black populations. Differences in years lived in the U.S. and race-specific reasons for e-cigarette use should be considered in race-specific tailored prevention and treatment programs for e-cigarette use.

POS3-137

PATTERNS OF PREMIUM AND NONPREMIUM CIGAR USE IN THE UNITED STATES: FINDINGS FROM WAVE 6 (2021) OF THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY

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Introduction. Understanding the characteristics of premium cigar (PC) use patterns is essential to minimizing public health harms. Typically, PCs are hand-made, larger, more expensive, and without the characterizing flavors that are present in other cigar types: nonpremium traditional cigars, cigarillos, and filtered cigars. **Aims/Methods.** Self-reported brand and price data were used from Wave 6 of the Population Assessment of

Tobacco and Health (PATH) Study to define and estimate premium vs. nonpremium cigar use among U.S. adults, as well as explore cigar smoking patterns, purchasing behavior, and reasons for use by cigar type. **Results.** In 2021, 0.9% (95%CI: 0.7-1.0) of adults were PC users, compared to 0.4% nonpremium traditional cigar users (95%CI: 0.3-0.5), 1.1% cigarillo users (95%CI: 1.0-1.2), and 0.6% filtered cigar users (95%CI: 0.5-0.7). PC users were overwhelmingly male (97.7%), and 35.8% were aged 55+. The average PC price/stick was \$8.67, \$5.50-7 more than other cigar types. Compared to other cigar types, significantly fewer PC users had a regular brand with a flavor other than tobacco (~15% vs. 38-53%). Though flavors remained the top reason for PC use, they were less likely to endorse flavors as a reason for use than other cigar users (~40% vs. 68-74%). PC users had lower prevalence (aRR: 0.37, 95%CI: 0.25-0.55) of dual use of cigars and cigarettes. **Conclusions/Implications.** Although <1% of U.S. adults use PCs, their use and purchasing characteristics continue to differ from other cigar types, highlighting the importance of capturing data specific to PC use.

FUNDING: Federal; FDACTP

POS3-138

PAIN AND MENTHOL USE ARE RELATED TO GREATER NICOTINE DEPENDENCE AMONG BLACK ADULTS WHO SMOKE CIGARETTES AT WAVE 5 (2018-2019) OF THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY

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Significance: Burdens related to pain, smoking/nicotine dependence, and pain-smoking comorbidity disproportionately impact Black Americans, and menthol cigarette use is overrepresented among Black adults who smoke cigarettes. Menthol may increase nicotine exposure, potentially conferring enhanced acute analgesia and driving greater dependence. Although pain has been implicated in the onset and maintenance of nicotine addiction (LaRowe & Ditte, 2020), we are not aware of prior work that has examined associations between pain, menthol cigarette use, and nicotine dependence. Given well documented health disparities, there is also particular need to examine pain and menthol smoking in relation to nicotine dependence among Black adults who smoke cigarettes. **Method:** The current study utilized data from Black adults who were current cigarette smokers ($n = 1,370$) at Wave 5 (2018-2019) of the Population Assessment of Tobacco and Health Study. Nicotine dependence was assessed using a modified version of the Wisconsin Inventory of Smoking Dependence Motives for the PATH Study. All models controlled for relevant sociodemographic factors and utilized population weights. **Results:** ANCOVA revealed that moderate/severe pain (vs. no/low pain) was associated with greater overall nicotine dependence ($p < .001$), and greater negative reinforcement, cognitive enhancement, and affiliative attachment smoking motives ($ps < .001$). Menthol smokers with moderate/severe pain also endorsed greater cigarette craving and tolerance, compared to non-menthol smokers with no/low pain ($ps < .05$). **Conclusion:** These findings support the notion that among Black individuals who smoke cigarettes, the presence of moderate/severe pain (vs. no/low pain) and menthol use may engender greater physical indices of nicotine dependence. Compared to no/low pain, moderate/severe pain was associated with greater emotional attachment to smoking and greater proclivity to smoke for reducing negative affect and enhancing cognitive function. Clinical implications include the need to address the role of pain and menthol cigarette use in the assessment and treatment of nicotine dependence, particularly among Black adults. These data may help to inform evolving tobacco control policies aimed at regulating or banning menthol tobacco additives.

FUNDING: Federal

POS3-139

CHANGES IN AND PATTERNS OF EXCLUSIVE E-CIGARETTE AND DUAL TOBACCO USE AMONG US YOUNG ADULTS, 2014-2015 AND 2018-2019

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Introduction: The ages 18-24 years is a critical period in which young adults may initiate and/or maintain patterns of ENDS use. Considering that the number and type of ENDS products have continued to increase, patterns of ENDS use among this population



have not been well-characterized in the literature. **Methods:** Using the Tobacco Use Supplement to the Current Population Survey, we compared prevalence differences in ENDS use (current, exclusive, or dual) from 2014-2015 to 2018-2019 among young adults ages 18-20 and 21-24 years. In addition, using data from 2018-2019, we examined ENDS use patterns by different sociodemographic and ENDS use characteristics. We used T-tests to determine significant differences between exclusive and dual users, as well as differences between estimates for 2014-2015 and 2018-2019. **Results:** The analyses included 28,658 young adults ages 18-24 years in 2014-2015 and 33,516 in 2018-2019. Among U.S. young adults ages 18-24 years in 2018-2019, 3.3% used ENDS exclusively and 0.8% used both ENDS and cigarettes. Additionally, among all current ENDS users, 13.9% used mint/menthol flavors, 48.2% used characterizing flavors, such as clove, spice, herb, fruit, alcohol, candy, sweets, or chocolate, and 28.5% used more than one flavor type. Among those who used ENDS exclusively and have smoked 100 cigarettes or more, 81.5% stated the reason for use of ENDS was to help quit smoking cigarettes, and 42.7% reported using ENDS where smoking is prohibited. Current ENDS use statistically significantly increased from 2014-2015 to 2018-2019 for those ages 18-20 years (2.5 percentage points) and 21-24 years (1.4 percentage points). Exclusive ENDS use increased among former cigarette smokers for both age groups (18-20 years: 14.1% to 31.6% for an increase of 17.5 percentage points; 21-24 years: 9.9% to 21.7% for an increase of 11.8 percentage points). Flavored ENDS use also statistically significantly increased by 15.2 percentage points among young adults 21-24 years in the same time periods. **Conclusion:** Among young adults (ages 18-24 years), the prevalence of exclusive ENDS use increased from 2014/2015 to 2018/2019, overall and among former smokers. More young adult ENDS users reported exclusively using ENDS than dual use with cigarettes in 2018/2019. Understanding young adult ENDS use patterns is important for informing tailored tobacco use prevention strategies and interventions.

FUNDING: FDACTP

POS3-140

RELATIONSHIPS BETWEEN POTENTIAL PSYCHOSOCIAL STRESSORS AND INFLAMMATORY BIOMARKERS IN AFRICAN-AMERICAN AND WHITE PERSONS WHO SMOKE

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Background: Inflammation and oxidative stress are key mechanisms in the pathogenesis of diseases caused by exposure to toxicants and carcinogens in cigarette smoke. Psychosocial stress can also contribute to physiological inflammation, potentially impacting inter-individual susceptibility to smoking-induced diseases. We investigated the relationship between proxy indicators of psychosocial stress (sociodemographics, education, income, marital status, etc.) and inflammatory biomarkers (C-reactive protein [CRP], oral cell mitochondrial DNA [mtDNA]) in smoking individuals. **Methods:** Analyses were conducted using available questionnaires and biomarker data on African American (AA n=78) and White (WH n=74) participants from a prior study investigating tobacco carcinogen exposures and metabolism in lung cancer risk from smoking. **Results:** Univariate analysis exploring the relationship between biomarkers and important predictors showed that biological sex (male), age, and BMI (kg/m²) was associated with levels of CRP (p=0.04, p=0.04, p<0.01, respectively). CRP levels and mtDNA content were not associated with smoking dose predictors such as cigarettes per day (CPD), nicotine intake (TNE), and years of smoking. Given the highly skewed distribution of the data, natural log mtDNA and CRP was used for regression analyses. When adjusting for important predictors (biological sex, age, and BMI [kg/m²]), CRP levels were associated with current employment status. Those who were currently employed part-time had about 0.3 times higher CRP levels compared to others (p=0.03). There was no apparent relationship between other potential psychosocial stressors and CRP. Our results showed that levels of mtDNA content were significantly associated with race (p<0.01), and this difference remained significant even after adjusting for age, sex, CPD, and TNE (p<0.01). Marital status was also associated with mtDNA content; separated individuals had 0.5 times higher levels of mtDNA when compared to other groups (married, never married, divorced, and widowed), (p=0.05). After adjusting for age, sex, CPD, and TNE, separated individuals still had higher mtDNA content compared to other marital statuses (p=0.05). **Conclusion:** Our results indicate that potential psychosocial stressors could contribute to the observed levels of CRP and mtDNA content in this cohort. The complex interaction between biological, behavioral, and psychosocial factors and their mechanistic contribution to the observed tobacco-associated health disparities should be further investigated.

FUNDING: Academic Institution

POS3-141

FLAVOR CAPSULE CIGARETTE USE, FINDINGS IN A MOBILE CESSATION INTERVENTION

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Background: Flavor capsule cigarettes (FCC) include capsules in the filter that smokers can crush to flavor cigarette smoke. The market share for this product is rapidly growing, particularly in Mexico, but little is known about FCC are used in the context of a mobile cessation intervention (mCessation). We determined FCC use among adult smokers participating in mCessation in Mexico. **Methods:** A mCessation was implemented in 2021. 100 Mexican smokers participated in the program with 12-weeks of duration and pre-post evaluation. Information about smoking patterns, Severity of Dependence Scale (SDS), physical activity, and characteristics of FCC variety were collected. The cut-off point of abstinence 7 days (biochemically verified by cotinine urine). Chi-square test and T-test were used for test differences. Separated logistic regression models were used to evaluate first sociodemographic and smoking-related factors associated with FCC use and its association between abstinence and FCC use, controlled by covariates. **Results:** Among participants, 36% preferred FCC, of them 23% used one capsule variety, and 13% two or more capsules. Favorite flavors included menthol-mint flavor as the most mentioned (75% menthol-mint alone; 13.9% menthol/mint plus another flavor). Age ranged from 28-67 years old (mean 43.9), 69.4% were female and 86.1% had at least a college education, 88.9% were daily smokers, 72.2% smoked 10 or fewer cigarettes per day (CPD). 22.2% of the participants reported regular physical activity and 8.42 points on average of SDS (ranged 3-15 points). Bivariate associations pointed out that being engaged in physical activity, SDS and CPD were associated with FCC use, and p-values statistically significant. Females were more likely than males to use FCC (AOR=3.41; IC95%=1.28-9.07). As age increased decreased the likelihood to prefer FCC (AOR=0.96; IC95%=0.92-0.99). No associations were found between abstinence and FCC use. **Conclusion:** Flavor capsules appear to continue capturing market share in Mexico even among smokers who are trying to quit, however, having used FCC during mobile intervention did not observe an association with abstinence. Patterns of use of FCC among smokers who are intending to quit may explain why tobacco control policies have not had the expected effects

FUNDING: Federal

POS3-142

DAYTIME TOBACCO USE AS A ROBUST PREDICTOR OF SUBSTANCE USE OUTCOMES

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Significance: Time to first morning cigarette has been linked to nicotine dependence, cotinine levels, and smoking cessation. Research on e-cigarettes has started to parallel these findings. This study extends that work by examining daytime tobacco use as a predictor of substance use-related outcomes in a study of college students. **Methods:** Participants (n=341) completed a baseline survey and two 28-day bursts comprising five daily surveys. A person-level indicator for ever using tobacco in the daytime (before 4PM) was computed. We fit linear models regressing subjective cigarette and e-cigarette addiction, Alcohol Use Disorder Identification Test (AUDIT) scores, and Cannabis Use Disorder Identification Test-Revised (CUDIT-R) scores onto this ever-daytime tobacco use variable controlling for any tobacco use (reported in the daily surveys), and quantity of alcohol and cannabis use (indexed as average drinks per study day and cannabis uses per study day, respectively). **Results:** Daytime tobacco use was uniquely associated with subjective cigarette and e-cigarette addiction and CUDIT-R scores but not AUDIT scores when controlling for any-tobacco use and alcohol and cannabis quantity. **Conclusion:** Daytime tobacco use is a robust predictor of substance use outcomes, even when accounting for any tobacco use and the use of alcohol and cannabis. Daytime tobacco use may be an efficient and effective screening tool to identify college students at risk for substance-related problems.

FUNDING: Federal



POS3-143

HEATED TOBACCO PRODUCT USE AMONG PEOPLE WHO SMOKE AND RECENT QUITTERS IN AOTEAROA/NEW ZEALAND: FINDINGS FROM THE ITC NZ (EASE) 2020-21 SURVEY

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Significance Aotearoa/New Zealand (A/NZ) has a smokefree goal to reduce smoking prevalence to <5% by 2025. Daily smoking prevalence is 8%, but higher among Māori (20%) (the Indigenous population) and Pacific peoples (18%). Heated tobacco products (HTPs) may help reduce smoking by providing a (possibly) less harmful alternative among people who smoke who don't want to or can't quit using nicotine products completely. We report HTP use among people in A/NZ who smoke or who have recently quit smoking. **Methods** Data were from Wave 3 of the ITC A/NZ (EASE) study, conducted online from October 2020 to February 2021. There were 1,230 participants (700 daily smokers, 292 less than daily smokers and 238 recent quitters) of whom 492 were Māori and 238 were Pacific peoples. We included recontacted Wave 2 participants and additional participants recruited from an online survey panel, social media advertising and community networks. We oversampled Māori and Pacific peoples and young adults aged 18-24. We asked participants whether they had tried HTPs and were currently using an HTP at least monthly or daily. Data were weighted to reflect A/NZ's population of current smokers and those who have recently quit smoking cigarettes. "Don't know" and "Refused" responses were excluded. **Results** 10.2% (95% CI: 8.1-12.7%) of people who currently smoke reported current HTP use (4.6% daily), and another 5.6% reported they had tried HTPs in the past. Current HTP use differed by sex (5.5% in females and 14.2% in males) and age (4.8% among people aged 18-24yrs, 17.0% among people aged 25-44, and 4.9% among people aged ≥45). Current use did not vary greatly by ethnicity (Māori, Pacific, or non-Māori/non-Pacific). History of trying HTPs was broadly similar by sex, age and ethnicity. Only 1.7% (95% CI: 0.6-4.3%) of recent quitters currently used HTPs (0.6% daily). A further 2.4% reported trying HTPs in the past. Current and prior HTP use did not differ greatly by sex, age, or ethnicity among recent quitters. **Conclusion** We found relatively low HTP use in current smokers and recent quitters, especially compared to vape/e-cigarette (EC) use (HTP vs EC daily use 4.6% vs 24.8% in current smokers and 0.6% vs 33.4% in recent quitters). The results suggest that HTPs are playing only a minor role as alternative nicotine products among people who smoke and in helping people to quit smoking in A/NZ.

FUNDING: Federal; State

POS3-144

ARE MY PRODUCTS REAL?: A PILOT INVESTIGATION OF ADULTERATED PUFF BAR PRODUCTS

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Significance: Since their introduction e-cigarettes have evolved rapidly. This speed of change has led to previously unknown brands quickly becoming popular for a short period of time and then fade as consumers switch to another emerging brand. This trend has led to unintended consequences such as the rise of concurrently sold imitation products ("knock-offs") that are often hard to differentiate from the original. According to claims by a distributor of Puff Bar e-cigarette brand, "fake" products now account for 70% of all "Puff Bar" sales in the US. This study aimed to determine the chemical differences between original Puff Bar products compared to their adulterated versions. **Methods:** Original (n=9) and "fake" (n=9) 5% nicotine Puff Bar devices were purchased in three flavors: Mango, Cool Mint and Grape in Roanoke, Virginia. Extracted e-liquid from each device was analyzed for difference in; pH, density, nicotine concentration, PG/VG ratios, as well as flavoring additives. Each chemical characteristic was compared pairwise between the original and "fake" Puff Bars using Wilcoxon non-parametric t-tests. **Results:** On average no significance differences were found between original and "fake" Puff Bar; pH (4.7±0.1 vs 5.1±0.2), density (1.1±0.1 vs 1.1±0.1), PG:VG ratio (60:40 for both), nicotine concentration (42.7 ± 0.3 vs 32.5±18.0 mg/ml) and number of flavor chemicals (18±5 vs 15±4). However, when comparing nicotine concentration between original and "fake" Puff Bar in mango flavor, we observed a large difference of 42.6 vs 11.7mg/ml. Both original and "fake" Puff Bar contain WS-23, a synthetic

cooling agent in all products and nicotine salt with benzoic acid in all products except the 11.7mg/ml "fake" mango. Between flavors, a similar flavor profile was observed between the original and "fake" Puff Bars. **Conclusions:** Preliminary results suggest that the original vs "fake" Puff Bar devices share many chemical similarities. However, variation in nicotine concentration in one product shows that product consistency is lacking in the adulterated products. Future studies that determine the concentration of flavor chemicals in each product, examine the physical differences of the device (e.g., voltage and coil resistance), along with verifying nicotine delivery profiles may uncover differences between original and adulterated products.

FUNDING: Federal; FDACTP

POS3-145

THE E-CIGARETTE DECISIONAL BALANCE SCALE IS ASSOCIATED WITH E-CIGARETTE USE AND FUTURE INTENTIONS IN A YOUNG ADULT SAMPLE

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The high prevalence of e-cigarette (e-cig) use among young people is of great public health significance. Understanding motivations for e-cig use/vaping may inform prevention and intervention efforts. Decisional balance is a motivational framework that assesses the importance of both the pros and cons of use. Decisional balance scales have been developed for various drugs, but up to this time there was no formal measure for e-cigs. These data were collected as part of the multi-phase development of the E-cigarette Decisional Balance Scale. In Phase 3, a sample of 665 young adults between the ages of 18 and 30 (M = 24 years, 60% White, 28% Black, 47% Male, 46% female, 7% non-binary, ~22% LGBTQ+) completed a survey via Qualtrics. Participants rated the importance of the pros/benefits (e.g., vaping is a good substitute for cigarette smoking) and cons/drawbacks (e.g., vaping is bad for my lungs) of e-cig use/vaping on a 5-point scale. In addition, those who reported never having tried an e-cig (n = 268) were asked to respond to questions assessing their intentions of trying an e-cig. Three decisional balance scores were calculated based on the 28-item measure, a pros score, a cons score, and pros minus cons score. Lifetime users of e-cigs reported greater importance of pros [F (1,663) = 53.91, p < .001] and lower importance of cons [F (1,663) = 51.20, p < .001] than never users. Cons outweighed pros much more so among never users than lifetime users [F (1,663) = 112.63, p < .001]. Among lifetime e-cig users, the number of days of e-cig use in the past month was significantly correlated with pros [r (1,368) = .242, p < .001], cons [r (1,368) = -.171, p < .001], and pros minus cons [r (1,368) = .323, p < .001]. Among never users, greater cons relative to pros was associated with lower expected likelihood of trying an e-cig in the next year [r (363) = -.417, p < .001] and if a best friend offered one [r (363) = -.445, p < .001], and lower curiosity about using an e-cig [r (363) = -.401, p < .001]. As predicted, e-cigarette use was associated with attitudes about the pros and cons of e-cigarette use with the pros having more importance and cons having less importance among e-cigarette users. The E-cigarette Decisional Balance Scale was also associated with self-reported intentions to try e-cigs. Findings support the utility of the newly developed E-Cigarette Decisional Balance Scale as a predictive tool that may facilitate prevention and intervention efforts.

FUNDING: Academic Institution

POS3-146

AWARENESS OF SYNTHETIC NICOTINE AND THE IMPACT OF SYNTHETIC NICOTINE DESCRIPTORS ON YOUTH: A NATIONAL STUDY

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Significance: E-cigarettes are being advertised and sold with synthetic nicotine in the US and globally. Little research has examined youth perceptions of synthetic nicotine or the impact of synthetic nicotine descriptors on e-cigarette products. **Methods:** Participants were a national sample of 1,603 US adolescents (ages 13-17) from a probability-based panel. The survey assessed knowledge of nicotine source in e-cigarettes (from "tobacco plants" or "other sources besides tobacco plants") and awareness of e-cigarettes containing synthetic nicotine. Then, in a between-subjects experiment with a 2x3 factorial design, we manipulated different descriptors on e-cigarette products: 1) nicotine descrip-



SRNT 2023 POSTER SESSION 3 • FRIDAY, MARCH 3, 2023, 11:30 AM - 1:00 PM

tor ("nicotine" or no descriptor) and 2) synthetic descriptor ("tobacco-free," "synthetic," or no descriptor). **Results:** Most youth were either unsure (41.8%) or did not think (20.2%) that nicotine in e-cigarettes comes from tobacco plants; similarly, most youth were also unsure (48.2%) or did not think (8.1%) that nicotine in e-cigarettes comes from other sources besides tobacco plants. There was low-to-moderate awareness of e-cigarettes containing synthetic or tobacco-free nicotine (28.7%), with higher awareness among youth susceptible to using e-cigarettes (31.4%) and current users (48.0%). While no main effects were observed in the experiment, there was a significant 3-way interaction between e-cigarette status and the two experimental manipulations. The "tobacco-free nicotine" descriptor increased purchase intentions relative to "synthetic nicotine" (simple slope: 1.20, 95% CI: 0.65, 1.75) and "nicotine" (simple slope: 1.20, 95% CI: 0.67, 1.73) for current e-cigarette users. **Conclusions:** Most US youth do not know or have incorrect beliefs about the sources of nicotine in e-cigarettes and describing synthetic nicotine as "tobacco-free nicotine" increases purchase intentions for youth e-cigarette users.

FUNDING: Federal; FDACTP

Poster Session 4: Rapid Submissions



RAPID SUBMISSIONS: POSTER SESSION 4

POS4-111

TOBACCO-USE AMONG PATIENTS WITH FIRST-EPISODE PSYCHOSIS IS ASSOCIATED WITH GREATER COGNITIVE AND SOCIAL FUNCTIONING: A CROSS-SECTIONAL ANALYSIS.

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Significance: Tobacco use in persons with psychotic disorders is a leading cause of death and disability. The self-medication hypothesis suggests that persons may use tobacco for temporary improvements in cognition. **Methods:** Participants were eighty persons with first-episode psychosis enrolled in EPICENTER with documented tobacco-use status at baseline. In this group, we compared mean differences in social and cognitive functioning at enrollment in EPICENTER. **Results:** There were significant differences in cognitive and social functioning in smokers compared to non-smokers. Specifically, smokers outperformed non-smokers on measures related to problem solving and interpersonal engagement. **Conclusions:** There are significance differences in cognitive and social functioning among persons with first-episode psychosis who smoke tobacco products. Smoking cessation interventions for persons with first-episode psychosis may need to be modified to target these differences in cognition and social functioning.

POS4-112

SMOKING ACROSS THE LIFESPAN: CHARACTERISTICS OF YOUNG, MIDDLE, AND OLDER AGE PATIENTS SEEKING TREATMENT FOR TOBACCO USE

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Introduction: Older adults (65+) who use combustible cigarettes carry a greater tobacco-related disease burden and experience lower success rates during their quit attempts than younger cohorts, but few studies focus on this age group. This observational study aimed to compare tobacco use characteristics young (18-24 years), middle (45-64 years), older-age adults (65+ years) patients. **Method:** This study included 585 adults smoking at least 10 cigarettes per day who attended the Center for Prevention and Cure of Tobacco use (CPCT) of the University of Catania between 2018 and 2019, seeking treatment for smoking cessation. The study compared the participants' demographic data (gender, education level), current and past smoking behavior (duration, prevalence, cigarettes per day), nicotine dependence, quit attempts, and methods to quit smoking. Inferential statistics were not used due to low power and sample size considerations. **Results:** Of the total sample, 51% were middle-aged (n=298) compared to 4.5% younger (n=27) and 8.2% older (n=49) adults. Older adults were highly dependent according to the Fagerstrom Test of Cigarette Dependence (Mean: 6.1), while younger or middle-aged cohorts were moderately dependent (means: 5.4 and 5.9). Older adults had smoked for approximately 50 years on average compared to 35.4 years 6.5 years for middle-age and younger adults, respectively. The average number of cigarettes smoked per day was similar between the middle-aged and older cohorts (24.2 and 23.2) and descriptively lower for the younger cohort (20.8 cigarettes). Approximately 70% of middle-aged and older adults had made a previous quit attempt, compared to only 52% of young adults. Younger adults were more likely to have tried e-cigarettes +motivational interviewing to quit smoking (40%) compared to middle-aged and older adults (~20%), while middle-aged and older adults were more likely to have tried chempix + motivational interviewing (23.0% and 20.5%, respectively) compared to younger adults (11.5%). Continuous abstinence at 52 weeks was higher for older adults (27 %) and middle-age adults (34 %) compared to younger adults (15%). **Conclusion:** This small-sample preliminary analysis found that older adults in a smoking cessation clinic had smoked for approximately 50 years and were currently smoking over a pack of cigarettes daily. Older and middle-aged adults were less likely to utilize e-cigarettes as a cessation tool in this setting compared to younger. Across all ages, most patients did not achieve continuous abstinence at 52 weeks (66 to 85%). These descriptive findings highlight potential differences in tobacco use and cessation across the lifespan that require further study, including approaches to age-tailored cessation interventions.

POS4-113

OPEN TRIAL FINDINGS OF HEART RATE VARIABILITY BIOFEEDBACK AS A TREATMENT ADJUNCT FOR SMOKING CESSATION AND EXAMINATION OF THE ROLE OF ANXIETY SENSITIVITY AND SMOKING CESSATION COGNITIONS

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Significance: Tobacco use is especially high among those with a mental illness. However, current smoking cessation interventions do not target bottom-up processes that may undermine self-regulation and compromise quit success. Heart rate variability biofeedback (HRVB) seeks to increase HRV, and is associated with improved regulation of physiological and cognitive-affective processes. Yet, no studies have examined the effect of HRVB on clinically relevant smoking processes that support self-regulation and promote cessation. **Methods:** In this study, n=9 smokers (66.7% Female, M_{age}=36.2 years, SD=6.36) who were motivated to quit and smoked an average of 11.13 cigarettes per day (SD=5.30) were guided through 10 sessions of HRVB and 6 sessions of smoking cessation treatment (SCT) over 7 weeks. Self-report measures including the Smoking History Questionnaire, Timeline Followback, Fagerstrom Test for Cigarette Dependence, Depression, Anxiety, and Stress Scale-21 (DASS-21), Anxiety Sensitivity Index-3 (AS), and Thoughts about Abstinence were used to assess cigarette use and dependence, as well as emotional distress. **Results:** Abstinence rates at quit day and at 1-month follow up (1MFU) were 85.7% (n=6 of 7) and 66.7% (n=6), respectively. Non-statistically significant decreases in DASS-21 scores were observed from baseline to 1MFU with medium to large effects (Cohen's d's = 0.42-0.82). Greater AS was related to dropping out prior to the quit day, but this relation was not statistically significant. AS was not related to other outcomes. No relation between expectation of quit success and quit day success or treatment engagement was observed. Despite non-significant changes in HRV from baseline to 1MFU amongst abstinent individuals, changes were in the expected direction (i.e. increased), with medium to large effects, Hedge's g = .36, 95% CI [-1.00, .72]. In addition, increases in HRV from baseline to 1MFU were significantly greater amongst individuals who reported abstinence versus those who did not, F(1, 4) = 56.97, p <.01. This is the first study of our knowledge to document improvements in HRV in smokers following a cessation intervention including HRV. **Conclusion:** Overall, treatment engagement was high and resulted in smoking reduction for the majority of the sample. Future studies should aim to include a larger sample size, attend to those that are higher in emotional distress, and examine the effects of AS on early dropout.

FUNDING: Federal

POS4-114

EFFICACY OF A BRIEF E-CIGARETTE SCREENING AND INTERVENTION FOR COLLEGE STUDENTS: A PILOT STUDY

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Significance: Electronic nicotine delivery systems (ENDS) have become the most used tobacco product among adolescents and young adults. Health risks such as lung injury, increased heart rate, and raised blood pressure have been associated with ENDS use. College students who use ENDS tend to focus more on perceived benefits of ENDS than risks. Brief, targeted, tobacco cessation interventions have been effective, but there are no existing empirically supported interventions for ENDS. Brief interventions based on principles of motivational interviewing (MI) suggest a brief ENDS intervention should be tailored to a young adult population and their perceptions of ENDS-related risks and benefits. **Methods:** We evaluated the efficacy of a brief, MI-based ENDS intervention delivered through video conferencing for college students. The intervention comprised MI techniques, psychoeducation on ENDS-related health risks, and personalized feedback on ENDS-related information. College student ENDS users (N = 55) were randomly assigned to a brief, MI-based intervention (n = 27) and a waitlist control condition (n = 28). **Results:** Participants were 83% female, 83.65 White, 20.2 (SD = 2.18) years of age, reported vaping within the last 30 days, with a medium level of nicotine dependency (M = 8.33, SD = 5.31) on the Penn State Electronic Cigarette Dependency Inventory (PS-ECDI). There was a significant condition by time interaction, F(1, 53) = 14.30, p less than .001, partial eta squared = .212, whereby participants in the MI intervention increased motivation to quit ENDS use from pre- (M = 6.96, SD = 0.48) to post-intervention (M = 8.38, SD = 0.53; p = .006), whereas the control group did not change. Condition by time significant interactions were also found for perceived risks, F(1, 53) = 4.40, p = .041, partial eta squared = .077, and benefits of ENDS, F(1, 53) =



14.53, $p < .001$, partial eta squared = .215, whereby participants in the MI intervention increased risk perceptions from pre- ($M = 89.37$, $SD = 1.82$) to post-intervention ($M = 96.85$, $SD = 2.15$) and decreased perceived benefits from pre- ($M = 47.00$, $SD = 2.72$) to post-intervention ($M = 36.93$, $SD = 2.60$), whereas control participants did not show change on these measures. **CONCLUSIONS:** Findings add to existing literature by demonstrating the efficacy of a brief, MI-based cessation intervention for ENDS use among college student ENDS users.

FUNDING: Academic Institution; Other: Louisiana State University Department of Psychology internal funds to Amy Copeland

POS4-115

USING ALTERNATIVE NICOTINE DELIVERY SYSTEMS TO REDUCE HARM FOR LOW SOCIOECONOMIC STATUS CIGARETTE SMOKERS

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Significance: Individuals with lower socioeconomic status (SES) are less likely to quit smoking and have high smoking-attributable burden. Alternative Nicotine Delivery Systems (ANDS) such as e-cigarettes (EC) and nicotine pouches (NP) may facilitate substitution of smoking for people with low SES who are unable or unwilling to quit. Clinical trials of EC show a harm reduction benefit compared to smoking but there is little known about the harm reduction potential of NP. This pilot study assessed the effects of EC or NP on cigarette use among adult smokers with low SES. We hypothesized that participants receiving EC or NP would smoke fewer cigarettes per day (CPD) at weeks 4 and 8 relative to baseline. We also hypothesize that participants receiving EC or NP would smoke fewer CPD than those in the control arm (exploratory). **Methods:** Adult smokers with household income <250% federal poverty level and no intention of quitting smoking in the next 30 days were randomized 2:2:1 to 8 weeks of 4th generation 5% nicotine EC (N=18), 4mg NP (N=18), both in their choice of menthol or tobacco flavor, or smoking as usual (N=9). The primary outcome was within-group change in average 7-day CPD from baseline to weeks 4 and 8, tested with an unadjusted paired t-test. The secondary outcome was between-group difference in CPD by study arm at weeks 4 and 8, tested with an unadjusted one-way ANOVA. **Results:** 40 participants completed week 4 and week 8 follow-up is ongoing (n=30). Compared to baseline, those in the EC arm had significantly lower CPD at week 4 (baseline mean: **14.75** [SD: 7.2]; week 4 mean: **4.4** [SD: 5.1], $p < .0001$). CPD continued to significantly decline by week 8 for those in the EC arm (baseline mean: **15.10** [SD: 7.8]; week 8 mean: **1.82** [SD: 2.8], $p < .0001$). Those in the NP group had significantly lower CPD at week 4 (mean at baseline: **14.65** [SD: 13.9]; mean at week 4: **9.26** [SD: 9.5], $p = 0.002$) and week 8 (mean at baseline: **15.58** [SD: 16.9]; mean at week 8: **8.6** [SD: 11.8], $p = 0.02$). There were no within-group changes for those in the control arm. The between-group differences at weeks 4 and 8 were not statistically significant. **Conclusion:** Individuals with low SES who smoke significantly decreased their CPD after switching to EC or NP. These findings show the potential of ANDS in helping people who smoke switch to less harmful devices. This pilot study was not statically powered to detect between-group differences.

FUNDING: Federal; Academic Institution

POS4-116

DIFFERENCES IN SMOKING AND VAPING EXPECTANCIES BY SEXUAL ORIENTATION AND GENDER

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INTRODUCTION: Sexual and gender minority young adults (SGMs) smoke cigarettes and e-cigarettes at higher rates than their heterosexual peers. Given historical targeted-marketing promoting tobacco use in SGM spaces (e.g., bars, Pride events), social smoking/vaping expectancies (i.e., beliefs about the anticipated social effects of using nicotine/tobacco) may be one reason for continued nicotine/tobacco use in this group. Understanding specific SGM smoking/vaping motivations could inform culturally targeted interventions to curb disparities. We examined sexual orientation and gender differences in social smoking/vaping expectancies among young adults. **METHODS:** Young adults (aged 18-35 years) were crowdsourced via Prolific to an online survey (N=2,807), with purposive oversampling for SGM individuals. Using linear regression with robust variance estimation, we estimated differences in social smoking and

vaping expectancies by sexual orientation and gender identity. Analyses controlled for sociodemographic characteristics, cigarette and vaping status, and perceived stress. **RESULTS:** Participants (40.3% SM, 9.2% GM) were mostly non-Hispanic White (59.7%) and aged 25-35 (67.3%). Multivariable analyses indicated no significant differences in social expectancies by sexual orientation. Compared to cisgender men, cisgender women reported significantly lower smoking/vaping expectancies, including to socialize (smoking: $B = -.58$; 95% CI: $-.86, -.34$; vaping: $B = -.26$; 95% CI: $-.48, -.04$), connect with community (smoking: $B = -.57$; 95% CI: $-.75, -.39$; vaping: $B = -.58$; 95% CI: $-.86, -.34$), fit in (smoking: $B = -.64$; 95% CI: $-.85, -.43$; vaping: $B = -.32$; 95% CI: $-.53, -.11$), and feel safer around strangers (Smoking $B = -.42$; 95% CI: $-.60, -.23$; vaping: $B = -.47$; 95% CI: $-.65, -.28$). Differences trended toward significance ($p < .06$) for GM; compared to cisgender men, GM reported lower expectancies for smoking to socialize ($B = -.39$; 95% CI: $-.79, -.001$) or fit in ($B = -.43$; 95% CI: $-.80, -.06$). **CONCLUSIONS:** Contrary to our hypothesis, there were no differences in smoking/vaping expectancies by sexual orientation. Surprisingly, women and gender minoritized participants were less likely to report using smoking or vaping to socialize or fit in. Future research and health communications should focus on the link between gender, sexual orientation, and social smoking/vaping.

FUNDING: Federal

POS4-117

SUPPORT FOR SMOKING IN VEHICLES WHEN PASSENGERS ARE PRESENT

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Introduction: Smoke-free policies protect people from exposure to secondhand smoke in public spaces and the workplace, but fewer protections exist for non-smokers in private vehicles. This study identified individual characteristics associated with support for or against thinking smoking should be allowed inside a vehicle when others and children, were present. **Methods:** Data derived from 128,835 participants in the 2018-19 wave of the Tobacco Use Supplement to the Current Population Survey (TUS-CPS). Multinomial logistic regression was used to analyze demographic and tobacco use characteristics associated with that thinking smoking should "never," "under some conditions," and "always" be allowed in a vehicle. Models were calculated separately for participant responses to two items asking about smoking in vehicles "when others are present" and "when children are present", with "never allowed" as the referent response for smoking in vehicles. **Results:** The majority of this sample was White-only (79.2%), non-Hispanic (83.1%), never smokers (70.7%), and had at least a high school diploma or G.E.D. (55.2%). When others are present, 76.1% thought that smoking in a vehicle should never be allowed. When children are present, 95.8% thought that smoking should not be allowed. In both regression models controlling for other demographic characteristics, male, White-only, non-Hispanic, and being an every day smoker were associated with higher odds of thinking smoking should be allowed in a vehicle under some conditions and always both when others were present, and children were present. For example, being an every day smoker compared to a never smoker was associated with higher odds of thinking smoking should be allowed when others were present under some conditions (AOR=6.41; 95% CI=6.01-6.82, p -value=<.0001) and always (AOR=11.53; 95% CI=10.36-12.83, p -value=<.0001). Being an every day smokers compared to never smokers was also associated with higher odds of thinking smoking should be allowed when children were present under some conditions (AOR=4.86; 95% CI=4.73-5.40, p -value=<.0001) and always (AOR=5.58; 95% CI=4.68-6.66, p -value=<.0001). **Conclusions:** This study identified specific characteristics linked to thinking that smoking in vehicles should be allowed. Health communication focused on reducing smoke exposure in vehicles should focus not only on children, but also other adult passengers in order to reduce the impact of tobacco smoke exposure.

POS4-118

ASSOCIATIONS BETWEEN TOBACCO-FREE WORKPLACE POLICIES IN BEHAVIORAL HEALTH TREATMENT CENTERS IN TEXAS AND EMPLOYEE BELIEFS AND CENTER PRACTICES ON TOBACCO TREATMENT

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SRNT 2023 POSTER SESSION 4 • FRIDAY, MARCH 3, 2023, 4:45 PM - 6:15 PM

Significance: Adults with behavioral health (i.e., non-nicotine substance use or mental health) needs consume ~40% of cigarettes smoked in the US. Despite clients in these settings expressing interest in quitting tobacco use, there is a prevailing misconception among employees that tobacco cessation hinders recovery during behavioral health treatment. This study assessed whether one evidence-based intervention—having a comprehensive tobacco-free workplace policy (TFWP) disallowing tobacco use anywhere on the premises—was related to other employee and workplace factors that are known to facilitate the provision of tobacco use care to clients. **Methods:** Non-profit behavioral healthcare is provided to Texans via 39 regional treatment centers that cover the state; employees from 30 responded to a 2021 survey about their center's tobacco-related policies and practices, and their own beliefs on tobacco and drug use co-treatment. Associations between having a TFWP and employee tobacco treatment beliefs and practices were explored using independent proportions tests. Due to a limited sample size, $p < .10$ was used. **Results:** Most (70%) centers had a TFWP. Having a TFWP was associated with a lower likelihood of employees believing that clients should stop using drugs before quitting tobacco (42.9% vs 77.8%, $p = .079$), and a greater likelihood of believing that clients should quit drugs and tobacco simultaneously (52.4% vs 11.1%, $p = .035$) and that concurrent improvements in their symptomatology could be attained if they did so (85.7% vs 55.6%, $p = .074$). At the workplace level, having a TFWP was associated with a greater likelihood of tobacco use screening training provision (80.9% vs 37.5%, $p = .024$), promoting insurance reimbursement for tobacco services (9.5% vs 37.5%, $p = .075$), state Quitline familiarity (90.5% vs 62.5%, $p = .075$), and encouraging Quitline referrals (78.9% vs 42.9%, $p = .077$). **Conclusions:** Relative to their counterparts, treatment centers with a comprehensive TFWP had fewer known barriers to tobacco use care provision, including misperceptions about the harms of quitting and a lack of workplace training and support. Results demonstrate that establishing favorable conditions for tobacco treatment is attainable and suggest opportunities for collaboration between centers to share policies and practices that can reduce the research-to-practice gap and resulting inequities statewide.

FUNDING: Federal; State

POS4-119

FDA RETAILER COMPLIANCE DATA FROM 2011 TO 2019 - AN ANALYSIS OF STATE TOBACCO 21 POLICIES

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Tobacco 21 (T21) is a tobacco control policy intended to disrupt underage social and illicit commercial access to tobacco products and reduce tobacco use among young people by prohibiting retailers from selling tobacco and tobacco derived products to those under 21 years of age. In recent years, T21 policies have gained momentum at the local and state level, and on Dec. 20, 2019, the Federal Food, Drug, and Cosmetic Act was amended to raise the federal minimum age for sale of tobacco products from 18 to 21 years. This study examines impacts of state-level T21 policies on retailer underage sales (those under 21) and potential implications of these policies on changes in illicit retail sales. We use 2011-2019 data from the U.S. Food and Drug Administration's Center for Tobacco Products' Office of Compliance and Enforcement to estimate the rate at which retailers fail inspection checks of undercover, underage purchasers in a state before and after the minimum legal sales age for tobacco changes in the state's policies, as well as data from the American Community Survey to control for demographics. An event study model is used to estimate the impacts of statewide T21 policies on violation rates for underage tobacco sales among retailers with first-time compliance inspections over the 2011-2019 inspection period (i.e., retail inspections at locations with no more than a single violation and without a history of prior inspections). Our results provide suggestive evidence of an approximately 11.4% reduction of first-time failure rates for retail establishments that occurs 3 years or more after passage of a statewide T21 policies. This is the first study to analyze the impacts of T21 policies using national retailer compliance data. In addition, the evidence we find from using national compliance data provides insightful information on sales to young people and may help identify opportunities for improvement in retailer education or compliance at the state and local level after T21 policies are put into place.

FUNDING: Federal; FDACTP; Academic Institution

POS4-120

SRNT 2023

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Significance: Despite the well-known harms of tobacco use and expansive control measures implemented worldwide, global progress in reducing youth smoking has been variable. This is a significant public health problem, as smoking experimentation in adolescence creates 90% of new smokers and is one of the largest causes of health disparities worldwide. To target this problem, there have been calls across many countries to raise the age of sale for tobacco to 21 years—known as T-21—due to its predicted effectiveness from modelling surveys in extensively limiting youth access to tobacco. However, preliminary findings from local and state implementation in the US demonstrate that policy effects vary across areas, with researchers suggesting that a range of factors relating to policy development, context and implementation influence T-21 effectiveness. This review systematically explored stakeholders' experiences of T-21 to obtain a richer understanding of the barriers and facilitators to policy effectiveness. **Methods:** Eleven electronic databases were searched systematically, including grey literature databases, from their date of commencement to the 30th of July 2022 to identify qualitative studies exploring stakeholders' experiences of T-21. Reference lists and forward citations were examined to ensure the comprehensiveness of results. Two reviewers independently conducted abstract and full-text screening to assess eligibility, and the CASP Qualitative Tool was used to appraise studies. Themes were generated independently by two reviewers using thematic synthesis. **Results:** The search strategies yielded 2444 studies, of which 13 were eligible for the final review. Eight barriers (cultural norms, the social factors driving youth smoking, the lack of available smoking cessation support, military exemptions, state T-21 laws, the lack of youth support, generational smoking, tobacco as a 'human right') and four facilitators (retail compliance checks, the provision of T-21 resources to retailers, the improvement of children's health literacy, explaining to retailers why T-21 is required) to T-21 were identified. Using CERQual, six findings were rated as high or moderate confidence, and six were rated as low or very low confidence due to methodological weaknesses in the primary studies. **Conclusion:** This is the first systematic review to explore the barriers and facilitators to implementing Tobacco-21. The findings from this review provide vital insight into the factors affecting the effectiveness of T-21 to inform the future implementation of T-21 laws.

POS4-121

A SIX-WAVE CROSS-SECTIONAL SURVEY ON PUBLIC SUPPORT FOR ANNUAL TOBACCO TAX INCREASE IN HONG KONG GENERAL PUBLIC AND TOBACCO USERS. 2015-2020

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Significance: Increasing tobacco tax is the single most effective and cost-effective approach to reduce tobacco use. However, Hong Kong (HK) has not increased its tobacco tax since 2014 where a pack of 20 cigarettes was increased by ~USD 0.51, which was only a 12%. We examined the trend and associated factors for public support for annual tax increase in HK from 2015 to 2020. **Methods:** 12,401 randomly-sampled respondents (current smokers: 1,978, never smokers: 5,217, ex-smokers: 5,206) aged 15 years or above, were telephone-interviewed in Tobacco Control Policy-related Surveys (TCPS) in HK from 2015 to 2020 (6 waves). Information of sociodemographic and smoking characteristics (including intention to quit), and support for annual tax increase (yes/no) was collected. Associations of sociodemographic and smoking characteristics with support for annual tax increase were analyzed using Poisson regression model with a robust error variance and adjustment for potential confounders. The support was weighted by age, sex, and smoking status of the HK population each year. **Results:** Public support for the annual tax increase increased slightly from 83.4% in 2015 to 86.3% in 2020 (Adjusted risk ratio (ARR) per year=1.015, 95%CI: 1.009-1.022, $P < 0.001$). Public support for annual tax increase was significantly lower in current smokers (29.6%) than never smokers (86.8%, ARR=0.35, 95%CI: 0.32-0.37) and ex-smokers (81.4%, 0.38, 0.36-0.41). Public support for annual tax increase was not associated with sociodemographic characteristics (sex, age, education and income). Current smokers who self-reported poor and fair health status (vs excellent, ARR 1.59 [95%CI: 1.07-2.37] and 1.45 [1.04-2.02], respectively), had intention to quit within 30 days and after 30 days (vs no intention to quit, 1.91 [1.44-2.54] and 1.40 [1.06-1.85], respectively), smoked the first cigarette after 60 mins upon waking (vs within 5 mins, 1.67 [1.17-2.38]), had cigarette expenditure in the past 8-30 days (vs within 7 days, 1.48 [1.07-2.04]), and did not (vs did) purchase



SRNT 2023 POSTER SESSION 4 • FRIDAY, MARCH 3, 2023, 4:45 PM - 6:15 PM

cheaper cigarettes (probably illicit) in the past 6 months (1.38 [1.02-1.89]) were more likely to support annual tax increase (all $P < 0.05$). **Conclusions:** Current smokers with poorer health status, higher intention to quit, stronger nicotine dependence, cigarette expenditure in past 8-30 days, and no purchase of probably illicit cigarettes in the past 6 months showed significantly greater support. Policy and interventions in promoting tax increase need to address the concerns of those who do not support annual tax increase.

FUNDING: Other: Hong Kong Council on Smoking and Health

POS4-122

TOBACCO INDUSTRY ABUSE OF THE SUBSTANTIAL EQUIVALENCE PATHWAY: THE CASE OF CHANGING CIGARETTE FILTER VENTILATION

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A major goal of the 2009 Family Smoking Prevention and Tobacco Control Act (TCA) was to end the tobacco industry's practice of secretly manipulating product characteristics to increase their attractiveness and addictiveness. Under the law, "pre-existing" tobacco products that were marketed as of February 15, 2007 do not require premarket review, but any new or modified product that is not "substantially equivalent" to a pre-existing tobacco product requires an extensive assessment by the U.S. Food & Drug Administration (FDA) before it can be sold. This presentation will present evidence that cigarette companies appear to be avoiding this premarket review requirement by using the substantial equivalence (SE) review process in previously unreported ways: they are modifying currently available cigarette brands by using an **entirely different product** as the predicate product for purposes of the SE review, and they are changing product features gradually in ways that may have significant public health effects. As a result, the FDA has authorized products marketed with the same branding and same packaging to be modified substantially—and without any notice to the public, researchers, or consumers—under the SE review pathway, contrary to the law's intent. This presentation will (a) detail one case study of such an SE authorization, where the product modification authorized by the FDA could harm public health; (b) provide broader evidence of substantial cigarette filter ventilation changes occurring in the marketplace, based on product surveillance conducted over two years; and (c) call on the FDA to take corrective action, including revision of its internal review memos and public guidance relating to SE reviews.

FUNDING: Federal

POS4-123

AVAILABILITY OF SINGLE CIGARETTES AND YOUTH SMOKING UPTAKE AMONG MEXICAN EARLY ADOLESCENTS

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Significance. The availability of single cigarettes is still a concern in many countries, including those where singles are banned, as in Mexico. The role of single cigarette has been examined in some studies among adult smokers in Mexico, but little is known about how single cigarette availability influences adolescent smoking uptake. **Methods.** Data were collected from wave 1 (2015) and wave 2 (2016) of a longitudinal study representative of public middle schools from three major cities in Mexico (Guadalajara, Mexico City and Monterrey) ($n=10,123$ students 12-13 years old). A total of 4,422 students who reported being never smokers at baseline were included in the analysis. Logistic model regressed smoking at follow up (non-smoker vs. smoking initiation) on baseline reports of having bought single cigarettes during the past 30 days (yes vs. no), frequency of going to stores that sell cigarettes (low, medium, high frequency) and frequency of having seen street vendors who sell singles around their school (never, sometimes, frequently or very frequently) while adjusting for socio-demographics and smoking risk factors. **Results.** At baseline, among never smokers (analytical sample), 4.6% reported having bought singles during the past 30 days. Having bought single cigarettes at baseline was associated with higher odds of smoking initiation at wave 2

(AOR=1.37, 95%CI=1.00, 1.87). Furthermore, frequency of visiting stores (AOR never vs. very frequently=1.28, 95%CI=1.10, 1.50) and frequency of having seen street vendors near their school (AOR never vs. sometimes=1.32, 95%CI=1.11, 1.58) were associated with greater odds of being smoker at follow-up. **Conclusion.** The results of this study suggests that the availability of purchase of single cigarettes influence youth smoking initiation. Further research should help to disentangle the role of availability of single cigarettes at well-established point of sales vs. availability of single cigarettes among street vendors.

FUNDING: Federal

POS4-124

PROTECTED STATUS VS TARGETED MARKETING? A COMPUTATIONAL ANALYSIS OF INDIVIDUALS ENGAGING WITH PUBLIC AND PROTECTED CIGAR-BRANDED TWEETS

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Background: Swisher Sweets is the leading flavored little cigar and cigarillo brand in the US. Swisher Sweets had a public Twitter account but then switched the account to protected, which in effect made Swisher Sweets' tweets only available to followers. Based on reactance theory, we hypothesized that protected status would be associated with increased engagement with Swisher Sweets tweets. **Methods:** We collected 1,571 replies to Swisher Sweets' public and protected tweets between 4/13/2018-12/31/2020. Machine learning algorithms were used to predict the demographics of people who replied to Swisher Sweets' tweets. We used a two-sample t-test to compare the mean difference in replies to public versus protected Swisher Sweets tweets. We conducted chi-square tests to compare flavor-related words in replies to public versus protected Swisher Sweets tweets. Mixed-effects logistic regression was used to evaluate the association between the demographics of Twitter users and the odds of replying to protected Swisher Sweets tweets. **Results:** Overall, 16% of 747 unique Twitter users who replied to Swisher Sweets' tweets were predicted to be under 21 years and 65% were predicted to be Black. The average number of replies to Swisher Sweets' public (mean \pm standard deviation [SD]=3.7 \pm 5.1) and protected tweets (mean \pm SD=4.8 \pm 8.3) were similar. Replies to protected Swisher Sweets tweets were more likely to contain any flavor ($p < 0.001$) and concept-flavor ($p < 0.001$) words than replies to public Swisher Sweets tweets. Individuals under the age of 21 years had similar odds of engaging with protected Swisher Sweets tweets as individuals aged ≥ 21 years. Black individuals were 2.61 times more likely to reply to protected Swisher Sweets tweets than White individuals (OR = 2.61; 95% confidence interval [1.36, 5.06]; $p = 0.004$). **Discussion:** The protected setting did not decrease the number of post replies or prevent engagement with Swisher Sweets' tweets from underage Twitter users. Black individuals, compared to White individuals, were more likely to reply to Swisher Sweets tweets after the status change, corroborating the targeted marketing towards Black populations from Swisher Sweets. More replies mentioned flavors and concept flavors after the status change, indicating the increasing appeal of flavors and concept flavors. Results suggest the need to prohibit flavors in cigars, and more stringent age verification procedures for social media accounts of tobacco companies.

FUNDING: Federal; FDACTP

POS4-125

HOW ARE THE CHARACTERISTICS OF DISPOSABLE E-CIGARETTES ASSOCIATED WITH THEIR PRICING: EVIDENCE FROM ONLINE VAPE SHOPS

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Significance: E-cigarettes have been marketed as a less harmful alternative to the regular combustible cigarettes in the US market since 2007. A substantial amount of e-cigarette business is conducted online, measuring up to about 30-50% of the total sale of e-cigarettes. E-cigarettes are the most used tobacco products among US youth and the use of disposable e-cigarettes is significantly prevalent in this age group. The goal of this study is to examine the associations between disposable e-cigarette characteristics (such as nicotine concentration and forms, flavors) and its pricing, using data from online vape shops in 2022 and a revealed preference approach. **Methods:** For our unique online vape shop database, we extracted data from March to August 2022. Currently we have data for a total of 2,356 disposable e-cigarettes from five popular online vape shops that sell to most states in the US. We will use the hedonic pricing model to estimate the associations between disposable e-cigarettes' key attributes and their standardized prices in the online stores. To standardize the prices of disposable e-cigarettes, we use two different methods and check the sensitivity of the results to the methods we use: sales price per milliliter of capacity (unit: US \$/ml), sales price per puff (unit: US ¢/puff). The key attributes of disposable e-cigarettes that we examine are: nicotine concentration (in mg/ml), flavors, nicotine form (i.e., salt or freebase), and whether containing synthetic nicotine (versus natural nicotine derived from tobacco). Using a comprehensive semantic database of e-cigarette flavors, we identify and categorize different flavors of disposable e-cigarettes in our sample. **Results and Conclusion:** We test the following hypotheses - disposable e-cigarettes containing salt-based nicotine and those who contain flavors are priced higher than their counterpart; there is no significant difference in pricing between disposable e-cigarettes containing synthetic nicotine and those containing natural nicotine, holding nicotine forms, concentration and flavors constant. If certain product characteristics are priced higher than the others, it's likely that they are preferred attributes and are in greater demand among vapers in the online market of disposable e-cigarettes. Our study will present unique evidence of relative appeal of different characteristics to users of disposable e-cigarettes and inform potential FDA regulatory actions such as ban on certain flavors, and restriction on the maximum level of nicotine concentration. The FDA regulations over product standards will influence the appeal of vaping products. This study also provides up-to-date information of a variety of product characteristics and rapid surveillance of disposable e-cigarettes in the tobacco marketplace.

FUNDING: Federal; Academic Institution

POS4-126

VIEWS ON CESSATION AND PERCEPTIONS OF RISKS AND BENEFITS OF ENDS AMONG COLLEGE STUDENT ENDS USERS PARTICIPATING IN FOCUS GROUPS

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Significance: Prevalence rates of electronic nicotine device systems (ENDS) use have recently increased, especially among adolescent and young adult populations. College students are particularly at risk, as they are more likely to initiate ENDS use than their same-aged peers not attending college. Given the rapid evolution of ENDS products being marketed, it is important to identify device features that compel use, current perceptions of benefits and risks associated with ENDS, and features of an acceptable and useful cessation intervention for this population. **Methods:** In the current study, we conducted eleven focus groups with 2-10 college student ENDS users in each group (total N = 76) to obtain this information and to inform an empirically based cessation intervention. **Results:** Participants were 75% female, 75% White, 19.2 (SD = 1.3) years of age, with a medium nicotine dependence level indicated by the E-cigarette Fagerstrom Test for Nicotine Dependence (e-FTND) and Penn State E-cigarette Dependency Inventory (PS-ECDI) scores. Common themes emerged from qualitative analysis of the focus group discussions, including preference for flavored, disposable devices, perceived benefits of stress reduction, enhanced social experience, improved concentration, customizable device features, and appetite control. Themes of perceived risks included risk of respiratory illness, nicotine addiction, acute adverse reaction to vaping (e.g., "nic sick"), and cost. Many participants reported their intent to use ENDS only while in college but not beyond that time, and many expressed current interest in quitting ENDS use. Regarding cessation intervention preferences and what they deemed would be helpful or not in a cessation program, participants favored peer support interventions without the use of nicotine replacement therapies. **Conclusions:** These findings can be used to inform (1) ENDS cessation interventions for college students; and (2) measurement of perceived risks and benefits associated with ENDS among adolescent and young adult populations.

FUNDING: Academic Institution

POS4-127

AWARENESS OF E-CIGARETTE HEALTH WARNING LABELS AND HARM PERCEPTIONS IN THE US

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Significance: In 2018, the US FDA mandated that a nicotine addiction warning label appear on e-cigarette packaging and advertisements. This study aimed to 1) describe awareness of e-cigarette warning labels and correlates among US adults, and 2) examine the association between awareness of warning labels and perceived harm of e-cigarettes. **Methods:** We conducted weighted cross-sectional analyses of Wave 5 (Dec 2018 - Nov 2019) of the Population Assessment of Tobacco and Health study. The analytic sample (N=5,703) was representative of US adults (aged 18 and older) who reported past 30-day e-cigarette use. We descriptively examined sociodemographics, general harm perceptions, and awareness of noticing e-cigarette warning labels (1=never to 5=very often). Weighted linear regression was conducted to identify correlates of awareness and whether awareness is associated with the perceived harm of e-cigarettes (1=not at all harmful to 5=extremely harmful). **Results:** Overall, 50.3%, 32.8%, and 16.9% of past 30-day e-cigarette users reported never, rarely/sometimes, and often/very often for noticing e-cigarette warning labels, respectively. Users rated general harm perceptions: nicotine to health (M=3.63, SD=1.11), using e-cigarettes (M=3.18; SD=1.08), e-cigarettes compared to cigarettes (M=1.64, SD=0.59), menthol e-cigarettes (M=2.05, SD=0.42), and nicotine in e-cigarettes (M=3.15, SD=1.08). Linear regression results indicated that being older (p<.001) and female (β=-0.13, p=.006) were associated with less awareness of e-cigarette warning labels, whereas being never married (β=0.17, p=.022), no past 30-day cigarette use (β=0.19, p<.001), and increased frequency of e-cigarette use (β=0.02, p<.001) were associated with greater awareness. With regard to perceived harm of using e-cigarettes, noticing e-cigarette warning labels often/very often (compared to never) (β=0.22, p=.003) being female (β=0.25, p<.001), and Hispanic (β=0.22, p<.001) were associated with greater perceived harm. More frequent e-cigarette use (β=-0.02, p<.001) was associated with decreased perceived harm. **Conclusions:** Noticing e-cigarette warning labels was associated with age, sex, marital status, past 30 day cigarette use and frequency of e-cigarette use. Noticing labels more often was associated with greater perceived harm. Further research is warranted to understand these associations across segments of e-cigarette users such as exclusive, dual, and former users.

POS4-128

PERCEPTIONS OF DIFFERENCES BETWEEN TOBACCO-FREE AND TOBACCO-DERIVED NICOTINE IN E-CIGARETTES: A QUALITATIVE STUDY OF YOUNG ADULTS WHO USE E-CIGARETTES

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Significance: Tobacco-free nicotine (TFN) is often marketed as a synthetic nicotine product that is better tasting than tobacco plant-derived nicotine (TDN). Studies have yet to systematically characterize subjective differences between these two products. This qualitative study explored young adults' perceptions of differences between using TFN and TDN e-cigarettes. **Methods:** We conducted a national online Qualtrics survey of U.S. young adults aged 18-25 years in October 2021. Young adults who had tried TFN e-cigarettes (n=317; 53% female; 40.4% Non-Hispanic White) provided a write-in response to the open-ended question: "What differences, if any, do you notice between TOBACCO-FREE nicotine vapes and vapes that contain tobacco-derived nicotine?" Responses from 291 participants with valid and non-missing data (91% of all responses) were thematically analyzed by two independent raters. **Results:** Overall, 18% (52/291) of participants perceived no differences between TFN and TDN and 10% (n=29) responded "I don't know". Themes that emerged from the remaining 211 responses included TFN having: better taste/smell/flavors (107/211; 50.7% e.g., "cleaner taste", "more and better flavor options"); different, and often stronger, psychoactive effects (n=54/211; 25.5% e.g., "TFN vapes give a stronger buzz"); less aversive effects (n=53/211; 25.1% e.g., "tobacco free vapes make me less sick and nauseous"); and different sensations in the throat or body (n=48/211; 22.7% e.g. "Throat hit is often stronger...") than TDN. **Conclusions:** These qualitative data suggest that young adults who have tried TFN e-cigarettes perceive TFN as better tasting and having different psychoactive and less aversive effects than TDN. Future experimental studies are needed to determine whether e-cigarette users blinded to the type of nicotine they are using can discern these differences, and whether any differences influence the addiction potential of TFN.

FUNDING: Federal; FDACTP; Nonprofit grant funding



POS4-129

SMOKING RELATED KNOWLEDGE, QUIT ATTEMPTS AND INTENTIONS, REGRET, AND PERCEIVED ADDICTION AMONG PEOPLE WHO SMOKE IN AOTEAROA/NEW ZEALAND: FINDINGS FROM THE ITC NZ (EASE) 2020-21 SURVEY

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Significance Aotearoa/New Zealand (A/NZ) has a smokefree goal to reduce smoking prevalence to less than 5% by 2025. Daily smoking prevalence in 2021/22 was 8%, but was substantially higher among Māori (20%) and Pacific peoples (18%). We present findings for key knowledge, psychosocial, and behavioural measures relating to smoking and quitting in the most recent wave of a national study in A/NZ. **Methods** Data were from Wave 3 of the ITC NZ (EASE) study, conducted online October 2020-February 2021. Participants were 992 current smokers (408 Māori and 197 Pacific peoples) of whom 71% were daily smokers. We included recontacted Wave 2 participants and additional people recruited from an online survey panel, social media advertising, and community networks. We oversampled Māori and Pacific peoples and young adults (18-24 yrs). Data were weighted to reflect A/NZ's population of current smokers. We analyzed responses to questions measuring: (1) knowledge of 8 smoking related harms, (2) quit attempts, (3) quit intentions, (4) regret about smoking, and (5) perceived addiction. We excluded "Don't know" and "Refused" responses except for smoking-related harms questions. **Results** Knowledge of smoking-related harms varied from 36.9% (bladder cancer) to 86.1% (oral cancer), with no major differences by ethnicity. 86.3% (95%CI 83.3-88.8%) of participants had ever tried to quit (Māori 89.0%, Pacific 84.1%, and non-Māori non-Pacific (NMNP) 85.3%). 51.5% (47.4-55.6%) had tried quitting in the last year (Māori 54.4%, Pacific 55.0%, NMNP 49.1%). 73.6% (69.5-77.4%) planned to quit smoking (Māori 76.9%, Pacific 75.3%, NMNP 70.7%). 43.3% (39.1-47.6%) planned to quit in the next 6 months (Māori 43.0%, Pacific 45.9%, NMNP 42.5%). 77.5% (74.0-80.8%) regretted starting smoking (Māori 75.0%, Pacific 69.9%, NMNP 81.1%). 87.3% (84.1-89.9%) reported being ('very' or 'somewhat') addicted to smoking (Māori 93.3%, Pacific 84.4%, NMNP 85.2%). **Conclusion** Among people who smoke in A/NZ, a high proportion reported addiction to smoking, regret about starting smoking, and a history of trying to quit and intent to quit smoking in the future. Knowledge of some key harms was low. Findings were broadly similar by ethnicity. These data provide a baseline prior to implementation of mandated denicotinisation of smoked tobacco products in 2025 and substantial (90%) reductions in tobacco retailers in 2024 through smokefree legislation passed in December 2022.

