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Flavored Tobacco Product Use in Youth and Adults: Findings From the First Wave of the PATH Study (2013–2014)

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Abstract

Introduction—The 2009 Family Smoking Prevention and Tobacco Control Act banned characterizing flavors other than menthol in cigarettes, but did not restrict their use in other forms of tobacco (e.g., smokeless, cigars, hookah, e-cigarettes).

Methods—A cross-sectional analysis of Wave 1 data from 45,971 U.S. adults and youth, aged 12 years in the Population Assessment of Tobacco and Health (PATH) Study collected in 2013–2014, was conducted in 2016. This study examined: (1) the prevalence and reasons for use of flavored tobacco products; (2) the proportion of ever tobacco users reporting that their first product was flavored; and (3) correlates of current flavored tobacco product use.

Results—Current flavored (including menthol) tobacco product use was highest in youth (80%, aged 12–17 years), and young adult tobacco users (73%, aged 18–24 years), and lowest in older adult tobacco users aged ≥ 65 years (29%). Flavor was a primary reason for using a given tobacco product, particularly among youth. Eighty-one percent of youth and 86% of young adult ever tobacco users reported that their first product was flavored versus 54% of adults aged ≥ 25 years. In

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multivariable models, reporting that one's first tobacco product was flavored was associated with a 13% higher prevalence of current tobacco use among youth ever tobacco users and a 32% higher prevalence of current tobacco use among adult ever users.

Conclusions—These results add to the evidence base that flavored tobacco products may attract young users and serve as starter products to regular tobacco use.

INTRODUCTION

Virtually all tobacco products include flavor additives. As of 2014, more than 1,300 flavoring ingredients had been identified in cigarettes, smokeless, and roll-your-own tobacco products.¹ Analyses of internal tobacco industry documents indicate that manufacturers have historically added flavoring ingredients to attract young customers.^{2–11} The 2009 Family Smoking Prevention and Tobacco Control Act banned the inclusion of constituents or additives that impart characterizing flavors (e.g., candy, fruit) other than tobacco and menthol in cigarettes, but not other tobacco products.¹²

Data from the National Survey on Drug Use and Health collected in 2004–2008,^{13,14} 2004–2010,¹⁵ and 2004–2014¹⁶ document the highest use of menthol cigarettes among youth and young adults compared with older adults in the U.S. This age gradient has also been observed in multiple national surveys of non-menthol flavored product use.^{17–20} Evidence suggests that flavored tobacco, especially menthol cigarettes, may serve as starter products for young tobacco users.^{21–23} Several studies in national samples have documented the appeal of flavored non-cigarette products in young people,^{20,24–26} and one study has demonstrated a strong correlation between first use of a flavored tobacco product and current tobacco use among adult tobacco users.²⁷

The Population Assessment of Tobacco and Health (PATH) Study represents the first national data source to ascertain use of tobacco products with characterizing flavors (flavored tobacco products) in both youth and adults. This paper reports on:

1. the prevalence and reasons for use of flavored tobacco products (including menthol);
2. the proportion of ever tobacco users who report that their first product was flavored; and
3. correlates of current flavored tobacco product use, comparing youth (aged 12–17 years), young adults (aged 18–24 years), and older adults (aged ≥ 25 years), in a large population-based U.S. sample.

METHODS

Data were from Wave 1 of the PATH Study conducted from September 12, 2013 to December 15, 2014. The PATH Study is a nationally representative longitudinal cohort study of 45,971 adults and youth in the U.S. aged ≥ 12 years. NIH, through the National Institute on Drug Abuse, is partnering with the U.S. Food and Drug Administration's Center for Tobacco Products to conduct the PATH Study under a contract with Westat. The PATH Study used audio computer-assisted self-interviews available in English and Spanish to

collect information on tobacco use patterns and associated health behaviors. This analysis draws from the 32,320 adult interviews (age 18 years) and the 13,651 youth interviews (age 12–17 years). Parents and emancipated youth provided written consent, whereas youth assented to participate. Recruitment employed address-based, area-probability sampling, using an in-person household screener to select youths and adults. Adult tobacco users, young adults aged 18–24 years and African Americans were oversampled relative to population proportions. The weighting procedures adjusted for oversampling and non-response; combined with the use of a probability sample, the weighted data allow the estimates produced by Wave 1 of the PATH Study to be representative of the non-institutionalized, civilian U.S. population. The weighted response rate for the household screener was 54.0%. Non-response analysis showed few differences with referent national surveys. Among households that were screened, the overall weighted response rate was 74.0% for the adult interview and 78.4% for the youth interview. Further details regarding the PATH Study design and methods appear elsewhere²⁸; Wave 1 questionnaires and information on accessing the data are available at doi.org/10.3886/ICPSR36231. The study was conducted by Westat and approved by Westat’s IRB.

Measures

Ever and current tobacco use were assessed among youth and adults for cigarettes, e-cigarettes, traditional cigars, cigarillos, filtered cigars, hookah tobacco, pipe tobacco, smokeless tobacco, snus pouches, and dissolvable tobacco. Youth were also queried about kreteks and bidis. For youth, current use was defined as past 30-day use (yes/no). For the purposes of this study, current established use (current use) in adults was defined as:

1. currently smoking/using some days or every day (or weekly or monthly for hookah); and
2. either smoking 100 lifetime cigarettes or using a non-cigarette tobacco product “ever fairly regularly.”

A participant was classified as a current tobacco user if they were defined as currently using at least one tobacco product (yes/no).

Ever tobacco users were queried about:

1. age of first use; and
2. whether the first product used was flavored to taste like menthol, mint, clove, spice, candy, fruit, chocolate, alcohol (such as wine or cognac), or other sweets.

