The 2009 Family Smoking Prevention and Tobacco Control Act prohibits “characterizing flavors” (e.g., candy, fruit, and chocolate) other than tobacco and menthol in cigarettes; however, characterizing flavors are not currently prohibited in other tobacco products (1). Analyses of retail sales data suggest that U.S. consumption of flavored noncigarette tobacco products, including flavored cigars and flavored e-cigarettes, has increased in recent years (2,3). There is growing concern that widely marketed varieties of new and existing flavored tobacco products might appeal to youths (2) and could be contributing to recent increases in the use of tobacco products, including e-cigarettes and hookah, among youths (4). CDC and the Food and Drug Administration (FDA) analyzed data from the 2014 National Youth Tobacco Survey (NYTS) to determine the prevalence of past 30 day use (current use) of flavored e-cigarettes, hookah tobacco, cigar, pipe tobacco or smokeless tobacco products, and menthol cigarettes among middle and high school students, and the proportion of current tobacco product users who have used flavored products. An estimated 70.0% (3.26 million) of all current youth tobacco users had used at least one flavored tobacco product in the past 30 days. Among current users, 63.3%, (1.58 million) had used a flavored e-cigarette, 60.6%, (1.02 million) had used flavored hookah tobacco, and 63.5% (910,000) had used a flavored cigar in the past 30 days. Given the millions of current youth tobacco users, it is important for comprehensive tobacco prevention and control strategies to address all forms of tobacco use, including flavored tobacco products, among U.S. youths.

The NYTS is a cross-sectional, school-based, self-administered, pencil-and-paper questionnaire administered to U.S. middle school (grades 6–8) and high school (grade 9–12) students. Information is collected to monitor the impact of comprehensive tobacco control policies and strategies and to inform FDA regulatory actions (1,5). For the 2014 NYTS, a three-stage cluster sampling procedure was used to generate a nationally representative sample of U.S. students attending public and private schools in grades 6–12. Among 258 schools selected for the 2014 NYTS, 207 (80.2%) participated, with a sample of 22,007 (91.4%) among 24,084 eligible students; the overall response rate was 73.3%.

Participants were asked about past 30-day use of eight different tobacco products: cigarettes; e-cigarettes; hookah; cigars (defined as cigars, cigarillos or little cigars); tobacco in pipes; smokeless tobacco (defined as chewing tobacco, snuff or dip); snus†; and dissolvable tobacco products (dissolvables).‡ Current use for each product was defined as using a product on ≥1 day during the preceding 30 days. “Any tobacco” was defined as using any of the tobacco products on ≥1 day during the past 30 days. “Any smokeless tobacco” was defined as using smokeless tobacco, snus, or dissolvables on ≥1 day during the past 30 days.

Participants also were asked about any current use of tobacco products that were “flavored to taste like menthol (mint), alcohol (wine, cognac), candy, fruit, chocolate, or other sweets.” Participants could select from a list of options to designate the flavored tobacco product or products they had used, which included each of the seven noncigarette tobacco product types and “I did not use flavored tobacco in the past 30 days.” Among those who reported any use of each respective product in the past 30 days, those who selected the flavored product were categorized as flavored product users, those who did not select the flavored product were categorized as only nonflavored product users, and those who did not provide any response to the flavored use question were categorized as missing flavor status. Because studies have suggested adolescent underreporting of menthol status of brands that exclusively or predominately produce menthol cigarettes (e.g., Newport and Kool) (6,7), menthol cigarette smoking was ascertained from responses to two questions: “During the past 30 days, were the cigarettes that you usually smoked menthol?” and “During the past 30 days, what brand of cigarettes did you usually smoke?” Among current cigarette smokers, those reporting “Yes” to the menthol question, or who reported “Newport” or “Kool” as the usual cigarette brand, were categorized as menthol smokers. Subsequently, respondents who reported “No” to the menthol question, or who did not report “Newport” or “Kool” brands, were categorized as nonmenthol smokers. All other current cigarette smokers were categorized as missing menthol smoking status.

Data were weighted to account for the complex survey design and adjusted for nonresponse. National prevalence estimates were calculated with 95% confidence intervals and weighted population estimates were rounded down

† Snus is a smokeless, spitless tobacco product.
‡ Participants also were asked about past 30-day use of bidis. Because information on use of flavored bidis was not available, bidi use was excluded from the analysis.
to the nearest 10,000. Two-sided chi-squared tests were used to assess statistically significant differences between demographic subgroups at p<0.05.

Among middle and high school students in 2014, an estimated 1.58 million used a flavored e-cigarette, 1.02 million used flavored hookah tobacco, 910,000 used flavored cigars, 900,000 used menthol cigarettes, 690,000 used flavored smokeless tobacco products, and 120,000 used flavored pipe tobacco in the past 30 days (Table). Among current users of any tobacco product, 70.0% reported using at least one flavored tobacco product in the past 30 days, corresponding to an estimated 3.26 million middle and high school students. The proportion of current tobacco users who reported flavored product use in the past 30 days was 63.5% for cigars, 63.3% for e-cigarettes, 60.6% for hookah, 58.8% for any smokeless tobacco, 53.6% for menthol cigarettes and 42.3% for tobacco pipes.