FUNDING: Federal

POS4-130

SMOKING AMONG PATIENTS INFECTED WITH HIV IN WESTERN JAMAICA

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Significance: Antiretroviral therapy (ART) has created a new paradigm in HIV infection, shifting the condition from a fatal illness to a treatable chronic disease. However, modifiable risk factors such as cigarette smoking have continued to impact patients' morbidity and mortality. The prevalence of cigarette smoking among the general population in Jamaica has been reported at 9.4%. Although, there is limited data available on smoking prevalence among people with HIV (PWH) in this country. Therefore, the purpose of this study was to assess the smoking prevalence, as well as the knowledge, attitudes, and perceptions of cigarette smoking and cessation among a sample of PWH in Western Jamaica. **Methods:** A total of 392 adult individuals seeking HIV care in health facilities under the Western Regional Health Authority (WRHA) in Jamaica were interviewed with a cross-sectional questionnaire. Means, frequencies, and proportions were calculated. Factors associated with smoking were assessed using logistic regression. **Results:** The current smoking prevalence among PWH in Western Jamaica was 17.4%, with 36.7% of them considered to be moderate to highly dependent on nicotine. Among current smokers, 11.8% of the individuals started smoking for the first time after HIV diagnosis, while 33.8% initiated cigarette smoking before HIV diagnosis. Almost two-thirds (62.7%) of the current smokers live with another smoker. About 20.0% of the study participants had never been asked about their smoking status by their healthcare, yet 94.8% had high to moderate motivation to quit smoking. Current smoking among PWH was significantly associated with being male (OR = 3.02; CI: 1.64 - 5.57; p<0.001),

non-Christian (OR = 2.14; CI: 1.18 - 3.88; p=0.012), moderate to severely depressed (OR = 3.60; CI: 1.19 - 10.88; p=0.023) and having clinically significant alcohol abuse (OR = 3.35; CI: 1.05 - 10.68; p=0.022). **Conclusion:** Our findings provide baseline information for designing and implementing a comprehensive smoking cessation program that considers the needs of PWH in Jamaica, with the potential of becoming a replicable model for other HIV-specialized healthcare settings in the Caribbean.

FUNDING: Federal

POS4-131

ARE THE RELEVANT RISK FACTORS BEING ADEQUATELY CAPTURED IN EMPIRICAL STUDIES OF SMOKING INITIATION? A MACHINE LEARNING ANALYSIS BASED ON THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH STUDY

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Introduction: Cigarette smoking continues to pose a threat to public health. Identifying individual risk factors for smoking initiation is essential to further mitigate this epidemic. To our knowledge, no study today has used Machine Learning (ML) techniques to automatically uncover informative predictors of smoking onset among adults using the Population Assessment of Tobacco and Health (PATH) study. **Methods:** In this work, we employed Random Forest paired with Recursive Feature Elimination to identify relevant PATH variables that predict smoking initiation among adult never smokers at baseline between two consecutive PATH waves. We included all potentially informative baseline variables in wave 1 (wave 4) to predict the past 30-day smoking status in wave 2 (wave 5). Using the first and most recent pairs of PATH waves was found sufficient to identify the key risk factors of smoking initiation and test their robustness over time. **Results:** As a result, classification models suggested about 60 informative PATH variables among more than 200 candidate variables in each baseline wave. With these selected predictors, the resulting models have a high discriminatory power with the area under the Specificity-Sensitivity curves of around 80%. We examined the chosen variables and discovered important features. Across the considered waves, three factors, (i) BMI, (ii) dental/oral health status, and (iii) taking anti-inflammatory or pain medication, robustly appeared as significant predictors of smoking initiation, besides other well-established predictors. **Conclusions:** Our work demonstrates that ML methods are useful for predicting smoking initiation with high accuracy, identifying novel smoking initiation predictors, and enhancing our understanding of tobacco use behaviors.

FUNDING: Federal; FDACTP

POS4-132

THE EFFECTS AND IMPLICATIONS OF THE COVID-19 PANDEMIC ON INDONESIAN YOUNG SMOKERS' BEHAVIORS AND PERCEPTIONS

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Significance Smoking prevalence in Indonesia is high and a disproportionate number of individuals who smoke are male. 33.5% of adults older than 15 (64.7% of males, 2.3% of females) and 18.8% of youth ages 13-15 (35.5% of males, 2.9% of females) smoke tobacco. A survey after the first ten months of the COVID-19 pandemic in Indonesia found that 40.3% of respondents who smoked reduced smoking intensity. As a part of a study on cigarette packaging, we examined the effect of the COVID-19 pandemic on the smoking behaviors and perceptions of young Indonesians who smoke. **Methods** We conducted 12 focus group discussions with adolescents and young adults who smoke kreteks stratified by gender and age in July and August 2022 - four groups each of males ages 13-15 and males and females ages 18-24, totaling 72 participants (six per group). Participants were asked how the COVID-19 pandemic impacted their smoking behavior and/or thoughts about smoking. We conducted a thematic analysis of the transcripts. **Results** Among youth and young adult males, reported changes to smoking behaviors due to the pandemic varied - participants from each group reported a mix of decreasing, not changing, and increasing the number of cigarettes smoked. The most common reason for reporting an increase in smoking was boredom. One male stated, "[My smoking] increased because I had more spare time and little activities. So, it's



more about getting rid of the boredom". Males reporting a decrease in smoking cited economic concerns. Young adult female participants commonly reported a decrease in smoking due to health concerns and associated fears. One female participant stated, "It is said that smoking habits also affects the lungs, now that's where I'm afraid of. Because if I get Covid, I fear that I will have more short breath because I smoke often". Another said, "I prioritize health a little bit, previously I could have 1 pack a day, now 2 days, 1 pack". One female reported increasing the number of cigarettes smoked due to boredom, like male participants. **Conclusions** Indonesian males and females who smoke reacted differently to the COVID-19 pandemic in terms of smoking behavior. Infectious disease outbreaks may present an opportunity for public health professionals to leverage communication about the health effects of smoking, particularly among females who smoke. Males who smoke may be more sensitive to messages related to the cost of smoking, particularly during times of economic downturn.

FUNDING: Nonprofit grant funding

POS4-133

REASONS FOR POLY-TOBACCO PRODUCT AND CANNABIS USE AMONG TEXAS YOUNG ADULTS

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SIGNIFICANCE: Past studies have examined reasons for single-product tobacco and cannabis use; limited studies compare use reasons between tobacco and cannabis exclusive and dual- or poly-use. **METHODS:** Participants were 722 young adults from the Texas Adolescent Tobacco and Marketing Surveillance (TATAMS) study. Past 30-day nicotine e-cigarette, cigarette, hookah, cigar, and cannabis users were asked if they agreed with reasons for using products. Reasons assessed were similar across products. For each of the products, reasons for use were compared between exclusive use and dual/poly-use groups. Dual/poly-use groups for nicotine e-cigarettes were: (a) nicotine e-cigarettes + combustible tobacco (cigarettes, cigars, hookah), (b) nicotine e-cigarettes + cannabis e-cigarettes, and (c) nicotine e-cigarettes + any cannabis (cannabis e-cigarettes, blunts, spliffs, edibles, etc.). Cigarette groups were: (a) cigarettes + nicotine e-cigarettes, (b) cigarettes + cannabis e-cigarettes, and (c) cigarettes + any cannabis. Cigar groups were: (a) cigars + nicotine e-cigarettes and (b) cigars + cigarettes. Hookah groups were: (a) hookah + nicotine e-cigarettes and (b) hookah + cigarettes. Cannabis groups were: (a) cannabis + nicotine e-cigarettes, (b) cannabis + combustible tobacco. Differences in prevalence of endorsed reasons for use were assessed via chi-square tests ($p \leq 0.05$) in Stata/SE 17.0. **RESULTS:** Nicotine + cannabis e-cigarette users and nicotine e-cigarette + combustible tobacco users were significantly more likely than exclusive nicotine e-cigarette users to report pleasurable buzz (89% and 88% vs. 77%, respectively). Nicotine e-cigarette + any cannabis users were less likely than exclusive nicotine e-cigarette users to report using e-cigarettes for relaxation (78% vs 87%) and to study/work (41% vs 56%). Cigarette + nicotine e-cigarette users were more likely than exclusive cigarette users to report cigarette smoking while drinking alcohol (84% vs 66%), friends use (46% vs 29%), and when unable to use e-cigarettes (52% vs 17%) as reasons for cigarette use. Cigarette + cannabis e-cigarette users were less likely to report relaxation (66% vs 86%) and more likely to report friends use (48% vs 32%). Prevalent reasons for cigar use were taste and friends use; reasons did not vary significantly between cigar groups. Hookah + nicotine e-cigarette users were more likely than exclusive hookah users to report relaxation (100% vs 47%) and pleasurable buzz (100% vs 65%) and less likely to report taste (50% vs 88%). Cannabis dual product users were more likely than exclusive cannabis users to report while drinking alcohol (>57% vs 44%), taste (>53% vs 35%), and treating a health condition (>18% vs 10%) as reasons for use. **CONCLUSION:** Cessation programs and messages should consider differences in reasons for using tobacco and cannabis among young adult exclusive and dual- or poly-users.

FUNDING: Federal

POS4-134

OBSERVED TOBACCO PRODUCT WASTE NEAR SCHOOLS IN KOLKATA, INDIA

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Significance Tobacco product waste is the most collected litter item globally. Reducing tobacco product litter will help the environment, and could further support the denormalization of tobacco use, an important strategy to discourage youth initiation. This observational study quantified and classified tobacco product waste near schools in Kolkata, India. **Methods** Litter observations were conducted along 18 pre-determined paths located in geographically dispersed areas of Kolkata. Each path was near a tobacco retailer and a school with students aged 13-18. The schools were a mix of private and public, and were located equally in low, medium, and high socioeconomic (SES) areas. Observation paths ranged between 500-700 meters in traversed distance. Each path was visited twice for a total of 36 observations. Data collectors used a mobile app to record each piece of tobacco product waste and classified it as either a bidi or cigarette butt, a bidi or cigarette pack, smokeless tobacco product (SLT) packaging, or e-cigarette/heated tobacco product (HTP) waste. Data collectors also noted if the tobacco product waste had a discernable brand. **Results** Data collectors observed N=2,340 pieces of tobacco product waste across a distance of 19,382m. The number of pieces of tobacco product waste per observation ranged from 34 to 123. SLT litter was the most observed tobacco product waste representing over one half of the sample (n=1196, 51%), followed by cigarette butts (n=489, 21%), bidi butts (n=483, 21%), cigarette packs (n=115, 5%), and bidi packs (n=57, 2%). No e-cigarette/HTP waste was observed. Across the sample of litter, 36% (n=852) had visible branding. There was no difference in the quantity or proportion of tobacco product waste along paths near private schools compared to litter observed near government schools. A greater proportion of the litter was observed along paths located in low SES areas (n=890, 38%), followed by medium SES (n=840, 36%) and high SES areas (n=610, 26%). **Conclusions** Tobacco product waste was observed during each observation. On average, there was a piece of tobacco product waste approximately every 8m. These data suggest that school aged children (13-18) might have another exposure point to tobacco products on a regular basis, including waste that is branded. SLT packets and cigarette butts comprised most of the observed litter; this waste is often plastic which can remain in the environment in perpetuity.

FUNDING: Nonprofit grant funding

POS4-135

INFLUENCE OF CANNABIS USE ON SUBSEQUENT CIGARETTE SMOKING CESSATION AMONG ESTABLISHED CIGARETTE USERS IN THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY WAVES 4-5

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Introduction: Cannabis use has been found to be common among cigarette users. As the legal and societal landscape of cannabis use rapidly evolves, it is important to understand if cannabis use hinders tobacco cessation efforts. This study examines the association between cannabis use among established adult cigarette users and subsequent tobacco cessation. **Methods:** Data on adult current cigarette users (n=7,120) were derived from Waves 4 and 5 (2016-2019) of the Population Assessment of Tobacco and Health (PATH) Study. Weighted multivariable logistic regression models assessed the association between past 30-day cannabis use at baseline (W4) and self-reported 30-day cigarette smoking abstinence at follow-up (W5), adjusting for demographics, nicotine dependence, and internalizing and externalizing mental health problems. **Results:** Approximately 28% (95% CI: 26.0, 29.0) of established cigarette users reported past 30-day cannabis use at baseline. Slight differences in the distribution of demographic and other characteristics were observed between past 30-day cannabis users and non-users. Roughly 13.5% (95% CI: 12.3, 14.7) of established smokers reported 30-day smoking abstinence at follow-up. The prevalence of smoking abstinence was slightly higher among cannabis non-users at baseline compared to cannabis users (13.8% vs. 12.7%). The absence of recent cannabis use at baseline was associated with a modest increased odds of cigarette smoking abstinence at follow-up; however, the association was not statistically significant (OR= 1.10; 95% CI: 0.90-1.34; p=0.33). Findings remained the same after adjusting for age, race/ethnicity, nicotine dependence, and internalizing and externalizing mental health problems. **Discussion:** After controlling for important confounding variables, cannabis use was unrelated to subsequent smoking cessation among established cigarette users thus co-use (cannabis and tobacco) does not appear to reduce tobacco cessation efforts. Our findings contrast with studies using earlier waves of PATH data and may signal shifts in reasons for and patterns of cannabis use. Future studies should explore differences in routes of cannabis administration and frequency on cessation outcomes, as well as other measures of cessation, such as abstinence from all combustible tobacco products, smokeless tobacco products, and alternative products.

FUNDING: Federal



POS4-136

THE EFFECTIVENESS OF SMOKING CESSATION EDUCATION AND TRAINING ONNURSING STUDENTS: A SYSTEMATIC REVIEW

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Significance: Nursing students will be essential in assisting patients and smokers to give up tobacco since they will be the nurses of the future. Several studies demonstrating the effectiveness of smoking cessation training in nursing students, but the effectiveness of learning outcomes has not been evaluated in systematic reviews. **Objectives:** To systematically evaluate effectiveness of smoking cessation training and education in enhancing nursing students knowledge, attitude/belief, and practice, providing recommendations for the future smoking cessation curriculum. **Design:** The systematic review informed by PRISMA guidelines and registered in PROSPERO (CRD42022373280). **Review methods:** Data sources from PubMed, Web of Science, CINAHL, Cochrane Library, Embase, PsycINFO, Scopus, ScienceDirect, ERIC and China National Knowledge Infrastructure. The retrieval time was from the establishment of those databases to October 2022. Studies are limited to randomized controlled trials (RCTs) or quasi-experimental designs (two groups or one group pre- and post-). The manual search of the references of the identified studies was also conducted to find the potential articles. Using the Medical Education Research Study Quality Instrument (MERSQI), two authors independently evaluated the methodological quality of the eligible studies. **Results:** This review included 12 articles, with 3 RCTs and 9 quasi-experimental studies. All articles have moderate to high methodological quality. 7 studies indicated that students' knowledge was improved, 4 articles found nursing students showed positive attitudes for the quit smoking intervention, 2 studies reported motivation was improved and 9 studies indicated that higher level of self-perceived competence self-efficacy/confidence. 2 studies reported students' behavior and practice on smoking cessation counselling were improved, and 2 studies found that the smoking status of students did not change after smoking cessation curricular. **Conclusions:** Results from this review showed that smoking cessation educational interventions have a favorable impact on nursing students' knowledge, attitude/belief, and practice about smoking cessation counselling. Based on the results, we recommend that smoking cessation education should be an essential part of the acquired courses for nursing education. Nursing educators should give more emphasis on the empathized relationship between the students and smokers. In addition, there should be more chances for nursing students to practice smoking cessation counseling. The quitting smoking plan should arrange for nursing students who are smokers during the curriculum.

FUNDING: Other: None

POS4-137

LONGITUDINAL PATTERNS OF SMOKING BEHAVIOURS IN ADOLESCENCE AND EARLY ADULTHOOD AND THEIR ASSOCIATION WITH MODIFIABLE AND SOCIODEMOGRAPHIC RISK FACTORS

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Smoking contributes a huge burden on public health, therefore identifying potential risk factors for smoking behaviours could help to improve tobacco control policies and identify effective intervention targets for smoking cessation. Smoking measures are often collected at a single timepoint and as a result can be subject to recall bias and measurement error, and do not tell us about smoking behaviours over time. Investigating smoking across an extended period of time can help reduce this bias and enable us to identify factors that influence these behaviours. This investigation looked at longitudinal patterns of smoking derived from 13 to 28 years of age using 12 repeated measures of smoking collected within the Avon Longitudinal Study of Parents and Children (ALSPAC). These patterns were derived using a longitudinal latent class analysis. We then looked at the association of these smoking patterns with over 500 measures of modifiable and sociodemographic factors including familial, peer and personal smoking and substance use, mental health and wellbeing, body mass index (BMI), diet, physical activity, sleep, pregnancy or parenthood, sex, ethnicity, education, socioeconomic position (SEP), employment, neighbourhood deprivation, adverse childhood experiences (ACEs) and trauma. It appears that the strongest correlates of smoking were having parents or household members who smoked during pregnancy or throughout childhood and adolescence, having friends who drink, smoke or use drugs, personal use of tobacco, cannabis, alcohol and other drugs in early adolescence, later use of drugs, and whether the participant became a parent in early adulthood. Many other correlates such as those related to education and mental health were also identified. This suggests that smoking behaviours may be reduced by targeting smoking and drug awareness campaigns at

young teenagers and by encouraging parents to quit smoking or abstain from using other substances, and this could be done through improving education and cessation programmes delivered via schools and maternity clinics.

FUNDING: Academic Institution; Nonprofit grant funding

POS4-138

E-CIGARETTE VENDING MACHINE AVAILABILITY IN MEXICO AND GUATEMALA

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Significance: Vending machines (VMs) have proven to be a successful sales strategy adopted by the tobacco industry. With the introduction of electronic cigarettes (e-cigarettes), VMs seem to be the new sales and promotion channel used by the industry to bring its product closer to potential consumers. Since 2021, e-cigarettes VMs were documented in shopping malls in Guatemala and Mexico. Given that VMs can facilitate minors to access e-cigarettes, as they can buy them without the possible restriction of convincing a salesperson, it is necessary to analyze their growth as a sales channel. This study examined the availability of e-cigarette VMs in Mexico and Guatemala and characterized them in terms of location, regulatory aspects, and product availability. **Methods:** We conducted a systematic identification and characterization of e-cigarette VMs in 5 Mexican cities (Mexico City, Puebla, Aguascalientes, San Cristobal, and Tuxtla Gutierrez) and 4 in Guatemala (Guatemala City, Mixco, Antigua Guatemala, and Quetzaltenango). A convenience sample was chosen in both countries, visiting 372 shopping malls (300 in Mexico and 72 in Guatemala). **Results:** A total of 50 e-cigarette VMs were found: 25 in Mexico and 25 in Guatemala. Almost all of them (98%) had visible products displayed, 92% sold disposable e-cigarettes and 64% sold multiple brands. Most VMs accepted cash (80%) and credit cards (78%) as payment methods and only 2 had an age-verification system (4%). Most VMs sold menthol (74%), menthol plus fruit (86%), tropical fruit (88%), citrus (76%), berries (78%), and non-alcoholic (72%) drinks flavor varieties. Health warnings were displayed in 24% of Mexican and 76% of Guatemalan VMs, while "no sale to minors" signs were present in 22% and 88% respectively. Price ranges in Mexico were between \$7.62 and \$33.02 USD, while in Guatemala from \$12.38 to \$42.72 USD. In Mexico, products were available with nicotine concentrations ranging from 0 - 50mg/dl (0 - 5%) and 200 to 5,000 puffs, while in Guatemala from 0 - 60mg/dl (0 - 6%) and 800 to 5,500, respectively. **Conclusion:** E-cigarette VMs represent an open sales channel appealing to the novel features in e-cigarettes such as different flavors, nicotine concentrations and number of puffs. Although Mexico has banned and Guatemala regulated VMs, these are still present in the market, without health warnings or age verification systems to prevent minors from accessing an addictive and potentially harmful product.

FUNDING: Federal

POS4-139

NUMERACY ACCORDING TO DEMOGRAPHIC AND TOBACCO USE BEHAVIORS IN THE UNITED STATES: SECONDARY ANALYSIS OF WAVE 3 OF THE HEALTH INFORMATION NATIONAL TRENDS SURVEY (HINTS)

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Significance: Numeracy is the ability to understand statistical and mathematical information, which can influence how and why information is processed and understood and may affect a person's decision-making skills. Numbers and statistics can be used to communicate the dangers of using tobacco products to the public, and thus a person's numerical ability could potentially play a role in their perceptions of the risks of certain diseases associated with smoking. In this study, we explored how numeracy is related to risk understanding (and salience) and decision making around tobacco use. We also explored how this relationship differs by demographic or behavioral factors. The implications of this research include determining whether numeracy impacts risk perception of tobacco-related diseases and subsequent tobacco use behaviors. The findings will help to inform effective risk communication strategies tailored to specific subgroups. **Methods:** We analyzed the relationships between numeracy and demographics/tobacco



use behaviors using Wave 3 (2007) of the Health Information National Trends Survey (HINTS). Linear and logistic regressions were run to explore whether numeracy was associated with specific demographic characteristics or tobacco use behaviors. Data was analyzed using SAS 9.4. Results: Age, education, sex, race, and income were associated with numeracy ($p < 0.05$). There are mean differences in numeracy by smoking status, cigarettes per day among individuals who smoke some days, cigarettes per day among individuals who previously smoked every day, quit attempt status, and quit intentions ($p < 0.05$). The highest numeracy means were among individuals who never smoked, individuals who some days smoke 5-10 cigarettes a day, individuals who previously smoked 0-5 cigarettes per day every day, individuals who have not tried to quit in the past year, and individuals who do not plan on quitting within the next 6 months. Conclusions: Numeracy differs by tobacco use behaviors and demographic characteristics. These results contribute evidence for the need of targeted risk communications that is numeracy-level appropriate. It also provides an indication as to who should be targeted with this information.

FUNDING: Federal

POS4-140

THE ASSOCIATION BETWEEN TOBACCO USE AND COVID-19 IN QATAR

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Significance: The effects of smoking on COVID-19 are controversial. Some studies show no link between smoking and severe COVID-19, whereas others demonstrate a significant link. This cross-sectional study aims to determine the prevalence of tobacco use among COVID-19 patients, examine the relationship between tobacco use and hospitalized COVID-19 (non-severe and severe), and quantify its risk factors. **Methods:** A random sample of 7430 COVID-19 patients diagnosed between 27 February-30 May 2020 in Qatar were recruited over the telephone to complete an interviewer-administered questionnaire. **Results:** The prevalence of tobacco smoking in the total sample was 11.0%, with 12.6% among those quarantined, 5.7% among hospitalized patients, and 2.5% among patients with severe COVID-19. Smokeless tobacco and e-cigarette use were reported by 3.2% and 0.6% of the total sample, respectively. We found a significant lower risk for hospitalization and severity of COVID-19 among current tobacco smokers ($p < 0.001$) relative to non-smokers (never and ex-smokers). Risk factors significantly related to an increased risk of being hospitalized with COVID-19 were older age (aged 55+), being male, non-Qatari, and those with heart disease, hypertension, diabetes, asthma, cancer, and chronic renal disease. Smokeless tobacco use, older age (aged 55+), being male, non-Qatari, previously diagnosed with heart disease and diabetes were significant risk factors for severe COVID-19. **Conclusion:** Our data suggests that only smokeless tobacco users may be at an increased risk for severe disease, yet this requires further investigation as other studies have reported smoking to be associated with an increased risk of greater disease severity.

FUNDING: Academic Institution; Other: Medical Research Center in Hamad Medical Corporation

POS4-141

COPD AND PRISM TRENDS FROM 2007-2012 AMONG US SMOKERS IN A NATIONALLY REPRESENTATIVE DATASET

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Significance: Those who use cigarettes are susceptible to various lung diseases due to impaired lung function. Preserved ratio impaired spirometry (PRISm) is a form of early lung obstruction associated with respiratory symptoms, chronic obstructive pulmonary disease (COPD) development, and mortality. Our study examines the trends of COPD severity categories and PRISm among US adult smokers stratified by gender and race. **Methods:** We used pre-bronchodilator spirometry data from the National Health and Nutrition Examination Survey (NHANES) from three waves 2007-2012 to estimate trends of COPD, COPD stratified by Global Initiative For Chronic Obstructive Lung Disease (GOLD) severity status, and PRISm. COPD was defined as FEV1/FEV < 0.7. We further stratified COPD by GOLD status defined by: GOLD 0, GOLD 1, GOLD 2, and GOLD 3&4. PRISm was defined as FEV1/FEV ≥ 0.7 and predicted FEV1% < 0.8. We defined smoking status as: current (100+ lifetime cigarettes and "Yes" to current smoking), former (100+ lifetime cigarettes and "No" to current smoking) and never (<100+ lifetime cigarettes). The an-

alytic sample included adults 20-79 years with complete smoking status and medical examination. Our analyses were conducted using single-year baseline weights. **Results:** Between 2007 and 2012, COPD prevalence increased 3.7% in current smokers, 2.7% in former smokers, and decreased 1.8% in never smokers. PRISm prevalence decreased 1.4% among current smokers, remained stable among former smokers (8.6-8.8%), and increased 1.5% among never smokers. By GOLD status, GOLD 1 prevalence was highest among former smokers (10.3-11.6%), while GOLD 2 (9.7-11.8%) and GOLD 3 & 4 (1.5-3.1%) prevalence was highest among current smokers. Never smokers had the lowest burden of COPD (6.5-8.3%) and PRISm (9.3-10.3%). During this time period, current male smokers had a higher prevalence of COPD (23.7-28.6%) than current female smokers (17.8-21.8%). However, current female smokers had higher PRISm prevalence (8.2-13.9%) than current male smokers (6.6-10.5%). Non-Hispanic White smokers had the highest COPD prevalence at 31.9%; non-Hispanic Black smokers had the highest PRISm prevalence at 38.8%. **Conclusions:** We found that there is a significant COPD and PRISm burden among smokers in the US. Stratified analyses showed that there are significant COPD and PRISm disparities that exist between gender and race/ethnicity. In particular, future research should examine PRISm in non-Hispanic Blacks and females.

FUNDING: Federal; Other: Research reported in this publication was supported by the National Cancer Institute of the National Institutes of Health under Award Number K01CA260378

POS4-142

EXPLORING PREFERENCES FOR ASSISTANCE WITH TOBACCO USE AND FOOD ACCESS AMONG CANCER SURVIVORS

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Significance: Tobacco use and food insecurity after a cancer diagnosis lead to poor outcomes and targeting both conditions may have synergistic effects. This study aimed to identify preferences for assistance with tobacco use and food insecurity among cancer survivors to inform the development of targeted interventions. **Methods:** Between December 2021 and July 2022, we conducted virtual/in-person semi-structured interviews (n=4) with cancer survivors who reported current cigarette use and difficulty affording food. Interviews were transcribed and analyzed using an inductive approach. Interviews were dual coded by two research assistants with minimal discrepancies. We assessed important aspects of smoking cessation programs, cancer support programs, food supplemental programs and participant's interest in 3 comprehensive services for smoking cessation and food-insecurity: 1) online integration, 2) telephone or video integration, and 3) in-person integration. **Results:** Participants were an average of 54.5 years (SD=15.61), 50.0% male (vs female) and 50.0% smoked every day (vs some days). Common themes emerged from interviews; Participants reported smoking due to stress from their cancer diagnosis and had an interest in quitting. With regard to helpful aspects of assistance programs, participants reported needing support, a distraction from smoking, and liked the concept of text message reminders. Participants reported an inability to follow doctors' orders with respect to nutrition due to affordability. With regard to feedback for comprehensive services for cancer survivors, participants reported uncertainty about using online applications or websites. Participants favored a telephone or video integration for time and money saving purposes and having a one-on-one coach. In-person integration was the least favored due to traveling far distances. **Conclusion:** Cancer survivors can benefit from alleviating smoking and food-insecurity, two factors that compound health harms and place cancer survivors at especially high risk for poor outcomes. Findings from this study underscore cancer survivor's interest in quitting smoking, difficulty affording nutritious meals, and preferences for how programs can mitigate these conditions. Our study is limited for its sample size due to challenges recruiting participants meeting inclusion criteria of tobacco use, cancer survivorship, and food insecurity. Future research should tailor interventions that target these factors through preferences for treatment identified from this work.

FUNDING: Federal



POS4-143

RELATIONSHIP BETWEEN ORAL MICROBIOME CHARACTERISTICS AND SOCIODEMOGRAPHIC FACTORS IN INDIVIDUALS WHO SMOKE

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Background: Cigarette smoking, diet, and other individual factors contribute to the compositional and functional variations in the oral microbiome, potentially affecting the microbially-mediated metabolism of tobacco toxicants and carcinogens. In a previous study, we have shown that microbial diversity was associated with HPB-releasing DNA adducts (DNA damage derived from tobacco-specific nitrosamines) and race, with African American (AA, n=74) having higher microbial diversity compared to White (WH, n=72) individuals who smoke. **Methods:** In this study, we used previously generated compositional data on oral bacterial communities (16S rRNA gene sequencing V4 hypervariable region) and available questionnaire data from the same study participants to examine the relationship between oral microbiome characteristics and sociodemographic factors such as marital status, current living situation (i.e., living alone or with others), education, employment, and annual income. **Results:** Alpha-diversity metrics (observed richness and Shannon index) differed significantly based on the current living situation (Kruskal-Wallis test, $H = 8.04$, $p = 0.02$, $H = 13.9$, $p < 0.01$, respectively). The post hoc test showed that both diversity indices were significantly different for those who lived with friends, parents, or other relatives compared to those with a spouse, partner, or kids ($p < 0.05$). There were no apparent differences in alpha diversity by marital status, education, employment, and income. Beta diversity, measured by weighted Bray-Curtis and Unifrac distances, did not differ between the groups ($p > 0.05$). However, indicator species analysis showed that *Prevotella*, *Actinomyces*, and *Veillonella* spp were associated with those who were married and lived with a spouse partner and kids. Functional analysis based on metagenome predictions revealed that bacterial pathways involved in carbohydrate metabolism were enriched in those who were separated, lived alone, and were homemakers. Pathways involved in the metabolism of formaldehyde and carbon dioxide fixation were also enriched in those who were homemakers. **Conclusion:** Together, these findings suggest that the oral microbiome's characteristics reflect the complexity of smoking exposures and sociodemographic stressors. The combined impact of such factors on smoking-associated health outcomes and the potential use of the oral microbiome as a novel tool for assessing tobacco use-associated harm should be further investigated.

FUNDING: Academic Institution

POS4-144

ARE E-CIGARETTE HOME BANS ASSOCIATED WITH REDUCED FREQUENCY OF E-CIGARETTE USE? A PILOT STUDY AMONG YOUNG ADULTS IN SOUTHERN CALIFORNIA DURING THE COVID-19 PANDEMIC

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Significance: Recent literature suggests that current vapers are significantly more likely to allow vaping inside the home compared to never-users. This lack of a "home ban", or complete restriction of e-cigarette use in the home, leads to in-home use that exposes both the primary user and others living in the home to constituents in e-liquid such as nicotine, propylene glycol, flavorings, and other chemicals through second- and third-hand routes. While current literature shows an association between e-cigarette home ban status and e-cigarette user vs. non-user status, the relationship between e-cigarette home ban status and e-cigarette use frequency among e-cigarette users hasn't been thoroughly addressed. This study assessed if an e-cigarette home ban is associated with reduced frequency of e-cigarette use among young adult e-cigarette exclusive and dual users (e-cigarettes + another product) in Southern California. **Methods:** Young adults who were a) current exclusive e-cigarette users ($n = 11$), b) dual users (n

$= 23$), or c) non-users ($n = 38$) completed an online survey examining household rules regarding e-cigarettes and frequency of tobacco/nicotine product use (past 30-days). Chi-square and independent sample t-tests were used to examine the association between household bans for e-cigarette use and frequency of use. **Results:** Participants (MeanAge[SD]=21.5[0.56] years) were mostly female (61.1%), mostly Hispanic or Latinx (54.2%), and reported residing with caregivers (76.4%). A greater proportion of current e-cigarette exclusive and dual users ($n = 33$; 51.5%) reported having no household ban on e-cigarettes compared to non-users ($n = 36$; 19.4%; $\chi^2 (1, N = 69) = 7.81$, $p = .01$). However, no significant differences were observed for e-cigarette household ban and past 30-day frequency of e-cigarette use (no household rule: Mean = 22.3 days [SD=10.4]; household rule: Mean = 16.1 days [SD = 10.9]; $t(31) = 1.66$, $p = 0.11$). **Conclusions:** A higher proportion of e-cigarette exclusive and dual users allowed vaping inside the home compared to non-users. While household ban and frequency of use was not significantly different in this study, future work should continue to examine individual and interpersonal level factors, like household home bans, which may help prevent and reduce e-cigarette use among young adults in the future.

FUNDING: Federal

POS4-145

IMPACT OF POLICIES FOR TOBACCO HARM REDUCTION PRODUCTS ON SMOKING TRENDS IN SELECTED LOW-INCOME COUNTRIES OF ASIA

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Significance: Because of the significant morbidity and mortality rates, tobacco smoking continues to be a serious problem for global public health. Although smoking is becoming less common overall, it is consistently increasing in the low-income countries of Asia. According to contemporary estimates, tobacco smoking causes an annual global economic loss of \$1.4 trillion, or 1.8% of the global gross domestic product. **Methods:** A total of 9 bibliographic and impact evaluation databases i.e. Google scholar, Hinari, Cochrane Tobacco Addiction Group Specialized Register, MEDLINE, Science Direct, EMBASE, PsycINFO, Web of Science and CINAHL were searched. The grey literature of IRIS (WHO), Oaister, and Google Scholar, Websites of various organizations and reference lists, INASP journals and online research projects were searched using a comprehensive search strategy. **Results:** All the aspects including agriculture, environment, health, economy, and market sector are the diversified efforts in tobacco harm reduction from the level of production and cultivation to supply and distribution of tobacco products. Global and regional disparities are prevalent in the distribution of tobacco harm-reduction products and combustible smoking. Tobacco harm reduction product policies and the smoking consumption pattern have a significant impact on low-income countries of Nepal. **Conclusion:** The findings of this study are one of the few in LMICs that is focused on the impact of policies on the THR. It argues that any attempt to achieve tobacco harm reduction regulation in this significant knowledge gap will certainly not succeed. The policies on addressing smoking cessation, switching, and prevention of tobacco use in the anti-tobacco field. We suggest a series of policies to explore of the costs and benefits.

Poster Session 5: Rapid Submissions



RAPID SUBMISSIONS: POSTER SESSION 5

POS5-1

ELECTRONIC HOOKAH (WATERPIPE) VAPING REDUCES VASCULAR ENDOTHELIAL FUNCTION: THE ROLE OF NICOTINE

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Significance Vaping (i.e., inhalation of vaporized liquid that includes nicotine and non-nicotine constituents, including solvents, and flavorings) has risen exponentially in recent years, particularly among young adults. Electronic (e-) hookahs are a newer category of vaping devices touted as safer tobacco alternatives. Emerging studies show that vaping increases cardiovascular disease risk, which has been attributed, in part, to vascular endothelial dysfunction. While e-hookah vaping acutely reduces endothelial function, the specific role of nicotine and the mechanisms by which it may impair endothelial function remain understudied. **Methods** In a randomized cross-over design study, we investigated the acute effects of e-hookah vaping, with and without nicotine, as compared to sham vaping on endothelial function assessed by brachial artery flow-mediated dilation (FMD), among 18 overtly healthy young adult hookah smokers. To determine the role of changes in circulating factors in serum after e-hookah vaping on endothelial cell function, human umbilical vein endothelial cells (HUVECs) were cultured with participants' serum sampled before and after the vaping sessions and acetylcholine-stimulated NO production and basal reactive oxygen species (ROS) bioactivity were assessed. Plasma nicotine were collected before and after the sessions. **Results** E-hookah vaping with nicotine, which acutely increased heart rate (HR) +7±2 bpm and mean arterial pressure (MAP) +8±2 mm Hg (mean±SE; P<0.001), decreased endothelial-dependent FMD by -1.62±0.25%Δ (P=0.001), indicating impairment in endothelial function. Vaping e-hookah without nicotine, which mildly increased hemodynamics (HR +2±1 bpm and MAP +1±1 mm Hg; P=ns), did not significantly impair endothelial function. No changes were observed after sham vaping. HUVECs cultured with participants' serum after vs before e-hookah vaping with nicotine, but not without nicotine or sham vaping, exhibited reductions in endothelial cell NO bioavailability and increases in ROS bioactivity (P<0.05). Plasma nicotine concentrations increased after vaping e-hookah with nicotine (+4.9±0.9 ng/mL; P<0.001), whereas no changes were observed after vaping e-hookah without nicotine or sham (P=ns). **Conclusions** Acute e-hookah vaping induces endothelial dysfunction by impairing NO-bioavailability associated with increased ROS production, and these effects are attributable to nicotine, not to non-nicotine constituents, present in the flavored e-liquid. Future studies are needed to understand the long-term and cumulative effects of e-hookah vaping, with or without nicotine, on vascular health.

FUNDING: State; Academic Institution

POS5-2

THE IMPACT OF E-CIGARETTES ON SMOKING CESSATION: RESULTS FROM A LARGE, RANDOMIZED, NATIONWIDE CLINICAL TRIAL IN THE UNITED STATES

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Introduction: Recent evidence suggests an association between e-cigarette use and subsequent smoking cessation. Most of this evidence comes from a limited number of observational/cohort studies, and an even fewer number of randomized studies. Among the existing trials to date, most have been conducted beyond the US, and primarily focused on instructive; i.e., purposeful and often guided e-cigarette use with aim to achieve smoking cessation. Complementing this existing literature, we herein present results from a recently concluded RCT conducted nationwide in the US that examined the naturalistic impact of e-cigarette sampling among current cigarette smokers with minimal e-cigarette experience. **Methods:** Participants were randomized in a 2:1 fashion to either receive (or not) an NJOY e-cigarette and a 4-week supply of pods, in multiple flavor options, with minimal instructions on use, nor any requirement to change smoking. Participants completed daily electronic diaries of tobacco use for 4 weeks, and regular

phone assessments for 6 months. Data collection completed 8/2022, with early results now available. **Results:** The final sample (N=638) was demographically diverse: 53.6% female, 68.5% White (18.5% Black; 14.1% Hispanic), 30.9% ≤HS education, mean age 42.3 (SD=11.5), with limited interest in quitting smoking (mean motivation to quit on 0-10 VAS=4.3; SD=3.2; 24.1% making QA in prior yr). Those receiving e-cigarettes (relative to those who did not) were significantly more likely to make a 24hr quit attempt within the first 4 weeks (26% vs. 14%; OR=2.5; 95% CI: 1.4-4.6), more like to achieve abstinence (7-day PPA) both at 1 month (10% vs 1%; OR=12.0; 95% CI: 2.9-50.0) and 6 months (14% vs 8%; OR=1.8; 95% CI: 1.0-3.2), and more likely to achieve 50% reduction in CPD throughout follow-up, up through 6 months (28% vs. 18%; OR=1.8; 95% CI: 1.2-2.7). There were significant time x group interactions for motivation & confidence to quit, and cigarettes smoked per day. Additional results anticipated for conference presentation include: patterns of dual use, changes in cigarette/e-cigarette dependence and product adoption beyond sampling. **Conclusions:** Complementing the existing literature that focuses on prescriptive e-cigarette use with goals of smoking cessation among treatment seeking smokers, the current trial demonstrate that unguided, self-determined use of e-cigarettes also leads to smoking cessation, offering both clinical and regulatory significance.

FUNDING: Federal; Other: n/a

POS5-3

\$100 VS. \$0 TO ENGAGE IN TELEPHONE COUNSELING: A RANDOMIZED, PLACEBO-CONTROLLED TEST OF MODEST FINANCIAL INCENTIVES TO IMPROVE ENGAGEMENT IN EVIDENCE-BASED TOBACCO TREATMENT

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Significance: Low rates of evidence-based smoking cessation treatment use contribute to the burden of mortality and low health quality of life among individuals who smoke. Increased use of smoking cessation treatments by patients who smoke will enhance value-based healthcare and reduce smoking costs to the individual and health system. Use of financial incentives may increase recommended smoking treatment use at reasonable costs to the healthcare system with little additional staff burden due to outreach activities. **Methods:** This randomized, active placebo-controlled trial of the effectiveness of \$0, \$50, or \$100 financial incentives for patients who smoke to engage tobacco treatment was conducted in a single healthcare system in southern Wisconsin. Eligible patients were all adults meeting Cigarette User Registry criteria who were contacted by a tobacco treatment specialist (TTS) via proactive telephone outreach to discuss tobacco use. Treatment enrollment was the proportion of those offered treatment and the financial incentive who accepted. Treatment engagement was assessed by setting a target quit date (TQD) within the next 30 days and completion of two counseling sessions (pre-TQD & 4-week post-TQD). Smoking status including biochemical confirmation of self-report abstinence was assessed at 6-months post-TQD. **Results:** Proactive outreach by the healthcare system TTS connected with 196 patients who smoke to offer the randomized financial incentive resulting in 98 smoking treatment enrollments (\$0: 38 enrolled/65 offered, 58%; \$50: 30 enrolled/65 offered, 46%; \$100: 30 enrolled/63 offered, 48%). Chi-square tests of rates of completion of 4-week post-TQD treatment by incentive condition were not statistically significant (e.g., \$0 (14 completed, 24 did not complete) vs. \$50 or \$100 (28 completed, 32 did not complete); p-value=0.3383). Chi-square tests of differences in CO-confirmed abstinence rates by incentive condition were not statistically significant (e.g., \$0 (35 smoking, 3 abstinent) vs. \$50 or \$100 (53 smoking, 7 abstinent); p-value=0.5478). **Conclusions:** Modest financial incentives for patients who smoke to engage in evidence-based tobacco treatment were not effective in increasing participation nor smoking abstinence. This finding contrasts with other data indicating positive treatment response to financial incentives. Our population may be unusual in that they had already been exposed to high rates of healthcare system proactive outreach for tobacco treatment support.

FUNDING: Federal



POS5-5

ADAPTING AN INTEGRATED MHEALTH APP FOR SMOKING CESSATION IN BLACK SMOKERS WITH ANXIETY: A QUALITATIVE ANALYSIS

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Significance: Black smokers have lower rates of smoking cessation and experience disparities in most smoking-related diseases. Tailored mobile health (mHealth) applications may offer a novel way of addressing cessation disparities. **Methods:** An evidence-based mHealth app previously developed for smokers with anxiety was adapted for Black smokers with anxiety by incorporating culturally tailored content (tobacco industry marketing of menthol cigarettes to Black communities, effects of discrimination on smoking and relapse, and use of Black narrators). The 6-week Mobile Anxiety Sensitivity Program for Smoking (MASP) was pilot tested with a nationwide sample of 24 Black smokers who were ≥ 18 years old, smoked ≥ 10 cigarettes daily, reported elevated anxiety, and desired to quit smoking within the next 2 weeks. Following the intervention, participants (21/24) completed a qualitative interview to assess MASP acceptability and usefulness, relevance and fit for Black smokers, barriers to use, and possible improvements. Transcribed interviews were coded using NVivo then analyzed for themes. **Results:** Participants ($n=21$) were 67% female, 71% college educated, and a mean age of 47 years (range 31-65 years). Participants suggested that recruitment materials should establish legitimacy of the study and reduce skepticism of the study, including professional appearance of the advertisement and linking the study with the university. Participants were attracted to the intervention because it was delivered via app, offered free nicotine replacement products, and included content addressing tobacco industry marketing practices, chronic stress, and race. Suggestions to make the app more culturally relevant included increased diversity in photos and videos, testimonials of previous Black participants, and asking about use of Black and Milds in the daily app surveys. The app had high acceptability, was easy to use, and was well-liked, particularly the stress-management toolkit, quitting strategies and daily messages. The most frequently suggested improvement was integrating interactions with other participants through the app, either through a chat room, discussion board, or establishing a virtual buddy system. **Conclusion:** Findings from this study were used to modify the app for the Phase II randomized controlled trial that will compare the improved MASP app to the NCI QuitGuide app for smoking cessation. Phase I findings contribute to culturally-informed evidence-based cessation interventions for Black smokers that can be widely disseminated.

FUNDING: Federal; Academic Institution

POS5-6

CROSS-VALIDATION OF SMOKING CONSUMPTION COLLECTIONS USING TIMELINE FOLLOW-BACK AND DIGITAL DIARY

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Background: The timeline follow-back (TLFB) interview is a common method of collecting daily cigarette consumption (cigarettes per day, CPD) in smoking research. However, it may be subject to recall bias because of its reliance upon retrospective reports often collected days or weeks later. The increasing ownership of smartphones allows many researchers to administer smartphone app-based digital diaries (DD) to collect CPD each day, which is expected to have less bias than the TLFB method. Several studies have compared these two methods for CPD collection and found that there is a noticeable discrepancy between them. However, these studies have generally focused on the time window when smokers were smoking ad libitum, and little is known regarding whether these two methods are comparable when smokers are attempting to quit smoking. **Methods:** In a medication treatment for smoking trial, treatment-seeking smokers ($n=251$, baseline mean CPD = 18.0) reported their daily cigarette consumptions using the TLFB and DD methods over the course of twelve weeks of treatment that included pharmacotherapy and counseling. **Results:** Using the Bland-Altman comparison approach, we found that the two methods produced a good agreement, which did not vary as a function of consumption levels, unlike previous findings. Consistent with this agreement, the correlations with biochemical measures of smoking (e.g., carbon monoxide and cotinine) between these two methods did not differ. Despite the good agreement, the

DD method appeared to be more precise by having less digit bias (i.e., the tendency to report CPD as multiples of five and ten) than the TLFB method. **Conclusion:** Both TLFB and DD agreed when assessing CPD during the cessation phase, but the DD was less subject to recall bias because of its reduced digit bias. Thus, capturing smoking behavior using either TLFB or DD approaches is likely to yield similar data when used while smokers are attempting to quit smoking.

FUNDING: Academic Institution

POS5-7

FACTORS PREDICTING LEVELS AND CHANGES OF MOTIVATION AND SELF-EFFICACY TO QUIT SMOKING AMONG PEOPLE WHO SMOKE WITH SERIOUS MENTAL ILLNESS

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Significance: People with serious mental illness (SMI) who smoke have low cessation rates. Given that motivation and self-efficacy to quit predict cessation success, it is important to understand changes in motivation and self-efficacy among high-risk populations. This study investigated: 1) changes in motivation and self-efficacy over time, 2) the effect of treatment and baseline psychiatric symptoms on levels and changes in motivation and self-efficacy over time among individuals with SMI with and without treatment post-psychiatric hospitalization. **Methods:** Participants were 353 adults with SMI in inpatient psychiatric care who smoked at least 5 cigarettes/day pre-hospitalization who were randomized to receive either a sustained care (SusC) smoking cessation intervention (motivational counseling, 12-week post-discharge telephone counseling) or usual care (brief counseling and self-help materials). Participants completed baseline, 1, 3 and 6-month assessments including questionnaires on depressive, anxiety, psychotic and emotion liability symptoms, two motivation questions (desire to quit, willingness to work hard at quitting), and two self-efficacy questions (perceived difficulty, likelihood of cessation success). All models included baseline values of corresponding outcomes and treatment condition as covariates. **Results:** Multilevel models revealed that out of four motivation and self-efficacy outcomes, only willingness to work hard increased from 1 to 6 months ($\beta = -.67$, 95% CI = -1.32 , $-.02$, $p = .04$). Receiving SusC predicted increased overall levels of desire to quit ($\beta = -.43$, 95% CI = $-.87$, $-.01$, $p = .05$), but not willingness to work hard, perceived difficulty or likelihood of success. Similarly, higher levels of anxiety symptoms only predicted greater overall levels of desire to quit ($\beta = .03$, 95% CI = 0.01 , 0.06 , $p = .02$). Changes in the outcomes did not differ as a function of treatment or anxiety levels. Depressive, psychotic and emotion liability symptoms did not predict levels or changes in any of the outcomes. **Conclusions:** While people with SMI are burdened with high levels of negative mood, depressive, psychotic or emotional liability symptoms did not affect motivation or self-efficacy. Higher anxiety symptoms predicted greater desire to quit, suggesting that anxiety may increase motivation in this high-risk population. Future studies investigating other factors predicting changes in motivation and self-efficacy among people with SMI are needed.

FUNDING: Federal

POS5-8

THE ASSOCIATION OF SUBSTANCE USE DISORDER AND ABILITY TO QUIT SMOKING AMONG CANCER PATIENTS

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Significance: Individuals with Substance Use Disorders (SUD) have poorer tobacco treatment outcomes than individuals without SUD. However, to our knowledge, the relationship between SUD and tobacco treatment outcomes has not been evaluated in cancer patients. **Methods:** To assess this relationship among cancer patients participating in the MD Anderson Tobacco Research & Treatment Program (TRTP), we examined data from cancer patients seen for psychiatric care in the TRTP. **Results:** Within a sample of 667 patients referred for psychiatric evaluation and treatment, 433 (65%) were either current or past users of a substance (e.g., alcohol, cannabis, cocaine, opioids or other substances). Bayesian generalized linear models were used to evaluate the relationships between each substance use category and abstinence from smoking. Analyses were adjusted for psychiatric comorbidity and for smoking and demographic characteristics. We found that those in early full remission (1-12 months) of cannabis use were less likely to abstain from smoking at 3-months after starting treatment in the



TRTP compared to those without a history of cannabis use disorder (OR = 0.40; Cred. Ind. = 0.16 - 0.82). Cancer patients with a sustained full remission of alcohol use disorder (>12 months) were less likely to stop smoking than those without a history of alcohol use disorder (OR = 0.60; Cred. Ind. = 0.33 - 0.94). Similarly, patients with full remission of opioid use (OR = 0.29; Cred. Ind. = 0.03 - 0.95) and other substances use disorders (OR = 0.52; Cred. Ind. = 0.26 - 0.89) were less likely to abstain than those in the no use groups. **Conclusion:** These data suggest that cancer patients with a history of SUD have more difficulty abstaining from smoking and may benefit from tobacco treatments targeting these comorbid disorders to help improve their tobacco treatment outcomes.

FUNDING: Academic Institution

POS5-9

IMPACT OF NICOTINE CONCENTRATION, FORM, AND E-LIQUID FLAVOR ON ACUTE E-CIGARETTE NICOTINE DELIVERY, PUFFING TOPOGRAPHY, AND SUBJECTIVE EFFECTS

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Significance: E-cigarette product standards focused on nicotine concentration (e.g., limiting nicotine concentrations), nicotine form (e.g., restricting nicotine salt-based e-liquids) and/or e-liquid flavor (e.g., removing non-tobacco flavors) may all have the potential to reduce e-cigarette appeal and abuse potential, particularly among young people and non-tobacco users. The present study conducted an initial examination of the acute effects of each of these e-liquid characteristics on nicotine delivery, puffing topography, and subjective effects in a sample of young adult exclusive e-cigarette users. **Methods:** Utilizing a within-subjects, factorial design, 25 young adult e-cigarette users (M=22.4 years, 72% female, 72% White) completed 9 vaping sessions including their usual brand e-cigarette and 8 lab-prepared liquids that varied by nicotine concentration (1% vs. 5% w/w), nicotine form (free-base [FB] vs nicotine salt-based [NSB]), and flavor (menthol vs tobacco). Participants were at least 3 hours nicotine abstinent before each vaping session that included a standardized 5-minute, 10 puff session followed by 30 minutes of ad-libitum vaping. Measures of nicotine delivery (i.e., plasma nicotine), puffing topography, and subjective effects were collected. The present trial is ongoing with an anticipated N=60. **Results:** Interim results show all e-liquid preparations significantly reduced nicotine craving ($p < .0001$), with no significant differences between e-liquids. NSB, 1%, and menthol flavored e-liquids were perceived as more appealing (less harsh and more pleasurable; all $p < .05$). Puff number, duration, average and total puff volumes ($p < .05$) were significantly greater with 1% (vs. 5%) e-liquids, with no significant differences by nicotine form or e-liquid flavor. Nicotine delivery was significantly greater with NSB ($p < .05$) and 5% e-liquids ($p < .05$), with use of 5% NSB e-liquids leading to the highest levels of nicotine delivery and no significant differences between e-liquid flavors. **Conclusion:** E-liquid nicotine concentration, form and flavor have differential effects on e-cigarette appeal, nicotine delivery, and puffing behaviors among young adult exclusive e-cigarette users. Further and more granular examinations of each of these characteristics is warranted to determine potentially effective e-cigarette product standards to reduce their appeal and addiction potential for young people.

FUNDING: Nonprofit grant funding

POS5-10

IMPACT OF SMOKING CESSATION ON BLOOD PRESSURE IN TREATED HYPERTENSIVE SMOKERS- THE GENTSMOKING TRIAL

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Background: Hypertensive smokers may have blood pressure levels influenced by nicotine consumption. Although smoking does not necessarily cause hypertension, smoking cessation may enhance hypertension treatment. **Purpose:** Identify the impact of smoking cessation on blood pressure in treated hypertensive smokers. **Methods:** We enrolled 361 participants from a randomized trial for smoking treatment (GENTSMOKING trial; NCT03362099) with bupropion, varenicline or both, a cohort of 113 treated hypertensive smokers were included in this sub-analysis. The antihypertensive medication was maintained during smoking treatment. At baseline and after 12 weeks, systolic and diastolic

blood pressure (SBP and DBP) and heart rate (HR) were measured using oscillometric digital semiautomatic device, mean blood pressure (MAP) was calculated using the formula $[(2 \times \text{DBP}) + \text{SBP}] / 3$, calculation of delta differences (Δ), subtracting results at week 12 minus baseline, was performed for SBP, DBP, MAP, HR variables. Smoking cessation was confirmed with carbon monoxide exhaled air (CO). **Results:** We identified 72 participants who stop smoking (cessation group) and 41 participants unsuccessful after 12 weeks (no cessation group). At baseline, there was no difference between cessation and no cessation groups for age (58 ± 10 vs. 58 ± 8 ; $p = 0.93$), body mass index (28.2 ± 5.5 vs. 27.3 ± 4.2 ; $p = 0.35$), CO (12.1 ± 4.8 vs. 12.9 ± 4.5 ; $p = 0.43$), and cigarette consumption (19.8 ± 8.1 vs. 23.1 ± 10.4 ; $p = 0.08$), respectively. Comparing pre and post intervention results, the cessation group decreased SBP (147 ± 2 vs. 137 ± 3 mmHg; $p < 0.01$), DBP (85 ± 2 vs. 81 ± 1 mmHg; $p = 0.04$), MAP (105 ± 2 vs. 99 ± 2 mmHg; $p < 0.01$) and HR (78 ± 2 vs. 73 ± 3 beats/min; $p = 0.02$) and increased weight (78.1 ± 3.5 vs. 79.7 ± 3.6 kg; $p < 0.001$), whereas no difference was found in no cessation group for these variables. Cigarettes consumption ($p < 0.001$) and CO ($p < 0.001$) decreased in both groups after 12 weeks of intervention. After 12 weeks, cessation group showed better Δ SBP [-6 ($-15 - 6$) vs. 5 ($-10 - 11$) mmHg; $p = 0.04$], Δ DBP [-2 ($-8 - 4$) vs. 2 ($0 - 7$) mmHg; $p = 0.03$], Δ MAP [-3 ($-9 - 6$) vs. 4 ($-4 - 8$) mmHg; $p = 0.04$], and Δ HR [-4 ($-14 - 5$) vs. 1 ($-5 - 5$) mmHg; $p = 0.02$] than no cessation group, respectively. There was a positive correlation between HR and CO ($r = 0.34$; $p = 0.001$). **Conclusion:** Smoking cessation reduce the blood pressure in hypertensive smokers, allowing they get closer to therapeutic targets for hypertension. Therefore, the impact of smoking cessation in treatment of hypertensive smokers is positive.

FUNDING: Other: FAPESP

POS5-11

THE EFFECTIVENESS OF THE VIRAL DITCH JUUL CAMPAIGN AMONGST COLLEGE STUDENTS

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Electronic nicotine delivery systems (ENDS) use continues to rise among young adults. Recent data indicate up to 36% of college students have used ENDS, with 21% reporting use in the past 30 days. This represents a substantial increase over the past decade, as only 4.9% of college students reported ENDS use in 2013. To combat the increased use of ENDS, new anti-vaping advertising techniques are essential. Social media advertising has shown promise for a variety of combustible tobacco products but research on the efficacy of social media anti-vaping campaigns is more limited. In 2020, the Truth Initiative® launched an anti-vaping social media campaign: Ditch Juul. However, to date there is virtually no public research available about the efficacy of the Ditch Juul campaign or social media anti-vaping advertising overall. We collected data from 156 college students (63.5% women, 72.4% White, M age=18.76) to examine their perceptions of the Ditch Juul campaign. Specifically, we examined: 1) if college students enjoyed Ditch Juul TikToks; 2) if college students believed individuals who created a Ditch Juul TikTok stopped using their nicotine vapor product; and 3) if college students who had viewed the Ditch Juul campaign reported lower intentions to use ENDS compared to college students who had not viewed the Ditch Juul campaign. We hypothesized that college students who had viewed the Ditch Juul campaign would 1) report enjoying the campaign; 2) not believe the individual in the TikTok actually quit using their nicotine vapor product; and 3) viewing the Ditch Juul campaign would not significantly effect intent to try nicotine vapor products. Results indicated that 40.3% of the sample reported having seen the Ditch Juul campaign on social media. Among this subsample, our hypotheses were partially supported. Contrary to predictions, only 31.1% of college students who viewed the Ditch Juul campaign rated their enjoyment of the TikToks as moderate or greater. Consistent with predictions, only 41.9% reported moderate or greater belief that the TikTok creator actually quit vaping. Finally, as predicted, no significant difference in participants' future intent to vape emerged between those who had viewed the Ditch Juul campaign and those who had never viewed the Ditch Juul campaign, $t(150) = -1.884$, $p = .63$. These results highlight the challenge of creating social media campaigns with broad reach that are both engaging and effective.

FUNDING: Academic Institution



POS5-12

TIME TO RELAPSE IN ADULTS WITH SEVERE MENTAL ILLNESS ENGAGED IN SMOKING CESSATION TREATMENT; RESULTS FROM AN EQUIPOISE RANDOMIZED DESIGN

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Significance: Although smoking cessation medications combined with psychosocial treatments are effective at helping people with severe mental illness (SMI) quit smoking in the short-term, long-term cessation rates are much lower. **Objective:** In this secondary analysis of 3 treatments, each provided with or without abstinence incentives, to adult Medicaid recipients with SMI who were trying to quit smoking, we explored differences by treatment type in number and duration of quit attempts at 3 months. We also explored whether number of smoke-free days was mediated by delayed reward discounting. **Methods:** The study used an equipoise stratified design whereby participants were willing to be randomly assigned to at least 2 out of 3 treatments (Prescriber Visit (PV) Only, PV + Cognitive Behavioral Therapy (CBT), or PV+ Assisted Quitline). After initial random assignment, participants were randomized again to receive monetary incentives for abstinence or not. **Participants:** A total of 661 adult smokers with SMI receiving services in community mental health centers were consented and enrolled. **Main Outcome Measures:** Using the Timeline-Followback method, interviewers asked participants to review their days of smoking and not throughout the study. Using this data, we computed number of smoke-free days from 3 months-12months, number of smoke-free episodes, and average smoke-free days per episode. **Analysis:** Descriptive statistics were used on primary outcomes for each treatment group and across the sample. Cox proportional hazards models were used to test the main effects of duration of smoke-free days to relapse by treatment at the 3-month follow-up. Causal mediation analysis was used to assess mediating effects of delayed reward discounting. **Results:** At the 3 month follow-up, 20.2% (103/509) reported at least one smoke-free day. There was a significant main effect for abstinence incentives on smoke-free days (HR=1.58; 95% CI= 1.05 to 2.36) but only a trend for CBT, however, the interaction between abstinence incentives and CBT showed significantly longer duration of smoke-free days (HR=3.67; 95% CI= 1.2 to 11.27) compared to PV Only. Delayed reward discounting did not mediate the treatment effect on number of smoke-free days. **Conclusion:** Abstinence incentives alone and combined with CBT increased the chances of smoke-free days over Prescriber Visit Only. Future studies should focus on mediators to extend the duration of smoke-free days in this vulnerable population.