These two items were used to create a derived variable for whether a respondent (youth or adult) first used a flavored tobacco product. For participants reporting ever use of multiple tobacco products, age of first use was determined by the youngest age a product was used (asked of each product ever used). If respondents reported first using multiple products at the same age category, any first product that was flavored was treated as the first product flavored. Response categories for age at first use in adults were grouped as <18, 18–24, 25–29, 30–34, 35–44, and 45 years.

Among adults, current smokers of manufactured and roll-your-own cigarettes were asked whether their regular brand was *flavored to taste like menthol or mint (yes/no)*. Current users of all other tobacco products were asked whether their regular brand was *flavored to taste like menthol, mint, clove, spice, candy, fruit, chocolate, alcohol (such as wine or cognac), or other sweets (yes/no)*. Youth current tobacco users were similarly asked about the use of menthol/mint-flavored cigarettes and flavored non-cigarette tobacco use, but in reference to the products they used in the past 30 days, rather than a regular brand. Participants were classified as current flavored tobacco users if they were defined as currently using at least one flavored tobacco product (yes/no).

Current tobacco users were asked to endorse reasons for use (e.g., *affordability*) separately for each product used except cigarettes (*yes/no*). One of these reasons was *comes in flavors I like*. Among youth, the ease of use of flavored products compared to unflavored products was also assessed. For each product, excluding cigarettes, participants aware of the product before the study were asked whether the flavored product is *easier, about the same, or harder* to use than the unflavored version of that product. All youth participants were asked whether cigarettes flavored like menthol or mint were *easier, about the same, or harder* to smoke than *regular cigarettes*. Participants that rated any flavored tobacco product *easier* to use than its unflavored counterpart were classified as perceiving flavored tobacco to be easier to use than unflavored (yes/no).

Sociodemographic variables used in these analyses included self-reported age, gender, race/ethnicity, educational attainment, and annual household income (adults only). Past 30-day alcohol and marijuana use were assessed. Respondents also completed the Global Appraisal of Individual Needs–Short Screener,²⁹ which measures severity of symptoms of internalizing problems, externalizing problems, and substance use problems in the past year (i.e., zero to one symptoms [low], two to three symptoms [moderate], and four or more symptoms [high], depending on the scale).

Statistical Analysis

Analyses were conducted using SVY procedures in Stata/SE, version 12.1 to account for weighting. The main outcomes were ever and current product-specific use and flavored product use. Prevalence of each outcome was estimated in the youth and adult samples. Data with denominators <50 or relative SEs >30% were suppressed.³⁰ Next, multivariable modified Poisson regression models³¹ were built separately for youth and adults to examine the relative association between the following domains and current tobacco use (Model A) or current flavored tobacco use (Model B): demographics, tobacco use (including whether the first tobacco product was flavored), and substance use and mental health severity. In the multivariable models of current flavored tobacco use (Model B), number of tobacco products currently used and age at first tobacco use were added at the second step in both the youth and adult samples. In youth, “ease of flavored use” was also added to the model at the second step.

RESULTS

The mean age of the youth sample was 14.5 years and 8.5% of youth reported use of a tobacco product in the past 30 days. Appendix Table 2 provides the following age breakdown of the adult sample: 13.0% aged 18–24 years, 8.7% aged 25–29 years, 9.0% aged 30–34 years, 16.5% aged 35–44 years, 34.5% aged 45–64 years, and 18.2% aged 65 years. Twenty-three percent of adults were current established tobacco users. Further detail about the sample appears elsewhere.²⁸

Figure 1 presents the prevalence of tobacco products with characterizing flavors currently used by age in the full sample, and the prevalence of current exclusive menthol cigarette use, exclusive flavored non-cigarette tobacco product use (one or more products), and polyuse of flavored cigarette and non-cigarette products among current tobacco users. Among current tobacco users, flavored tobacco product use followed a clear age gradient, with the highest use among youth aged 12–17 years (79.8%) and lowest in those aged 65 years (28.6%). Flavored non-cigarette tobacco product use and polytobacco use accounted for the majority of tobacco use among those aged <25 years. Among adults aged 25 years, menthol cigarettes were the dominant flavored tobacco product used. The prevalence of any current menthol cigarette use among current tobacco users by age group was 32.0% (95% CI=28.8, 35.4) in youth (aged 12–17 years), 33.2% (95% CI=31.1, 35.4) in young adults (aged 18–24 years), and 29.8% (95% CI=28.6, 31.1) in adults (aged 25 years). The prevalence of any current flavored cigar use among current tobacco users was higher in youth (20.6%, 95% CI=18.2, 23.3) and young adults (18.4%, 95% CI=16.9, 19.9) than adults (6.9%, 95% CI=6.4, 7.5). The prevalence of any current flavored e-cigarette use among current tobacco users followed an age gradient with the highest use in youth (31.2%, 95% CI=27.8, 34.8) followed by young adults (13.6%, 95% CI=12.2, 15.2), and the lowest use in adults (7.0%, 95% CI: 6.4, 7.7). Data on youth and adults are presented in Appendix Table 1; more-detailed adult age categories are presented in Appendix Table 2.

Table 1 presents the percentage of ever tobacco users who reported that their first tobacco product was flavored, stratified by current age, age at first tobacco use, and type of tobacco product used. Eighty-one percent of youth ever tobacco users reported that their first product was flavored, with first flavored use highest for ever users of hookah (89%), e-cigarettes (81%), and snus (81%). Among youth ever users, the greatest trial of flavored tobacco before age 15 years occurred for hookah (87%), e-cigarettes (80%), and flavored snus (80%).

Adult ever tobacco users commonly reported their first hookah used was flavored (89% aged 18–24 years, 74% aged 25 years), with the proportion of ever users reporting first product flavored generally lower among adults compared with the youth and young adult ever hookah users. Among young adult ever users, the most prevalent trial of a flavored product before age 18 years occurred for hookah (89%) and snus (79%), whereas for older adults, flavored snus trial before age 18 years was higher (69%) than hookah (58%).