Among all current tobacco users, a higher proportion of high school than middle school students reported use of flavored e-cigarettes, flavored hookah, flavored smokeless tobacco, and any flavored product, while the proportion of male and female users who reported flavored product use was generally similar. Among current cigarette smokers, a greater proportion of non-Hispanic blacks reported menthol cigarette use (70.5%) than non-Hispanic whites (51.4%) and Hispanics (52.3%); however, among current users of other tobacco products, non-Hispanic blacks generally had lower prevalence of flavored product use than non-Hispanic whites.

Among high school students only, 24.5% reported using one or more tobacco products in the past 30 days (i.e., current use). Current use of at least one flavored product was reported by 17.9% of all high school students, whereas 5.8% reported using only nonflavored tobacco products (Figure).

### TABLE. Percentage of middle and high school students currently using tobacco products* who reported using flavored products† during the preceding 30 days, by sex and race/ethnicity — National Youth Tobacco Survey, United States, 2014

<table>
<thead>
<tr>
<th>Tobacco product</th>
<th>Overall</th>
<th>Any tobacco§</th>
<th>E-cigarettes</th>
<th>Hookah</th>
<th>Cigars</th>
<th>Cigarettes§</th>
<th>Any smokeless tobacco**</th>
<th>Pipe tobacco</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% (95% CI)</td>
<td>% (95% CI)</td>
<td>% (95% CI)</td>
<td>% (95% CI)</td>
<td>% (95% CI)</td>
<td>% (95% CI)</td>
<td>% (95% CI)</td>
<td>% (95% CI)</td>
</tr>
<tr>
<td>Estimated no. of flavored users11</td>
<td>3,260,000</td>
<td>1,580,000</td>
<td>1,020,000</td>
<td>910,000</td>
<td>900,000</td>
<td>690,000</td>
<td>120,000</td>
<td></td>
</tr>
<tr>
<td>Prevalence of flavored use among all students</td>
<td>12.0 (10.9–13.2)</td>
<td>5.9 (4.9–7.1)</td>
<td>3.9 (3.3–4.6)</td>
<td>3.5 (3.0–4.0)</td>
<td>3.4 (2.9–4.0)</td>
<td>2.6 (2.2–3.1)</td>
<td>0.5 (0.4–0.6)</td>
<td></td>
</tr>
<tr>
<td>Proportion of flavored use among current product users</td>
<td>70.0 (67.4–72.4)</td>
<td>63.3 (59.8–66.7)</td>
<td>60.6 (56.5–64.5)</td>
<td>63.5 (59.4–67.3)</td>
<td>53.6 (47.9–59.1)</td>
<td>58.8 (53.8–63.7)</td>
<td>42.3 (34.2–50.9)</td>
<td></td>
</tr>
</tbody>
</table>

** Any smokeless tobacco is current use of smokeless tobacco (chewing tobacco, snuff, or dip), snus, or dissolvables on ≥1 day in the preceding 30 days.

§§ The estimated numbers of flavored tobacco product users were rounded down to the nearest 10,000.

Abbreviation: CI = confidence interval.

* Current cigarette smoking was determined by asking,”During the past 30 days, on how many days did you smoke cigarettes?” Current use of cigars, cigarillos, or little cigars? Current use of smokeless tobacco was determined by asking,”During the past 30 days, on how many days did you use chewing tobacco, snuff, or dip?” Current use of e-cigarettes was determined by asking,”During the past 30 days, on how many days did you use electronic cigarettes or e-cigarettes such as Blu, 21st Century Smoke, or NJOY?” Current use of hookahs, pipe tobacco (not hookah), snus, and dissolvable tobacco were determined by asking,”In the past 30 days, which of the following products have you used on at least one day?”

†† Flavored tobacco product use was determined by the response to the question,”Which of the following tobacco products that you used in the past 30 days were flavored to taste like flavor status.” Participants could select from a list of options to designate the flavored tobacco products they had used. Among those who reported any use of each respective product in the preceding 30 days, those who selected the flavored product were categorized as a flavored product users; those who did not select the flavored product were categorized as only nonflavored users; and those who did not provide any response to the flavored use question were assigned to missing flavor status.

§ Any tobacco use is use of cigarettes, cigars, smokeless tobacco, e-cigarettes, hookahs, tobacco pipes, snus, or dissolvables on ≥1 day in the preceding 30 days.

