

**Awareness and use of tobacco products among underage individuals: Findings from the Altria Client Services Underage Tobacco Use Survey 2020-2021**

Hui G. Cheng PhD, Andrea R. Vansickel PhD, and Edward G. Largo PhD

Altria Client Services LLC, 601 E. Jackson, Richmond VA 23219, USA

**\*Address correspondence to**

Hui G. Cheng, Ph.D.

Altria Client Services LLC

601 E. Jackson, Richmond VA 23219, USA

E-mail: [hui.cheng@altria.com](mailto:hui.cheng@altria.com)

**Word count: 2,918 words excluding abstract, references, tables, figures, and other associated disclosures.**

## **Abstract**

**Background:** Timely data about tobacco products, especially emerging products such as novel oral nicotine products (ONPs), provides critical information for the prevention of underage tobacco use. With a recent federal law raising the legal age of purchase of tobacco products from 18 to 21, it is of interest to benchmark awareness and use of tobacco products in the new underage population, young adults 18-20 years old. This study provides estimates on awareness and use of tobacco products among individuals 13-20 years old during May 2020 to August 2021 in the United States.

**Methods:** Altria Client Services Underage Tobacco Use Survey (UTUS) is a repeated cross-sectional survey conducted every quarter-year. A stratified random sampling approach was used to draw nationally representative samples of household dwelling individuals 13-20 years old. Information about the awareness and use of tobacco products was obtained via online self-administration or phone interviews after a consent/assent process.

**Results:** A sizable portion of underage individuals were aware of ONPs (~40% among youth and ~50% among underage young adults). Lowest levels of awareness were observed for heated tobacco products and snus. E-cigarettes were the most used tobacco products among underage individuals. Underage young adults were more likely to use tobacco products than youth. There was no clear trend in the awareness and use of tobacco products during the study period despite some quarter-to-quarter fluctuations.

**Conclusions:** The awareness and use of tobacco products remained relatively stable between May 2020 and August 2021. There is a notable level of awareness of novel ONPs among underage individuals.

**Keywords:** Tobacco Use; Underage; Adolescents; Survey

## 1. INTRODUCTION

The United States (US) Surgeon General declared youth vaping an epidemic in 2018 (Office of the Surgeon General 2018). National cross-sectional studies have consistently demonstrated a rapid, increasing trend in youth e-cigarette use alongside a steadily decreasing trend in all other youth tobacco use between 2011 and 2019 (Johnston, Miech et al. 2021, United States Food and Drug Administration 2021). The rise in youth e-cigarette prevalence reached an inflection point recently. According to the National Youth Tobacco Survey (NYTS), prevalence of e-cigarette use among high school students dropped from 27.5% in 2019 to 19.6% in 2020 (pre-COVID-19 pandemic); the most recent estimate was 11.3% in 2021 (during COVID-19 pandemic) (Wang, Gentzke et al. 2019, Gentzke, Wang et al. 2020, Park-Lee, Ren et al. 2021). Timely collection of market-relevant data will be crucial to preventing any future surges in youth tobacco use.

In the meantime, two novel tobacco product categories, oral nicotine products (ONPs), which do not contain tobacco leaf, and heated tobacco products (HTPs), which are inhalable products that heat but do not burn tobacco, have recently emerged in the US market. IQOS®, an HTP, was the first of its kind authorized by FDA for sale in the US in April 2019. Based on data from the 2017 International Tobacco Control Youth Tobacco and E-cigarette Survey, however, 9.1% of 16-19 year olds in the US were aware of IQOS at that time (Czoli, White et al. 2020). Data from the 2019 National Youth Tobacco Survey (NYTS), a US national school-based survey, revealed that 12.8% of US middle- and high-school students were aware of HTPs; 2.4% had ever used an HTP, and 1.6% had used an HTP in the past 30 days (Dai 2020); data from the 2020 NYTS showed a similar past 30-day prevalence (1.4%) (Gentzke, Wang et al. 2020). As for 18-20 year olds, data from the 2019 Tobacco Use Supplement to the Current Population

Survey showed a similar level of awareness of HTPs (13.3%) but lower level of ever use (0.96%) compared to estimates for youth based on NYTS data (Azagba and Shan 2021). To date, no government surveys have yielded data on the ONP tobacco product category. The NYTS added questions related to ONPs to the 2021 survey, but those data have yet to be released.

In addition to new, emerging tobacco product categories, the federal minimum legal age to purchase tobacco in the U.S. has recently changed from 18 to 21 years (i.e., in December 2019), creating a new underage population of 18-20 year old individuals. Evidence suggests, at least at the state and local level, that raising the minimum legal age to purchase tobacco to 21 years reduces cigarette smoking and vaping among 18-20 year olds (Friedman, Buckell et al. 2019, Friedman and Wu 2020, Dove, Stewart et al. 2021). Current school-based national surveys (e.g., NYTS, Monitoring the Future, and the Youth Risk Behavior Surveillance System) are not well-poised to evaluate tobacco use among the 18-20 year old population.

Given the rapidly evolving underage tobacco use landscape, Altria Client Services (ALCS) launched the ALCS Underage Tobacco Use Survey (UTUS) in May of 2020 to enhance the ability to obtain timely information related to tobacco use that covers a broad range of traditional and novel tobacco products among underage individuals, including the new underage population of 18-20 year olds. The UTUS is a repeated cross-sectional survey that collects data on underage tobacco use every quarter year. Here we present findings from the UTUS between May of 2020 (quarter 2, 2020) and August of 2021 (quarter 3, 2021). The data collection period coincides with the COVID-19 pandemic, including a period when multiple national government surveys were disrupted (quarters 2 – 4, 2020).

