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The role of flavors in vaping initiation and satisfaction among U.S. adults

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Abstract

Background: The prevalence of electronic cigarette use has grown over the past decade, with some users reportedly initiating e-cigarette use primarily due to flavors. This study examined the role of flavors in initiation among adult e-cigarette users, as well as the association of flavors with satisfaction and perceived addiction to vaping.

Methods: The analysis sample consisted of 1,492 current e-cigarette users aged 18 or older, drawn from an online quantitative survey conducted in 2016. Multivariable logistic regression and general linear models were used.

Results: Most current e-cigarette users (62.9%) typically used flavors other than tobacco (including fruit, mint/menthol, sweet, candy, coffee and other), 24.2% typically used tobacco flavors, and 12.9% typically used non-flavored e-cigarettes. Flavor was a common reason for vaping initiation, selected by 29.5% of the sample. Flavor, particularly fruit flavor, was more likely to motivate young adults 18–24 to initiate vaping compared adults 35–44. Those who used flavors, particularly mint/menthol and flavors other than tobacco flavor, had higher odds of reporting high

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satisfaction with vaping and had higher odds of perceived addiction to vaping than respondents who did not use flavored e-cigarettes.

Conclusions: Users of flavored e-cigarettes reported greater satisfaction and self-perceived addiction than users of non-flavored e-cigarettes. The appeal of flavors, particularly among young adults, has implications for regulatory policy regarding the marketing and promotion of flavored products. These findings may provide direction for the Food and Drug Administration's plans to restrict flavors other than menthol, mint, and tobacco.

Keywords

electronic nicotine delivery systems; flavoring agents; addiction; adults; special populations

1. INTRODUCTION

Awareness and use of electronic cigarettes, or e-cigarettes, has increased significantly since their entry into the U.S. market in 2007.[1–3] E-cigarettes typically contain nicotine, propylene glycol, glycerin, humectants to produce an aerosol, flavor additives, and compounds to dissolve flavorants.[4,5] An estimated 7,700 e-liquids across 466 brands are available, each with their own concentration and combinations of nicotine and flavorings.[6–7] Studies have typically categorized flavors into tobacco, menthol or mint, fruit, candy, other sweet, and coffee.[8] Flavor is one of the main reasons adults initially try and continue to use e-cigarettes, although other common reasons are using e-cigarettes as a tool for quitting cigarette use, health reasons, and curiosity.[9–15]

Most adult e-cigarette users use flavored products, with menthol/mint being the most common, followed by fruit.[16–17] The appeal of flavor differs by age among adult e-cigarette users. Young adults are more likely to cite flavors as a reason to use c-cigarettes compared with adults aged 55 or older.[11–12] Adults age 30 or older are less likely than younger adults (18–29) and youth to prefer sweet flavors and more likely to prefer non-sweet flavors (tobacco, menthol, coffee, spice).[17–18] Flavor appears to be associated with use of e-cigarettes as a cessation strategy to quit combustible cigarettes.[19–20]

Although e-cigarettes are perceived by most adults to be less addictive than combustible cigarettes overall, younger adults indicate higher addictive qualities.[21] Compared with non-smokers, cigarette smokers are more likely to believe that e-cigarettes are less addictive than cigarettes.[22]

A recent review of longitudinal studies provides strong evidence that e-cigarette use is associated with increased odds of subsequent and concurrent cigarette smoking among adolescents and young adults.[23] Further, a growing literature suggests that the use of flavored e-cigarettes by youth and young adults may be associated with transitions to other tobacco products.[24–25]

In summary, available literature suggests the importance of flavors in the vaping experience. To expand our understanding of the role of flavors in e-cigarette use, especially for adults, this study examined the role of flavors in initiation, as well as the association of flavors with

satisfaction and perceived addiction to vaping. Our hypothesis was that flavor plays a significant role in the initiation of e-cigarette use, as well as the potential for continued use. We also examined the distinction between tobacco flavor, mint/menthol flavor, and other flavors compared with non-flavored e-liquids.

2. METHODS

2.1 Sample

A national online quantitative survey of 2,561 adults was conducted in summer 2016. Adult participants 18–64 years old were selected randomly from an online panel through a marketing research vendor. Participants in the online panel were recruited via email, online marketing channels, targeted websites, and online affiliate partners, with tailored campaigns for hard-to-reach populations. Individuals were asked about perceptions, and behavior regarding e-cigarettes and other tobacco products as well as socio-demographic information. Specific demographic subgroups were oversampled to ensure sample diversity (non-Hispanic Blacks, Hispanics, lower socioeconomic status) and thus the final sample was not intended to be representative of the general population.

