DEPARTMENT OF HEALTH

Teens and Tobacco in Minnesota: Highlights from the 2017 Minnesota Youth Tobacco Survey

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We express our thanks to the thousands of students who completed the Minnesota Youth Tobacco Survey in 2017, and in previous years, for their willingness to answer questions about their experiences with tobacco. We are equally indebted to the principals, teachers, and staff who worked to make sure the survey went smoothly at schools around the state. ICF Macro, Inc. and its team of local survey administrators made all the arrangements with schools and administered the survey in the selected classrooms. Our colleagues in the Office on Smoking and Health at the U. S. Centers for Disease Control and Prevention (CDC) provided the core survey questions, drew the school samples, scanned the survey booklets, and prepared the initial data file.

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Finally, we thank the many dedicated people throughout the state who support the well-being of our young people by encouraging them to reject tobacco use and other threats to health and growth. We hope this information will help everyone better understand the trends and characteristics of teen tobacco use in Minnesota.

Contents

Introduction

In 2014, the U.S. Centers for Disease Control and Prevention (CDC) reported that nearly 90 percent of adult smokers tried their first cigarette by age 18.[1] Therefore, preventing children from becoming addicted to nicotine is a critical strategy for reducing the harm caused by tobacco products. Since 2000, the Minnesota Department of Health (MDH) has conducted the Minnesota Youth Tobacco Survey (MYTS) to provide comprehensive information needed to understand tobacco use among young people and to design and evaluate prevention efforts. MDH conducted the seventh MYTS in 2017. Previous surveys took place in 2000, 2002, 2005, 2008, 2011, and 2014.

The 2017 Minnesota Youth Tobacco Survey measured use of eight types of tobacco products and included additional questions related to use of cigarettes and electronic cigarettes. The survey also measured exposure to tobacco advertising and secondhand smoke and e-cigarette vapor. One hundred public schools and classrooms across the state were randomly selected, and 70 participated in the study. Overall, 4,112 students in grades 6 through 12 took the survey. The data were weighted to better represent statewide demographics.

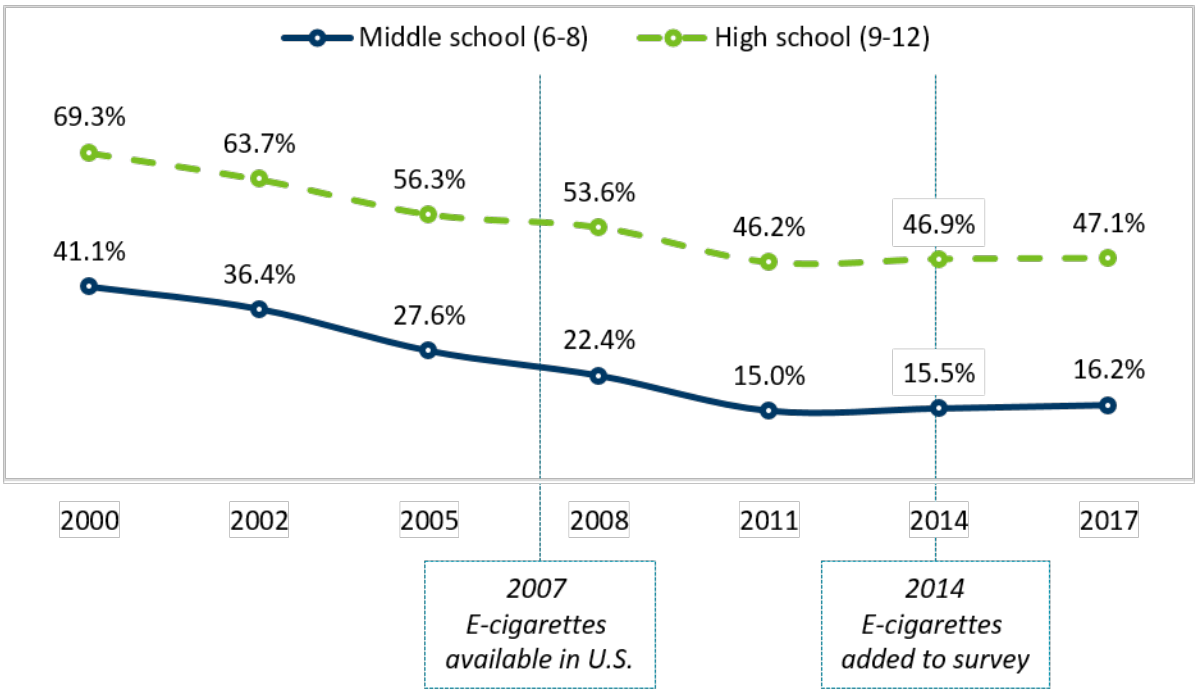
This report presents highlights from the 2017 survey results, and where possible, changes over time since 2000.