## 2. METHODS

### 2.1 Study Period, Study Population, and Sampling Methods

UTUS was launched in May of 2020 and has been conducted on a quarter-year schedule. Data from quarter two of 2020 to quarter three of 2021 were used in this analysis (see Table 1 for more details). The study population was household dwelling individuals 13-20 years of age. Samples were drawn using a list-assisted, address-based, stratified, random sampling method. The primary sample units were residential housing units in the US, including the 50 states and the District of Columbia, obtained from the US postal service computerized delivery sequence file, and flagged as likely to contain a person 13-20 years of age. First, housing units' addresses on the sampling frame were stratified by geographic regions, urban/rural residence, and three age groups (13-15, 16-18, and 19-20 years old). In the quarter two and three surveys of 2020, the four census regions (i.e., Northeast, Midwest, South, and West) were used for stratification. Starting from quarter four of 2020, the South region was further divided into four subregions – Atlanta (Georgia), Charlotte (North Carolina), Richmond (Virginia), and the rest of the South region.

Within each stratum, a random sample of addresses was drawn. Invitation letters were sent to all sampled addresses to ask an adult household member to enumerate all household members. Up to two eligible individuals were randomly selected from each household to participate in the survey. For potential participants 13-17 years of age, parental/guardian consent and participant assent were required. For potential participants 18-20 years of age, participant consent was required. The consent/assent form contained information about the purpose of the study, the survey procedure, potential risks and benefits, steps to protect privacy, the voluntary nature of participation, compensation for completing the survey, and contact information of the Institutional Review Board (IRB). In the consent/assent form, it was stated that the survey was sponsored by a tobacco

manufacturer. After proper consents and assents were provided, the selected individuals were directed to complete the questionnaire. Participants received a code to obtain a \$20 e-card for Amazon or Target upon completion of the survey. For participants 13-17 years of age, a parent code was necessary to obtain the e-card. The study was approved and overseen by a designated IRB.

## **2.2 Assessment**

Respondents completed the survey via online self-administration or phone interviews in English or Spanish. The survey consisted of modules for the following nine tobacco product categories: e-cigarettes, cigarettes, cigars (cigars, cigarillos, or little cigars), smokeless tobacco (chewing tobacco, snuff, or dip), hookah, pipe tobacco, snus, HTPs, and ONPs. Each module contained questions about the awareness and use of the tobacco product category. Proper skips were implemented to reduce respondent burden. Survey questions were largely sourced from national surveys such as the NYTS and Population Assessment of Tobacco and Health (PATH). The questionnaire is available at <https://sciences.altria.com/library/underage-tobacco-use-survey?src=topnav>

Questions about the awareness of a tobacco product were in the form of “have you ever seen or heard of ... before this study?” Questions about ever use of a tobacco product were in the form of “have you ever used ..., even once or twice?” or “have you ever smoked..., even one or two puffs?” A “yes” answer to respective questions was coded as being aware of, or having ever used, the tobacco product; a “no” answer was coded as not being aware of, or having never used, the tobacco product.

Questions about the recency of use were in the form of “when was the last time you used ..., even one or two times?” or “when was the last time you smoked a ..., even one or two puffs?” Respondents who answered “earlier today,” “not today, but sometime during the past 7 days,” or “not during the past 7

days, but sometime during the past 30 days” were coded as past 30-day users, and those who answered “not during the past 30 days but sometime during the past 6 months,” “not during the past 6 months but sometime during the past year,” “1 to 4 years ago,” “5 or more years ago,” or indicated they had never used the respective tobacco product were coded as non-past-30-day users.

### **2.3 Analysis**

All estimates were weighted to account for selection probabilities and non-response patterns, and post-stratification was used to bring the sample into balance with the target population with respect to age, sex, race/ethnicity, geographic region, and urban/rural residency. To account for potential clustering within households and the stratified sampling approach, variance was computed using Taylor series approximation. Stata 16.0 (College Station, TX) was used for analysis.

## **3. RESULTS**

Table 1 shows the schedule and final sample size of each survey. The quarter four survey of 2020 was designed to be a double-sample size survey to enhance the annual sample size. A total of 9,334 individuals 13-20 years of age completed the survey during May 2020 to August 2021 (n=5,505 and 3,829 for 13-17 and 18-20 year olds, respectively). Response levels varied from 6.5% to 8.6% at the household screening stage (i.e., screener completion among all invited households) and 52% to 61% at the individual interview stage (i.e., survey completions among individuals who were selected; see Table 1 for more details).

Figure 1 presents the estimated awareness of various tobacco products assessed. (Estimates and their 95% confidence intervals are in supplementary Table S1.) Almost all underage individuals were aware of e-cigarettes and cigarettes (>90%). In contrast, less than 20% of youth (13-17 year olds) and less than 30% of underage young adults (18-20 year olds) had heard of, or seen, snus or HTPs. With respect to

ONPs, more than a third of youth and more than half of underage young adults had heard of or seen these products. Underage young adults were more likely to be aware of tobacco products compared to youth, except for e-cigarettes and cigarettes. There was a slight increasing trend in the awareness of ONPs among youth until quarter one of 2021, which plateaued afterwards.

Figure 2 and Table S2 present estimated ever use of tobacco products. E-cigarettes were the most commonly used tobacco products among both youth and underage young adults. Between 10% and 15% of youth had ever tried an e-cigarette, and approximately a third of underage young adults had tried an e-cigarette. Between 5% to 10% of youth and 15-25% of underage young adults had tried cigarettes or cigars. Underage young adults were more likely to have tried the tobacco products assessed, compared to youth. Similar patterns were observed for the past 30-day use of tobacco products (Figure 3 and Table S3). E-cigarettes were the most commonly used tobacco product in both youth (3-4%) and underage young adults (10-15%). Approximately 5% of underage young adults smoked cigarettes or cigars in the 30 days prior to the assessment.

#### **4. DISCUSSION**

In this study, we provide data from a national survey conducted during the COVID-19 pandemic and found that (a) a sizable portion of underage individuals were aware of emerging tobacco products, such as HTPs and ONPs; (b) there was no substantial change in the awareness and use of tobacco products during the study period (i.e., May 2020 to August 2021); (c) e-cigarettes were the most commonly used tobacco products among underage individuals; and (d) underage young adults were more likely to use tobacco, compared to youth.