FUNDING: State; Academic Institution

POS5-13

IMPAIRED SUSTAINED ATTENTION AT BASELINE PREDICTS SMOKING LAPSE DURING A 4-DAY SIMULATED SMOKING QUIT ATTEMPT

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Significance: Many smokers who attempt to quit will experience a smoking lapse early in the quitting process, with most leading to relapse. Identifying predictors of early lapse may assist in providing targeted treatments for individuals who are at high risk. Cognitive factors such as sustained attention and focus are influenced by nicotine administration. It is possible that individuals with greater attentional deficits may be more likely to maintain use and have greater difficulty quitting. The present study examined sustained attention as a predictor of early lapse in a controlled experimental study involving a simulated quit attempt. **Methods:** Daily smokers (N = 425, M FTND = 4.63, 40% female, M age = 39, 76% African American) completed baseline measures and a 3-min practice trial of the Rapid Visual Information Processing Task (RVIP), a measure of sustained attention. Participants smoked one cigarette to equate recent smoke exposure. Participants then completed the 12-minute version of the RVIP task in which 1200 digits were presented on a computer screen one at a time. Participants were instructed to press a key each time they identified three consecutive odd or even digits (96 potential hits). Participants earned 2.5 cents for each hit and lost 2.5 cents for each false alarm. Participants then received brief smoking cessation counseling and were instructed to abstain from smoking for the next 4 days with an \$80 incentive for biologically confirmed abstinence. Participants returned to the laboratory each day for assessment. **Results:** By day 4, 67.2% of participants had lapsed. Logistic regression demonstrated that every time false alarms doubled on the RVIP task, there was an associated 18% increased odds of lapsing ($p = .005$). These effects remained significant

even when simultaneously controlling for age ($p = .118$), gender ($p = .017$), nicotine dependence ($p = .005$), menthol status ($p = .063$), quitting confidence ($p = .023$), and desire to quit ($p = .004$). RVIP hit rate did not predict lapse likelihood (OR = 1.00, $p = .878$). **Conclusions:** Participants who had more false alarms on the RVIP, perhaps reflective of lower ability to filter out irrelevant information or lower response inhibition, were more likely to lapse. Future research examining predictors of early lapse and underlying mechanisms is needed. Laboratory quitting analogue models offer a controlled time- and cost-effective framework to investigate smoking cessation and lapse processes.

FUNDING: Academic Institution

POS5-14

LEARN2QUITNY (L2QNY) TEXT MESSAGING CESSATION PROGRAM PILOT STUDY: USER EXPERIENCE, INTERACTIONS, AND ENGAGEMENT

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Title: Learn2QuitNY (L2QNY) text messaging cessation program pilot study: User experience, interactions, and engagement. **Significance:** Automated text messaging cessation programs are more efficacious than minimal support, but little is known about user engagement, experience, and interactions in clinical applications. **Methods:** L2QNY is a 6-week, unmonitored, automated text messaging cessation program based on a 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. Using opt-out invitation texts, we examined user interactions and engagement with L2QNY among 509 consecutive cigarette smokers with recent contact with the NY Quitline (QL). We analyzed responses to pre-programmed interactivity and conducted Thematic Qualitative Analysis (TQA) and Linguistic Analysis (LA: LIWC2015) of unsolicited inbound texts from participants. The LA assessed analytic thinking (logical thought), clout (expertise, confidence), and authenticity (honest, disclosing) as standardized scores converted to percentiles (PCTL); as well as the percentage of words that reflected temporal orientation, positive or negative affect, and reward-seeking. **Results:** Participants were 58% female, mean age 55, smoking a mean of 18 cigarettes per day; 57% were White, 24% Black, 12% Hispanic. The majority were of lower socioeconomic status. Nearly all (95%) had been eligible for free nicotine replacement therapy (NRT) in the past 6 months. Only 8% opted out. About 30% (n=140) texted responses to pre-programmed interactive elements; 33% (n=156) sent 554 unsolicited texts, 449 of which were analyzable words with a mean of 6.7 (SD 9.8) words per text. TQA revealed 10 thematic categories with two-thirds of unsolicited texts reflecting positive applications of content (35.9%; "I will ride my bike"); agreement (18.3% "Glad to know"); or gratitude (13.4% "Thank you!"). Unsolicited texts were in the 45th PCTL for analytic thinking, 37th PCTL for clout, and the 45th PCTL for authenticity; 20% of texts were present-, 2% past-, and 3% future-focused; 17% reflected positive and 2% negative emotions; 3% reflected reward-seeking. L2QNY appeared to be well-received. **Conclusion:** About one-third of participants were highly engaged as evidenced by responses and sending unsolicited texts with authentic, thoughtful, present-focused, positive messages as if a live person was listening. L2QNY might be used to re-engage or maintain engagement among QL users.

FUNDING: Academic Institution

POS5-15

CHANGE IN PREFERRED E-CIGARETTE SETTINGS AND CIGARETTE CONSUMPTION DURING A SWITCHING TRIAL

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Significance: Refillable e-cigarettes (ECs) often allow for customization of settings. Yet, limited research has longitudinally examined how preferred EC settings change as smokers attempt to switch to ECs. This study aimed to characterize changes in smok-



ers' preferred EC flavor, nicotine strength, wattage, and airflow settings over 12 weeks and determine whether these changes are associated with cigarettes smoked per day (CPD) at follow-ups. **Methods:** A total of 265 smokers not interested in quitting and not using an EC (38% male, 62% female, mean age 40 years, 82% white, mean 17 CPD) were randomized to low wattage ECs (LW; n=132) or high wattage ECs (HW; n=133) as part of a randomized controlled trial (NCT03113136). Preferred EC flavor (tobacco/tobacco blend, menthol, fruit/sweet), nicotine strength (6-24mg [LW], 3-18mg [HW]), wattage (5-10W, 1-75W), air valve openness (0mm-13.25mm [HW]), and CPD were assessed at baseline, 1-week, 4-week, 8-week, and 12-week follow-ups. Mixed effects regression models were used to test for significant differences in preferred EC settings between baseline and follow-ups. A longitudinal mixed effects linear regression model was used to examine associations of CPD at follow-ups with changes in preferred EC settings (time-varying), controlling for covariates including demographics and baseline readiness to switch. **Results:** Over 12 weeks, smokers reduced smoking by 10 CPD on average and consistently preferred fruit/sweet flavors the most (58.2% at Week 12). Preferred nicotine strengths decreased from baseline to Week 12 (14.6 to 14.3mg [LW], 7.6 to 7.0mg [HW]), significant only in the LW group. Preferred wattage and airflow increased from baseline to Week 12 (7.7 to 8.0W [LW], 23.2 to 26.8W [HW], 6.5 to 7.2mm [HW]), though not statistically significant. In the LW group, none of preferred EC settings was associated with CPD at follow-ups. In the HW group, preferences for menthol/mint flavors (vs. tobacco flavors) and higher nicotine strengths (vs. 3mg) were associated with reduction in CPD at follow-ups. **Conclusion:** Smoker preference for EC settings remained stable over 12 weeks, although preferred nicotine strengths tended to decrease. The findings indicate that the customizability of ECs may facilitate smoking reduction.

FUNDING: Federal; FDACTP

POS5-16

REASONS FOR ELECTRONIC CIGARETTE USE QUESTIONNAIRE: DEVELOPMENT AND INITIAL ANALYSIS

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Significance: Electronic cigarettes (e-cigarettes) are used for many different reasons. To date there are no comprehensive assessments of the reasons for tobacco vaping. The aim of the present study is to develop and test the initial validity of a new measure to assess reasons for e-cigarette use. **Methods:** We developed a 56-item measure based on literature that examined or discussed reasons for e-cigarette use. This measure, along with demographic and tobacco use questions, was administered to individuals who self-identified as past or present e-cigarette users on the Prolific crowdsourcing platform. The sample (n = 987) was randomly assigned into two analytic groups for an exploratory factor analysis (EFA; n = 493) and confirmatory factor analysis (CFA; n = 493). **Results:** After removing highly correlated items and non-loading items on the EFA, the 56-item scale was reduced to 44 items. Compared to a 7 and 6-factor solution, EFA indicated a good relative and absolute fit for an 8-factor model and was confirmed by the subsequent CFA. Thus, we have 8 sub-scales assessing various motivation domains of e-cigarette use, including social, alternative to cigarettes, pleasurable effects, harm reduction, dependence, cessation, weight/appetite, and smell/flavor. **Conclusion:** This study provides evidence of the construct validity for the first comprehensive measure tested to assess reasons for e-cigarette use. This measure has potential to become a valuable assessment for researchers examining factors contributing to tobacco vaping among a variety of populations and settings.

FUNDING: State; Academic Institution

POS5-17

THE PROSPECTIVE RELATIONSHIPS OF DUAL USE (OF CIGARETTES AND CANNABIS) AND INTERNALIZING DISORDERS AMONG US ADULTS USING DATA FROM THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY

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Background: People who report dual use of cigarettes and cannabis represent a high-risk population given their elevated physical and mental health risks relative to those who report sole use of either cigarettes or cannabis, yet they are understudied. Extant evidence suggests that those who report dual use are more at risk for internalizing symptoms and disorders compared to those who report sole use of either cigarettes

or cannabis, but no study to date has examined these relationships longitudinally. The current study aimed to examine the prospective relationships between dual use and internalizing disorders using publicly available data from the Population Assessment of Tobacco and Health (PATH) Study. **Methods:** Four waves of data (Waves 1-4) from the adult cohort of the Population Assessment of Tobacco and Health (PATH) Study (n = 7,796) were used. Participants who reported current cigarette smoking, cannabis use, or both were included. The prospective relationships of dual use (versus sole use of either cigarettes or cannabis) and internalizing disorders (high probability versus low probability) were examined using cross-lagged panel models, testing three bidirectional cross-lagged pathways, controlling for age, sex, race/ethnicity, education, employment, and income. **Results:** People who reported dual use, compared to people who reported cigarette-only smoking, had 10% increased odds of having a subsequent internalizing disorder for two out of three cross-lagged pathways (ORs: 1.11/1.09, 95% CIs: 1.06-1.17/1.03-1.14). No significant differential risks of having subsequent internalizing disorder were observed when comparing people who reported dual use versus cannabis only use. Exploratory analysis revealed that people who reported cannabis-only use had 6% increased odds of having a subsequent internalizing disorder compared to those who reported cigarette-only smoking, but it was only for one cross-lagged pathway (OR: 1.06, 95% CI: 1.01-1.12). **Conclusion:** Both dual use and cannabis-only use, when compared to cigarette-only use, were linked to higher odds of having a subsequent internalizing disorder, but results for dual use were more consistent. People who report dual use may be particularly vulnerable for developing internalizing disorders. Using models that allow us to parse out within versus between person differences in future research will help us closely examine the impact of dual use on development of psychiatric symptoms and disorders. **Keywords:** cannabis, cigarettes, dual use, adults, longitudinal research, mental health conditions. Funding source: N/A

POS5-18

THE RELATIONSHIPS OF CHILDHOOD TRAUMA AND POST-TRAUMATIC STRESS DISORDER TO SMOKING OUTCOMES IN CANCER PATIENTS

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Significance: In the general population, childhood trauma and post-traumatic stress disorder (PTSD) are related to higher levels of nicotine dependence and poorer tobacco cessation outcomes. The aims of the current study were to assess these relationships in cancer patients participating in the MD Anderson Tobacco Treatment Program (TTP); and whether the effects of PTSD and trauma on abstinence were mediated by negative affect. **Methods:** A sample of 10,130 patients treated in the TTP was used to conduct analyses. PTSD and childhood trauma diagnosis were assessed by clinical interview. At program entry, nicotine dependence and negative affect were assessed by the Fagerstrom Test for Nicotine Dependence and Positive and Negative Affect Scale, respectively. We used logistic regression to derive odds ratios for the effects of PTSD and trauma on abstinence, controlling for demographic variables and psychiatric disorder comorbidity; and linear regression to derive coefficients for the effects on nicotine dependence and negative affect. We used mediational analysis to identify the indirect effects of PTSD and childhood trauma attributed to negative affect. **Results:** 10,076 patients had no PTSD and 54 had PTSD; 9,947 had no history of childhood trauma and 185 had childhood trauma. Being diagnosed with PTSD decreased the odds of abstaining at the end of the 3-month treatment period by 50% compared to those with no PTSD; history of childhood trauma was associated with a 38% decrease in odds of abstaining. Patients with PTSD had higher levels of negative affect and those with childhood trauma had higher nicotine dependence and negative affect, compared to patients without these diagnoses. Mediation analyses showed evidence for statistically significant mediation by negative affect of the relationship between PTSD/childhood trauma and abstinence at 3- months. **Conclusions:** PTSD and childhood trauma were associated with lower likelihood of achieving abstinence, following tobacco dependence treatment, than those without these conditions and were associated with factors previously shown to increase abstinence failure. Levels of negative affect accounted for a small but significant proportion of the effect of PTSD and childhood trauma on abstinence. Given the increased risk for poorer abstinence outcomes associated with PTSD and childhood trauma, there may be a need to develop more targeted tobacco treatments in cancer patients with these conditions.

FUNDING: State; Academic Institution



POS5-19

A BRIEF ALCOHOL CONTROL INTERVENTION DURING SMOKING CESSATION TREATMENT DELIVERED BY HEALTH CARE PROFESSIONALS: A PILOT RANDOMIZED CONTROLLED TRIAL

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Significance: This study aims to examine the feasibility, acceptability and preliminary efficacy of a brief alcohol control (AC) intervention in smokers with drinking habits.

Methods: We conducted a single-blinded, 2 arm pilot randomized controlled trial in smokers who self-reported tobacco use in past month and self-reported alcohol use in past year (n=100; 82.0% male). The setting were smoking cessation (SC) clinics in Hong Kong. The intervention group (n=51) received a short video on the association between AC and SC, a brief counseling on personalized AC during SC services, and 4-week personalized text-messages (3 messages each week). The control group (n=49) received a general advice on AC during SC services. The primary outcome was biochemically validated tobacco abstinence at 2-month follow-up. Secondary outcomes were Alcohol Use Disorders Identification Test (AUDIT) scores and self-reported 7-day alcohol consumption (in alcohol units) at 2-month follow-up, and the feasibility and acceptability of the AC intervention in the intervention group at 2-month follow-up. **Results:** By intention to treat, the intervention group (12.0%) and the control group (10.0%) showed a similar prevalence of biochemically validated quit rate (RR (risk ratio) =1.19, P=0.79). The intervention group showed a significant reduction of AUDIT (Mean=7.32 and 4.71 for baseline and 2-month follow-up, t=2.77, P=0.01), but the control group did not show a significant reduction (Mean=7.15 and 7.05 for baseline and 2-month follow-up, t=0.13, P=0.90). The interaction effect was significant (P=.02, partial eta squared=.071). Self-reported 7-day alcohol consumption in intervention group was less than control group, but the difference was not significant (6.85 versus 13.66, P=0.26). The average time required for the brief AC counseling was 9.2 minutes. Participants perceived the AC intervention increased their understanding and willingness to attempt AC during SC (Mean=4.25/5 and 4.54/5 for the short video and the brief AC counseling, respectively). **Conclusion:** The study's findings showed that the AC intervention did not significantly increase tobacco abstinence in smokers received SC services, but it potentially reduced smokers' alcohol dependence level and consumption. Our AC intervention is feasible and acceptable in smokers. Further modifications in the intervention and evaluations in other settings are warranted.

FUNDING: Academic Institution; Nonprofit grant funding

POS5-20

TRANSITIONS OF CARE IN TOBACCO TREATMENT

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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 interventions are effective when treatment continues for at least a month post-discharge. Many hospitalized patients return for outpatient follow-up visits, and these are an excellent opportunity for post-discharge tobacco treatment. However, the transition of care for tobacco treatment between hospitalization and outpatient care is understudied. The purpose of our study was to describe post-discharge tobacco treatment follow-up for recently hospitalized smokers participating in a smoking cessation clinical trial. These analyses include 400 participants who had an outpatient visit within six weeks post-discharge in one medical center. Chart reviews were conducted using the electronic health record (EHR). There were 852 visits during the 6-week follow-up period. Among all participants, 67.8% were identified as current smokers in the EHR, 52.0% had progress notes indicating that tobacco use was addressed at any visit, 5.5% had a tobacco-related billing code entered, 25.5% had smoking cessation medications prescribed and/or verified during a visit and 26.3% had tobacco included in the problem list. These patients were participants in an inpatient treatment study that clearly documented intervention in the EHR. Most continued to use tobacco and those who managed to quit were only 6 weeks into their attempt. These patients should have received outpatient smoking cessation treatment to promote and maintain abstinence. Although some providers discussed and documented tobacco use with patients, most patients had no documentation of tobacco treatment. Tools to

facilitate continuity of care, such as problem lists and billing, are underutilized by health care providers. Healthcare systems are falling far short of their potential to improve health due to breakdowns in continuity of care - in this case, outpatient follow-up with evidence-based smoking cessation treatment. Potential strategies to ensure effective care transitions for tobacco treatment include EHR modifications that would provide reminders and support documentation.

FUNDING: Federal

POS5-21

MULTILEVEL CONFIRMATORY FACTOR ANALYSIS OF AN ECOLOGICAL MOMENTARY ASSESSMENT (EMA) MEASURE OF MINDFULNESS AMONG ADULTS WITH MOOD DISORDERS DURING A SMOKING CESSATION ATTEMPT

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Background: Mindfulness training has been incorporated into smoking cessation interventions. Increases in mindfulness have been shown to predict higher cessation rates and be associated with smoking-related constructs such as negative and positive affect and craving to smoke. Accurately capturing real-time momentary mindfulness via ecological momentary assessment (EMA) allows us to understand the dynamic impact of mindfulness on smoking behaviors and cessation process, yet the factor structure of EMA mindfulness items has not been investigated. The current study examined the multilevel factor structure and internal consistency of an EMA measure of mindfulness facets. **Methods:** EMA data collected for a randomized controlled trial examining the efficacy of a smartphone-assisted, mindfulness-based smoking cessation intervention (versus enhanced standard treatment) were used. Participants were 49 adults with mood disorders who reported daily smoking, and asked to complete five reports per day including 10 mindfulness items from the Five Facet Mindfulness Questionnaire (FFMQ), smoking behavior, negative and positive affect, and craving to smoke during 10-day pre-quit and 4-week post-quit periods. **Results:** Multilevel confirmatory factor analyses supported a three-factor model with observing, non-judging, acting with awareness factors (2 items per factor) over a single-factor (10 items), five-factor (2 items per factor), or a higher-order model (second-order factor with three first-order factors) of mindfulness. The three-factor model had great model fit and factor loadings were stable across pre- and post-quit periods. While the non-judging and acting with awareness factors were highly correlated, only weak (pre-quit) or no significant correlations (post-quit) between observation and non-judging/acting with awareness were found. The internal consistencies of all three factors were higher at the between-person levels ($\Omega_{\text{between}} > .62$) compared to those at the within-person levels ($\Omega_{\text{within}} > .90$). At the between-person levels, all three factors were strongly correlated with the corresponding mindfulness facet assessed with the full FFMQ at baseline. At the within-person levels, all three factors were negatively related to latent factors representing negative affect, craving to smoke, and positively related to latent positive affect. Non-judging and acting with awareness, but not observing, were negatively associated with recent smoking. **Conclusion:** This study provides preliminary support for a three-factor model of an EMA measure of mindfulness, and demonstrates that 2-item subscales can capture three separate momentary mindfulness constructs (observation, non-judging, acting with awareness) and their relationships with smoking behaviors and other smoking-relevant constructs among adults with mood disorders during a quit attempt.

FUNDING: Federal

POS5-22

TRI-PEC STUDY: FACILITATORS & BARRIERS TO SWITCHING TO ALTERNATIVE NICOTINE DELIVERY SYSTEMS IN ADULTS WITH LOW SOCIOECONOMIC STATUS WHO USE COMBUSTIBLE CIGARETTES

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Significance: Adults with low socioeconomic status (SES) have higher use of combustible cigarettes (CC) and lower cessation rates compared to their middle to higher SES counterparts. Nascent studies suggest that Alternative Nicotine Delivery Systems (ANDS) show promising results in helping individuals reduce CC use and, subsequently, quit smoking altogether. However, few studies have explored the use of ANDS as a harm reduction tool, especially nicotine pouches (NP) in populations with low SES. The



purpose of this study is to qualitatively assess the facilitators and barriers to switching from CC to ANDS in adults with low SES who use CC. **Methods:** This study employed qualitative interviews from the Tri-PEC study, an 8-week randomized controlled trial (RCT) that randomized low SES adults who use CC to a 2:2:1 allocation of electronic cigarettes (EC), NP, or smoking as usual. Qualitative interviews were conducted at the end of the study (Week 8). Interviews were audio-recorded, transcribed, and de-identified. Only interviews from the experimental arms (EC & NP) were analyzed for this study. De-identified transcriptions were divided into three groups and six trained coders were paired to independently transcribe each of the interviews. The pairs and the coding team met to reconcile any discrepancies. A combination of grounded theory and thematic analyses were employed to analyze the data that allowed for a-priori codes and new data to emerge. Categories and sub-categories were created from the codes, relationships were evaluated between categories and sub-categories to inform the creation of themes. **Results:** Based on data from the experimental arms (N=19), several themes emerged to inform facilitators and barriers to switching to ANDS. Facilitators to switching included convenience of ANDS, reduced stigma when using ANDS in public settings compared to CC, attenuated craving for CC, and impressions of safety and improved health benefits since using ANDS. Barriers to switching included the perception of slower nicotine delivery in ANDS compared to CC, absence of hand-to-mouth fixation for participants randomized to NP, and notions of inaccessibility and unaffordability of ANDS products in retail stores relative to CC products. **Discussion:** ANDS show initial acceptability in adults with low SES who use CC, particularly EC. Future studies should consider intervening on the identified barriers to further strengthen the efficacy of ANDS in helping individuals who use CC to switch.

FUNDING: Federal

POS5-23

"THEY ARE SEEKING A COPING MECHANISM THAT IS HEALTHY ENOUGH": SEXUAL AND GENDER MINORITY YOUTH PERCEPTIONS OF VAPING AS CONCURRENTLY A BENEFIT AND DETRIMENT TO MENTAL HEALTH

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Significance: U.S. youth are experiencing co-occurring vaping and mental health epidemics. Sexual and gender minority youth (SGM) are at higher risk for both, reporting higher prevalence of vaping, poorer mental health, and less access to quality mental health care compared with cisgender heterosexual youth. It is unclear how SGM youth view vaping and its impacts on their mental health. This analysis qualitatively examines how SGM youths perceive the relationships between vaping and mental health. **Method:** Participants were youth, ages 13-18 from across the U.S. recruited using Instagram paid advertising. Some participants initially completed an elicitation survey aimed at evaluating vaping beliefs among SGM youth while some were recruited for the qualitative portion only. We then conducted 24 semi-structured interviews and 5 (2 participants each) focus groups over Zoom with SGM youth (n=34). We coded transcripts using NVivo 1.6 and a team-based and flexible coding approach, followed by inductive secondary coding. This analysis focused on discussions about mental health and vaping. We stratified the results by vaping status (initiated vaping versus susceptible but not initiated). **Results:** The main themes from the analysis were 1) Vaping as a cause of poorer mental health, 2) Vaping benefiting mental health by decreasing stress, and 3) Vaping as a replacement for more harmful coping behaviors. First, SGM youth participants perceived that vaping led to poorer mental health by increasing stress, anxiety, depression, and nicotine addiction. Second, because SGM youth face lack of support and acceptance from their community, they experience more stress, anxiety, and depression, which leads to more SGM youth turning to vaping as a coping behavior. Third, youth who had initiated perceived vaping as a less harmful stress management tool, reducing self-harm, disordered eating, and other forms of substance use. Fewer susceptible youth disclosed personal mental health struggles associated with vaping. **Discussion:** SGM youth in this study perceived a strong connection between mental health and vaping. Although they recognized the negative impacts of vaping on mental health, they viewed vaping as a less harmful way to cope with poorer mental health than other coping behaviors. Therefore, it is important that public health interventions acknowledge the nuanced relationship that exists between their lived experience, mental health, and vaping and promote healthier alternatives for dealing with stress and other mental health issues when possible.

FUNDING: Federal

POS5-24

YOUTH E-CIGARETTE USE BEHAVIORS BY INTERSECTIONALITY OF SEXUAL ORIENTATION AND SEX WITH RACE ETHNICITY RESULTS FROM 2020 NATIONAL YOUTH TOBACCO SURVEY

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Background E-cigarette use rates are higher among certain sexual minority youth (SMY) compared with their heterosexual counterparts. Such high levels of e-cigarette use by SMY might be driven by minority stress from structural discrimination regarding their sexual orientation. It is more concerning for SMY of color who may experience multiple axes of social marginalization regarding their sexual orientation and race/ethnicity. This study aimed to investigate youth e-cigarette use at the intersection of sexual orientation and race/ethnicity among youth. **Methods** We analyzed data from the 2020 National Youth Tobacco Survey (NYTS) (N=14,531). The outcome was e-cigarette use status (never; experimental/past use [ever, but not current use]; current use). Predictors were sexual orientation (heterosexual; gay/lesbian/bisexual) and race (White; Black; others) and ethnicity (non-Hispanic; Hispanic). We controlled for associated factors -age, current use of any other tobacco (e.g., cigarettes, cigars), exposure to any e-cigarette ads (i.e., TV, print, stores, internet, social media), peer/family member's e-cigarette use, health professional's advice, internalizing tendencies. We fitted multinomial logistic regression models to predict e-cigarette use using sexual orientation, race, ethnicity, and their interactions, controlling for covariates and stratified by sex. **Results** Among US youth, 15.7% of girls and 5.8% of boys identified as either gay, lesbian, or bisexual. There was a significant interaction in e-cigarette use between sexual orientation and race among girls. Specifically, Black sexual minority girls showed a significantly higher level of current e-cigarette use than Black heterosexual girls (3.2% vs. 0.8%) (p<0.05). The relative risk ratio of current e-cigarette use (vs. never) between sexual minority Black girls (vs. heterosexual Black girls) was 3.46 times higher than the relative risk ratio between sexual minority white girls (vs. heterosexual White girls) (95% CI=1.15, 10.38). There were significant interactions in e-cigarette use between sexual orientation and race or ethnicity among boys and between sexual orientation and ethnicity among girls. **Conclusions** Sexual minority Black girls may be at increased risk for e-cigarette use compared with Black heterosexual girls. These findings will inform future studies one-cigarette use disparities by minority youth, and address culturally tailored vaping prevention among at-risk youth populations.

FUNDING: Federal

POS5-25

MIXED-METHODS STUDY OF A DIGITAL THERAPEUTIC FOR SMOKING CESSATION AMONG AFRICAN AMERICAN INDIVIDUALS WITH SERIOUS MENTAL ILLNESS

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Objectives: Rates of tobacco use are stagnant among African American (AA) individuals with serious mental illness (SMI), compared to their White counterparts, suggesting the importance of evaluating current digital therapeutics (DTx) for smoking cessation in patients at the intersection of these two priority populations. Previous early-phase work empirically validated the design and content of Learn to Quit (LTQ), a DTx designed for patients with SMI. However, this DTx has not been examined among patients at the intersection between these two priority groups. **Methods:** In a mixed-methods study of a pilot trial, we examined the feasibility, acceptability, and clinical benefit of LTQ versus NCI QuitGuide among AA individuals with SMI who smoke (n=30). All participants received combination nicotine replacement therapy. Reductions in cigarettes per day were assessed at week 16 and analyzed using linear regression. Semi-structured interviews were conducted at week 4. Digital biomarkers were passively collected for 16 weeks (n=9,455 obs.) and analyzed using linear regression. Qualitative and quantitative measures of usability, acceptability, digital biomarkers, and clinical benefit were combined using standard data integration methods. **Results:** Digital biomarkers of software use indicated that compared to QuitGuide, LTQ participants had a larger number of interactions with the DTx (Mean=409 vs 192; p=0.03), and longer durations of use (Mean=280 mins vs 62 mins hrs; p=0.004). At week 16, LTQ led to greater reductions in cigarettes per day compared to QuitGuide (Mean=14 vs 5.7; p=0.06). The most frequent themes reported by LTQ participants were 'Eye opening exercises', 'Novel insights and perspectives', and 'Simple and easy to use'. Most frequently endorsed themes from QuitGuide users included 'Useful tracking features', 'Design problems and technical issues', and 'Not helpful or applicable features'. **Integration and Conclusion:** This mixed-methods



SRNT 2023 POSTER SESSION 5 • SATURDAY, MARCH 4, 2023, 11:00 AM - 12:30 PM

study provides in-depth insights about the objective and subjective response of AA individuals with SMI who smoke enrolled in a pilot trial. The identified qualitative themes converged with the obtained digital biomarkers of software use. This data, in turn, is consistent with smoking reductions for LTQ participants at trial endpoint. This study provides preliminary evidence for the feasibility, acceptability, and clinical benefit of LTQ for individuals at the intersection of these two priority populations.

FUNDING: Federal

POS5-26

RACIAL AND ETHNIC DIFFERENCES IN INITIATION OF MENTHOL TOBACCO SMOKING AND SUBSEQUENT TOBACCO USE IN THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH STUDY, WAVES 1-4 (2013-2018)

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Introduction: Use of menthol flavors in tobacco products is a contributor to tobacco-related health disparities, due to its selective marketing to vulnerable communities by the tobacco industry. This study evaluated the racial/ethnic differences in smoking initiation of menthol/mint flavored cigarettes and cigars among never users, and in subsequent tobacco product use among adults who initiated smoking of cigarettes or cigars with menthol/mint flavors. **Methods:** Data from Waves 1 to 4 of the Population Assessment of Tobacco and Health (PATH) Study were analyzed. The outcomes of interest were new use of menthol-flavored products, and past 30-day and past 12-month cigarette and cigar smoking at the subsequent wave after initiation. Modified Poisson regression models were used to estimate the association between race/ethnicity and product-specific use. **Results:** The percentages of new users of menthol-flavored cigarettes and cigars at Waves 2-4 were higher in non-Hispanic Blacks and Hispanics than in non-Hispanic Whites. Adjusting for age and sex, non-Hispanic Blacks who first used menthol-flavored cigarettes had a higher prevalence of subsequent past 30-day cigarette use (adjusted prevalence ratio, aPR 1.44; 95% confidence interval, CI 0.99-2.10) compared with non-Hispanic Whites. Blacks also had higher prevalence of past 30-day (aPR 1.48; 95% CI 1.11-1.96) and past 12-month (aPR 1.74; 95% CI 1.55-2.63) any cigar use, and higher prevalence of past 30-day (aPR 1.99; 95% CI 1.09-3.61) and past 12-month (aPR 2.34; 95% CI 1.0-5.45) traditional cigar use at the subsequent wave. **Conclusions:** This study shows that racial/ethnic differences exist in the initiation of menthol-flavored tobacco products and subsequent use after smoking initiation with menthol-flavored products; Blacks and Hispanics have higher rates of initiation and/or subsequent use.

FUNDING: Federal

POS5-27

TRENDS IN LITTLE CIGAR AND CIGARILLO USE AMONG CALIFORNIA MIDDLE AND HIGH SCHOOL STUDENTS: THE EFFECT OF ETHNICITY

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SIGNIFICANCE: Little cigars and cigarillos (LCC) are combustible tobacco products often used with marijuana by youth for self-rolled blunts. This study examines the trend of LCC use among middle and high school students in California, from 2015 to 2020. **METHODS:** California Student Tobacco Surveys (CSTS) is a state-representative tobacco survey of 8th grade, 10th grade, and 12th grade students. Data from the 2015-16 cycle (N=47,981) and 2019-20 cycle (N=162,675) were analyzed for LCC use characteristics. **RESULTS:** Overall, the prevalence of LCC use in the last 30 days among middle and high school students in California decreased significantly from 3.2% in 2015-16 to 1.8% in 2019-20. The trend in LCC use diverged by ethnicity, however, with the prevalence among African Americans remaining essentially unchanged (from 3.9% to 3.7%) while the prevalence for White, Hispanic, and other ethnicity all significantly declined (from 4.3% to 1.5%, 3.2% to 1.8%, and 2.1% to 1.4%, respectively). While the proportion of marijuana use among LCC users was consistently high among all ethnic groups over the years (ranging from 86.2% to 95.5%). The proportion of LCC use among marijuana users significantly decreased for most ethnic groups (from 27.8% to 10.5% for Whites, from 25.2% to 13.5% for Hispanics, and from 24.9% to 15.3% for others), except for African Americans, whose proportion did not significantly decrease (from 27.1% to 21.5%, P<0.05). **CONCLUSIONS:** The prevalence of LCC use among California middle and high school students decreased among most ethnic groups except African Americans. The prevalence of LCC appears to be highly correlated with the proportion

of LCC use among marijuana users, which could explain the lack of change in LCC use for African American students. The popularity of marijuana use among middle and high school students appears to present new challenges for a tobacco control endgame, especially for certain ethnic groups.

FUNDING: State

POS5-28

STAGNANT DAILY SMOKING PREVALENCE BETWEEN 2008-2019 AMONG BLACK AND HISPANIC ADULTS WITH SERIOUS PSYCHOLOGICAL DISTRESS

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Significance: Racial/ethnic minority status and serious psychological distress (SPD) are the two largest factors independently driving inequity in cigarette smoking prevalence and related adverse health. People of racial/ethnic minority groups suffer a greater burden of tobacco-related disease despite smoking fewer cigarettes per day and on fewer days than people who are White. Additionally, people with serious mental illness smoke at 3-4 times the rate of the general population. There is a need to quantify smoking prevalence among people at the intersection of these two marginalized identities in addition to evaluating trends in smoking over time. **Methods:** This study is an analysis of the National Survey on Drug Use and Health (NSDUH) from 2008-2019. Linear time trends of daily smoking prevalence were assessed among people with SPD reporting White, Black, Hispanic, and Other race/ethnicity and people without SPD reporting White, Black, Hispanic, and Other race/ethnicity using logistic regression, with survey year as the predictor. Models with year-by-smoking status interactions terms, and F-tests to test the significance of these interactions, were used to assess differential time trends. **Results:** The daily smoking prevalence among people without SPD decreased between 2008-2019 among people reporting White (from 17.2% to 11.8%; aOR=0.96, p<0.001), Black (from 14.1% to 9.2%; aOR=0.96, p<0.001), Hispanic (from 8.1% to 4.7%; aOR=0.95, p<0.001), and Other (from 11.1% to 7.5%; aOR=0.97, p=0.002) race/ethnicity. Among people with SPD, the smoking prevalence decreased significantly among people with White race/ethnicity (37.4% vs. 25.4%; aOR=0.95, p<0.001), with non-significant decreases among people with Black and Other race/ethnicity, and a non-significant increase among people with Hispanic race/ethnicity. The rate of change differed significantly between race/ethnicity groups with SPD, with the prevalence decreasing most rapidly among White respondents (p=0.002). **Discussion:** Smoking among people who are Black and Hispanic with SPD has not changed in the past 11 years despite decreasing among White and non-SPD groups. People who identify as Black/Hispanic and people with SPD independently struggle to quit smoking, which is further amplified at the intersection of these identities. Unique barriers to smoking cessation in this population must be better assessed via tailored interventions to address multiple disparities.

FUNDING: Federal; Other: Dr. Vilardaga is the Principal Investigator of a digital therapeutic trial funded by Twill Inc., to Duke's Clinical Research Institute

POS5-29

DESIGNING AND BETA-TESTING SMOKEFREESGM: A TEXT-BASED SMOKING CESSATION INTERVENTION FOR SEXUAL AND GENDER MINORITY GROUPS

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Significance Although the prevalence of smoking is significantly higher among sexual and gender minority groups (SGM) than the general population, no text-based smoking cessation intervention has been specifically tailored to SGM smokers. Our study aimed to develop SmokefreeSGM, an SGM-tailored text-based smoking cessation program, and pilot-test it to determine the necessary refinements before launching a larger-scale feasibility trial. **Methods** SmokefreeSGM was adapted from SmokefreeTXT, the National Cancer Institute's smoking cessation text-based program, to respond to the needs of SGM smokers. Among the tailored features, SmokefreeSGM includes a new keyword, STRESS, to address the unique psychosocial stressors (e.g., internalized homophobia, discrimination events, stigma consciousness, etc.) of SGM smokers. The unidirectional and bidirectional text messages were distributed to SGM smokers over a six-week period. In addition to enrollment in the SmokefreeSGM program, participants were provided with nicotine patches to aid their efforts to quit. Baseline information such as demographics and smoking-related data (e.g., smoking status, nicotine dependence,



SRNT 2023 POSTER SESSION 5 • SATURDAY, MARCH 4, 2023, 11:00 AM - 12:30 PM

etc.) were collected at baseline. Quantitative (engagement, the usability of the program, etc.) and qualitative (acceptability and engagement) assessments were performed at the one-month follow-up. **Results** A total of 18 SGM smokers were recruited for the pretesting phase of the study. The average age was 39.0 (± 12.16) years, with seven males, seven females, and four nonbinary SGM smokers. There were 27.78% gay men, 11.11% lesbian women, 27.78% bisexual females, 16.67% bisexual males, and the remaining were other SGM. Participants were 55.56% white, 27.78% Black or African American, and 16.67% other races. Two-thirds (66.7%) were moderate to highly dependent on nicotine at enrollment, and 44.4% had made more than five attempts to quit smoking. 56.25% of participants had moderate or active engagement in the program. The average engagement rate was 44.09%. 9 participants completed the one-month assessment (50% retention rate). The System Usability Scale score at the 1-month assessment was 81.67 (± 15.46). Furthermore, a total of four major themes emerged from the analysis of qualitative interviews (i.e., appreciation for the intervention, program feasibility, content, and drawbacks), which our research team has utilized to further refine and improve the text-messaging program. **Conclusions** Overall, our pilot test of SmokefreeSGM has shown to be highly usable and acceptable among SGM smokers who are willing to quit smoking.

FUNDING: Federal

POS5-30

FACTORS ASSOCIATED WITH SMOKING QUIT ATTEMPTS AMONG RURAL ADULTS IN THE US

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Introduction: Rural American communities are heavily affected by tobacco-related health disparities. Identifying factors associated with smoking cessation success among rural adults is necessary for the development of effective public health efforts for this population. **Objective:** This study aims to evaluate the prevalence of quit attempts and factors that promote or impede quit attempts among rural adults who smoke daily. **Methods:** We analyzed data from Wave 5 (2018 to 2019) of the Population Assessment of Tobacco and Health (PATH) study, a U.S. nationally representative prospective cohort study. We conducted weighted, multivariable logistic regression to identify factors, encompassing socio-demographics, tobacco use behaviors, normative beliefs, and perceived health and health care interactions, associated with attempt to quit smoking in the past 12 months among rural adults who smoke. Backward selection was used to identify variables included in the final model with statistical significance set at $p < 0.05$. **Results:** Among 1,610 rural adults who smoked daily, the prevalence of a quit attempt in the past 12 months was 25.9% (95% CI: 23.2, 28.2). In multivariable modeling, factors associated with greater odds of a quit attempt included: having more than high school/GED education (aOR = 1.35, 95% CI: 1.03, 1.80), past 30 days use of an e-cigarette (aOR=0.98 95% CI: 0.97-0.99), disapproval of smoking from close friends and family (aOR= 1.46, 95% CI: 1.09-1.94), greater frequency of thinking about the harm of tobacco use (aOR = 1.48, 95% CI: 1.28, 1.71), fair/poor physical health (aOR=1.31, 95% CI: 1.00, 1.70) and being advised to quit smoking by a doctor (aOR =1.63 , 95% CI:1.25, 2.13); whereas, past 30-day use of smokeless tobacco (aOR = 0.67, 95% CI: 0.47, 0.96) and greater use of cigarettes per day (aOR = 0.67, 95% CI: 0.47, 0.96) were associated with lower odds of a quit attempt. **Conclusion:** Only 1 in 4 rural adults who smoke made a past year quit attempt. Based on these findings, interventions that promote provider advice to quit smoking, health harms of tobacco, and normative beliefs may increase quit attempts in rural communities. Research on the role of e-cigarettes and smokeless tobacco in promoting or impeding quitting smoking is also recommended.

FUNDING: Federal

POS5-31

BRAIN INJURY FROM INTENTIONAL VIOLENCE IS PREVALENT AND PRECEDES TOBACCO USE AMONG YOUTH AND YOUNG ADULT SMOKERS EXPERIENCING HOMELESSNESS

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Background: 70%+ of youth and young adults experiencing homelessness (YYEH; 14-24 yrs. old) smoke combustible tobacco. Acquired brain injury (ABI) can be caused by either blunt force head trauma or oxygen deprivation events, like strangulation or overdose.

Though tobacco use is more common among adults living with ABIs, in general, little is known about the prevalence of ABI among YYEH and its impact on combustible tobacco use progression. **Study Aim.** To determine prevalence of ABI among YYEH, its source, and its impact on progression to tobacco use. **Methods.** Past-week combustible tobacco users were recruited from a homeless youth drop-in center for interviewer-administered survey in Dec '19-Mar '20. Questions were asked about timing of exposure to oxygen deprivation (strangulation, accidental, choking games) and blunt force head trauma (intentional, shaken violently, accidental) events and perpetrator of intentional assault. Brain injury was classified using the Brain Injury Severity Assessment. First and regular use of tobacco were also assessed. **Results.** Participants (n=96) were on average 22 years old and representative of populations who experience structural disparities, including minoritized populations by race (84.4%) and gender or sexual orientation (26.0%). 87% of participants reported at least one exposure to blunt force head trauma and 65% to oxygen deprivation exposure. Intentional injury was more likely accidental—with partners and peers perpetrating most known assaults. 60.4% of participants were classified as having probable ABI and were used for subsequent analysis. ABI from all sources was associated with progression to tobacco use among YYEH. A significant proportion of YYEH smokers living with ABI were exposed to both blunt force head trauma and oxygen deprivation events prior to trying tobacco (68.5%, $p=0.002$) and to first regular use of tobacco (82.8%, $p<0.001$). Among YYEH smokers with ABI (n=59), injury exposure occurred a median of 1 and 5 years before age of first regular tobacco use, dependent on injury mechanism. **Conclusion.** Brain injury from violence by known perpetrators is prevalent and precedes tobacco use among youth and young adult smokers experiencing homelessness.

FUNDING: Federal; Academic Institution

POS5-32

FLAVOUR BANS ARE EFFECTIVE FOR ADDRESSING E-CIGARETTE USE IN YOUTH AND YOUNG ADULT: A LONGITUDINAL QUASI EXPERIMENTAL STUDY

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Significance: With the emerging popularity of e-cigarette use among adolescents, a number of federal and provincial restrictions and policies have been implemented in hopes to combat this growing trend. In particular, the provinces of Nova Scotia, Ontario, New Brunswick, and PEI have implemented restrictions on flavours of e-cigarette liquids except for tobacco and menthol flavours. This study aims to evaluate the association of the implementation of these policies with changes in e-cigarette and cigarette use. **Methods:** The Vaping Dependence Cohort includes 3376 Canadian youth and young adults (16-25) recruited beginning August 2020, with e-cigarette and cigarette use over sampled. Each participant was followed up every three months for up to 21 months. Dates of implementation of each of the provincial policies were coded, providing two types of control groups: in comparison for changes pre-post regulations within province and in comparison to provinces without such policies. Fixed effect regression models were used to assess changes in e-cigarette use (current (past 30 days) e-cigarette use, e-cigarette initiation and cessation, changes in PS-EDI dependence score, number of puffs per session, sessions per day, and days vaped per month among continuing e-cigarette users) and cigarette use (past 30 days). Controls were included for calendar date and length of time under observation. **Results:** Most participants (80.6%) were female, 73.7% were Caucasian, and 49.7% resided in Ontario. 40% of the cohort were current e-cigarette users at baseline while 31% were current smokers. Flavour regulations were associated with a decrease in e-cigarette use (IRR: 0.81; 95%CI: 0.68, 0.95). There was no significant association of flavour regulations on likelihood of smoking (IRR: 0.57; 95% CI: 0.33, 1.02). Among continuing e-cigarette users, flavour regulations were not associated with significant decreases in PS-EDI dependence scores, number of puffs per sessions, number of days vaped per month or number of sessions vaped per day. There were no significant effects of flavour regulations on vaping initiation or cessation although the direction of effect for each was consistent with the overall effect on use. **Conclusions:** Flavour regulations were associated with successfully reducing the level of vaping without increasing smoking. This study adds to the limited literature examining the real world effect of e-cigarette flavour regulations among youth and young adults.

FUNDING: Federal; FDACTP; Other: CIHR, NIH U54DA036105



POS5-33

WHAT IS (UN)FLAVORED? A SCOPING REVIEW OF CIGARILLO FLAVOR MEASUREMENT

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Introduction: In 2022, the U.S. Food and Drug Administration proposed restrictions on menthol and other non-tobacco characterizing flavors in cigar products. Ambiguity remains in the proposed rule regarding the precise definition of flavor which presents challenges in predicting what products will remain on the market if the rule is adopted. The purpose of this scoping review was to identify how flavor is measured with respect to cigarillos, the predominant form of flavored cigar products available in the U.S., to identify potential legislative loopholes that might emerge resulting from the language used. **Methods:** Three methods were used to identify research measuring flavor with respect to cigarillo products including: 1) querying research databases (PubMed, Web of Science, Academic Search Complete) using key words 'cigarillo', 'tobacco' and 'flavor'/'flavour'; 2) sub-sampling of the eligible literature with backwards and forwards reference searching, and 3) a bibliographic search of key experts identified in cigarillo research. Inclusion criteria were: available in English, published prior to 3/1/2022, be original and peer-reviewed, pertain to cigarillo products, and have a measure of flavor with respect to cigarillos. Of the 8105 works evaluated, 163 met the criteria for inclusion. These were qualitatively evaluated for their respective measures of flavor. **Results:** Flavor measures were frequently based on marketing and packaging characteristics (e.g., name, descriptors) as well as on non-specific or open-ended determinations by potential end users. Select research described flavor with reference to chemical constituents but often used marketing and packaging characteristics in their sampling strategies. Measures of un-, non-, or tobacco-flavors were often apophatic, or in opposition to the definition of flavor. The emergence of non-specific, ambiguous, or "concept" flavors and subsequent measures present a complication to this in that they may fall under the un-, non-, or tobacco-flavored designation while being chemically comparable to those that are considered flavored. **Conclusions:** Cigarillo flavor measures are variable and evolving likely in response to changes in the tobacco industry. There is a lack of standardization or specificity in the measurement language that can lead to legislative loopholes and difficulties in developing comprehensive, gold standard tobacco control policies for restricting or regulating flavored tobacco sales.

FUNDING: Federal; FDACTP

POS5-34

SMOKERS' ANTICIPATED BEHAVIORAL RESPONSES TO POTENTIAL REGULATORY ACTIONS TO REDUCE CIGARETTES TO NON-ADDICTIVE LEVELS: FINDINGS FROM THE 2020 ITC SMOKING AND VAPING SURVEY IN AUSTRALIA, CANADA, ENGLAND AND THE UNITED STATES

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Significance: The United States (US) and New Zealand governments plan to mandate a "very low nicotine content" (VLNC) standard for cigarettes. This study examined what people who smoke anticipate their behavior would be if this policy was implemented. **Method:** We analyzed data from a random sample (N=4561) of people who smoke (including daily and less than daily) in the 2020 ITC Four Country Smoking and Vaping Survey in England, Canada, Australia and the US. Respondents were asked: "Which of the following describes what you would be most likely to do if nicotine in cigarettes was reduced to non-addictive levels?" Response options were: smoke the reduced-nicotine cigarettes; find a way to get cigarettes with nicotine; switch to a nicotine vaping product; switch to a heated tobacco product (HTP); switch to nicotine replacement therapy (NRT); quit smoking without taking up anything else; or don't know. We calculated descriptive statistics on weighted data and explored country differences. **Results:** The most common anticipated behavior was to smoke VLNC cigarettes (43.6%). Similar proportions reported they didn't know what they would do (17.0%) or that they would quit smoking altogether (16.1%). Fewer reported they would find a way to get cigarettes with nicotine (11.6%) or switch to an alternative nicotine product (11.0%; 6.7% said they would use a vaping product, 2.1% a HTP, and 2.2% NRT). Differences between countries were significant ($X^2 [12, N=4531]=67.8, p<0.001$). The proportion reporting that they would

smoke VLNC cigarettes ranged from 39.1% in England to 48.9% in Canada. England had the highest proportion reporting they would switch to an alternative nicotine product (14.4%) or find a way to get cigarettes with nicotine (13.6%). Those in the US had the lowest proportion reporting that they would switch to alternative nicotine products (8.3%). **Conclusion:** About half of those who currently smoke believe they will smoke VLNC cigarettes if a VLNC standard is mandated. Only a minority reported that they would seek out nicotine-containing cigarettes. Anticipated responses to this policy may not reflect future behaviour; however, the high proportion stating they would smoke the VLNC cigarettes, and the high proportion of "don't know" responses suggests that significant efforts will be required to educate people about the mechanisms of the health risks of smoking, regardless of nicotine content, and encourage quitting altogether.

FUNDING: Federal; Academic Institution; Nonprofit grant funding; Other: US National Cancer Institute (P01 CA200512); Canadian Institutes of Health Research (FDN-148477); NHMRC Australia (APP 1106451, GNT1106451, GNT1198301). KM: UQ ECR fellowship; GTF: Senior Investigator Grant, Ontario Institute for Cancer Research.

POS5-36

TOBACCO PURCHASING BETWEEN 2007 AND 2020 IN AUSTRALIA: FINDINGS FROM INTERNATIONAL TOBACCO CONTROL POLICY EVALUATION PROJECT

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Significance Australian cigarette prices are among the highest in the world due to annual tobacco tax increases implemented between 2010 and 2020. The tobacco industry progressively introduced smaller roll-your-own (RYO) tobacco pouch sizes and larger factory-made cigarette (FMC) pack sizes to attract consumers opting seeking low-priced cigarettes. We investigated the trends in tobacco purchase behaviours between 2007 and 2020 in Australia and examined whether the purchase behaviours were associated with quit intentions. **Methods** We analysed a population-based survey of adult smokers; nine waves (2007-2020) of the International Tobacco Control Policy Evaluation (ITC) Australia Survey (N=11 534). The main outcome measures were types of tobacco products purchased: RYO tobacco vs FMC, pack or pouch size. We used generalized estimating equation logistic regression models to estimate the trends in tobacco products purchased and associations with socio-demographic and smoking-related factors including quit intentions. A multinomial regression analysis was conducted for the purchased cigarette pack sizes. **Results** Compared to purchasing FMC use, RYO tobacco purchase significantly increased over the study period (adjusted Odds Ratio (aOR)₂₀₂₀=2.45; 95% CI: 1.85, 3.24, vs. 2007/2008, p for trend<0.001). Those who were male (aOR=1.72, 95% CI 1.36 to 2.19 vs. female), had a lower annual income (aOR_{low}=1.68, 95% CI 1.34 to 2.12; aOR_{moderate}=1.45, 95% CI 1.18 to 1.79 vs. high) were more likely to buy RYO tobacco. Compared to purchasing mid-sized packs, big or small-sized pack purchases significantly increased among those who reported FMC as their last purchase over the study period (p for trend<0.001). Those who were female (adjusted Related Risk Ratio (aRRR)=1.04, 95% CI 1.02 to 1.05 vs. male), had a lower income (aRRR_{low}=2.22, 95% CI 1.40 to 3.53; aRRR_{moderate}=1.67, 95% CI 1.13 to 2.48 vs. high), had a lower education level (aRRR_{low}=4.57, 95% CI 2.72 to 7.65; aRRR_{moderate}=2.12, 95% CI 1.27 to 3.48 vs. high), and had high nicotine dependence (aRRR=1.44, 95% CI 1.05 to 1.97) were more likely to purchase large packs, compared to middle-sized packs. Purchasing RYO tobacco or large FMC packs was associated with lower quit intentions (aOR_{in next month}=0.76, 95% CI 0.63 to 0.91; aRRR_{in next month}=0.36, 95% CI 0.22-0.59, respectively vs. no intention). **Conclusion** Large pack size and products with a low cost upfront (e.g., small RYO pouches) may appeal to low-income consumers. Standardizing the size of pack size may reduce price-related marketing and especially benefit people who purchase large packs.

FUNDING: Academic Institution

POS5-37

VIEWS OF VUSE ADS: SOCIAL MEDIA MARKETING OF VUSE AFTER FDA'S MARKETING GRANTED ORDER

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Background FDA requires companies wishing to sell any new tobacco product to submit a premarket tobacco product application (PMTA) by September 2020 in order for the product to remain on the market. In October 2021, FDA issued Marketing Granted Orders (MGOs) authorizing the marketing of Vuse Solo e-cigarette devices and their tobacco-flavored pods, making Vuse Solo the first e-cigarette authorized by FDA through PMTA process. The authorization to market Vuse Solo is contingent upon several conditions, including ensuring that the content of any advertising materials must not incorporate themes that could attract youth. In the wake of FDA's authorization of Vuse Solo, little is known about the changes of Vuse marketing messages on social media before and after an MGO was issued, particularly whether the ads are appealing to adolescents. **Methods** We conducted a content analysis of the official accounts of RJ Reynolds Vapor Company on Instagram and Facebook. We collected all ads posted from October 10, 2019, when the PMTA application was submitted, to February 21, 2022. We compared the 62 post-PMTA posts (Oct. 2021 - Feb 2022) with those in the previous pre-PMTA winter (Oct. 2020 - Feb. 2021) so that the comparison is based on the same season. **Results** Among the total 627 posts, no one featured Vuse Solo, the authorized product. Vuse Alto, which did not receive marketing authorization, was the only product that was explicitly marketed. Innovation/creativity, which associates using the product with inspiration for art and other creative activities, was the top theme (30.8%), and art was the top featured activity (28.5%). The second most prominent theme was individuality/freedom, meaning associating the use of the product with taking control in one's life or having choices of self-expression. No ads mentioned health-related claims. Other emerging features in the ads after PMTA included nature, alcohol, and tech devices. While top the themes decreased after PMTA, the general pattern remained the same. **Conclusion** The marketing messages about Vuse remain consistent after Vuse Solo's PMTA. Rather than featuring harm reduction, Vuse marketing focuses on self-expression and creativity, which could potentially be attractive to youth. Extensive advertising of products not receiving authorization could be misleading to consumers that Vuse Alto is an authorized product, and since FDA authorization is often misinterpreted as an approval, this could mislead people about the perception of the product's safety for health.

FUNDING: Federal; FDACTP

POS5-38

EVALUATION OF ENDS PACKAGE DESIGNS: FINDINGS AND POLICY IMPLICATIONS

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Significance: Tobacco companies in the United States spend billions on marketing annually, capturing the attention of youth and young adults and influencing the initiation of tobacco use. Youth are attracted to colorful graphic designs and find plain packaging boring or lame. Also, youth tend to purchase products with atypical designs. Look-alike products, resembling familiar candy or soda brands, may enhance product recall and promote youth ENDS use. In contrast to combustible cigarettes, ENDS designs are not regulated in the United States. We purchased e-liquids and evaluated them for youth appealing features, including package design and look-alike products. Findings may contribute to policy development impacting ENDS marketing strategies. **Methods:** We evaluated 285 e-liquids, purchased onsite from tobacco specialty stores, using a comprehensive thematic analysis. One aspect of the thematic analysis was packaging design. Three researchers independently assessed ENDS packaging for color and look-alike products. We also used Google Image search for the look-alike analysis. **Results:** Of the 285 e-liquids, only 2.1% (n = 6) were coded as plain (white/greyscale) and 91.9% (n = 262) were coded as having color with graphics and/or images. The most common type of packaging for all e-liquid types (nicotine free, free-base, and salts) was colorful with graphics and/or images. The distribution of overall packaging categories differed significantly across the e-liquid types ($p = 0.0002$) driven by the higher percentages of colorful packaging in free-base and salt samples compared to nicotine-free samples. Additionally, coders identified 72 e-liquids (25.3%) that resembled a common or familiar product and 30 e-liquids (10.5%) had a positive match via the Google Image search. Nicotine-free e-liquids (43.9%) were most likely to have a look-alike product. Some of the look-alike products resembled everyday items like prescription medication bottles, pop cans, candy, and coffee cups. **Conclusion:** Our study found free-base and salt e-liquids were more likely to have colorful packaging, and approximately 25% of e-liquid samples resembled a common or familiar product. Interestingly, nicotine-free e-liquids, those most likely to be purchased by youth, were the most likely to have a product with a look-alike design. Given the high rate at which youth initiate use of ENDS products, it is imperative that regulations address ENDS marketing strategies and package designs. Australia, Israel, Canada, and Denmark are countries that require plain packaging for tobacco and/or ENDS products. The United States should consider requiring plain packaging for tobacco products, especially ENDS.

FUNDING: State

POS5-39

EXAMINING E-CIGARETTE TAX CONVERSION: STANDARDIZED TAX MEASURES BASED ON VOLUME, PRICE, AND NICOTINE CONCENTRATION

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Background: Since the early 2010s, state legislatures have introduced e-cigarette taxes to curb the increasing prevalence of e-cigarette use in the US. Unlike cigarette taxes, where specific excise taxes are levied per pack, e-cigarette taxes are imposed in multiple ways, such as ad valorem tax on wholesale price or retail price, and specific excise tax per e-liquid milliliter or container (e.g., pod or cartridge). Given this nature, formulating a unified e-cigarette tax measure is key to assessing the impacts of e-cigarette taxes on behaviors. **Objective:** We develop standardized e-cigarette taxes using multiple approaches and compare these approaches with the existing standardized method reported in Cotti et al. (2021). These alternative tax standardization approaches and measures are critical to estimating robust and unbiased tax and price elasticities of e-cigarette demand. **Methods:** Using e-cigarette prices and nicotine profiles from the Nielsen Retail Scanner Data, we develop standardized tax measures in the following ways: 1) standardized e-cigarette taxes based on wholesale or retail price (in ad valorem rate), 2) standardized e-cigarette taxes based on nicotine concentration, and 3) standardized e-cigarette taxes into separate measures of ad valorem taxes vs. specific taxes. **Results and Conclusion:** We will present standardized e-cigarette tax levels in multiple forms across states between 2010 and 2020. To the best of our knowledge, this study would be the first to convert e-cigarette taxes based on ad valorem rate and nicotine concentration. This study will provide alternative e-cigarette tax measures with researchers for empirical research. **Citations/Disclaimers** Researcher(s)' own analyses calculated (or derived) based in part on data from Nielsen Consumer LLC and marketing databases provided through the NielsenIQ Datasets at the Kilts Center for Marketing Data Center at The University of Chicago Booth School of Business. The conclusions drawn from the NielsenIQ data are those of the researcher(s) and do not reflect the views of NielsenIQ. NielsenIQ is not responsible for, had no role in, and was not involved in analyzing and preparing the results reported herein.

FUNDING: Federal

POS5-40

CIGAR CHARACTERIZING FLAVOR DESCRIPTORS AND WARNINGS ALTER PRODUCT PERCEPTIONS AMONG YOUTH

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Significance: Cigars are the most used combustible tobacco product among middle and high school students. Cigars are addictive, available in flavors known to be enticing to youth, and can result in similar health effects as smoking cigarettes. The US Food and Drug Administration has proposed two potential regulatory policies to reduce cigar use 1) mandating cigar warnings, and 2) banning characterizing flavors in cigars. This experiment examines the impact of these policies by testing a strengthened cigar warning in combination with removing a characterizing flavor descriptor among youth. **Methods:** We conducted a national online survey from September-October 2022 with US youth. Participants were eligible to participate if they were 15-20 years old and reported past 30-day little cigar and cigarillo (LCC) use, ever LCC use, or if they were susceptible to using LCCs. In a 2x2 experiment, participants were randomly assigned to view a fictional cigar package that manipulated: 1) the presence or absence of a characterizing flavor descriptor "Purple Crush" and 2) a text-only or a text + image warning. Outcome measures assessed included perceived warning effectiveness (PWE), cigar risk perceptions, and perceptions of the cigar flavor and taste. Linear regression models were used to test for main effects and interactions. **Results:** We recruited 680 youth ages 15-20 who had used LCCs or were susceptible to using LCCs. Slightly over half of the sample identified as a woman or girl (56.2%), White (56.3%), and heterosexual (62.5%). In terms of LCC status, 27.5% reported past 30-day LCC use, 20.7% reported ever LCC use, and 51.8% were susceptible. There were no significant interactions between the two experimental conditions; however, there were significant main effects. The text + image warning increased PWE more than the text-only warning ($p < 0.005$). The "Purple Crush" descriptor increased perceptions that the cigars had a non-tobacco flavor ($p < 0.001$), were sweet ($p < 0.001$), and were fruity ($p < 0.001$). In addition, the "Purple Crush" descriptor decreased perceptions that the cigars had a tobacco taste ($p < 0.05$).



Conclusions: A characterizing flavor descriptor on a cigar package made participants think that the cigars were sweet, fruity, and had a non-tobacco flavor and a text + image warning increased perceived warning effectiveness.

FUNDING: Federal; FDACTP

POS5-41

GLOBAL POLICIES REGULATING ELECTRONIC NON-NICOTINE DELIVERY SYSTEMS (ENNDS)

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Significance: As of Oct 2022, the Johns Hopkins policy scan identified at least 109 countries/jurisdictions (countries) that regulate e-cigarettes. The scan also surveils countries in this sample that regulate electronic non-nicotine delivery systems (ENNDS). The extent to which countries specifically regulate ENNDS is unclear. Here we report on countries' policies regulating ENNDS and how they regulate these products. **Methods:** Information on ENNDS policies was obtained from written national policies for e-cigarettes and requesting information on e-cigarette policies from representatives working in tobacco control/public health. Countries mentioning ENNDS were noted, including those specifying that ENNDS are not regulated. ENNDS policies were categorized into 14 domains: advertising/promotion/sponsorship (APS), child safety packaging, clean air, distribution, health warning labels, importation, ingredients/flavors, manufacture, minimum age, nicotine volume/concentration, reporting/notification requirements, sale, tax, and trademarks. Classification of ENNDS (e.g., tobacco products, consumer products) was also noted. **Results:** Of the 109 countries that regulate e-cigarettes, 55 (50%) mention ENNDS specifically. Of these, 22 (40%) are low- or middle-income countries from all 6 WHO regions. ENNDS are most commonly classified as e-cigarettes (n=12, 22%), consumer products (n=11, 20%), or tobacco-related products (n=5, 9%). Eleven countries (20%) specify that ENNDS are not regulated under tobacco control policies. Bans on importing and selling e-cigarettes apply to ENNDS in 7 (13%) and 5 (9%) countries, respectively, and bans on manufacturing and distributing e-cigarettes each apply to ENNDS in 4 (7%) countries. The most common ENNDS policy domains are APS and clean air (n=23, 42% each), minimum age (n=22, 40%), and sales (n=19, 35%, including 5 banning sales). **Conclusion:** Half of countries reviewed specify ENNDS in their policies, including 11 that do not regulate ENNDS under tobacco control policies. Fifty-four countries do not mention ENNDS at all; thus, the extent to which they regulate ENNDS is unclear. While labelled nicotine-free, some ENNDS have been found to contain nicotine, and ENNDS aerosol contains potentially harmful substances. ENNDS can be used to inhale other substances (e.g., cannabis, vitamins), with several companies making unsubstantiated health claims for such products. Thus, these devices and associated e-liquids should be regulated.