Overall, cigarettes were the top product ever used in all age groups. Fifty percent of youth who had ever used cigarettes reported use of flavored cigarettes at first use versus 49% of

young adults and 32% of adults. E-cigarettes were the second most prevalent product tried in youth, with 81% of youth reporting using a flavored e-cigarette at first use, compared with 61% of young adults and 46% of adults; hookah was the second most prevalent product used among young adults (89% flavored at first use) and cigars (any) were the second most prevalent product used among adults (36% flavored at first use).

Appendix Table 3 shows the reasons for using a tobacco product among current tobacco users, stratified by type of product and age. Across all product types, one of the top reasons given for use of a tobacco product was *comes in flavors that I like*, with the exception of young adult and adult e-cigarette users who ranked *less harmful to me than cigarettes* highest. In youth, *comes in flavors that I like* was the most highly ranked reason among users of filtered cigars, cigarillos, and e-cigarettes; in both youth and adults, *comes in flavors that I like* ranked second below *I like socializing while using them* among cigar and hookah users. Within the full youth sample, the belief that the flavored product was easier to smoke/use than the unflavored counterpart ranged from 27.4% for cigarettes to 56.1% for hookah (Appendix Table 4). Endorsing that a flavored tobacco product was easier to use than a non-flavored product, assessed only among youth, was significantly associated with current use of cigarettes (adjusted prevalence ratio [APR]=1.27), e-cigarettes (APR=1.13), any cigar type (APR=1.32), cigarillos (APR=1.31), and filtered cigars (APR=1.36) (Appendix Table 4).

Controlling for all covariates in the model, reporting that one's first tobacco product was flavored was associated with a 13% higher prevalence of current tobacco use among youth ever users and a 32% higher prevalence of current established tobacco use among adult ever tobacco users (Model A, Tables 2 and 3). In Model B, the strongest correlate of current flavored tobacco use among both youth and adult current tobacco users was reporting a flavored tobacco product at first use (youth, APR=1.21; adult, APR=1.93) (Tables 2 and 3). When tobacco products were disaggregated, flavored tobacco at first use was strongly associated with current exclusive menthol cigarette use (APR=2.10), exclusive flavored non-cigarette product tobacco use (APR=1.84), and flavored polytobacco use (APR=1.44) (Appendix Table 5).

DISCUSSION

The majority of youth and young adult tobacco users consume products with characterizing flavors. Considerable use of flavored tobacco products was observed in younger people, including menthol cigarettes and non-cigarette flavored products, especially hookah, cigars, and e-cigarettes, which are commonly marketed as flavored products. Menthol cigarette use remains the dominant form of flavored tobacco use in adults. Results from this study extend previous research on menthol cigarettes,²¹⁻²³ highlighting a significant association between first use of a flavored tobacco product and current tobacco use in a nationally representative study of youth and adults. The PATH survey presents tobacco-specific prevalence estimates comparable to other national tobacco surveys,^{32,33} strengthening the generalizability of these findings.

The tobacco marketplace has become increasingly diversified in terms of product types and flavor offerings. Following the ban on characterizing flavors other than menthol in cigarettes, the market share of menthol cigarettes has increased³⁴ as has the sale of flavored cigarette-like small cigars.³⁵ In 2013, menthol/mint, fruit, and other flavored e-cigarettes accounted for 41% of e-cigarette market sales in traditional tobacco retail stores, up from 38% in 2012.³⁶ Increased sales of flavored cigarette and non-cigarette products are consistent with PATH Study data showing a high prevalence of flavored tobacco use, particularly in youth and young adults.

Limitations

The current study has several limitations. First, flavored tobacco product use in the study questionnaire is based on the respondent's perception of and ability to recall whether past or current products were flavored. The type of flavoring used (e.g., menthol, fruit, candy) was not captured in Wave 1. Second, as youth typically do not have established regular brands, the question about current flavored tobacco use referenced any of the particular products youth respondents used in the past 30 days, whereas adults were asked to identify whether their usual or regular brand was flavored. In cigarette users, 93% of adults reported a usual brand; of those, there was 97% agreement between self-reported menthol cigarette use and identified brand. By contrast, 69% of youth smokers had a usual brand, with 67% agreement of menthol status between identified brand and past 30-day menthol smoking. This discordance may arise either from recall error or multiple brand use in the past 30 days among youth. If in error, the observed age gradient in current flavored use could be inflated; however, an age gradient was observed among younger versus older adults who were asked the same item. This age gradient may reflect a potential cohort effect with differences in the reported use of flavored products between generations related to availability, visibility, and diversity of product choice in the retail environment at time of first use. Compared with adults, youth respondents therefore may be more likely to report first use of a flavored product owing to greater availability of flavored tobacco in their proximal environment.

Assessment of first tobacco product being flavored is subject to recall bias, with older participants potentially less likely to accurately recall the age at which they first used a tobacco product or whether that product was flavored. Those who currently use flavored products may also be more likely to report their first product was flavored and those that tried multiple products have a greater chance of one of them being flavored. Sensitivity analyses conducted among youth using an additional variable on the first product used among multiple products to classify whether the first product was flavored had no impact on participant classification, nor study findings. Finally, model-wise deletion may result in biased estimates.

CONCLUSIONS

A central question in tobacco control is whether characterizing flavors in any or some tobacco products exert a significant effect on youth experimentation and progression to regular tobacco use. The results from this study illustrate the widespread use of flavored tobacco products especially in young tobacco users and the association between first use of

flavored tobacco and current tobacco use. Findings from future waves of the PATH Study will allow for further elucidation of the role of flavors in tobacco use experimentation and progression to established use over time.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

ACV led this study, with substantial contributions to conception and design from all study authors. ACV and ALJ conducted the data analysis and all authors contributed to interpretation of the data. ACV drafted the manuscript and all authors provided critical revision of the manuscript for important intellectual content. All authors provided final approval of the version to be published and agree to be accountable for all aspects of the work.