To the best of our knowledge, this is one of the first studies to report the awareness and use of emerging ONPs, such as nicotine pouches, among household dwelling individuals 13-20 years of age. In the current study, we found that despite an intermediate level of awareness (as compared to other tobacco products), use of such products remained at a low level during the study period (i.e., past 30-day use <0.5% and <1.5% among youth and underage young adults, respectively). Although still a small share of overall tobacco consumption, nicotine pouches have become a fast growing tobacco product category in the US (Marynak, Wang et al. 2021). Our findings suggest no substantial uptake of these new ONPs; however, continued active monitoring is necessary.

HTPs are another emerging tobacco product category. A few studies have reported the awareness and use of HTPs (Dai 2020, Gentzke, Wang et al. 2020, Azagba and Shan 2021). The current study provides more recent data on the awareness and use of HTPs. Our results showed that despite a slightly higher level of awareness of HTPs (15-20% and 20-25% among youth and underage young adults, respectively) compared to a previous estimate of ~13% (Dai 2020, Gentzke, Wang et al. 2020, Azagba and Shan 2021), there is limited uptake of HTPs among underage individuals (ever use <1.5% and 5.0% among youth and underage young adults, respectively; past 30-day use <1% in both youth and underage young adults). It is worth mentioning that previous studies (Czoli, White et al. 2020, Dai 2020, Azagba and Shan 2021), except for NYTS 2020, were conducted before the US Food and Drug Administration authorized the marketing of IQOS, and when other HTPs were in very limited distribution in the US, while the current study was conducted after the authorization of IQOS. Taken together, results for ONPs and HTPs from this study detected little uptake of these emerging tobacco products among underage individuals. Nonetheless, continued surveillance is necessary for this population.

The estimated past 30-day use of e-cigarettes among youth was lower in the current study compared to results from the most recent estimate from the NYTS (i.e., 3-4% from the current study vs. 7.6% from NYTS 2021) (Park-Lee, Ren et al. 2021). We consider the following to be the main reasons for the observed differences. First, the UTUS is an address-based household survey and it has been well documented that household surveys typically produce lower estimates for underage tobacco use when compared to school surveys (Rootman and Smart 1985, Griesler, Kandel et al. 2008, Cho, Hirschtick et al. 2021). The differences between the UTUS and NYTS estimates were proportionate to those between PATH, a national household survey, and the NYTS (Cho, Hirschtick et al. 2021). Second, the study population of the NYTS was all middle- and high-school students, of whom some were 18 years of age or older. In contrast, the estimates among youth from the UTUS were among 13-17 year olds.

The estimates observed in our study were likely influenced by the effects of the COVID-19 pandemic. A few recent studies have documented a large reduction in e-cigarette use among youth during the COVID-19 pandemic (Gaiha, Lempert et al. 2020, Wright, Williams et al. 2021). Multiple factors can underlie this observed decline in tobacco use during the COVID-19 pandemic, including reduced access to retail (Kreslake et al., 2021), reduced access from peers, increased parental monitoring due to stay-at-home restrictions, etc. It is well documented that youth access to tobacco is largely through social sources (e.g., from friends or someone else) (Liu, Snyder et al. 2019, Tanski, Emond et al. 2019) and socializing with peers is a common reason for e-cigarette use (Wang, Gentzke et al. 2019). COVID-19 can serve as a barrier to this motive due to concerns about infection and reduced face-to-face contact with peers to share an e-cigarette (Kreslake et al., 2021) and can block social access to tobacco due to reduced in-person social interaction. There is also likely increased parental monitoring during the lockdown. In addition, the federal minimum age of sale of tobacco products was raised from 18 to 21

years in December 2019, which may also restrict youth access to tobacco products, especially among 15-17 year olds (Bonnie, Stratton et al. 2015).

To the best of our knowledge, the current study is the first to report the awareness, ever use, and past 30-day use among underage 18-20 year olds in 2020-2021. Our estimates were generally in line with estimates from NHIS 2020. For example, estimated ever and current e-cigarette use among 18-20 year olds from NHIS 2020 was 28.3% and 8.3%, respectively, and our estimates ranged from 30% to 36% for ever use and 11% to 14% for past 30-day use. Previous studies have shown a lag between the enactment of nationwide policies and observed change in behaviors (Cheng and Anthony 2016, Anderson, Rees et al. 2021). Although the UTUS was launched after the federal legal age to purchase tobacco was raised to 21, estimates from the current study suggest that any effect of the increased minimum age on underage young adult tobacco use is yet to be seen.

Several limitations should be considered when interpreting results from the UTUS. First, non-household-dwelling individuals were excluded. Second, the relatively low level of response at the household level (between 6-9%) renders the study subject to potential selection biases. Third, all assessments were based on self-reporting, which can result in under-reporting of tobacco use. Although we embedded language to encourage parents to provide privacy, it was not guaranteed. Last but not least, UTUS survey questions did not differentiate whether the source of nicotine was tobacco derived or synthesized. Future questions about products with synthetic nicotine will provide more information given the increasing presence of such products. Counter balancing strengths include a national coverage and a probability-based sampling scheme. The mail-push to online or phone approach does not require face-to-face contact, which facilitated data collection during the COVID-19 pandemic. Compared to

household visitations, the mail-push to online approach is less time and resource consuming and enables a quarterly data collection schedule.

Taken together, findings from this study and other national surveys highlight the need for continued surveillance of tobacco use among underage individuals, including young adults 18-20 years of age, which is essential for the assessment of potential impact of foreseeable and unforeseeable changes such as the introduction of new tobacco products, tobacco-related policies, and COVID-19. Recognizing the importance of such data, ALCS has made the UTUS publicly accessible via a data request process. Please visit <https://sciences.altria.com/library/underage-tobacco-use-survey?src=topnav> for details.

