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## Nicotine Pouch Awareness and Use Among Youth, National Youth Tobacco Survey, 2021

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### Abstract

**Introduction:** This manuscript examines prevalence of awareness and use of nicotine pouches among U.S. middle and high school students by sociodemographic characteristics and other tobacco product use and characterizes nicotine pouch and other tobacco product use behaviors among current nicotine pouch users.

**Aims and Methods:** Data are from the 2021 National Tobacco Youth Survey, a cross-sectional, school-based survey of middle and high school students (N = 20 413; overall response rate: 44.6%), which included questions on nicotine pouches in 2021 for the first time. Prevalence estimates, 95% confidence intervals, and estimated population counts were assessed for nicotine pouch awareness, ever use, and current (past 30 days) use, and for use behaviors related to nicotine pouches (frequency of use, flavor(s) used) and other tobacco products (ever, current, frequency of use) among current nicotine pouch users.

**Results:** Over one-third of students (35.5%) had ever heard of nicotine pouches. An estimated 1.9% (490 000) reported ever using them, while 0.8% (200 000) reported current use. Among current nicotine pouch users, 61.6% reported flavored nicotine pouch use, 64.2% reported current e-cigarette use, and 52.6% used multiple (≥ 2) tobacco products. Current use of nicotine pouches was common among current smokeless tobacco users (41.3%).

**Conclusions:** Overall, in 2021, while relatively few students had ever tried nicotine pouches or currently used them, more than one-third had heard of them. Current nicotine pouch users tended to use other tobacco products, particularly e-cigarettes and smokeless tobacco. Given previous rapid increases in youth uptake of e-cigarettes, it is important to continue monitoring nicotine pouch use among young people.

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Declaration of Interests

The authors have no conflicts of interests or financial disclosures to declare.

Supplementary Material

A Contributorship Form detailing each author's specific involvement with this content, as well as any supplementary data, are available online at <https://academic.oup.com/ntr>.

**Implications:** This study’s findings provide an important baseline for future monitoring of nicotine pouch awareness and use among middle and high school students. Emerging tobacco products, particularly those that are flavored, widely available, discreet, and inexpensive have the potential to attract youth. Given the potential of these products to appeal to young people, ongoing monitoring of nicotine pouch use behaviors is important to inform public health and regulatory efforts.

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## Introduction

Nicotine pouches—small, flavored pouches containing a similar amount of nicotine as many combustible products<sup>1</sup>—are a burgeoning class of smokeless tobacco products in the United States.<sup>2,3</sup> Like other smokeless products, nicotine pouches are placed in the mouth or between the lip and gum, but differ from dip and chewing tobacco in that they do not require spitting and snus in that they do not contain tobacco leaf.<sup>4</sup> Sales of nicotine pouches in the United States have increased substantially since 2016,<sup>2,5</sup> and at least eight brands of nicotine pouches claiming to contain nicotine from sources other than tobacco entered the market in 2021.<sup>2</sup>

Little is known about nicotine pouch use in the United States. Two studies of adults who smoke or recently quit smoking suggest low prevalence of ever and current use of nicotine pouches.<sup>3,6</sup> However, many of the product characteristics of nicotine pouches may appeal to youth, which is a public health concern because nicotine is addictive, adversely impacts adolescent brain development, and may prime the brain for addiction to other drugs.<sup>7</sup> Nicotine pouches are easy to access, can be used discreetly, and come in flavors that young people tend to prefer in other tobacco products such as e-cigarettes, like mint, menthol, and fruit.<sup>4,8–10</sup> Furthermore, marketing for nicotine pouches commonly draws on descriptors like “tobacco free” or “tobacco-leaf free,”<sup>11</sup> which are associated with increased appeal among youth and young adults<sup>12</sup> and may contribute to their perceptions of reduced risk.<sup>12–15</sup> As observed with the rise in youth use of e-cigarettes, new tobacco products can gain popularity quickly among young people.<sup>4,16</sup> Indeed, a recent study of Southern California high school students indicated that after e-cigarettes, flavored oral nicotine products (including nicotine pouches) were the next most commonly used nicotine product.<sup>17</sup> Thus, close monitoring for potential surges in uptake are important.

