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Prevalence and Factors Associated with Smokeless Tobacco Use, 2014–2016

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Abstract

Objectives—We aimed to determine whether the prevalence of current use of smokeless tobacco products (STPs) changed during 2014–2016 and examine factors associated with use among adults in the United States (US).

Methods—Data were obtained from Tobacco Products and Risk Perceptions Surveys of probability samples representative of US adults in 2014, 2015, and 2016. Change over time in current (past 30 day) STP use was examined using pairwise comparisons of proportions and multivariable logistic regression. Associated factors were examined using Rao-Scott χ^2 and multivariable logistic regression.

Results—The prevalence of current STP use was higher in 2015 (3.6%) than in 2014 (2.3%, $p < .001$) and 2016 (2.7%, $p = .018$) among US adults. In 2016, current STP use was associated with

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Human Subjects Statement

The Georgia State University Institutional Review Board approved this study.

Conflict of Interest Statement

The other authors declare they have no conflicts of interest.

being male, under age 60, currently using hookah or e-cigarettes, and having less than a college degree. Rates of use did not vary by cigarette smoking status, race/ethnicity, income, or metropolitan statistical area (MSA).

Conclusions—The prevalence of current STP use peaked in 2015. In 2016, current STP use was more prevalent among males and adults with lower education. Continuous monitoring of STP use is needed, particularly non-cigarette tobacco product users.

Keywords

smokeless tobacco; snus; snuff; tobacco use prevalence; polytobacco use; tobacco use trends; smokeless tobacco marketing

Tobacco use is the leading cause of preventable death in the United States (US) and reducing use of cigarettes and smokeless tobacco products (STPs) among US adults is a national objective of *Healthy People 2020* (HP 2020).^{1,2} Although, the prevalence of cigarette smoking in the US has continually declined towards the HP 2020 target for cigarettes, the use of STPs has persisted in the US since 2003 and trend analyses suggest that the HP 2020 goal of reducing STP prevalence to 0.3% or below will not be reached.^{2–5} Specifically, estimates of the national prevalence of current STP use among US adults range from 2.5% to 3.6%.^{4–9} The persistence in STP use among US adults could be due to several factors, including the introduction of new forms of STPs, flavored STPs, increases in STP marketing and advertising, and high rates of multiple tobacco product use among adults.^{10–15}

Historically, STPs could be found in the form of loose leaf, plug, or twist chewing tobacco and dry or moist snuff/dip.¹⁰ Presently, STPs also include the newer products of snus, a form of moist snuff popular in Sweden, and dissolvable tobacco, which were introduced into the US market starting in the early to mid-2000s.^{11,16,17} STPs also can be found in a variety of flavors, as the Family Smoking Prevention and Control Act of 2009 only banned non-menthol characterizing flavors in cigarettes.¹⁸ From 2000 to 2015 the overall consumption of STPs in the US increased by 23.1%, which appears to be driven largely by moist snuff sales, flavored STPs, and discount STP brands.^{12,19} Simultaneously, tobacco companies increased STP marketing, advertising, and promotions; moreover, it is common for them to market STPs to current cigarette smokers and for use in smoke-free environments.^{11,13,20–22} Historically, STPs have been marketed towards and most commonly used among Whites, males, persons with less than a college degree, and persons residing in rural/non-metropolitan areas.^{3,13,14} However, STP marketing now has begun to target the general adult population, females, and those residing in urban areas.^{3,13,14,23} Moreover, there has been a surge in poly-tobacco product use as well as the use of novel, non-cigarette tobacco products, such as hookah and electronic nicotine delivery systems (ENDS, eg, e-cigarettes).^{15,24–28} Considering the increase in multiple and novel tobacco use nationally, in addition to increases and changes in STP marketing, advertising, and promotion it is likely that factors associated with STP use have changed.

