

# Attitudes Toward Tobacco 21 Among US Youth

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abstract

**BACKGROUND:** An important movement in reducing youth smoking is to restrict the supply of cigarettes to youth by raising the minimum age of sales to 21, termed Tobacco 21. This study examined attitudes toward Tobacco 21 among youth and their correlations with tobacco use.

**METHODS:** Data from the 2015 National Youth Tobacco Survey ( $n = 17\,092$ , the typical age of 11–18 years) were analyzed to examine the prevalence of support toward Tobacco 21 among youth. This study further assessed whether attitudes toward Tobacco 21 were associated with (1) intention to initiate cigarette smoking among never-smoking youth ( $n = 16\,449$ ); and (2) intention to quit tobacco use among current tobacco users ( $n = 2914$ ).

**RESULTS:** Approximately 63.9% of respondents reported supporting Tobacco 21. Support for Tobacco 21 was higher among middle school students (versus high school students), girls (versus boys), and noncurrent users of cigarettes or electronic cigarettes (versus current users). Youth support attitudes were significantly associated with perceptions of tobacco's danger and tobacco use by household members. Never smokers who supported Tobacco 21 had lower odds of intention to initiate cigarette use (adjusted odds ratio = 0.2,  $P < .0001$ ). Current tobacco users who supported Tobacco 21 had higher odds of intention to quit tobacco use in the next 12 months (adjusted odds ratio = 2.6,  $P < .0001$ ).

**CONCLUSIONS:** Tobacco 21 is supported by the majority of youth nationwide and youth attitudes were correlated with smoking behaviors. Education programs about the harm of smoking and nicotine addiction at the early stages of life may help increase support of this policy among young tobacco users.

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**WHAT'S KNOWN ON THIS SUBJECT:** Raising the legal age of tobacco product sales to 21 could restrict youth access to cigarettes and reduce youth smoking rates. Existing adult surveys show that this policy is broadly supported by adults, including both smokers and nonsmokers.

**WHAT THIS STUDY ADDS:** Nearly two-thirds of youth support raising the minimum age of smoking to 21 years. The level of support varied by demographic factors, smoking status, perception of tobacco's danger, and tobacco use by household members.

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Youth are at the greatest risk of smoking, and smokers almost always begin experimenting with smoking cigarettes and other tobacco products before age 18.<sup>1,2</sup> Each day in the United States, more than 3200 adolescents aged 18 years or younger start smoking, and over 1000 youth become daily cigarette smokers.<sup>2</sup> In recent years, the decline in adolescent smoking rates has slowed, but adolescents' use of alternative tobacco products such as electronic cigarettes (e-cigarettes), hookahs, and small cigars have been increasing,<sup>3</sup> which could offset decades of effort in tobacco control.

Restricting the supply of tobacco products through age-of-sale restrictions is an important component in reducing youth smoking. Underage laws and compliance check inspections of tobacco product retailers have led to a decrease in the prevalence of youth buying cigarettes in a store.<sup>4-6</sup> However, social access to cigarettes has been increasing with strong evidence indicating that youth <18 are able to obtain their cigarettes from friends and young adolescents aged 18 to 20 years.<sup>7-9</sup> This, along with health concerns, has prompted state and local efforts to raise the legal age of tobacco sale to 21 years. Tobacco 21 could restrict young adults aged 18 to 20 from smoking and also greatly reduce the social access of tobacco products among youth <18 years.<sup>9</sup> It is estimated that a nationwide Tobacco 21 law would result in a significant reduction in smoking prevalence, 249 000 fewer premature deaths, 45 000 fewer deaths from lung cancer, and 4.2 million fewer lost life-years among individuals born between 2010 and 2019.<sup>9,10</sup> Since Needham, Massachusetts, became the first municipality to establish Tobacco 21 laws in 2005, the momentum to promote Tobacco 21 has been surging across the nation. As of February 2, 2017, 2 states (HI and

CA) and at least 215 municipalities in 12 states have raised the minimum smoking age from 18 to 21 years.<sup>11</sup>

A few recent surveys of US adults revealed strong support for raising the minimum legal age of tobacco sales to 21 years, with support rates ranging from 66% to 75%.<sup>12-14</sup> The support for Tobacco 21 was higher among older adults as compared with younger adults aged 18 to 20 years<sup>13</sup> and 18 to 24 years.<sup>12</sup> The policy change received high support rates among both smokers and nonsmokers.<sup>12,14</sup> Another national survey randomly assigned 19, 20, and 21 years as the minimum sales age and found that support for raising the minimum age of sales trended higher for 21 years as compared with 19 and 20 years.<sup>13</sup> Studies also show that support for Tobacco 21 is strong across all major sociodemographic groups.<sup>10,14</sup>