FUNDING: Nonprofit grant funding

POS5-43

ASSOCIATION BETWEEN CIGARETTE SALES TRENDS AND LEVELS IN THE U.S. AND FDA'S ANNOUNCEMENT OF ITS INTENTION TO PROHIBIT MENTHOL AS A CHARACTERIZING FLAVOR IN CIGARETTES

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Significance On April 29, 2021, the FDA announced its intention to prohibit menthol as a characterizing flavor in cigarettes. This study uses retail point-of-sale (POS) data to examine whether the announcement might have set forth the process of modifying cigarette smoking behavior at the population level in anticipation of the prospective prohibition. **Methods** We used monthly retail POS of cigarettes from the Nielsen Local Trade Area (LTA) data to create the LTA-level panel sample from September 2019 to April 2022 for interrupted time series analysis (ITSA). The Nielsen LTA data comprise 2,182 LTAs spanning the contiguous US states, combining POS with LTA-level demographic characteristics. 379 LTAs with local menthol cigarette sales restrictions were excluded, and the analytical sample included 1,803 LTAs with 35 monthly sales data points (N = 63,105). The expected trends of cigarette sales without the announcement were extrapolated from the pre-announcement trends. We then calculated the change in cigarette sales associated with the announcement as the average difference between the observed and expected post-announcement 12-month cigarette sales per 1000-persons for the full sample and the sample stratified by LTA-level racial/ethnic compositions. **Results**

Monthly menthol cigarette sales per 1000-persons increased immediately after the announcement by 6.10 packs (95% CI, [3.68, 8.53]) and then declined at a higher rate than pre-announcement trend by 0.47 packs (95% CI, [-0.87, -0.08]). Stratified analysis shows that for LTAs with the lowest proportion of non-Hispanic Black population (<3.01%), the observed post-announcement 12-month menthol cigarette sales were significantly lower than expected by 21.14% (95% CI, [-29.00, -13.28]). Contrarily, LTAs with a relatively higher proportion of non-Hispanic Black population (7.90-19.73%) witnessed a significantly higher observed post-announcement 12-month menthol cigarette sales than expected by 23.46% (95% CI, [15.09, 31.83]). **Conclusion** The announcement might have set forth the process of modifying cigarette smoking behavior in areas with a relatively lower proportion of non-Hispanic Black population. Areas with a relatively higher proportion of non-Hispanic Black population bear a disproportionately larger burden of menthol cigarettes consumption. The findings suggest the need for the federal, state, and local governments' immediate action of providing effective cessation support to population sub-groups with a disproportionately larger burden of menthol cigarette smoking to achieve greater health equity.

POS5-44

CONTENT ANALYSIS OF E-CIGARETTE AND E-LIQUID MODIFICATIONS TO VAPE CANNABIS ON YOUTUBE

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Significance: E-cigarettes were originally created to vape e-liquids with nicotine, however social media demonstrates increased modifications to e-liquids and devices to vape cannabis. Combined use of nicotine and cannabis increases the addictive and psychoactive effects of each. Content analysis of YouTube videos helps us understand how e-cigarette devices and liquids are modified to vape cannabis. **Methods:** We ran YouTube searches with ten search term combinations to identify videos containing modifications to e-cigarette/liquids to contain either "CBD", "cannabis", or "THC". We extracted the first 40 videos from each search based on relevance, resulting in 152 videos without duplicates. 16 videos were no longer available and 77 did not contain cannabis products or e-cigarettes. We coded the remaining 59 videos for cannabis content, age-restriction, purchasing links, video type, and types of modifications. **Results:** Out of the 59 videos, 53% included THC, 54% CBD, and 12% both. 21 videos (36%) were age restricted (65% containing THC; 16% CBD). 44% of videos included a purchasing link for cannabis products and 14% for nicotine products. 51% (n=30) of videos were product reviews and/or demonstrations of how to use pre-made cannabis products with e-cigarette devices. This includes manufacturer-made e-liquids and the creation of coil-based e-cigarettes that allow for vaping wax-based products. 39% (n=23) of videos included user modifications to e-liquids or devices. The most frequent modification was mixing their own e-liquid with cannabis products to be compatible with e-cigarette devices. None of the videos included e-liquids containing both nicotine and cannabis, however the most frequently reported reasons for modifications were to: 1) use the same device(s) to vape cannabis that they use to vape nicotine; and 2) be able to vape cannabis in public due to others thinking that they are vaping nicotine. **Conclusion:** The contents of self- and manufacturer-made cannabis e-liquids are not currently regulated and have not been tested rigorously for safety in e-cigarettes. Despite this, YouTube content demonstrates the marketing and modification of cannabis e-liquids to be compatible in devices also used for nicotine. The use of the same devices for multiple substances can potentially enable co-use and complicate the FDA's regulation of e-cigarettes. More research is needed to better understand how e-cigarettes may impact co-use of cannabis and nicotine.

FUNDING: Federal

POS5-45

AWARENESS AND USE OF SHORT-FILL E-LIQUIDS BY YOUTH IN ENGLAND IN 2021: FINDINGS FROM THE ITC YOUTH TOBACCO AND VAPING SURVEY

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Background: Refillable tank e-cigarettes were the most commonly used type of e-cigarette in England in 2021. The UK Tobacco and Related Products Regulations (TRPR) limits e-liquids to 20mg/ml of nicotine in a 10ml bottle. Short-fill e-liquids, which are not covered by TRPR regulations, are nicotine-free and come in larger, underfilled bottles to allow consumers to customise nicotine strength with the addition of nicotine 'shots'. This paper investigates awareness, prevalence of use, and reasons for use of short-fill



SRNT 2023 POSTER SESSION 5 • SATURDAY, MARCH 4, 2023, 11:00 AM - 12:30 PM

e-liquids among youth in England. **Methods:** Data are from 4224 youth aged 16-19 years in England, from the online 2021 ITC Youth Tobacco & Vaping Survey. Weighted logistic regression models investigated associations between awareness and past 30-day use of short-fills by smoking status, vaping status, nicotine strength vaped and participant demographics. Reasons for use were also reported. **Results:** Approximately one-quarter (23.0%) of youth in England reported awareness of short-fill e-liquids. Among past 30-day vapers, 22.1% had used short-fills in the past 30 days; use was most prevalent among those who were also smokers (43.2%; AOR=13.7 95%CI=4.56-40.93, $p<.001$) and those who reported usually vaping nicotine concentrations of 2.1% (21mg/ml) or more (40.8%; AOR=3.16 95%CI=1.53-6.49, $p=.001$). 'Convenience of a bigger bottle' was the most commonly selected reason for use (45.0%), followed by 'less expensive than regular e-liquids' (37.6%). **Conclusions:** Awareness of short-fills was common among youth in 2021, including never vapers/smokers. Among past 30-day vapers, use of short-fills was more prevalent among those who also smoked and those who vaped higher strength nicotine e-liquids.

FUNDING: Nonprofit grant funding

POS5-46

PREVALENCE AND CORRELATES OF SINGLE-UNIT/LOOSE CIGARETTE AND SINGLE-UNIT/LOOSE BIDI PURCHASE IN INDIA: EVIDENCE FROM THE INTERNATIONAL TOBACCO CONTROL POLICY EVALUATION PROJECT

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Significance: Easy access to loose smoked tobacco (loosies) among minors and disadvantaged groups may promote smoking initiation and addiction. This study aims to determine prevalence and correlates of loose cigarette and bidi purchase among Indian smokers. **Method:** Data from the 2018-19 Tobacco Control Policy (TCP) India survey was analyzed, limiting the analytic sample to those who reported buying either loose/packed cigarettes ($n=643$) or loose/bundled bidis ($n=730$) at their last purchase. The prevalence of purchasing loose cigarettes and bidis was calculated, including among key subgroups. Crude and adjusted logistic regression models were fit separately for cigarettes and bidis, whereby purchase behavior (loose vs pack/bundle) was regressed on socio-demographic factors, tobacco use patterns (i.e., non-daily/daily; smoked tobacco only/mixed use), having ever tried to quit cigarette/bidi smoking (yes/no), and intention to quit cigarette/bidi smoking in the next six months (yes/no). **Results:** Most respondents were male (98.3%), married (86.1%), from urban neighborhoods (71.4%), had low education (62%), smoked daily (81.3%) and exclusively (72.3%), had no intention to quit in the next 6 months (93.9%), and had never made a quit attempt (81%). About 75% of smokers, who purchased cigarettes for themselves at their last purchase, reported having bought them loose; only about 12% smokers who purchased bidis for themselves at their last purchase bought loose bidis. More than 80% of loose cigarette and bidi purchases were made from tobacco stores and small tobacco kiosks. In adjusted logistic models, non-daily smokers (AOR=9.36), smokers with low education level (AOR=1.86), and smokers who had ever made a quit attempt (AOR=2.30) were more likely to purchase loose cigarettes, and exclusive smoked tobacco users were less likely (OR=0.56) than mixed product users to purchase loosies. In adjusted models for loose bidi purchase, females (OR=2.99), smokers from urban neighborhoods (AOR=5.54), non-daily smokers (AOR=2.47), and unemployed smokers (vs smokers in unorganized sector (OR=0.43)) were more likely to purchase loose bidis. **Conclusions:** Most cigarettes purchased were in the form of loosies and the prevalence was higher among disadvantaged populations with lower educational attainment. The high prevalence of loose purchases calls for adoption and enforcement of a complete ban on the sale of loosies due to its potential to reduce smoking initiation and consumption.

POS5-47

THE EFFECTS OF CANDY MARKETING AND NICOTINE FORMULATION ON PERCEIVED APPEAL AND SENSORY CHARACTERISTICS OF E-CIGARETTE PRODUCTS

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Significance: People who use tobacco products commonly prefer fruity, minty, and sweet-flavored e-cigarette liquids, some of which are marketed with candy themes. Whether marketing products with candy themes impacts perceived appeal and sensory characteristics is unknown, yet crucial to informing regulations for tobacco marketing. This remote laboratory experiment examined whether the administration of e-cigarette products with vs. without candy-themed marketing impacted perceived appeal and sensory characteristics of these products. We also assessed whether these effects were moderated by nicotine formulation (salt vs. free-base). **Methods:** Adults who currently use e-cigarettes and/or cigarettes ($N=72$) completed a single-session procedure involving the controlled self-administration of one puff from eight different individually-packaged e-liquid pods with fruity, minty, and/or sweet flavors in a pod-style device. Of the eight samples, four presented with standard marketing (e.g., labeled "mango" with picture of mango fruit) and four presented with candy marketing (e.g., labeled "mango gummy bear" with gummy bear image). Following each puff administration, participants rated several items for sensory experience and appeal (all on 0-100 scale). Participants were randomized between-subjects to either all salt or all free-base solutions with equivalent nicotine concentration (~2.3%). **Results:** In the sample (mean age[SD]=31.4[12.8] years), marketing (candy vs. standard) had no main effect on appeal and sensory ratings. Interactions between marketing and nicotine formulation were significant for appeal ($|B|=11.1$), liking ($|B|=11.8$), disliking ($|B|=9.1$), sweetness ($|B|=7.9$) and smoothness ($|B|=9.6$), such that marketing predicted greater appeal ($B=7.7$), liking ($B=8.4$), disliking ($B=-6.9$) and sweetness ($B=5.7$) among free-base solutions but not salt solutions. **Conclusion:** Candy packaging may improve the appeal and sensory experience of e-cigarettes with free-base e-liquids. Regulations targeting marketing could have incremental impact for products with sweet, fruity, and minty characteristics. Because candy product labels are most appealing to youth and young adults, these findings highlight an important area of consideration for future policy.

FUNDING: Federal

POS5-48

E-CIGARETTE PREEMPTION LAWS: LIMITING LOCAL COMMUNITIES FROM PROTECTING YOUTH

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Significance: E-cigarette use is prevalent among youth in the United States. Historically, local communities have been a catalyst for adopting evidence-based tobacco control policies. However, some states have ceiling preemption laws that prevent more stringent statutes from being enacted at the city or county level and inhibit tobacco control efforts. The current study documents state preemption laws regarding e-cigarette advertising, licensure, indoor clean air, and youth access. **Methods:** We conducted a systematic synthesis of state statutes in 2022 to identify states with e-cigarette preemption laws. Data were collected on four policy categories being preempted: advertising, licensure, clean indoor air, and youth access. Laws were compiled, and the content was verified using the Westlaw legal database. We also coded laws for preemption terminology. **Results:** In the US, 25 states preempt stricter local e-cigarette regulations in 53 laws. Of these states, 19 preempt advertising regulations, 11 preempt licensure requirements, four preempt ordinances for indoor clean air, and 21 preempt youth access. A broad range of terms was employed to describe preemption, yet few states explicitly used the term "preempt." **Conclusion:** E-cigarette ceiling preemption laws inhibit public health progress and prevent local authorities from addressing the popularity of e-cigarettes among adolescents. Understanding the specific roles and prevalence of e-cigarette preemption laws could help inform tobacco control efforts and counter the tobacco industry's influence.

FUNDING: Federal

POS5-49

REVIEW OF COUNTY-LEVEL POLICIES REGULATING ONLINE E-CIGARETTE SALES

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Introduction: Buying and selling goods has increasingly shifted to the online marketplace, a trend that extends to tobacco products. Little is known about how countries'



SRNT 2023 POSTER SESSION 5 • SATURDAY, MARCH 4, 2023, 11:00 AM - 12:30 PM

policies extend to online purchases. This work reports which countries are regulating online e-cigarette sales and how. **Methods:** The Institute for Global Tobacco Control's E-cigarette Policy Scan tracks country-level policies regulating ENDS across the globe. The scan, which is updated twice a year, includes 130 countries. In-country contacts provide specific policy information and documents. Policy details were collected through November 2022. This research summarizes insights obtained through this active policy surveillance work in which we requested information on e-cigarette regulations applicable to online sales. We reviewed responses and quantified how many countries have policies regulating online sales, and further classified their policy approaches. **Results:** We identified 17 countries in the scan with policies regulating online sales of e-cigarettes. Policies took one of three regulatory approaches to regulating online e-cigarette sales: 1. a ban on online e-cigarette sales [8 countries], 2. Restrictions to eliminate online exposure and sales of e-cigarettes to minors [3 countries], and 3. No applicable regulations for online e-cigarette sales [5 countries]. For example, in Costa Rica, online sales of e-cigarettes are banned in instances where the purchaser's legal age cannot be verified in a clear and timely manner. One approach not captured in the three above is Australia, a country that takes a unique approach by requiring a prescription for online sales (a copy of which must be included in the package containing the online order). Countries regulating online sales encompass all World Health Organization (WHO) regions, including Africa (1 country); Americas (2 countries); Eastern Mediterranean (2 countries); Europe (7 countries); South-East Asia (1 country); Western Pacific (4 countries). **Conclusions:** Most countries either have no regulations for online e-cigarette sales or ban it entirely. Countries placing limits on online sales are focused on restricting sales to minors.

FUNDING: Federal; Nonprofit grant funding

POS5-50

TOBACCO CONTROL POLICY SUPPORT AMONG CANCER SURVIVORS: FINDINGS FROM HINTS-SEER

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Background: Cigarette smoking causes approximately 20% of all cancers and nearly 30% of cancer deaths in the US. Tobacco control policies have been successfully used to reduce tobacco use, resulting in significant declines in cancer incidence and death. The aim of this study was to estimate tobacco control policy support (prevalence and predictors) among cancer survivors. **Methods:** We analyzed data from HINTS-SEER, a pilot study that utilized the Health Information National Trends Survey (HINTS) 5 Cycle 4 administered to cancer survivors from three Surveillance, Epidemiology, and End Results (SEER) cancer registries (Greater Bay Area, Iowa, New Mexico). Data were collected from cancer survivors ($n = 1,234$) between January and August of 2021. Support for five tobacco control policies was measured using a 5-point Likert scale (ranging from strongly oppose to strongly support): cigarette pack pictorial health warnings (Warnings), R-ratings for movies depicting cigarette smoking (Ratings), requiring stores to keep tobacco products out of customers' view at checkout counters (Products), requiring stores to keep advertisements for tobacco products away from cash registers and out of windows (Ads), and tobacco products should not be advertised on social media (Social Media). We calculated weighted estimates of policy support (collapsing strongly support/support vs. all other responses) and used weighted multivariable logistic regression to identify predictors of policy support. **Results:** A majority of cancer survivors from all three registries supported all five policies. Support was highest for Labels (80.6%), followed by Social Media (79.4%), Ads (72.9%), Products (67.4%), and Ratings (64.4%). Female sex, older age, having a college degree or greater, and being a former or never cigarette smoker were all independently associated with greater odds of policy support. Being a survivor of a tobacco-related cancer (versus other cancers) was not associated with policy support. **Conclusions:** Support for tobacco control policies is high among cancer survivors from the Greater Bay Area, Iowa, and New Mexico SEER registries. These findings suggest that cancer survivors may be uniquely positioned to effectively advocate for tobacco control policies.

POS5-52

HOW COST LEVELS AND THE GROWTH OF E-CIGARETTES IMPACT CIGARETTE EXCISE TAX PASS-THROUGH TO PRICES

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Background: How excise taxes are passed through to prices determines whether tax policies will be effective in changing smoking behaviors. Literature published in the 90s

and early 2000s has documented that cigarette taxes are overly shifted to prices (i.e., an \$1 increase in taxes leads to a >\$1 increase in prices), which ensures that consumers face higher prices when cigarette taxes are raised. However, there is limited evidence on how cigarette taxes pass through to prices is impacted by the entrance and growth of e-cigarettes in the US, which could be close substitutes for cigarettes. It is also unclear whether cigarette manufacturers strategize tax pass-through based on price levels (e.g., premium vs discount brands). **Objective:** This study uses the Nielsen Retailer Scanner Data from 2006-2020 to investigate how cigarette taxes are passed to prices at the 25, 50, and 75 percentile levels. We further analyze how cigarette tax pass-through rates differ by e-cigarette availability (2012 onward) and growth (2017 onward due to the significant growth of nicotine salt products). **Methods:** We use Nielsen Retailer Scanner Data to estimate 25, 50, and 75 percentile cigarette price levels for each state between 2006 and 2020. Tax pass-through rates to these price levels are assessed using OLS regressions while controlling for state, year, and month fixed effects. We then test the difference in tax pass-through rates by different time periods: 2006-2011, 2012-2016, and 2017-2020 to ascertain whether cigarette tax pass-through rate was impacted by the entrance of e-cigarettes and the growth of nicotine salt products. **Findings:** During the study period, tax pass-through rates to 25, 50, and 75 percentile prices were 1.09, 1.09, and 1.13, respectively. The tax pass-through rate to prices at the 75-percentile level was significantly higher than the rate at 25 and 50 percentiles. In addition, the tax pass-through to median (50 percentile) prices were significantly higher after the entrance of e-cigarettes and the growth of nicotine salt products. **Conclusions:** Consistent with existing literature, the cigarette excise tax pass-through rate is higher for higher-priced products, and the rate increases after the entrance of e-cigarettes and the growth of nicotine salt products. These findings suggest that continuing to raise cigarette excise taxes remains an important policy tool to increase cigarette prices and reduce smoking. With the cigarette tax pass-through rate increasing during the e-cigarette eras, cigarette taxes could create financial incentives to encourage smokers to switch to e-cigarettes.

FUNDING: Academic Institution

POS5-53

PRESENCE OF GREENWASHING TACTICS IN CIGARETTE ADS, 2019-2020

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Significance: The tobacco industry has a long history of using deceptive marketing tactics to mislead consumers into believing a product is safer. In recent years, tobacco companies have used greenwashing - making a product seem eco-friendly and/or natural; several of these tactics (e.g., the terms 'natural' and 'additive-free') were identified by FDA as misleading consumers. However, there are likely myriad other tactics the industry uses to greenwash products and potentially mislead consumers. **Methods:** We obtained ads run in 2019-20 from Kantar, a market research firm, Trinkets and Trash (a database of tobacco ads hosted by Rutgers University Center for Tobacco Studies) and internal social media surveillance, and identified 196 ads containing greenwashing. Ads were double-coded by two trained coders (reliability > .8), with discrepancies reconciled by a third coder and group deliberation, as needed. We calculated frequencies and percentages to assess the prevalence of different greenwashing tactics. **Results:** Initial analyses indicate about one-third (31%) of the ads were for Natural American Spirit, 31% were for Winston, and 20% were for Marlboro. The most commonly used words/phrases in the ads were 'tobacco and water' (31%), simple (27%), different (20%), real (17%), organic (10%), recycling (12%) and earth-friendly (10%). Seventeen percent of ads contained text encouraging consumers to adopt eco-friendly behaviors, while 11% touted the company's eco-friendly behavior. Eleven percent of ads each referenced farming practices. Nearly half (48%) of ads contained imagery of outdoors landscapes, while 31% contained images of flora and 9% contained farming imagery. Other greenwashing tactics observed included environmentally-themed coupons, sweepstakes and giveaways. Thirty-nine percent of ads contained disclaimers that the product was not safer than other products. **Conclusion:** Tobacco companies engage in a wide range of greenwashing tactics. Research has documented that some of these tactics mislead consumers to believe a product is safer. Additional research is needed to understand how additional tactics could affect consumer product perceptions and use.

FUNDING: Federal; FDA/CTP



POS5-54

SHIFTS IN YOUTH TOBACCO PURCHASING AND USE BEHAVIOR FOLLOWING TOBACCO 21 - FINDINGS FROM THE NATIONAL YOUTH TOBACCO SURVEY 2019-2021

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Significance: In Dec 2019, the Tobacco 21 (T21) amendment raised the minimum legal sales age (MLSA) for tobacco products from 18 to 21 years in the US. T21 is expected to restrict product access among youth and young adults, though effectiveness requires retailer compliance and enforcement by relevant agencies. This study aims to identify changes in tobacco use, access perceptions, and procuring methods, following T21 using existing data from the National Youth Tobacco Survey (NYTS). **Methods:** Annual data from 2017-2021 of the NYTS were analyzed. Descriptive statistics and regression models were used to assess cross-sectional changes in ever and past 30-day use of any tobacco, peer use of cigarettes and e-cigarettes, perceived ease of access to tobacco products, and purchasing behaviors following T21. All models were adjusted for demographic characteristics, as well as past 30-day tobacco use. **Results:** Students were 0.76 (95%CI: 0.71, 0.81) less likely to perceive purchasing tobacco products in a store as somewhat easy as opposed to not easy at all, and 0.49 (95%CI: 0.45, 0.54) less likely to perceive purchasing products in a store as easy following the T21 amendment. Further, students were 0.87 (95%CI: 0.79, 0.97) less likely to perceive purchasing tobacco products online as somewhat easy as opposed to not easy at all, and 0.71 (95%CI: 0.63, 0.80) less likely to perceive purchasing products online as easy following the T21 amendment. Ever tobacco use did significantly decrease following T21 (35.1% to 28.2%, $p < 0.0001$) as did past 30-day use (18.6% to 12.4%, $p < 0.0001$). Students were 1.56 (95%CI: 1.25, 1.94) times more likely to be denied purchasing tobacco products in the past 30-days because of age following T21. However, the percentage of students who reported purchasing their own tobacco products also increased from 33.5% to 50.1% ($p < 0.0001$). **Conclusion:** Following T21, decreases in tobacco use, perceived access to tobacco products in stores and online, and observed peer use of cigarettes and e-cigarettes on school grounds were observed. However, a sizeable proportion of the past 30-day tobacco users were still able to purchase tobacco products despite being underage. While many demographic variables and behaviors did not differ based on where the survey was completed in 2021, future studies need to be done due to the change in the NYTS survey distribution due to the COVID-19 restrictions. However, greater enforcement and penalties within communities would likely increase the benefits of T21.

FUNDING: FDACTP

POS5-55

DEVELOPMENT OF A NATIONAL TOBACCO DATA LAKE IN HUNGARY

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Besides the significant health and social burdens, smoking also causes serious economic damages. Its costs are multiple times higher than tax revenues gained from tobacco products on both global and national levels. The market share of novel tobacco and nicotine delivery products is rapidly increasing while monitoring of consumption and economic data of these products are challenging. This study aimed to present the development of an information technology (IT) system in Hungary to monitor and perform real time economic and epidemiologic analyses of tobacco and nicotine delivery products. The development of the Hungarian Tobacco Data Lake (HTDL) has started in 2017. The HTDL is an IT system or repository of large amount of data stored in its natural or raw format. Inclusion criteria for data to be included are 1) either structured or unstructured) 2) nationally representative or nationwide, 3) regularly updated or real-time, 4) covers consumption, sales, economic, epidemiological, and health-related characteristics. Economic, consumption, and sales data are channelled by the National Tobacco Trade Company, National Tobacco Shops, and the National Tax and Customs Administration and they provide data on retail prices by product type, brand name, and unit as well as the amount of tax receipts and retail sales data by product types. Epidemiological data are provided by national population studies monitoring tobacco use in representative samples of adults and adolescents. Tobacco-related health outcome data are channelled by the National Health Insurance Fund. Supported by a national data transfer system, the HTDL provides various analytical possibilities in unprecedented depth and accuracy on a national level to assess the size of the tobacco market, to estimate tobacco and nicotine use prevalence of the population in alternative ways, to explore trends of tobacco use and market share, and even to forecast potential tobacco-related health burden. The

HTDL is a comprehensive, data-driven method of continuous monitoring and analyses of all segments of the tobacco epidemic. The HTDL provides extraordinary opportunities for data-driven decision making tailored to national circumstances.

FUNDING: Other: The study was funded by the National Research, Development and Innovation Office in Hungary (RRF-2.3.1-21-2022-00006, Data-Driven Health Division of National Laboratory for Health Security)

POS5-56

HEALTH WARNING LABEL COMPLIANCE IN MEXICO: TOBACCO INDUSTRY EXPLOITING STRONG LEGISLATION

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Background Prominent pictorial health warning labels (HWLs) are effective in communicating health risks and supporting cessation. With text warnings covering 100% of the back and one side of pack, and a pictogram on the upper 30% of the pack front, Mexican HWLs rank among the largest globally. We assessed compliance with HWLs on cigarette packs in Mexico. **Methods** In October/November 2021, we used the Tobacco Pack Surveillance System (TPackSS) systematic protocol to collect unique cigarette packs across selected tobacco vendors in 12 low, middle, and high socioeconomic areas within each of Mexico City, Guadalajara, Leon, Durango and Merida. All packs with current Mexican HWLs at the time of data collection were double-coded for compliance with warning location, coverage, label elements (text and background color, pictogram text outlined in black), and pictogram implementation (image is the same as shown in the regulation). All indicator variables are specified in the Mexican regulation, except for pictogram implementation and text outlined in black, which were added to our assessment because the regulation indicates the pictogram must appear exactly as shown in it. **Results** In total, 189 unique cigarette packs with a current Mexican HWL were collected. All packs were compliant with warning location; 88% complied with coverage. Only 62% had all the correct label elements; the low compliance was driven by the lack of black outlining the text in the pictogram. One pack was not compliant because it had an old HWL, which was covered by a sleeve with a current HWL. Pictogram implementation was the worst indicator at 28% compliance. Combined compliance of all four indicators was 19%. **Conclusion** Overall, cigarette packs' HWLs were compliant with most indicators in Mexico. Yet, we observed several cases in which the pictograms were manipulated which diminished their visibility by zooming in or out of the image, and thus focusing less on the disease portrayed and/or made the text harder to read when it was not outlined in black. Countries implementing new HWL policies should establish strong procedures to assure the correct implementation of HWLs as the tobacco industry finds ways of exploiting loopholes. Mexico should consider larger pictorial HWLs and adopting plain and standardized packaging to ensure better implementation while improving effectiveness of HWLs and thus achieve significant smoking prevalence reduction, which has stalled in the past years. **Funding** This work was supported with funding from Bloomberg Philanthropies' Bloomberg Initiative to Reduce Tobacco Use (bloomberg.org).

FUNDING: Nonprofit grant funding

POS5-57

IMPACT OF SMOKE-FREE POLICIES IN PUBLIC HOUSING ON USE OF TOBACCO CESSATION COUNSELING AND MEDICATION

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BACKGROUND: Enactment of smoke-free policies (SFPs) in public housing authorities (PHAs) may increase resident use of tobacco dependence treatments (TDTs) due to assistance from PHAs and residents' increased motivation to quit. We evaluated the association between enacting SFPs and use of TDTs among residents living in Massachusetts PHAs. **METHODS:** We identified public housing residents ages 18-64 in the 2011-2018 Massachusetts All Payer Claims Database (N=37,812) using personal identifiers in tenancy files from the U.S. Dept. of Housing and Urban Development and



the claims database. SFP enactment dates were obtained from public records and survey data. We exploited variation in the timing of SFP enactments across PHAs in Massachusetts to assess the association between enacting an SFP and use of TDT billed to insurance. Though we could not specifically identify tobacco users, TDT use was identified from claims for tobacco cessation counseling, varenicline, nicotine, and bupropion. We fit longitudinal mixed-effect logit models to assess associations between any monthly TDT use and SFP enactment, adjusting for time-invariant (age, sex, race/ethnicity), and time-varying (insurance type, housing type [family, elderly/disabled, mixed]) covariates, PHA fixed effects and resident-level random effects. We tested whether associations with SFPs varied by resident characteristics, insurance type or housing type. **RESULTS:** PHA residents in our sample were 68% female with mean age 39 (SD 14), 74% had Medicaid, 25% private insurance, 73% lived in family housing, and 23% lived in elderly/disabled housing. Across PHAs, the unadjusted incidence rate of TDT use was 8.0 per 1,000 resident-months. In adjusted models, SFP enactment was associated with an increased likelihood that residents used TDT (adjusted odds ratio [aOR]=1.08, 95% CI 1.01, 1.14). Interactions of SFP enactment with sex and housing type were significant ($p<0.05$). The subgroup-specific association was aOR=1.15 (95% CI 1.07, 1.22) for females vs. aOR=0.86 (95% CI 0.78, 0.96) for males. For those in family housing, the aOR=1.19 (95% CI 1.11, 1.28) vs. aOR=0.93 (95% CI 0.85, 1.01) for those in elderly/disabled housing. Associations between SFP enactment and use of medication (aOR=1.08, 95% CI 1.01, 1.15) but not cessation counseling (aOR=1.08, 95% CI 0.87, 1.34) were significant. **CONCLUSIONS:** Enacting SFPs in public housing was associated with increased TDT use among residents overall, but associations were varied.

FUNDING: Federal

POS5-58

INFLUENCE OF NICOTINE FLUX AND FORM ON SUBJECTIVE EFFECTS AND PUFFING TOPOGRAPHY

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Nicotine flux, the rate at which electronic nicotine delivery systems (ENDS) emit nicotine ($\mu\text{g}/\text{sec}$), is a potential regulatory target as it encapsulates all the parameters that may influence ENDS performance (e.g., power, design, and liquid composition). Another factor that can mediate nicotine delivery because it can influence puffing behavior is nicotine form (protonated, freebase). In this work we examine the influence of nicotine flux and form on subjective effects and puffing topography in an ongoing clinical lab study. Participants attended the lab for five visits (10 puffs directed+60min *ad-lib* bouts) that differ by nicotine flux and/or form: two nicotine fluxes (18 and 35 $\mu\text{g}/\text{s}$) coupled with two nicotine forms (freebase vs protonated) and a zero-nicotine control condition. Puff topography and subjective effects were measured. We used linear-mixed effect models (LMMs) to test associations between harshness, satisfaction, urges, liking, and puffing time with nicotine flux and form (for the 60min *ad-lib* bouts). For the 14 completers to date, we found that greater nicotine flux was significantly associated with increased harshness ($B=0.13, SE=0.027, p<.001$), decreased satisfaction ($B=-0.1, SE=0.03, p=0.013$), and decreased puffing time ($B=-1.8, SE=0.49, p=0.003$). Freebase (vs. protonated nicotine) was significantly associated with increased harshness ($B=2, SE=0.48, p=.001$), decreased satisfaction ($B=-2.1, SE=0.51, p<.001$), and decreased puffing time ($B=-43, SE=11, p=.002$). Urges and liking were not associated with either nicotine flux or form. The preliminary results suggest that increasing nicotine flux results in greater perception of harshness, but reduced puffing time and satisfaction. Freebase vs. protonated nicotine resulted in increased harshness, reduced puffing time, and decreased satisfaction.

FUNDING: Federal

POS5-59

CHARACTERIZATION OF NICOTINE WITHDRAWAL ACROSS THE ESTROUS CYCLE

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During abstinence from chronic nicotine use, the magnitude of withdrawal severity fluctuates across the menstrual cycle in women. Female rodents have a 4-day estrous cycle that can be subdivided into a follicular (estrus and proestrus) and luteal phase (metestrus and diestrus). The follicular phase is characterized by peak increases in estradiol (E2) and progesterone. Our prior work has revealed that the removal of ovarian hormones abolishes the negative affective states produced by withdrawal. Also, the magnitude

of withdrawal severity is correlated with high E2 and low progesterone levels. Ongoing mechanistic studies in our laboratory have revealed that the interpeduncular nucleus (IPN) plays a central role in modulating anxiety-like behavior (but not physical signs) of nicotine withdrawal. Previous work in our laboratory has demonstrated that E2 promotes and progesterone reduces anxiety-like behavior produced by nicotine withdrawal in female rats. The goal of the present study was to compare neuronal activation, by observable Fos expression in the IPN of nicotine vapor-dependent females that were tested in the follicular or luteal phase of the estrous cycle. Female rats were exposed to 12mg/mL of nicotine vapor for fourteen days. Rats then received administration of the nicotinic receptor antagonist, mecamylamine (3.0 mg/kg; salt), and physical signs and anxiety-like behavior were assessed. Also, vaginal lavage procedures were used to assess the phase of the estrous cycle they were tested in. The rats were then euthanized and brain sections containing the IPN were processed for Fos immunofluorescence to infer the possible IPN subnuclei displaying differential activation. The results revealed an increase in Fos activation in the IPN of female versus male rats. The magnitude of neural activation in female rats was correlated with anxiety-like behavior (but not physical signs). The activation of the IPN in males was not correlated with either anxiety-like behavior or physical signs. This work suggests that the magnitude of anxiety-like behavior and activation of the IPN is greater during the follicular phase of the estrous cycle. These data have clinical implications that can help assess the hormone status of women contemplating quitting smoking ideally when the magnitude of withdrawal symptoms may be lower and less likely to contribute to relapse behavior.

FUNDING: Federal

POS5-60

DECIPHERING THE EFFECTS OF ELECTRONIC CIGARETTES ON ORAL EPITHELIUM REGENERATION

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Background: Tobacco smoking and electronic cigarettes (E-cig) are well-established risk factors for multiple oral-related maladies. The oral mucosa, which serves as a barrier between the organism and the environment, is the initial site where e-cig aerosols contact the body, but its toxic effects on oral tissues are relatively unexplored. Recently, we have characterized rapidly dividing oral epithelial progenitor cells (OEPCs) in the basal layer of the oral mucosa. Our goal is to determine how OEPCs modify their behavior in response to E-cig exposure. **Methods:** Using an in vivo exposure system, Scireq inExpose system, to mimic acute exposure, mice were exposed to E-cig aerosols for 1 hour daily for five days. Given that the most common chemicals in E-cigs are propylene glycol and glycerol (70:30), with or without nicotine (6mg/ml or 50mg/ml), we used the inExpose system to vaporize these compounds to generate the aerosols that the mice were exposed to. Using immunofluorescence staining, qPCR and FACS, we followed OEPC and their niche behavior and regenerative capacities. **Results:** We found that exposure to these compounds led to (1) changes in oral mucosal histology; (2) A significant decrease in cell proliferation in groups exposed to liquids compared to control, suggesting on impairment of the proliferative properties of the tissue (3) changes in the cellular and cell junctions patterning and, (4) alteration in the stromal microenvironment. **Conclusions:** Overall, our findings highlight that exposure to E-liquids has rapid and significant effects in a mouse model, including impairment of the proliferative properties of the oral mucosa tissue. These findings emphasize the further need to evaluate the possible harmful effects of e-cigarettes on the oral cavity. The alterations seen in experimental mice will lay a foundation for unraveling the increased risk for oral pathologies in E-cig users.

POS5-61

TOBACCO- AND ARECA-SPECIFIC ALKALOIDS IN SMOKELESS TOBACCO PRODUCTS CONTAINING ARECA NUT

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Background: In India and other countries in South and Southeast Asia, the use of smokeless tobacco (SLT) products containing areca nut is associated with various negative health outcomes, including addiction and oral and esophageal cancers. In addition to tobacco-specific constituents that are partially responsible for these effects, such products contain areca nut-specific alkaloids arecoline, arecaine, guvacoline, and guvacine. Some of these alkaloids can form nitrosamines in the oral cavity of users resulting in DNA adducts, a critical step in chemical carcinogenesis. Further, arecoline



has been implicated in the addictiveness of areca nut. There is limited data on the potential variations in the levels of such key harmful constituents across different brands of areca nut-containing SLT products. **Methods:** A total of 21 products were purchased in Mumbai, India in the summer of 2022. The products included various brands of pan masala with tobacco (companion sachets intended for mixing before consumption) and manufactured gutkha. Analytical methods that have been developed and routinely applied in our laboratory were used for the analysis of nicotine, NNN, NNK, and areca alkaloids. **Results:** In gutkha products, levels of nicotine averaged 1.15 mg/g and levels of carcinogenic nitrosamines NNN and NNK averaged 0.41 and 0.08 µg/g product, respectively. Levels of areca alkaloids varied 4 to 6-fold across different brands of gutkha, with arecoline averaging 0.25 mg/g product. The tobacco sachets of products that are sold as "twin" packages of pan masala and tobacco contained on average 17.4 mg/g nicotine, and levels of NNN and NNK ranged from 1.3 to 8.3 µg/g and 0.4 to 4.2 µg/g product, respectively. Levels of areca alkaloids in pan masala sachets were comparable to those found in gutkha products. **Conclusions:** The substantial variations of tobacco- and areca-specific constituents across SLT products containing areca nut are likely to affect the addictive and carcinogenic potential of these products. Users of twin packages of pan masala with tobacco - a substitute for the currently banned manufactured gutkha - are likely to be exposed to relatively high levels of nicotine and tobacco carcinogens. Regulatory measures and public education are needed to prevent the consumption of SLT products, including those containing areca nut, in order to reduce the high burden of the associated diseases in India and other South and Southeast Asian countries.

FUNDING: Academic Institution

POS5-62

CONTINGENCY MANAGEMENT IS ASSOCIATED WITH LOWER SMOKING RISK AND LONGER PERIODS OF SMOKING ABSTINENCE DURING A QUIT ATTEMPT

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Background: Smoking lapse is common for adults trying to quit smoking and prior research has indicated that women are less likely to achieve smoking abstinence than men. Monetary incentives (contingency management; CM) can increase initiation and maintenance of smoking abstinence. This study examined whether supplementing standard care (SC) with a CM intervention reduced smoking lapses, increased periods of abstinence, and if gender moderated the risk of recurring smoking episodes. **Methods:** Data collected from a randomized controlled trial that assigned participants to SC (counseling+pharmacotherapy; $n=148$) or SC plus a low-cost CM intervention ($n=147$) were used for this study. Participants completed ecological momentary assessments of their smoking behavior for 28 days post-quit ($M=21.3$ days, $SD=8.5$). The analysis sample included participants who reported abstinence for at least 24 hours ($n_{SC}=100$; $n_{CM}=124$; $M_{Age}=48.2$ years, $SD_{Age}=11.7$, 64% Female; 80% with annual family income less than \$21,000). Data were formatted for fitting multilevel recurring episode survival models. Episodes of smoking were defined as spans of concurrent smoking days. **Results:** After an initial 24-hours of abstinence, participants on average self-reported initiating 2.2 smoking episodes (min=1, max=6), each spanning a median of 3 days (min=1, max=28). Results indicated CM participants were 57% less likely to initiate a smoking episode on a given post-quit day compared with SC participants ($HR=0.4$, 95% $CI[0.3, 0.6]$). Gender was not uniquely associated with time until recurring smoking episodes ($HR=0.9$, 95% $CI[0.5, 1.6]$), but it moderated the association between intervention type and time until recurring smoking episodes ($HR=2.6$, 95% $CI[1.2, 5.6]$). Whereas men and women who received SC were relatively similar in their likelihood of initiating smoking episodes (Median=3 days until each lapse), women who received CM were more likely than men who received CM to initiate smoking episodes sooner (Median_{Women}=5 days, Median_{Men}=16 days). **Conclusions:** These findings suggest that supplementing SC for smoking cessation with low-cost CM incentives may be particularly effective for men in terms of reducing recurring smoking lapse risk and lengthening the time between smoking lapses during a quit attempt. Future research should collect objective measures of daily smoking abstinence (e.g., remote CO) and identify ways to increase periods of smoking abstinence for female participants.

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

POS5-63

DUAL USE OF CIGARETTES AND E-CIGARETTES: WHAT ARE THE MOST PROMISING MESSAGES FOR CESSATION?

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Significance. About half (55%) of the 11 million e-cigarette users in the US also smoke cigarettes. Some biomarkers of harm for these "dual users" are as high or higher than those of exclusive cigarette smokers, yet many dual users may not realize their high risk. There has been little communication research in this area. We sought to determine promising messages for a communication campaign to encourage dual users to quit cigarettes and e-cigarettes. **Methods.** We assembled a library of potential communication messages from academic literature, quit-smoking campaigns, quit-vaping campaigns, and focus groups with dual users. We coded the 70 resulting messages on 13 unique themes. A national convenience sample of adult dual users then completed an online survey to rate the messages. Participants were asked the extent to which each message motivated them to quit smoking and to quit vaping. Additionally, participants were randomized to receive messages advocating one of three cessation goals (quit cigarettes, quit both cigarettes and e-cigarettes, or sequentially quit cigarettes then e-cigarettes). We used multi-level modeling and examinations of mean rating scores to determine which messages and themes appeared most promising and for whom. **Results.** Among the 755 dual user survey participants, the median age was 45, 50% were male, 13% were Black, and 13% identified as Hispanic/Latino. The majority (55%) predominantly smoked followed by 21% who were daily dual users, 15% nondaily dual users, and 9% predominantly vaped. The top 3 performing message themes for both smoking and vaping were 1) long-term health effects, 2) harmful chemical constituents, and 3) financial cost. Messages were more likely to be perceived as motivating by male participants than female and nonbinary participants ($p<.05$), and by Black participants than participants of other races/ethnicities ($p<.01$). Messages were also perceived as more effective by participants with higher intentions to quit smoking and vaping ($p<.01$). There was no effect of varying the cessation goal on perceived effectiveness of the messages. In the presentation we will describe the message collection, development, and testing process including showing example messages. **Conclusion.** Message themes of long-term health effects, harmful constituents, and cost may be especially effective to promote cessation among dual users of cigarettes and e-cigarettes in communication campaigns. Future research can test the effectiveness of these themes in changing quit intentions and quit behaviors.

FUNDING: Federal; FDA/CTP

POS5-64

ABSOLUTE AND COMPARATIVE HARM PERCEPTIONS OF E-CIGARETTES AND CIGARETTES AND SUBSEQUENT TOBACCO USE AMONG U.S. ADULTS WHO SMOKE CIGARETTES

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Introduction: Absolute and comparative harm perceptions about combustible cigarettes (cigs) and e-cigarettes (e-cigs) may be differentially associated with product use and switching among cig smokers. These associations might also differ by age due to differing product use norms. We identified the independent contributions of relative and absolute harm perceptions of cigs and e-cigs on subsequent tobacco use behaviors among adults who smoke, stratified by age. **Methods:** We used the Waves 4 (baseline) and 5 (follow-up) adult data from the Population Assessment of Tobacco and Health Study, restricting to baseline established cig smokers ($n=9,053$). We used weighted multivariable logistic regressions to examine the independent contributions of baseline absolute and comparative harm perceptions of cigs and e-cigs on past-year and current cig and e-cig use, completely switching to e-cigs, using e-cigs to quit, and any cig attempt at follow-up, controlling for covariates and stratified by age (YA: young adults ages 18-34 [$n=3,958$], MA: mature adults ages 35-64 [$n=4,498$], OA: older adults ages 65+ [$n=5,977$]). **Results:** Harm perceptions varied by age. YAs (25.8%) were more likely to perceive e-cigs as less harmful than cigs compared to MAs (20.8%); MAs (46.6%) were more likely than YAs (42.5%) to think e-cigs are very/extremely harmful;



and OAs (62.5%) were less likely than YAs (71.6%) and MAs (71.2%) to perceive cigs are very/extremely harmful. Among YAs, perceiving e-cigs as less harmful than cigs at baseline was negatively associated with current cig smoking (aOR: 0.74) and positively associated with complete switching to e-cigs at follow-up (aOR: 1.55). Among MAs, high absolute harm perceptions of e-cigs at baseline was negatively associated with current cig smoking (aOR: 0.72) and positively associated with past-year cig quit attempt at follow-up (aOR: 1.30). Among OAs, high absolute harm perceptions of cigs at baseline was negatively associated with subsequent past-year cig smoking (aOR: 0.21) and current smoking (aOR: 0.38). High absolute harm perceptions of cigs were positively associated with using e-cigs to quit among YAs and MAs. **Discussion:** Different types of harm perceptions about cig and e-cigs are associated with varying subsequent cig and e-cig use behaviors among adults of varying ages who smoke. Findings can inform tobacco harm communication tailored to adult smokers of various age groups to facilitate smoking cessation and product switching.

FUNDING: Federal; Academic Institution

POS5-65

AUTOMATICALLY DETECTING LARGE CIGAR CONTENT ON REDDIT POSTS USING COMPUTER VISION FRAMEWORKS

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SignificanceReddit is a popular social media platform with online communities that may facilitate the diffusion of tobacco content. Research shows that exposure to and engagement with cigar-content on social media is significantly associated with cigar use, posing negative health outcomes such as oral and lung cancers. As of Dec, 2022, the 'r/cigars' subreddit has 161,000 members actively engaging in cigar-content with around 50 posts per day. The development of methods to automatically identify cigar content would facilitate enhanced surveillance of content on social media platforms. **Methods**We used object detection, a computer vision technique that is trained on human-labeled images to automatically detect large cigar-specific images in relevant Reddit posts. We scraped 2 subreddits: (r/cigars and r/EveryDaysCigarDay) and collected images from the posts. After excluding irrelevant images, we included 876 unique large cigar-related images (N=293 and N=583 respectively). We annotated the full sample manually by drawing bounding boxes where a large cigar was present in each image. We also scraped images from 3 other subreddits: (r/Cigarettes, r/pen and r/VapePorn: chosen to train the model to distinguish between large cigars and other tobacco products) to create a dataset of non-cigar images (N=1526). We deployed the YoloV7 model to train the object detection task. Specifically, we used 844 images for training (which include 250 from the non-cigar dataset), 136 for validation and 146 images for testing, which gave us a 75% (train), 12% (validate), and 13% (test) split. After the model was trained, we ran it on the non-cigar dataset (N=1276) to check how accurately our model could distinguish between cigars and cigarettes/pens/vapes. **Results**Our model was able to correctly classify a large cigar 98.7% of the time with an F1 score of 0.983 and a recall value of 0.98 on the test set images that contain only large cigars (N=146). The mean average precision (mAP) at IoU=0.5 was 0.989. Our model was also able to distinguish cigars from similar objects (i.e. cigarettes, vapes, pens) with an accuracy of 97.4% (1276 non-cigar images). **Conclusions**We were able to develop automated, scalable computer vision models that successfully detected a wide range of large cigar images on Reddit and distinguished between large cigars and other tobacco products. Our methods may facilitate monitoring large cigar-related content and promotions on Reddit and other social media platforms.

FUNDING: Federal; FDA/CTP

POS5-66

MIXED METHODS EVALUATION OF VAPING AND TOBACCO PRODUCT USE PREVENTION INTERVENTIONS AMONG YOUTH IN THE FLORIDA 4-H PROGRAM

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Significance: The tobacco product landscape continues to evolve as the industry introduces an increasingly wide array of novel tobacco products, including electronic nicotine delivery systems (ENDS), commonly referred to as e-cigarettes. Novel prevention programs are developed to address the increase in e-cigarette use (vaping) among children. However, it remains paramount to test their feasibility in rural settings. This pilot study implemented and evaluated the feasibility of two innovative programs, *CATCH My Breath* (CMB) and *smokeSCREEN* (SS), among youth in rural settings in Florida. **Methods:** We conducted four focus groups with youth aged 11-17 recruited from 4-H rural clubs in Florida. In a subsequent randomized controlled trial, we recruited 82 youth participants and assigned them to one of three arms: CMB, SS, or control. CMB and SS participants attended online group intervention sessions while the control group received educational material. Pre- and post-surveys were administered to all participants. The primary outcomes are knowledge, susceptibility, perceived positive outcomes and risk perceptions. **Results:** Results of focus group discussions informed the implementation of both interventions in terms of delivery format, scheduling of sessions and incentives. Participants also recommended incorporating information about how stress and mental health issues contribute to vaping, providing visuals that demonstrate the consequences of vaping on the body and appearance, delivering the programs to younger age groups, and disseminating programs through social media. After the intervention, CMB participants significantly improved their general tobacco-related knowledge (post-pre=16.21-12.92= 3.3, p<.01) and risk perceptions towards other flavored tobacco products (post-pre=19.29-17.71= 1.6, p<.05). SS participants significantly improved their general tobacco knowledge (post-pre=18.77-13.77= 5.0, p<.01), knowledge about e-cigarettes (post-pre=9.08-6.31=2.8, p<.01) and risk perception towards e-cigarettes (post-pre=24.69-21.92=2.8, p<.05). **Conclusion:** The adolescents' feedback provided during the focus groups that preceded the trial informed the implementation of the programs and identified potential adaptations in program delivery. Findings indicate positive influence of CMB and SS interventions. Follow-up studies with more representative samples are recommended to determine the generalizability of the study findings to other groups.

FUNDING: Nonprofit grant funding

POS5-67

PERCEIVED NEIGHBORHOOD DISADVANTAGE, E-CIGARETTE RETAIL ACCESS, AND E-CIGARETTE USE AMONG SOUTHERN CALIFORNIA ADOLESCENTS

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Significance: There is a higher concentration of tobacco retailers within socioeconomically disadvantaged neighborhoods. Neighborhood disadvantage has also been associated with youth vaping in prior research. It is unknown whether neighborhood disadvantage is associated with greater retail access to e-cigarettes among youth, which is critical for the development of policies to reduce youth vaping in socioeconomically disadvantaged communities. **Methods:** We collected survey data at baseline (Feb-June 2022) and at a 6-month follow-up assessment (Sep-Dec 2022) from socioeconomically diverse high school students enrolled in 11 high schools in Southern California. In a sample of 2,685 youth who reported no current e-cigarette use at baseline, we examined associations of perceived neighborhood disadvantage (validated Neighborhood Disorder Scale measured at baseline) with perceived e-cigarette retail access (measured at baseline) and uptake of current vaping in the past 6-months (measured at follow-up), adjusting for parental education, financial status, gender, and race/ethnicity. **Results:** Among youth who did not vape at baseline, those with the highest quartile of perceived neighborhood disadvantage (vs. lowest quartile) had increased odds of reporting a greater number of retailers near their homes where they could purchase e-cigarettes (adjusted odds ratio [aOR]=1.9, 95%CI: 1.6-2.3), and reported greater perceived ease of purchasing e-cigarettes (b=6.4, p<0.001). Perceived neighborhood disadvantage was positively associated with subsequent uptake of current vaping at follow-up, after adjustment for parental education, financial status, gender, and race/ethnicity (OR=2.2, 95%CI: 1.3-3.9). In interaction analyses, associations did not differ by race/ethnicity. **Conclusions:** Perceived neighborhood disadvantage was positively associated with perceived e-cigarette retail access and uptake of current e-cigarette use among youth who did not vape at baseline. Interventions or policies that reduce youth e-cigarette retail access in more disadvantaged neighborhoods are needed and may help to prevent youth vaping.

FUNDING: Federal; FDA/CTP



POS5-68

EVIDENCE OF MESSAGE EFFECTIVENESS IN FDA YOUTH TOBACCO EDUCATION CAMPAIGNS: A META-ANALYSIS OF ADVERTISEMENT COPY TESTING STUDIES

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Significance: The U.S. Food & Drug Administration (FDA) has launched multiple large-scale youth tobacco prevention campaigns based on extensive formative research with the campaigns' intended audiences. This study reports a meta-analysis of nearly 10 years of FDA's formative copy testing research across these campaigns. **Methods:** Data for this analysis came from 10 pre-market copy testing studies for FDA's youth-tobacco prevention campaigns (six studies on cigarettes, three on ENDS, and one on smokeless tobacco) fielded October 2013-May 2020. A total of 9,503 youth participants aged 13-17 who were either product experimenters or susceptible non-users participated in these studies, which featured a consistent posttest-only control group design. Primary outcome measures included beliefs about health consequences, addiction, harmful and potential harmful constituents (HPHC), and attitudes toward product use. For each ad, an effect size (Hedges' *g*) was derived for each outcome measure, capturing the differences between the ad exposure group and the no-ad control group. Data were analyzed to 1) estimate the overall effect sizes across all ads, as well as product and campaign specific effect sizes, 2) compare overall and product specific effect sizes for different subgroups including, age, gender, race/ethnicity, and tobacco use status, and 3) assess potential differences based on the content foci of the ads (health consequences, HPHC, and addiction). **Results:** Across all studies, the overall effect size (*g*) was .439 (95%CI = .373-.505) for attitude, .290 (95%CI = .217-.362) for health consequence beliefs, .250 (95%CI = .168-.333) for HPHC beliefs, and .348 (95%CI = .295-.401) for addiction beliefs. Overall, the same pattern emerged at the product level and campaign level. Content foci analyses found that ads with an HPHC focus generated a larger effect size on HPHC beliefs than non-HPHC messages ($p = .006$). The same pattern emerged for addiction messages ($p = .043$). **Conclusions:** Overall, this meta-analysis suggests that FDA's campaign messages have potential to successfully impact tobacco beliefs and attitudes among intended audiences. Additionally, there is evidence that ads containing HPHC and addiction messages had stronger impact on beliefs in these domains than messages featuring other themes, suggesting success in belief-targeting in message development. **Disclaimer:** This information is not a formal dissemination of information by FDA/CTP and does not represent Agency position or policy.

FUNDING: Federal; FDA/CTP

POS5-69

SUPPORT FOR PICTORIAL HEALTH WARNING LABELS ON CIGARETTE PACKAGES AMONG CURRENT AND FORMER SMOKERS IN THE UNITED STATES: FINDINGS FROM THE INTERNATIONAL TOBACCO CONTROL US SMOKING AND VAPING SURVEYS

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Significance: In 2009, the United States (US) Food and Drug Administration (FDA) was granted authority to revise health warnings on cigarette packs. In June 2011, the FDA unveiled nine pictorial health warnings (PHWs); however, over the past decade, cigarette manufacturers have challenged the FDA's attempts to implement PHWs. As a result, text warnings, most recently revised in 1985, still remain on the side of cigarette packs. This study assessed the level of support for PHWs in 2020, factors related to that support, and whether there were changes in support between 2016-2020 among current and former smokers. **Methods:** Data from Waves 1 (2016, $n=2557$), 2 (2018, $n=2685$) and 3 (2020, $n=1112$) US ITC Smoking and Vaping Surveys were analyzed and included adult (≥ 18 years) current and former smokers. Using weighted multivariable regression models, data from the 2020 survey was used to assess the level of support for PHWs (strongly support, support, oppose, strongly oppose, or uncertain, multinomial regression) and to identify factors associated with support (support vs. other response, logistic regression). Weighted logistic regression models were fit using generalized estimation equation models to assess changes in support (support vs. other response). **Results:** In 2020, 23% of current and former smokers strongly supported PHWs, 28% supported PHWs, 22% opposed PHWs, 13% strongly opposed them, and 23% were uncertain. Support for PHWs was significantly higher among those who were: former smokers (55%) [vs. daily (36%, $p=0.01$) and non-daily (45%, $p=0.045$) smokers], younger (18-39, 67%) [vs. 40-54

(37%), 55+ (31%), both $p<0.001$], and Black (52%) [vs. White (40%), $p=0.03$]. Among smokers, those intending to quit smoking (45%) were more likely to support PHWs compared to those not planning to quit (22%, $p<0.001$). There were no differences by income, education, or sex. Overall, 38% of respondents supported PHWs in 2016, and 45% supported PHWs in 2018 and 2020, representing a significant increase in support from 2016-2020 ($p=0.004$). **Conclusions:** Evidence from many countries shows that changing from text-only warnings to pictorial warnings leads to significant increases in smokers' awareness of the risks of smoking and the benefits of quitting. We found that close to half of adult current and former smokers in the US supported PHWs in 2020, with support being higher among those who were younger, Black, former smokers, and smokers intending to quit. Support increased between 2016 and 2020.

FUNDING: Federal; Nonprofit grant funding

POS5-70

ASSOCIATIONS BETWEEN NOTICING E-CIGARETTE ADVERTISING FEATURES AND E-CIGARETTE PRODUCT APPEAL AND PRODUCT SWITCHING AMONG YOUNG ADULTS

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Background: E-cigarette (e-cig) marketing features (e.g., models, price promotions, nicotine warnings) may influence e-cig perceptions and use behavior among young adults. Our studies examined the associations between noticing specific e-cig ad features and e-cig product appeal among young adults of various tobacco-using statuses. **Methods:** We collected data from two online surveys among young adults who were non-tobacco users (ages 18-29) ($n=1,993$) and established cigarette smokers (ages 18-34) ($n=2,023$). For each survey, participants were shown 12 static images of cartridge-based e-cig ads through an embedded heatmap tool. Participants viewed the ads and clicked on three areas of the ads they noticed. After seeing each ad, participants reported the appeal (ad liking, product curiosity, and use interest) of the e-cig products shown in the ad, and smokers also reported their interest in completely switching to the products. We used generalized estimating equations to examine within-person associations between noticing specific ad features and reporting product appeal (and product switching for smokers), adjusting for noticing other features and participant characteristics. **Results:** Noticing flavored packages and descriptors related to fruits (e.g., berries, pineapple) increased overall product appeal and use interest among both non-tobacco users and cigarette smokers; it also increased interest in product switching among cigarette smokers. Noticing price promotions (e.g., discounts, sales) also increased product appeal among both groups as well as use interest among non-tobacco users. In contrast, noticing nicotine warnings, tobacco flavors, or smoker-targeted claims reduced product appeal among both groups; it also reduced smokers' interest in product switching. **Conclusions:** Noticing common features of e-cig marketing (e.g., fruit flavors, price promotions, nicotine warnings) affected e-cig product appeal similarly in young adults who used and did not use cigarettes. There were no unique e-cig ad features that increased interest in product switching among young adults who smoked cigarettes. If e-cigarettes are to serve as a harm-reduction tool, further research may be needed to identify ad features that minimize appeal among young non-users, while increasing interest in switching among young combustible tobacco users.

FUNDING: Federal; FDA/CTP

POS5-71

SMOKING CESSATION BEHAVIORS AMONG PERSONS WHO SMOKE WITH MEDICAL COMORBIDITIES, UNITED STATES, 2011-2020

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Introduction: Cigarette smoking is associated with numerous comorbidities and cessation substantially mitigates smoking-related disease, financial, and social consequences. This study presents a comprehensive contemporary update on cessation behaviors nationally among persons who smoke, across a range of comorbidities, to inform clinical and public health efforts. **Methods:** Data from nationally representative Behavioral Risk Factor Surveys 2011-2020 and National Health Interview Surveys, 2015, 2020 were used to identify persons who smoke cigarettes according to comorbidity status (ever diagnosed with cancer, cardiovascular diseases (MI, CHD, stroke), pulmonary (COPD, asthma), pain (arthritis), mental illness (depression); number of comorbidities: 0, 1-2, 2+). Differences and time trends in the quit ratio (% former smokers among ever



smokers), and prevalence of past-year quit attempt, successful cessation for 6+months, and clinical cessation treatments, were compared according to comorbidity status. Interaction of depression with individual comorbidities was explored. **Results:** Quit ratios (2%-22%) and successful cessation prevalence (17%-24%) were consistently lower among persons with depression, CVDs, COPD, and arthritis compared to those without these conditions, even though their quit attempt prevalence is similar or 3-4% higher. Among persons with kidney disease and diabetes, those with depression have 1%-6% lower quit attempt prevalence vs. those without depression, whereas among persons without these conditions, quit attempt prevalence was 4% higher in persons with vs. without depression. Finally, there were steeper declines in quit attempt prevalence between 2014-2020 in those with 2+ (9%) vs. 0 or 1-2 conditions (4%-5%), while successful cessation increased linearly in those with 0 or 1-2 conditions (19%-20%) while stalling in those in 2+ conditions (3%) between 2011-2020. Consequently, cessation disparities widened across persons with multiple vs. fewer comorbidities. **Conclusions:** Cessation outcomes varied widely across comorbidities, suggesting the need for targeted clinical interventions among those with depression, CVDs, COPD, and pain. Cessation efforts targeting comorbid depression may be clinically warranted among kidney disease and diabetes patients. Equitable public health approaches need to address widening cessation disparities among persons with multiple comorbidities, given their significant medical needs and health disparities.