This paper focused on the sub-sample of 1,492 current e-cigarette users. For the purpose of this analysis, current users were defined as those who had vaped within the past week, vaped for 6 months or longer, and vaped at least 20 times in their lifetime, regardless of their combustible cigarette smoking status. These criteria were identified in order to recruit long-term users who had recently vaped. Of 1,494 eligible participants, two were excluded due to inconsistency in reporting race and ethnicity, resulting in a final sample of 1,492 participants.

2.2 Measures

The survey consisted of closed-end and open-end questions. Demographic variables included sex, race, ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic), age (18–24, 25–34, 35–44, 45–64), education (highest grade completed), employment status, and annual household income. To examine initiation related to flavors, respondents were asked, “What was the primary reason you started using your vaping device?” and were given a list of 15 possible reasons and allowed to write in an “other” reason. They were instructed to select up to three reasons. To examine flavor preference, respondents were asked “What is the e-liquid flavor you typically buy?” and were given a list of six commonly available flavor categories and were allowed to write in an “other” flavor. They could choose all that apply or indicate no flavor. Responses were categorized into one of the following six categories: tobacco, mint/menthol, fruit, candy, sweet, or coffee/chocolate. The categories were collapsed for analysis into four groups: tobacco flavor, mint/menthol flavor, other flavors, and non-flavored (no flavors selected). Satisfaction with vaping was assessed using a 0–10 scale, where 0=not at all and 10=very much. Perceived addiction to vaping was assessed by asking, “Do you believe you are addicted to or dependent upon vaping?” with four response options, which were ultimately collapsed into two categories for analysis: 1) addicted = “very much,” “somewhat,” “slightly,” and 2) not addicted = “no.”

2.3 Statistical Analyses

Descriptive statistics for e-cigarette users by flavor category were used to compare differences in proportions using a Chi-square test. We used logistic regression models to examine factors associated with "like[d] flavors" as the primary reason for initiating e-cigarette use, as well as to estimate odds ratios of being addicted to vaping by flavored category. We used general linear models to estimate adjusted means of vaping satisfaction level across flavored categories. We also used logistic regression models to further examine the odds of reported vaping satisfaction, where the scale of satisfaction was further categorized as a binary variable: high satisfaction (scale rating of 9 or 10) versus low satisfaction (scale ratings ranged from 0–8). All models were adjusted for sex, age, race, ethnicity, education, employment status, annual household income, cigarette smoking status, and other tobacco product use. Because racial disparity and tobacco/nicotine products use is also an issue that can be addressed from our oversampled Hispanic and non-Hispanic Blacks, we further explored racial differences on the odds of being addicted to vaping as well as of vaping satisfaction, with non-Hispanic White as the reference group in the models. Analyses were conducted with SAS statistical software (version 9.4 with SAS/STAT 14.1, SAS Institute Inc., Cary, NC), and a p value<0.05 was considered statistically significant.

3. RESULTS

3.1 Sample Characteristics

The study participants included 22.9% non-Hispanic Whites, 23.0% non-Hispanic Blacks, and 54.2% Hispanics. Participants were grouped into four age categories: 18–24 (17.5%), 25–34 (38.6%), 35–44 (23.3%), 45+ (20.6%). In terms of cigarette smoking status, 26.4% of respondents had never smoked, 35.6% were past smokers, and 38.0% were current smokers. Nearly half of respondents (43.8%) had used other types of tobacco products. (Table 1)

3.2 Initiation Due to Flavors

Of the total respondents, 29.5% identified flavor as a primary reason for vaping initiation. Flavor was the third most commonly reported reason for vaping initiation. Other more common reasons were as an alternative to cigarettes (43.7%) and because respondents viewed e-cigarettes as healthier/less harmful than other tobacco products (31.2%). (Table 2) Age, cigarette smoking status, and use of other tobacco products were significant predictors for e-cigarette users initiating due to flavor. For example, the odds of reporting that flavor was a primary reason for vaping in users aged 35–44 were lower by about a half as compared with users aged 18–24 (OR: 0.53, 95% CI: 0.35, 0.80). Users who were either current or past cigarette smokers had lower odds of reporting that flavor was a primary reason for vaping when compared to vapers who never smoked cigarettes; ORs (95% CI) were 0.54 (0.41,0.72) and 0.42 (0.30,0.57) for current and past cigarette smokers, respectively. In contrast, those who were using other tobacco products had higher odds of reporting that flavor was a primary reason for vaping when compared to vapers who did not use other tobacco products; OR (95% CI) was 1.32 (1.03,1.68). There was no racial disparity in reporting that flavor was a primary reason for vaping. (Table 3)