Although STPs, particularly low-nitrosamine varieties such as snus, are considered less harmful than cigarettes, STPs are not harmless. STPs contain over 30 carcinogens and are associated with an increased risk of tobacco-related morbidity and mortality, including oral

diseases and cancers.^{10,29–38} Thus, the US Food and Drug Administration (FDA) proposed its first ever tobacco product standard in January 2017 to limit the amount of the carcinogen N-nitrosornicotine (NNN) in all STPs to reduce mortality and morbidity attributed to oral cancer.³⁹ Moreover, STP use also is linked to cardiovascular diseases as highlighted in several studies.^{35,36,40} For example, a US longitudinal study that excluded persons with a history of combustible tobacco use estimated that current STP users, particularly those who used multiple STPs, had a higher mortality risk for coronary heart disease compared to never users of tobacco.³⁶ Similarly, Sinha et al's meta-analysis estimated that in 2010 there were nearly 11,000 STP attributable deaths in the US and over 530,000 STP-attributable disability adjusted life-years (DALYs) in the Americas.³⁵ They also found that STP use in the US was associated with an increased risk of all-cause mortality, all cancer mortality, stomach cancer mortality, and stroke mortality.³⁵

Few studies have reported the prevalence of STP use overall or by demographics in a nationally representative sample.^{4–8} Moreover, most studies on the prevalence and factors associated with STP use have focused on STP use among cigarette smokers (dual use of cigarettes and STPs) or STP use in South Asia.^{41–52} Given the health risks associated with STP use, the FDA's proposed STP product standard, and the persistence of STP use among US adults, we conducted this study to examine whether the prevalence of STP use changed during 2014–2016 and to determine the factors associated with current STP use among US adults.

METHODS

Procedure and Sample

We used data from the 2014 (June–November), 2015 (August–September), and 2016 (September–October) cross-sectional, Tobacco Products and Risk Perceptions Surveys conducted by the Georgia State University Tobacco Center of Regulatory Science (TCORS). Participants for these surveys were drawn from GfK's KnowledgePanel, a probability-based Web panel designed to be representative of non-institutionalized US adults. For each survey, a probability sample of 5717, 6051, and 6014 participants, including an oversampling of cigarette smokers, were selected in 2014, 2015, and 2016, respectively. Final stage completion rates of 74.4% in 2014, 76.0% in 2015, and 75.9% in 2016 were obtained. Following closure of the main survey field period, a study-specific post-stratification weight was computed using an iterative proportional fitting (raking) procedure to adjust for survey non-response and an oversampling of cigarette smokers. Benchmark distributions for adjustment were utilized and derived from the demographic and geographic distributions from the most recent Current Population Survey (CPS) and included sex, age, race/ethnicity, education, household income, census region, metropolitan area, and Internet access.

Measures

Current STP use—Participants who reported use of at least one STP (chewing tobacco, dip, snuff, snus, or dissolvable tobacco) in the past 30 days were classified as a current STP user.

Other tobacco product use—Respondents who reported ever smoking at least 100 cigarettes were asked: “Do you currently smoke cigarettes every day, some days, or not at all?” Those who responded “every day” or “some days” were considered current cigarette smokers, whereas those who responded “not at all” were considered former cigarette smokers. Those who reported that they had not ever smoked at least 100 cigarettes were considered never cigarette smokers. All respondents also reported past 30-day use of electronic nicotine delivery systems (ENDS; eg, e-cigarettes), large/traditional cigars (TCs), little cigars or cigarillos (LCCs), and hookah.

Demographic characteristics—Respondent characteristics including sex, age, race/ethnicity, educational attainment, annual household income, metropolitan statistical area (MSA), and US Census region were obtained from profile surveys administered by GfK to KnowledgePanel panelists.

Statistical Analysis

SAS 9.4 (Cary, NC) was utilized to obtain weighted point estimates and 95% confidence intervals for current STP use, overall and by cigarette smoking status, and current use of other tobacco products. Pairwise comparisons of the proportions were conducted to test for differences in proportions of current STP users in 2014, 2015, and 2016. Multi-variable logistic regression analyses tested whether the prevalence of current STP use changed over time while controlling for sex, age, race/ethnicity, education, and cigarette smoking status. To examine factors associated with current STP use we estimated bivariate and multivariable logistic regression and Rao-Scott χ^2 tests. In this paper we present prevalence, adjusted odds ratios, and accompanying 95% confidence intervals. For all analyses, a p-value < .05 was considered statistically significant.