ACV and ALJ had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

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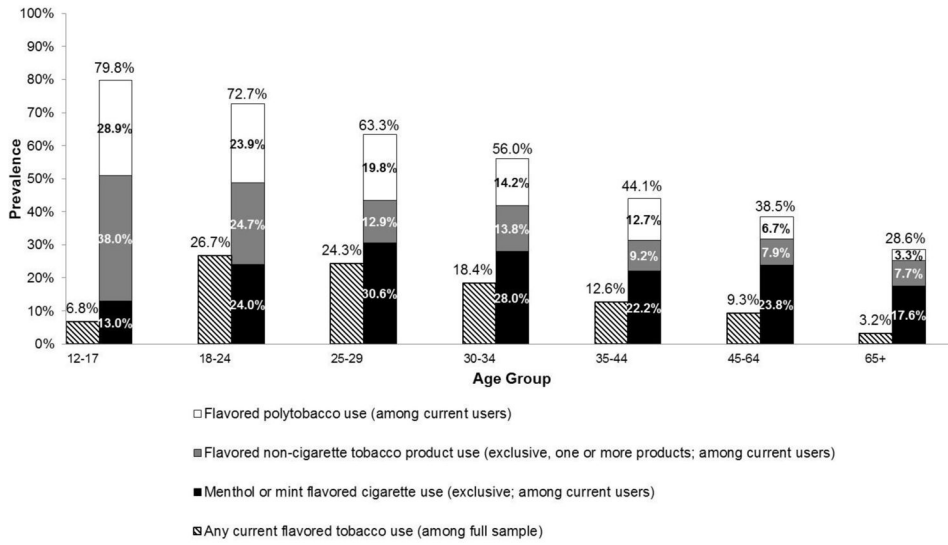


Figure 1. Prevalence of current flavored tobacco use in the full sample and among current tobacco users, by age; Population Assessment of Tobacco and Health, 2013–2014^a
^aPercentages are weighted to represent the U.S. population.

Table 1

Tobacco Product-specific Ever Use, First Product Flavored, and Age at First Use by Age Group^a

Variables	Youth (N=2,900) (Current age 12-17)/ Age at first use (%) ^b				Young adults (N=7,311) (Current age 18-24)/ Age at first use (%) ^b				Adults (N=20,225) (Current age 25+ years)/ Age at first use (%) ^b					
	Unweighted N	Total (%)	Age <12 (n=497) ^d	Age 12-14 (n=1298) ^d	Age 15-17 (n=1,023) ^d	Unweighted N	Total (%)	Age <18 (n=497) ^d	Age 18-24 (n=2,334) ^d	Unweighted N	Total (%)	Age <18 (n=14,374) ^d	Age 18-24 (n=4,748) ^d	Age 25+ (n=1,057) ^d
Overall			16.9	45.4	37.7			65.1	34.9			68.7	25.7	5.6
Ever use of any tobacco product ^c	2,900	21.4	3.5	9.4	7.8	7,311	66.5	43.3	23.2	20,225	73.0	49.9	18.7	4.1
First product non-flavored	537	4.0	1.0	1.8	1.1	899	9.4	5.3	4.1	7,052	33.7	22.5	9.1	2.2
First product flavored	2,256	16.8	2.5	7.7	6.7	6,395	57.0	38.0	19.1	13,020	39.0	27.5	9.7	1.9
First product flavored/Ever use		81%	72%	81%	86%		86%	88%	82%		54%	55%	52%	46%
Ever use of cigarettes ^e	1,838	13.4	2.6	6.1	4.4	5,964	53.2	35.2	17.9	19,218	69.0	47.1	18.4	3.4
% first cigarette non-menthol/non-flavored	883	6.5	1.5	3.1	1.9	2,945	27.0	18.0	9.0	12,188	46.8	33.0	11.7	2.1
% first cigarette menthol/flavored	902	6.6	1.1	3.0	2.5	2,999	26.1	17.3	8.8	6,943	22.1	14.1	6.7	1.2
First product flavored/Ever use		50%	41%	49%	56%		49%	49%	49%		32%	30%	36%	40%
% first cigarette menthol	777	5.8	0.9	2.6	2.1	2,751	23.9	15.9	8.0	6,476	20.6	13.3	6.1	1.0
First product mentholated/Ever use		43%	34%	43%	48%		45%	45%	45%		30%	28%	33%	36%
Ever use of e-cigarettes	1,452	10.7	-	3.5	6.7	3,887	32.0	3.9	28.1	7,635	15.6	-	1.1	14.3
% first e-cigarette non-flavored	276	2.0	-	0.7	1.1	1,508	12.5	1.5	10.9	4,071	8.4	-	0.5	7.9
% first e-cigarette flavored	1,154	8.5	-	2.8	5.6	2,367	19.4	2.4	17.1	3,528	7.1	-	0.6	6.4
First product flavored/Ever use		81%	-	80%	84%		61%	61%	61%		46%	-	52%	46%
Ever use of any cigar	1,048	7.7	0.7	3.0	3.6	5,010	44.0	23.7	20.2	12,093	38.1	11.0	16.3	10.7
% first any cigar non-flavored	342	2.5	0.3	1.0	1.2	1,783	15.7	8.0	7.6	6,992	24.3	6.5	10.5	7.3
% first any cigar flavored	652	4.8	0.4	2.0	2.4	3,213	28.2	15.7	12.6	5,041	13.7	4.5	5.9	3.3
First product flavored/Ever use		65%	58%	67%	66%		64%	66%	62%		36%	41%	36%	33%
Ever use of traditional cigars	297	2.3	-	1.0	1.0	2,046	18.5	9.1	9.3	8,176	27.3	7.2	11.8	8.3
% first traditional cigar non-flavored	154	1.2	-	0.5	0.6	1,200	11.0	5.0	6.0	6,235	21.8	5.4	9.5	6.9
% first traditional cigar flavored	142	1.1	-	0.5	0.5	841	7.4	4.2	3.3	1,913	5.5	1.7	2.3	1.4
First product flavored/Ever use		48%	-	50%	45%		40%	46%	35%		20%	24%	20%	18%
Ever use of cigarillos	863	6.3	0.5	2.5	3.2	4,500	39.0	20.7	18.3	9,052	26.0	7.3	11.5	7.2
% first cigarillo non-flavored	303	2.2	-	0.9	1.1	1,699	14.6	7.7	6.8	5,227	15.8	4.2	7.1	4.6
% first cigarillo flavored	551	4.0	-	1.7	2.1	2,794	24.4	13.0	11.4	3,798	10.1	3.1	4.4	2.5
First product flavored/Ever use		64%	-	66%	65%		63%	63%	63%		39%	42%	38%	38%
Ever use of filtered cigars	310	2.2	-	0.9	1.2	1,948	16.6	8.0	8.5	4,676	12.6	3.0	5.0	4.5