In light of the increases in nicotine pouch sales in recent years and their potential to appeal to young people, the objectives of this study were to estimate youth awareness and use of these products, overall and by sociodemographic characteristics and other tobacco product use, and to characterize use behaviors related to nicotine pouches and other tobacco products among current nicotine pouch users. This study will provide critical insight into youth awareness and use of these emerging products.

## Methods

### Data Source

Data were from the 2021 National Youth Tobacco Survey (NYTS), a voluntary, school-based, cross-sectional survey administered annually to a nationally representative sample of

U.S. students in middle school (grades 6–8) and high school (grades 9–12). The 2021 NYTS sample included responses from 20 413 middle and high school students from 279 schools; the overall response rate was 44.6%, with a student response rate of 81.2% and a school response rate of 54.9%.<sup>8</sup> Sampling procedures and other methodological details have been described elsewhere.<sup>18</sup>

The NYTS included questions on nicotine pouches for the first time in 2021. At the beginning of the section on nicotine pouches, students were shown generic pictures of the products.<sup>18</sup> The survey text also included a description (“small, flavored pouches” placed in the mouth, containing tobacco-derived nicotine but not tobacco leaf) and named specific brands (Zyn, on!, and Velo) in order to reduce misclassification.<sup>19</sup>

## Measures

**Nicotine Pouch Awareness**—Awareness of nicotine pouches was assessed with the question, “Before today, have you heard of ‘nicotine pouches?’” Response options included “Yes,” “No,” and “Don’t know/Not Sure.”

**Nicotine Pouch Use**—Ever use of nicotine pouches was assessed with the question, “Have you ever used a ‘nicotine pouch,’ even just one time?” Response options included “Yes,” “No,” and “Don’t know/Not Sure.” Frequency of use of nicotine pouches was assessed with the question, “During the past 30 days, on how many days did you use a ‘nicotine pouch?’” Respondents could input a number between 0 and 30 days; responses were collapsed into “1–5 days,” “6–19 days,” and “20–30 days” in order to facilitate comparison with published data on other tobacco products.<sup>9</sup> Current use of nicotine pouches was defined as use on one or more days of the past 30 days.

Among current nicotine pouch users, use of flavored nicotine pouches was assessed with the question, “Were any of the nicotine pouches that you used in the past 30 days flavored to taste like menthol, mint, clove or spice, alcoholic drinks, candy, fruit, chocolate, or any other flavor?” and response options included “Yes,” “No,” and “Don’t know.” Flavor(s) used were assessed with the question, “What flavors were the nicotine pouches that you have used in the past 30 days? (Select one or more).” Response options for this item included “menthol,” “mint,” “clove or spice,” “fruit,” “chocolate,” “alcoholic drinks (such as wine, margarita, or other cocktails),” “candy, desserts, or other sweets,” and “some other flavor not listed here.” Those who reported using “some other flavor not listed here” could provide a write-in response; these were recorded if they corresponded to an original response option.

**Other Tobacco Product Use**—Respondents’ ever, current (ie, past 30-day use), and frequency of use of other types of tobacco products were considered, including smokeless tobacco products (chewing tobacco, snuff, dip, snus, or dissolvable tobacco), heated tobacco products, combustible tobacco products (cigarettes, cigars [cigars or cigarillos or little cigars], hookahs, pipe tobacco, or bidis), and e-cigarettes. Frequency of use was assessed separately for each product and determined by asking respondents on how many days they used each product during the past 30 days. For smokeless and combustible tobacco products, where respondents could report using more than one product, frequency of use for the broader category was based on the product used most frequently.

**Sociodemographic Characteristics**—Sociodemographic measures included school level (middle school [grades 6–8] or high school [grades 9–12]), sex (male or female), race and ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, or non-Hispanic other), sexual, and gender identity (lesbian, gay, bisexual, or transgender [LGBT]; not LGBT; or unknown), and language other than English spoken at home (yes or no). Additionally, respondents completed the four-item patient health questionnaire-4, measuring psychological distress (responses summed and categorized as none [0–2], mild [3–5], moderate [6–8], and severe [9–12]), and the four-item Family Affluence Scale (responses summed and categorized into approximate tertiles based on the weighted distribution of scores in this sample: Low [0–5], medium [6–7], and high [8–9]).