RESULTS

Trends in the Prevalence of Current STP Use, 2014–2016

The prevalence of current STP use was 2.3% in 2014, 3.6% in 2015, and 2.7% in 2016 (Figure 1). In pairwise analyses of proportions, the prevalence of current STP use significantly increased from 2014 to 2015 ($\chi^2 = 12.10$, $p = .001$) and decreased from 2015 to 2016 ($\chi^2 = 5.61$, $p = .018$). Following adjustment for sex, age, race/ethnicity, education level, and cigarette smoking status, the odds of current STP use was significantly lower ($p < .001$) in 2014 and 2016 ($p = .033$) compared to 2015.

Factors Associated with Current STP Use in 2016

Table 1 displays the prevalence and adjusted odds ratios associated with current STP use among US adults in 2016. In bivariate analyses, the prevalence of current STP use was statistically significantly higher among current cigarette smokers than among non-current smokers (Table 1). However, among current STP users, 23.2% were current cigarette smokers while nearly one-half (49.5%) were never cigarette smokers (Appendix A). Multiple logistic regression analyses showed that males, adults aged less than 60 years old, those with less than a college degree, those who resided in the Midwest or West, and current cigarette smokers had higher odds of being a current STP user. Following adjustment for

current use of other tobacco products, most associations remained statistically significant; however, being a current cigarette smoker was no longer significantly associated with current STP use (AOR: 1.24; 95% CI: 0.71, 2.18). However, being a current hookah smoker (AOR: 3.70; 95% CI: 1.51, 9.12) and current ENDS user (AOR: 2.71; 95% CI: 1.40, 5.24) was associated with statistically higher odds of being a current STP user, compared to a non-current user (Table 1). We found no statistical association for current STP use by race/ethnicity, income, or MSA category.

Factors Associated with Current STP Use in 2014

In multiple logistic regression analyses that controlled for demographic characteristics, cigarette smoking status, and current use of other tobacco products, males, persons aged 30–59, persons with less than a college degree, persons residing in non-metropolitan areas, the Midwest, or the South, and current traditional cigar smokers had significantly higher odds of reporting current STP use. Conversely, non-Hispanic Blacks, Hispanics, and those with an income of at least \$50,000 but less than \$75,000 had significantly lower odds of current STP use (Appendix B).

Factors Associated with Current STP Use in 2015

In multiple logistic regression analyses that controlled for demographic characteristics, cigarette smoking status, and current use of other tobacco products, males, persons aged 18–59, persons residing in non-metropolitan areas, persons with an income of at least \$25,000 but less than \$50,000, current traditional cigar smokers, current hookah smokers, and current ENDS users had higher odds of reporting current STP use (Appendix C).

DISCUSSION

These results show that in 2016, the prevalence of current STP use was 2.7% among US adults. We also found that the prevalence of current STP use among US adults was statistically significantly higher in 2015 (3.7%) than in 2014 (2.3%) and 2016. Estimates of current STP use in the present study for 2014 and 2015 are lower than the 2014 National Survey on Drug Use and Health (NSDUH), but are consistent with the 2015 NSDUH, 2013/2014 National Adult Tobacco Survey (NATS), and 2012–2014 National Health Interview Survey (NHIS) estimates, which assessed a similar range of STP types.^{5–8} To our knowledge, this study is the first to report the national prevalence and factors associated with current STP use in 2016 among US adults.

As our 2014 estimates show, STP use in the US historically has been associated with being non-Hispanic White, male, less educated, and residing in rural areas, the Midwest, or the South.^{4,5,11,13} However, the 2016 estimates of this study suggest that the factors associated with current STP use may be changing. Although being younger and less educated were still associated with current STP use in 2016, no relationship was observed between current STP use and race/ethnicity, which likely can be attributed to higher proportions of STP use among racial/ethnic minorities, particularly non-Hispanic Blacks. Similarly, in 2016, we observed no relationship between current STP use and MSA category or residing in the

southern US. Moreover, whereas being male was associated with current STP use in 2016, the strength of this association was substantially weaker than in 2014.