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Variables	Youth (N=2,900) (Current age 12-17) Age at first use (%) ^b				Young adults (N=7,311) (Current age 18-24) Age at first use (%) ^b				Adults (N=20,225) (Current age 25+ years) Age at first use (%) ^b					
	Unweighted N	Total (%)	Age <12 (n= 497) ^d	Age 12-14 (n= 1298) ^d	Age 15-17 (n=1,023) ^d	Unweighted N	Total (%)	Age <18 (n=4,971) ^d	Age 18-24 (n=2,334) ^d	Unweighted N	Total (%)	Age <18 (n=14,374) ^d	Age 18-24 (n=4,748) ^d	Age 25+ (n=1,057) ^d
% first filtered cigar non-flavored	106	0.8	-	0.3	0.4	800	6.6	3.1	3.5	2,683	7.6	1.8	3.0	2.9
% first filtered cigar flavored	199	1.4	-	0.6	0.8	1,142	9.9	5.0	5.0	1,978	4.9	1.2	2.0	1.6
First product flavored/Ever use		65%		63%	65%		60%	62%	59%		39%	40%	40%	39%
Ever use of hookah	1,006	7.4	-	2.4	4.7	5,061	44.3	14.7	29.5	5,562	12.2	1.2	5.3	5.7
% first hookah non-flavored	115	0.8	-	0.3	0.5	603	5.0	1.6	3.4	1,386	3.2	0.5	1.3	1.5
% first hookah flavored	877	6.5	-	2.1	4.3	4,445	39.2	13.1	26.2	4,128	8.9	0.7	4.0	4.2
First product flavored/Ever use		89%		87%	90%		89%	89%	89%		74%	58%	76%	75%
Ever use of pipe	259	1.9	-	0.8	0.9	1,550	13.2	4.9	8.3	5,628	18.6	5.3	7.8	3.5
% first pipe non-flavored	175	1.3	-	0.6	0.6	1,127	9.7	3.5	6.1	3,935	13.1	3.9	5.4	2.5
% first pipe flavored	77	0.5	-	0.2	0.3	421	3.5	1.5	2.1	1,667	5.3	1.4	2.4	1.0
First product flavored/Ever use		30%		26%	33%		27%	30%	26%		29%	26%	31%	30%
Ever use of smokeless tobacco (SLT) ^f	574	4.4	0.6	1.9	1.7	1,633	14.2	8.4	5.8	4,979	15.5	7.7	5.1	2.7
% first SLT non-flavored	174	1.3	0.2	0.7	0.4	595	5.2	2.7	2.1	2,546	8.3	4.0	2.6	1.7
% first SLT flavored	391	3.0	0.4	1.3	1.3	1,033	9.0	5.7	3.7	2,420	7.1	3.7	2.5	0.9
First product flavored/Ever use		69%	62%	66%	76%		63%	68%	63%		46%	48%	49%	43%
Ever use of snus ^g	227	1.7	-	0.8	0.8	1,296	11.1	5.0	6.1	2,575	6.7	1.4	2.3	3.0
% first snus non-flavored	41	0.3	-	0.2	0.1	381	3.3	1.1	1.3	1,362	3.8	0.3	0.5	0.7
% first snus flavored	184	1.4	-	0.6	0.6	914	7.8	4.0	4.8	1,206	2.9	0.6	1.0	1.2
First product flavored/Ever use		81%		80%	83%		70%	79%	78%		43%	69%	67%	66%
Ever use of dissolvable tobacco		-				103	0.9	-	0.5	244	0.5	-	0.1	0.3
% first dissolvable tobacco non-flavored		-				54	0.4	-	0.3	117	0.2	-	0.5	0.7
% first dissolvable tobacco flavored		-				47	0.4	-	0.3	124	0.2	-	1.0	1.2
First product flavored/Ever use		-					45%		50%		48%		53%	50%
Ever use of bidis		-					N/A	N/A	N/A		N/A	N/A	N/A	N/A
% first bidis non-flavored		-					N/A	N/A	N/A		N/A	N/A	N/A	N/A
% first bidis flavored		-					N/A	N/A	N/A		N/A	N/A	N/A	N/A
First product flavored/Ever use		-					N/A	N/A	N/A		N/A	N/A	N/A	N/A
Ever use of kreteks	52	0.4	-	-	-		N/A	N/A	N/A		N/A	N/A	N/A	N/A
% first kreteks non-flavored	-	-	-	-	-		N/A	N/A	N/A		N/A	N/A	N/A	N/A
% first kreteks flavored	-	-	-	-	-		N/A	N/A	N/A		N/A	N/A	N/A	N/A
First product flavored/Ever use		-					N/A	N/A	N/A		N/A	N/A	N/A	N/A

Notes: - Suppressed due to $n < 50$ or coefficient of variation $> 30\%$.