### Analytic Approach

All analyses were conducted in SAS-callable SUDAAN software (version 11.0.3; RTI International) to account for the NYTS' complex sampling design. Prevalence estimates, 95% confidence intervals, and estimated population counts were assessed for nicotine pouch awareness and use, overall and by sociodemographic characteristics and other tobacco product use, and behaviors related to use of nicotine pouches and other tobacco products among current nicotine pouch users. Estimated population counts were calculated from extrapolated probability weights and were rounded down to the nearest 10 000 persons. Estimates were suppressed if they had an unweighted denominator of less than 50 or a relative standard error of more than 30%.

## Results

### Awareness of Nicotine Pouches

As shown in Supplementary Table S1, overall, approximately 9.4 million or 35.5% of students had ever heard of nicotine pouches. Nearly one-third (32.9%) of middle school students and 37.5% of high school students were aware of nicotine pouches, as were 36.8% of males and 34.1% of females. The prevalence of awareness was 44.1% among non-Hispanic white students, 26.4% among Hispanic students, 24.6% among non-Hispanic students of other races, and 23.6% among non-Hispanic black students. Nearly half of other tobacco product ever users (46.1%) and other tobacco product current users (49.1%) were aware of nicotine pouches, compared to 32.2% of never users and 34.2% of non-current users. Awareness was especially prevalent among ever and current users of smokeless tobacco (68.6% and 64.5%). At least 47% of ever or current users of e-cigarettes (47.4% and 51.6%), cigarettes (53.1% and 53.0%), cigars (53.9% and 47.6%), and heated tobacco products (59.4% and 50.7%) reported having ever heard of nicotine pouches.

### Prevalence of Nicotine Pouch Use

As presented in Supplementary Table S2, ever nicotine pouch use was reported by 1.9% of students overall, including 0.6% of middle school students and 3.0% of high school students; 2.6% of males and 1.2% of females; 2.6% of non-Hispanic white students, 1.3% of Hispanic students, and 0.7% of non-Hispanic black students. Ever nicotine pouch use was reported by 34.9% of ever and 50.5% of current smokeless tobacco users, 13.0% of ever and 18.4% of current cigarette users, and 8.1% of ever and 14.8% of current e-cigarette users. Current

nicotine pouch use was reported by 0.8% of students overall, including 0.3% of middle school students and 1.1% of high school students; 1.0% of males and 0.5% of females; 0.9% of non-Hispanic white students and 0.7% of Hispanic students; and 2.9% of other tobacco product ever users and 7.4% of current users. Current nicotine pouch use was reported by 13.3% of ever and 41.3% of current smokeless tobacco users, 5.1% of ever and 11.5% of current cigarette users, and 3.2% of ever and 6.9% of current e-cigarette users.

### Characteristics of Current Nicotine Pouch Users

About 63.5% of current users reported using nicotine pouches on 1–5 days in the past month, while 19.3% used them on 6–19 days and 17.2% used them on 20–30 days (Supplementary Table S3). Most current users (61.6%) reported using flavored nicotine pouches. The two most common flavors among current flavored nicotine pouch users were mint (53.5%) and menthol (50.2%); 45.5% reported using other flavors, such as fruit and candy, desserts, or other sweets. Compared with 14.6% of exclusive nicotine pouch use, 85.4% reported currently using at least one other type of tobacco product: 32.8% used one other type and 52.6% used two or more.

Many current nicotine pouch users were also ever users of e-cigarettes (79.2%), smokeless tobacco (62.3%), or cigarettes (54.7%). Additionally, current nicotine pouch users also commonly were current users of e-cigarettes (64.2%), smokeless tobacco products (48.5%), or cigarettes (22.7%). Overall, the most commonly used tobacco product among current nicotine pouch users was e-cigarettes, and many users reported using them frequently: more than one-third (34.3%) of nicotine pouch users reported e-cigarette use on 20–30 days per month.