We believe that these findings may be attributed to the shift in STP marketing, advertising, and promotions toward more demographically diverse consumers. For example, studies have documented STP advertising in magazines with broad readership (Entertainment Weekly, US Weekly, TV Guide), high rates of female (Glamour, Vogue) and minority readers (Essence, Latina), and upscale audiences (Golf Magazine, Ski).^{14,53} The implications of changes in STP marketing and the factors associated with STP use raise cause for concern. Despite the historical fact that males have used STP at higher rates than females, females may be at higher risk of STP-related mortality and morbidity.³⁵ For example, Sinha et al estimated that in 2010 about 85% of all STP-attributable cancer mortality and disability adjusted life years (DALYs) in the Americas were found in females with just 15% found in males.³⁵ Similarly, the top causes of death among African-Americans/Blacks are cardiovascular disease and cancer, both of which are associated with use of STP and other tobacco products.^{1,35,54–56} Moreover, the rate of heart disease among Blacks surpasses that of Whites, and Blacks also have the highest rates of mortality and shortest survival for most cancers, including oral cancer.⁵⁷ We recommend continuous monitoring of current STP use among US adults, especially among racial/ethnic minorities, females, and adults residing in metropolitan areas, to inform future public health communication, campaigns, and policy.

Additionally, over the past few years rates of current STP use were higher among current cigarette smokers. This finding is unsurprising, as STPs are promoted towards cigarette smokers and many STP users also smoke cigarettes as documented in prior studies.^{20,21,43,58–60} However, in the present study, being a current cigarette smoker was not associated with higher odds of STP use once current use of other tobacco products was accounted for and most current STP users were never cigarette smokers. Moreover, across all survey years, the prevalence of STP use was higher among current users of traditional cigars, little cigars and cigarillos, hookah, and ENDS and current hookah and ENDS users had higher odds of being a current STP user in 2016.

Polytobacco use has grown substantially among cigarette smokers and users of non-cigarette tobacco products alike and a study by Sung et al found that 54.8% of current chewing tobacco users and 42.5% of current snuff users reported polytobacco use.^{15,25,61} Previous studies have linked use of flavored tobacco products at initiation with increased odds of current polytobacco use, and a study by Oliver et al noted that around 60% of STP users started using STP with a flavored product.^{62–64} Moreover, STPs often are marketed for use in smoke-free settings and STP advertising suggests that STPs are less harmful than cigarettes; thus, it is unsurprising that STP users report using STPs in smoke-free settings or as a cigarette cessation method.^{14,43,44,65,66} Our findings not only provide additional evidence that STPs are used commonly alongside other non-cigarette tobacco products, but also suggests that research related to the dual use of STP and cigarettes should account for the use of other tobacco products.

Limitations

Our data are based on self-report. However, a previous study by Agaku et al found a high level (>95%) of concordance between self-reported STP use and serum cotinine levels in US adults.⁶⁷ It is also important to note that STP use was assessed differently in 2014 compared to 2015/2016. In 2014, assessment of current STP use was preceded by questions related to STP awareness and ever use, whereas the 2015/2016 surveys only assessed past 30-day use of STPs. For a consistent measure across surveys, we defined current STP use as any use in the past 30 days, which may limit the comparability of our findings with the findings of other studies that define STP use differently.³¹

Conclusion

This study adds to the limited literature related to the prevalence of current STP use among US adults in 2014–2016. Our findings indicate that the prevalence of current STP use among adults peaked in 2015 and that males, younger adults, adults with less than a college degree, and adults who reside in the Midwest or West were most likely to be current users of STPs in 2016. Health education campaigns may prove more effective in preventing and reducing rates of STP use when targeting these populations. However, our results also suggest that several factors associated with STP use in 2016 deviated from those most commonly associated with STP use in prior years. Specifically, in 2016, the strength of the association between being male decreased substantially and no association was found for current STP use, and race/ethnicity or MSA category. STP use should be monitored continuously, particularly among females, racial/ethnic minorities, and those residing in metropolitan areas. Lastly, the prevalence of current STP use was higher among current users of non-cigarette tobacco products including hookah and ENDS. Future research should investigate use of multiple tobacco products, namely non-cigarette products, among STP users.