3.3 E-liquid Flavor Preferences.

Most e-cigarette users (62.9%) reported buying flavored e-liquid other than tobacco flavor. These flavors included fruit (42.2%), mint/menthol (29.3%), sweet (29.2%), candy (24.3%), coffee (12.2%), and other (4.2%). One-fourth of e-cigarette users said they bought tobacco flavored (24.2%) and 12.9% bought non-flavored e-cigarettes. Approximately half (48.2%) indicated buying one flavor versus multiple flavors.

There were 718 participants who purchased only one type of flavor (Table 4). Among those who bought tobacco flavor only, the proportion of respondents 45+ is significantly higher than younger participants (18.0% among 18–24, 16.3% among 25–34, 26.2% among 35–44, 31.3% among 45+, $p<0.001$). The youngest age group (18–24) was least likely to buy mint/menthol flavors (9.0% among 18–24, 24.8% among 25–34, 20.8% among 35–44, 19.9% among 45+, $p=0.02$). In contrast, fruit flavors were most likely to be bought by the 18–24 age group (46.1% among 18–24, 28.5% among 25–34, 21.3% among 35–44, 21.0% among 45+, $p<0.001$). Candy also was bought more often by the 18–24 age group than respondents 25+ (14.6% among 18–24, 8.9% among 25–34, 4.4% among 35–44, 5.1% among 45+, $p=0.01$).

3.4 Satisfaction with Vaping

Overall, e-cigarette users were satisfied with vaping (adjusted mean 7.90 on an 11-point scale). Satisfaction among those who bought flavored e-liquid was higher than those who did not buy flavored e-liquid. The adjusted mean ratings for flavored e-liquid excluding tobacco flavor, tobacco-flavored e-liquid, and non-flavored e-liquid were 7.83, 7.68, and 6.60, respectively. Results were also consistent when the levels of satisfaction were dichotomized to compare the odds of rating high satisfaction vs. low satisfaction. Odds ratios (95% CI) of rating high satisfaction with vaping among those who bought flavored e-liquid excluding tobacco flavor and tobacco-flavored e-liquid compared to those who did not buy flavored e-liquid were 2.73 (1.91,43.89) and 2.46 (1.65,3.67), respectively. Similarly, the mean rating for mint/menthol-flavored e-liquid was highest, and it was lowest for non-flavored e-liquid. For example, the odds of rating high satisfaction with vaping were 3.23 times higher among those who bought mint/menthol-flavored e-liquid compared to those who did not buy flavored e-liquid (OR: 3.23, 95% CI: 2.20,4.75). (Table 5)

We also observed differences in satisfaction by age, race, and cigarette smoking status. For example, the odds of rating high satisfaction with vaping in e-cigarette users 45+ were significantly lower than in younger users (18–24) (OR: 0.63, 95% CI: 0.41,0.97). Further, non-Hispanic Black users had significantly higher odds of rating high satisfaction with vaping than non-Hispanic Whites (OR: 1.59, 95% CI: 1.14,2.21). And vapers who were past cigarette smokers had significantly higher odds of rating high satisfaction with vaping than vapers who had never smoked cigarettes (OR: 1.64, 95% CI: 1.22, 2.21). No significant differences between Hispanics and non-Hispanic users were observed. (Table 6)

3.5 Perceived Addiction

Respondents who bought tobacco-flavored e-liquid had significantly higher odds of reporting perceived addiction to vaping than users who did not buy flavored e-liquid (OR:

3.46, 95% CI: 2.34, 5.12). Similarly, current e-cigarette users reporting purchase of flavored e-liquid other than tobacco flavors had significantly increased odds of reporting perceived addiction compared with users of non-flavored e-liquid (OR: 2.23, 95% CI: 1.60, 3.11). Respondents who bought mint/menthol-flavored e-liquid had significantly higher odds of reporting perceived addiction to vaping than users who did not buy flavored e-liquid (OR: 2.99, 95% CI: 2.07, 4.33). (Table 5) Vapers who were past cigarette smokers had significantly higher odds of reporting perceived addiction than vapers who had never smoked cigarettes (OR: 1.62, 95% CI: 1.21, 2.18). No significant differences were observed by age or race/ethnicity. (Table 6)