It is important to understand youth's attitudes toward Tobacco 21 as well as the correlations between these attitudes and smoking behaviors. Favorable opinions of Tobacco 21 and other tobacco control measures from the younger generation could provide continuous momentum to end the tobacco epidemic.<sup>15</sup> Current studies have focused on the attitudes of adults, and little is known about how youth nationwide perceive the laws of Tobacco 21. To fill the gaps in knowledge, this study used data from the 2015 National Youth Tobacco Survey (NYTS) to analyze the prevalence of youth support toward Tobacco 21 (overall and stratified by demographic characteristics, tobacco use status, perception of tobacco's danger) and tobacco use by household members. This study further assessed whether supporting Tobacco 21 was correlated with (1) intention to initiate cigarette smoking among never-smoking youth; and (2) intention to quit tobacco use among current tobacco users.

## METHODS

### Data

The 2015 NYTS is a cross-sectional and school-based annual survey covering tobacco-related knowledge, attitudes, and behaviors of middle and high school students in the United States. The 2015 NYTS was conducted by using a stratified, 3-stage cluster sampling procedure, and a detailed description of the 2015 NYTS survey design, questionnaires, and data collection process can be found on the NYTS Web site.<sup>16</sup> In 2015, 17 711 students (with the typical age of 11–18 years) from 185 schools completed the NYTS questionnaire. The school participation rate was 72.6% and the student response rate was 87.4%, yielding an overall response rate of 63.4%.<sup>17</sup>

Because NYTS results are public data with deidentified information, this study is treated as a nonhuman-subject study and exempt from institutional review board approval.

### Measures

#### *Attitudes Toward Tobacco 21*

The survey participants were asked the question, "Do you think the minimum age to buy tobacco products should be 21?" Respondents who answered "definitely yes" or "probably yes" were defined as having supporting attitudes toward Tobacco 21. Respondents who answered "probably not" or "definitely not" were defined as having opposing attitudes toward Tobacco 21. A total of 619 respondents with missing information on this question were excluded in the analysis, resulting in 17 092 respondents in the final study.

#### *Smoking Status*

Current use of cigarettes was determined by the item, "During the past 30 days, on how many days did you smoke cigarettes?" Students who responded at least 1 day in the last

30 days were categorized as current smokers. Current use of e-cigarettes was defined as at least 1 day in the last 30 days by the item, "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 any tobacco is defined by use of cigarettes, cigars (including cigars, cigarillos, or little cigars), smokeless tobacco (including chewing tobacco, snuff, or dip), e-cigarettes, hookahs, tobacco pipes, snus, or dissolvables at least 1 day in the last 30 days.<sup>3</sup>

#### *Intention to Initiate Cigarette Use or Quit Tobacco Use*

Students who responded "No" to the item, "Have you ever tried cigarette smoking, even 1 or 2 puffs?" were defined as never smokers. Among never-smoking youth, the intention to smoke cigarettes was measured on the basis of 2 NYTS questionnaire items: (1) "Do you think you will smoke a cigarette in the next year?" and (2) "Do you think you will try a cigarette soon?" Responses for these questions included "definitely yes," "probably yes," "probably not," and "definitely not." The respondents who answered "definitely not" to both questions were classified into the group "no intention to initiate cigarette smoking." The respondents who answered "definitely yes," "probably yes," or "probably not" to either of these 2 questions were classified into the group "intention to initiate cigarette smoking."<sup>18-21</sup>

Among current tobacco users, the intention to quit tobacco use was measured by the question, "Are you seriously thinking about quitting the use of all tobacco products?" The respondents who answered, "yes, within the next 30 days," "yes, within the next 6 months," or "yes, within the next 12 months" were classified into the group "intention to quit tobacco use in the next 12 months." Those who responded, "yes, but not within the next 12 months" or "no,

I am not thinking about quitting cigarettes" were classified into the group "no intention to quit tobacco use in the next 12 months."

#### *Covariates*

Several covariates were included in the analysis, such as sex (male or female), race and ethnicity (non-Hispanic white, non-Hispanic African American, Hispanic, or non-Hispanic others), age (9-11, 12-14, 15-17,  $\geq 18$  years), and grade (middle or high school).