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Appendix A Cigarette Smoking Status among US Adult Current STP Users in 2014–2016

	2014 N = 107 % (95% CI)	2015 N = 190 % (95% CI)	2016 N = 149 % (95% CI)
Current Smokers	31.2 (21.1, 41.3)	25.4 (18.0, 32.8)	23.2 (15.8, 30.6)
Former Smokers	32.8 (22.4, 43.2)	26.1 (18.4, 33.8)	27.3 (19.1, 35.6)
Never Smokers	36.0 (26.0, 46.0)	48.5 (39.4, 57.6)	49.5 (39.9, 59.1)

Note.

CI, confidence interval. All % reported are weighted column %.

Appendix B Prevalence and Factors Associated with Current Smokeless Tobacco Product Use among US Adults, 2014

Characteristic	Prevalence	AOR (95% CI)
Sex	p < .001	
Male	4.1 (3.1, 5.0)	7.79 (3.79, 15.99)
Female	0.6 (0.2, 0.9)	Ref
Age	p = .009	
18–29	2.3 (1.2, 3.4)	1.76 (0.72, 4.34)
30–44	3.2 (2.1, 4.4)	3.16 (1.56, 6.42)
45–59	2.6 (1.6, 3.5)	2.33 (1.15, 4.73)
60+	1.0 (0.5, 1.6)	Ref
Race/Ethnicity	p = .010	
White, NH	2.7 (2.1, 3.3)	Ref
Black, NH	1.1 (0.0, 2.1)	0.33 (0.11, 0.98)
Other, NH	3.9 (0.6, 7.1)	1.96 (0.65, 5.91)
Hispanic	0.5 (0.0, 1.2)	0.05 (0.01, 0.41)
Education	p = .007	
<High School	4.0 (1.6, 6.3)	5.18 (2.08, 12.92)
High School	2.7 (1.7, 3.6)	3.40 (1.68, 6.89)
Some College	2.3 (1.5, 3.1)	2.30 (1.19, 4.44)
College Degree+	1.2 (0.7, 1.7)	Ref
Income	p = .62	
<\$25K	2.6 (1.2, 4.0)	0.63 (0.31, 1.31)
\$25K–\$49.99K	1.9 (1.1, 2.7)	0.56 (0.28, 1.11)
\$50K–\$74.99K	1.9 (0.9, 2.8)	0.49 (0.26, 0.94)
\$75K–\$99.99K	3.0 (1.5, 4.5)	0.86 (0.43, 1.75)
\$100K+	2.3 (1.5, 3.1)	Ref
MSA Category	p < .001	
Metro	1.9 (1.4, 2.4)	Ref
Non-metro	4.2 (2.5, 5.8)	2.06 (1.18, 3.60)
US Region	p = .013	
Northeast	0.9 (0.3, 1.6)	Ref
Midwest	2.6 (1.5, 3.6)	3.49 (1.34, 9.10)
South	3.1 (2.2, 4.0)	5.15 (2.04, 12.97)

Characteristic	Prevalence	AOR (95% CI)
West	1.8 (0.8, 2.8)	2.40 (0.81, 7.07)
Cigarette Smoking p < .001		
Current	4.2 (2.6, 5.8)	1.36 (0.66, 2.82)
Former	2.6 (1.6, 3.6)	1.37 (0.76, 2.46)
Never	1.5 (1.0, 2.0)	Ref
Current TC Smoking p < .001		
Yes	18.3 (9.6, 26.9)	11.95 (5.57, 25.63)
No	1.9 (1.5, 2.4)	Ref
Current LCC Smoking p = .027		
Yes	5.0 (1.3, 8.7)	0.47 (0.17, 1.27)
No	2.2 (1.7, 2.6)	Ref
Current Hookah Smoking p = .007		
Yes	8.3 (0.0, 16.8)	2.86 (0.85, 9.64)
No	2.1 (1.7, 2.6)	Ref
Current ENDS Use p < .001		
Yes	5.8 (2.6, 9.0)	1.70 (0.81, 3.56)
No	2.0 (1.5, 2.4)	Ref

Note.