DISCUSSION

Our results indicate that the availability of flavors is a key reason for initiating vaping, as reported by adults. Nearly one-third of users indicated starting to vape because they liked the flavors, and flavored products were preferred by most users. These results support findings from previously published research regarding the importance of flavors to the vaping experience.[12–13] Our study probed the distinction between tobacco flavor versus other non-tobacco flavors, as well as mint/menthol flavor, and identified some differences. Most e-cigarette users reported buying flavors other than tobacco flavor. Also, users of tobacco-flavored or other flavored e-cigarettes rated their satisfaction with vaping and their perceived addiction to vaping as higher than users who did not use flavored e-liquid. Finally, users of mint/menthol flavored e-liquid reported higher satisfaction and perceived addiction compared with users of non-flavored e-liquid.

We observed significant differences by age group. Flavor, particularly fruit flavor, was more likely to motivate young adults 18–24 to initiate vaping compared adults 25+. The 18–24 age group was more likely to buy fruit or candy flavors and less likely to purchase tobacco or mint flavors, compared with age groups 25+. Overall, these findings strongly suggest flavor is associated with vaping initiation and satisfaction, particularly among younger adults 18–24. The connection between flavor use and both satisfaction and perceived addiction suggests that flavor is an integral part of the vaping experience for many e-cigarette users. Flavors may play a role in vaping initiation as a function of (a) enhanced pleasurable sensory qualities (e.g., taste and smell), (b) those more prone to addiction finding flavoring more appealing, or (c) association of some flavors such as fruit or mint with health or less harm.

4.1 Limitations

There are some limitations of this study. (1) Using an online data collection method, recruitment procedures may have excluded individuals who do not use the Internet; these individuals may differ in important ways from our sample. (2) The survey was cross-sectional, and thus potential changes in perceptions over time were not captured. (3) A non-random sample was recruited to assure adequate representation of specific populations of interest. The researchers were interested in examining potential differences among vulnerable populations, specifically race and ethnicity, for the purposes of this analysis. Thus, our findings cannot be generalized to the larger U.S. population. However, our sample size allowed us to examine differences by key subgroups. (4) Respondents were asked about

their purchase of e-liquids rather than use of e-liquids; this may have led to inaccurate interpretation if some respondents were given products and did not buy them directly. (5) We did not inquire about types of devices used, which precluded consideration of device type with flavor preferences and satisfaction. (6) Some measures employed were developed based on related focus group research conducted prior to this survey and, although informed by, were not validated measures. We did not use standardized nicotine dependence questions, but instead measured perception of addiction, which was not a validated measure.

4.2 Conclusions

Users of flavored e-cigarettes report greater satisfaction and perceived addiction than users of non-flavored e-cigarettes. Based on our findings that young adults18–24 are more likely to begin vaping because of flavors and are more satisfied with vaping than adults 45+, the appeal of flavors among young adult users has implications for regulatory policy regarding the marketing and promotion of flavored products. These findings may provide direction for the Food and Drug Administration's plans to restrict flavors other than menthol, mint, and tobacco flavors. Banning fruit and candy flavors in particular may decrease vaping initiation, while retaining tobacco, mint, and menthol flavors may facilitate the maintenance of vaping in adults who may be attracted to e-cigarettes as an alternative to cigarettes or cessation strategy. Additional research, particularly of a longitudinal nature, is needed to better understand the influence of e-cigarette flavors in initiation and continued use. This study adds to previous research suggesting flavors may serve to promote the initiation and maintenance of e-cigarette use.

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Highlights

- Flavor was a reason some users initially tried and continued to use e-cigarettes.
- Most e-cigarette users typically used flavors other than tobacco flavor.
- Typical flavors included fruit, mint/menthol, sweet, candy, coffee and other.
- Satisfaction was greater among users of flavored versus non-flavored e-cigarettes.
- Perceived addiction was also greater among users of flavored e-cigarettes.

Table 1.