## References

- Anderson, D. M., D. I. Rees, J. J. Sabia and S. Safford (2021). "Association of Marijuana Legalization With Marijuana Use Among US High School Students, 1993-2019." *JAMA Netw Open* **4**(9): e2124638.
- Azagba, S. and L. Shan (2021). "Heated Tobacco Products: Awareness and Ever Use Among U.S. Adults." *Am J Prev Med* **60**(5): 684-691.
- Bonnie, R. J., K. Stratton and L. Y. Kwan (2015). Public Health Implications of Raising the Minimum Age of Legal Access to Tobacco Products. *Public Health Implications of Raising the Minimum Age of Legal Access to Tobacco Products*. R. J. Bonnie, K. Stratton and L. Y. Kwan. Washington (DC).
- Cheng, H. G. and J. C. Anthony (2016). "Does our legal minimum drinking age modulate risk of first heavy drinking episode soon after drinking onset? Epidemiological evidence for the United States, 2006-2014." *PeerJ* **4**: e2153.
- Cho, B., J. L. Hirschtick, B. Usidame, R. Meza, R. Mistry, S. R. Land, D. T. Levy, T. Holford and N. L. Fleischer (2021). "Sociodemographic Patterns of Exclusive, Dual, and Poly tobacco Use Among U.S. High School Students: A Comparison of Three Nationally Representative Surveys." *J Adolesc Health* **68**(4): 750-757.
- Czoli, C. D., C. M. White, J. L. Reid, O. C. RJ and D. Hammond (2020). "Awareness and interest in IQOS heated tobacco products among youth in Canada, England and the USA." *Tob Control* **29**(1): 89-95.
- Dai, H. (2020). "Heated tobacco product use and associated factors among U.S. youth, 2019." *Drug Alcohol Depend* **214**: 108150.
- Dove, M. S., S. L. Stewart and E. K. Tong (2021). "Smoking behavior in 18-20 year-olds after tobacco 21 policy implementation in California: A difference-in-differences analysis with other states." *Prev Med* **148**: 106553.
- Friedman, A. S., J. Buckell and J. L. Sindelar (2019). "Tobacco-21 laws and young adult smoking: quasi-experimental evidence." *Addiction* **114**(10): 1816-1823.
- Friedman, A. S. and R. J. Wu (2020). "Do Local Tobacco-21 Laws Reduce Smoking Among 18 to 20 Year-Olds?" *Nicotine Tob Res* **22**(7): 1195-1201.

Gaiha, S. M., L. K. Lempert and B. Halpern-Felsher (2020). "Underage Youth and Young Adult e-Cigarette Use and Access Before and During the Coronavirus Disease 2019 Pandemic." JAMA Netw Open **3**(12): e2027572.

Gentzke, A. S., T. W. Wang, A. Jamal, E. Park-Lee, C. Ren, K. A. Cullen and L. Neff (2020). "Tobacco Product Use Among Middle and High School Students - United States, 2020." MMWR Morb Mortal Wkly Rep **69**(50): 1881-1888.

Griesler, P. C., D. B. Kandel, C. Schaffran, M. C. Hu and M. Davies (2008). "Adolescents' Inconsistency in Self-Reported Smoking: A Comparison of Reports in School and in Household Settings." Public Opin Q **72**(2): 260-290.

Johnston, L. D., R. A. Miech, P. M. O'Malley, J. G. Bachman, J. E. Schulenberg and M. E. Patrick (2021). MONITORING THE FUTURE NATIONAL SURVEY RESULTS ON DRUG USE, 1975–2020. Ann Arbor, MI, Institute for Social Research, The University of Michigan

Liu, S. T., K. Snyder, M. A. Tynan and T. W. Wang (2019). "Youth Access to Tobacco Products in the United States, 2016-2018." Tob Regul Sci **5**(6): 491-501.

Marynak, K. L., X. Wang, M. Borowiecki, Y. Kim, M. A. Tynan, S. Emery and B. A. King (2021). "Nicotine Pouch Unit Sales in the US, 2016-2020." JAMA **326**(6): 566-568.

Office of the Surgeon General (2018). Surgeon General's Advisory on E-cigarette Use Among Youth. S. G. s. Office.

Park-Lee, E., C. Ren, M. D. Sawdey, A. S. Gentzke, M. Cornelius, A. Jamal and K. A. Cullen (2021). "Notes from the Field: E-Cigarette Use Among Middle and High School Students - National Youth Tobacco Survey, United States, 2021." MMWR Morb Mortal Wkly Rep **70**(39): 1387-1389.

Rootman, I. and R. G. Smart (1985). "A comparison of alcohol, tobacco and drug use as determined from household and school surveys." Drug Alcohol Depend **16**(2): 89-94.

Tanski, S., J. Emond, C. Stanton, T. Kirchner, K. Choi, L. Yang, C. Ryant, J. Robinson and A. Hyland (2019). "Youth Access to Tobacco Products in the United States: Findings From Wave 1 (2013-2014) of the Population Assessment of Tobacco and Health Study." Nicotine Tob Res **21**(12): 1695-1699.

United States Food and Drug Administration. (2021). "Get the Latest Facts on Teen Tobacco Use." from <https://www.fda.gov/tobacco-products/youth-and-tobacco/get-latest-facts-teen-tobacco-use>.

Wang, T. W., A. S. Gentzke, M. R. Creamer, K. A. Cullen, E. Holder-Hayes, M. D. Sawdey, G. M. Anic, D. B. Portnoy, S. Hu, D. M. Homa, A. Jamal and L. J. Neff (2019). "Tobacco Product Use and Associated Factors Among Middle and High School Students - United States, 2019." MMWR Surveill Summ **68**(12): 1-22.