POS5-72

TRENDS IN E-CIGARETTE AND TOBACCO CIGARETTE PURCHASING BY ADOLESCENTS IN THE UNITED STATES, CANADA, AND ENGLAND, 2017-2021

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Significance: This study describes trends in adolescent purchasing of e-cigarettes (EC) and tobacco cigarettes (TC) between 2017 and 2021 in the United States (US), Canada (CA), and England (EN). **Methods:** The data are based on 7 repeat cross-sectional online surveys conducted between July 2017 and August 2021 with national samples of youths aged 16 to 19 years in the US (n=33,387), CA (n=29,719), and EN (n=28,541). Outcomes are based on past-year reports of EC and TC use, purchasing and purchase locations, and being refused product sale. Purchase locations were coded as specialty tobacco/vape shops, traditional retail stores, online, and family/friend/someone else; respondents could select multiple locations. **Results:** In all countries, there was an upward trend in past-year EC use that peaked in the February 2020 survey and fell afterwards. Among past-year EC users, purchasing of an EC increased in all countries between 2017 and 2021 (CA: 32% to 55%; EN: 26% to 52%; US: 40% to 54%). Among EC purchasers, vape shop was the most commonly reported purchase location in all countries (45%-68%), though declined over time. Traditional retail stores (18%-47%) and family/friend/someone else (17%-39%) were also common. Purchasing EC from a family/friend/someone else was more often reported by respondents in the US (25%-39%) and CA (29%-33%) compared to those from EN (17%-23%), whereas purchasing from the internet was more often mentioned by respondents in EN (23%-33%) compared to CA (9%-25%) and US (12%-27%). Among past year TC users, reported purchasing of TC declined between 2019 and 2021 in the US (45% to 28%), but not in CA (46% to 44%) and EN (47% to 49%). Traditional retail stores were the most common purchase locations for TC (75%-87%), although purchasing from family/friend/someone else was also common (19%-34%) and also more often reported by respondents in CA and the US compared to EN. Among past year TC users, specialty tobacco shops (13%-22%) and the internet (3%-18%) were less often reported as purchase locations. In all countries, having been refused the sale of either EC or TC in the past year was relatively low among past-year users, but consistently higher for TC (16%-28%) compared to EC (9%-19%). **Conclusions:** Among youth users, past year purchasing of an EC increased in all countries between 2017 and 2021, while past year purchasing of TC declined in the US but was unchanged in CA and EN. The purchase locations for EC were more diverse than for TC.

FUNDING: Federal; Other: Health Canada's Substance Use and Addictions Program (SUAP)

POS5-73

NEURAL ACTIVATION IN VENTRAL STRIATUM DURING ANTI-VAPING MESSAGE EXPOSURE PREDICTS VAPING INTENTION AMONG YOUNG ADULT VAPERS: THE MODERATING ROLE OF DEPRESSION

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Significance: Public service announcements (PSAs) are promising tools for countering the young adult (YA) vaping epidemic, yet availability of validated anti-vaping PSAs is limited. Gauging the acute neurocognitive and motivational salience of novel PSAs on the health and socioemotional consequences of vaping may reflect their validity. However, in addition to such consequences, vaping also often serves as a coping mechanism for YAs, prompting us to explore whether severity of depressive symptoms would influence PSA salience. We used functional MRI (fMRI) to examine whether neural response to PSAs would be prospectively linked to YA vapers' intention to vape assessed 1-month later. **Method:** A novel set of static anti-vaping PSA images were presented during fMRI to 64 YA vapers (46 female; age $M=20$, $SD=1.50$; vaped $M=25$ of past 30 days, $SD=7.38$), followed by four weekly self-reports of vaping intention. Depressive symptoms were assessed before fMRI using the Patient Health Questionnaire ($M=1.64$, $SD=0.60$). A significant ventral striatum (VS) response to the PSAs was further examined due to its known associations with reward, motivation and decision-making. Linear regressions were conducted to examine whether VS response predicted vaping intention, with depressive symptoms as a potential moderator. **Results:** Stronger VS activation was associated with lower vaping intention assessed 1-month later ($Beta=-.51$, $p=.001$). A significant moderation by depressive symptoms was observed ($Beta=.48$, $p=.001$). Decomposition of the interaction revealed that the effect was only observed among those who scored higher on depression ($Beta=-.62$, $p=.010$), but not among those who scored lower ($Beta=-.37$, $p=.082$). **Conclusion:** Stronger response to anti-vaping PSAs in the VS predicts lower vaping intention reported 1-month later. Depressive symptoms may acutely potentiate PSA salience, increasing both PSA efficacy and predictive utility of the VS marker. Although acute VS response to a single exposure to these novel PSAs likely does not cause lower long-term intent to vape, our results suggest its validity as an outcome neuromarker and impact of depressive symptoms on active engagement and processing of PSAs. They also highlight the importance of considering the influence of mental health conditions of YA vapers when designing health messaging to effectively reduce vaping intentions and behaviors.

FUNDING: Federal; Academic Institution

POS5-74

DEVELOPMENT AND VALIDATION OF A METHOD TO MEASURE URINARY CANNABINOIDS THAT IS SENSITIVE ENOUGH TO DETECT EXPOSURE TO SECONDHAND CANNABIS SMOKE

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Background. As of November 2022, 21 states, two territories, and the District of Columbia have legalized adult non-medical cannabis use in the U.S. Furthermore, 37 U.S. states have legalized medical use of cannabis products. Smoking cannabis has been associated with adverse health effects from exposure to cannabinoids and toxic chemicals found in cannabis smoke. In addition, many people smoke cannabis with tobacco yet fail to identify themselves as tobacco users; measuring cannabis biomarkers along with tobacco biomarkers allows for a more complete understanding of exposure. We modified a previous method and developed an improved, semi-automated, high-throughput assay that is sensitive enough to measure five cannabinoids in urine across the range of concentrations expected from secondhand cannabis smoke exposure as well as from active use. **Methods.** We used isotope dilution and ultrahigh performance liquid chromatography coupled with electrospray ionization tandem mass spectrometry (UH-PLC-ESI-MS/MS) to measure $\Delta 9$ -tetrahydrocannabinol (THC), cannabidiol, cannabinol, and two major metabolites of THC, 11-hydroxy-THC and 11-nor-9-carboxy-THC (COOH-THC) in urine. A pool of anonymized human urine obtained from commercial sources was used for method validation. To measure the total concentrations of each analyte, urine samples were spiked with internal standard solution containing stable isotopically labeled versions of the analytes, followed by enzymatic hydrolysis with β -glucuronidase. The sample was cleaned on a C18 solid phase extraction (SPE) plate, concentrated, and the residual was injected into the UHPLC-ESI-MS/MS system. All aliquots of sample, internal standard, and enzyme as well as the transfer of mixtures and cleaning on the SPE were completed using an automated liquid handler. **Results.** The limit of detection (LOD) for this assay using 0.5 mL of urine was 0.005 ng/mL for all 5 analytes. The accuracy of our method ranged from 89.6% to 101.3% with a within-day precision from



SRNT 2023 POSTER SESSION 5 • SATURDAY, MARCH 4, 2023, 11:00 AM - 12:30 PM

2.5% to 8.6% and a between-day precision from 1.4% to 9.3%. Recoveries ranged from 71.8% to 89.6%. **Conclusions.** Our method improves on previous work resulting in a semi-automated, high-throughput assay that is sensitive, accurate, and precise with high recoveries. Our LOD for COOH-THC is well below the 15 ng/mL threshold used to confirm active cannabis use in federally regulated testing. This method can be used to detect exposure to secondhand cannabis smoke as well as to help understand coexposure to both cannabis and tobacco smoke. **Disclaimer.** The findings and conclusions in this report are those of the authors and not necessarily the official position of the Centers for Disease Control and Prevention. Use of trade names and commercial sources is for identification only and does not constitute endorsement by the U.S. Department of Health and Human Services or the Centers for Disease Control and Prevention.

FUNDING: Federal

POS5-75

DIFFERENCES IN SOCIOCULTURAL, ENVIRONMENTAL, PSYCHOLOGICAL, AND BEHAVIORAL CORRELATES OF TOBACCO USE BETWEEN WHITE AND BLACK ADOLESCENTS

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Significance: Tobacco use, predominantly established in adolescence, is a major cause of health disparities between Black and White individuals in the United States. Although population-based studies have identified key determinants of tobacco use among adolescents, little is understood about the factors that uniquely relate to tobacco use among Black youth compared with their White counterparts. This information is critical for the development of effective tobacco control approaches for Black youth. This study aimed to identify distinct sociocultural, environmental, psychological, and behavioral factors associated with ever use and current use of tobacco products among a nationally representative sample of adolescents in the US. **Methods:** Participants ($N = 8,295$; 51.7% male) were from wave 1 of the Population Assessment of Tobacco and Health (PATH) Study who were between the ages of 12 and 17 years and who identified as either non-Hispanic (NH) White ($n = 6,495$) or NH Black ($n = 1,800$). Logistic regressions, stratified by race, identified the associations between sociocultural, environmental, psychological, and behavioral factors and the probability of ever use and current use of tobacco products. Dominance analysis identified the relative importance of these factors, indicating the ones that had the highest influence in the regression models for tobacco use. **Results:** Factors uniquely and strongly associated with a higher likelihood of tobacco use among NH Black adolescents were living in the Northeast, peer influences, availability of tobacco in the home, and thinking that tobacco use would help reduce stress. Factors uniquely associated with a higher likelihood of tobacco use among NH White adolescents were lower parental education, discussion of tobacco in social media, and the belief that tobacco would be enjoyable. Other factors such as older age, male sex, ADHD diagnosis, and the use of alcohol and other substances were linked to a higher likelihood of tobacco use for both NH Black and NH White adolescents. **Conclusion:** Factors distinctly associated with tobacco use among NH Black adolescents are potential key intervention targets for the prevention of tobacco use among NH Black youth. These distinct factors, in addition to the factors common to both NH Black and NH White adolescents should be considered in the development of public health approaches to prevent adolescent tobacco in Black communities.

FUNDING: Federal

POS5-76

LONGITUDINAL ASSOCIATIONS BETWEEN CIGAR USE, WITH AND WITHOUT CIGARETTES, AND SELF-REPORTED DIAGNOSED INCIDENT COPD AMONG US ADULTS 40+

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Significance: While regular cigar smoking is believed to carry similar health risks as regular cigarette smoking, the respiratory health effects of cigars are not well characterized. As the per capita consumption of cigars continues to increase in the US, it is important to understand the relationship between cigar use, both exclusively and in combination with cigarette use, and chronic obstructive pulmonary disease (COPD). **Methods:** Using waves 1-5 of the Population Assessment of Tobacco Health (PATH) study, we followed adults aged 40+ at baseline who participated in at least one follow-up

interview. We estimated discrete time survival models with a time-varying tobacco exposure to examine the association between exclusive and dual cigar and/or cigarette use and diagnosed incident COPD. The time-varying exposure variable was lagged by one wave and categorized respondents by current use status (1+ days in the past 30 days): non-use, exclusive cigar or cigarette use, and dual use. We controlled for baseline sociodemographic and health status variables (age, sex, race/ethnicity, education, asthma, obesity, exposure to second-hand smoke) and smoking history (other tobacco product use, cigarette pack-years). **Results:** Of the 9,850 respondents in the analytic sample, 923 self-reported being diagnosed with COPD during the five-year follow-up period. Compared to non-use, exclusive cigar use (aHR 1.26, 95% CI: 0.65, 2.43) was not associated with increased diagnosed incident COPD risk while exclusive cigarette use (aHR 1.38, 95% CI: 1.06-1.81) and dual cigar/cigarette use (aHR 1.69, 95% CI: 1.14-2.51) both were. The risk of diagnosed incident COPD increased with the log of cigarette-pack-years and was higher for older respondents, females, respondents with lower education, and respondents with baseline asthma, obesity, or higher second-hand smoke exposure. **Conclusions:** Exclusive cigarette use and dual cigar/cigarette use were associated with diagnosed incident COPD after controlling for confounders, including cigarette pack-years. These results suggest that cigars, when used in combination with cigarettes, may be associated with poorer respiratory health. It is possible that dual use may promote a higher likelihood of inhaling cigar smoke, and future research would benefit from examining whether inhalation of cigar smoke increases COPD risk.

FUNDING: Federal; Academic Institution

POS5-77

CAN MESSAGES ABOUT THE CLIMATE, POLLUTION AND SOCIAL JUSTICE HARMS OF TOBACCO MOTIVATE QUITTING?

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Significance: The numerous adverse effects of tobacco on human health have been extensively documented and communicated via campaigns to people who smoke to help motivate them to quit. Tobacco production and use also exert an enormous toll on the environment, sustainable development and human rights, yet communication of these non-health harms in campaigns is limited. This study aimed to examine the potential of climate, pollution and social justice tobacco harm messages for motivating quitting among people who smoke. **Methods:** An online cross-sectional study of people who smoke tobacco cigarettes at least weekly ($N=412$ Victorian adults 18-59 years) examined the extent to which messages about climate (4 messages), pollution (3 messages) and social justice (3 messages) harms were perceived as motivating on a 5-point scale from 1 'Not at all' to 5 'Very much so', with response options 4 and 5 categorised as 'motivating'. Prevalence ratios estimated through generalised linear models with log-link (Poisson regression) and robust standard errors compared each age (18-34 years vs 35-59 years), gender, socioeconomic status (most disadvantaged 40% of areas vs rest) and geographic region (metropolitan vs regional). **Results:** At least half of all participants perceived all 10 messages about the climate, pollution and social justice harms of tobacco to be motivating to quit (50-67%). Messages highlighting harms to human and animal welfare were most effective at motivating people who smoke to quit (all $\geq 60\%$), while messages that described the environmental damage using references to the 'average daily smoker' were least effective (50-57%). Overall younger adults (55-74%) were more likely to be motivated compared to older adults (43-57%). Climate messages that included jargon such as '5.1 tonnes of CO₂' or 'contributes four times more to climate change' were significantly less effective at motivating older people to quit (45-49%) compared to younger people (61-67%). The extent to which these messages were perceived as motivating did not differ by gender, socio-economic area or geographic region. **Conclusions:** Mass media campaigns would benefit from integrating environmental and social justice messaging within the suite of anti-tobacco communications. Messages that bring public attention to the harms of tobacco beyond health may be especially motivational for younger cohorts, who tend to be more alert to and engaged with environmental and social justice issues.

FUNDING: State; Nonprofit grant funding



POS5-78

SENSORY EVALUATION OF FLAVORS IN NICORETTE GUM AND CAMEL SNUS WITH SMOKERS AND NONSMOKERS

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Significance: Flavors, along with packaging design, messaging, and advertising, are an important driver of consumer response to tobacco products. The appeal of oral tobacco and nicotine products may be particularly affected by sensory perceptions of flavor. We assessed olfactory responses to Camel Snus (CS) and Nicorette Gum (NG) to gauge consumer interests and potential uptake of products based on perceived flavor. **Methods:** In a single laboratory session taking place in Buffalo, NY or Boston, MA, 342 participants were allowed to touch and smell products without actual use. An assessment of sensory perception of products (olfactory) was performed including flavor description (adjectival descriptors on a 1-6 not present to very much scale), intensity (1-5 none to intolerable), and pleasantness (1-5 pleasant to extremely unpleasant). Conceptually related odor ratings were combined into 3 summated rating scales (mint, fruity, chemical; $\alpha > 0.7$) for analysis. Current smokers were given the option to sample products by oral administration for 5 mins under supervision according to manufacturers' instructions. Sensory (gustation) and emotional evaluations were completed for both products. **Results:** Of the participants, 64% were smokers and 36% were non-smokers. Mint/cooling were the top odors describing both products (CS- 42.7% and NG- 42.1%). Ratings of mint, fruity, and chemical scales, as well as aromatic, bitter, chalky, musky, light, earthy, cinnamon, garlic, and nutty between smokers and non-smokers differed for NG ($p < 0.05$) but not CS. Differences in flavor ratings, intensity, and pleasantness of NG were observed across locations ($p < 0.05$). After offers to sample, 76.5% of smokers sampled at least one product. Flavor, intensity, and pleasantness ratings did not influence smokers trying CS or NG ($p > 0.05$). **Conclusion:** Consistent with packaging descriptions, participants described flavors as mostly minty in both products. The difference in location between Boston, MA and Buffalo, NY is a consistent predictor of trial across flavor. Difference in product appeal and interest to try based on olfactory sense could limit the potential of NG and CS as smoking alternatives.

FUNDING: Federal; FDACTP

POS5-79

PREDICTING PAST 30-DAY E-CIGARETTE USE USING A MACHINE LEARNING APPROACH

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Significance: The objective of this study was to predict e-cigarette use in the past 30-days from theory-driven clusters of predictors using a machine learning approach and identify the most important predictors. **Methods:** The study used longitudinal survey data collected by TATAMS. The study included participants who completed at least one survey from the six surveys administered between Spring 2019 and Fall 2021 (Wave 9 - Wave 14). The outcome variable was past 30-day use of e-cigarette products (yes/no). Predictors used in the study were selected based on prior literature (cognitive, environmental/social, psychological/personality and behavioral factors, and sociodemographic variables). Component-wise gradient boosting was used (R package *mboost*) to build penalized generalized linear models. The final model described the relationship of the selected predictors with past 30-day e-cigarette use by regression coefficients, which were further exponentiated to obtain odds ratios. Model performance was evaluated by examining the confusion matrix and other metrics such as precision, sensitivity, specificity, and accuracy. A normalized index of predictor importance (0-100%) was calculated by dividing each predictor coefficient by the strongest predictor. **Results:** Data consisted of 14,285 observations collected over six surveys. At Wave 9, participants were in 10th grade (mean age= 16.4 yrs), 12th grade (mean age= 18.5 yrs), and two years post-high school (mean age= 20.1 yrs). Initially, 21 variables were identified with varying numbers of categories. Each variable with more than 2 response categories was dummy coded to create 78 predictor variables which were entered in the CGB algorithm, 39 of these variables were retained in the model. Factors that predicted at least 10% of the importance of the top predictor included peer use, race/ethnicity, perception of the addictive potential of e-cigarettes, exposure to marketing/advertisements, lifetime

and past 30-day use of other products (combustible tobacco, marijuana, alcohol). The largest absolute coefficient value (0.757) was obtained for the response category of 'none' for predictor 'How many friends use e-cigarettes?' with a corresponding odds ratio of 0.47. Having no friends who used e-cigarettes was associated with 53% lower odds of reporting past 30-day e-cigarette use. The model showed an accuracy of 85%. Sensitivity, specificity, and precision were found to be 90%, 84% and 45%. AUC of 94% indicates high ability of the model to distinguish between the binary class of past 30-day e-cigarette use. **Conclusion:** The study demonstrated the utility of *mboost* algorithm in predicting past 30-day e-cigarette use and identifying the most important predictors. The study findings can help intervention planning by identifying risk factors specific to a given population.

FUNDING: Federal

POS5-80

MONITORING AND IDENTIFYING EMERGING E-CIGARETTE BRANDS AND FLAVORS ON TWITTER

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Significance: Flavored electronic cigarettes (e-cigarettes) have become very popular in recent years. e-Cigarette users like to share their e-cigarette products and e-cigarette use (vaping) experiences on social media. e-Cigarette marketing and promotions are also prevalent online. This study aims to develop a method to identify new e-cigarette brands and flavors mentioned on Twitter and to monitor e-cigarette brands and flavors mentioned on Twitter from May 2021 to December 2021. **Methods:** We collected 1.9 million tweets related to e-cigarettes between May 3, 2021, and December 31, 2021, by using the Twitter streaming application programming interface. Commercial and noncommercial tweets were characterized based on promotion-related keywords. We developed a depletion method to identify new e-cigarette brands by removing the keywords that already existed in the reference data set (Twitter data related to e-cigarettes from May 3, 2021, to August 31, 2021) or our previously identified brand list from the keywords in the target data set (e-cigarette-related Twitter data from September 1, 2021, to December 31, 2021), followed by a manual Google search to identify new e-cigarette brands. To identify new e-cigarette flavors, we constructed a flavor keyword list based on our previously collected e-cigarette flavor names, which were used to identify potential tweet segments that contain at least one of the e-cigarette flavor keywords. Tweets or tweet segments with flavor keywords but not any known flavor names were marked as potential new flavor candidates, which were further verified by a web-based search. The longitudinal trends in the number of tweets mentioning e-cigarette brands and flavors were examined in both commercial and noncommercial tweets. **Results:** Through our developed methods, we identified 34 new e-cigarette brands and 97 new e-cigarette flavors from commercial tweets as well as 56 new e-cigarette brands and 164 new e-cigarette flavors from noncommercial tweets. The longitudinal trend of the e-cigarette brands showed that JUUL was the most popular e-cigarette brand mentioned on Twitter; however, there was a decreasing trend in the mention of JUUL over time on Twitter. Menthol flavor was the most popular e-cigarette flavor mentioned in the commercial tweets, whereas mango flavor was the most popular e-cigarette flavor mentioned in the noncommercial tweets during our study period. **Conclusion:** Our proposed methods can successfully identify new e-cigarette brands and flavors mentioned on Twitter. Twitter data can be used for monitoring the dynamic changes in the popularity of e-cigarette brands and flavors.

FUNDING: Federal; FDACTP

POS5-81

SMOKING CANNABIS FROM WATERPIPE AND THE CORRELATIONS WITH OTHER TOBACCO PRODUCTS USE AMONG ADULTS IN THE UNITED STATES

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Significance: Some tobacco products (e.g., cigars, e-cigarettes, and waterpipe) are used to consume cannabis. The growing popularity of cannabis use in the United States (US) makes it crucial to better understand the routes by which people consume



cannabis. We aim to examine the rates of smoking cannabis from a waterpipe and how it correlates with the use of other tobacco products among US adults. **Methods:** This is a trend analysis of waves 3-5 (2015-2019) of the PATH Study among US adults who answered a question about ever smoking cannabis from a waterpipe. Weighted multivariable regression models were conducted to assess factors associated with smoking cannabis from a waterpipe at wave 5 (2018-2019) ($n=34,279$). **Results:** The trend analysis of PATH data showed that the prevalence of smoking cannabis from a waterpipe increased significantly from 2015 (8.9%, 95%CI: 8.4-9.5) to 2019 (9.7%, 95%CI: 9.1-10.2; time trend $p=.007$). In 2019, Adults aged 25-44, years old (vs. 18-24; 13%, vs. 9%, $p<.0001$), whites (vs. Black; 11% vs. 9%, $p=0.004$), and LGBs (vs. straight; 17% vs. 9%, $p<.0001$) were more likely to report ever smoking cannabis from a waterpipe. Former and current users (vs. never users) of e-cigarettes (19% and 25% vs. 5%, both $ps<.0001$), cigarettes (11% and 21% vs. 2%, both $ps<.0001$), cigars (17% and 27% vs. 3%, $p<.0001$ and $p=.0008$), and pipes (21% and 33% vs. 7%, $p<.0001$ and $p=.0002$) were more likely to ever smoke cannabis from a waterpipe. Past 30-day blunt users were more likely to smoke cannabis from a waterpipe than non-users (39% vs. 9%; $p<.0001$). Those with poor mental health were more likely to smoke cannabis from a waterpipe (14% vs. 9%; $p=0.0127$). **Conclusion:** Smoking cannabis from waterpipe is prevalent among young adults in the US and it has increased significantly from 2015-2019. Moreover, the concurrent use of cannabis and tobacco products is a public health challenge requiring educational and regulatory actions to prevent the cumulative dire health consequences (e.g., lung damage) instigated by smoking these substances.

POS5-82

PATIENT PERCEPTIONS OF MEDICAL STIGMA RELATED TO SMOKING. DEVELOPMENT OF A PATIENT-REPORTED EXPERIENCE MEASURE

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Significance: Stigma occurs when one is labeled, stereotyped, loses status, and experiences discrimination. Stigma derived from health behaviors or conditions, is referred to as health-related stigma (HRS). HRS has many negative impacts including poorer quality of life, delays in seeking help, increased illness related stress, as well as other detriments to social, physical, and psychological wellbeing. Smoking, which in the past had been seen as a socially acceptable, even desirable, behavior, has significant and detrimental impacts on the health of the smoker, and those around them. Smoking prevention and cessation have long been the focus of public health campaigns. As a result, smoking has been on the decline, but the marginalization of smokers is now common which can interfere with a smokers healthcare experience. Stigma associated with smoking has not been studied in the context of healthcare interactions. This study directly engaged individuals who smoke, or recently quit, in the development of the first patient experience measure of smoking-related stigma in healthcare interactions. **Methods:** Using Group Concept Mapping, a mixed-methods, participatory approach that combines qualitative group processes with multivariate statistical analyses, participants directly engaged in the development of measure items. Two brainstorming focus groups were held with a total of 23 participants, who were asked to express how being a current or past smoker has affected their experiences with health care providers and their staff. After brainstorming, participants sorted statements made in the focus groups based on their perception of their meaning. This sorted data were used to create conceptual maps. The statements were adapted into measure items and the conceptual maps were used to visualize the conceptual domains of the measure. **Results:** The statements shared in the focus groups were overwhelmingly negative, highlighting that individuals who smoke have poor patient experiences and commonly experience stigma in the healthcare setting. Despite asking a broad patient experience question, 93 of the 116 statements made by participants were negative and associated with stigma. Conceptual domains include patient anxiety, lying and avoidance of healthcare, and internalized stigma and shame. A pilot version of a measure of medical stigma associated with smoking containing 53 items was developed. **Conclusion:** Negative, stigmatizing interactions within the healthcare system could prevent individuals who smoke from seeking care and potentially negatively, impact quit attempts. Understanding the patient experience of individuals who smoke will provide avenues for improving care. This measure will be validated in the Fox Chase Cancer Center's Tobacco Registry which contains nearly 2,500 tobacco users who seek cancer and non-cancer care at Fox Chase Cancer Center.

FUNDING: Academic Institution

POS5-83

ASSOCIATIONS BETWEEN TYPES OF TOBACCO USE AND SELF-REPORTED SYMPTOMS OF DEPRESSION AND ANXIETY AMONG ADOLESCENTS IN CANADA, ENGLAND, AND THE USA FROM 2020-2021

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Significance: While tobacco use has a well-established bi-directional relationship with mental health conditions (MHCs), it is unclear whether MHCs are associated with using different types of tobacco products among adolescents. Given the range of emerging tobacco products adolescents use, changes in tobacco use patterns, and the rise of MHCs during the COVID-19 pandemic, this study examines associations between mental health symptoms and use of different types of tobacco products. **Methods:** Data come from 4 waves (Feb 2020, Aug 2020, Feb 2021, Aug 2021) of the International Tobacco Control Youth Tobacco and Vaping Survey, an online repeat cross-sectional survey of adolescents aged 16-19 in Canada, England, and the US ($n=60,906$). Four categories of past 30-day tobacco/nicotine use were created, based on existing evidence of differences in harm between combustible and non-combustible products: 1) no use, 2) exclusive non-combustible product use (e-cigarettes, smokeless tobacco, nicotine replacement therapy, and nicotine pouches), 3) exclusive combustible product use (cigarette, little cigars or cigarillos, cigars, bidis, waterpipe), and 4) use of both non-combustible and combustible products. Correlates of each use status (compared to no use) were examined using a multinomial logistic regression model that included past 30-day self-report of symptoms of depression and of anxiety, country, survey wave, age, sex, and race, conducted using weighted data. **Results:** Across all waves, 77% reported no past 30-day use, 9% exclusive non-combustible use, 8% both non-combustible and combustible use, and 6% exclusive combustible use. Those reporting symptoms of depression were more likely to report all categories of past 30-day use of tobacco, with the strongest association among those who used both non-combustible and combustible products (AOR: 1.69, 1.56-1.84), followed by exclusive combustible products (AOR: 1.48, 1.35-1.63), and exclusive non-combustible products (AOR: 1.38, 1.28-1.50). Those reporting anxiety symptoms were more likely to report exclusive non-combustible product use (AOR: 1.28, 1.18-1.39) and use of both non-combustible and combustible products (AOR: 1.23, 1.14-1.34). **Conclusion:** Self-reported symptoms of depression and anxiety were positively associated with using a range of tobacco product types, with the strongest association found for depression and using both non-combustible and combustible products.

FUNDING: Federal

POS5-84

SYNTHETIC E-CIGARETTE PRODUCTS SOLD ONLINE: 2021-2022

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Backgrounds: On March 15, 2022, the U.S. Congress passed a law that includes synthetic nicotine as a tobacco product and required the manufacturers of synthetic nicotine to submit marketing applications to the FDA by May 14, 2022, and set July 13, 2022 as a final date to obtain premarket approval. We aimed to understand the characteristics of synthetic nicotine e-cigarette products that are sold on popular e-cigarette online retailers during this time. **Methods:** To identify online e-cigarette retailers, we searched "online vape store," "online vape shop," "buy vape online," "online e-cig shop" on Google and obtained a list of URLs on the first 5 pages of each search term. Online retailers that were based in the U.S., did not have a physical shop, and were not only limited to selling e-liquids were then verified on Alexa.com ($n=14$). On each of these websites, we searched for "tobacco free nicotine" and "synthetic nicotine" and assessed the online presence, the type of synthetic nicotine e-cigarette products, flavors, and nicotine concentration in August 2021 (Time 1). We repeated this examination on April-May 6, 2022 (Time 2), and after July 13, 2022 (Time 3; data collection is underway). **Results:** We observed a 312% increase in the number of synthetic nicotine e-cigarette brands between Time 1 ($n=25$) and Time 2 ($n=103$). The number of official brand websites was $n=15$ (Time 1), $n=72$ (Time 2), and $n=17$ (Time 3). The brands mostly sold synthetic nicotine e-liquids and disposable devices (Time 1: $n=27$ [48% e-liquid, 44% disposable, 2% pods], Time 2: $n=129$ [65% e-liquid, 34% disposable, 0.8% pods]). There were 173 unique flavors in Time 1 and 1286 unique flavors in Time 2 (e.g., fruit, candy, dessert, coffee, vanilla, menthol, "ice," and tobacco). Synthetic nicotine was available in both freebase and nicotine salt with a range of concentrations (0-50mg/ml). **Conclusions:**



There was an exponential increase in synthetic nicotine e-cigarette brands and products sold online between 2021 and prior to May 14, 2022. We will present data on whether these products are still being sold after July 13, 2022. These findings will shed light on whether enforcement of the law is needed on online retailers.

FUNDING: Federal; FDACTP

POS5-85

CROSS STATE BORDER NICOTINE VAPING PRODUCTS PURCHASE - EARLY EVIDENCE FROM STATE EMERGENCY SALES RESTRICTIONS IN 2019

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AIMS: A diverse array of available flavors is a significant factor explaining the wide-spread use of nicotine vaping products (NVPs) among youths and adults. Our study aims to shed some light on the conflicting findings regarding NVP sales restrictions. While retail data indicated good compliance with flavor sale restrictions, survey data showed residents could still obtain NVPs that were not legally available in-state from other sources. Our study focused on three states: Washington (WA), Massachusetts (MA), and Rhode Island (RI), where an emergency policy prohibiting NVP sales was implemented from September through December of 2019. We investigated whether and to what extent the cross-border purchase from states of WA, MA, and RI with NVP sale restrictions to their neighboring states where NVP flavors or NVPs were allowed to be sold. **METHODS:** Data comes from Nielsen Scanner data from Kilts Marketing Data Center Archive of the Nielsen Company. The 2019 weekly county-level NVP sales by flavors (tobacco, mint/menthol, and other flavors) were compiled. The study sample was restricted to the county-level NVP weekly sale by flavors (e.g., tobacco, mint/menthol, and other flavors) from the surrounding states of WA, MA, and RI, 10 weeks before and after their NVP sale restrictions. A quasi-experimental, comparison group pre-post study design was used to study the impacts of NVP sale restrictions on cross-border NVP purchases. **RESULTS:** We found that in response to the WA, MA, and RI bans, weekly sales among border counties significantly increased for tobacco flavored (6%, 56%, and 47%, respectively), menthol/mint flavored (39%, 51%, and 16%, respectively), and other flavored (2%, 79%, and 18%, respectively) NVPs compared to the sales for the non-border county counterparts (all p-values <0.01). Our findings implied that, on average, 10% of statewide NVP sales shifted from the states with sale restrictions to those without sale restrictions. Effect magnitudes varied by flavor types and states. **CONCLUSION:** Our study indicated that despite these states prohibited flavored NVP sales in response to the EVALI outbreak in 2019, a significant cross-state border NVP purchase, consistently in all three settings of WA, MA, and RI, to circumvent NVP sale restrictions was identified. This cross-border purchasing undermined state legislation and dampened state regulation's effect on public health.

FUNDING: Federal

POS5-86

THE RELATIONSHIP BETWEEN PROPYLENE GLYCOL/VEGETABLE GLYCERIN (PG/VG) AND OTHER LIQUID CHARACTERISTICS AMONG FREQUENT USERS OF REFILLABLE ENDS: FINDINGS FROM THE VAPER STUDY

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Significance: The relationship between propylene glycol (PG) and vegetable glycerin (VG) ratio and other ENDS liquid characteristics is understudied. Understanding the relationship can help regulators better understand how liquid attributes potentially influence ENDS abuse liability/toxicant exposure. **Methods:** 1219 U.S. adult (21+) frequent (5+ days/week) ENDS users participated in wave 3 of the Vaping and Patterns of E-cigarette use Research (VAPER) Study between September – November 2021. Participants self-reported their ENDS use and submitted photos of their most used ENDS device and liquid. Data from photos were prioritized over self-reported data to obtain liquid nicotine concentration (mg/mL), primary flavor (sweet, tobacco, menthol/mint, or other), PG/VG percentage composition, and bottle size (mL). When a variable was found to be positively associated with PG%, it could be implied that the same variable was also negatively associated with VG% with the same magnitude and significance

since the sum of PG% and VG% in a liquid equal 100%. Data were analyzed descriptively and compared using Kendall correlation, Kruskal-Wallis, and Mann-Whitney U (with Benjamini-Hochberg correction) tests. **Results:** 56.3% (n=686) of participants used an ENDS device that could be refilled from a bottle of liquid. Among participants using refillable ENDS, 57.3% used liquid containing 30% PG, 24.6% used liquid containing 50% PG; the remaining 18.1% used other levels of PG (PG%<30:8.0%, 30<PG%<50:8.7%, PG%>50:1.3%). Nicotine concentration was positively correlated with PG% (tau-b=0.52; p<0.001). Primary flavor was associated with PG% (Kruskal-Wallis $\chi^2=18.8$, p<0.001), with menthol/mint liquids containing a significantly higher PG% than sweet liquids (median: 50% vs. 30%; p<0.001). Bottle size was negatively correlated with PG% (tau-b=-0.52, p<0.001). **Conclusion:** Frequent refillable ENDS device users typically used liquid containing 30% or 50% PG. Refillable ENDS liquid with a lower percentage of PG tended to be stored in a larger bottle, to have a lower nicotine concentration, and was more likely to be sweet flavored than menthol/mint. These results suggest that liquid nicotine concentration, flavor, and bottle size are associated with PG/VG composition and can inform regulators about tendencies of liquid used by frequent users of refillable ENDS.

FUNDING: Federal; FDACTP

POS5-87

A CASE STUDY IN OPTIMIZING RETENTION OF U.S. ADULT ENDS USERS IN LONGITUDINAL ONLINE SURVEYS - EXPLORING DIFFERENT INCENTIVE STRUCTURES

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Significance Longitudinal studies are critical to understand if and how behaviors, such as electronic nicotine delivery systems (ENDS) use, evolve over time, particularly when products and policies change. Optimizing follow-up rates in longitudinal studies is necessary for ensuring high quality data with sufficient power for analyses. However, achieving high rates of follow-up in online longitudinal studies can be challenging. Here, we compare follow-up rates and participant demographics for two incentive delivery strategies among our sample of U.S. adult ENDS users to understand the optimal incentive structure. **Methods** Data are from a longitudinal cohort study (Wave 4; July-Sept 2022) of adult (≥ 21 years) U.S. ENDS users (≥ 5 days of use/week). Participants (n=1804) invited to the follow-up were randomly assigned into one of two groups, each offered a different incentive structure: (1) \$30 gift card upon completion of the survey (2) \$15 gift card prior to and upon completion of the survey (n=902 each). Chi-squared tests were used to assess the difference in follow-up rates and participant demographics between these two groups. **Results** Of the 902 participants invited to the follow-up survey in each group, a higher proportion of those in group one (n=662; 73.4%) started the survey, as compared to group 2 (n=565; 62.6%) (p<0.001). Of those who started the survey, 555 (83.8%) in group 1 and 446 (78.9%) in group 2 completed the screener and were eligible for the survey (p=0.063). Of those eligible, 514 (92.6%) from group 1 and 401 (89.9%) from group 2 completed the survey and were deemed valid after a review of the data (p=0.137). Overall, more valid completions were yielded from group 1 (n=514; 57.0%) than group 2 (n=401; 44.5%) (p<0.001). Among those who validly completed the survey, no significant differences were found by group for gender, income, race, ethnicity, region, or past 30-day cigarette use. **Conclusion** Providing a \$30 gift card upon completion of the survey yielded higher rates of survey starts and completions than providing a \$15 gift card before and after survey completion. Additionally, these two methods yielded participants with similar demographics, suggesting one approach is not superior to the other in obtaining a balanced sample. Based on this case study, future online surveys examining U.S. adult ENDS users could consider adopting an incentive structure that provides the full incentive upon completion of the survey.

FUNDING: Federal; FDACTP

POS5-88

ENVIRONMENTAL TOBACCO SMOKE IN MULTIGENERATIONAL HOUSEHOLDS AND COVID-19 INFECTION IN THE CHEYENNE RIVER SIOUX TRIBE, SOUTH DAKOTA

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SRNT 2023 POSTER SESSION 5 • SATURDAY, MARCH 4, 2023, 11:00 AM - 12:30 PM

Introduction: The Cheyenne River Sioux Tribe (CRST), as other Indigenous communities in the US, have disproportionately high tobacco use compared to other demographic groups. Of concern is exposure to environmental tobacco smoke (ETS) in indoor environments and its potential impact on risk of infection from COVID-19. The purpose of our study is to assess ETS exposure and COVID-19 infection in multi-generation households within the CRST in South Dakota. **Methods:** The CRST COVID-19-Wayakta He study ("Are you on guard against COVID-19?") in collaboration with Missouri Breaks Industries Research, Inc. (MBIRI), Tribal partners in South Dakota, is recruiting 300 multigenerational households with 2 adults at least 9 years apart since February 2022. All participants provide responses to a Tribally-validated questionnaire on COVID-19 infection, risk factors, housing conditions, and environmental health factors. Participants deployed a passive ETS air monitor in their homes for one week. Air monitors were analyzed using GC-MS. We split ETS levels into 4 categories to report-back to the participants: no exposure (samples below limit of detection (<LOD) of 0.017 $\mu\text{g}/\text{m}^3$), low (0.03-0.1 $\mu\text{g}/\text{m}^3$), medium (0.1-1, $\mu\text{g}/\text{m}^3$), and high (>1.0 $\mu\text{g}/\text{m}^3$). COVID-19 positivity, immunoglobulin levels, and household NO_2 levels are also reported. **Results:** In this ongoing community-based study, 173 households (> 300 participants) have been recruited and returned air monitors. So far, 86 households have received results back. The median ETS concentration was 0.017 $\mu\text{g}/\text{m}^3$ (range: 0.017-5.3), with 62.8% (n=54) of households <LOD (0.034). Of the 32 samples with results above LOD, 12.54% fell in the "low exposed" category, 31.3% in the medium, and 56.3% of households had exposures qualified as high. Twenty-six percent of participants have been infected with COVID-19 at least once based on self-report. **Discussion:** The American Cancer Society has determined there is no safe level of exposure to ETS, particularly for children. ETS exposure is known to be associated with more severe upper respiratory infections. The combination of health disparities and systemic racism causes Indigenous communities to be at higher risk of COVID-19 infection, with 12.1% of total cases in SD while Tribal members only represent 8.8% of the population. High exposures to household ETS and COVID-19 in the CRST highlight the need to fund and support exposure assessment and smoke-free home interventions in Tribal communities.

FUNDING: Federal

POS5-89

THE RELATIONSHIP BETWEEN CIGARETTE SMOKING AND PSYCHIATRIC COMORBIDITY AMONG INDIVIDUALS WITH COPD: A SYSTEMATIC REVIEW

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Introduction: Chronic Obstructive Pulmonary Disease (COPD) is the sixth leading cause of death in the United States and the third leading cause globally. Cigarette smoking is a cause of COPD, and both smoking and psychiatric illness (e.g., depression) are associated with poor COPD-related health outcomes. While psychiatric conditions are linked with difficulty quitting cigarettes among individuals without COPD, less research has examined the course and treatment of COPD among individuals who smoke and have psychiatric illness. Our systematic review evaluates the literature (up to February 2022) by assessing the links between smoking and psychiatric illness among individuals with COPD. **Methods:** A systematic search of PubMed, Embase, PsycInfo, and Web of Science occurred in February 2022 and at least two reviewers examined each of the search results for inclusion. Inclusion criteria consisted of peer-reviewed journal articles and an investigation of smoking/nicotine use among individuals with at least one psychiatric condition and COPD. Case reports, articles without full text, nonspecific measures of psychiatric functioning (e.g., quality of life) or sleep-wake disorders, and articles unavailable in English were excluded. **Results:** After duplicates were removed from the four-database query, 3,739 articles were screened with an initial title and abstract review, and 453 were selected for a full-text review. A total of 101 studies were deemed eligible for this study and included in the review. Eligible studies were predominately cross-sectional surveys conducted in North American, Asian, and European countries. Depression and anxiety received the greatest focus, and evidence indicates they are positively related with current smoking, nicotine dependence, at least 10 pack-years, and mortality risk among patients with COPD. A few nationwide studies also examined psychosis, identifying schizophrenia as an independent risk factor for acquiring COPD when accounting for smoking history. **Conclusions:** Observational studies identified an association between depression, anxiety, and schizophrenia and smoking among patients with COPD. Additional research should examine relationships between other psychiatric comorbidities (e.g., personality disorders, PTSD) and smoking,

and track physical, cognitive, and psychological COPD-related symptom change over time as a function of smoking cigarettes or newer nicotine products (e.g., e-cigarettes) and smoking cessation.

POS5-90

FRUIT FLAVORS IN ELECTRONIC CIGARETTES (ECIG) ARE ASSOCIATED WITH NON-PRODUCTIVE COUGH AMONG CURRENT AND FORMER ESTABLISHED ECIG USERS: A POPULATION LONGITUDINAL ANALYSIS

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Background and Significance. Flavors in electronic cigarettes are associated with increased appeal and continued use among youth and young adults. Though most flavors are generally recognized as safe for ingestion, the toxicity associated with inhalation has been recently scrutinized. Evidence from in vitro and animal models has identified the pulmonary toxicity of some ECIG flavors, however, less is known from epidemiological studies about the effects of flavors on respiratory health. This report examined the longitudinal association between exposure to flavors in ECIG and self-reported dry cough in current and former established ECIG users. **Methods.** A prospective longitudinal analysis was conducted of data from the Population Assessment of Tobacco and Health (PATH) Study Wave 1 through Wave 5 (2014-2019). The study population included adults who provided information across all five waves (n=18,925), for a total of 38,638 observations. Weighted incidence estimates of self-reported dry cough and exposure to ECIG flavors are presented. Weighted generalized estimating equation models to assess unadjusted and adjusted associations were performed. Models were adjusted for sex, age, race and ethnicity, educational level, body mass index, disease status, ever tobacco use, and secondhand smoke exposure. **Results.** The weighted incidence proportion (WIP) of self-reported dry cough was significantly higher among established current ECIG users of fruit flavors (WIP:16.6%, 95% CI: 10.5, 21.2) and former fruit flavored ECIG users (WIP:16.6%, 95% CI: 11.3, 21.9) as compared to non-ECIG users (WIP:11.1%, 95% CI: 10.6, 11.6). Current established ECIG users of fruit flavors showed 47% higher risk of reporting dry cough than non-ECIG users (aRR:1.47, 95% CI: 1.06, 2.04). Former established ECIG users of multiple flavors and other flavors had 300% and 75% higher risk to develop dry cough, respectively (aRR:3.34, 95% CI: 1.50, 7.44 and aRR:1.75, 95% CI: 1.15, 2.67), relative to non-ECIG users. **Conclusion.** We observed a significantly higher risk of developing dry cough in the past 12 months in current ECIG users of fruit flavors and in former ECIG users of multiple flavors and fruit flavors, all as compared to non-ECIG users. To the extent that dry cough may serve as an early indicator of respiratory disease risk, the longitudinal association between ECIG use and development of dry cough raises potential concerns that warrant further study.

FUNDING: FDACTP; Academic Institution; Other: N/A

POS5-91

INITIAL PREFERENCES FOR MENTHOL CIGARETTES AND SUBSEQUENT CHANGES IN PREFERENCES AND SMOKING CESSATION AMONG ADULT CIGARETTE SMOKERS IN THE UNITED STATES (US): FINDINGS FROM THE INTERNATIONAL TOBACCO CONTROL (ITC) FOUR COUNTRY SURVEYS, 2002-2020.

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Significance: While most adult cigarette smokers maintain consistent preferences for menthol or non-menthol cigarettes over time, people choosing menthol brand cigarettes have been shown in some studies to have greater difficulty quitting. Using data from adult (18+) cigarette smokers participating in the ITC US Surveys from 2002-2020, this study examined the association between initial preferences for menthol or non-menthol brands and subsequent changes in preferences and smoking cessation. **Methods:** Data from 5435 adult cigarette smokers who smoked in the past 30-days and participated in at least 2 consecutive survey waves were selected to examine changes in menthol use and smoking cessation 1-2 years after their initial survey. Use of menthol cigarettes was self-reported; smoking cessation was defined as having quit for at least 30 days at follow-up. Weighted multinomial logistic regression models were fit to examine changes in use (no change, switched, quit) according to baseline use of menthol/non-menthol brands. Models were fit via generalized estimating equations and adjusted for baseline



sociodemographics, survey wave, and smoking behaviors. **Results:** Overall, 28.2% of smokers reported using a menthol cigarette brand at their initial survey wave. Across all waves, 7.4% of menthol smokers had switched by the subsequent wave compared to 3.8% of non-menthol smokers ($p < 0.01$). Cessation rates did not differ by whether people initially smoked menthol (9.7%) or non-menthol (9.3%) cigarettes ($p = 0.65$). Switching and cessation were not modified by sex ($p = 0.32$) or age ($p = 0.78$) but did vary by race/ethnicity ($p < 0.01$). Blacks who smoked non-menthol brands had 13.7 times the odds of switching to menthol across all waves compared to non-Hispanic whites who smoked non-menthol (95% CI: 8.5-22.0). Blacks who smoked menthol brands also had lower odds of quitting compared to non-Hispanic whites who smoked menthol (OR=0.7, 95% CI: 0.5-1.0). **Conclusions:** The overall rate of switching from menthol to non-menthol brands was low. Switching from menthol to non-menthol was more common than switching from non-menthol to menthol. However, Black people who smoked a non-menthol brand were more likely to switch to menthol than non-Hispanic white people. Black people who smoked menthol were also less likely to quit smoking compared to non-Hispanic white people who smoked menthol. Cessation support must consider the unique needs of smokers from different ethnic/racial backgrounds.

FUNDING: Federal; FDACTP; Other: Canadian Institutes of Health Research (MOP-57897, MOP-79551, MOP-115016, FDN-148477); Robert Wood Johnson Foundation (045734); Ontario Institute for Cancer Research

POS5-92

WHO ARE INFREQUENT E-CIGARETTE USERS? FINDINGS FROM A PROSPECTIVE COHORT STUDY OF ADOLESCENTS AND YOUNG ADULTS

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Significance: For adolescents and young adults ("youth") who use e-cigarettes (ECs), "current use" is commonly operationalized as any use in the past 30 days. This broad definition yields wide variation in use frequency. Whereas some youth use ECs daily, national U.S. studies indicate that infrequent EC use among youth is extremely common. Although it is generally assumed that most of these infrequent users will ultimately escalate in their use, youth EC trajectories are only beginning to be understood. The purpose of this project was to examine the correlates, predictors, and behavioral outcomes of infrequent EC users. **Methods:** Participants were from a prospective cohort of youth in Ohio (aged 15-24 at baseline). Youth who used an EC 1-5 days of the last 30 days were classified as infrequent users ($N = 273$); youth who used an EC 6 or more days of the last 30 days were classified as frequent users ($N = 278$). All participants completed an online survey at baseline and at 4-, 8-, and 12-month follow-up periods. Surveys assessed tobacco-related attitudes and behaviors, peer and family behaviors, and sociodemographic characteristics. **Results:** Compared to frequent users, infrequent users at baseline were less likely to be using other tobacco products, less likely to be using cannabis, started using ECs at an older age, had been using ECs for less time, were less likely to report that their nicotine addiction and lung health had gotten worse, and had lower scores for nicotine dependence (all p -values $< .01$). Infrequent users were also less likely to own an EC, less likely to report using an EC in secret, and were more likely to report that vaping was not allowed in their home or vehicles (all p -values $< .01$). At the 12-month follow-up, 45.5% of the infrequent users reported no past-30-day use, 36.5% remained infrequent users, and 18.0% had escalated to frequent use. Among the baseline infrequent users, those who escalated to frequent use were more likely to have tobacco users in their family; those who declined in their use were more likely to be in a romantic relationship. **Conclusions:** The present findings demonstrate the heterogeneity within the "current use" category commonly used to identify youth EC users. Infrequent users who did not escalate in their use over a 1-year period appeared to have protective interpersonal factors. Future research into these protective factors will be critical for mitigating the escalation of youth EC use and improving population health.

FUNDING: Nonprofit grant funding

POS5-93

CHARACTERISTICS OF CURRENT DUAL CIGARETTE AND ENDS USERS BY FREQUENCY OF PRODUCT USE, 2018-2019

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Significance: Dual-use of cigarettes and electronic nicotine delivery systems (ENDS) is a common tobacco use behavior; several studies have shown that patterns of dual-use are heterogeneous. **Methods:** We utilized a categorization methodology based on frequency of use of cigarette and ENDS, respectively, which yielded four groups: daily dual-users (daily/daily), predominant smokers (daily/non-daily), predominant ENDS users (non-daily/daily), and non-daily dual-users (non-daily/non-daily). We applied this categorization to the 2018-19 Tobacco Use Supplement to the Current Population Survey (TUS-CPS), the largest nationally representative survey of adult tobacco use in the United States, and provided descriptive statistics by sociodemographic characteristics and selected tobacco use behaviors. We calculated the weighted percentages, medians, and 95% confidence intervals by dual-use group. We calculated Chi-square tests to assess overall differences among the dual-use groups for each categorical variable while a quantile regression model was used to assess differences in medians for continuous variables. For selected variables, we conducted two-sided t-tests to determine differences in proportions for each variable category between pairs of dual-use groups. **Results:** There were approximately 2.2 million dual-users of cigarettes and ENDS (unweighted $n = 1158$). Predominant smokers (49%) were the largest dual-use group followed by non-daily dual-users (21%), daily dual-users (16%), and predominant ENDS users (14%). All groups were varied based on sex, age, other sociodemographic characteristics, and tobacco use behaviors. Non-daily dual-users and predominant ENDS users tended to be younger than predominant smokers. Predominant ENDS users had the highest proportion (45%) classified as preparing to quit smoking, use of open ENDS devices (68%), and characterizing flavor use such as candy or fruit (54%). Predominant smokers had the lowest proportion (16%) preparing to quit smoking and had the greatest indication of smoking dependence (i.e., time to first cigarette after waking is less than 30 minutes). Daily dual-users had lower cigarette consumption in terms of cigarettes smoked per day (CPD) compared to predominant smokers. **Conclusion:** This analysis aligns with previous research that dual-users continue to be a heterogeneous group, and these distinctions in subcategorization of dual-users will aid tobacco research, surveillance, and health education efforts.

FUNDING: Federal; FDACTP

POS5-94

FACTORS ASSOCIATED WITH SUSCEPTIBILITY TO ELECTRONIC VAPING PRODUCT USE AMONG OKLAHOMA HIGH SCHOOL STUDENTS, 2021-2022

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Significance: Most adults who use tobacco or nicotine products start before age 18. Initiation is influenced by many factors, including susceptibility. Measures of susceptibility have successfully predicted cigarette and electronic vapor product (EVP) use in longitudinal studies. The aim of this study was to determine variables associated with EVP susceptibility. **Methods:** The Oklahoma Youth Tobacco Survey was administered to a random sample of 36 Oklahoma High Schools during the 2021-2022 school year ($n = 1220$). Susceptibility was assessed among never users of any tobacco/nicotine product using a validated four-item measure combining curiosity, likelihood to try ever and in the next year, and likelihood of use if best friend offered. Covariates included sociodemographic characteristics, harm perception, exposure to EVP ads, social media interaction with EVP content, and psychological stress. Associations between variables and EVP susceptibility were identified using stepwise logistic regression for weighted survey data with an $\alpha = 0.05$. Results are presented separately for males and females due to interactions with sex. **Results:** Of 819 students who had never used any tobacco/nicotine product, 37.5% were susceptible to EVP use. Males were more likely than females to be susceptible (38.8% vs. 33.9%). Among males, factors associated with EVP susceptibility included perceiving little or no harm from secondhand vapor ($aOR = 2.3$, 95% CI = 1.2, 4.5), interacting with EVP content on social media ($aOR = 3.5$, 95% CI = 1.3, 9.6), seeing two or more ads promoting EVPs in the last year ($aOR = 3.5$,



95% CI = 1.3, 9.6) and earning grades of C or lower in school (aOR = 2.2 95% CI = 1.1, 4.5). Black males were less likely to be susceptible to EVPs than white males (aOR=0.35, 95% CI=0.15, 0.87). Among females, interacting with EVP content on social media (aOR = 5.0, 95% CI = 1.6, 15.0), earning C grades or lower (aOR = 3.4, 95% CI = 1.3, 9.2), and psychological distress (aOR = 2.8, 95% CI = 1.1, 6.7) were significantly associated with EVP susceptibility. **Conclusion:** Males and females had different patterns of EVP susceptibility, with more than one-third identified as susceptible. Understanding which groups of adolescents are most susceptible to the use of tobacco and other nicotine products can help target prevention efforts at home, in schools, and within communities. This knowledge can also inform media messaging opportunities at state and national levels.

FUNDING: State

POS5-95

CHANGES IN E-CIGARETTE USE DURING PREGNANCY AND RISK OF SGA AMONG ADOLESCENTS

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Significance: Little is known about changes in e-cigarette (EC) use among pregnant adolescents. We examined changes in EC and combustible cigarette (CC) use during pregnancy among adolescents, and their associations with SGA birth. **Methods:** We used data from 8,973 adolescent mothers aged 19 years and younger enrolled in the U.S. Pregnancy Risk Assessment Monitoring System 2016-2020. SGA was defined as birth weight below the 10th percentile of the same sex and gestational age. We grouped adolescents by pre-pregnancy EC/CC use as non-users of any products, exclusive CC users, exclusive EC users, or dual users, and identified their trajectory of EC/CC use during pregnancy. We used logistic regression models to evaluate the association between changes in EC/CC use during pregnancy and the odds ratio (OR) of SGA birth. **Results:** Discontinuation during pregnancy was 81.4% among EC users and 56.9% among CC users. Among dual users, discontinuation was 20.7% for EC use only, 11.9% for CC use only, and 54.5% for dual use. Switching was uncommon. Compared to non-users of EC and CC, adjusted for confounders there was no difference in odds of SGA among exclusive EC users who either continued (OR, 1.01 [95% confidence interval or CI 0.32-3.16]) or discontinued (OR, 1.09 [95% CI 0.68-1.75]) EC use during pregnancy. There was no difference in odds of SGA among dual users who continued dual use (OR, 1.62 [95% CI 0.69-3.79]), discontinued CC use only (OR, 1.49 [95% CI 0.54-4.10]), discontinued EC use only (OR, 1.74 [95% CI 0.84-3.61]), or discontinued both (OR, 0.67 [95% CI 0.41-1.10]) during pregnancy as compared to non-users. SGA was twice as prevalent in exclusive CC users who continued CC use during pregnancy as compared to non-users (26.6% vs. 13.1%, weighted; OR, 2.44 [95% CI 1.70-3.51]). The odds of SGA among exclusive CC users who discontinued CC use during pregnancy attenuated to that of non-users (OR, 0.94 [95% CI 0.68-1.30]). There was a decreased odds of SGA for exclusive CC users who discontinued CC use during pregnancy as compared to those who continued (OR, 0.40 [95% CI 0.26-0.62]). Dual users who discontinued both had decreased odds of SGA as compared to those who continued dual use (OR, 0.46 [95% CI 0.22-0.97]). **Conclusion:** Discontinuation was common during pregnancy across adolescent EC, CC, and dual users. Continuous CC use was a significant risk factor for SGA birth, which could be substantially reduced by discontinuation. Dual users who discontinued both products had decreased risk of SGA birth.

FUNDING: Federal; FDACTP

POS5-96

QUITTING SMOKING WITH SMOKE: UNAUTHORIZED SMOKING CESSATION CLAIMS USED BY HERBAL CIGARETTE MANUFACTURERS

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Introduction: Herbal cigarettes are made with a variety of non-tobacco plant materials (e.g., tea leaves, hemp), are typically sold pre-rolled in packs and with filters, and are combusted and smoked like tobacco cigarettes. Herbal cigarette manufacturers have a history of making misleading health claims and at least two companies have settled with the Federal Trade Commission over deceptive advertising. The aim of this study was to examine current claims and product characteristics of herbal cigarettes sold on a popular online retailer. **Methods:** On December 11, 2022, we searched Amazon.com for "herbal cigarettes" and "hemp cigarettes" and identified all herbal cigarette

products sold on the first page of search results. Browser search history, cookies, and cached files were cleared prior to searching. Two coders independently content analyzed each herbal cigarette's Amazon page for claims (e.g., smoking cessation claims, health claims), product characteristics (e.g., price, # and mean customer rating, flavors), and presence of warnings (e.g., health warning on pack). **Results:** A total of 51 unique herbal cigarette products were identified. Of these, 78.4% made smoking cessation claims (e.g., "A more scientific way to quit smoking", "decreases nicotine craving symptom and helps to quit tobacco smoking", "harmless cigarette quit smoking aid"). Further, 45.1% of product pages included claims stating the product had lower risk or exposure compared to tobacco products (e.g., "Enjoy the pleasure of smoking without the addictive nicotine and toxic chemicals found in tobacco cigarettes"; "For passive smokers, the harm of secondhand smoke is also reduced"). Mean pack price was \$9.72 (mean \$0.63 per stick) and nearly all products (94.1%) were sold with offers of free shipping (49.0% free shipping if purchase over \$25; 37.3% free shipping via Amazon Prime). Products had a mean of 265 customer ratings (range: 0-1979), with a mean rating of 3.5 stars (out of five). Herbal products were available in a variety of flavors, including menthol (21.6%) and fruit (17.7%) flavors. Only 35.3% of products included visible health warnings. **Conclusions:** Many herbal cigarette products are currently being sold on Amazon.com with unauthorized cessation and health benefit claims. Regulatory agencies must act decisively to stop the misleading advertising of these products and develop appropriate warnings to educate the public about the potential harms of herbal cigarettes.

POS5-97

MOTIVATING CHANGE IN OLDER SMOKERS: MOTIVATIONAL SMOKING CESSATION MESSAGE TESTING

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Significance: Over 14 million adults ages 50 and older in the U.S. smoke and are at elevated risk for the greatest age-related fear of older adults: dementia. Compared to younger adults, older adults who smoke are half as likely to make a quit attempt, but more likely to maintain abstinence using evidence-based smoking treatments. Motivational messages to promote evidence-based smoking cessation treatments among older adults are needed. Previous patient-centered research suggests the increased risk of dementia among people who currently smoke may motivate cessation in this at-risk population. These messages have not been tested for motivational impact specifically in an older adult smoking population. **Method:** 820 adults, $M_{age}=61.1$ years ($SD=7.4$), 48.0% cisgender women, without dementia, 66.6% White, 23.3% Black, who smoke $M=15.7$ CPD ($SD=9.6$) completed a 15-minute online survey assessing impact of one of three randomly assigned time-matched messages (Control N = 266, Fear N = 274, Hope N = 280) on motivation and intentions to quit. The Fear and Hope messages were based on the link between smoking and dementia, and each provided clear, actionable ways to quit smoking. **Results:** Mann-Whitney U Tests were used to examine change scores for each variable due to non-normal distributions. Compared to the control message (water ad), the Fear message showed significantly greater improvement in motivation to quit smoking. $U(N_{control}=266, N_{fear}=274)=30391, z=-3.33, p=.001$. The Hope message did not statistically differ from the control message or Fear message ($p>.05$). There were no differences between messages in terms of intention to quit ($p>.05$). Perceived message effectiveness demonstrated a trend towards significance for both the Fear ($p=.099$) and Hope ($p=.088$) messages in comparison to the control message. **Conclusion:** A Fear-based message package highlighting the potential losses associated with a future diagnosis of dementia as a result of cigarette smoking was more motivating than a time-matched control message, after accounting for baseline levels of motivation to quit. Hope-based messages did not significantly differ from control or Fear messages, despite recent research highlighting the potential patient preference for this form of messaging. Neither Fear- nor Hope-based messages improved intentions to quit compared to a control message. Future work should examine the feasibility and acceptability of this fear-based motivational package in healthcare settings.

FUNDING: Federal; Nonprofit grant funding



POS5-98

MACHINE LEARNING APPLICATION FOR PREDICTING SMOKING CESSATION AMONG US ADULTS

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Significance: Identifying determinants of smoking cessation is critical for developing optimal cessation treatments and interventions. Machine learning (ML) is becoming more prevalent for smoking cessation success prediction in treatment programs. However, only individuals with an intention to quit participate in such programs, which limits the generalizability of the results. This study applies data from the Population Assessment of Tobacco and Health (PATH), a United States longitudinal nationally representative survey, to select primary determinants of smoking cessation and to train ML classification models for predicting smoking cessation among the general population. **Methods:** An analytical sample of 9,281 adult current established smokers from the PATH survey wave 1 was used to develop classification models to predict smoking cessation by wave 2. Random forest and gradient boosting machines were applied for variable selection, and the SHapley Additive explanation method was used to show the effect direction of the top-ranked variables. **Results:** The final model predicted wave 2 smoking cessation for current established smokers in wave 1 with an accuracy of 72% in the test dataset. The validation results showed that a similar model could predict wave 3 smoking cessation for wave 2 smokers with an accuracy of 70%. **Conclusions:** Our analysis indicated that more past 30 days e-cigarette use at the time of quitting, fewer past 30 days cigarette use before quitting, ages older than 18 at smoking initiation, fewer years of smoking, poly tobacco past 30-days use before quitting, and higher BMI resulted in higher chances of cigarette cessation for adult smokers in the US.