Among all respondents, the perception of tobacco's danger was measured by the item, "How strongly do you agree with the statement 'All tobacco products are dangerous?'" The respondents who answered "strongly agree" or "agree" were classified into the group "perceived tobacco danger," and those who answered "disagree" or "strongly disagree" were classified into the group "no perceived tobacco danger." Tobacco use by other household members was defined as "none," and "any tobacco product use" was determined by the multiple-choice question "Does anyone who lives with you now... (Choose all that apply)" with the following response options: "smoke cigarettes," "smoke cigars, cigarillos, or little cigars," "use chewing tobacco, snuff, or dip," "use electronic cigarettes or e-cigarettes," "smoke tobacco from a hookah or waterpipe," "smoke pipes filled with tobacco (not waterpipes)," "use snus," "use dissolvable tobacco products," "smoke bidis (small brown cigarettes wrapped in a leaf)," and "no one who lives with me now uses any form of tobacco."

#### **Statistical Methods**

Weighted estimates along with 95% confidence intervals (CIs) of prevalence of supporting Tobacco 21 were calculated, both overall and stratified by demographic characteristics and smoking-related variables. A Rao-Scott  $\chi^2$  test was

used to detect group differences. Sampling weights and survey stratum were included in analyses to account for the complex survey design. A logistic regression model was used to examine the factors associated with supportive attitudes toward Tobacco 21, which included demographic characteristics (sex, race, and age), tobacco use status (current cigarette smoking and e-cigarette use), perception of tobacco's danger, and tobacco use by household members. Stratified analysis was additionally performed to assess the associations between attitudes toward Tobacco 21 and the intention to smoke among never smokers and the intention to quit smoking among current smokers. Adjusted odds ratios (aORs) were calculated in the multivariable analysis. Statistical analyses were performed by using SAS 9.4 (Cary, NC) and a *P* value  $< .05$  was considered statistically significant.

#### **RESULTS**

As shown in Table 1, 63.9% of all respondents ( $n = 17\,092$ ) reported supportive attitudes toward Tobacco 21. Younger adolescents (versus older adolescents) and girls (versus boys) were more likely to support Tobacco 21. Noncurrent smokers had a higher support rate for Tobacco 21 than current smokers (67.3% vs 17.1%). The prevalence of supporting Tobacco 21 was higher among noncurrent e-cigarette users as compared with current e-cigarette users (68.1% vs 31.2%). Respondents who did not use any tobacco had a higher prevalence of reporting supportive attitudes toward Tobacco 21 than any tobacco users (70.9% vs 30.3%). Approximately 68.8% of students who perceived tobacco as dangerous reported supportive attitudes toward Tobacco 21, nearly 2 times higher than those who did not perceive tobacco as dangerous (35.0%). Students who did not live with someone using tobacco

**TABLE 1** Sample Characteristics and Prevalence of Supporting Tobacco 21, NYTS, 2015 (*N* = 17 092)

	Unweighted, <i>N</i>	Weighted Characteristics, % (95% CI)	Support Tobacco 21, % (95% CI)	Support Tobacco 21, <i>P</i>
Total	17 092	100%	63.9 (63.0–64.9)	
Age, y				<.0001
9–11	925	5 (4.6–5.4)	69.8 (66.0–73.7)	
12–14	7751	43.9 (43–44.8)	72.7 (71.4–73.9)	
15–17	7044	42.5 (41.6–43.5)	58.5 (57.1–60.0)	
≥18	1319	8.5 (8–9.1)	42.9 (39.5–46.4)	
Sex				<.0001
Male	8598	50.8 (49.9–51.8)	61.8 (60.5–63.0)	
Female	8384	49.2 (48.2–50.1)	66.5 (65.2–67.8)	
Grade				<.0001
Middle school (6–8 grades)	7894	44.2 (43.3–45.1)	72.0 (70.7–73.3)	
High school (9–12 grades)	9118	55.8 (54.9–56.7)	57.7 (56.5–59.0)	
Race and ethnicity				.02
White, non-Hispanic	8307	57.5 (56.6–58.4)	64.2 (62.9–65.5)	
African American, non-Hispanic	2418	13.8 (13.2–14.4)	65.7 (63.3–68.1)	
Hispanic	4648	23.5 (22.8–24.2)	62.1 (60.4–63.8)	
Other, non-Hispanic	997	5.1 (4.7–5.5)	68.1 (64.3–71.8)	
Cigarette smoking <sup>a</sup>				<.0001
Noncurrent	15 782	94 (93.6–94.5)	67.3 (66.4–68.3)	
Current	1010	6 (5.5–6.4)	17.1 (14.2–19.9)	
E-cigarette use <sup>b</sup>				<.0001
Noncurrent	15 066	88.9 (88.3–89.5)	68.1 (67.1–69)	
Current	1864	11.1 (10.5–11.7)	31.2 (28.6–33.7)	
Any tobacco use in past 30 d				<.0001
No	14 178	82.9 (82.2–83.6)	70.9 (69.9–71.8)	
Yes	2914	17.1 (16.4–17.8)	30.3 (28.2–32.4)	
Perception of tobacco's danger				<.0001
No	2319	13.9 (13.2–14.5)	35.0 (32.5–37.4)	
Yes	14 649	86.1 (85.5–86.8)	68.8 (67.9–69.8)	
Tobacco use by household members				<.0001
No	10 086	60.6 (59.6–61.5)	68.4 (67.2–69.5)	
Yes	6344	39.4 (38.5–40.4)	57.9 (56.3–59.4)	