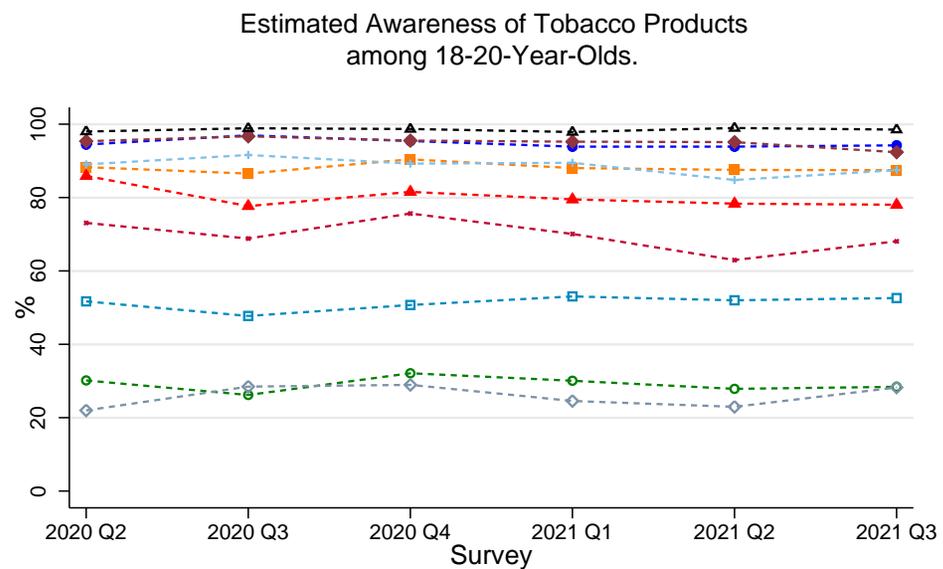
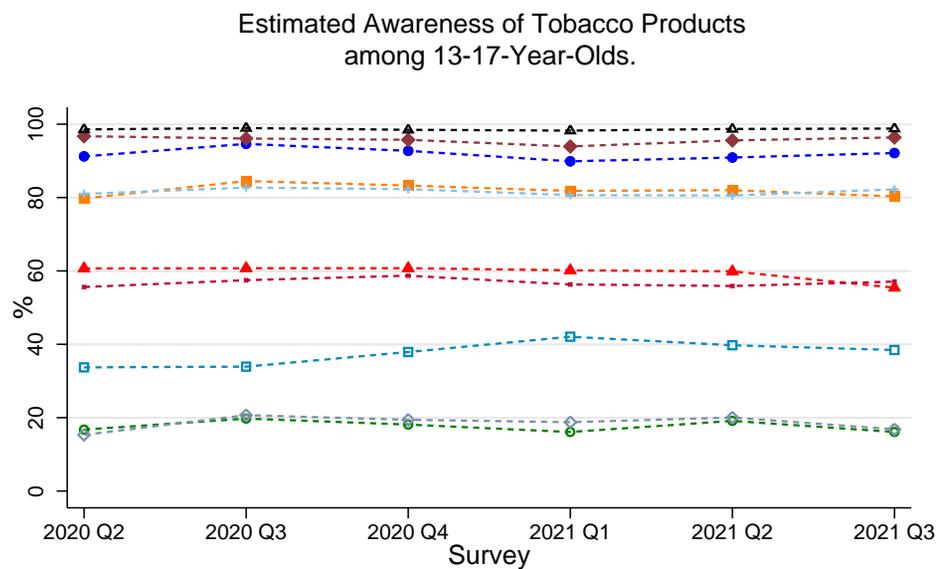
Wright, L. J., S. E. Williams and J. Veldhuijzen van Zanten (2021). "Physical Activity Protects Against the Negative Impact of Coronavirus Fear on Adolescent Mental Health and Well-Being During the COVID-19 Pandemic." Front Psychol **12**: 580511.

**TABLE 1. Altria Client Services Underage Tobacco Use Survey Schedule and Sample Sizes.**

Year	UTUS wave	Duration	Sample size		Response level	
			13-17	18-20	Household screening*	Individual interviews*
2020	Quarter 2	May – Jun.	857	632	8.6%	61%
	Quarter 3	Jul. – Aug.	647	380	7.0%	55%
	Quarter 4	Oct. – Nov.	1,637	1,099	7.2%	54%
2021	Quarter 1	Jan. – Feb.	966	721	8.4%	55%
	Quarter 2	Apr. – May	706	505	6.5%	52%
	Quarter 3	Jul. –Aug.	692	492	6.6%	53%

\* Response level at household screening is the number of households that completed the household screener divided by the number of invitations sent. Response level at the individual interview level is the number of individuals who completed the survey divided by the number of individuals selected to complete the survey.

**Figure 1. Estimated Awareness of Tobacco Products. Data from ALCS UTUS, May 2020 to August 2021.**

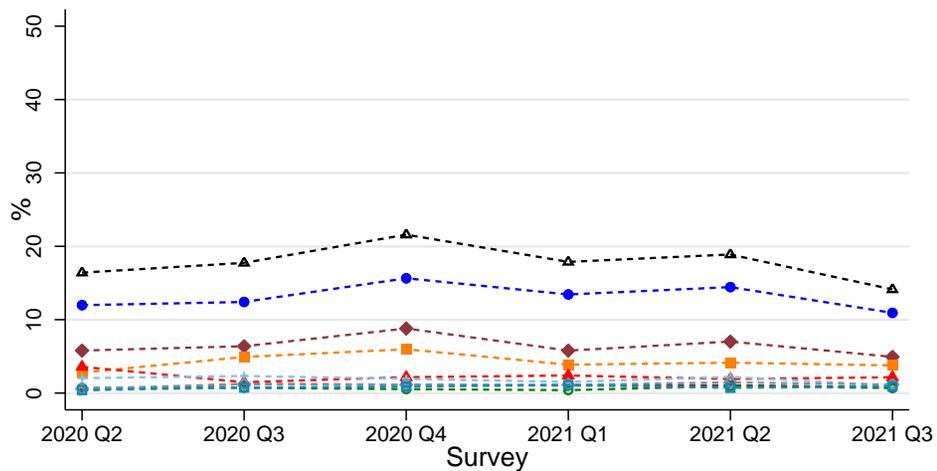


- E-Cigarettes    ---◆--- Cigarettes    ---■--- Cigars    ---▲--- Hookah
- ◇--- Pipe    ---+--- Chew/Snuff/Dip    ---○--- Snus    ---◇--- Heated Tobacco
- Oral Nicotine    ---▲--- All Tobacco