FUNDING: FDACTP

POS5-100

ADOLESCENT USE OF E-CIGARETTES DURING LATE PREGNANCY: YEARLY TRENDS, CORRELATES, AND ASSOCIATION WITH SMALL-FOR-GESTATIONAL-AGE BIRTH

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Significance: Electronic cigarettes (e-cigarettes) have been increasingly used by adolescents. But little is known about e-cigarette use among *pregnant* adolescents, a population with double health vulnerability. We examined the yearly trends, correlates, and health consequences of e-cigarette use during late pregnancy among adolescents. **Methods:** We analyzed data in the Pregnancy Risk Monitoring Systems (PRAMS) from 8,995 U.S. adolescents (10-19 years old) who gave birth between 2016-2020. Adolescents reported their e-cigarette and cigarette use during the last 3 months of pregnancy. Potential correlates included socio-demographics and pregnancy characteristics. Small-for-gestational-age (SGA) was defined as birth weight below the 10th percentile for the same sex and gestational duration. We compared the risk of SGA across exclusive e-cigarette users, exclusive cigarette users, dual users, and non-users using the Chi-squared test and multivariable logistic regression. **Results:** Among U.S. pregnant adolescents, the (weighted) prevalence of e-cigarette use during late pregnancy increased from 0.8% in 2016 to 2.2% in 2020, while the prevalence of cigarette use decreased continuously from 9.2% in 2017 to 5.0% in 2020. The prevalence of dual use fluctuated with a range from 0.6% to 1.6%. White pregnant adolescents were more likely to use e-cigarettes than other pregnant adolescents. Compared with non-users (12.9%, weighted), e-cigarette users (17.0% vs 12.9%; confounder-adjusted odds ratio, 1.53 [95% confident interval, 0.73-3.20]) and dual users (17.7% vs 12.9%; 1.59 [0.70-3.59]) during late pregnancy had no statistically significantly different risk of SGA birth, but cigarette users had a two-

fold higher risk of SGA (24.8% vs 12.9%; 2.42 [1.72-3.41]). **Conclusion:** Unlike cigarette use, e-cigarette use during late pregnancy was not associated with a high risk of SGA among adolescents.

FUNDING: Federal; FDACTP

POS5-101

CHEMICAL ANALYSIS OF E-LIQUID PRESENT IN MEXICAN AND GUATEMALAN MARKETS

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Introduction: The rapid evolution of the nicotine market has led to the growth of local e-liquid producers. Although e-cigarettes are banned in Mexico, implementation is weak, whereas Guatemala has no e-cigarette regulations. In both countries, the lack of standards around the import and local e-liquids production creates uncertainty about their quality and safety. This study analyzed the chemicals in e-liquids available in Mexico and Guatemala. **Methods:** A total of 59 e-liquids (bottles and pods) were collected from different physical and online stores, based on clerks' recommendations or "most popular" lists, in Mexico and Guatemala (25 and 34, respectively). Eight e-liquids were available in both markets (6 from the Mexican-produced "Corona Brothers" and 2 from Juul). Gas chromatography with single quadrupole mass spectrometry was used for qualitative analysis, with the NIST library used for chemical identification. Gas chromatography with a nitrogen-phosphorous detector (GC-NPD, Varian brand) was used to quantify nicotine levels. **Results:** Of all e-liquids, 30 were manufactured in Mexico, 21 in USA, 6 in UK and 2 in Malaysia. Across the samples, 101 chemicals were identified (range=5-36 per sample), including 43 irritants, 33 toxicants and 5 carcinogenic chemicals. The most common chemicals present in e-liquids were Pyridine (93%), Nicotirine (88%) and Propylene glycol (80%). The 48% of the sample had between 10% and 92% less nicotine than indicated on the label, 34% had more nicotine (half above 5% more), and one contained the indicated amount. Of the e-liquids labeled as "0 nicotine" (n=10), all contained some nicotine (from 1 to 6%). Compared to e-liquids purchased in Guatemala, those from Mexico had more chemicals (15-24 vs. 8-21), more samples had less nicotine content than declared in the label (72% vs 29% of the country samples), and fewer samples contained more nicotine than indicated (20% vs 44%). **Conclusion:** E-liquids in Mexico and Guatemala contain multiple toxic or irritating chemicals, including some carcinogens. Beyond possible degradation caused by transport and storage conditions, differences between e-liquids suggest poor manufacturing processes and unstable products. Manufacturing standards that allow stable products and adequate labelling are necessary to better inform consumers about the e-liquids they use.

FUNDING: Federal; Nonprofit grant funding

POS5-102

BIRTH-COHORT PATTERNS OF E-CIGARETTE USE AMONG ADOLESCENTS IN THE US

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Background: E-cigarette use has increased considerably among US adolescents. While many studies have described cross-sectional prevalence trends of youth e-cigarette use, less is known about cohort or generational initiation and use patterns. **Methods:** We used data from the US National Youth Tobacco Survey (NYTS) from 2014 to 2021 and age-period-cohort models to analyze age-specific patterns of e-cigarette use initiation and prevalence by cohort and calendar. For comparison, we also examined patterns of use initiation and prevalence for cigarettes, cigars, and smokeless tobacco, using NYTS data from 1999 to 2021. **Results:** Age-specific e-cigarette initiation and prevalence varied enormously by calendar year and birth cohort. There was a rapid increase in e-cigarette initiation and prevalence starting with the 1995 birth cohort, peaking with the 2005 birth cohort, and now apparently decreasing with more recent cohorts. In contrast, there were substantial decreases in cigarette, cigar, and smokeless use initiation and prevalence by birth cohort. While the reductions in cigarette smoking started with the 1980s birth cohorts, cigar and smokeless initiation and prevalence did not decrease until the 1990-



1995 cohorts. Conclusions: Despite their recent emergence, e-cigarette use has varied considerably across US adolescent cohorts. These trends reflect the rapidly changing market, policy, regulatory and social environment. As the tobacco product landscape continues to evolve, it will be essential to monitor patterns of use of adolescent and young adult cohorts as they age into adulthood.

FUNDING: Federal; State; FDACTP

POS5-103

LONGITUDINAL ASSOCIATION OF EXCLUSIVE AND DUAL USE OF CIGARETTES AND CIGARS WITH ASTHMA EXACERBATION AMONG US ADULTS - POPULATION ASSESSMENT OF TOBACCO AND HEALTH STUDY WAVES 1-5 (2013-2019)

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Significance: Cigarette smoking is linked with asthma exacerbation in adults, but few, if any, studies have examined the role of cigar use. This study aims to assess whether cigarette and cigar use are prospectively associated with self-reported asthma exacerbation in US adults with asthma. **Methods:** Using Generalized Estimating Equation (GEE) models and data from Waves 1-5 of the Population Assessment of Tobacco and Health Study, we examined the association between time-varying cigar and cigarette use and self-reported asthma exacerbation in US adults (18+) with asthma. We defined established cigarette use as having smoked at least 100 cigarettes in a lifetime, established cigar use as having ever used a cigar product (traditional cigars, cigarillos, filtered cigars) fairly regularly, and current use as having used a tobacco product at least once in the past 30 days. Cigar and cigarette use was lagged by one wave and categorized into five categories: never established use of cigarettes or cigars, former established use of cigarettes or cigars, exclusive cigarette use, exclusive cigar use, and dual use of cigarettes and cigars. Respondents were considered to have an asthma exacerbation event if they reported having an asthma attack in the past 12 months that necessitated oral or injected steroid medication and/or they reported that their asthma symptoms disrupted their sleep at least once a week in the past 30 days. We adjusted for established Electronic Nicotine Delivery Systems (ENDS) use, age, sex, race/ethnicity, household income, health insurance, secondhand smoke exposure, and body mass index. **Results:** At baseline, 22.5% of adults had former established use, 15.9% had exclusive cigarette use, 1.1% had exclusive cigar use, and 1.4% had dual use. Compared to never established use, exclusive cigarette use (IRR: 1.40, 95% CI: 1.18-1.65) and dual use (IRR: 1.70, 95% CI: 1.35-2.14) were associated with a higher rate of asthma exacerbation, while former use (IRR: 1.10, 95% CI: 0.88-1.37) and exclusive cigar use (IRR: 0.90, 95% CI: 0.56-1.45) were not. **Conclusion:** The finding that current established cigarette use, alone or in combination with cigars, was associated with higher rates of asthma exacerbation over a 5-year period highlights the need for strategies to curb cigarette smoking in adults with asthma who continue to smoke.

FUNDING: Federal; FDACTP

POS5-104

VAPING PERCEPTIONS, CONCERNS, AND USE OF FLAVORED PRODUCTS: PRELIMINARY QUALITATIVE RESULTS

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Significance: Limited research has been done about consumer beliefs, behaviors, and experiences with vaping. This study aims to better understand the experiences of vape device users including health concerns, flavored product and device preferences, reasons for vaping and reasons for quitting. **Methods:** A total of 22 semi-structured interviews (focus groups and key informant interviews) were conducted via Zoom. Demographic information was collected using REDCap. Participants (N=52) provided thoughts and reactions to electronic cigarette use, flavor availability and marketing, and experiences with vaping and cessation. A team of coders developed a code book for transcribed interviews resulting in 159 distinct domain codes. Each unit of analysis (quote) was coded using these codes by two independent coders who then compared and confirmed a final set of codes for each transcript. Codes were condensed and categorized into 10 over-arching themes. **Results:** Of the 52 participants, 20 (38.5%) identified as female. The median age was 27.5 years. Results show a diversity of perspectives and experiences with vaping. Interpretable over-arching themes (n=10) were endorsed between

22 and 452 times. Most represented were Health Perceptions and Product Perceptions, with a wide range of beliefs, often including positive perceptions (especially relative to cigarettes). Perceptions of Flavor Use (other than tobacco or menthol) were common. Other themes included Legislation, Reasons to Vape, and Cessation Efforts. **Conclusion:** Participants had diverse experiences with vaping and with vaping flavors other than tobacco or menthol. Most did not support flavor bans. Many ways of acquiring flavored juice were reported, including subverting flavor bans. Some participants indicated they may try to quit vaping if flavors were inaccessible. Participants favored devices that are cost effective, compact and discrete. They mostly reported no health concerns and believe vaping to be safer than smoking. Most believe there is not enough research to know if vaping is dangerous, although some report that research showing health risks would cause them to consider quitting. Barriers to cessation included nicotine addiction and fear of not being able to manage stress. These themes can inform further studies of the nuances of the experiences of vape device users. **Supported by** The National Cancer Institute (NCI) and the FDA (TCORS Grant U54CA228110).

FUNDING: Federal

POS5-105

LIKELY RESPONSE TO A HYPOTHETICAL MENTHOL CIGARETTE BAN AMONG SMOKERS WITH MENTAL HEALTH CONDITIONS WITH NO CURRENT PLANS TO QUIT SMOKING

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Background Menthol cigarettes have been associated with increased smoking initiation and reduced quitting behaviors. The United States Food and Drug Administration is proposing a ban on menthol cigarettes because of increased harm. Studies have been conducted to understand how smokers may respond to a ban on menthol cigarettes, however, very little is known about how smokers with mental health conditions may respond. This study aimed to assess responses to a hypothetical ban on menthol cigarettes among smokers with mental health conditions and factors associated with the intention to quit smoking. **Methodology** A cross-sectional study design was conducted to collect data from menthol cigarette users with mental health conditions who participated in a randomized controlled trial of reduced nicotine cigarettes. The study was conducted at two sites, the Penn State College of Medicine in Hershey, PA, and the Massachusetts General Hospital in Boston, MA. Participants reported demographics (age, gender, education level, income, race, and ethnicity), and tobacco consumption patterns, and responded to a hypothetical question on a potential ban on menthol cigarettes. Means and frequencies were used to describe the sample. Logistic regression was used to determine the association between independent variables and the intention to quit smoking. **Results** Participants (n=77) were a mean age of 42.5 years (SD 12.5), 61% female, 68.8% white, and 5.2% Hispanic. The mean number of cigarettes smoked per day was 19.9 (SD 10.8) and the mean total years of smoking was 25.3 years (SD 12.9). The most common mental health condition among participants was major depressive disorder (76.6%). In response to a hypothetical ban on menthol cigarettes, 58.4% (n=45) reported that they would switch to non-menthol cigarettes, 19.5% (n=15) would switch to other tobacco products and 22.1% (n=17) would quit smoking and not use any other tobacco products. As a result of the menthol ban, the intention to quit tobacco smoking was associated with Hispanic ethnicity (OR=12.64, p-value 0.03) after adjusting for all other covariates. **Conclusion** Among menthol cigarette smokers with mental health conditions, less than a quarter reported intention to quit cigarettes in response to a menthol ban. Latino menthol smokers were more likely to report intent to quit. If a menthol ban is passed in the US, education and cessation interventions should be targeted at smokers with mental health conditions to promote quitting.

FUNDING: Other: National Institute on Drug Abuse of the National Institutes of Health under Award Number P50DA036107

POS5-106

USING SURVEY AND GOOGLE SEARCH DATA TO INVESTIGATE E-CIGARETTE BRAND AWARENESS AND PREFERENCES AMONG YOUTH AND YOUNG ADULTS IN THE U.S.

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Significance: The e-cigarette marketplace continues to evolve due to changes in regulations and nicotine delivery technologies. Given limited recent research on young



people's e-cigarette brand preferences, we aim to assess brand popularity, preferences, and reasons for preferences among U.S. youth and young adults (YYA). We used 2 data sources - YYA survey data and Google search data - to assess popularity of brands and associations between each brand's public interest (Google search data) and self-reported brand awareness (survey data) to see how the two sources triangulate. **Methods/Results:** We used 5 waves of a repeated, cross-sectional online survey of youth (15-20 years) and YA (21-24 years) recruited through social media, collected April 2021-Feb. 2022 (N=1500 per wave). Participants were susceptible to using or ever used e-cigarettes. Study outcomes included awareness and use of e-cigarette brands and reasons for brand preferences. Among the brands assessed, JUUL, Puff Bar, and blu had the highest awareness, while JUUL, Puff Bar, and Vuse had the highest rates of use across all waves. About 50% of the sample reported friends' use and flavors as reasons for their brand preference; 40% reported ease of use and access. Brand awareness, use, and reasons for preferences differed across demographic groups. We collected volumes of brand-related Google searches in the U.S. during the survey period. Top Google search terms are publicly available via Google Trends API and are accessible through a Python programming package. Volume analyses indicated some agreement in top brands across both datasets: JUUL, Puff Bar, and Vuse. While awareness of blu was high among survey participants, it had a low overall Google search score. We fit a least-square line to each brand and performed trend analyses to assess associations in the directionality of each brand's popularity between the two datasets. Excluding Vuse, which had a positive trend, all brands studied had declining or steady trends in popularity. **Conclusion:** This study provides recent insights into brand preferences among youth, and YA - a previously understudied population despite high rates of use. We demonstrate how multiple data sources can be used to triangulate e-cigarette brand popularity and preferences. Top brands identified in this study may appeal to young people due to targeted marketing, availability of disposable devices (currently not a U.S. regulatory enforcement priority), and other device characteristics that warrant further investigation.

FUNDING: Federal; FDA/CTP

POS5-107

HOOKAH SIZE MATTERS: THE EFFECT OF HOOKAH SIZE ON TOXICANT EXPOSURES AND SUBJECTIVE EXPERIENCES AMONG REGULAR SMOKERS

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Significance: Hookah use is a popular mode of tobacco consumption among young adults. Factors such as hookah's size, design, and accessories, are shown to influence harm perception and encourage experimentation and use. However, the effect of specific hookah components such as size configuration on smoking behavior and toxicant exposures remains largely unexplored. This study aims to evaluate the effect of different hookah sizes on smokers' toxicant exposures, puffing behavior, and subjective experiences. **Methods:** Twenty-eight hookah smokers (21-39 yrs.) completed three, 45-minute ad libitum smoking sessions (small vs medium vs large hookah) in a randomized crossover study. Saliva nicotine concentration and exhaled carbon monoxide (eCO) were measured before and after each smoking session. Puff topography was recorded throughout the smoking session. Participants completed questionnaires assessing subjective smoking experiences following each session. Means for all subjective measures and puffing parameters were compared by hookah size using two-tailed t-tests. The effect of hookah size on plasma nicotine and eCO concentration was assessed using repeated measures ANOVA. **Results:** Significant differences were observed in saliva nicotine concentration between the three hookah sizes, with higher concentrations for the small hookah relative to medium and large sizes (P -values<0.05). Exhaled CO was significantly higher after smoking the large hookah compared to the small and medium-hookahs (P -values<0.05). Puff topography results revealed significant differences between all hookah sizes and followed a dose-response pattern with greater size being associated with more puffs, greater smoke volume inhaled, and greater puff duration (P -values<0.05). Compared to the small-hookah, the large hookah was associated with enhanced subjective measures of satisfaction, taste, calmness, concentration, awareness, puff liking, and size familiarity (P -values<0.05). Hookah harm perception showed no significant differences by size. **Conclusion:** The size of hookah substantially impacts puffing behavior, nicotine delivery, CO exposure, and the sensory experience. Therefore, regulation of hookah size should be an essential element in comprehensive tobacco control policies aimed at curbing hookah use among young adults. Altogether, findings from this study will aid with the development of hookah size-specific standards to regulate the marketing and sales of hookah devices and protect public health.

FUNDING: Federal

POS5-108

A SECONDARY ANALYSIS OF TOBACCO USE TRENDS IN MALAWI, ZAMBIA, AND ZIMBABWE PRE- AND POST-RATIFICATION OF THE WHO FRAMEWORK CONVENTION ON TOBACCO CONTROL

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Significance: The impact from tobacco use ranges from proximate individual outcomes (e.g., an individual's health status) to distal societal outcomes (e.g., decreased economic growth). To help curb these consequences, the World Health Organization introduced the Framework Convention on Tobacco Control (FCTC) in 2003. The FCTC provides Parties with evidence-based guidelines for addressing tobacco use via targeted policies, such as sales tax and smoke-free public spaces. While many high-income Parties to the FCTC have seen a decrease in tobacco use in recent decades, research has suggested an increased shift in the burden of tobacco use and associated non-communicable diseases within low- and middle-income countries (LMICs). Thus, it is important to understand how tobacco use in LMICs has changed pre- and post-ratification of the FCTC. **Methods:** Secondary data analysis was conducted using publicly available Demographic and Health Survey datasets for Malawi (2004, 2010, 2015), Zambia (2007, 2013, 2018), and Zimbabwe (2005-06, 2010-11, 2015). Multivariate regression analyses were used to measure the associations between demographic predictor variables, such as age, residence, education, marital status, occupation, and wealth index and the outcome variable of current tobacco use. Regression models were run separately for each country and country year using weighted data. **Results:** Across the three most recent years for each country (sample size ranges from 3,256 to 14,689), there was an observed decrease in the overall percentage of tobacco users. Comparing earlier datasets to the more recent dataset year for each country, Malawi saw a 42% decrease in tobacco users, Zambia had a 15% decrease, and Zimbabwe had a 21% decrease. Generally, all three countries saw living in rural areas, not working, having a higher wealth index, and higher education as protective factors against tobacco use, whereas increasing age, being together with a partner, or no longer together with a partner were common predictors of tobacco use. **Conclusion:** Significant changes were observed in each country for different demographic predictor variables. Of importance, while Malawi did not ratify the FCTC, there were significant decreases in tobacco use and changes in demographic predictors of tobacco use. These results provide an initial step towards understanding shifts in tobacco use predictors and protective factors in LMICs.

POS5-109

SECONDHAND SMOKE EXPOSURE AT HOME FROM DIFFERENT SOURCES AMONG HONG KONG ADOLESCENTS: PREVALENCE, CHANGES AND DIFFERENCES BY SOCIOECONOMIC STATUS

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Introduction Despite its low smoking prevalence of 9.5% in people aged 15+, adolescent secondhand smoke (SHS) exposure at home, from inside and from neighbouring flats, was disproportionately high in Hong Kong, where most people live in crowded multi-unit housing. The SHS prevalence and its socioeconomic differences have been reported in many countries, but not in HK young people. **Objectives** We aimed to investigate changes in the prevalence of SHS exposure at home from inside and from neighbours among Hong Kong adolescents, overall and by socioeconomic status (SES), from 2016/17 to 2020/21. **Methods** We conducted three territory-wide school-based Smoking Survey among Students in 2016/17 (N=26,648), 2018/19 (N=32,355) and 2020/21 (N=25,653). SHS exposure at home from inside and from neighbours was measured by the questions 'On how many of the past 7 days had someone smoked near you at home?' and 'In the past 7 days, did you breathe in secondhand smoke that came from outside your flat (e.g. neighbouring flats, corridors) while you were at home?'. Response options were from 0 to 7 days. The highest parental education level (secondary or below, post-secondary, don't know) and perceived family affluence (poor, medium, rich) were used as proxies for (SES). The prevalence of SHS exposure was weighted by sex, age and grade distribution. Changes in SHS exposure from 2016/17 to 2020/21 were calculated overall and by SES. Prevalence differences (PDs) and ratios (PRs) in low versus high SES groups were used to evaluate absolute and relative inequalities between SES groups. **Results** SHS exposure at home in 2016/17, 2018/19 and 2020/21 was 24.6%, 30.8% and 29.8% from inside, and 21.8%, 32.6% and 40.7% from neighbours. This represented respective increases of 21.0% and 86.4% in SHS exposure at home from inside and neighbours across the surveys (P <0.05). Greater increases were observed in poor versus rich families for both exposure from inside (25.9% vs 9.7%) and from neighbours (87.3% vs 72.7%), and in low versus high parental education level for SHS exposure from inside (29.1% vs 18.3%). Adolescents with higher parental education levels and rich family affluence



had lower prevalence of exposure to SHS at home from any sources in all survey rounds ($P < 0.05$). Increasing trends over time were found in PDs and PRs for education level in SHS from inside increased and in those for family affluence in SHS from neighbours (P s for trend < 0.05). **Conclusions** Adolescent SHS exposure at home from inside and from neighbours both increased from 2016/17 to 2018/19 in Hong Kong, the SHS exposure from neighbours further increased in 2020/21. Socioeconomic inequalities in SHS exposure at home from different sources were found and the temporal trends varied by absolute and relative measures. Effective public health interventions and policies are urgently needed to protect adolescents from SHS exposure at home, especially those with lower SES.

FUNDING: Other: Regional source

POS5-110

A CROSS-SECTIONAL ONLINE SURVEY TO DETERMINE THE PREVALENCE, KNOWLEDGE, ATTITUDE AND PRACTICE OF TOBACCO CESSATION AMONG GOVERNMENTAL HEALTHCARE WORKERS IN QATAR

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Significance: One effective approach of tobacco control is to encourage the role and the participation of healthcare workers in the prevention efforts against tobacco use. This study aimed to determine the prevalence of tobacco use among governmental healthcare workers in Qatar, to assess healthcare workers' knowledge, attitude and practice of tobacco cessation, and to predict factors associated with above average tobacco cessation practice scores. **Methods:** A cross-sectional survey study was conducted among governmental healthcare workers aged 18 years and above ($n=7214$) working in Hamad Medical Corporation (HMC) and Primary Health Care Centers in Qatar using a self-administered online questionnaire in 2019. **Results:** The response rate of our online survey was 20.6% (7214/35,000). Of the 7214 healthcare workers, 16.3% ($n=1178$) were current tobacco users (7.7% daily, 8.6% occasional). In particular, the prevalence of tobacco use among physicians was 11.0% (5.8% daily, 5.2% occasional). Fifty-two percent of healthcare workers ($n=2338$) attained an average knowledge score (12-17), 71.8% ($n=3094$) attained positive attitude scores (8-12), and 57.1% ($n=3052$) attained above average practice scores (12-26). Among the different professions, physicians were having the highest mean knowledge (15.3 \pm 4.7), attitude (9.4 \pm 1.9), and practice (13.7 \pm 6.1) scores. Multivariate analysis showed that having good knowledge ($AOR=2.8$; $p<0.0001$) and 1 training ($AOR=2.4$; $p<0.0001$) were the strongest factors associated positively with above average tobacco cessation practice scores. **Conclusions:** Healthcare workers in Qatar have a relatively similar prevalence of tobacco use than earlier studies with no significant increase. Investing more in training programs for healthcare workers are needed to root out this negative behavior and to increase their skills to assist users to quit. Consequently, HMC Tobacco Control Center-WHO Collaborating Center would conduct comprehensive trainings in treating tobacco dependence among healthcare workers. 2

FUNDING: Other: Medical Research Center in Hamad Medical Corporation

POS5-112

THE BEHAVIOUR CHANGE TECHNIQUES USED IN CANADIAN ONLINE SMOKING CESSATION PROGRAMS: CONTENT ANALYSIS

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Background: Smoking cessation continues to be a priority for public health in Canada with the current focus to reach a key objective whereby less than 5% of Canadians are using tobacco by 2035. Offering effective cessation services to support citizens is paramount to achieve this target. Provincial and national cessation websites, funded through Canadian governments, need to be evaluated on their ability to effectively promote behaviour change so they can successfully cater to citizen needs. This study aimed to evaluate the quality of these websites utilizing the BCTTv1 taxonomy to identify what behaviour change techniques (BCTs) these websites apply. **Methods:** 12 Canadian government-funded websites were analysed using deductive content analysis after training in applying the BCTTv1 taxonomy was complete. Coding of the websites was accomplished using the 16 BCT categories and the 93 BCTs within these categories. **Results:** In total, 14 of 16 BCT categories were found to be used on these websites. However, select BCT categories were applied more frequently than others with the most utilized BCT categories represented on all 12 websites. These categories included goals

and planning, social support, natural consequences and regulation. **Conclusions:** This method of analysis showcases a practical method to identify what techniques online cessation services are using to aid in behaviour change. The results provide direction for developers on ways these websites may need to be adapted to support Canadians in a manner that directly targets behaviour change to facilitate cessation. The results of this study pave the way for the analysis of other web-based cessation services and other public health services directed towards cessation and health promotion.

FUNDING: Academic Institution

POS5-113

A SYSTEMATIC REVIEW AND META-ANALYSIS FOR THE EFFECTIVENESS ON THE VERY BRIEF ADVICE IN SMOKING CESSATION

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Significance Very Brief Advice for smoking cessation has been advocating worldwide. However, its evidence from systematic review lacked. This review aimed to assess the effectiveness of very brief healthcare professional advice for smoking cessation (< 3 min) to tobacco abstinence and quit attempts in smokers. **Methods** Relevant randomized controlled trials were identified and included from 5 databases and 2 clinical registries. We extracted data on smoking abstinence and quit attempts. Study quality was assessed by risk of bias tool 1. Effects were estimated using frequentist pair-wise random effect model with restricted maximum likelihood estimator. **Results** 13 studies were included in the systematic review. Of which, 10 studies were included in the meta-analysis. Compared to usual care, the pooled relative risks (RR) was 1.17 (95% confidence interval (CI): 1.07-1.27) after sensitivity and trim and fill analysis. There was evidence that healthcare professional very brief smoking cessation advice increased the success of tobacco abstinence. **Conclusions** Healthcare professional may be more effective by offering less than 3 min very brief smoking cessation advice when contacting all smokers than a usual care.

POS5-114

SYSTEMATIC REVIEW OF QUALITATIVE STUDIES ON YOUTH PERCEPTIONS OF E-CIGARETTES

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Significance: Understanding youth decisions to use e-cigarettes may inform prevention efforts. Decision making theories highlight the importance of perceptions (i.e., beliefs and attitudes) and social influences on decisions. Qualitative methods are uniquely positioned to understand youth decisions to use e-cigarettes. **Methods:** We searched PsycINFO, Medline, Scopus, and Web of Science for qualitative studies (e.g., "qualitative" OR "mixed method") examining youth (e.g., "teen" OR "adolescent" OR "youth") perceptions of e-cigarettes (e.g., "e-cigarette" OR "electronic nicotine delivery systems" OR "vape"). Of the 285 unique search results through July 2022, 35 articles met review criteria and were coded for (1) youth positive and (2) negative perceptions of e-cigarettes, and (3) social influences on decisions to use. **Results:** Youth with positive perceptions of e-cigarettes were more likely to be e-cigarette users. Positive perceptions included: 1. Low perceptions of health risk, including a perceived lack of research demonstrating negative health effects; 2. Convenient use including easy access, public use, and ability to hide use from adults; 3. Social benefits and amusement including opportunities for peer bonding, vape tricks, and viewing e-cigarettes as "cool"; and 4. Physiological and sensory rewards including perceived positive effects on mood and enjoying the taste, smell, and nicotine high. Youth negative perceptions of e-cigarettes included high perceptions of health risk; inconvenient access and use; fear of social criticism; lack of physiological benefits; and lack of alignment between vaping and their personal goals. The most frequently reported social influences included: 1. Enabling or prohibiting access; 2. Positive or negative social norms around e-cigarette use, particularly at home and school; and 3. Sharing information about e-cigarette impacts, contents, and regulations, with youth trust in information sources indicated as a potential moderator of influence on decisions to use. **Conclusion:** This review highlights several pathways in which physiological and social factors can influence youth perceptions of e-cigarettes, including providing information, impacting access, and developing social norms. More



research is needed to identify what alternative messaging sources and content are needed to capitalize on these physiological and social factors to amplify youth negative perceptions and mitigate positive perceptions to prevent youth e-cigarette use.

FUNDING: Federal

POS5-115

A UNIVERSAL SMOKING MACHINE ADAPTOR FOR EMISSIONS TESTING WITH SMOKING/VAPING MACHINES: DEVELOPMENT, VALIDATION, AND BENCHMARKING

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Background: Tobacco use remains the leading cause of preventable death in the world. Newer products, such as electronic cigarettes, sparked epidemic use among youth, underscoring nicotine's addictiveness. All nicotine-containing tobacco products sold in the US are now regulated by the US FDA. However, product innovation has surpassed our ability to conduct non-clinical, standardized machine testing with commercial, benchmarked apparatus. Existing smoking and vaping machines, designed to hold rods of a certain diameter and mass (~8 mm, 1 g), require a leak-free seal between the machine and the product mouthpiece. The variety of newer tobacco product geometries and sizes make this challenging. **Methods:** A prototype universal smoking machine adaptor (USMA) that interfaces with existing cigarette, cigar, and e-cigarette smoking/vaping machines was designed and fabricated mainly from inert materials. Using the USMA, emissions were generated from e-cigarettes (n=7 brands), cigars (n=2), cigarillos (n=2), and a heated tobacco product, encompassing a variety of product geometries and weights for the most popularly used US products. To benchmark and validate results, reference tobacco products for cigars, cigarillos, and cigarettes were tested alongside the commercial products. Three comparison adaptors, the standard cigarette, Cerulean cigar, and CDC's JUUL adaptor, were also used to generate emissions. Mainstream nicotine and total particulate/aerosol matter (TPM/TAM), and product consumption were quantified. Product variability was compared across adaptors using non-parametric Wilcoxon Rank Sum testing. **Results:** For mainstream nicotine and TPM, the USMA had greater precision and accuracy than the standard cigarette adaptor when testing a certified reference cigarette (1R6F). Replicate data (n=10 per brand) indicate repeatability across all products tested generally meets or exceeds that for the comparison adaptors and extant data. **Conclusion:** The USMA seals well with a variety of e-cigarette, cigar, cigarillo and heated tobacco product geometries. Variability among replicates for product consumption, mainstream nicotine and TPM/TAM was similar or smaller when machine smoking/vaping with the USMA vs the other adaptors. Precision and accuracy when testing the 1R6F with the USMA were excellent. The USMA is more user friendly, has fewer parts, and takes less time to assemble/disassemble than existing commercial adaptors. **Funding:** This project is supported by the Food and Drug Administration (FDA) of the U.S. Department of Health and Human Services (HHS) as part of a financial assistance award [FAIN] totaling \$5M with 100 percent funded by FDA/HHS. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement, by FDA/HHS, or the U.S. Government.

FUNDING: Federal; FDA/CTP

POS5-116

"NO ONE EVER TOLD ME WHAT IS BAD ABOUT E-CIGS": A QUALITATIVE STUDY ON E-CIGARETTE PREVENTION AMONG YOUNG ADULTS

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Funding: K01HL148907. **Significance:** Electronic cigarettes (ECs) are the most commonly used tobacco product among young adults. The majority of research has focused on behavioral correlates and health effects associated with young adult use of ECs. Few studies focus on protective factors that prevent individuals from using ECs. This study examined qualitative data from individual interviews of young adults to identify potential prevention messaging content and themes regarding young adult perceptions of ECs. **Methods:** Participants (N = 46, aged 18 - 25 yrs; nonusers of ECs and other tobacco

products) completed a baseline individual interview to identify potential prevention messaging content and themes related to ECs including: 1. reasons they chose *not* to use ECs; 2. personal perceptions of harm and tobacco policies; and 3. peer normalization, social media, and EC advertising. These data are baseline data as part of an ongoing longitudinal study examining respiratory outcomes associated with EC use. All interviews were audio recorded and transcribed. A codebook identifying relevant categories was created in NVIVO. Each transcript was independently coded, data were synthesized, and a thematic analysis approach was utilized to interpret transcripts. **Results:** Most participants identified as female (68.9%), heterosexual (53.3%), and were diverse in racial/ethnic identity (White = 37.8%, Asian = 26.7%, Hispanic/Latinx = 15.6%, Black = 13.3%, Multiracial = 6.7%). Majority of participants (63%) discussed that ECs are depicted negatively in media (TV, social media). The most viewed content about ECs in media were in the form of anti-vaping posts (e.g., "I think now it's condemning them quite a bit, [people] see them as a significant health risk"). Majority of the participants (91%) mentioned ECs have negative health "repercussions" (e.g., "It's toxic to your lungs," "It's not good for developing brains"). Half of participants perceived a "lack of research and education" about ECs for young people as the primary reason for not using or trying ECs (e.g., "there's not enough research done, so you don't really know what you're doing to your body"). **Conclusions:** In this sample, findings highlight that health-related EC messaging, and a lack of education are major reasons young adults did not use ECs. Strategies to prevent or reduce use among young people may include providing educational resources and increasing knowledge through public education campaigns, particularly on social media.

FUNDING: Federal

POS5-117

AD EXPOSURE, SOCIAL NORMS AND COMPARED RISK PERCEPTION AMONG MEXICAN SMOKERS AND DUAL USERS

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Introduction: Perceptions of the risk of using electronic cigarettes (e-cig) may influence their use, including switching from cigarettes to e-cigs, or vice versa. E-cig ad exposure, as well as social norms, may help account for smokers' and dual (combustible and electronic cigarette) users' perceptions of the relative risk of smoking and e-cig use in Mexico, a country with an e-cig ban. **Methods:** Data were analyzed from seven surveys (Nov. 2018-Nov. 2021) of an open cohort of 9,765 Mexican adult smokers and dual users from a consumer panel. Self-reported perceptions of relative risk of smoking and e-cig use were used to derive three variables: health improvement (HI) if replacing smoking with e-cig (yes=1, no=0); lower harmfulness (LH) of e-cig use relative to smoking (yes=1, no=0); and less addictiveness (LA) using e-cig with nicotine compared with smoking (Yes=1, No=0). Ad exposure variables were divided in three groups: physical settings (stores, events, concerts, and temporary outlet); internet (e-mail, social media); and searching for vaping related information or visiting vape websites. Separate multilevel mixed-effects logistic models were fitted to estimate odds ratio (OR & AOR) of positive perceptions of e-cig and ad exposure, using a cluster for repeated measures. Models were adjusted by sociodemographic, smoking and e-cig-related variables (e.g., ads exposure and social norms) and wave. **Results:** Adjusted models for exposure to ads in physical settings increased HI and LH in low (1-2 ads) exposure (AOR=2.63 95% CI 1.82-3.80 and AOR=2.45 95% CI 1.73-3.47 respectively) and medium (3-4 ads) exposure (AOR=3.06 95% CI 1.68-5.56 and AOR=2.63 95% CI 1.58-4.36). However, the highest level (5-6 ads) was not significant in any case. Medium exposure was significantly associated with LA (AOR=1.97 95% CI 1.07-3.62). Searching for e-cig information online increased the likelihood of HI (AOR=2.63 95% CI 1.15-6.04) and LA (AOR=1.88 95% CI 1.02-3.47). E-cig use among family (AOR=3.83 95% CI 1.57-9.38) and friends (AOR=2.36 95% CI 1.35-4.12) significantly increased HI, friends e-cig use also increased LH (AOR=1.64 95% CI 1.07-2.50) and LA (AOR=2.61 95% CI 1.68-4.07). Perceived social approval of e-cig use was positively associated with HI (AOR=6.19 95% CI 4.11-9.30), LH (AOR=5.08 95% CI 3.63-7.10) and LA (AOR=2.84 95% CI 1.92-4.21). **Conclusions:** Although self-reported exposure to online ads were unrelated to lower risk perceptions of e-cigs, exposure to physical ads was positively associated with all three perception measures. Policies that limit ads may reduce e-cig use among Mexican smokers, though more research is needed on this topic, including its potential interaction with social norms.

FUNDING: Federal



POS5-119

PERCEPTIONS OF E-CIGARETTES AND E-LIQUIDS FLAVOURS HARMFULNESS IN THE GENERAL POPULATION RESULTS OF A FRENCH NATIONALLY REPRESENTATIVE SURVEY

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Background: France has the second-largest proportion of current electronic cigarette (EC) users in the EU: 6%. With a relatively high smoking prevalence (25.5% daily smokers, 2020), EC appears as a potentially effective smoking cessation method (2021 Cochrane review) being less harmful than combustible cigarettes (CCs) (e.g. NASEM report). Perceptions of harm are then a determinant of initiation of EC use for both smokers and non-smokers. **Method:** The Cancer Barometer (INCa and 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 and flavours were assessed (1) directly – on health, (2) for cancer risks, and (3) for EC, compared to CCs harmfulness. Descriptive analyses and Chi2 tests were performed. Binomial and multinomial logistic regressions were used to identify significant socio-demographic determinants. **Results:** 74.6% of people surveyed considered ECs to be quite or very harmful to their health: especially women (OR=1.54 [1.09-2.16]) and persons under 55 y.o. (notably, 25-34, OR=3.91 [2.30-6.66]). On the contrary, highly-educated people (Master's degree, OR=0.47 [0.25-0.87]) and occasional current smokers vs. never smokers (OR=0.47 [0.25-0.88]) were less likely to share this opinion. Compared to CCs, 53% of respondents perceived it as equally or more harmful, notably those with incomes above 1100€ (≥1800€, OR=0.50 [0.29-0.84]), higher-educational level (Master's degree, OR=0.34 [0.14-0.82]), ex-smokers (OR=0.56 [0.35-0.90]), and current occasional smokers vs. never smokers (OR=0.38 [0.15-0.96]). E-liquid flavours were perceived by 42.2% as rather, 17.7% as very and 10.1% as extremely harmful. Regarding EC use and cancer, 79.4% declared agreeing that its use may lead to developing cancer (33% strongly and 46.6% somewhat agreed). People under 45 y.o. were more likely to share this opinion (notably, 25-34, OR=3.09 [2.03-4.71]), while higher-educated people were less likely to perceive a link between EC use and cancer (Master's degree, OR=0.60 [0.38-0.93]). Finally, 23.9% strongly and 49.8% somewhat agreed that EC flavours might lead to cancer. **Learnings:** This first nationally representative study in France analysing EC and flavours harmfulness perceptions of the general population reveals fairly negative perceptions, contrasting with polarized scientific evidence, and points towards avenues for further research.

FUNDING: Federal; State

POS5-120

DESIGNING AND PRE-TESTING OF A VOLUMETRIC CHOICE EXPERIMENT (VCE) ON THE CONSUMPTION OF ELECTRONIC NICOTINE DELIVERY SYSTEMS (ENDS) AND CIGARETTES

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Background: Volumetric choice experiments (VCEs) are a type of emerging stated preference methods to understand the consumption and choices among multiple goods. Compared to discrete choice experiments, VCEs have the advantage of eliciting the consumption and choice decisions by dual users of cigarettes and ENDS and those who are interested in co-using or substituting several nicotine or tobacco products. However, the instructions, layout, and design of VCEs are underdeveloped in the context of tobacco and nicotine consumption, which could hinder its application in tobacco regulatory science. **Objective:** We designed and tested alternative layouts of a VCE survey where we present popular disposables, rechargeable ENDS (device and e-liquid), pod systems (device, replacements, and a starter kit) and cigarettes. We also assessed the instructions (e.g. budget setting) and length of VCEs (# of tasks) among adult ENDS users or cigarette smokers. **Method:** We are recruiting a convenient sample (N=10) of current ENDS users or cigarette smokers aged 21 and older to participate in a one-hour one-and-one qualitative interview to pre-test the VCE survey. The themes of VCE design are coded and verified. **Results:** Based on preliminary data on completed interviews. Participants may consider their budget either weekly or monthly. They reported having no problems understanding the divisions of ENDS products (i.e., disposables vs. Pods vs. rechargeable) and purchasing with a monthly budget. We also found that showing multiple products vertically works effectively on both desktop and mobile screens. **Conclusion:** It is important to carefully design and administer a volumetric choice ex-

periment in order to obtain accurate and meaningful results. This may involve pretesting the experiment to ensure that it is understood by participants and that the choice sets are appropriately balanced. The findings provide researchers with information on how to best design and pre-test VCE surveys related to substance use behaviors.

FUNDING: Federal

POS5-121

EFFECT OF GRAPHIC WARNING LABEL ON ACUTE CHANGES IN PUFFING BEHAVIOR, SMOKING URGES AND SATISFACTION, AND BIOMARKER OF EXPOSURE

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Background: Young adults perceive waterpipe (WP) smoking as less harmful than cigarette smoking. To combat misperceptions, health warning labels containing text and pictures, or graphic warning labels (GWLs), can communicate accurate information about the health risks of WP smoking. We examined the effect of exposure to a GWL on WP smoking behaviors and carbon monoxide (CO) biomarker among young adults who participated in lab WP smoking sessions. **Methods:** Young adult, established WP smokers (n=92; mean age 26.2 years; 51% female; n=80 completers) were enrolled in a randomized clinical trial to compare an optimized graphic vs. blank label on acute smoking behaviors (tobacco and charcoal consumption, topography) and change in exhaled CO. The GWL contained the text "Warning: Hookah smoke contains poisons that can cause mouth and lung cancers" and pictures of a diseased mouth and lungs. All participants smoked a research-grade WP (RWP), equipped with topography recording. Both GWL and Control labels were affixed to the RWP hose just below the mouthpiece. Visit sequence for the control group (n=41) included a blank label for V1 and V2. The GWL group (n=39) included a blank label for V1 and a GWL for V2 and V3. All visits were separated by a week. Self-report data on nicotine dependence, smoking urges and satisfaction (HONC, direct effects of nicotine and tobacco) were also collected. Linear mixed models were used to test for within group changes in outcomes across visits and to compare V1 to V2 changes across treatment groups. Holm's method corrected for multiple testing. **Results:** Changes in puffing topography, smoking time, tobacco and charcoal consumption, and exhaled CO boost between V1 and V2 were not different between groups (all p's>0.34). Within the GWL and Control groups, we also observed no changes in these outcomes across visits (all p's>0.11), except a small reduction in puff duration between V1 and V3 (20%, p = 0.05). Mean puff volume and duration trended downwards from V1 to V2 for the GWL group but not significantly (p=0.40 and p=0.51, respectively). Nicotine dependence (HONC 1.66 +/- 2.06) and other self-report data were also not different between and within the groups. **Conclusion:** Up to two weekly exposures to a GWL on the hose were not associated with acute changes in WP puffing behavior, tobacco and charcoal consumption, exhaled CO boost, relief of smoking urges, and smoking satisfaction. Future studies should include repeated exposures to a GWL. **Funding:** Research reported in this publication was supported by the National Cancer Institute of the National Institutes of Health under Award Number R01CA229306. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

FUNDING: Federal; FDACTP

POS5-122

"IT WAS GOLDEN; SHINY. IT GAVE AN AIR OF SOPHISTICATED": YOUNG ADULT PERCEPTIONS OF MOOD CONVEYED BY FLAVORED LITTLE CIGAR AND CIGARILLO PACKAGING

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Significance: The FDA has issued a product standard banning characterizing flavors in cigars, including little cigars and cigarillos (LCC). The tobacco industry pivoted its marketing tactics in response to flavor bans in other countries. It is imperative to understand, in the interim of the ban, the impact of cigar marketing practices on young adults, an industry-targeted group. Critical gaps exist about how LCC packaging



descriptors (e.g., text, color, images), a portable and easily accessible advertising tool, influence young adults' perception of the products and increase the demand of LCCs. **Methods:** The present study draws upon a diverse sample of 18-24 year old LCC users to explore their perceptions of LCC packaging during online focus group chats. Three online focus group chats were conducted with 40 young adults from across the United States. The sessions were segmented by racial self-identification with one for Black, Hispanic, and White young adults, respectively. Each online focus group chat required 120 minutes to complete. **Results:** A central concept of mood emerged from all three online group chats as participants' described their perceptions of LCC packaging. The LCC tobacco packaging communicated mood in varied ways, including product names, color schemes, typography, and use of images or logos. Moreover, mood, as described by the study participants, was located at the intersection of emotions, aspirations, needs, values, narratives and ideas evoked by the LCC packaging. **Conclusions:** This research begins to unravel the layered and complex perceptions of packaging characteristics that contribute to continued and future LCC smoking behaviors among diverse young adults. Surveillance of LCC packaging in anticipation of the flavor ban is needed to track pivots in the cigar industry's marketing tactics and its influence on young adult perceptions.

FUNDING: Federal; FDACTP

POS5-123

FACTORS ASSOCIATED WITH PROCUREMENT OF TOBACCO AMONG YOUTH AND YOUNG ADULTS EXPERIENCING HOMELESSNESS

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Introduction/Significance: 70% of youth and young adults experiencing homelessness (YYEH) smoke combustible tobacco, 2.5 times higher than their housed peers. Tobacco 21 laws prohibit the sale of tobacco products to those under 21, yet YYEH still access these products. Very few studies have described how YYEH acquire tobacco. The present study aims to characterize predictors of tobacco procurement and associated financial burden among YYEH. **Methods:** This study uses a mixed-methods design. Samples included YYEH aged 14-24 who smoked combustible tobacco in the past week (Quantitative: N=36, Qualitative: N=96). Semi-structured qualitative interviews were conducted in person in 2018. Researchers utilized qualitative coding to identify themes across responses regarding why one last smoked and where/how one's last cigarette was obtained. **Results:** Descriptive and logistic regression analyses examined predictors of where YYEH reported last obtaining tobacco (purchasing from a store vs. other sources) and past week spending on tobacco (in relation to past week income). Results: According to interviews, 62% of participants purchased tobacco, whether from a store, a friend, or some other source (n=21). Those who described symptoms of nicotine dependence more commonly discussed buying their tobacco from a store, and participants who either identified as Black or as a sexual minority more commonly discussed getting their tobacco products some other way. From quantitative survey data, 59% of participants purchased tobacco from a store. In multivariate analyses, older (p=0.02) and straight-identifying YYEH were more likely to purchase from a store (p<0.05). More than half (53%) of the sample had no source of income but spent money on tobacco in the past week. Those who spent more on tobacco than they earned were more likely to endorse smoking to regulate affect (p=0.03), relieve boredom (p=0.03), and self-enhance (p=0.01) compared to those who spent less than they made. **Conclusions:** YYEH are accessing tobacco through formal and informal sources and are purchasing tobacco despite having no or low income. Racial/ethnic and sexual minority YYEH may be more likely to access tobacco products informally. Interventions to reduce access to tobacco and promote smoking cessation are needed in this at-risk population, potentially targeting psycho-social factors influencing smoking.

FUNDING: Federal

POS5-124

LONGER-TERM IMPACT OF GRAPHIC WARNING LABELS ON WATERPIPE SMOKING HARM PERCEPTIONS AMONG YOUNG ADULT USERS

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Background: Young adults perceive waterpipe (WP) smoking to be less harmful than cigarette smoking. To combat these misperceptions, graphic warning labels (GWLs) may be used to communicate accurate information about the health risks of WP smoking. We examined the effect of exposure to a WP GWL on WP harm perceptions and smoking behaviors among young adults who participated in lab WP smoking sessions.

Methods: Young adults (n=92; mean age 26.2 years; 51% female) were enrolled in a randomized clinical trial to compare an optimized GWL vs. blank label on acute WP smoking behaviors (topography). The GWL was affixed to the WP hose just below the mouthpiece. The message, "Warning: Hookah smoke contains poisons that can cause mouth and lung cancers," was paired with images of a diseased mouth and lungs. Three months post-enrollment, participants were asked how much people harm themselves when they smoke WP (1 No Harm; 10 Extreme Harm), whether they intended to cut back or quit WP smoking (yes/no), and their WP smoking behaviors over the past week (1+ vs. 0 times). We investigated differences between the GWL and blank label for all outcomes using t-tests and chi-square tests. Among GWL participants, we assessed differences in harms perceptions between those who reported talking to others about the GWLs (vs. not) and those who reported thinking about the GWL at least a moderate amount (vs. less). **Results:** Follow-up interviews were completed with 50 participants (54%). Harm perceptions did not differ between the two groups (6.1 ± 2.0 in GWL vs. 6.1 ± 2.4 in blank). However, within the GWL group, higher harm perceptions were reported among those who reported talking to others about the risks of WP (6.8 ± 2.0 vs. 5.7 ± 2.0 among those who did not) and thinking about the risks at least a moderate amount (6.8 ± 1.9 vs. 5.6 ± 2.1 among those who did not), although the differences were not statistically significant (p=0.23 and p=0.18, respectively). WP smoking in the past week did not differ between the groups (54.2% in GWL vs. 53.9% in blank label). Intention to cut back or quit WP smoking was higher in the GWL group (54.2% vs. 42.3%) but not statistically significant (p=0.57). **Conclusion:** Findings indicate that acute exposure to a GWL did not influence harm perceptions or smoking behaviors at the 3-month follow-up. However, results suggest that the GWL could alter harm perceptions if it causes participants to think about the risks of waterpipe smoking and discuss these risks with others. Future studies should investigate how repeated exposures to GWL may affect harm perceptions and behaviors over time.

FUNDING: Federal; FDACTP

POS5-125

RELATIONS BETWEEN SMOKING, SOCIOECONOMIC STATUS, AND INAPPROPRIATE SLEEP DURATION

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Significance: There is evidence that smoking is associated with poor sleep. However, no studies have examined whether this association differs by socioeconomic status (SES). **Methods:** This study used National Health and Nutrition Examination Survey (NHANES) data (2017- March, 2020; pre-pandemic) to examine how current smoking status and low SES are related to sleeping an inappropriate number of hours among adults aged 18 and older (N = 6,258). Multivariate logistic regression models were used to estimate the association of SES (at/above vs. below 200% of the federal poverty level) and reporting sleeping an appropriate number of hours based on Sleep Foundation guidelines (6-11 hours for ages 18-25; 6-10 hours for ages 26-64; 5-9 hours for ages 65 and older (0) vs. sleeping for fewer or greater hours than that (1)) controlling for sex, age, marital status, race (non-Hispanic White vs. Black vs. Other), depressive symptoms (Center for Epidemiological Studies Depression Scale; CES-D), alcohol use (heavy drinking vs. not), and body mass index. Results were stratified by current smoking status to examine differences in sleeping an appropriate number of hours. **Results:** Respondents were a mean of 48.5 years old (SD = 17.0) and primarily female (51.9%). The majority lived at or above the poverty threshold (62.7%) and were non-Hispanic White (66.3%). Overall, 10.5% in the higher SES group reported currently smoking while 27.0% in the lower SES group reported this. In the higher SES group, 9.5% reported sleeping for an inappropriate number of hours while in the lower SES group, 16.4% reported this. Results from the logistic regression models showed that having lower SES was associated with sleeping an inappropriate number of hours regardless of current smoking status, and this was statistically significant (p < 0.05). Adults who smoked and had lower versus higher SES were 1.9 times more likely to sleep an inappropriate number of hours (OR: 1.93, 95% CI: 1.19-3.12), whereas adults who did not smoke and had lower versus higher SES were only 1.4 times more likely to sleep an inappropriate number of hours (OR: 1.43, 95% CI: 1.08-1.90). **Conclusion:** Our findings indicate that sleeping an inappropriate number of hours is related to both smoking and SES. Findings may inform the development of policies and programs to target smoking cessation and sleep health among adults with low SES.



POS5-126

IMPACT OF ENDS NON-TOBACCO FLAVORS ON ADULT CIGARETTE SMOKING CESSATION. LONGITUDINAL ANALYSIS OF PATH STUDY DATA

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Significance: Electronic nicotine delivery systems (ENDS) use has been shown to be associated with cigarette smoking cessation in randomized trials and some observational studies. However, it is unclear if ENDS flavors play a role in facilitating cigarette smoking cessation. **Methods:** Using waves 3-5 (2016-2019) of the Population Assessment of Tobacco and Health (PATH) Study, 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 ENDS use was measured as a categorical time-varying covariate, lagged by one wave with the following groupings: 1) never or non-current use, 2) exclusive unflavored or tobacco-flavored ENDS use, and 3) non-tobacco-flavored ENDS use. 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 controlled for baseline demographics (age, sex, race/ethnicity, education), tobacco dependence, and menthol cigarette smoking. **Results:** Of the 6,603 established smokers at Wave 3, 1,048 (15.9%) reported smoking cessation by Wave 5. Non-tobacco-flavors were reported by about 75% of ENDS users. Non-tobacco-flavored ENDS use was significantly associated with smoking cessation (adjusted hazard ratio [aHR] 1.30, 95% CI 1.03-1.64), but unflavored or tobacco-flavored ENDS use was not (aHR 0.90, 95% CI 0.51-1.62). When restricted to more frequent ENDS use (10+ days of the past 30 days), the aHRs became larger for both non-tobacco-flavored (aHR 1.56, 95% CI 1.17-2.09) and unflavored or tobacco-flavored ENDS use (aHR 1.89, 95% CI 0.95-3.77), but the association remained statistically insignificant for unflavored or tobacco-flavored ENDS. **Conclusions:** Non-tobacco-flavored ENDS use was associated with adult smoking cessation in PATH waves 3-5. The use of unflavored or tobacco-flavored ENDS was not associated with smoking cessation, but stronger non-statistically significant effects were seen for more frequent use. Further research is needed to understand the role of ENDS and flavored ENDS in supporting cigarette smoking cessation in adults. **Funding Statement:** Supported by NIH/FDA grant U54CA229974. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH or the FDA. **Keywords:** ENDS, flavors, smoking cessation, longitudinal analyses.

FUNDING: Federal; FDACTP

POS5-127

ADOLESCENT HARM PERCEPTION PROFILES PREDICT VAPING AND SMOKING AFTER TWO YEAR FOLLOW-UP

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Significance: The long-term health consequences of e-cigarettes (ECIGs) are intensely debated. As this scientific debate unfolds, adolescents create their own beliefs about tobacco products. Profiles of adolescent harm perception are important to identify associations with current and future use. We hypothesize that youth with lower overall risk perceptions will be more likely to smoke cigarettes and vape ECIGs at follow-up 2 years later. **Methods:** The Population Assessment of Tobacco and Health (PATH) study is a longitudinal study of tobacco use weighted to represent the United States population. For the current analyses, we included all youth (12-17 years old) who completed waves 3 through 4.5 (N = 6,659). Latent Class Analysis (LCA) was used to profile harm perception belief patterns. Indicator variables for latent class models included perceptions of harmfulness for cigarettes, ECIGs, hookahs, cigarillos, and smokeless tobacco. We began with a one-class model and then incrementally increased the number of classes. Based on Bayesian Information Criteria (BIC) and Lo-Mendell-Rubin likelihood ratio test, a three-class model was preferred. Follow-up (F/U) analyses 2 years later adjusted for class uncertainty via Mplus. **Results:** Class 1 (C1) indicated high probabilities (.89+) for high harm perception for all products. Class 2 (C2) indicated a high probability for cigarette harm (.87), but lower probabilities for other products (.37 for ECIGs; .66 for cigarillos). Class 3 (C3) represented a moderate probability for high harm from cigarettes (.46), but low probabilities for all other products (< .20). In F/U analyses, C3 was over 2 times more likely than C1 to smoke cigarettes (odds ratio [OR]: 2.5, 95% confidence interval [CI]: 2.0-3.1) and vape ECIGs (OR: 2.6, 95% CI: 1.8-3.9); C2 was 1.8 (95% CI: 1.4-2.3) times more likely to smoke cigarettes than C1, but did not significantly differ in ECIGs use (OR: 1.5, 95% CI: 0.9-2.5). **Conclusion:** Youth varied in their tobacco

products harm beliefs. Cigarettes were generally believed to be harmful. There were varying beliefs about other products, especially ECIGs. Youth in the first latent class (C1) expressing lower overall perception of risk were more likely to use cigarettes and ECIGs 2 years later, although this was not the case in the second latent class (C2) that only perceived cigarettes as harmful. These results can help inform counteradvertising and marketing policies, as well as predict future use trends.

FUNDING: State

POS5-128

ASSOCIATIONS OF CANCER TREATMENT STATUS ON SMOKING CESSATION AMONG SURVIVORS OF CIN OR CERVICAL CANCER

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Significance: Continued smoking after a CIN or cervical cancer diagnosis may reduce the effectiveness of cancer treatment and increases the risk of cancer recurrence and second primary cancers. **Methods:** The current study is a secondary analysis from a two-arm cessation RCT (N=194) that compared the efficacy of a 12-month flexible, holistic Motivation And Problem Solving (MAPS) approach to quitline treatment among CIN and cervical cancer survivors. Participants were followed for 18 months. This analysis evaluated differences in self-reported 24-hour point prevalence abstinence among participants in active cancer treatment versus those not in active cancer treatment at trial enrollment. Participants were predominantly non-Hispanic white (75%), generally low-income (41% had an annual household income <\$20,000), and had an average age of 48 years. Participants were categorized into two distinct groups: in active cancer treatment (n=40) and not in active cancer treatment (n=154). Abstinence was assessed at 3-, 6-, 12- and 18-months post-baseline, with missing data imputed as smoking. When these groups were compared on demographic and psychosocial variables, the only significant differences observed were in educational attainment and years since diagnosis. Participants not in active cancer treatment (vs. in active cancer treatment) were more educated (71% vs. 40% reported > high school, p<.001) and reported a longer time since diagnosis (x =16.4 vs. x =0.6 years, p<.001). Chi-square and Fisher's Exact tests compared 24-hour point prevalence abstinence rates between the cancer treatment groups at each assessment point. GEE was used to examine these associations over time. **Results:** Results indicated that participants in active cancer treatment were significantly less likely to be abstinent at 6 months (5% vs. 25%, p=.004), 12 months (5% vs. 28%, p=.002) and 18 months (5% vs. 20%, p=.031). Cancer treatment status was also a significant predictor of abstinence when collapsing across the four timepoints (x² (df=1, n=194)=10.22, p=.001). Smoking cessation treatment condition (MAPS vs. quitline) was not differentially associated with abstinence across the two cancer treatment groups. **Conclusion:** Future research is needed to identify the specific challenges associated with smoking cessation during active cancer treatment. Similarly, modifying cessation interventions to support greater smoking cessation during this time period may be warranted.

FUNDING: Federal

POS5-129

DIFFERENCES IN NEGATIVE AFFECT AMONG CURRENT AND FORMER SMOKERS WITH AND WITHOUT A CANCER DIAGNOSIS

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Significance: Smoking poses significant health risks for individuals diagnosed with cancer. However, trials aimed at increasing smoking cessation among individuals with cancer have largely been unsuccessful and cessation rates remain low. Mental health concerns such as depression, anxiety, and stress interfere with successful smoking cessation in the general population, but it remains unclear if this is true among those with



cancer. The current study assessed differences between current and former smokers with and without cancer to determine if there are differences in depression, anxiety, and stress that may need to be targeted in future cessation interventions among cancer patients. **Methods:** Participants (N = 203) completed an online survey about demographic characteristics, cigarette use, depression, anxiety, and stress. Linear regressions were used to assess for differences between groups, controlling for age, sex, and income. **Results:** Current smokers with cancer had higher depression ($B = 2.66$, standard error [SE] = 1.29, $p = .04$), anxiety ($B = 7.02$, SE = 2.83, $p = .01$), perceived stress ($B = 4.34$, SE = 1.77, $p = .01$), and cancer-related stress ($B = 12.25$, SE = 4.71, $p = .01$) scores compared to former smokers with cancer. Current smokers with cancer had higher anxiety scores ($B = 6.28$, SE = 2.70, $p = .02$) than current smokers without cancer. **Conclusions:** Negative affect and stress may be important points of intervention within smoking cessation programs among individuals with cancer in order to increase chances of success. While government-sponsored programs, such as smokefree.gov, refer to negative affect as an important consideration in quitting smoking, the treatment recommendations are often vague. Assessment of negative affect and stress in these programs may be particularly important to ensure these experiences are identified and treated concurrently. In conclusion, the current study may help to inform future cancer-specific cessation intervention development to improve cessation rates and health outcomes.