<sup>a</sup> 300 respondents with missing current smoking status were not included in Table 1. The prevalence (%) of supporting Tobacco 21 among these respondents was 42.3 (35.3–49.2).

<sup>b</sup> 162 respondents with missing current e-cigarette use status were not included in Table 1. The prevalence (%) of supporting Tobacco 21 among these respondents was 58.1 (48.4–67.8).

products had a higher prevalence of supporting Tobacco 21 than did those with tobacco use by household members (68.4% vs 57.9%).

### Factors Associated With Supporting Tobacco 21

Table 2 presents the results from the multivariable logistic regression model that examined the factors associated with attitudes supporting Tobacco 21. Students aged 15 to 17 years (aOR = 0.6, *P* < .0001) and ≥18 years (aOR = 0.3, *P* < .0001) were less likely to support Tobacco 21 than those aged 12 to 14 years. Boys had lower odds of supporting Tobacco 21 than did girls (aOR = 0.9, *P* = .001). After adjustment by other covariates, there was no difference in support of Tobacco 21 across races. Current smokers (aOR = 0.2, *P* < .0001) and

current e-cigarette users (aOR = 0.4, *P* < .0001) were much less favorable to Tobacco 21 than were noncurrent users. Students who reported perceiving tobacco as dangerous had higher odds of supporting Tobacco 21 than those who did not report perceiving tobacco as dangerous (aOR = 3, *P* < .0001). As compared with those with no household members using tobacco products, students who lived with someone using any tobacco product (aOR = 0.8, *P* < .0001) were less likely to support Tobacco 21.

### Factors Associated With Intention to Initiate Cigarette Smoking and Plan to Quit Tobacco Use

Of never-smoking youth (*n* = 16 449), 7.7% intended to initiate cigarette smoking. Of youth currently using

any tobacco products (*n* = 2914), 31.5% intended to quit tobacco use in the next 12 months. In the multivariable analysis, support for Tobacco 21 was significantly associated with lower odds of intention to smoke cigarettes among never-smoking youth (aOR = 0.2, *P* < .0001). Older students (15+ years old) had higher odds of intention to smoke cigarettes than did younger students (12–14 years old). As compared with non-Hispanic whites, non-Hispanic African Americans had lower odds of intention to smoke cigarettes (aOR = 0.7, *P* = .01), and Hispanics were more likely to intend to smoke cigarettes (aOR = 1.7, *P* < .0001). Perceiving tobacco as dangerous was associated with lower odds of intention to smoke cigarettes (aOR = 0.4, *P* < .0001), and



living with users of tobacco products was associated with higher odds of intention to smoke cigarettes (aOR = 2.2,  $P < .0001$ ).

Among students who currently use any tobacco products, support of Tobacco 21 was significantly associated with high odds of intention to quit tobacco use in the next 12 months (aOR = 2.6,  $P < .0001$ ). As compared with non-Hispanic whites, non-Hispanic African Americans (aOR = 2.8,  $P < .0001$ ) and Hispanics (aOR = 1.6,  $P = .003$ ) were more likely to plan to quit tobacco use in the next 12 months. Perceiving tobacco as dangerous was associated with higher odds of intention to quit tobacco use (aOR = 2.8,  $P < .0001$ ) (Table 3).