^a Percentages are weighted to represent the U.S. population and CIs are estimated using the balanced repeated replication (BRR) method.

^b Youngest age at which tobacco product use was reported. Individuals who reported “don’t know” or refused to answer were excluded from the denominator. Excluded from the denominator for youth $n=82$, young adults $n=6$, adults $n=46$.

^c Ever use of any tobacco product is defined as reporting ever use of any tobacco product, “even one or two puffs” or “even one time.” Individuals who reported “don’t know” or refused to answer any part of the definition of ever use were excluded from the denominator. First flavored use is defined as reported the first product used was “flavored to taste like menthol, mint, clove, spice, candy, fruit, chocolate, alcohol (such as wine or cognac), or other sweets.” Individuals who reported “don’t know” or refused to answer whether their first product was flavored were excluded from the denominator. Excluded from the denominator for youth: any tobacco ($n=107$), cigarettes ($n=53$), e-cigarettes ($n=22$), cigars ($n=54$), traditional cigars ($n=1$), cigarillos ($n=9$), filtered cigars ($n=5$), hookah ($n=14$), pipe ($n=7$), smokeless tobacco ($n=9$), snus ($n=2$), kreteks ($n=1$). Excluded from the denominator for young adults: any tobacco ($n=17$), cigarettes ($n=20$), e-cigarettes ($n=12$), cigars ($n=14$), traditional cigars ($n=5$), cigarillos ($n=7$), filtered cigars ($n=6$), hookah ($n=13$), pipe ($n=2$), smokeless tobacco ($n=5$), snus ($n=1$), dissolvable tobacco ($n=2$). Excluded from the denominator for adults: any tobacco ($n=153$), cigarettes ($n=87$), e-cigarettes ($n=36$), cigars ($n=60$), traditional cigars ($n=27$), filtered cigars ($n=15$), hookah ($n=48$), pipe ($n=26$), smokeless tobacco ($n=13$), snus ($n=7$), and dissolvable tobacco ($n=3$).

^d In addition to those who reported “don’t know” or refused to answer whether their first product was flavored, those who reported “don’t know” or refused to report the youngest age at tobacco use were also excluded from the denominator for each product. Excluded from the denominator for youth: any tobacco ($n=32$), cigarettes ($n=3$), e-cigarettes ($n=3$), cigars ($n=10$), traditional cigars ($n=2$), cigarillos ($n=2$), filtered cigars ($n=2$), hookah ($n=3$), pipe ($n=3$), smokeless tobacco ($n=19$), snus ($n=3$), kreteks ($n=4$). Excluded from the denominator for young adults: any tobacco ($n=4$), cigarettes ($n=14$), e-cigarettes ($n=22$), cigars ($n=18$), traditional cigars ($n=11$), cigarillos ($n=18$), filtered cigars ($n=14$), hookah ($n=19$), pipe ($n=28$), smokeless tobacco ($n=69$), snus ($n=129$), dissolvable tobacco ($n=3$). Excluded from the denominator for adults: any tobacco ($n=41$), cigarettes ($n=59$), e-cigarettes ($n=17$), cigars ($n=118$), traditional cigars ($n=67$), cigarillos ($n=85$), filtered cigars ($n=76$), hookah ($n=37$), pipe ($n=100$), smokeless ($n=189$), snus ($n=790$), dissolvable tobacco ($n=14$).

^e Manufactured cigarette or roll-your-own.

^f Respondents who indicated ever having used a cigar were asked about use of traditional cigars, cigarillos, and filtered cigars separately. Respondents indicating use of two or more types of cigars (traditional, cigarillo, or filtered cigars) were asked about the flavor status of each type of cigar separately. Any respondent who reported ever using two or more types of cigars had their responses aggregated, so that if any of the first traditional, cigarillo, or filtered cigars they used were flavored, they were included in the estimate of ever cigar users reporting that their first cigar was flavored.

^g Ever use of snus and smokeless tobacco were based on a single item with the following response choices: (1) loose snus, moist snuff, dip, spit, or chewing tobacco. Participants were not reclassified from snus to smokeless tobacco use based on brand of product used (e.g., Skoal Bandits), nor were they excluded from the denominator if they did not identify a regular brand.

Source: Population Assessment of Tobacco and Health, 2013–2014

N: unweighted sample size; N/A, not applicable

Table 2
Correlates of Current Tobacco Use and Current Flavored Tobacco Use Among Youth^a

Variables	Model A. Adjusted prevalence ratios for current tobacco use among ever tobacco users in the youth sample (Unweighted N=2,126)			Model B. Adjusted prevalence ratios for current flavored tobacco use among current tobacco users in the youth sample (Unweighted N=886)		
	% ^b	APR	95% CI	% ^b	APR	95% CI
Overall ^c	42%			83%		
Age ^e	15.88 (0.04) ^d	1.17	(1.11, 1.24)	15.90 (0.04) ^d	0.98	(0.95, 1.01)
Gender ^e						
Male	45%	Ref		85%	Ref	
Female	40%	0.86	(0.79, 0.95)	81%	0.95	(0.89, 1.01)
Race ^e						
White	43%	Ref		83%	Ref	
Black/African American	42%	0.97	(0.84, 1.12)	83%	1.01	(0.91, 1.11)
American Indian/Alaskan Native	51%	1.22	(0.95, 1.57)	91%	1.05	(0.91, 1.22)
Asian	37%	0.76	(0.48, 1.20)	76%	0.97	(0.70, 1.32)
Native	30%	0.90	(0.59, 1.37)	68%	0.84	(0.58, 1.21)
Hawaiian/Pacific Islander 2+ races	38%	0.87	(0.74, 1.03)	86%	1.03	(0.93, 1.14)
Hispanic ^e						
No	44%	Ref		83%	Ref	
Yes	36%	0.80	(0.70, 0.90)	82%	1.01	(0.94, 1.10)
High school enrollment or completion ^f						
No	27%	Ref		75%	Ref	
Yes	45%	0.95	(0.74, 1.23)	84%	1.15	(0.98, 1.35)
Number of tobacco products currently used				1.90 (0.04) ^d	1.09	(1.06, 1.12)
First tobacco use was flavored						
No	39%	Ref		71%	Ref	
Yes	44%	1.13	(1.02, 1.26)	88%	1.21	(1.11, 1.32)
Age at first tobacco use						
<12	39%	1.22	(1.06, 1.40)	86%	1.00	(0.90, 1.10)