AOR, adjusted odds ratio; CI, confidence interval; NH, non-Hispanic; K, 1000; MSA, metropolitan statistical area; TC, traditional cigar; LCC, little cigar and cigarillo; ENDS, electronic nicotine delivery systems. Boldface indicates statistical significance at $p < .05$.

Appendix C Prevalence and Factors Associated with Current Smokeless Tobacco Product Use among US Adults, 2015

Characteristic	% (95% CI)	AOR (95% CI)
Sex p < .001		
Male	5.4 (4.4, 6.5)	2.84 (1.81, 4.45)
Female	1.9 (1.2, 2.6)	Ref
Age p < .001		
18–29	6.5 (4.5, 8.5)	3.82 (2.01, 7.23)
30–44	4.1 (2.9, 5.4)	2.65 (1.45, 4.82)
45–59	3.1 (2.0, 4.2)	2.00 (1.07, 3.73)
60+	1.5 (0.8, 2.3)	Ref

Characteristic	% (95% CI)	AOR (95% CI)
Race/Ethnicity p = .84		
White, NH	3.8 (3.0, 4.6)	Ref
Black, NH	2.8 (1.1, 4.5)	0.66 (0.31, 1.37)
Other, NH	3.6 (1.3, 5.9)	0.74 (0.35, 1.59)
Hispanic	3.6 (1.8, 5.4)	0.59 (0.31, 1.12)
Education p = .33		
<High School	3.6 (1.1, 6.2)	0.95 (0.33, 2.73)
High School	3.2 (2.1, 4.3)	1.17 (0.69, 1.99)
Some College	4.6 (3.2, 6.1)	1.30 (0.82, 2.07)
College Degree ⁺	3.1 (2.3, 4.0)	Ref
Income p = .21		
<\$25K	3.3 (1.6, 5.0)	1.39 (0.62, 3.11)
\$25K–\$49.99K	4.7 (3.1, 6.2)	2.15 (1.10, 4.19)
\$50K–\$74.99K	3.9 (2.4, 5.4)	1.48 (0.77, 2.85)
\$75K–\$99.99K	4.0 (2.5, 5.5)	1.54 (0.81, 2.92)
\$100K+	2.4 (1.4, 3.4)	Ref
MSA Category p = .008		
Metro	3.3 (2.6, 3.9)	Ref
Non-metro	5.7 (3.6, 7.8)	1.92 (1.15, 3.20)
US Region p = .79		
Northeast	3.5 (1.8, 5.3)	Ref
Midwest	3.2 (2.2, 4.2)	0.76 (0.40, 1.45)
South	3.6 (2.6, 4.7)	0.94 (0.52, 1.72)
West	4.2 (2.7, 5.6)	1.08 (0.55, 2.12)
Cigarette Smoking p = .001		
Current	6.6 (4.5, 8.6)	1.32 (0.75, 2.31)
Former	3.4 (2.2, 4.5)	1.14 (0.72, 1.82)
Never	3.1 (2.2, 3.9)	Ref
Current TC Smoking p < .001		
Yes	16.4 (10.5, 22.3)	3.45 (1.94, 6.14)
No	3.1 (2.5, 3.8)	Ref
Current LCC Smoking p < .001		
Yes	13.3 (7.7, 18.9)	1.20 (0.62, 2.31)
No	3.3 (2.6, 3.9)	Ref

Characteristic	% (95% CI)	AOR (95% CI)
Current Hookah Smoking	p < .001	
Yes	23.4 (12.5, 34.3)	3.44 (1.71, 6.93)
No	3.3 (2.7, 3.9)	Ref
Current ENDS Use	p < .001	
Yes	11.9 (7.3, 16.5)	1.78 (1.00, 3.16)
No	3.2 (2.5, 3.8)	Ref

Note.

AOR, adjusted odds ratio; CI, confidence interval; NH, non-Hispanic; K, 1000; MSA, metropolitan statistical area; TC, traditional cigar; LCC, little cigar and cigarillo; ENDS, electronic nicotine delivery systems. Boldface indicates statistical significance at $p < .05$.