Demographic information of current e-cigarette users

	N	%
	1492	
Gender		
Female	770	51.6
Race/Ethnicity		
Non-Hispanic White	341	22.9
Non-Hispanic Black	343	23.0
Hispanic	808	54.2
Age		
18–24	261	17.5
25–34	576	38.6
35–44	348	23.3
45+	307	20.6
Education		
Less than high school	63	4.2
GED	64	4.3
High school graduate	238	16.0
Some college/2-year associate/trade degree	610	40.9
College degree	392	26.3
Graduate or professional degree	125	8.4
Employment		
Working full-time	968	64.9
Working part-time	179	12.0
Homemaker	73	4.9
Unemployed	80	5.4
Retired	59	4.0
Disabled	66	4.4
Student	67	4.5
HH Income		
Less than $20,000	177	11.9
$20,000 to $49,999	438	29.4
$50,000 to $64,999	287	19.2
$65,000 to $89,999	279	18.7
$90,000 to $124,999	181	12.1
$125,000 and over	130	8.7
Flavor Use		
Used tobacco flavored e-cigarettes	361	24.2
Used non-tobacco flavored e-cigarettes	938	62.9
Did not use any flavored e-cigarettes	193	12.9

	N	%
Cigarette Smoking Status		
Never smoked	394	26.4
Past smoker	531	35.6
Current smoker	567	38.0
Use any Other Tobacco Products	653	43.8

Table 2.

Primary reasons for starting vaping

	N	%
	1492	
Just an alternative to cigarettes	652	43.7
Healthier/less harmful than other tobacco products	465	31.2
I like the flavors	440	29.5
Trying to quit smoking cigarettes or other tobacco products	277	18.6
Nicer smell than tobacco smoke	276	18.5
When I can’t smoke cigarettes	275	18.4
My friends vape	126	8.5
I like trying new products.	114	7.6
Cheaper than other tobacco products	113	7.6
I like the nicotine	94	6.3
More places allow vaping that do not allow smoking cigarettes or cigars	75	5.0
Makes me feel good about myself	70	4.7
I’m a cloud chaser – I like big clouds	69	4.6
A healthcare professional recommended it	54	3.6
My family members vape	32	2.1
Other	38	2.55

Table 3.

Odds ratios for initiating e-cigarette use due to liking flavors

	OR	95% CI	P-value
Sex			
Male (ref)	1.00	-	-
Female	0.96	(0.75, 1.22)	0.734
Age			
18–24 (ref)	1.00	-	
25–34	0.90	(0.64,1.26)	0.531
35–44	0.53	(0.35, 0.80)	0.002
45-older	0.74	0.47, 1.17)	0.204
Race			
Non-Hispanic White/Caucasian (ref)	1.00	-	-
Non-Hispanic Black/African-American	. 0.95	(0.65, 1.37)	0.766
Hispanic	1.08	(0.80, 1.51)	0.631
Highest Grade Level Completed			
Less than high school	1.65	(0.80, 3.41)	0.174
GED	0.57	(0.25, 1.30)	0.182
High school graduate	1.09	(0.63, 1.89)	0.767
Some college/2-year associate/trade degree	1.33	(0.82, 2.18)	0.252
College degree	1.13	(0.69, 1.86)	0.623
Graduate or professional degree (ref)	1.00	-	
Current Employment Status			
Working full-time (ref)	1.00	-	-
Working part-time	1.15	(0.79, 1.66)	0.476
Homemaker	1.40	(0.81, 2.43)	0.233
Unemployed	0.84	(0.48, 1.47)	0.546
Retired	0.64	(0.29, 1.40)	0.260
Disabled	0.88	(0.45, 1.71)	0.710
Student	1.41	(0.81, 2.47)	0.229
Total Annual Household Income			
Less than $20,000 (ref)	1.00	-	
$20,000 to $49,999	1.36	(0.88, 2.08)	0.162
$50,000 to $64,999	1.38	(0.86, 2.21)	0.181
$65,000 to $89,999	1.43	0.88, 2.32)	0.154
$90,000 to $124,999	1.71	(1.00, 2.90)	0.049
$125,000 and over	1.27	(0.69, 2.35)	0.439
Cigarette Smoking Status			
Never smoked (ref)	1.00		
Current smoker	0.54	(0.41, 0.72)	<0.001
Past smoker	0.42	(0.30, 0.57)	<0.001
Use other tobacco products	1.32	(1.03, 1.68)	0.028

Adjusted for sex, age, race, ethnicity, education, employment status, annual household income, cigarette status, and other tobacco products use.

Table 4.