Variables	Model A. Adjusted prevalence ratios for current tobacco use among ever tobacco users in the youth sample (Unweighted N=2,126)			Model B. Adjusted prevalence ratios for current flavored tobacco use among current tobacco users in the youth sample (Unweighted N=886)		
	%b	APR	95% CI	%b	APR	95% CI
12-14	44%	1.26	(1.14, 1.40)	82%	0.96	(0.89, 0.00)
15-17	41%	Ref		84%	Ref	
Perception that flavored tobacco is easier to use than non-flavored						
No	39%	Ref		78%	Ref	
Yes	44%	1.00	(0.89, 1.12)	85%	0.95	(0.87, 1.03)
Past 30-day alcohol use						
No	34%	Ref		81%	Ref	
Yes	64%	1.37	(1.22, 1.52)	86%	1.03	(0.96, 1.10)
Past 30-day marijuana use						
No	34%	Ref		81%	Ref	
Yes	73%	1.64	(1.49, 1.80)	86%	1.01	(0.94, 1.09)
Substance use scale						
Low ^g	35%	Ref		81%	Ref	
Moderate	59%	1.23	(1.09, 1.40)	87%	1.00	(0.93, 1.07)
High	67%	1.35	(1.16, 1.57)	83%	0.96	(0.87, 1.06)
Internalizing scale						
Low	40%	Ref		81%	Ref	
Moderate	43%	1.09	(0.96, 1.25)	82%	1.01	(0.92, 1.10)
High	44%	1.08	(0.93, 1.26)	85%	1.09	(1.00, 1.19)
Externalizing scale						
Low	46%	Ref		79%	Ref	
Moderate	36%	0.70	(0.59, 0.82)	87%	1.08	(0.99, 1.18)
High	45%	0.79	(0.67, 0.92)	83%	1.01	(0.92, 1.11)

Notes: Boldface indicates statistical significance ($p < 0.05$). Respondents with missing outcome variables or missing covariates were excluded from the respective model's analytic sample. Missingness for Model A = Gender (n=3; 0.1%), race (n=16; 0.4%), education (n=145; 4.9%), first tobacco use was flavored (n=79; 2.7%), age at tobacco trial (n=41; 1.4%), ease of use (n=34; 12.4%), alcohol (n=7; 0.2%), marijuana (n=18; 0.6%), substance use scale (n=97; 3.4%), internalizing scale (n=53; 1.8%), and externalizing scale (n=94; 3.1%). Missingness for Model B = Race (n=8; 0.5%), education (n=82; 6.5%), first tobacco use was flavored (n=33; 2.7%), ease of use (n=101; 8.7%), age at tobacco trial (n=1; 0.1%), marijuana (n=11; 0.8%), alcohol (n=2; 0.2%), substance use scale (n=41; 3.4%), internalizing scale (n=27; 2.2%), and externalizing scale (n=38; 2.9%).

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^bPercentages are weighted to represent the U.S. youth population and CIs are estimated using the balanced repeated replication (BRR) method.

^bRow percentages presented for prevalence of current tobacco use among ever tobacco users (Model A) and prevalence of flavored tobacco use among current tobacco users (Model B) across different correlates.

^cPrevalence of the outcome among youth ever tobacco users included in the analytic sample in Model A and current (past 30 day) tobacco users included in the analytic sample in Model B.

^dMean and linearized standard error among ever tobacco users (Model A) and current tobacco users (Model B).

^eMissing data on age, gender, race, and Hispanic ethnicity were logically assigned from household screener data, as described in the PATH Restricted Use File User's Guide.³⁷

^fYouth who are not enrolled in school, are home schooled, or are in ungraded schools were treated as missing. Individuals who had completed high school are treated as "yes".

^gNever users of all of the following substances: alcohol, marijuana, painkillers, Ritalin, cocaine, stimulants, and "other drugs like heroin or ecstasy" are treated as "Low".

Source: Population Assessment of Tobacco and Health, 2013–2014

APR, adjusted prevalence ratio

Table 3
Correlates of Current Tobacco Use and Current Flavored Tobacco Use Among Adults^a