FUNDING: Academic Institution

POS5-130

HIGH THROUGHPUT ANALYSIS OF MENTHOL, CESSATION PHARMACEUTICALS, NICOTINE, NICOTINE METABOLITES, AND MINOR TOBACCO-RELATED ALKALOIDS IN HUMAN URINE WITH AUTOMATED SAMPLE PREPARATION AND LC-MS-MS

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Measuring biomarkers of exposure can be used to assess whether cigarette mentholation impacts the efficacy of various smoking cessation programs. Here we describe an efficient method for automated sample preparation and LC-MS/MS quantitation of 14 tobacco-related analytes: menthol glucuronide (MEG), three smoking cessation pharmaceuticals (bupropion, varenicline, cytisine [not FDA approved]), three tobacco-exposure biomarkers (nicotine-NICF, cotinine-COTF, trans-3'-hydroxycotinine-HCTF), five minor tobacco-related alkaloids (anabasine-ANBF, anatabine-ANTF, isonicotinine, myosmine, beta-nicotyrine), and two areca nut exposure biomarkers (arecaine and arecoline). The automated sample preparation method includes solid phase extraction sample cleanup with customized step-pressure functions and can process 96 samples within 4 hours while yielding about 90% recovery. The LC-MS/MS method separates analytes in 4.2 minutes using reversed-phase liquid chromatography and detects them using a triple quadrupole mass spectrometer with atmospheric-pressure chemical ionization in positive and negative ionization modes; the analyte limits of detection range from 0.26-8.91 ng/mL. Wide quantitation ranges (1-72,000 ng/mL) were established especially for MEG, COTF, HCTF and NICF to quantify the broad range of biomarker concentrations found in the U.S. population. Also, ^{13}C transitions were used and carryover potentials were evaluated and resolved to enable efficient measurement of high- and low-concentration samples in a single analytical run to avoid time-consuming repetitive sample preparation and analysis. The overall process is high throughput (a sample is prepared and analyzed in an average of 8.8 minutes), accurate (>90% accuracy), and precise (<7% imprecision). We used the method to analyze urine samples from smoking and non-smoking subjects. For those who smoked, over 98% detection rates were observed for MEG, COTF, HCTF, NICF, ANBF, and ANTF. For those who didn't smoke, MEG was commonly detected (albeit at significantly lower concentrations compared with smoking). The wide distribution of HCTF (200-14,100 ng/mL) and MEG (60-57,700 ng/mL) demonstrate the efficacy of the method for quantifying multiple analytes across wide concentration ranges in a single analytical run. The described method enables characterization of tobacco and menthol exposure, evaluation of compliance with cessation programs, and detection of changes in exposure related to tobacco product use. **The findings and conclusions in this study are those of the authors and do not necessarily represent the official position of the U.S. Department of Health and Human Services (HHS) or the U.S. Centers for Disease Control and Prevention (CDC). Use of trade names and commercial sources is for identification only and does not constitute endorsement by HHS or CDC.*

POS5-131

YOUTH WHO USE ELECTRONIC VAPOR PRODUCTS ARE AT HIGHEST RISK TO CONCURRENTLY USE OTHER SUBSTANCES

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Significance: Electronic vapor product (EVP) use among Vermont high school students increased from 15% in 2015 to 26% in 2019. Despite the significant rise of vaping in Vermont, little is known about the use of EVPs with cigarettes, cannabis and alcohol. **Methods:** We examined the prevalence of past 30-day use of EVPs, cigarettes, alcohol and cannabis by age of first use of flavored tobacco, cigarettes, cannabis and alcohol among Vermont Middle School (MS) and High School (HS) students. Additional analyses examined differences by grade level, race/ethnicity, sex, mental health and sexual orientation/gender identity. Data from the 2019 Vermont Youth Risk Behavior Survey (YRBS) was analyzed using only respondents with complete data for current and lifetime substance use and demographics (MS N=10,511, HS N=13,543). **Results:** Among MS youth, EVPs are the most used substance, with 2%, 7% and 13% of 6th, 7th and 8th grade students currently using them, respectively. Among HS youth, over one-third (38%) used at least one substance, representing an estimated 7,200 students. HS youth were over twice as likely to report currently using two or more substances than only one (26% vs. 12%). The use of substances in HS was associated with initiation at earlier ages. As the number of substances initiated before age 13 increased, the likelihood of current substance use increased by as much as 15 times. Only 4% of HS youth who did not try any substances before age 13 currently smoked cigarettes. Risk ratios were calculated comparing additional substance use prevalence among youth who did and did not already use a substance. Youth who used EVPs were at the highest risk of concurrently using additional substances while those who smoked cigarettes had the lowest risk. HS youth who used EVPs were 36, 10 and 5 times more likely to concurrently use cigarettes, cannabis, and alcohol, respectively. However, youth who smoked cigarettes were only 4, 5 and 3 times more likely to also use EVPs, cannabis, and alcohol, respectively. While alcohol was most likely to be used individually, youth who already used other substances were most likely to smoke cigarettes. Youth who felt sad or hopeless, white non-Hispanic youth, and LGBT youth were significantly more likely to use at least three of the four studied substances concurrently. **Conclusion:** Students who use any substance are more likely to use additional substances, confirming the need for effective and comprehensive youth substance use prevention and treatment programming.

FUNDING: Federal; State

POS5-132

PREVALENCE OF DEPRESSIVE SYMPTOMS AND ALCOHOL MISUSE AMONG DAILY CIGARETTE SMOKERS WHO DO AND DO NOT USE CANNABIS: FINDINGS FROM THE 2020 US AND CANADA ARMS OF THE ITC FOUR COUNTRY SMOKING AND VAPING SURVEY

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Significance: Evidence suggests that people who use both tobacco and cannabis (co-consumers) are more likely to report mental health problems and alcohol misuse, both of which are associated with reduced success in tobacco cessation. It is currently unclear whether cannabis use and high-risk alcohol consumption differ between daily cigarette smokers who do and do not have depressive symptoms. This is particularly important in Canada and the US where cannabis use is prevalent, particularly among people who smoke cigarettes. **Methods:** We analyzed data from 3615 adults (age 18+) who smoked cigarettes daily from the 2020 ITC Four Country Smoking and Vaping Survey in Canada and the US. Respondents were asked about their cannabis use, alcohol consumption (defined by the US NIAAA criteria), and were screened for depressive symptoms using the 'two-question case-finding instrument'. Co-use was defined as at least monthly cannabis use, and people who only smoke cigarettes reported never using cannabis or only use it infrequently (<monthly). Weighted regression analyses (adjusting for age, sex, country) were used to examine whether co-consumers and cigarette-only smokers differed by (1) the presence of depressive symptoms; and (2) alcohol misuse by depressive symptom status. **Results:** Co-consumers were more likely to report depressive symptoms (30%) compared to cigarette-only smokers (24%, $p=0.01$); highest among daily cannabis co-consumers (32%), followed by weekly/monthly cannabis co-consumers (26%), and cigarette-only smokers (24%). Co-consumers were significantly more likely to report high-risk alcohol consumption (24%) compared to cigarette-only smokers (16%, $p<0.001$); highest among daily cannabis co-consumers



(29%), followed by weekly/monthly cannabis co-consumers (21%) and cigarette-only smokers (15%). When analyses were stratified by depressive symptoms, co-consumers with depressive symptoms were more likely to report high-risk alcohol consumption (34%) compared to co-consumers without depressive symptoms (20%, $p=0.001$) and cigarette-only smokers with (21%, $p=0.001$) and without (14%, $p<0.001$) depressive symptoms. **Conclusion:** Depressive symptoms and high-risk alcohol consumption were more likely to be reported by adult tobacco and cannabis co-consumers, particularly among daily cannabis co-consumers. Tobacco cessation treatment may require multi-pronged strategies to address mental health, alcohol misuse, and regular cannabis use—co-factors that may reduce cigarette cessation activity (e.g., quit attempts, maintaining abstinence after quitting).

FUNDING: Federal; Nonprofit grant funding

POS5-133

UNDERSTANDING THE REASONS YOUNG ADULTS USE TOBACCO FREE NICOTINE E-CIGARETTES

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Significance: Tobacco-free nicotine (TFN) e-cigarettes, made from synthetic nicotine, have become available recently. TFN marketing claims note improved taste and potential health benefits (e.g., "cleaner" than tobacco-derived e-liquids). It is unknown how these claims influence reasons that TFN e-cigarettes are used among young adults. The aim of this study was to investigate reasons young adults use TFN e-cigarettes. **Methods:** A Fall 2021 Qualtrics survey panel of young adults (18-25 years; $n=1239$) assessed TFN product awareness and use. Respondents who reported lifetime TFN e-cigarette use ($n=317$, mean age: 20.8 (SD:2.2), 53.9% female; 40.4% Non-Hispanic [NH] White, 37.2% Hispanic, 16.7% NH Black, 5.7% NH Other Race) were asked the open-ended question "What are the reasons you chose to use tobacco-free nicotine vapes?" 291/317 respondents (91.7%) gave valid responses and 272 gave at least one reason to use TFN e-cigarettes. Responses were categorized into codes by two raters and when applicable, assigned multiple codes. Codes were grouped into larger themes. **Results:** 20 codes were identified and grouped into 6 major themes from the 272 responses reporting a reason to use TFN. Themes included use due to social influence (64/272, 24% e.g., "friend had it, made me want to hit it", "looked cool"); product taste/smell (58/272, 21%; e.g., "smoother taste", "no tobacco taste", "good flavor options"); convenience/ease of access (56/272, 21%, e.g., "easier to get"); health reasons (50/272, 18%; e.g., "healthier option", "tobacco free sounds safer", "better for lungs"); psychoactive effects (30/272, 11%; e.g., "gives me better head rushes", "takes all my stress away"), and relationship to other products (66/272, 24%), including perceptions they are better than other tobacco products and that they help with other product cessation. Of the remaining responses, 6% (17/291) reported they did not know why they used TFN e-cigarettes and 1% (2/291) reported a reason not to use. **Conclusion:** Like other e-cigarettes, peer influence and availability were major reasons reported among young adults who use TFN e-cigarettes. Additionally, reasons to use align with marketing claims of TFN e-cigarettes including perceptions that TFN e-cigarettes are healthy and that these products have improved taste and flavor. Research studies are needed to assess the accuracy of these claims. Understanding why young adults use TFN e-cigarettes is important in the development of effective and accurate communication about these products.

FUNDING: Federal; FDACTP; Nonprofit grant funding

POS5-134

2020-2021 E-CIGARETTE BRANDS AVAILABLE IN THE UNITED STATES

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Background: Identifying the existing brands in the e-cigarette market in the US is key to calculating the market share of different companies and their market power. A database of e-cigarette brands will expedite the e-cigarette market surveillance and help policymakers monitor market changes following regulatory actions. **Methods:** To

facilitate the surveillance of the e-cigarette market and various product types that exist, we created a semantic database of e-cigarette brand names of 2020-2021 from multiple data sources, including web data from online vape shops that we collected using web scraping tools in 2021, e-cigarette brand information from the Nielsen Retail Scanner Data in 2020, a pre-existing list of e-cigarette brands on Wikipedia, and self-reported brands from e-cigarette users in the US who participated in the 2020 International Tobacco Control Four Country Smoking and Vaping (ITC 4CV). **Results:** In total, we identify 657 brands in our database that sell a variety of e-cigarette products through different channels (e.g., brick-and-mortar stores or online), such as e-liquids, pods/cartridges, disposables, devices, and starter kits. In 2020, the top five high-level brands were Vuse, Njoy, Blu, JUUL, and Logic, which may represent about 45% of e-cigarette products observed in Nielsen Retail Scanner Data. **Conclusions:** Continuous monitoring of the existing e-cigarette brands is crucial for the e-cigarette market surveillance, and our semantic database can serve as a useful research tool to assess the manufacturers' marketing behaviors. **Citations/Disclaimers:** Researcher(s)' own analyses calculated (or derived) based in part on data from Nielsen Consumer LLC and marketing databases provided through the NielsenIQ Datasets at the Kilts Center for Marketing Data Center at The University of Chicago Booth School of Business. The conclusions drawn from the NielsenIQ data are those of the researcher(s) and do not reflect the views of NielsenIQ. NielsenIQ is not responsible for, had no role in, and was not involved in analyzing and preparing the results reported herein.

FUNDING: Federal; Nonprofit grant funding; Other: Canadian Institutes of Health Research and National Health and Medical Research Council of Australia

POS5-135

CIGARETTE AND E-CIGARETTE USE AND DEPRESSIVE SYMPTOMS AMONG GUATEMALAN ADOLESCENTS

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Significance Adolescence is a high-risk period for developing mental health conditions (e.g., depression) and substance use. COVID-19 may have exacerbated depression due to confinement and social distancing measures. **Methods** Data from 1,179 Guatemalan students surveyed in 2021 were analyzed to explore the relationship between depressive symptoms and cigarette and e-cigarettes (e-cigs) use. A dichotomous indicator of depressive symptoms was derived using the CES-D-10. Cigarette and e-cig use, and susceptibility measures were combined into 3 categories for each product: non-susceptible never use (reference group); susceptible never use; and ever use (due to few current users). Two separate multinomial regression models (Relative Risk Ratios (RRR)) were fitted to explore if the categories of susceptibility and use of cigarettes and e-cigs were associated with depressive symptoms, and the use of the other tobacco products, while adjusting for alcohol, marijuana, and social media use, and sociodemographic variables. **Results** The 58.1% of the sample reported depressive symptoms ($n=685$). The non-susceptible never cigarette (49.0%) and e-cigs (45.2%) users had the lowest prevalence of depressive symptoms compared to the other product use and susceptibility categories. In adjusted models, having depressive symptoms was associated with higher likelihood of ever smoking (ARRR=1.77 95%CI 1.08, 2.89). Ever e-cig use also increased the likelihood of susceptibility to (ARRR=29.85 CI95% 16.20, 55.02) and ever smoking (ARRR=20.63 CI95% 9.64, 44.16). Marijuana use increased the likelihood of ever smoking (ARRR=9.42 95%CI 3.03, 29.31). Adjusted models for e-cigs use, showed that having depressive symptoms was associated with a higher susceptibility of using e-cigs (ARRR=1.65 CI95% 1.08, 2.53) but there was no association with ever e-cig use. Ever smoking increased the likelihood of susceptibility to (ARRR=4.11 CI95% 1.63, 10.34) and ever use of e-cigs (ARRR=18.99 CI95% 8.82, 40.88). **Conclusions** Depressive symptoms are associated with cigarette and e-cig use among youth. Furthermore, the use of these substances increases the likelihood of using the other. In Guatemala, where tobacco control is weak, interventions addressing depression could aid in decreasing cigarette and e-cig use among adolescents.

FUNDING: Federal



POS5-136

TOPOGRAPHY DIFFERENCES WHEN VAPING OWN-BRAND AMONG A COHORT OF ESTABLISHED YOUNG ADULT E-CIGARETTE USERS

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Introduction: Given the profitability of the e-cigarette market and the gradual increase of regulations at the federal level, devices are constantly evolving. As different brands and devices rise and fall in popularity, puffing behaviors (topographies) associated with device characteristics and nicotine concentration, form and isomer, can provide insights into toxicant delivery from vaping. **Methods:** Established e-cigarette users (n=96), ages 18-25 years old, were recruited and vaped ad-lib for 30 minutes using their own devices and e-liquid. Topographies (puff volume, duration, flow rate, and interval) were electronically recorded and analyzed. We used Tukey's honestly significant difference (HSD) test to control for multiple comparisons and to evaluate the significance of the pairwise comparisons between brands. All statistical analyses were performed using Stata software. **Results:** The top three brands were Hyde (n=41), JUUL (n=20), and Vuse (n=8); all three nominally contain the same nicotine concentration (5%), form (protonated or "salt"), and isomer (>99% S-nicotine). The average puff volume of JUUL users (117.57 mL) was 187% greater than Vuse users (62.85 mL) and statistically significant (p=0.025). Compared to Hyde users (88.69 mL), JUUL users had 133% greater average puff volumes, although not significant (p=0.085). Both JUUL (31.1 mL/s, p=0.005) and Hyde (29.8 mL/s, p=0.006) users vaped with significantly higher average puff velocities, 180% and 173% greater, respectively, than Vuse users (17.3 mL/s). The total puff volume for JUUL users (1984 mL) was almost double (194% greater) Vuse users (1025 mL) and 158% greater than Hyde users (1255 mL); both comparisons were statistically significant (p=0.046 and p=0.016, respectively). For average puff durations, JUUL users (3.74 seconds) had significantly longer durations (p=0.012) compared to Hyde users (2.96 seconds). No significant differences were found between brands for puff count and inter-puff interval. **Discussion:** Initial findings from this convenience sample suggest that users of JUUL and Hyde devices tend to vape more aggressively (higher average puff velocities and volumes) than Vuse users, but take the same number of puffs with the same duration for each puff. Further research should examine physical characteristics and mainstream emissions of devices generated with both user and standard puffing topographies to understand how device design influences user exposure to mainstream toxicants.

FUNDING: Nonprofit grant funding

POS5-137

TOBACCO-FREE NICOTINE VAPING PRODUCT USE AND PERCEPTIONS AMONG NEW ENGLAND ADOLESCENTS AND ADULTS

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Significance. Tobacco-free nicotine (TFN) vaping products are gaining popularity in recent years. Little is known about public awareness, how users and non-users perceive harm and addictiveness of TFN vaping products, and intentions to use TFN relative to tobacco-derived nicotine (TDN) vaping products. **Method.** We surveyed approximately 120 adolescents aged 13-17 and 120 adults aged 18+ in five New England states monthly from February to August 2022. We measured awareness and use of TFN vaping products, perceived absolute harms and addictiveness, relative harms and addictiveness of TFN versus TDN vaping products, likelihood of using TFN compared to TDN vaping products, and susceptibility to using TFN vaping products. Participants could complete more than one survey wave; we analyzed descriptive statistics of the above measures based on participants' first response to the TFN measures for an analytic sample of 777 teens and 655 adults. **Results.** Approximately one-third of adolescents (31.3%) and adults (38.2%) had heard of TFN. A minority of adolescents (8.9%) and adults (21.1%) had ever used TFN vaping products. Among never users, 43.0% of teens and 71.6% of adults were

susceptible. About half of adolescents and adults thought that TFN vaping products were equally harmful (55.2% and 51.0%, respectively) and addictive (55.0% and 58.6%, respectively) as those with TDN. Approximately 20% of both groups said TFN was less harmful and 6% said TFN was more harmful, 22.1% of adolescents and 18.8% of adults thought TFN was less addictive, and 6.6% of adolescents and 5.7% of adults thought TFN was more addictive than TDN vaping products. Fewer participants perceived TFN vaping products to cause a lot of harm (32.7% of adolescents and 13.9% of adults) than they did TDN vaping products (45.8% of adolescents and 26.1% of adults). 38.7% of adolescents and 27.3% of adults did not know whether they would be more likely to use TFN vaping products; adolescents (14.7%) and adults (21.7%) reported being less likely to try TFN compared to TDN vaping products about as frequently as they reported being more likely (16.7% and 15.6%, respectively). **Conclusion.** Under half of teens and adults in this study were aware of TFN and ever use of TFN vaping products was low among teens. About one in five adolescents and adults incorrectly perceived TFN vaping products as less harmful and less addictive than TDN vaping products. Communication campaigns may be necessary to educate consumers and potential consumers about the harms and addictiveness of TFN vaping products.

FUNDING: Federal

POS5-138

PERCEIVING E-CIGARETTES AS LESS HARMFUL THAN CIGARETTES PREDICTS ANTECEDENTS OF SMOKING CESSATION AND PRODUCT SWITCHING AMONG YOUNG ADULT DUAL USERS

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Background: Exclusively transitioning to e-cigarettes from combustible cigarettes may reduce users' exposure to harmful chemicals. This study examined the associations between comparative harm perceptions of e-cigarettes versus cigarettes and antecedents of smoking cessation and product switching among young adult dual users. **Methods:** Data from a sample of young adults (ages 18-34) who smoke cigarettes and use e-cigarettes (dual users) (n=1,821) were collected online in 2022. Respondents were asked about their perceived comparative harm of e-cigarettes versus cigarettes, motivation to quit cigarettes, past year quit attempts, and e-cigarette use frequency. Those who had made a past-year quit attempt(s) (n=1,250) were also asked about their use of e-cigarettes to quit smoking. Those who used e-cigarettes to quit (n=896) were then asked about perceived effectiveness of using e-cigarettes to quit. Multivariable logistic regressions were used to examine the associations between comparative e-cigarette/cigarette harm perceptions and five behavioral antecedents of smoking cessation and product switching. **Results:** Less than half of the participants (40.6%) perceived e-cigarettes as less harmful than cigarettes (versus equally or more harmful). Perceiving e-cigarettes as less harmful than cigarettes was positively associated with motivations to quit smoking cigarettes (AOR=1.32, 95% CI=1.07-1.62), having made a quit attempt in the past year (AOR=1.44, 95% CI=1.15-1.78), and daily e-cigarette use (AOR=1.80, 95% CI=1.42-2.29). Among those who tried to quit smoking in the past year, perceiving e-cigarettes as less harmful than cigarettes was positively associated with having used e-cigarettes to try to quit smoking (AOR=2.43, 95% CI=1.83-3.24). Among those who had used e-cigarettes in their quit attempt, perceiving e-cigarettes as less harmful was positively associated with perceiving e-cigarettes as effective for quitting smoking or cutting back (AOR=2.39, 95% CI=1.80-3.18). **Conclusions:** Perceiving e-cigarettes as less harmful than cigarettes was associated with increased odds of all examined behavioral antecedents of smoking cessation and product switching among young adult dual users. However, most dual users did not hold this belief. Health communication efforts to improve understanding about lower comparative harms of e-cigarettes versus cigarettes may help facilitate smoking cessation and product switching among this group.

FUNDING: Federal; FDA/CTP



POS5-139

PERCEPTIONS ABOUT THE HARMFULNESS OF E-CIGARETTES, HEATED TOBACCO PRODUCTS, AND CIGARETTES IN 16 COUNTRIES: FINDINGS FROM THE ITC PROJECT

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Significance: Perceptions of the harms of cigarettes in relation to non-cigarette nicotine products are important predictors of which products people try and use. Data on the harm perceptions of e-cigarettes (ECs) and heated tobacco products (HTPs) relative to cigarettes can guide public health communications and regulations. This study presents data among current adult cigarette smokers from 16 countries on perceived harmfulness of ECs and HTPs compared to cigarettes and ECs vs HTPs in 9 countries. **Methods:** ITC cross-sectional data from adult current smokers (18 and older) in 16 ITC countries (N= 860-3734) at most recent survey wave (2018-2021) in Australia, Canada, England, France, Germany, Greece, Hungary, Japan, Malaysia, Netherlands, New Zealand, Poland, Republic of Korea, Romania, Spain, and United States examined the percentage of people who smoke believing that (1) ECs/HTPs are less harmful than cigarettes; (2) ECs/HTPs are equally/more harmful than cigarettes; (3) ECs are more harmful than HTPs; and (4) HTPs are more harmful than ECs. Weighted estimates were based on logistic regression models and adjusted by sex, age groups, smoking status, and time in sample. **Results:** In all 16 countries, fewer than half of the adults who currently smoke perceived ECs and HTPs to be less harmful than cigarettes. People who smoke in England and Japan (49%) were most likely to believe that ECs are less harmful than cigarettes, while current smokers in Spain (16%) were least likely. People who smoke in Japan were most likely to perceive HTPs to be less harmful than cigarettes (49%) and current smokers in Spain and Hungary were lowest (13%). Among 9 ITC countries, perceiving that ECs are more harmful than HTPs was highest in the Netherlands (23%) and lowest in New Zealand (9%). Perceiving that HTPs are more harmful than ECs was highest in England (22%) and lowest in Republic of Korea (13%). More than 40% of people who smoke in Canada (42%), England (48%), New Zealand (52%), the US (54%), and Australia (65%) reported that they did not know whether using ECs is more, less, or equally harmful than using HTPs. **Conclusion:** Perceptions among people who currently smoke cigarettes of the harmfulness of ECs and HTPs compared to cigarettes vary substantially across the 16 ITC countries. Smokers in Japan were most likely to believe that ECs and HTPs are less harmful than cigarettes. Smokers remain uncertain about the relative harm of ECs vs HTPs.

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

POS5-140

HEATED TOBACCO PRODUCTS AND COMBUSTIBLE CIGARETTE USE AND ITS ASSOCIATION WITH QUITTING BEHAVIOUR IN AN ONLINE SAMPLE OF SOUTH AFRICAN ADULTS

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Significance: Heated tobacco products (HTP) was launched in South Africa (SA) in 2017 and marketed as a harm reduction product for users of combustible conventional cigarettes (CC) that switch to HTP. Recent retail scanner sales data suggest increasing

HTP sales volume along with increasing CC sales volume. While the use of these HTPs have been described and observed to be increasing in some high-income countries, no population-based data is available on the pattern of use of these products in any of the countries in the Sub-Saharan African region and limited data from LMICs, in general. This study therefore sought to describe the use of HTPs in relation to use of CC and quitting behaviour among South African adults. **Methods:** This study involved South African adults ≥18-years-old who participated in a large online survey on the use of electronic nicotine delivery systems (ENDS) and other risk behaviours during October 2021 (n=14,324). Participants were purposefully recruited online, using the national consumer database of South Africa's largest digital news channels in order to reach a large sample of CC smokers and users of ENDS. We used previously validated questionnaire to obtain information, amongst others, on participants' socio-demographic data, use of CC, HTP, e-cigarettes, CC smoking intensity, perceived harm from these products compared to CC, past 12-months quit attempts and quit status. Data analysis included descriptive statistics, t-tests, chi-square statistics and multivariable-adjusted regression analysis. **Results:** Of the 88% of participants aware of HTPs, 8.2% (n=1173) reported ever HTP use and 3.5% (n=496) reported current use with use rates highest among current smokers (5.9%), those with <High school education (5.6%), those 18-24 years-old (4.8%) and males (4.5%). Of current HTP users, 85.4% also smoke CC, 54.3% also currently use e-cigarettes and 42.4% reported current use of all three products. Of the study participants, 55.8% (n=7463) believed HTPs were just as harmful or more harmful than CC with no significant difference by HTP use status. Of the current smokers of CC, 55% (n=3079) reported a quit attempt in the last 12 months with higher proportion of HTP users than none users reporting attempt to quit CC (60.3% vs. 54.2%; p=0.039). However, after adjusting for other significant correlates of quit attempt including younger age, male gender and self-identifying as black Africans, current HTP use was no longer associated with quit attempt (OR=0.85; 95%CI=0.64-1.12). Similarly, daily smoking intensity among those who attempted to quit was not significantly different by HTP status (8.3 vs. 8.6 cpd; p=0.571). **Conclusion:** HTP use is more commonly used among South African male youth smokers and it is not associated with higher odds of making a quit attempt or reporting a lower smoking intensity among those who unsuccessfully attempted to quit CC.

FUNDING: Nonprofit grant funding

POS5-141

ELECTRONIC CIGARETTE USE AMONG PEOPLE WHO SMOKE AND RECENT QUITTERS IN AOTEAROA/NEW ZEALAND: FINDINGS FROM THE ITC NZ (EASE) 2020-21 SURVEY

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Significance: Aotearoa/New Zealand (A/NZ) has a smokefree goal to reduce smoking prevalence to <5% by 2025. Daily smoking prevalence is 8%, but higher among Māori (20%) and Pacific peoples (18%). Electronic cigarettes (ECs) may help reduce smoking by providing a less harmful alternative among people who smoke who don't want to or can't quit using nicotine products completely. We report EC use among A/NZ people who smoke or have recently quit smoking. **Methods:** Data were from Wave 3 of the ITC A/NZ (EASE) study, conducted online from October 2020 to February 2021. There were 1,230 participants (700 daily smokers, 292 less than daily smokers and 238 recent quitters) of whom 492 were Māori and 238 were Pacific peoples. We included recontacted Wave 2 participants and additional participants recruited from an online survey panel, social media advertising and community networks. We oversampled Māori and Pacific peoples and young adults (18-24 yrs). We asked participants whether they had tried ECs and were currently using ECs at least monthly or daily. Data were weighted to reflect A/NZ's population of people who smoke or have recently quit smoking cigarettes. "Don't know" and "Refused" responses were excluded. **Results:** Current (≥ monthly) EC use among current smokers was 41.6% (95%CI 37.6-45.6%). Highest prevalence was among males (47.6%) and people aged 18-24yrs (58.0%); lowest prevalence among females (34.6%) and people aged ≥45 yrs (27.2%). Daily EC use among current smokers was 24.8% (95%CI 21.3-28.6%); highest among 18-24 yrs (37.0%) and non-daily smokers (43.9%); and lowest among ≥45yrs (15.3%) and daily smokers (17.8%). Current EC use among recent quitters was 39.7% (95%CI 31.5-48.6%). Highest prevalence was among 18-24 yrs (45.8%) and 25-44 yrs (48.0%), Māori (52.2%), and Pacific (54.4%); and lowest among ≥45 yrs (29.3%) and non-Māori non-Pacific (NMNP) participants (34.0%). Daily EC use among recent quitters was 33.4% (95%CI 25.6-42.2%); highest among 25-44 yrs (42.5%), Māori (40.0%), and Pacific (51.6%); and lowest among ≥45 yrs (27.6%) and NMNP (28.4%). **Conclusion:** A high proportion of current smokers and recent quitters were using ECs. High rates of EC use among recent quitters suggests that ECs are an



alternative for people who smoke who are unable to quit nicotine use, particularly among Māori and Pacific peoples. In older and daily smokers, use of ECs is lower, suggesting that ECs will have less of an impact on reducing smoking among these groups.

FUNDING: Federal

POS5-142

ROLE OF PERSONALITY FACTORS IN E-CIGARETTE USE TRAJECTORIES

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Objective: Past studies have examined psychological and behavioral factors related to cigarette use trajectories, but similar research related to stable patterns in e-cigarette use trajectories, especially among youth, is lacking. **Methods:** The objective of this study was to examine differences in stable developmental trajectories of e-cigarette use without marijuana (i.e., nicotine vaping) and e-cigarette use with marijuana (i.e., cannabis vaping), from 11 to 19 years of age, by enduring personality factors. It was hypothesized that there are differences in trajectory patterns by personality factors. Trajectory patterns in the sample were identified in another study. For nicotine vaping trajectories, participants were categorized into non-users, early escalators, mid escalators, and late escalators. For cannabis vaping, participants were categorized into non-users and escalators. The Ten Item Personality Inventory (TIPI) was used to obtain scores on five personality factors (openness, conscientiousness, extraversion, agreeableness, and emotional stability). Each personality factor was categorized as 'high' and 'low' based on the scores being above or below the mean score on that factor. Unadjusted and adjusted logistic regression models (AOR (95% CI)) were fit to assess differences in trajectories of nicotine and cannabis vaping, given each personality factor, separately. Models were adjusted for race/ethnicity, gender, and grade. **Results:** The sample consisted of 2497 participants, of whom 57.9% (n=1447) were females and 37.8% (n=943) were Hispanic. 73.3% (n=1830) of the sample were non-users of nicotine while 13.9% (n=346) were mid escalators, 6.9% (n=173) late escalators, and 5.9% (n=148) early escalators, from 11 to 19 years of age. 90.8% (n=2267) of the sample were non-users of cannabis while 9.2% (n=230) were escalators, from 13 to 19 years of age. For nicotine vaping (reference: non-users), early escalators were more likely to demonstrate lower emotional stability [0.59 (0.42-0.83)] and conscientiousness [0.69 (0.49-0.97)]. Mid escalators were more likely to demonstrate higher openness [1.48 (1.17-1.87)] and extraversion [1.62 (1.27-2.08)]. Late escalators were more likely to demonstrate higher openness [1.43 (1.04-1.97)], extraversion [1.48 (1.06-2.07)], and agreeableness [1.40 (1.01-1.94)]. For cannabis vaping (reference: non-users), escalators were more likely to be higher on extraversion [1.40 (1.05-1.87)] and lower on agreeableness [0.76 (0.57-1.00)] and emotional stability [0.66 (0.50-0.88)]. **Conclusion:** The study presents important findings that show stable trajectories of e-cigarette use across adolescence, from 11 to 19 years of age, "map" to different personality characteristics. Differences in these personality factors between nicotine vaping and cannabis vaping trajectories were also identified.

FUNDING: Federal

POS5-143

SMOKING TREATMENT HISTORY AND PREFERENCES AMONG ADULTS ENTERING A SMOKING CESSATION PROGRAM

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Significance: There are various resources that can be used to support a smoking cessation attempt (e.g., medications, state helplines) and previous smoking cessation experiences likely influence preferences for future quit attempts. This study aimed to examine resources used during past quit attempts, perceived effectiveness of smoking cessation medications, and preferences for future smoking cessation attempts. **Methods:** Secondary analyses of baseline data from a 13 week, 3-arm randomized controlled trial that tested a novel smoking cessation smartphone application were conducted for this study. Participants provided demographic information and answered questions

about previously used smoking cessation resources and preferences for resources that they would like to use during future smoking cessation attempts. **Results:** Participants (N=81) were female (50.6%), White (71.6%), 49 years old on average, and reported using the following to help them quit in the past: Chantix/Varenicline (34.6%), Zyban/Wellbutrin (23.5%), nicotine patch (63%), nicotine gum or lozenge or nasal spray (38.3%), other medication (3.7%), E-cigarettes (28.4%), Oklahoma Tobacco Helpline (18.5%), and smartphone app (1.2%). A total of 21% of participants reported that they had not previously used any of the mentioned cessation tools. Of those that reported previous use of smoking cessation medications, 49.4% found the medications to be helpful and most participants (98.8%) reported that they would like to use smoking cessation medications to help them quit in the future. Further, in a forced single choice question of most preferred smoking cessation resource, participants reported that they would prefer to use medications (60.5%), in person individual counseling (14.8%), smartphone app (8.6%), group counseling (4.9%), helpline phone counseling (4.9%), and no smoking cessation resources (6.2%). **Conclusion:** Results indicated considerable variation in previous smoking cessation resource use and future cessation resource use preferences. Interestingly, nearly all participants reported that they would like to use smoking cessation medications in future quit attempts. Past smoking cessation experiences and future preferences for smoking cessation resources should be considered when treatment plans are developed for smokers that are attempting to quit. More research is needed to determine efficacy of smoking cessation treatments centered on smoker's preferences versus standard care.

FUNDING: Federal; State

POS5-144

AGENT-BASED MODELING OF CIGARETTE USE DIFFUSION AMONG ADOLESCENTS IN MEXICO

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Background. Agent-based models (ABM) are powerful computational tools that help visualize, analyze, and inform complex dynamic systems in public health. This model reproduces the influence that social networks have on the consumption of cigarettes in Mexican adolescents. **Methods.** Data were retrieved from a two-times survey applied (Wave 1 2015- wave 2 2016) in students from secondary schools in three cities in Mexico (N=4,998). Reported cigarettes use, including current and ever, was consider the dependent variable and coded as ever use (1), or never used (0). Initial conditions were constructed considering the coefficients of the following independent variables at Wave 1: Age (B1= 0.02423), any family member smoked (B2=0.02785), positive expectancies about smoking (B3=0.05062) and sensation seeking (B4=0.10311). When the probability of this set of variables exceeds the given probability limit (Th = 0.2201), the agent begins the simulation for smoking (Smokes= 1) otherwise, its status is non-smoker (Smokes= 0). An identity-based network was build using sex, parental education, age, and wealth variables, weighted, and normalized. The more similarities found between agents, a higher probability of establishing a link. The model follows a established dynamic: agents start the cycle at home, go to school, built links with other agents based on similarities, have a social time (where they can be influenced to smoke according to a transition function), go back home and repeat the cycle. The transition function depends on the total number of smokers in the model and the percentage of smokers in the agent's network. **Results.** The model successfully reproduced the final use means of the original database (wave 1: 6.2% [SD 0.2412698] and wave 2: 32.83% [SD 0.469628]). The model built a network with an average number of students and a diffusion curve of tobacco use (logistics) consistent with the literature. **Conclusions.** This model can be use as basis for a set of applicable variations for the simulation of tobacco control public health policies including, but not limited, to display ban, advertising limitations and the introduction of other nicotine products such as e-cigarettes.

FUNDING: Federal

POS5-145

SMOKING CESSATION AND TOBACCO-RELATED RISK PERCEPTIONS AMONG PEOPLE WITH AND WITHOUT A DIAGNOSIS OF CANCER

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Significance: Little is known about how cancer diagnosis and tobacco-related risk perceptions are associated with smoking behavior. **Methods:** We used data from Waves (W) 1-3 (2013-2016) of the Population Assessment of Tobacco and Health Study to analyze longitudinal smoking behavior among adults who were current smokers and not previously diagnosed with cancer at W1 (n=7,829). The outcome was smoking cessation as of W3. Explanatory variables were sociodemographics, other tobacco product use, adult at first cigarette, cancer diagnosis after W1, and tobacco-related risk perceptions (cigarette harm perception, worry that tobacco products will damage one's health ["worry"], belief that smoking causes cancer ["belief"], and nondaily smoking harm perception). **Results:** Cessation was significantly associated with W1 worry (odds ratio [OR]=1.18; 95% confidence interval 1.05-1.31), W3 cigarette harm perception (OR=2.30 [2.02-2.61]), and W3 belief (OR=1.50 [1.29-1.74]). Among individuals with low worry, respondents diagnosed with cancer were less likely to have quit smoking than those without cancer (OR=0.55), and among those with high worry, those with cancer were more likely to have quit smoking (OR=4.82; interaction $p=0.01$). **Conclusions:** Cessation is associated with tobacco-related risk perceptions, and those associations differ by cancer diagnosis status. Associations between cancer diagnosis, tobacco-related risk perceptions and smoking behavior may inform the development of evidence-based smoking cessation interventions.

FUNDING: Federal

POS5-146

NICOTINE AND FLAVOR EFFECTS ON NICOTINE-SALT ELECTRONIC CIGARETTE ABUSE POTENTIAL FOR ADULT SMOKERS WHO DO NOT REGULARLY USE ELECTRONIC CIGARETTES

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Background: Electronic cigarette (EC) regulation aims to minimize non-smoker initiation while recognizing a potential public and individual health benefit if smokers who are unable or unwilling to quit smoking completely switch to this potentially reduced-harm product. Typically, the higher the abuse potential of a product, the greater the likelihood that the product can substitute for another product. Product characteristics, such as nicotine concentration and flavor of e-liquid, may help facilitate complete substitution of cigarettes for ECs. The EC market is dominated by nicotine-salt ECs. Therefore, this study assessed the abuse potential of nicotine-salt ECs (Juul) with different e-liquid nicotine concentrations (3% or 5%) and flavors (Virginia Tobacco or Menthol). **Methods:** Twenty-three adult (21+) cigarette smokers who do not regularly use ECs attended five laboratory visits where they used their usual brand cigarettes and, in random order, each of four EC pods (3% Tobacco, 3% Menthol, 5% Tobacco, 5% Menthol). Visits were at least 48 hours apart. Participants filled out questionnaires about withdrawal, subjective responses, and behavioral economics. After sampling all pods in the lab, participants took them home to use for 3 days while completing daily use questionnaires, after which they chose which pod they would use for another 7 days. Wilcoxon signed-rank tests examined whether EC use decreased withdrawal. Regression analyses examined whether e-liquid nicotine concentration and flavor impacted subjective responses and behavioral economic measures. A Fisher's exact test examined differences in EC choice distributions between menthol and non-menthol smokers. **Results:** All ECs reliably decreased cigarette withdrawal and smoking urges ($p<0.001$). However, flavor and nicotine concentration did not differ in subjective responses or behavioral economic measures. While menthol smokers overwhelmingly chose menthol-flavored ECs (83%), this was not statistically different from non-menthol smoker choice of menthol flavor (30%). **Conclusion:** The nicotine concentrations and flavors used in this study did not significantly differ on laboratory measures of abuse potential for cigarette-smoking adults who do not regularly use ECs. This may suggest a similar abuse potential across these product characteristics. Overall, these results add to the current research on the abuse potential of currently available nicotine-salt ECs.

FUNDING: Federal

POS5-147

THE NICOTINE CONTENT OF NICOTINE POUCHES

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Nicotine pouch products, oral smokeless products that contain nicotine but no tobacco leaf material, have recently entered the U.S. marketplace. Available data indicate sales

of these products in the U.S. have increased since 2018; however, the extent of use among U.S. youth and adults is uncertain. To assay the chemistry of these emerging tobacco products, we analyzed 37 nicotine pouch brands from 6 total manufacturers. Almost all of the products had flavor descriptors (36 of 37), such as mint, licorice, coffee, cinnamon, and fruit. The amount of free nicotine, the form most easily absorbed, was calculated for each product using total nicotine, product pH, the appropriate pK_a , and the Henderson-Hasselbalch equation. Nicotine pouch products varied in pouch content mass, moisture content (1.12 – 47.2%), alkalinity (pH 6.86 – 10.1), and % free nicotine (7.7% – 99.2%). Total nicotine content nicotine ranged from 1.29 – 6.11 mg/pouch; whereas, free nicotine ranged from 0.166 – 6.07 mg/pouch. These findings indicate that nicotine and pH levels found in some of these nicotine pouches are similar to conventional tobacco products, such as moist snuff and snus, and that most of these pouch products are flavored. Although these products likely lack many tobacco-related chemicals, each product analyzed contained nicotine, which is both addictive and can harm human health. Given that nicotine pouches may appeal to a spectrum of users, from novice to experienced users, it is important to include these emerging tobacco products in tobacco control research, policy, and practice.

FUNDING: Federal

POS5-148

PREVALENCE AND CORRELATES OF FLAVORED NOVEL ORAL NICOTINE PRODUCT USE AMONG A NATIONAL SAMPLE OF YOUTH

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Background: Marketing and use of novel oral nicotine products (not FDA-approved for cessation), such as gum, lozenges, and gummies, is growing, with some limited, regional research finding these products are the second most prevalent nicotine product youth report using. These products come in flavors, such as mint and fruit, which may enhance their appeal for youth and lead to nicotine addiction. This study assessed the prevalence and correlates of novel oral nicotine products in a national sample of youth. **Methods:** We conducted a national online survey with Qualtrics, September-October 2022, as part of a study to develop pictorial warnings for little cigars and cigarillos (LCCs) among youth. Those aged 15-20 years old who reported ever using LCCs or susceptibility were eligible. Participants were asked "in the past 30 days, which of the following nicotine products have you used at least once?" with response options: *flavored nicotine gum, flavored nicotine lozenges, flavored nicotine tablets, flavored nicotine gummies, flavored nicotine pouches, none of the above*. Example brands were included. Descriptive statistics and chi-square analyses were used to assess the use prevalence and associations with other past 30-day tobacco product use and participant characteristics. **Results:** Of the full sample (n=680), about half identified as a woman or girl (56.2%), white (56.3%), straight/heterosexual (62.5%), and reported any past 30-day tobacco use (52.4%). About one-fifth (17.1%) reported using flavored novel oral nicotine products in the past 30 days, with the most common being gum (6.2%), gummies (4.4%), and lozenges (3.7%). Any past 30-day tobacco use (excluding flavored novel oral nicotine) was highly correlated with past 30-day flavored novel oral nicotine use ($ps<0.001$), increasing to 26.8% among those reporting use of e-cigarettes, 41.4% for cigarillos, 48.9% for little cigars, and 61.8% for large cigars. Age was also significantly associated with past 30-day oral nicotine use, with higher prevalence among those aged 18-20 (19.2%) compared to 15-17 (11.2%). **Discussion:** In our national convenience sample of youth who have used or are susceptible to LCCs, prevalence of flavored novel oral nicotine products was high, with almost one-fifth of our sample reporting past 30-day use. This highlights the need for continued monitoring and surveillance to inform regulatory decision-making, and a better understanding of use with other tobacco products and reasons for use.

FUNDING: Federal; State



POS5-149

EXPOSURE OF PRO AND ANTI-TOBACCO CUES AND ASSOCIATION WITH SMOKING AND SMOKELESS TOBACCO USE AND INTENTION/ SUSCEPTIBILITY OF TOBACCO USE AMONG SECONDARY SCHOOL STUDENTS: A CROSS COUNTRY STUDY IN SOUTH ASIA

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Background: Most smokeless tobacco (SLT) users initiate SLT use in adolescence. Prior studies have focused largely on factors associated with smoked tobacco (ST) among adolescents and very little is known about factors associated with SLT use. Therefore, this study aimed to assess the association between pro and anti-tobacco cues and susceptibility of ST as well as SLT use in 3 South Asian countries (Bangladesh, India, and Pakistan). **Methods:** A multi-stage stratified random sampling strategy was used to select 8 urban/rural schools within each country. For each type of tobacco (SLT and ST), the primary outcome was a binary composite variable indicating whether a student ever used and was susceptible to using tobacco in the next twelve months. Frequencies were reported for demographic variables and distribution of anti- and pro-tobacco cues by the type of tobacco use/intention/ susceptibility of use. For each type of tobacco, the association between primary outcome and pro and anti-tobacco cues was analyzed using logistic regression, adjusted for covariates (age, sex, country, family members' tobacco use, and friends' tobacco use). Odds Ratio (OR) and 95% confidence intervals (CI) were reported. **Results:** Participants (n= 1774) were a mean age of 13 years (SD 1.3), 58.57% boys (n= 1039), and 41.3% girls (735). 97 children self-reported that they were susceptible to using SLT products whereas 62 did so to using smoking products. The susceptibility of SLT use was associated with pro-tobacco cues i.e., exposure to SLT products (OR 2.54; CI 1.58,4.09), owning SLT branded items (OR 2.08; CI 1.21, 3.57) but was not significantly associated with anti-tobacco cues i.e., exposure to health warnings on SLT pack (OR 1.95; CI 0.88, 4.31), exposure with the anti-tobacco message at sports/ events (OR 1.30; CI 0.84, 2.01) and being taught in class about SLT use dangers (OR 0.84; CI 0.54, 1.31). The susceptibility of ST was associated with pro-tobacco cues i.e., exposure to tobacco promotion (OR 1.87; CI 1.05, 3.31) and seeing openly displayed products (OR 2.47; CI 1.16, 5.24) but was not significantly associated with anti-tobacco cues i.e., exposure to health warnings on cigarette pack (OR 2.59; CI 0.89, 7.50), exposure with the anti-tobacco message at sports/events (OR 1.25; CI 0.73, 2.14), and were taught in class on ST dangers (OR 0.79; CI 0.45, 1.36). **Conclusion:** SLT susceptibility among youth is highly influenced by anti-tobacco cues; exposure to health warnings, the anti-tobacco message at sports/events, and being taught in class about SLT use dangers. **Source of Funding:** This work was supported by the UK's National Institute for Health Research (NIHR) [ASTRA (Grant Reference Number 17/63/76)]

FUNDING: Other: This work was supported by the UK's National Institute for Health Research (NIHR) [ASTRA (Grant Reference Number 17/63/76)]

POS5-150

CIGARETTE DESIGN FEATURES AND CONSUMER PERCEPTIONS AMONG POPULAR CIGARETTE BRANDS FROM THE 2020 ITC US SURVEY

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Significance: Cigarette design features such as filter ventilation, rod density, filter density, and pack descriptors such as "light and mild" have been shown to influence consumer perceptions of their cigarettes. This study assesses the design features of popular cigarette brands in the United States (US) with respect to consumer perceptions about those products. **Methods:** A sample of the 44 leading cigarette brand varieties in the United States, as determined from the 2020 International Tobacco Control (ITC) US Survey, were purchased and analyzed for cigarette design features using established methods. Respondents (n=769, unweighted) whose usual brands were among the 44 leading brands, were included in the analytic data set. **Results:** Among the 44 brands, 39% (n=17) were 100s, 41% (n=18) had filter ventilation holes. 11% (n=5) of the brands were labeled as "mellow" and 23% (n=10) of the brands were labeled as "smooth." The leading brand family was Marlboro, which accounted for 50% (n=22) of the total. Cigarettes had a median tobacco weight of 0.7 grams, a median ventilation level of 22.6%,

a median filter density of 117.6 mg/cm³, and a median rod density of 245.0 mg/cm³. Most respondents (79.5%) responded that their brand was "no different" in harmfulness compared to other brands. Reporting one's brand as less or more harmful than others differed by age groups and race/ethnicities (p<0.010). 55.9% of respondents perceived their brand as "smoother" than others, which differed significantly among age groups and gender (p<0.001). 57.4% reported that their usual brand is plain tobacco over menthol flavor, which differed significantly among age groups, gender, and race (p<0.005). Over half (51.1%) classified their brands as high quality which differed significantly among age groups (p=0.002). The sample was 56% male, 44% female, 63.3% white, and had a median age of 42. **Conclusions:** Consumer perceptions of brands differed by age group, gender, and race/ethnicity. Most respondents perceived their brand as "smoother" than others, which may be related to the observed descriptors of "mellow" and "smooth" on many packs, as well as ventilation levels, rod density, and filter density. The majority of respondents do not believe their brand is any more or less harmful than others, suggesting a potential impact of policies such as removing 'light' from packaging.

FUNDING: Federal

POS5-151

NEW APPROACHES FOR UNDERSTANDING AUDIENCE EXPOSURE TO ONSCREEN TOBACCO IMAGERY IN A CHANGING MEDIA ENVIRONMENT

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Significance: Onscreen tobacco use influences millions of underage youth and young adults (Y/YA) to initiate smoking. While tobacco advertisements are banned on TV, onscreen tobacco imagery in media persists. Research indicates Y/YA with high exposure to onscreen tobacco use are three times more likely to initiate e-cigarette use. Historically, researchers relied on theatrical film box office revenue estimates to determine potential audience exposure to tobacco imagery. However, the rise of films released concurrently or straight-to-streaming (on services such as HBO Max and Disney+) has complicated the ability to produce estimates of exposure as these companies do not make viewership data publicly available. **Methods:** We identified 112 top films released in 2021 using the Thumbs Up Thumbs Down methodology to code for the presence of tobacco imagery. We conducted a survey in May 2022 of 1,615 Y/YA (ages 15 to 24) to more accurately assess top films viewed among this audience in 2021, along with measures to evaluate tobacco use behaviors, future use intentions, and quitting behaviors. **Results:** Survey respondents were largely 21-24 years old (44%), female (52%), identified as heterosexual (64%), not of Hispanic origin (56%), and white/European American (39%) followed by Black/African American (30%). 31% of Y/YA reported having used a tobacco product in the past 30 days and 30% indicated a future intention to use e-cigarettes. There were 53 out of 112 (47%) 2021 films with any tobacco, of which 17 youth-rated films (G/PG/PG-13) contained tobacco imagery (15%). Our survey revealed films viewed on streaming platforms were far more prevalent than films viewed in theaters among our Y/YA respondents - only one (*Spider-Man: No Way Home*, PG-13 rating) of the top 20 films was watched in a theater. Y/YA exposure to harmful tobacco imagery still exists, with 74% of respondents reporting watching at least one 2021 film containing tobacco imagery. Among the top five watched films, only one film contained tobacco (42% of respondents aged 15-17, 48% aged 18-20, and 49% aged 21-24 reported viewing the film). **Discussion:** With changing film releases and viewing behaviors, continued research in this area is imperative to understand and curb tobacco initiation and use. In the future, we plan to account for tobacco initiation dates to better assess if exposure is associated with tobacco use behavior. Nonetheless, Y/YA exposure to onscreen tobacco use remains a significant public health concern. **Conclusion:** Examining Y/YA exposure to tobacco on streaming services among top annually grossing films is paramount to addressing Y/YA tobacco initiation.

FUNDING: Nonprofit grant funding



POS5-152

AN INVESTIGATION OF FUNCTIONAL BRAIN CIRCUITS INVOLVED IN INHIBITION AND SMOKING CUE REWARD DURING NICOTINE ABSTINENCE

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Significance: Drug addiction is characterized by impaired inhibitory control, enhanced sensitivity to drug rewards, and diminished reactivity to natural rewards. The current study aimed to better understand how the functional brain circuits that manage these processes interact to drive urge, craving, impulsivity, and attention for individuals dependent on nicotine. **Methods:** Fifteen adults who smoked at least five cigarettes per day for at least one year completed a laboratory visit after 14 hours of nicotine abstinence. The visit included a smoking Go-NoGo computerized task during functional MRI to engage brain circuitry involved in inhibitory control and smoking cue reward. Out of the scanner, participants completed computerized color-word Stroop and monetary delay discounting tasks, the Questionnaire on Smoking Urges, and a Likert scale of cigarette craving. Cognitive interference was calculated on Stroop accuracy and response latency and impulsivity was measured using Kirby's k discount rate. Blood oxygen-level dependent brain signal was contrasted between NoGo vs. Go task blocks (inhibition) and smoking vs. neutral stimuli blocks (smoking cue reward) with FSL software. One-sample t-tests assessed whole-brain, voxel-wise, group averages of each contrast and associations of brain signal with cognitive interference, impulsivity, urge and craving. Statistical significance was set at a voxel threshold of $p < .001$ and a cluster threshold of $p < .05$. **Results:** Inhibition during the Go-NoGo task engaged frontoparietal cognitive control and reward salience (i.e., insula, caudate, and thalamus) brain circuits. There was no main effect of smoking cue reward on brain function. During inhibition, stronger cigarette craving was associated with decreased activation in the left caudate; more cognitive interference with decreased left anterior cingulate cortex and increased primary visual cortex activation; and higher impulsivity with increased left prefrontal activation. During smoking cue reward, stronger urge to smoke was associated with increased left frontal pole activation and higher impulsivity with increased right prefrontal and primary visual cortex and decreased left hippocampus and occipital pole activation. **Conclusion:** Our results show that cognitive control and reward salience brain circuits are engaged during inhibition in a state of nicotine abstinence. Inhibition- and smoking cue-related brain engagement was associated with relevant addictive behaviors highlighting their potential role as mechanisms driving chronic nicotine use.

FUNDING: Federal

POS5-153

BELIEFS AND ATTITUDES TOWARDS A HYPOTHETICAL E-CIGARETTE MODIFIED EXPOSURE AD CLAIM AMONG YOUNG ADULTS WHO SMOKE AND YOUNG ADULTS WHO DO NOT USE TOBACCO

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Introduction: Some e-cigarettes (e-cigs) could potentially be authorized as modified exposure tobacco products to promote switching from cigarettes to e-cigs. The associated claims may, however, inadvertently promote e-cig use among young people naïve to tobacco products. Therefore, it is important to assess the perceptions of such claims among young adults with various tobacco-using statuses. **Methods:** A New Jersey-based convenience sample of 18-29-year-old non-tobacco users ($n=26$) and established cigarette smokers ($n=26$) participated in a semi-structured in-depth interview (~25 minutes) in June-September 2022. Participants were first shown a print ad for Vuse e-cigs that included a hypothetical modified exposure claim ("Switching completely from cigarettes to this product can greatly reduce smokers' exposure to harmful chemicals"). They then discussed their beliefs and attitudes towards the claim and whether it made them want to use (or completely switch to) the e-cigs shown in the ads. A thematic analysis of the interview data was conducted using inductive and deductive coding. **Results:** Most participants expressed doubt of the claim, including because (1) it lacked the support of scientific evidence about specific differences in chemical exposure (i.e. ingredients) and whether such differences lead to changes in health outcomes, (2) they were skeptical of the tobacco industry's commercial intent, and (3) not knowing the absolute or long-term harms of e-cig use. Cigarette smokers were especially likely to

disbelieve the claim because they often perceived it as an industry marketing gimmick with little credibility. Most of the non-tobacco users explicitly reported having no interest in using the e-cigs shown in the ad because the claim was not relevant to them. Most of the cigarette smokers also expressed no interest in using or completely switching to e-cigs, primarily due to the reasons that caused their skepticism of the claim because they did not believe the claim. **Discussion:** A modified exposure claim, when shown in an e-cig ad, was generally not well-accepted by young adults who smoke cigarettes nor non-tobacco users in our study, and did little to prompt e-cig use interest in either group. Claims aimed at promoting product switching among adults who smoke may be more impactful if they come from non-industry sources and reference scientific support, specific chemicals of (reduced) exposure, and health effects of using e-cigs.

FUNDING: Federal; FDA/CTP

POS5-154

TRANSITIONS IN TOBACCO PRODUCT USE STATES AMONG YOUNG ADULTS AGED 18-29 YEARS

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Significance: The purpose of this study was to examine young adults' tobacco use transitions based on their past 30-day use states, and to identify socioecological factors that influenced their transitions. **Methods:** Participants ($N=12377$) were young adults aged 18-29 years at Wave 1 who also participated at Waves 2-5 (2013-2019) of PATH. They reported on their use of cigarettes, electronic cigarettes [ECIGs], large cigars, small cigars, cigarillos, smokeless tobacco [SLT], and hookah in the past month. Tobacco use states were categorized by the number of past-month use days (0, 1-4, 5-8, 9-12, 13-30 days); multistate Markov models examined transitions between use states and multinomial logistic regressions examined socioecological predictors (perceived harm; perceived social acceptability; advertising exposure; internalizing/externalizing problems) of these transitions. **Results:** The pattern of transitions between use states was strikingly similar for all products. Most young adults remained nonusers (i.e. reported 0 use days) across adjacent waves (e.g. 88-92% for cigarettes; 98-99% for SLT). Many young adults also transitioned toward nonuse; collapsed across waves, the average percentage who moved from use at any level to nonuse ranged from 46% for cigarettes to 67% for hookah. Fewer young adults transitioned toward use; collapsed across waves, the average percentage who moved from nonuse to use at any level ranged from 4% for hookah to 10% for cigarettes. Transitions to riskier patterns of use (i.e. transitioning to or remaining a user (vs nonuser) across adjacent waves) were predicted by several factors: male (all products); younger age (cigarettes, ECIGs, cigarillos, hookah); White (cigarettes, ECIGs, SLT); Black and/or Hispanic (cigar products; hookah); lower education levels (all products except large cigars); sexual minority status (cigarettes, ECIGs, small cigars, hookah); higher internalizing and/or externalizing problems (cigarettes, ECIGs, cigarillos, and large cigars); lower harm perceptions (all products except cigarillos and small cigars); increased advertising exposure (cigarettes, ECIGs, large cigars, and cigarillos); and higher social acceptability perceptions (cigarettes, cigarillos, and small cigars). **Conclusions:** Few young adults escalated their tobacco use over time. Factors that predicted such escalations were dependent on the product used, supporting the need for tailored prevention and intervention efforts.

FUNDING: Federal; FDA/CTP

POS5-155

CONVENTIONAL TOBACCO PRODUCTS HARBOR UNIQUE AND HETEROGENOUS MICROBIOMES

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While an increasing number of studies have evaluated tobacco microbiomes, comparative microbiome analyses across diverse tobacco products are non-existent. Moreover, to our knowledge, no previous studies have characterized the metabolically-active (live) fraction of tobacco bacterial communities and compared them across products. To address these knowledge gaps, we compared bacterial communities across four commercial products (cigarettes, little cigars, cigarillos and hookah) and one research cigarette product. After total DNA extraction ($n=414$) from all samples, the V3/V4 region of the 16S rRNA gene was sequenced on the Illumina HiSeq platform. To identify



metabolically-active bacterial communities within these products, we applied a coupled 5-bromo-2-deoxyuridine labeling and sequencing approach to a subset of samples (n=56). Each tobacco product was characterized by its signature microbiome, along with a shared microbiome across all tobacco products consisting of *Pseudomonas aeruginosa*, *P. putida*, *P. alcaligenes*, *Bacillus subtilis*, and *Klebsiella pneumoniae*. Comparing across products, a statistically significantly higher (LeFSe $p < 0.05$) relative abundance of *Klebsiella* and *Acinetobacter* was observed in commercial cigarettes, while a higher relative abundance of *Pseudomonas* and *Pantoea* was observed in research cigarettes. *Methylobacterium* and *Paenibacillus* were higher in hookah, and *Brevibacillus*, *Lactobacillus*, *Bacillus*, *Lysinibacillus*, and *Staphylococcus* were higher in little cigars and cigarillos. Across all products, the majority of the metabolically-active bacterial communities belonged to the genus *Pseudomonas*, followed by several genera within the Firmicutes phylum (*Bacillus*, *Terribacillus*, and *Oceanobacillus*). Identification of some metabolically-active pathogens such as *Bacillus cereus* and *Haemophilus parainfluenzae* in commercial products is of concern because of the potential for these microorganisms to be transferred to users' respiratory tracts via mainstream smoke. Future work is warranted to evaluate the potential impact of these tobacco bacterial communities on users' oral and lung microbiomes, which play such an important role on the spectrum from health to disease.

FUNDING: Federal; Academic Institution

POS5-156

COST OF ALTERNATIVE TOBACCO AND NICOTINE PRODUCTS - EVIDENCE FROM THE 2020 ITC KOREA SURVEY

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Study Objective: Our study examines the socio-demographic determinants of different use patterns and reduced price purchase patterns of nicotine and tobacco products, such as cigarettes, nicotine vaping products (NVPs) refills, and heated tobacco products (HTPs) refills, and to compare the relative prices of cigarettes, NVP refills, and HTP refills in South Korea. **Methods:** Data were from the 2020 (Wave 1) International Tobacco Control Korea (ITC KRA1) Survey. Chi-squared, ANOVA tests, and logistic regressions were used to examine socio-demographic characteristics of respondents by use patterns among exclusive, dual, and triple consumers of cigarettes, NVP refills, and HTP refills. Using respondents' self-reported prices, we standardized NVP refills and HTP refills into a comparable unit for a pack of cigarettes and compared the relative prices of NVP refills and HTP refills to the price of cigarettes. Socio-demographic characteristics associated with reduced price purchase were also assessed by each product consumer group. **Results:** Exclusive NVP and HTP consumers, and poly-product consumers were younger than exclusive cigarette smokers ($p < 0.05$). Exclusive cigarette consumers were less likely to have college education and more likely to be low income compared to consumers of NVPs and HTPs ($p < 0.05$). Among poly-product consumers (consumers who use more than one product), dual NVP-HTP consumers had higher education and higher income, while dual cigarette-NVP consumers had lower education and lower income. (All p -values < 0.05). In the comparable unit analysis, NVP refills and HTP refills were more expensive than cigarettes. Higher odds of NVP purchase with reduced prices were found for NVP consumers with college education or higher, as compared to NVP consumers without college education. **Conclusion:** In South Korea, NVP refills, and HTP refills are more expensive than cigarettes, and consumers of these alternative products tend to have higher education and income than cigarette smokers. Based on these findings, policymakers should consider developing tax policies on alternative tobacco or nicotine refill products and how they relate to cigarettes.