### Discussion

The objectives of this study were to describe youth awareness and use of nicotine pouches, overall and by sociodemographic characteristics and other tobacco product use, and to characterize nicotine pouch and other tobacco product use behaviors among current nicotine pouch users. Findings indicate that more than one-third of middle and high school students were aware of nicotine pouches, while among current and ever users of smokeless tobacco, cigars, cigarettes, and e-cigarettes, this figure ranged from nearly half to two-thirds. Overall, prevalence of use of nicotine pouches among youth was low relative to awareness, with about 2% of students reporting ever using them, while fewer than one percent were current users. Nevertheless, in 2021, nearly half a million students reported ever trying nicotine pouches. Results suggest that the vast majority of current users of nicotine pouches used at least one other type of tobacco product; e-cigarettes were the most commonly used product, followed by smokeless tobacco. More than six in ten nicotine pouch users reported using flavored pouches—mostly mint and menthol—and using pouches relatively infrequently, on 1–5 days in the past month.

This analysis is, to the best of our knowledge, the first to thoroughly examine nicotine pouch awareness and use among youth using the NYTS. Completely switching from combustible to noncombustible nicotine products may benefit nonpregnant adults. Although nicotine pouches may contain lower levels of some tobacco-related chemicals compared to

conventional smokeless tobacco products,<sup>1</sup> nicotine itself is addictive and has known adverse consequences for adolescent brain development.<sup>7</sup> Further, the fact that many nicotine pouch product characteristics have been reported to be important characteristics for novel products like e-cigarettes—such as being flavored, inexpensive, easy to access, and discreet to use<sup>8,10,20</sup>—may suggest potential for greater youth use as products become more established in the marketplace. For example, the most commonly reported flavors of nicotine pouches were mint and menthol, which are also popular flavors of e-cigarettes, smokeless tobacco, cigarettes, and cigars.<sup>9</sup> Most nicotine pouch users also used at least one other type of tobacco product—and more than half used two or more—which may be linked to nicotine dependence in youth.<sup>21,22</sup> While nicotine pouch use behaviors were assessed for the first time in the 2021 NYTS, it may be important to continue monitoring their use to understand and address any possible surge in use of these products.<sup>23</sup>

Our findings should be considered in light of study limitations. First, due to the relatively low prevalence of ever and current nicotine pouch use, estimates for many of the smaller sociodemographic subgroups could not be reported. Second, data were self-reported and might be subject to recall and response bias. Third, because the NYTS uses school-based sampling, results can generalize only to young people currently enrolled in school; those who are homeschooled or not in school are not captured in the sampling frame. Fourth, due to the coronavirus disease-2019 pandemic, about half of students completed the web-based survey at school, while the other half completed it at home or somewhere else, which may have impacted results.<sup>9,24</sup> Similarly, unmeasured characteristics related to the ongoing COVID-19 pandemic may have either facilitated or reduced exposure and access to nicotine pouches. Thus, it is unclear if future research conducted outside of the pandemic would produce similar results as this study.

This study provides a valuable first look at nicotine pouch use behaviors among middle and high school students. Nicotine pouch awareness and use were especially prevalent among ever and current tobacco product users, with most current users of nicotine pouches reporting use of multiple other types of tobacco products. Products may be a situational substitute for use in places where smoking or vaping is prohibited, potentially contributing to greater overall nicotine intake and thereby fostering nicotine dependency. Further, inclusion of nicotine pouches in tobacco-free school grounds policies is important to maintain the health and safety of students and staff. Given the numerous similarities in appealing product features between e-cigarettes and nicotine pouches—including their attractive flavors, low cost, ease of accessibility, and ability to be used discreetly—ongoing surveillance, including longitudinal studies, can provide important information about the role of nicotine pouches in youth tobacco product initiation and use.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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### Disclaimer

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the U.S. Food and Drug Administration, Centers for Disease Control and Prevention, or Department of Health and Human Services.

### Data Availability

Data from the 2021 National Youth Tobacco survey are publicly available at: [https://www.cdc.gov/tobacco/data\\_statistics/surveys/nyts/data/index.html](https://www.cdc.gov/tobacco/data_statistics/surveys/nyts/data/index.html).

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