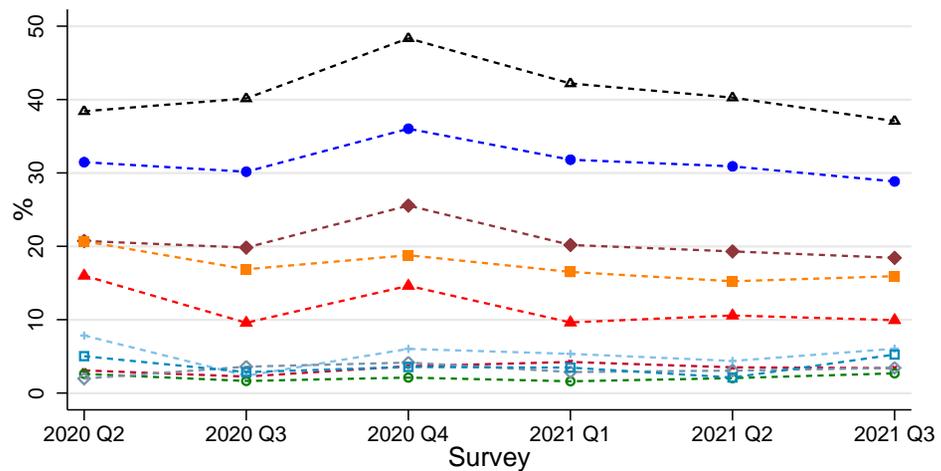
- E-Cigarettes    ---◆--- Cigarettes    ---■--- Cigars    ---▲--- Hookah
- ◇--- Pipe    ---+--- Chew/Snuff/Dip    ---○--- Snus    ---◇--- Heated Tobacco
- Oral Nicotine    ---▲--- All Tobacco

**Figure 2. Estimated Ever Use of Tobacco Products. Data from ALCS UTUS, May 2020 to August 2021.**

Estimated Ever Use of Tobacco Products among 13-17-Year-Olds.



Estimated Ever Use of Tobacco Products among 18-20-Year-Olds.



- E-Cigarettes    ---◆--- Cigarettes    ---■--- Cigars    ---▲--- Hookah
- +--- Pipe    ---+--- Chew/Snuff/Dip    ---○--- Snus    ---◇--- Heated Tobacco
- Oral Nicotine    ---▲--- All Tobacco

- E-Cigarettes    ---◆--- Cigarettes    ---■--- Cigars    ---▲--- Hookah
- +--- Pipe    ---+--- Chew/Snuff/Dip    ---○--- Snus    ---◇--- Heated Tobacco
- Oral Nicotine    ---▲--- All Tobacco



Supplementary material

**Table S1. Estimated awareness (% , 95% CI) of tobacco products among underage individuals by age. Data from ALCS UTUS May 2020 to August 2021.**

Survey	E-Cigarettes	Cigarette	Cigar	Hookah	Pipe	Smokeless Tobacco	Snus	Heated Tobacco	Oral Nicotine
<b>13-17</b>									
2020 Q2	91.3 (88.0 ,93.7)	96.7 (94.4 ,98.1)	79.8 (75.9 ,83.2)	60.7 (56.2 ,65.0)	55.6 (51.0 ,60.2)	81.0 (76.8 ,84.6)	16.8 (13.8 ,20.3)	15.3 (12.4 ,18.9)	33.7 (29.7 ,38.0)
2020 Q3	94.7 (92.0 ,96.5)	96.1 (93.6 ,97.7)	84.5 (80.6 ,87.8)	60.8 (56.0 ,65.4)	57.5 (52.5 ,62.3)	82.7 (78.6 ,86.2)	19.8 (16.1 ,24.0)	20.7 (17.1 ,24.9)	33.9 (29.4 ,38.7)
2020 Q4	92.8 (91.1 ,94.1)	95.8 (94.4 ,96.8)	83.3 (81.0 ,85.4)	60.8 (57.9 ,63.5)	58.7 (55.8 ,61.6)	82.3 (79.8 ,84.5)	18.1 (16.1 ,20.4)	19.4 (17.2 ,21.9)	37.9 (35.1 ,40.7)
2021 Q1	89.9 (87.1 ,92.2)	94.0 (91.6 ,95.7)	81.8 (78.6 ,84.7)	60.2 (56.3 ,63.9)	56.3 (52.4 ,60.2)	80.7 (77.2 ,83.7)	16.1 (13.5 ,19.1)	18.8 (15.9 ,22.0)	42.1 (38.2 ,46.1)
2021 Q2	90.9 (88.1 ,93.1)	95.6 (93.2 ,97.2)	82.0 (78.5 ,85.1)	59.9 (55.7 ,64.0)	55.9 (51.5 ,60.3)	80.6 (76.7 ,83.9)	19.1 (16.0 ,22.7)	2<0.1 (16.7 ,23.8)	39.7 (35.7 ,43.9)
2021 Q3	92.2 (89.3 ,94.3)	96.4 (94.3 ,97.8)	80.3 (76.7 ,83.5)	55.5 (51.0 ,59.8)	57.1 (52.6 ,61.5)	82.2 (78.5 ,85.4)	16.1 (13.2 ,19.6)	16.8 (13.7 ,20.5)	38.4 (34.2 ,42.9)
<b>18-20</b>									
2020 Q2	94.5 (90.6 ,96.8)	95.4 (91.7 ,97.5)	88.3 (83.1 ,92.1)	85.9 (80.9 ,89.8)	73.1 (67.1 ,78.4)	89.1 (84.6 ,92.3)	30.2 (24.9 ,36.1)	22.0 (17.5 ,27.3)	51.7 (45.6 ,57.7)
2020 Q3	97.0 (93.4 ,98.7)	96.7 (93.2 ,98.4)	86.6 (80.7 ,90.8)	77.7 (71.2 ,83.1)	68.8 (61.7 ,75.2)	91.6 (87.2 ,94.6)	26.2 (20.4 ,33.0)	28.5 (22.2 ,35.7)	47.7 (40.6 ,55.0)
2020 Q4	95.4 (93.7 ,96.7)	95.5 (93.8 ,96.8)	90.4 (88.1 ,92.3)	81.6 (78.7 ,84.1)	75.7 (72.6 ,78.5)	89.3 (86.9 ,91.3)	32.1 (29.0 ,35.4)	29.0 (26.0 ,32.1)	50.7 (47.2 ,54.2)
2021 Q1	93.9 (90.8 ,96.0)	95.3 (92.4 ,97.1)	88.1 (84.7 ,90.8)	79.5 (75.5 ,83.0)	70.1 (65.8 ,74.1)	89.5 (86.2 ,92.1)	30.1 (26.2 ,34.2)	24.6 (20.9 ,28.7)	53.1 (48.7 ,57.4)
2021 Q2	93.9 (90.7 ,96.1)	95.1 (92.3 ,97.0)	87.6 (83.8 ,90.5)	78.4 (73.9 ,82.3)	63.0 (58.2 ,67.6)	84.8 (80.5 ,88.3)	27.9 (23.6 ,32.5)	23.0 (19.1 ,27.4)	52.0 (46.9 ,57.1)
2021 Q3	94.2 (91.0 ,96.4)	92.4 (88.6 ,95.0)	87.5 (83.2 ,90.8)	78.1 (73.2 ,82.3)	68.1 (62.9 ,72.9)	87.5 (83.3 ,90.8)	28.4 (24.0 ,33.3)	28.2 (23.9 ,33.1)	52.6 (47.3 ,57.8)