Variables	Model A. Adjusted prevalence ratios for current tobacco use among ever tobacco users in the adult sample (Unweighted N=23,841)				Model B. Adjusted prevalence ratios for current flavored tobacco use among current tobacco users in the adult sample (Unweighted N=12,568)			
	% ^b	APR	95% CI	% ^b	APR	95% CI		
Overall ^c	32%			50%				
Age ^d								
18-24	44%	0.98	(0.95, 1.02)	73%	1.24	(1.19, 1.29)		
25+	31%	Ref		46%	Ref			
Gender ^d								
Male	37%	Ref		50%	Ref			
Female	27%	0.77	(0.74, 0.80)	51%	1.07	(1.03, 1.11)		
Race ^d								
White	31%	Ref		44%	Ref			
Black/African American	39%	0.91	(0.86, 0.96)	82%	1.63	(1.56, 1.70)		
American Indian/Alaskan Native	37%	1.01	(0.86, 1.19)	60%	1.21	(1.06, 1.38)		
Asian	24%	1.05	(0.90, 1.22)	50%	1.11	(0.96, 1.29)		
Native	30%	0.95	(0.74, 1.21)	74%	1.30	(1.16, 1.45)		
Hawaiian/Pacific Islander 2+ races	42%	1.10	(1.00, 1.20)	58%	1.12	(1.04, 1.21)		
Hispanic ^d								
No	33%	Ref		49%	Ref			
Yes	28%	0.68	(0.64, 0.72)	60%	1.17	(1.11, 1.24)		
Education								
<HS	45%	2.13	(1.97, 2.31)	47%	1.00	(0.93, 1.08)		
GED	54%	2.40	(2.19, 2.63)	49%	1.02	(0.94, 1.12)		
HS diploma	39%	2.00	(1.84, 2.17)	51%	1.10	(1.01, 1.19)		
Some college	35%	1.82	(1.70, 1.94)	54%	1.11	(1.04, 1.19)		
College or greater	15%	Ref		42%	Ref			
Annual household income								
<\$15,000	48%	1.31	(1.23, 1.39)	56%	1.00	(0.95, 1.05)		

Variables	Model A. Adjusted prevalence ratios for current tobacco use among ever tobacco users in the adult sample (Unweighted N=23,841)				Model B. Adjusted prevalence ratios for current flavored tobacco use among current tobacco users in the adult sample (Unweighted N=12,568)			
	% ^b	APR	95% CI		% ^b	APR	95% CI	
\$15,000 up to \$34,999	39%	1.19	(1.13, 1.26)		51%	1.01	(0.95, 1.06)	
\$35,000 up to \$74,999	30%	Ref			47%	Ref		
\$75,000+	19%	0.74	(0.69, 0.79)		43%	0.94	(0.89, 1.00)	
Number of tobacco products currently used					1.29 (0.01) ^e	1.22	(1.20, 1.24)	
First tobacco use was flavored								
No	27%	Ref			29%	Ref		
Yes	39%	1.32	(1.27, 1.37)		67%	1.93	(1.84, 2.03)	
Age at first tobacco use								
<18	37%	1.71	(1.50, 1.94)		50%	1.05	(0.94, 1.18)	
18-24	22%	1.16	(1.02, 1.32)		54%	1.05	(0.93, 1.19)	
25+	19%	Ref			49%	Ref		
Past 30-day alcohol use								
No	32%	Ref			47%	Ref		
Yes	33%	1.10	(1.05, 1.16)		53%	1.03	(0.98, 1.07)	
Past 30-day marijuana use								
No	29%	Ref			48%	Ref		
Yes	62%	1.43	(1.37, 1.50)		60%	0.98	(0.94, 1.01)	
Substance use scale								
Low ^e	29%	Ref			47%	Ref		
Moderate	42%	1.15	(1.09, 1.21)		57%	1.05	(1.00, 1.09)	
High	62%	1.27	(1.19, 1.35)		63%	1.02	(0.96, 1.09)	
Internalizing scale								
Low	28%	Ref			48%	Ref		
Moderate	35%	1.09	(1.04, 1.15)		52%	1.01	(0.97, 1.05)	
High	50%	1.32	(1.24, 1.41)		56%	1.01	(0.96, 1.07)	
Externalizing scale								
Low	30%	Ref			47%	Ref		
Moderate	33%	0.95	(0.90, 0.99)		52%	1.01	(0.97, 1.06)	

	Model A. Adjusted prevalence ratios for current tobacco use among ever tobacco users in the adult sample (Unweighted N=23,841)			Model B. Adjusted prevalence ratios for current flavored tobacco use among current tobacco users in the adult sample (Unweighted N=12,568)		
Variables	% ^b	APR	95% CI	% ^b	APR	95% CI
High	47%	0.99	(0.93, 1.05)	59%	1.03	(0.97, 1.09)

Notes: Boldface indicates statistical significance ($p < 0.05$). Respondents with missing outcome variables or missing covariates were excluded from the respective model's analytic sample. Missingness for Model A=Age (n=5; 0.0%), race (n=79; 0.2%), education (n=153; 0.5%), annual household income (n=2,433; 9.8%), first tobacco use was flavored (n=25; 0.2%), age at tobacco trial (n=53; 0.4%), alcohol (n=36; 0.1%), marijuana (n=240; 0.8%), substance use scale (n=698; 2.5%), internalizing scale (n=327; 1.2%), and externalizing scale (n=595; 2.5%). Missingness for Model B=Age (n=1; 0.0%), race (n=30; 0.2%), education (n=101; 0.8%), annual household income (n=1,220; 8.6%), age at first tobacco use (n=8; 0.1%), marijuana (n=146; 1.0%), alcohol (n=17; 0.1%), substance use scale (n=396; 2.8%), internalizing scale (n=183; 1.4%), and externalizing scale (n=315; 2.4%).

^a Percentages are weighted to represent the U.S. adult population and CIs are estimated using the balanced repeated replication (BRR) method.

^b Row percentages presented for the prevalence of current tobacco use among ever tobacco users (Model A) and prevalence of current flavored tobacco use among current tobacco users (Model B) across different correlates.

^c Prevalence of the outcome among ever tobacco users included in the analytic sample in Model A and current (past 30 day) tobacco users included in the analytic sample in Model B.

^d Missing data on age, gender, race, and Hispanic ethnicity were logically assigned from household screener data, as described in the PATH Restricted Use File User's Guide.³⁷

^e Mean and linearized SE.

^f Never users of all of the following substances: alcohol, marijuana, painkillers, Ritalin, cocaine, stimulants, and "other drugs like heroin or ecstasy" are treated as "Low".

Source: Population Assessment of Tobacco and Health, 2013–2014
 APR, adjusted prevalence ratio; HS, high school, GED, General Educational Development test