FUNDING: Other: The Wave 1 ITC Korea Survey was supported by the Republic of Korea National Health Promotion Fund and additional support from the Canadian Institutes of Health Research Foundation Grant (FDN-148477). Additional support to GTF was provided by a Senior

POS5-157

EXAMINING SMOKING CESSATION PREFERENCES: A QUALITATIVE STUDY OF ADULT CIGARETTE USERS IN GERMANY

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Introduction: Smoking prevalence in Germany remains high at 36%. Research has shown less than 20% of cigarette users have made a quit attempt in the past year. Among those who have made a quit attempt, e-cigarettes were reported to be the most used method above approved cessation aids. To understand preferences for smoking cessation interventions, and therefore the likelihood people who smoke will engage with an intervention, we conducted in-depth semi-structured interviews with German adults who smoke cigarettes. **Methods:** Adults who smoked cigarettes were recruited from the Hamburg Panel (i.e., residents and students of Hamburg, Germany). An interview guide was used to identify attributes (i.e., behavioral counseling) for smoking cessation interventions. Data were analyzed using an inductive qualitative content analysis method. **Results:** A total of 16 interviews were conducted. The study sample was on average 36.9 (standard deviation [SD]=14.4) years of age and 56% female. The average number of cigarettes smoked per day was 10.5 cigarettes (SD=8.3). About 50% reported smoking their first cigarette of the day 60 minutes after waking up. Most (87.5%) had made at least one past quit attempt. Methods to assist in quitting included use of nicotine replacement (18.8%), e-cigarettes (12.5%), and alternatives such as acupuncture or reading a book (18.8%). We identified four main themes: knowledge of smoking cessation services, smoking cessation perceptions, barriers to quitting, and reasons to quit. German cigarette users have little knowledge and experience with smoking cessation services (e.g., "....not at all....my doctor....he gave me a flyer at some point, but to be honest, I have also not read it."). Interest in quitting smoking with the help of medications is low (e.g., "That would actually be the last thing I would try if I wanted to quit. I'm generally not a fan of medication."). Support in quitting included being distracted or receiving support from relatives, especially because most of the smoking cessation therapies are expensive and not covered by health insurance. The use of willpower to quit smoking successfully was a common belief (e.g., "....will must be strong....You have to tell yourself that again and again."), yet there was an openness to try smoking cessation services. **Conclusions:** Adults in Germany who smoke are unfamiliar and therefore reluctant to try smoking cessation aids. Reducing the costs of smoking cessation therapies may increase the likelihood of use. Interventions to increase awareness and knowledge of evidence-based smoking cessation are needed.

FUNDING: Federal; State

AUTHOR INDEX

**A**

Aarvig, Kathleen RAP1-1
Abad, Erika Nayeli POS5-144
Abadi, Melissa H. RAP3-6
Abad-Vivero, Erika N. POS4-123
Abarno, Cristina N. POS3-125, POS4-114
Abdullah, SM POS5-149
Abe, Tania POS2-112
Abe, Tania M. O. POS1-115, POS5-10
Abroms, Lorien POS4-127
Ackerman, Christopher POS3-121
Adibah, Nada POS5-151
Adolfo, Amanda POS5-1
Agar, Thomas POS3-126, POS3-143, POS4-129,
POS5-141
Agterberg, Silvana POS5-89
Aguilera, Diana POS4-130
Aherrera, Angela POS5-88
Ahlualwalia, Jasjit S. POS2-119, POS3-136, POS4-115,
POS5-22
Ait Ouakrim, Driss POS1-123
Alcheva, Aleksandra POS3-140, POS4-143
Alexander, Adam POS5-5, POS5-62
Alexander, Wynta RAP3-9
Allen, Sophia POS5-105
Allread, Gary POS5-115
Almulla, Ahmad M. POS1-137, POS4-140, POS5-110
Alqahtani, Mohammed POS5-81
Alves, Maria-Janieire N. N. POS5-10
Amalia, Beladenta POS1-122, POS4-132
Ambrose, Bridget POS3-137
Amer Nordin, Amer Siddiq POS1-135, POS5-139
Anand, Tanvi POS1-128, POS1-144, POS2-126,
POS5-65
Anderson, Marissa K. POS5-47
Andler, Raphael POS1-135
Andler, Raphaël POS5-139
Andrayas, Alexandria POS4-137
Anesetti-Rothermel, Andrew POS3-137
Angeles, David POS2-143, POS5-121, POS5-124
Angus, Colin POS2-117
Arakji, Ahmad POS5-58
Arillo-Santillan, Edna Judith POS5-117
Arthur, Kianna POS5-108
Asare, Samuel POS5-43
Atella, Lara POS2-122, POS3-127, POS5-41, POS5-49
Aung, Maung POS4-130
Aurouet, Philémon POS5-119
Avey, Jaedon POS1-118
Avila, Jaqueline C. POS2-119, POS4-115, POS5-22
Awadalla, Josephine POS3-121, POS5-153
Ayo-Yusuf, Olalekan A. POS5-140
Azadi, Mona RAP1-1, POS5-50, POS5-96
Azagba, Sunday POS5-48

B

Baig, Sabeeh POS5-93
Bailey, Steffani R. POS3-119
Baker, Laura POS5-145
Baker, Timothy POS5-3
Ball, Coltin POS1-117
Ball, Jude POS3-126, POS3-143, POS4-129,
POS5-141
Bandi, Priti POS5-43, POS5-71

Bansal-Travers, Maansi POS2-120, POS3-137,
POS5-69, POS5-78, POS5-104
Banthin, Christopher POS5-57
Barker, Hannah E. POS1-120, POS4-132
Barnes, Andrew RAP1-4
Barnoya, Joaquin POS1-130, POS2-137, POS4-138,
POS5-101, POS5-135
Barrientos, Steven POS5-107
Barrientos-Gutiérrez, Inti POS3-133, POS4-123,
POS4-138, POS5-101, POS5-117, POS5-144
Barrington-Trimis, Jessica L. POS5-67
Barrow, Corissa POS1-119
Bataineh, Bara POS5-79, POS5-142
Bauld, Linda POS2-117
Beckerich, Heidi POS3-120
Bedi, Danishi K. POS5-16
Bedi, Mannat K. POS5-16
Beebe, Laura A. POS4-135, POS5-15, POS5-94
Behaleh, Raed POS2-133, POS5-81
Beheshtian, Kiana POS5-22
Belline, Bianca B. POS2-112, POS1-115, POS5-10
Bellon, Alfredo POS5-152
Belvin, Keace L. POS4-126
Beneventi, Diane POS5-8, POS5-18
Benjamin, Emelia POS4-124
Benjamin, Emelia J. POS2-139, PPS7-6
Bennet, Hedvig RAP1-6
Bennett, Chad POS5-115
Bennett, Morgane POS3-116, POS5-106
Benowitz, Neal L. POS5-1
Bensch, Lindsey POS1-113, POS5-14
Benson, Lizbeth POS5-62
Ben Taleb, Ziyad POS2-133, POS5-81, POS5-107
Berman, Micah POS4-122
Beulah, Faith POS2-134
Bhatnagar, Aruni POS2-139
Bhattacharya, Paramita POS4-134
Bickel, Warren POS4-122
Bickel, Warren K. RAP3-5, POS3-144
Binrajka, Urvi POS4-115, POS5-22
Birchwale, Jennifer POS5-89
Bittencourt, Lorna POS5-30
Blake, Kelly POS5-50
Blakely, Tony POS1-123
Blalock, Janice POS5-8, POS5-18
Blank, Melissa POS5-154
Blount, Benjamin C. POS1-142, POS5-74, POS5-130
Bokemeyer, Frederike POS5-157
Bold, Krysten W. RAP2-4, RAP2-7, POS4-128,
POS5-133
Bolkovac, Emma POS5-123
Bontemps, Andrew P. POS1-110, POS2-113
Bordner, Candace R. POS5-152
Borland, Ron POS1-135, POS5-34, POS5-139
Borle, Amod POS5-149
Bourassa, Jenna POS1-114
Bourne, Dana E. POS1-134
Bover Manderski, Michelle POS1-142, POS5-64
Boynton, Marcella H. POS5-63
Bray, Bethany POS5-154
Brecher, Alison C. POS5-82
Brecht, Mary-Lynn POS5-1
Breitborde, Nicholas J. K. POS4-111
Brewer, Noel T. POS5-63
Bridges, John F. P. POS5-120

Brinkman, Hannah R. POS4-113
Brinkman, Marielle POS2-143, POS5-9, POS5-15,
POS5-115, POS5-121, POS5-124, POS5-136
Britton, Maggie POS2-144, POS3-123, POS4-118
Brown, Jamie POS2-117, RAP3-3
Brown, Jennifer L. POS1-122, POS2-121, POS4-132
Brown, Richard POS5-7
Brunette, Mary F. POS1-114, POS5-12
Bteddini, Dima RAP3-8, POS5-23, POS5-66
Buettnner-Schmidt, Kelly POS5-38
Bullen, Christopher RAP3-3, POS3-120
Bullock, Sandilyn POS3-115
Bursac, Zoran POS2-133, POS5-81
Businelle, Michael S. POS2-111, POS2-131, POS5-5,
POS5-62, POS5-143
Buss, Vera H. POS2-117
Buszkiewicz, James H. RAP2-3, POS5-76, POS5-103
Byron, M. Justin POS5-63

C

Calixte-Civil, Patricia POS5-25
Camenga, Deepa R. RAP2-4, POS2-138, POS4-128,
POS5-133
Campbell, Janis E. POS4-135
Cannoy, Ciara POS5-16
Caponnetto, Pasquale POS4-112
Cappella, Joseph N. POS5-63
Carcoba, Luis M. PPS17-7
Carl, Ellen POS1-113, POS5-14
Carney-Knisely, Geoffrey POS4-111
Caron, Kevin T. POS5-74
Carpenter, Mathew J. RAP2-1, POS5-2
Carreon, Ana S. PPS-8
Carroll, Dana POS5-30
Carter, Brian J. POS2-144, POS3-123, POS4-118
Cartujano-Barrera, Francisco POS2-129, POS3-141
Case, Samantha POS3-140
Celentano, Mia POS5-114
Cervenka, Iris POS5-119
Cestaro, Kaitlyn N. POS5-114
Chaiton, Michael POS1-138, POS5-32
Chakraborty, Bedant POS2-129
Chan, Ching Han Helen POS1-111, POS5-19
Chan, Gary POS5-34, POS5-36
Chan, Siu Chee Sophia POS1-111, POS5-19
Chan, Sophia Siu Chee POS4-121, POS4-136
Chan, Sophia Siu-chee RAP1-7
Chang, Joanne POS5-93
Chapman, Hannah M. RAP3-2, POS3-125, POS4-126
Chattopadhyay, Suhana POS5-155
Chaturvedi, Pankaj POS5-61
Chávez, Arlette POS3-141
Chávez, Ricardo Artemio POS4-123, POS5-144
Cheema, Sohaila POS1-137, POS4-140
Chen, Baojiang POS2-127, POS5-79, POS5-142
Chen, Jian POS4-125, POS5-134
Chen, Jiarui POS2-125
Chen, Meng POS2-111
Chen, Tian Qi POS5-109
Chen, Tzuan A. POS2-144, POS3-123, POS4-118
Cheney, Marshall K. POS4-117, POS5-5
Cheng, Chiao-Wei POS5-1
Cheng, Christopher Chi Wai POS5-113
Cheng, David POS5-57
Cheng, Kai-Wen POS5-85, POS5-156



SRNT

AUTHOR INDEX

Cheng, Yu-Ching	POS3-137	Cummings, K. Michael	POS1-135, POS4-122, POS5-2, PPS5-6, POS5-34, POS5-69, POS5-72, POS5-91, POS5-132, POS5-139, POS5-150	Eissenberg, Thomas	RAP1-4, POS5-32
Chen-Sankey, Julia	POS5-64, POS5-70, POS5-138, POS5-153	Cumo, Raphael	POS2-145	El Hage, Rachel	POS5-58
Cheung, Derek Yee Tak	POS4-121, POS4-136, POS5-113	Cupertino, Paula	POS3-141	El Hellani, Ahmad	POS5-115
Cheung, Derek Yee-Tak	POS5-19	Curran, Hayley	POS2-143, POS5-121, POS5-124	El-Hellani, Ahmad	POS5-58
Cheung, Yee Tak	POS5-109	Curtis, Sarah	POS3-120	Ellerbeck, Edward F.	RAP3-4, POS5-20
Cheung, Yee Tak Derek	POS1-111	Czaplicki, Lauren	POS1-120, POS2-114, POS2-132, POS5-53	ElNakib, Nour	POS5-110
Chi, Xiaofei	POS5-66	D			
Chiang, Shawn	POS1-133	Dabroy, Danny	POS5-107	Erdei, Esther	POS5-88
Childers, Margaret	POS5-154	da Fonseca, Guilherme W. P.	POS5-10	Erinoso, Olufemi	POS1-131
Cho, Ara	POS5-36	Dahne, Jennifer	RAP2-1	Espinosa, Adriana	RAP3-9, POS5-75
Cho, Sung-il	POS5-156	Danielsson, Tobias	RAP1-6	Espinoza, Veronika E.	PPS-8, POS5-59
Cho, Yoo Jin	POS5-15	Dark, Michael	POS3-112	Estey, David	POS5-89
Choi, Kelvin	POS5-70	Davies, Nathan	POS4-120	Everard, Colm	POS1-142
Chou, Ann F.	POS4-135	Davila, Gustavo	POS1-130, POS2-137, POS4-138	Excell, ShayLin	POS5-16
Christensen, Carol	POS3-139, POS5-93	Davis, Danielle	RAP2-4, POS2-138, POS4-128		
Chung-Hall, Janet	POS5-69	Davis, Danielle R.	POS5-133	F	
Cinciripini, Paul M.	POS5-6, POS5-8, POS5-18	Davis, Taylor	POS3-120	Fabbricatore, Jessica	POS5-73
Clark, Sonia	POS2-146	Delbourgo Patton, Caroline	POS5-89	Fagan, Pebbles	POS3-115
Clark, Sonia A.	POS1-121, POS5-40	Delnevo, Cristine D.	POS1-140, POS1-142, RAP2-6, POS3-137	Fahey, Margaret C.	RAP2-1
Clawson, Ashley H.	POS3-115	Del Valle-Pinero, Arseima	POS1-142, POS3-137	Fahnlander, Alexandra M.	POS5-66
Clegg Smith, Katherine	POS4-132, POS5-56	Demjén, Tibor	POS1-135, POS5-139	Fahrion, Alexis	POS1-117
Clendennen, Stephanie L.	POS2-127, POS2-141, POS4-133, POS5-79, POS5-142	de Moraes, Iana R.	POS1-115, POS2-112, POS5-10	Fahsen, Natalie	POS1-130, POS5-135
Clifford, James S.	POS1-132	Denlinger-Apte, Rachel L.	POS3-120	Fahsen Paetau, Natalie	POS2-137
Cobb, Caroline	POS5-107	Deshmukh, Chetana	POS5-149	Fahsen-Paetau, Natalie	POS4-138
Cockburn, Myles G.	POS5-67	Devine, Brittany P.	POS3-110	Faith, Beulah	POS3-113
Cohen, Joanna	POS1-120, POS1-122, RAP2-5, POS2-121, POS2-122, POS3-127, POS3-129, POS4-134, POS5-32, POS5-49, POS5-56	Deyo, Alexa G.	POS3-138	Fajardo, Gerardo	POS1-119
Cohen, Joanna E.	POS2-123, POS4-132, POS5-41, POS5-86, POS5-87	Diaz, Destiny	POS4-139	Feinstein, Marc Jerome	POS2-118
Cohn, Amy M.	POS2-131, POS2-140, POS4-135	Diaz, Megan	POS2-130	Feng, June	POS1-142
Colwell, Brian	POS5-108	Díaz-Andrade, Evangelina	POS3-133	Ferketich, Amy	POS2-143, POS5-121, POS5-124
Compton, Wilson	POS3-137	Dimaya, Brenda S.	POS5-151	Fernández, Esteve	POS1-135, POS5-139
Conway, Fiona N.	RAP3-9, POS5-75	Dino, Geri	POS5-154	Ferron, Joelle	POS1-114, POS5-12
Cook, Steve	POS5-126	Ditre, Joseph W.	POS3-138	Fetterman, Jessica L.	POS2-139, POS4-124, PPS7-6
Cook, Steven	POS5-76	Doane, Jacqueline	POS5-57	Fiellin, Lynn E.	POS5-66
Copeland, Amy	POS4-114	Donald, Katherine	POS3-115	Fieroze, Fariza	POS5-149
Copeland, Amy L.	RAP3-2, POS3-125, POS4-126	Donaldson, Elisabeth	POS3-137	Figueroa, Wilson	POS4-116
Coreas, Saida	POS4-144	Donny, Eric	POS3-120	Finazzo, Jeremy J.	POS3-110
Cornacchione Ross, Jennifer	POS1-121, POS2-139, POS2-146, POS5-40, POS5-148, PPS7-6	Donovan, Emily	RAP1-1, POS5-96	Fiore, Michael	POS5-3
Correa- Fernández, Virmarie	POS1-119, POS2-144	Dowd, Ashley N.	POS2-114	Fix, Brian	POS5-78, POS5-150
Cotoc, Crina	POS3-140	Drake, Cara	POS1-127	Fleischer, Nancy L.	RAP2-3, POS5-76, POS5-103
Cottoms, Naomi	POS3-115	Driezen, Pete	PPS5-6, POS5-91, POS5-132	Fleisher, Linda	POS5-82
Cottrell-Daniels, Cherell	RAP3-10, POS5-128	Duan, Zongshuan	POS4-127	Fleshman, Clint C.	POS5-115, POS5-136
Cox, Sharon	POS2-117	Dubray, Jolene	POS1-138	Flores Escartin, Maria Guadalupe	POS5-56
Craig, Lorraine V.	POS5-69, POS5-139	Duffy, Kara	POS1-142	Fofana, Malik	POS5-157
Creamer, MeLisa	POS3-137	Dunlap, Chris M.	POS4-117	Fong, Geoffrey T.	POS1-135, POS3-126, POS3-143, POS4-129, PPS5-6, PPS5-7, POS5-34, POS5-46, POS5-69, POS5-91, POS5-132, POS5-134, POS5-139, POS5-141, POS5-150, POS5-156
Crespi, Elizabeth	POS2-121, POS2-123, POS4-132, POS5-86, POS5-87	Duren, Michelle	POS2-122, POS3-127, POS5-41, POS5-49	Foucaud, Jerome	POS5-119
Cristol, Benjamin A.	POS2-141	Durkin, Sarah J.	POS1-116, POS5-77	Foulds, Jonathan	POS5-105, POS5-152
Croft, Daniel	POS5-90	E			
Cropsey, Karen L.	POS1-110, POS2-113	East, Katherine	POS5-45	Foulon, Alanna	POS5-16
Crossley, Sam	POS4-120	Easter, Alexa G.	POS1-140	Franco, Nicholas	POS5-84
Crouch, Maria C.	RAP2-7	Ebling, Todd	POS5-48	Frank-Pearce, Summer G.	POS2-111, POS2-131, POS4-135
Cravinel, Erica	RAP3-4, POS5-20	Ebrahimi Kalan, Mohammad	POS2-133, POS5-81, POS5-107	Frasso, Rosie	POS5-82
Cruz, Lisa	POS5-89	Eckel, Sandrah P.	POS5-67	Freitas-Lemos, Roberta	RAP3-5, POS3-144
Cruz-Jiménez, Lizeth	POS3-133, POS5-117	Edwards, Kathryn	RAP1-5, POS1-142, POS3-137	Friedman, Daniela B.	POS5-46
Cui, Mandy	POS2-145	Edwards, Richard	POS1-135, POS3-126, POS3-143, POS4-129, POS5-139, POS5-141	Friedman, Joseph	POS5-89
Cui, Yong	POS5-6, POS5-8	Ehlke, Sarah J.	POS2-140	Frischmann, Sarah-Michelle	POS5-33
Cui, Yuxian	POS1-120			Fryer, Craig	POS3-124
Cullen, Karen	POS5-93			Fryer, Craig S.	POS5-122



Fu, MarcelaPOS1-135, POS5-139
Fung, Vicki POS5-57

G

Gaal, Peter POS5-55
Gaalema, Diann E. POS2-118
Gades, Mari POS5-146
Gajendra, Sangeeta POS2-129
Gajweski, Byron RAP3-4
Galas, Larissa G. POS2-112, POS5-10
Gali, Kathleen POS5-157
Gallagher, Matthew POS5-5
Gallegos, Katia POS5-117
Gallegos-Carrillo, Katia POS3-133, POS3-141
Gallopel-Morvan, Karine POS5-119
Galper, Emily POS3-146
Gamble, Karen L. POS1-110
Ganz, Ollie POS1-140
Garcia-Trevizo, Prescilla PPS-7
Gardner, Alice RAP3-10
Garey, Lorra POS5-5
Garg, Suneela POS5-149
Gartner, Coral POS1-135, POS5-34, POS5-36
Gautam, Prem POS1-136, POS5-81
Gautum, Prem POS2-133
Gaya, Patricia V. POS1-115, POS2-112, POS5-10
Gebhardt, Zachary POS2-130
George, Tony POS5-89
Geronimo, Berjarano POS5-62
Gill, Steven R. POS5-90
Giner, Priscilla PPS-8, POS5-59, PPS17-7
Giovenco, Daniel POS3-121
Giovenco, Daniel P. POS1-140
Gittleman, Jennifer POS5-89
Glasser, Allison M. POS5-31, POS5-123
Glover, Nina I. RAP3-2, POS4-126
Goff, Roman Mikail POS5-107
Goldberg, Sydney POS5-57
Golden, Sara POS3-119
Goldstein, Adam POS1-121, POS2-146, POS5-40,
POS5-148
Goldstein, Adam O. POS3-110, POS5-63
Gomez, Andres POS4-143
Goniewicz, Maciej L. POS1-142, POS3-144,
POS5-100
Gonzalez Anaya, Maria J. POS5-116
Gonzalez Anaya, Maria Jose POS2-115
Gordon, Natacha POS5-89
Gottfredson, Nisha POS3-146
Gottlieb, Mark POS5-137
Gould, Thomas J. PPS-7
Goyette, Rebecca POS5-96
Gravely, Shannon POS1-135, PPS5-6, PPS5-7,
POS5-34, POS5-69, POS5-91, POS5-132
Green, Charles E. POS5-6
Grilo, Graziele POS4-134, POS5-56
Gueroguevia, Ralitz RAP2-7
Guillemin, Anne-Fleur POS5-119
Gunawan, Tommy POS5-13
Gundle, Kenneth POS3-119
Gunturi, Aditya POS2-129
Gunzler, Douglas POS1-139
Guo, Derek POS5-104
Guo, Merrybelle POS5-68
Guo, Ziqiu POS2-124

Gupta, Prakash POS5-61
Gupta, Prakash C. POS5-46
Gurka, Matthew J. POS5-66
Gutter, Michael S. POS5-66

H

Hackworth, Emily E. POS5-83, POS5-135
Hagen, Les RAP2-5
Hairi, Farizah Mohd POS1-135
Halenar, Michael POS3-137
Hall, Jaclyn M. POS5-66
Hall, Mark POS5-48
Halpern-Felsher, Bonnie POS5-37
Hammad, Hoda POS3-137
Hammal, Fadi RAP2-5
Hammond, David PPS5-7, POS5-45, POS5-69,
POS5-72, POS5-83, POS5-132
Han, Dae Hee POS2-115
Han, Dae-Hee POS5-47
Han, Eileen POS5-37
Hanby, Elaine RAP3-8, POS5-23
Hanna, Eliana POS5-58
Hansen, Eleanore POS2-128
Hao, Deyan POS4-124
Hardesty, Jeffrey J. POS2-123, POS5-86, POS5-87
Harlow, Alyssa F. POS5-67
Harrell, Melissa POS2-141
Harrell, Melissa B. POS2-127, POS4-133, POS5-79,
POS5-142
Harrell, Paul POS5-127
Harris, Jeff POS1-118
Hart, Joy L. POS5-100
Hartzell, Julie A. POS3-110
Harwood, Emily POS3-120
Hatsukami, Dorothy ... POS1-142, POS3-120, POS4-122,
POS4-143, POS5-15, POS5-146
He, Aaron Wanjia POS4-121, POS5-113
He, Wanjia POS4-136
He, Yanyun POS3-122, POS5-52, POS5-134
Heaney, Chris POS5-88
Hebert, Emily POS5-5, POS5-62
Hébert, Emily POS5-143
Hébert, Emily T. POS2-141
Hebert, James R. POS5-46
Heckman, Bryan W. POS3-138
Heide, Dani POS5-151
Henley, Patricia POS5-57
Heo, Moonseong POS3-114
Hepi, Maria RAP2-8
Heron, Jon POS4-137
Hidalgo, Samantha POS2-120
Hines, Lindsey POS4-137
Hinton, Alice POS5-9, POS5-15, POS5-31, POS5-123
Hirschtick, Jana L. RAP2-3, POS5-103
Ho, Sai Yin POS5-109
Hobkirk, Andrea L. POS5-152
Hogan, Alexis POS1-131
Hong, Chen RAP1-7
Hong, Kurt POS2-115
Hong, Kurt M. POS5-47
Hong, Traci POS2-139, POS4-124, PPS7-6
Hosgor, Murat POS5-21
Houser, Kenneth R. POS5-152
Hovhannisyann-Romero, Erena POS5-88
Howe, Samantha POS1-123

Hoyt, Danielle L. POS4-113
Hrywna, Mary RAP2-6, POS3-121
Huber, Maria V. POS5-95
Huque, Rumana POS5-149
Hyland, Andrew POS1-113, POS1-135, POS1-142,
POS2-120, POS3-137, PPS5-6, PPS5-7, POS5-14,
POS5-34, POS5-91, POS5-132,
POS5-134, POS5-139

I

Ibrahim, Maryam POS5-53
Indome, Eunice O. POS5-139
Iqbal, Romaina POS5-149
Islam, Khandaker POS4-144
Issabakhsh, Mona POS4-131, POS5-98
Iturbe, Emilio POS5-101

J

Jackson, Asti RAP2-4
Jackson, Cath POS5-149
Jackson, Kristina M. POS3-142
Jacob, Peyton III RAP1-5
Jacques, Nerline POS3-132
Jafarzadeh, Nikki S. POS2-115, POS5-47
Jafry, Midhat Z. POS3-123, POS4-118
James, Shirley A. POS5-94
Jamil, Hassan POS3-144
Jankowski, Emma POS2-143, POS4-116, POS5-121,
POS5-124
Jansen, Kelley POS1-118
Jao, Nancy C. POS1-136
Jarman, Kristen L. POS1-121, POS2-146, POS5-40,
POS5-148
Jebai, Rime POS2-133, POS5-81
Jeffers, Abra POS5-57
Jemal, Ahmedin POS5-71
Jensen, Joni POS4-143
Jenson, Desmond POS4-122
Jeon, Jihyoun POS5-126
Jeon, Moonsun POS1-143
Jeong, Michelle POS5-70
Jiang, Shuning POS5-134
Jimenez Mendoza, Evelyn RAP2-3
Jimenez-Mendoza, Evelyn POS5-126
John, Lovina POS2-120
Johnson, Adrienne L. POS5-97
Johnson, Ellie POS3-126, POS3-143, POS5-141
Johnson, Matthew POS5-53
Johnson-Campbell, M POS4-130
Jolly, Pauline POS4-130
Jones, Dina M. RAP3-10, POS3-115
Jones, Erin POS5-73
Jones, Flannery M. POS3-110
Jones, Hannah POS4-137
Jones, Jamal POS3-139
Jones, Jeremy POS5-115
Joo, Tamas POS5-55
Juliano, Laura M. POS3-145, POS5-13
June, Kristie M. POS5-78

K

Kaareen, Aadeeba POS4-125, POS5-52, POS5-134
Kahassai, Soliana POS5-121
Kakarla, Sriya N. POS3-123, POS4-118



- Kali, Kgomotso S. POS5-140
Kanaan, Mona POS5-149
Kanaan, Sushama POS5-149
Kaplan, Brent A. RAP3-5
Karam-Hage, Maher POS5-6, POS5-8, POS5-18
Karaoghlanian, Nareg POS5-58
Kashan, Rachel POS5-89
Kasza, Karin A. PPS5-6, PPS5-7, POS5-91
Katanoda, Kota POS1-135, POS5-139
Katuri, Guru Prasad RAP3-1
Katz, David POS3-119
Kaufman, Annette POS5-50, POS5-145
Kaur, Raman POS5-123
Kaye, Jesse T. POS5-97
Kelder, Steven H. POS5-66
Keller, Brittany L. POS4-113
Keller-Hamilton, Brittney POS2-143, POS5-115, POS5-121, POS5-124
Kellner, Allie M. POS5-66
Kemper, Joya RAP3-3
Kendzor, Darla POS1-133, POS2-111, POS2-131, POS5-62, POS5-143
Kendzor, Darla E. POS2-140
Kenford, Susan L. POS5-11
Kennedy, Ryan POS3-129
Kennedy, Ryan David POS2-114, POS2-122, POS2-123, POS2-132, POS3-127, POS4-134, POS5-41, POS5-49, POS5-53, POS5-86, POS5-87
Kernan, Colleen POS3-112
Keshari, Shuvam POS5-65
Kezbers, Krista POS5-5, POS5-143
Khalil, George E. POS5-66
Khalil, Georges E. POS5-26
Khan, Asia POS1-142
Khan, Fahad POS5-94
Khan, Zohaib POS5-149
Khanna, Niharika POS3-112
Kharal, Maariyah POS4-142
Khariwala, Samir POS5-61
Khlystov, Andrey POS1-129, POS1-131
Khouja, Jasmine POS4-137
Kibbey, Mindy M. POS4-113
Kierstead, Elexis POS2-130
Kildosher, Kathleen E. POS4-113
Kim, Minji POS1-117
Kim, Seokhun POS5-6
Kim, Su Young POS1-135, POS5-139
Kim, Yeol POS5-156
Kim, Yoonsang POS2-130
Kimmel, Heather POS1-142, POS3-137
Kim-Mozeleski, Jin POS1-139
King, Ahsley POS3-114
King, Jessica POS5-48
Kingsley, Melody POS5-57
Klaff, Rebecca POS4-130, POS5-29
Klein, Elizabeth POS2-143, POS5-124
Klein, Elizabeth G. POS3-130, POS3-135, POS5-121
Klein, Ophir POS5-60
Klemperer, Elias POS2-118
Klemperer, Elias M. RAP3-7
Kleykamp, Bethea A. RAP1-4, POS4-112
Klyushnenkova, Elena POS3-112
Kofie, Justina POS5-93
Kong, Amanda POS3-121, POS5-84
Kong, Amanda Y. RAP2-6
Kong, Grace POS1-128, POS1-144, RAP2-4, POS2-126, POS4-128, POS5-44, POS5-65, POS5-84, POS5-114, POS5-133
Koopman Gonzalez, Sarah POS3-130, POS5-33
Kosarac, Ivana RAP3-1
Kostygina, Ganna POS2-130
Kouyoumjian, Silva POS1-137, POS4-140, POS5-110
Kowitt, Sarah POS2-135
Kowitt, Sarah D. POS1-121, POS2-146, POS3-146, POS5-40, POS5-148
Krenek, Brittany POS5-29
Krishnan-Sarin, Suchitra RAP2-4, POS2-138, POS4-128, POS5-84, POS5-133
Krukowski, Rebecca A. RAP2-9, POS5-129
Kruse, Gina POS3-113
Kruse, Gina R. POS2-134
Kue, Donald POS1-131
Kueppers, George POS5-50
Kumar, Sean S. POS5-127
Kumarasamy, Nagalingeswaran POS2-134, POS3-113
Kurim, Sara RAP3-1
Kyburz, Bryce POS2-144, POS3-123, POS4-118
Kypriotakis, George POS5-6, POS5-8, POS5-18
Kypriotakis, Maria POS5-8
- L**
Labarbe, Benoît POS5-119
La Capria, Kathryn POS5-70, POS5-138, POS5-153
Lagasse, Lisa POS3-137
Lai, Vienna Wai Yin POS2-124
Lai, Vienna Wai-yin POS4-121
Laking, George RAP3-3, POS3-120
Lam, Tai Hing RAP1-7, POS1-111, POS2-124, POS4-121, POS5-19
Lam, Tat Hing POS5-109
Lam, Veronica Suk Fun POS4-136
Land, Stephanie POS5-145
Lang, Bodo RAP3-3
LaNoue, Marianna POS5-82
Le, Nicolette POS2-145
Le, Thuy T. T. POS4-131, POS5-98
Leal, Diego POS4-123, POS5-144
Leal, Isabel M. POS3-123
Ledgerwood, David M. POS5-16
Lee, Boram POS5-57
Lee, Dara POS5-100
Lee, Elizabeth K. POS1-110
Lee, Eugenia POS3-124
Lee, Hye Myung POS5-156
Lee, Hyunjung POS5-17
Lee, Jeong Kyu POS4-117
Lee, Ji-Hyun POS5-26, POS5-66
Lee, John POS5-24
Lee, Joseph RAP2-6, POS3-121
Lee, Joun POS5-17, POS5-89
Lee, Juhan POS1-128, POS1-144, RAP2-4, POS2-126, POS5-65
Lee, Sangah C. POS4-115, POS5-22
Lee, Sangah Clara POS3-136
Lee, Sarah POS2-125
Lee, Sungkyu POS5-156
Lee, Taylor POS4-119
Lee, Terrence POS3-139, POS5-93
Leigh, Noel J. POS3-144
LeLaurin, Jennifer H. RAP3-8, POS5-23, POS5-66
Lempert, Lauren POS5-37
Leong, Man-Chong POS5-26
Lerman, Caryn POS2-115
Leventhal, Adam POS2-115
Leventhal, Adam M. POS5-47, POS5-67
Levin, Jacob POS5-89
Levy, David POS4-131, POS4-141, POS5-85, POS5-98, POS5-102, POS5-126
Levy, David T. POS5-76
Levy, Douglas POS5-57
Levy, Sera M. POS2-113
Leyro, Theresa M. POS4-113
Li, Dongmei RAP1-2, POS2-125, POS5-80, POS5-90
Li, Wei RAP2-4, POS2-133, POS2-138, POS5-81
Li, Yameng POS4-131, POS5-98
Liao, Jiangang POS5-152
Liber, Alex POS5-85
Liber, Alex C. POS5-98
Lim, Sujin POS5-156
Ling, Pamela POS5-96
Little, Melissa A. RAP2-9
Litwin, Alain POS3-114
Liu, Jiaying POS1-143, POS5-73
Liu, Lufeiya POS5-100
Loretan, Caitlin POS5-93
Lou, Xiang-Yang POS5-26
Lovelady, Nakita RAP3-10
Lowery, Bryce POS4-117
Lu, Bo POS5-92
Lu, Yu POS4-117
Ludwig, Katelyn POS5-1
Lugo, Wilmer POS1-119
Luk, Tzu Tsun RAP1-7, POS4-121
Lundahl, Leslie H. POS5-16
Luo, Xianghua POS2-128
- M**
Ma, Jianqi POS4-124
Ma, Shaoying POS4-125, POS5-39, POS5-52, POS5-120, POS5-134, POS5-156
Macauda, Mark M. POS5-46
MacDonald, Lindsey RAP2-8
Macisco, Joseph POS5-31
Mackey, Timothy K. POS2-145
Madar, Alena POS1-122, POS5-56
Madar, Alena E. POS4-134
Maddock, Jay POS5-108
Maglalang, Dale Dagar POS2-119, POS3-136, POS4-115, POS5-22
Maglia, Marilena POS4-112
Mahmood, Alina POS5-18
Maisonnette, Patrick POS1-137, POS4-140
Mak, Tin Shun Titan POS1-111, POS5-19
Malayil, Leena POS5-155
Malik, Najum Z. POS5-95
Malone, Mona H. POS4-115, POS5-22
Mamtani, Ravinder POS1-137, POS4-140
Mandarano, Lucia POS5-115, POS5-121
Mares, Juan Jose POS5-101
Marion, Matthew POS1-113, POS5-14
Martines, Paul POS5-116



- Martinez, Bianca POS1-129
Martinez, Bianca L. POS1-131
Martinez, Jose POS4-119
Martinez Leal, Isabel POS2-144, POS4-118
Martins, Silvia S. POS5-127
Mason, Tyler POS2-115
Mason, Tyler B. POS5-47
Matoska, Cameron POS5-5
Maxton, Olivia POS5-153
Mays, Darren POS5-115
Mazhar, Laraib POS5-105, POS5-149
McCarthy, Danielle POS5-3
McClernon, F Joseph POS5-30
McClernon, Joseph POS5-28
McClure, Erin POS5-132
McColgan, Bryan RAP1-6
McDonald, Abigail POS1-117
McDonald, Emily POS3-116
McDonough, Brian POS1-113, POS5-14
McIntosh, Scott POS2-129, POS5-104
McLaughlin, Victoria POS1-131
McMains, Joshua POS5-73
McMann, Tiana POS2-145
McNeill, Ann POS1-135, POS5-34, POS5-139, POS5-149
Mehta, Toral POS5-9, POS5-121, POS5-136
Mendez, David RAP1-3, POS4-131, POS5-98
Mendez, Ian A. PPS-8
Meng, Gang POS1-135, POS5-69, POS5-139
Menkevich, Madison POS5-153
Mercer, Anna POS5-104
Mercincavage, Melissa POS1-131
Messer, Sylvie POS5-89
Meza, Rafael POS4-131, POS4-141, POS5-76, POS5-98, POS5-102, POS5-126
Middleton, William A. RAP3-7
Miller, Donald POS5-38
Miller, Felicia POS1-131
Miller, Irit POS5-60
Milstred, Andrea POS5-154
Min, Jung-Yun POS5-89
Minami, Haruka POS5-7, POS5-17, POS5-21
Minnix, Jennifer POS5-6, POS5-8, POS5-18
Minocha, Rohan POS4-144
Mishu, Masuma POS5-149
Mitsopoulos, Eve POS1-116, POS5-77
Mobley, Erin M. POS5-66
Moe, Aye A. POS5-100
Mohan, Nikhil POS1-144
Mohd Hairi, Farizah POS5-139
Mongodin, Emmanuel POS5-155
Mons, Ute POS1-135, POS5-139
Monterosso, John POS2-115
Montgomery, Audrey POS5-62, POS5-143
Monzon, Jose POS1-130, POS4-138, POS5-101
Monzon, Jose Carlos POS2-137, POS5-135
Moore, Graham POS2-117
Morales, Makayla POS1-117
Moran, Meghan POS2-132, POS3-129, POS5-53
Moran, Meghan B. POS2-114
Morean, Meghan POS2-138
Morean, Meghan E. RAP2-4, POS5-133
Moreno, Chelsea S. POS3-132
Morphett, Kylie POS5-34
Mortazavizadeh, Zeinab POS2-133
Moser, Richard POS5-50
Mukerjee, Richa RAP2-3
Mukherjee, Nirmalya POS4-134
Mulhern, Ryan POS2-129
Murphy, James G. POS5-129
Murray, Rachael POS4-120
Murthy, Dhiraj POS1-128, POS1-144, POS2-126, POS5-65
Mus, Sophia POS1-130, POS2-137, POS4-138, POS5-101, POS5-135
Muscata, Joshua E. POS5-152
N
Nader, Joanne POS4-140
Nagawa, Catherine S. POS2-134, POS3-113
Nam, Sunny POS5-84
Nargis, Nigar POS5-43, POS5-71
Naude, Gideon POS5-53
Navarro, Mario A. POS5-106
Nazir, Niaman POS5-20
Nemeth, Julianna POS5-123
Nemeth, Julianna M. POS5-31
Newcomer, Eiman H. POS3-110
Ng, Tsz King POS2-124
Nguyen, Kimberly POS3-139
Nian, Qinghua POS2-123, POS5-86, POS5-87
Niaura, Raymond POS1-142, POS4-127
Nini, Paul POS2-143, POS5-121, POS5-124
Nip, Janine POS3-126, POS3-143, POS4-129, POS5-141
Njie, Gibril POS3-132
Noar, Seth POS3-146
Noar, Seth M. POS2-135
Noble, Bishop POS1-133
Nollen, Nikki POS4-115
Nollen, Nikki L. RAP3-4
Noonan, Devon POS5-30
Norris, Andrew POS2-130
Norton, Kaila POS5-9, POS5-15, POS5-78, POS5-136
Nosa, Vili RAP3-3
Nshimiyimana, Jean POS5-15
Nuss, Tegan POS1-116, POS5-77
O
Ober Allen, Julie POS4-117
O'Brien, Erin K. POS5-106
O'Connor, Richard POS1-113, POS2-120, POS3-137, POS3-144, POS4-122, POS4-139, POS5-14, POS5-54, POS5-78, POS5-150
O'Connor, Shannon D. RAP3-7
O'Dell, Laura E. PPS-8, POS5-59, PPS17-7
Ogbansiegebe, Joseph POS3-116
Oh, Hayoung POS4-141
Okitondo, Christian POS5-43
Okker-Edging, Kate POS5-23
O'Leary, Rae POS5-88
Oliver, Jason A. POS2-140
O'Malley, Stephanie S. RAP2-7
O'Neal, Riley RAP2-1
Ordonez, Maricar POS5-116
Origgi, Juan M. POS4-124
Origgi, Juan Manuel PPS7-6
Orloff, Mohammed POS3-115
Ormond, Isabelle K. POS5-100
Orr, Megan POS5-38
Ortega, Sebastian POS5-59, PPS17-7
Ortiz, Erik POS3-114
Osborn, Catherine POS3-130, POS5-33
Osibogun, Olatokunbo POS5-81
Ossip, Deborah POS2-129, POS5-90, POS5-104
Ouellete, Rachel POS1-128, POS1-144, POS2-126, POS5-65
Ouellette, Rachel R. POS5-44, POS5-114
Ovilla, Marbella POS5-101
Ozga, Jenny E. RAP1-5, POS5-100
P
Page, Michelle K. POS3-144
Page, Simon POS5-151
Palenski, Paige POS5-25
Palmer, Amanda RAP3-3
Pan, Liping POS3-132
Pancake, Mary H. POS5-115
Pandey, Ashok POS4-145
Pang, Jiayi POS5-104
Pang, Raina POS5-47
Pant, Mohan D. POS5-127
Parag, Varsha RAP3-3, POS3-120
Parent, Abby POS3-140, POS4-143
Park, Hojin POS5-39, POS5-52, POS5-120, POS5-134
Patel, Akash POS5-103
Patel, Devaki POS2-115, POS5-116
Patel, Minal POS5-43
Patil Bovi, Mamata POS1-126
Patten, Christi POS1-118
Patterson, Joanne POS2-143, POS4-116, POS5-121, POS5-124
Paul, Emily POS5-78, POS5-150
Pauls, Caroline POS2-128
Pearson, Jennifer POS1-127, POS1-131, POS1-142
Pebley, Kinsey RAP2-1, POS5-129
Peck, Jennifer D. POS4-135
Pednekar, Mangesh S. POS5-46
Pehlivan, Nazife POS5-125
Peña, Sebastián POS3-128
Pennell, Michael POS2-143, POS5-121, POS5-124
Penzes, Melinda POS5-55
Peraza, Natalia POS2-115, POS5-47, POS5-116
Perez, Esther POS5-89
Perfekt, Roland RAP1-6
Pericot-Valverde, Irene POS3-114
Petersen, Ashley POS5-146
Peterson, Emily B. POS5-68
Petitti, Ryan POS5-115
Petraccone, Dora RAP3-1
Pia, Tyler POS5-89
Pike Moore, Stephanie POS1-139, POS3-130, POS5-33
Pilehvari, Asal RAP2-9
Pilla, Jenine RAP3-8, POS5-23
Piyankarage, Sujeeva C. POS5-130
Plotnik, Isabella POS5-89
Pluta, Kathryn RAP3-8, POS5-23
Polansky, Caroline J. POS5-66
Pollak, Kathryn I. RAP3-4
Polosa, Riccardo POS4-112
Pomichter, Emily POS2-136
Poongulali, Selvamuthu POS2-134



Porneala, Bianca POS3-113
Porneala, Bianca C. POS2-134
Powers, Jessica M. POS3-138
Prakash, Krithika POS5-16
Pratt, Sarah POS1-114
Pratt, Sarah I. POS5-12
Prom-Wormley, Elizabeth C. POS1-132
Przewoźniak, Krzysztof POS1-135, POS5-139
Puntambekar, Namrata POS5-61

Q

Qiu, Zefeng POS4-125
Quah, Anne POS3-126, POS3-143, POS4-129,
POS5-141, POS5-156
Quah, Anne C. K. POS5-69, POS5-139
Queimado, Lurdes POS5-15
Quinones Tavaréz, Zahira A. POS5-90
Quisenberry, Amanda POS2-120, POS3-130

R

Ra, Chaelin K. POS2-111, POS5-125
Rabello, Luane POS1-119
Radhakrishnan, Sriji POS1-144, POS5-65
Rahimi, Mehdi RAP3-3
Rahman, Irfan RAP1-2, POS5-90
Rajesh Kumar, Lavanya POS4-128
Rajesh-Kumar, Lavanya POS5-133
Ramachandran, Padmini POS5-155
Ramírez-Palacios, Paula POS3-133, POS3-141
Rams, Alissa POS2-135
Ranker, Lynsie POS2-139, POS4-124, POS5-7
Ranney, Leah POS1-121, POS2-146, POS5-40,
POS5-148
Rath, Jessica POS5-151
Rebuli, Meghan E. POS4-144
Rees, Vaughan W. POS5-78
Rehman, Khalid POS5-149
Reid, Jessica PPS5-7, POS5-45, POS5-72, POS5-83
Reisinger, Sarah POS4-122
Reitzel, Lorraine R. POS2-144, POS3-123, POS4-118
Ren, Chunfeng POS5-93
Reuben, Jacqueline POS3-139
Reyes-Guzman, Carolyn POS5-93, POS5-119,
POS5-145
Reynales-Shigematsu, Luz Myriam POS5-56
Rezk-Hanna, Mary POS5-1
Richter, Kimber P. RAP3-4, POS5-20
Rigotti, Nancy POS2-134, POS3-113, POS5-57
Rinola, Bukola POS4-130
Ritchie, Caroline POS2-135, POS3-146
Rivard, Cheryl PPS5-7
Roberson, Avery POS5-72
Roberts, Megan POS2-143, POS5-9, POS5-92,
POS5-121, POS5-124, POS5-136
Roberts, Megan E. POS3-117
Robertson, Rose Marie POS2-139
Robichaud, Meagan O. POS5-41
Robinson, Jason POS5-6, POS5-8, POS5-18
Rodberg, Danielle POS2-142, POS5-112
Rodríguez, Rosibel POS5-117
Rodríguez-Bolaños, Rosibel POS3-133
Rodríguez-Bolaños, Rosibel de los Angeles POS3-141
Roemhildt, Maria POS5-131
Rogers, Erin POS4-142

Rogova, Anastasia POS2-144, POS3-123, POS4-118
Roh, Esther POS3-139
Rojas-Carmona, Anabel POS3-133
Rojewski, Alana POS1-112
Romm, Katelyn POS5-154
Rosado, Marina POS4-142
Rose, Shyanika W. RAP2-6, POS2-130
Rosenthal, Samantha R. POS3-136
Rosman, Jessica POS2-129
Ross, Jennifer C. POS4-124
Ross Dew, Kelsey POS5-63
Rossman, Matthew J. POS5-1
Rostron, Brian L. POS1-142, POS3-139
Roy, Karina POS5-57
Rubenstein, Dana POS3-138, POS5-25, POS5-28,
POS5-30, POS5-148
Ruglass, Lesia M. RAP3-9, POS5-75
Rule, Ana POS5-88
Ruleman, Ashlynn M. POS4-133
Ruszczak, Christopher POS4-143
Ruybal, Andrea L. POS5-100

S

Sabaratnam, Premini POS5-95
Sakhuja, Mayank POS5-46
Sakti, Primadya POS5-1
Salam, Sally POS5-58
Salazar, Maredyth C. RAP2-7
Saliba, Najat POS5-58
Salinas, Kalin Z. POS5-152
Sallis, Hannah POS4-137
Salloum, Ramzi G. RAP3-8, POS5-23, POS5-26,
POS5-66
Salman, Rola POS5-58
Sánchez-Romero, Luz M. POS4-131, POS4-141,
POS5-98
Sanders, Emily C. POS3-116
Santos, Meghan POS1-114
Santos, Meghan M. POS5-12
Sapkota, Amy POS5-155
Sawdey, Michael POS3-139
S. Bataineh, Bara POS2-127
Schaeffer Fraase, Kolby POS5-38
Scheuermann, Taneisha S. RAP3-4, POS5-20
Schick, Melissa R. RAP2-1
Schillo, Barbara RAP1-1, POS5-96
Schlam, Tanya POS5-125
Schlam, Tanya R. POS2-111
Schneller, Liane POS2-125, POS5-54
Scholz, Jaqueline POS1-115, POS2-112
Scholz, Jaqueline R. POS5-10
Schug, Kevin POS5-107
Schwartz, Robert POS1-138, POS5-32
Scollo, Michelle M. POS5-36
Scott, l'Yanna N. POS5-100
Seals, Douglas R. POS5-1
Secord, Robin POS1-113, POS5-14
Sedani, Ami E. POS4-135
Seidenberg, Andrew POS3-146, POS5-50, POS5-96
Selino, Sophia POS5-44
Selva Kumar, Danusha POS5-7
Selvamuthu, Poongulali POS3-113
Seng, Elizabeth K. POS3-111
Seo, Hong Gwan POS1-135, POS5-139, POS5-156
Seo, Young S. PPS5-7

Sesay, Mahdi RAP2-6, POS3-121
Shabaneh, Noor POS3-123, POS4-118
Shahab, Lion POS2-117, RAP3-3
Shaikh, Nida POS1-139
Shamblen, Stephen R. RAP3-6
Shane, Aliassa POS1-118
Shang, Ce POS3-122, POS3-124, POS4-125,
POS5-39, POS5-52, POS5-120, POS5-134,
POS5-156
Sharma, Akshika RAP2-4, POS2-120, POS2-138,
POS5-78
Sharma, Eva POS1-136, POS1-142
Sharma, Ramona POS2-116, POS2-142, POS5-112
Shaw, Jennifer L. POS1-118
Sheeran, Paschal POS1-121, POS2-135, POS2-146,
POS3-146, POS5-63
Sheffer, Christine E. POS1-113, RAP3-9, POS5-14,
POS5-75
Shenkmann, Elizabeth A. POS5-66
Shergina, Elena RAP3-4, POS5-20
Shields, Peter POS4-122
Shih, Ya-Chen Tina POS5-128
Shihadeh, Alan POS5-58
Shirin, Ahnoa POS5-104
Shoenbill, Kimberly A. POS3-110
Shojaie, Sharareh POS5-106
Shorey Fennell, Bethany POS5-128
Shroff, Neha POS5-60
Shukla, Radha POS5-149
Shuren, Chelsea C. POS5-100
Siddiqi, Ammar D. POS2-144
Siddiqi, Kamran POS5-149
Sifat, Munjireen POS1-133, POS2-131
Sigmon, Stacey C. RAP3-7
Simmons, Vani N. POS5-128
Sinamo, Joshua POS5-87
Sinamo, Joshua K. POS2-123, POS4-132, POS5-86
Singer, Jill M. POS3-117, POS5-92
Singh, Arjun POS5-61
Singh, MM POS5-149
Sinicrope, Pamela S. POS1-118
Sivertsen, Børge POS1-141
Skelly, Joan M. RAP3-7
Skogen, Jens C. POS1-141
Sloan, Ruth POS5-9, POS5-136
Smith, Caitlyn POS5-28
Smith, Danielle POS1-142, POS5-132
Smith, Katherine C. POS1-122
Smith, Michael A. POS2-140
Smith, Tracy POS5-2
Snell, Morgan RAP1-4
Sokolovsky, Alexander W. POS3-142
Son, Yeongkwon POS1-129, POS1-131
Song, Glory POS5-57
Sosnoff, Connie POS1-142
Sosnoff, Connie S. POS5-74
Sparrock, Lindsey S. POS3-145
Spears, Claire POS1-139
Speer, Jessica POS3-116
Spillane, Torra E. POS1-140
Spindle, Tory R. POS2-114
Stang, Garrett POS1-112
Stanley, James POS3-126, POS3-143, POS4-129,
POS5-141
Stanley, Nadia POS5-62, POS5-143



- Stanton, CassandraRAP1-5, POS1-142
Stanton, Cassandra A.POS5-100
Starceovich, KatherinePOS1-127
Stein, Jeffrey S.RAP3-5
Stepanov, IrinaPOS1-126, POS2-128, POS3-140,
POS4-122, POS4-143, POS5-15, POS5-61
Sterling, KymberlePOS3-124, POS5-122
Stewart, Shelby A.POS4-114
St. Helen, GideonRAP1-5
Stocklin, JaylynnPOS5-88
Storie, ChristinePOS4-119
Strasser, Andrew A.POS1-140
Strickland, JustinPOS5-53
Stroud, Laura R.POS1-136
Struckhof, NelePOS5-157
Struik, LauraPOS2-142, POS5-112
Suchting, RobertPOS5-79, POS5-142
Suh, RileyPOS4-115, POS5-22
Sumbe, AsleshaPOS2-127, POS4-133, POS5-79,
POS5-142
Sun, Christina J.POS3-119
Sun, RuoyanRAP1-3
Suratkal, JessicaPOS5-33
Sutfin, ErinPOS2-135, POS3-146
Sutton, Steven K.POS5-128
Sweet, LawrencePOS5-73
Szeliga, AndrewPOS1-113, POS5-14
- T**
- Tabbakh, TamaraPOS1-116, POS5-77
Tabuchi, TakahiroPOS1-135, POS5-139
Tackett, AlaynaPOS2-115, POS5-9, POS5-92,
POS5-136
Tackett, Alayna P.POS4-144, POS5-116
Talih, SohaPOS5-58
Tami-Maury, IrenePOS4-130, POS5-29
Tan, AndyPOS5-24
Tan, Andy S.POS5-23
Tan, Andy S. L.RAP3-8, POS5-137
Tan, JialePOS4-131, POS5-98
Tang, QihangPOS5-80
Tang, SharonPOS3-120
Tanner, NicholePOS1-112
Tapia, EverardoPOS5-101
Tautolo, El-ShadanPOS3-126, POS3-143,
POS4-129, POS5-141
Taylor, EvePOS5-45
Taylor, KristiePOS3-137
Taylor, Nandi L.POS5-20
Teddy, LaniRAP2-8
Tegge, Allison N.RAP3-5
Terry, Ellen L.POS3-138
Thakur, RomaPOS2-131
Theis, Ryan P.RAP3-8, POS5-23, POS5-66
Thickett, KellyRAP3-1
Thomas, AnnabellePOS2-143, POS5-121, POS5-124
Thomas, S. JustinPOS1-110
Thomas, SamanthaPOS5-25
Thompson, Kirsten T.RAP3-6
Thompson, Mary E.PPS5-6, POS5-91
Thornley, ToraPOS5-114
Thrasher, JamesPOS1-121, POS1-130, POS2-146,
POS4-123, POS5-40, POS5-83, POS5-101, POS5-117,
POS5-135, POS5-144, POS5-148
Thrasher, James F.POS2-137, POS3-133, POS4-138
- Thrasher, James F.POS5-46, POS5-69
Thrul, JohannesPOS1-120, POS2-114, POS5-53
Tillery, AnnaPOS5-88
Tjora, TorePOS1-141
Toll, BenjaminPOS1-112, RAP2-1
Tong, Henry Sau ChaiPOS2-124
Tong, Henry Sau-chaiPOS4-121
Torres-Alvarez, RossanaPOS5-102
Tountas, YiannisPOS5-139
Tran, HangPOS5-147
Tran, HyPOS2-130
Tran, Thanh HangPOS3-131
Trapl, ErikaPOS3-124, POS3-130, POS5-33,
POS5-122
Tretyakova, AlexandraRAP2-3
Trifiro, BrianaPPS7-6
Trinidad, DennisPOS5-27
Trites, JeffreyPOS5-131
Trofor, AntigonaPOS1-135, POS5-139
Tundealao, SamuelPOS4-130, POS5-29
Turiano, NicholasPOS5-154
Turnquist, Bruce E.POS5-13
Twesten, JennyPOS5-145
- U**
- Ullah, SafatPOS5-149
Uriarte, CaitlinPOS5-153
Usman, AyaantuPOS5-146
- V**
- van Bommel, DanaPOS1-142
Vander Weg, MarkPOS3-119
Van De Venne, JudyRAP2-6
Vardavas, Constantine I.POS1-135, POS5-139
Vargees, ComreenPOS5-100
Vassey, JuliaPOS3-134
Vasu, PranavPOS5-33
Vaughan, PhillipPOS5-104
Vergara, VictorPOS1-119
Versace, FrancescoPOS5-6
Vescia, FrancescaPOS5-37, POS5-37
Vidana, DesireePOS1-130, POS5-83, POS5-101
Vidaña Pérez, DesiréePOS2-137
Vidaña-Pérez, DésiréePOS3-133, POS4-123,
POS4-138
Vidana-Pérez, DésiréePOS5-117
Vidaña-Pérez, DésiréePOS5-135, POS5-144
Vidrine, Damon J.POS5-128
Vidrine, Jennifer I.POS5-128
Vigorita, MeganPOS3-116, POS5-68
Vilardaga, RogerPOS5-25, POS5-28
Villanti, AndreaPOS1-142, POS3-137, POS5-64,
POS5-70
Villanti, Andrea C.POS1-140
Vinton, KamiPOS2-126
Vogel, ErinPOS2-115
Vogel, Erin A.POS1-117
Vojjala, MahathiPOS4-142
Vujanovic, AnkaPOS5-5
V. Wilkinson, AnnaPOS2-127
- Waa, Andrew M.POS1-135, POS5-139
Wackowski, OliviaPOS5-64, POS5-70, POS5-138,
POS5-153
Wackowski, Olivia A.POS1-140
Wagener, Theodore L.POS5-9, POS5-15, POS5-115,
POS5-136
Wagner, DylanPOS5-92
Wahlquist, AmyPOS5-2
Walker, NatalieRAP3-3, POS3-120
Wallace, JaclynPOS5-78, POS5-150
Walton, MathewRAP2-8
Wang, JijiangPOS5-27
Wang, Kelvin Man PingPOS4-136
Wang, LanqingPOS1-142, POS5-74, POS5-130
Wang, Man PingRAP1-7, POS1-111, POS2-124,
POS4-121, POS5-19, POS5-109
Wang, YanPOS4-127
Ward, Kenneth D.POS2-133, POS5-81
Ware, Emily E.RAP2-1
Warner, KennethRAP1-3
Washburn, DavidPOS5-108
Waters, DamianPOS5-122
Watkins, Shannon LeaPOS1-117
Weiger, CaitlinPOS3-129, POS5-64, POS5-138,
POS5-153
Weinberger, Andrea H.POS3-111, POS5-89
Weiner, BenjaminPOS4-119
Welding, KevinPOS1-122, POS2-122, POS2-123,
POS3-127, POS4-134, POS5-41, POS5-49,
POS5-56, POS5-86, POS5-87
Wen, XiaozhongPOS5-95, POS5-100
Wermert, AmyPOS5-31, POS5-123
Werstuik, Saige-Taylor M.POS2-116
West, JuliaPOS2-136
West, Tyler A.POS3-121
Westmaas, J. LeePOS5-71
Wetter, David W.POS5-62, POS5-128
Whaley, ReidPOS2-115
White, Ashley H.POS5-94
White, CassidyPOS3-120
White, Helene R.POS3-142
Wicke, RebekahPOS5-73
Widanka, HollyPOS2-129, POS5-104
Wijaya, DerryPOS4-124, PPS7-6
Wiley, Rhiannon C.RAP3-7
Wilkinson, Anna V.POS5-79, POS5-142
Wilks, MeganPOS5-88
Willemssen, MarcPOS1-135, POS5-139
Williams, RhondaPOS5-131
Williams, TeresaPOS2-144, POS3-123, POS4-118
Wilson, Clark W.POS5-115, POS5-136
Wilson, MadelynePOS2-140
Wilson, NickPOS1-123
Wilson, Stephen J.POS5-152
Wilson, TimPOS1-123
Winickoff, Jonathan P.POS5-57, POS5-137
Wiseman, KaraRAP2-9
Wojtovich, Andrew P.POS5-90
Woodward, HonorPOS5-128
Worsdale, AllisonPOS5-73
Wright, StacyPOS5-23
Wright, Stacy E.RAP3-8
Wu, Chieh-MingPOS5-121
Wu, JiaxiPOS2-139, POS4-124, PPS7-6
Wu, Socrates YongdaPOS4-121



SRNT

AUTHOR INDEX

Wu, Yongda Socrates POS2-124
Wysota, Christina N.POS4-127, POS4-142

X

Xie, Zidian RAP1-2, POS2-125, POS5-80
Xu, Emily POS2-125
Xu, Shaowei POS5-156
Xuan, Ziming POS2-139, POS4-124, PPS7-6
Xue, Zheng POS5-71
Xue, Zheng (Ashley) POS5-43

Y

Yadgaran, Ester POS5-89
Yaklic, Rebecca POS5-11
Yamaguchi, Naosuke POS5-116
Yan, Xinyu POS5-26
Yang, Joshua POS2-145
Yang, Qian POS3-122, POS5-52, POS5-120
Yang, Qing X. POS5-152
Yao, Ying POS2-124
Yershova, KatrinaPOS2-128, POS5-61
Yingst, Jessica POS5-105
Yip, Annie On Ni RAP1-7
You, Wen RAP2-9
Young, Allison POS3-119
Yount, Catherine S. POS5-104
Yueh, Spencer POS1-126

Z

Zaganjor, Ibrahim POS5-93
Zale, Emily L. POS3-138
Zaring-Hinkle, BrittanyPOS1-133, POS2-131,
POS2-140
Zatonski, Witold POS1-135
Zatoński, Witold POS5-139
Zehner, Mark POS5-3
Zhang, Guowen POS4-136
Zhang, Jane POS3-143, POS4-129, POS5-141
Zhang, Minjin POS4-136
Zhang, Ying POS2-132
Zhao, Xiaoquan POS5-68
Zhou, Jie POS4-136
Zhou, Runtao POS5-80
Zhu, Shu-Hong POS5-27
Zhuang, Yue-Lin POS5-27
Zulkiewicz, Brittany A. POS5-137
Zvolensky, Michael POS5-5
Zwaga, DeeJay POS5-3
Zwonik, Connor POS5-131