CI: confidence interval. ALCS UTUS: Altria Client Services Underage Tobacco Use Survey.

**Table S2. Estimated ever use (% , 95% CI) of tobacco products among underage individuals by age. Data from ALCS UTUS May 2020 to August 2021.**

Survey	E-Cigarettes	Cigarette	Cigar	Hookah	Pipe	Smokeless Tobacco	Snus	Heated Tobacco	Oral Nicotine
<b>13-17</b>									
2020 Q2	12.0 (9.5 ,15.1)	5.8 (3.9 ,8.6)	2.8 (1.8 ,4.4)	3.6 (2.3 ,5.5)	0.4 (0.1 ,1.1)	2.0 (1.1 ,3.8)	0.7 (0.3 ,1.6)	0.6 (0.3 ,1.3)	0.4 (0.1 ,1.5)
2020 Q3	12.4 (9.6 ,16.0)	6.4 (4.3 ,9.3)	4.9 (3.2 ,7.6)	1.5 (0.6 ,3.5)	1.3 (0.5 ,2.9)	2.3 (1.3 ,4.2)	0.7 (0.3 ,2.0)	1.2 (0.6 ,2.7)	0.8 (0.3 ,2.2)
2020 Q4	15.7 (13.6 ,17.9)	8.8 (7.3 ,10.6)	6.0 (4.8 ,7.4)	2.2 (1.4 ,3.3)	1.2 (0.7 ,1.9)	1.9 (1.4 ,2.8)	0.5 (0.3 ,1.1)	1.2 (0.7 ,1.9)	0.9 (0.5 ,1.5)
2021 Q1	13.5 (11.1 ,16.2)	5.8 (4.4 ,7.6)	3.9 (2.7 ,5.6)	2.4 (1.5 ,3.7)	1.0 (0.5 ,2.1)	1.5 (0.9 ,2.7)	0.4 (0.1 ,1.1)	1.1 (0.6 ,2.1)	1.1 (0.6 ,2.1)
2021 Q2	14.5 (11.8 ,17.6)	7.0 (5.2 ,9.4)	4.2 (2.8 ,6.2)	1.9 (1.1 ,3.4)	1.1 (0.5 ,2.2)	2.2 (1.2 ,4.0)	1.0 (0.4 ,2.2)	1.5 (0.8 ,2.6)	0.7 (0.3 ,1.8)
2021 Q3	10.9 (8.5 ,13.9)	4.9 (3.4 ,7.1)	3.8 (2.4 ,6.0)	2.2 (1.2 ,3.8)	0.8 (0.3 ,2.0)	1.0 (0.5 ,2.0)	0.7 (0.3 ,1.8)	1.2 (0.6 ,2.4)	0.9 (0.4 ,2.0)
<b>18-20</b>									
2020 Q2	31.5 (25.9 ,37.7)	20.7 (15.9 ,26.6)	20.7 (15.8 ,26.6)	16.0 (11.5 ,21.8)	3.1 (1.6 ,5.8)	7.8 (5.1 ,11.8)	2.6 (1.3 ,5.2)	2.0 (1.0 ,4.0)	5.0 (3.1 ,8.1)
2020 Q3	30.2 (23.9 ,37.2)	19.8 (15.0 ,25.8)	16.9 (12.3 ,22.7)	9.6 (6.3 ,14.3)	2.3 (1.0 ,4.8)	2.4 (1.0 ,5.4)	1.6 (0.6 ,4.8)	3.6 (1.7 ,7.5)	2.9 (1.2 ,6.8)
2020 Q4	36.0 (32.8 ,39.4)	25.6 (22.7 ,28.6)	18.8 (16.3 ,21.6)	14.6 (12.3 ,17.3)	3.7 (2.6 ,5.1)	6.0 (4.7 ,7.8)	2.1 (1.4 ,3.2)	4.2 (3.0 ,5.7)	3.5 (2.6 ,4.9)
2021 Q1	31.8 (27.9 ,36.0)	20.2 (16.9 ,23.9)	16.5 (13.5 ,20.1)	9.6 (7.5 ,12.3)	4.2 (2.7 ,6.5)	5.3 (3.8 ,7.5)	1.6 (0.9 ,2.9)	2.9 (1.7 ,4.8)	3.5 (2.1 ,5.6)
2021 Q2	30.9 (26.5 ,35.7)	19.3 (15.6 ,23.7)	15.2 (11.8 ,19.4)	10.6 (7.9 ,14.0)	3.5 (2.0 ,6.1)	4.4 (2.6 ,7.4)	2.0 (0.8 ,5.1)	3.1 (1.7 ,5.5)	2.1 (1.2 ,3.8)
2021 Q3	28.9 (24.4 ,33.8)	18.4 (14.7 ,22.9)	15.9 (12.6 ,19.9)	9.9 (7.3 ,13.3)	3.4 (2.0 ,5.6)	6.0 (4.0 ,9.1)	2.7 (1.5 ,4.8)	3.4 (2.1 ,5.7)	5.2 (3.2 ,8.4)