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Figure 1.
Trends in the Prevalence of Current Smokeless Tobacco Product Use among US Adults
2014–2016

Note. 2014 to 2015, $p < .001$; 2015 to 2016, $p = .018$. Bars represent 95% confidence intervals.

Table 1

Prevalence and Factors Associated with Current Smokeless Tobacco Product Use among US Adults, 2016

Characteristic	Prevalence	AOR (95% CI)
Sex	p < .001	
Male	3.8 (2.9, 4.7)	2.47 (1.66, 3.68)
Female	1.7 (1.1, 2.2)	Ref
Age	p = .007	
18–29	3.6 (2.2, 5.0)	2.76 (1.40, 5.44)
30–44	3.3 (2.1, 4.4)	2.53 (1.32, 4.86)
45–59	2.9 (1.9, 3.8)	2.15 (1.18, 3.94)
60+	1.3 (0.7, 2.0)	Ref
Race/Ethnicity	p = .66	
White, NH	2.7 (2.1, 3.3)	Ref
Black, NH	3.5 (1.8, 5.2)	1.29 (0.74, 2.28)
Other, NH	2.3 (0.5, 4.2)	0.88 (0.36, 2.12)
Hispanic	2.2 (0.8, 3.5)	0.59 (0.27, 1.27)
Education	p = .018	
<High School	3.2 (1.0, 5.3)	2.49 (0.99, 6.27)
High School	2.4 (1.6, 3.2)	1.99 (1.10, 3.59)
Some College	3.9 (2.8, 5.0)	2.30 (1.35, 3.92)
College Degree+	1.7 (1.0, 2.4)	Ref
Income	p = .54	
<\$25K	2.8 (1.7, 4.0)	0.71 (0.37, 1.35)
\$25K–\$49.99K	3.0 (1.9, 4.2)	0.94 (0.53, 1.65)
\$50K–\$74.99K	3.1 (1.8, 4.3)	0.93 (0.51, 1.69)
\$75K–\$99.99K	1.7 (0.6, 2.7)	0.51 (0.23, 1.14)
\$100K+	2.6 (1.6, 3.7)	Ref
MSA Category	p = .93	
Metro	2.7 (2.1, 3.2)	Ref
Non-metro	2.8 (1.5, 4.0)	1.04 (0.59, 1.81)
US Region	p = .18	
Northeast	1.5 (0.8, 2.3)	Ref
Midwest	3.0 (2.0, 4.0)	1.96 (1.02, 3.78)
South	2.9 (1.9, 3.8)	1.71 (0.90, 3.22)
West	3.0 (1.9, 4.2)	2.13 (1.11, 4.10)

Characteristic	Prevalence	AOR (95% CI)
Cigarette Smoking	p = .005	
Current	4.7 (3.1, 6.3)	1.21 (0.69, 2.14)
Former	2.7 (1.8, 3.6)	1.28 (0.78, 2.11)
Never	2.2 (1.6, 2.9)	Ref
Current TC Smoking	p < .001	
Yes	9.3 (2.9, 15.6)	1.84 (0.56, 6.00)
No	2.5 (2.0, 3.0)	Ref
Current LCC Smoking	p < .001	
Yes	9.5 (4.3, 14.7)	1.52 (0.58, 3.99)
No	2.5 (2.0, 3.0)	Ref
Current Hookah Smoking	p < .001	
Yes	17.8 (6.5, 29.0)	3.65 (1.48, 9.01)
No	2.5 (2.0, 3.0)	Ref
Current ENDS Use	p < .001	
Yes	10.5 (5.7, 15.3)	2.70 (1.41, 5.20)
No	2.4 (1.9, 2.9)	Ref

Note.

AOR, adjusted odds ratio; CI, confidence interval; NH, non-Hispanic; K, 1000; MSA, metropolitan statistical area; TC, traditional cigar; LCC, little cigar and cigarillo; ENDS, electronic nicotine delivery systems. Boldface indicates statistical significance at $p < .05$.