## DISCUSSION

This national study demonstrates that the majority of youth in the United States support raising the minimum age of smoking to 21 years. Moreover, support for Tobacco 21 is strong across demographic groups (ie, age, sex, and race and ethnicity). Existing studies show that youth attitudes toward antismoking policies may play a role in their decisions about smoking.<sup>22–24</sup> If adolescents broadly support Tobacco 21, they may be more likely to obey the policy, to encourage peers to follow the policy, and to report any violations of the policy. Supportive attitudes toward Tobacco 21 could help denormalize smoking among adolescents. When adolescents establish social norms about Tobacco 21, they might be more likely to advocate for this policy and provide positive peer influence to prevent youth from smoking.<sup>25</sup> In contrast, negative attitudes toward antismoking policies could trigger psychological reactance and resentment among youth, which could increase the risk of smoking among youth.<sup>24,26,27</sup>

**TABLE 2** Logistic Regression for Factors Associated With Youth's Supportive Attitudes Toward Tobacco 21

	All Respondents (N = 17 092), Support Tobacco 21	
	aOR	P
Age, y		
9–11	0.8 (0.7–1.1)	NS
12–14	REF	REF
15–17	0.6 (0.6–0.7)	<.0001
≥18	0.3 (0.3–0.4)	<.0001
Sex		
Male	0.9 (0.8–0.9)	.001
Female	REF	REF
Race and ethnicity		
White, non-Hispanic	REF	REF
African American, non-Hispanic	1 (0.9–1.2)	NS
Hispanic	0.9 (0.8–1)	NS
Other, non-Hispanic	1.2 (1–1.5)	NS
Cigarette smoking		
Never	REF	REF
Current	0.2 (0.2–0.2)	<.0001
E-cigarette use		
Never	REF	REF
Current	0.4 (0.4–0.5)	<.0001
Perception of tobacco's danger		
No	REF	REF
Yes	3 (2.7–3.5)	<.0001
Tobacco use by household members		
No	REF	REF
Yes	0.8 (0.7–0.9)	<.0001

NS, not significant; REF, reference.

The findings from this youth study, in conjunction with previous adult studies,<sup>12–14</sup> suggest that the support rate for Tobacco 21 may follow a U-shape curve by age, in which older adolescents aged 15 to 17 years and young adults aged 18 to 20 years have lower support rates than do younger adolescents (aged 9–11 years and 12–14 years) and older adults (aged ≥21 years). There are 2 plausible reasons for the lower prevalence of support among youth aged 15 to 20 years. First, the policy change will directly impact youth in this age group and restrict them from purchasing tobacco products in a store. The policy change could also impact social access to tobacco products by reducing the likelihood of youth <18 from obtaining tobacco products from peers aged 18 to 20 years. Second, youth aged 15 to 20 years may be eager to experiment with tobacco products for novelty and believe smoking can make them look cool, appear older, and

feel independent. The opposing attitudes of youth might be because of psychological reactance when they feel the freedom of smoking by 18 is lost or threatened.<sup>24,26,27</sup> Raising the legal minimum age of smoking could delay youth from initiating smoking and reduce their risk of transition into heavy smoking in adulthood. Therefore, educational campaigns to raise the awareness and health implications of Tobacco 21 may help youth understand the benefits of this policy.

This study also identified a negative correlation between smoking status and attitudes toward Tobacco 21. This finding is consistent with previous studies that showed smokers reported less favorable attitudes toward the efficacy of tobacco control laws, tobacco possession laws, and tobacco sales laws than did nonsmokers.<sup>15,22</sup> However, the gap of support rate between smokers and nonsmokers seems to be larger in this youth

study as compared with multiple adult studies.<sup>12–14</sup> For instance, in a sharp contrast to 69.9%<sup>12</sup> support among adult smokers, there is 17.1% support among youth cigarette smokers. In recent years, e-cigarette and alternative tobacco products use has been increasing, which leads to a high prevalence of e-cigarette and any tobacco use among youth.<sup>3</sup> Both e-cigarette users and any tobacco users revealed a lower level of support toward Tobacco 21 as compared with nonusers. As multiple longitudinal studies indicate that e-cigarette use might serve as a gateway to cigarette use,<sup>28–31</sup> e-cigarette and any tobacco use could normalize the smoking behavior and lead to negative attitudes toward tobacco control policies.