¶ Flavored cigarette use refers to menthol cigarettes. Menthol cigarette status was determined by asking,”Menthol cigarettes are cigarettes that taste like mint. During the past 30 days, were the cigarettes that you usually smoked menthol?” and “During the past 30 days, what brand of cigarettes did you usually smoke?” Among past 30-day cigarette smokers, those responding “Yes” to the menthol question, or who reported “Newport” or “Kool” as the usual cigarette brand, were classified as menthol smokers; subsequently those who reported “No” to the menthol question, or who did not report “Newport” or “Kool” brands, were classified as nonmenthol smokers; all other past 30-day cigarette smokers were classified as missing menthol smoking status.

* The estimated numbers of flavored tobacco product users were rounded down to the nearest 10,000.

†† The estimated data are statistically unreliable because the sample size was <50 or the relative standard error was >30%.
E-cigarettes (8.8%) were the most commonly used flavored tobacco product among high school students, followed by hookah (6.0%), cigars (5.3%), menthol cigarettes (5.0%), any smokeless tobacco (4.1%), and tobacco in pipes (0.7%).

**Discussion**

Among U.S. middle and high school students who used a tobacco product in the preceding 30 days in 2014, an estimated 3.26 million used a flavored tobacco product. In 2014, among middle and high school students who used a tobacco product within the past 30 days, 70.0% reported using at least one flavored tobacco product, including 1.58 million e-cigarette users, 1.02 million hookah users, 910,000 cigar smokers, and 900,000 menthol cigarette smokers. Consequently, millions of youths are exposed, through inhalation or oral absorption, to nicotine and harmful constituents from these tobacco products (8). Nicotine exposure during adolescence, a critical window for brain development, causes addiction, is more likely to lead to sustained tobacco use, and might have lasting adverse consequences for brain development (8).

The proportion of current users who reported flavored use was consistently high across tobacco products including among cigar smokers (63.5%), e-cigarette users (63.3%), and hookah users (60.6%). The popularity of flavors across the range of products has been associated with increased use and development of addiction (8).
tobacco products suggests that flavoring might have broad appeal to young tobacco users. Therefore, it is important that comprehensive tobacco prevention and control strategies for youths address all forms of flavored tobacco products and not just cigarettes.

The findings in this report are subject to at least five limitations. First, data were collected only from students who attended either public or private schools and might not be generalizable to all middle and high school–aged youths. Second, flavored tobacco product use was ascertained from a check-all-that-apply response, which might yield lower estimates than forced-choice response options. Third, NYTS is a paper-pencil based survey; therefore, students might report current use of a flavored product, but also report that they did not use any form of that product in past 30 days. In this analysis, a student had to first report any use of a tobacco product in the past 30 days before flavored tobacco use status was determined. Fourth, inconsistencies in responses to menthol and usual brand questions required the development of a measure of menthol cigarette status that relied on responses to both questions. Finally, the flavor question referred to use of any flavored products, whereas the menthol and cigarette brand questions referred to the usual cigarettes smoked. Additionally, the flavor measure reflects any flavored use in the preceding 30 days, and not how frequently flavored products were used.

Sustained efforts to implement proven tobacco control policies and strategies are needed to prevent all forms of tobacco use, including flavored tobacco products, among U.S. youths. For example, several local jurisdictions, including New York City (New York), Chicago (Illinois), Providence (Rhode Island),** and Santa Clara (California) have acted to limit or restrict sales of flavored tobacco products in their communities.†† Additional strategies that can reduce youth tobacco use include increasing the price of tobacco products, adopting comprehensive smoke-free laws, implementing advertising and promotion restrictions and national public education media campaigns, and raising the minimum age of purchase for all tobacco products to age 21 years (9,10).

Summary

What is already known on this topic?

Retail sales data suggest that U.S. consumption of flavored tobacco products, including flavored cigars and flavored e-cigarettes, has increased in recent years. There is growing concern that widely marketed varieties of new and existing flavored tobacco products might appeal to youths and could be contributing to recent increases in the use of tobacco products, including e-cigarettes and hookah, among youths.

What is added by this report?

In 2014, among middle and high school students, 1.58 million e-cigarette users, 1.02 million hookah users, 910,000 cigar smokers used flavored varieties of these products during the preceding 30 days. Among current tobacco users, 70.0% reported using at least one flavored tobacco product in the past 30 days, including 63.5% of cigar smokers, 63.3% of e-cigarette users, and 60.6% of hookah users.

What are the implications for public health practice?

In 2014, millions of youths were exposed, through inhalation or oral absorption, to nicotine and harmful constituents from tobacco products. Sustained efforts to implement proven tobacco control policies and strategies (e.g., increasing the price of tobacco products, adopting comprehensive smoke-free laws, implementing advertising and promotion restrictions and national public education media campaigns, and raising the minimum age of purchase for all tobacco products to age 21 years) are needed to prevent all forms of tobacco use, including flavored tobacco products, among U.S. youths.

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¶ Available at http://www.providenceri.com/efile/2036.