CI: confidence interval. ALCS UTUS: Altria Client Services Underage Tobacco Use Survey.

**Table S3. Estimated past 30-day use (% , 95% CI) of tobacco products among underage individuals by age. Data from ALCS UTUS May 2020 to August 2021.**

Survey	E-Cigarettes	Cigarette	Cigar	Hookah	Pipe	Smokeless Tobacco	Snus	Heated Tobacco	Oral Nicotine
<b>13-17</b>									
2020 Q2	3.7 (2.5 ,5.6)	1.1 (0.5 ,2.6)	0.6 (0.2 ,1.8)	0.6 (0.2 ,1.6)	0.1 (<0.1 ,0.9)	0.4 (0.1 ,1.1)	0.2 (<0.1 ,1.4)	<0.1 (<0.1 ,<0.1)	0.2 (<0.1 ,1.4)
2020 Q3	2.7 (1.6 ,4.7)	0.5 (0.1 ,3.0)	0.6 (0.2 ,1.8)	0.2 (<0.1 ,1.6)	0.2 (<0.1 ,1.7)	0.2 (<0.1 ,1.1)	0 (.,.)	0 (.,.)	0.4 (0.1 ,1.5)
2020 Q4	4.1 (3.1 ,5.3)	1.2 (0.7 ,1.9)	1.5 (0.9 ,2.2)	0.7 (0.3 ,1.5)	0.2 (0.1 ,0.4)	0.3 (0.1 ,0.8)	0.2 (<0.1 ,0.7)	0.2 (0.1 ,0.6)	0.2 (0.1 ,0.6)
2021 Q1	3.0 (2.0 ,4.5)	1.3 (0.7 ,2.4)	1.0 (0.5 ,2.2)	0.4 (0.1 ,0.9)	<0.1 (.,.)	0.1 (<0.1 ,1.0)	0.1 (<0.1 ,1.0)	0.4 (0.2 ,1.1)	0.2 (0.1 ,0.8)
2021 Q2	3.3 (2.1 ,5.2)	1.0 (0.5 ,2.1)	0.9 (0.3 ,2.2)	0.1 (<0.1 ,0.5)	<0.1 (.,.)	0.2 (<0.1 ,1.3)	0.2 (<0.1 ,1.4)	0.2 (<0.1 ,1.2)	0.1 (<0.1 ,0.9)
2021 Q3	3.4 (2.2 ,5.3)	0.6 (0.2 ,1.9)	1.9 (0.9 ,3.8)	0.2 (0.1 ,0.8)	0.1 (<0.1 ,0.4)	<0.1 (.,.)	0.1 (<0.1 ,0.4)	0.2 (<0.1 ,0.8)	0.2 (<0.1 ,0.7)
<b>18-20</b>									
2020 Q2	11.0 (7.7 ,15.5)	3.9 (2.2 ,6.8)	4.6 (2.3 ,8.9)	2.2 (0.9 ,5.3)	1.0 (0.3 ,2.9)	1.3 (0.6 ,3.0)	0.9 (0.3 ,2.7)	0.1 (<0.1 ,0.9)	1.4 (0.6 ,3.7)
2020 Q3	11.8 (7.9 ,17.2)	4.5 (2.4 ,8.3)	3.7 (1.9 ,7.2)	3.3 (1.5 ,7.4)	0.5 (0.1 ,2.0)	1.1 (0.3 ,4.2)	<0.1 (<0.1 ,0.1)	<0.1 (<0.1 ,0.1)	0.7 (0.2 ,2.9)
2020 Q4	14.2 (11.9 ,16.8)	5.6 (4.2 ,7.3)	5.3 (3.9 ,7.0)	3.6 (2.5 ,5.2)	1.3 (0.7 ,2.3)	0.8 (0.4 ,1.6)	0.4 (0.2 ,1.1)	1.0 (0.5 ,1.9)	0.8 (0.4 ,1.5)
2021 Q1	11.6 (9.0 ,14.8)	4.0 (2.6 ,6.2)	4.1 (2.7 ,6.1)	0.4 (0.1 ,0.9)	0.4 (0.1 ,1.4)	0.8 (0.3 ,2.2)	0 (.,.)	0.5 (0.2 ,1.3)	0.6 (0.2 ,1.8)
2021 Q2	11.2 (8.3 ,15.0)	2.4 (1.2 ,4.4)	2.0 (0.9 ,4.2)	1.4 (0.6 ,3.1)	1.0 (0.4 ,2.9)	0.3 (0.1 ,1.3)	0 (.,.)	0 (.,.)	0.7 (0.2 ,2.0)
2021 Q3	11.5 (8.5 ,15.4)	3.8 (2.1 ,6.6)	4.2 (2.6 ,6.8)	1.9 (0.9 ,4.0)	0.7 (0.2 ,2.5)	1.2 (0.4 ,3.4)	0.2 (0.1 ,1.1)	0.8 (0.3 ,2.0)	1.7 (0.6 ,4.3)

CI: confidence interval. ALCS UTUS: Altria Client Services Underage Tobacco Use Survey.