A longitudinal study using the MetroWest Adolescent Health Survey has shown a steeper declining trend of youth smoking prevalence in Needham, Massachusetts, as compared with neighboring communities that did not implement Tobacco 21.<sup>32</sup> This study shows that youth tobacco users who did not support Tobacco 21 had lower odds of intention to quit tobacco products and that youth nonsmokers who did not support Tobacco 21 had higher odds of intention to start smoking in the near future. The findings were consistent with the previous studies regarding the correlation between youth attitudes about antitobacco policies and youth smoking behaviors.<sup>22–24</sup> These results suggest that attitudes play an important role in shaping youth's perceptions to motivate healthy behaviors. Although this cross-sectional study is unable to infer causal effects between attitudes and smoking or quitting intentions, there might be an interplay between these 2 aspects. On one hand, the opposing attitudes could cause youth smokers to become more reluctant to change their smoking behaviors. Less favorable opinions on Tobacco 21 could also leave nonsmokers to

**TABLE 3** Multinomial Logistic Regression for Factors Associated With Intention to Smoke Cigarettes and Plan to Quit Tobacco Use in the Next 12 Months

	Never Smoker ( <i>n</i> = 16 449) Intention to Smoke Cigarettes		Any Tobacco Use in the Past 30 d ( <i>n</i> = 2914) Plan to Quit Tobacco Use in 12 mo	
	aOR	<i>P</i>	aOR	<i>P</i>
Support tobacco 21				
No	REF	REF	REF	REF
Yes	0.2 (0.2–0.3)	<.0001	2.6 (1.9–3.7)	<.0001
Age, y				
9–11	0.6 (0.3–1.1)	NS	1.4 (0.6–3.5)	NS
12–14	REF	REF	REF	REF
15–17	1.7 (1.5–2.1)	<.0001	0.6 (0.4–0.9)	.02
≥18	1.9 (1.5–2.5)	<.0001	0.7 (0.4–1.1)	NS
Sex				
Male	0.8 (0.7–1)	.046	1.1 (0.8–1.4)	NS
Female	REF	REF	REF	REF
Race and ethnicity				
White, non-Hispanic	REF	REF	REF	REF
African American, non-Hispanic	0.7 (0.5–0.9)	.01	2.8 (1.7–4.5)	<.0001
Hispanic	1.7 (1.4–2)	<.0001	1.6 (1.2–2.2)	.003
Other, non-Hispanic	1.2 (0.9–1.8)	NS	1.2 (0.6–2.4)	NS
Perception of tobacco's danger				
No	REF	REF	REF	REF
Yes	0.4 (0.3–0.5)	<.0001	2.8 (2–3.8)	<.0001
Tobacco use by household members				
No	REF	REF	REF	REF
Yes	2.2 (1.9–2.6)	<.0001	1 (0.8–1.4)	NS

NS, not significant; REF, reference.

be more open to initiate smoking. On the other hand, use of tobacco products could normalize smoking behaviors and reduce the perceived danger of tobacco products, leading to opposing attitudes toward Tobacco 21.

This study is subject to several limitations. First, the 2015 NYTS data are cross-sectional, thus the causal inference between attitudes and tobacco use cannot be established. Second, tobacco use behaviors were self-reported, thus they are subject to recall biases, especially for younger respondents.<sup>33</sup> Third, support of Tobacco 21 was measured by a binary variable. The degree of support was not examined in this study. Fourth, this study included the perception of tobacco danger on all tobacco products as a covariate in the multivariable analysis. However, youth might perceive the danger differently across various tobacco

products, especially given the recent debate regarding the benefit or harm of e-cigarettes to public health.<sup>34–37</sup> This might confound the measurement of perceived tobacco danger. Finally, the 2015 NYTS is a school-based survey collected from students who attended either public or private schools. The results might not be generalizable to all school-aged youths.

Despite these limitations, this study is important because it examined youth attitudes toward Tobacco 21 by using a nationally representative sample and added to the existing literature by identifying demographic and smoking factors that are correlated with the prevalence of support attitudes toward Tobacco 21 among youth. The findings further suggest that youth attitudes are correlated with the intention to smoke cigarettes among never-smoking youth and with a plan to

quit among current tobacco users. Longitudinal studies are needed to evaluate the impact of youth attitudes toward Tobacco 21 on youth smoking behaviors.

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## ABBREVIATIONS

aOR: adjusted odds ratio  
CI: confidence interval  
e-cigarette: electronic cigarette  
NYTS: National Youth Tobacco Survey

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