Flavor typically purchased by age category among those who bought only one flavor (n=718)

		Age Categories				
Flavor (%)	**N**	**18–24**	**25–34**	**35–44**	**45+**	**P-value**
Tobacco	163	18.0	16.3	26.2	31.3	<0.001
Mint/menthol	152	9.0	24.8	20.8	22.2	0.017
Fruit	194	46.1	28.5	21.3	21.0	<0.001
Candy	54	14.6	8.9	4.4	5.1	0.011
Sweet	92	7.9	12.6	16.4	11.9	0.242
Coffee/chocolate	24	0.0	3.7	4.9	2.8	0.193
Other	39	4.5	5.2	6.1	5.7	0.995

P-values based on χ^2 test

Table 5.

Multivariable linear regression model for satisfaction with vaping in relation to flavors and multivariable logistic regression model for self-perceived addiction to vaping

	Satisfaction with Vaping			
	OR[a]	95% CI	P-value	Mean (0–10 scale)
Uses Flavored E-Cigarettes				
Yes—Flavors Excluding Tobacco	2.73	(1.91, 3.89)	<0.001	7.83
Yes—Tobacco Flavor	2.46	(1.65, 3.67)	<0.001	7.68
No (ref)	1.00	-	-	6.60

	Satisfaction with Vaping			
	OR[a]	95% CI	P-value	Mean (0–10 scale)
Uses Mint/Menthol E-Cigarettes				
Yes— Mint/Menthol	3.23	(2.20, 4.75)	<0.001	8.08
Flavor Excluding Mint/Menthol	2.41	(1.68, 3.45)	<0.001	7.65
No (ref)	1.00	-	-	6.60

	Perceived Addiction to Vaping		
	OR	95% CI	P-value
Uses Flavored E-Cigarettes			
Yes—Flavors Excluding Tobacco	2.23	(1.60, 3.11)	<0.001
Yes—Tobacco Flavor	3.46	(2.34, 5.12)	<0.001
No (ref)	1.00	-	-

	Perceived Addiction to Vaping		
	OR	95% CI	P-value
Uses Mint/Menthol Flavored E-Cigarettes			
Yes—Mint/Menthol	2.99	(2.07, 4.33)	<0.001
Flavor Excluding Mint/Menthol	2.28	(1.63, 3.19)	<0.001
No (ref)	1.00	-	-

Adjusted for sex, age, race, ethnicity, education, employment status, annual household income, cigarette status, and other tobacco product use.

[a]Odds Ratios of reporting high satisfaction vs. low satisfaction

Adjusted for sex, age, race, ethnicity, education, employment status, annual household income, cigarette status, and other tobacco product use.

[a a]Odds Ratios of reporting high satisfaction vs. low satisfaction

Adjusted for sex, age, race, ethnicity, education, employment status, annual household income, and cigarette status

Adjusted for sex, age, race, ethnicity, education, employment status, annual household income, and cigarette status

Table 6.

Multivariable linear regression model for satisfaction with vaping in relation to flavors and multivariable logistic regression model for self-perceived addiction to vaping

	Satisfaction with Vaping			Perceived Addiction to Vaping		
	OR	**95% CI**	**P-value**	**OR**	**95% CI**	**P-value**
Age						
18–24 (ref)	1.00	-		1.00		
25–34	0.88	(0.63, 1.22)	0.446	1.17	(0.83, 1.64)	0.378
35–44	0.78	(0.54, 1.14)	0.203	1.35	(0.91, 2.00)	0.140
45-older	0.63	0.41, 0.97)	0.035	1.20	(0.77, 1.87)	0.414
Race						
Non-Hispanic White/Caucasian (ref)	1.00	-	-			
Non-Hispanic Black/African-American	1.59	(1.14, 2.21)	0.006	1.00	(0.71, 1.42)	0.991
Hispanic	1.32	(0.98, 1.77)	0.069	1.09	(0.80, 1.49)	0.600
Cigarette Smoking Status						
Never smoked (ref)	1.00					
Current smoker	0.78	(0.59, 1.04)	0.084	0.75	(0.57, 1.00)	0.046
Past smoker	1.64	(1.22, 2.21)	<0.001	1.62	(1.21, 2.18)	<0.001
Use other tobacco products	1.16	(0.92, 1.46)	0.204	1.13	(0.90, 1.43)	<0.001

Adjusted for sex, age, race, ethnicity, education, employment status, annual household income, cigarette status, and other tobacco products use.