Tobacco initiation and current use

Tobacco initiation

Nearly 9 out of 10 adult cigarette smokers first tried smoking by age 18, and 99 percent first tried smoking by age 26.[2] Every day, more than 3,200 American children smoke their first cigarette.[2] The nicotine in cigarettes and other tobacco products is highly addictive, and exposure to nicotine during adolescence harms brain development, causing lasting deficits in cognition and emotional regulation.[3] The younger children are when they start using tobacco products, the more likely they are to become addicted to nicotine, and the more powerfully addicted they will become.[4] Experimenting with tobacco is the first step that may eventually lead to regular use. Local communities are working collaboratively to engage public health, schools, youth organizations, and community members to prevent youth initiation of tobacco use.

Figure 1. Percent of students who have tried a tobacco product, 2000-2017.



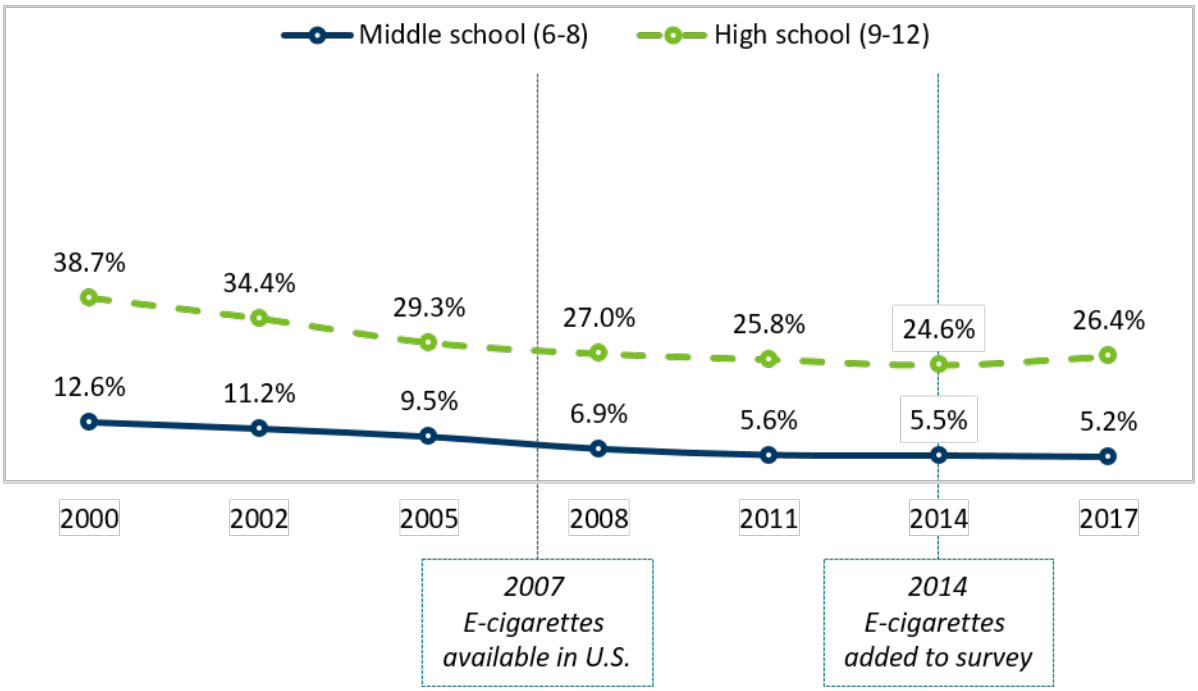
Source: Minnesota Youth Tobacco Survey, 2000-2017.
** Questions about e-cigarettes, hookah, and snus were added to the MYTS for the first time in 2014.*

In 2017, 16.2 percent of middle school and 47.1 percent of high school students in Minnesota had tried at least one tobacco product in their lifetimes (Figure 1). While these percentages are 32 percent and 61 percent lower than they were in 2000, the declines in tobacco initiation observed over time have stalled, and youth initiation rates are now beginning to rise.

Current use of tobacco

Current use of tobacco is defined among youth as having used tobacco products on one or more days in the past 30 days. Current use is an important measure because it reflects how many youth have not only tried tobacco products but also used them recently, which may indicate more regular use.

Figure 2. Percent of students who used a tobacco product in the past 30 days: 2000-2017.



Source: Minnesota Youth Tobacco Survey, 2000-2017.
** Questions about e-cigarettes, hookah, and snus were added to the MYTS for the first time in 2014.*

In 2017, 5.2 percent of middle school students used one or more tobacco products in the past 30 days. Among high school students, 26.4 percent had used one or more tobacco products in the past 30 days, a 7 percent increase from 2014 (Figure 2). These rates indicate that an estimated 77,790 students used a tobacco product in the past 30 days, 5,945 more than in 2014. This is the first time in the history of the MYTS that the number of students who use tobacco products has increased.

Nationally, the CDC reported that 7.2 percent of middle school and 20.2 percent of high school students were current tobacco users in 2016. Minnesota's 2017 rate of tobacco use among high school students is 31 percent higher than this national rate.

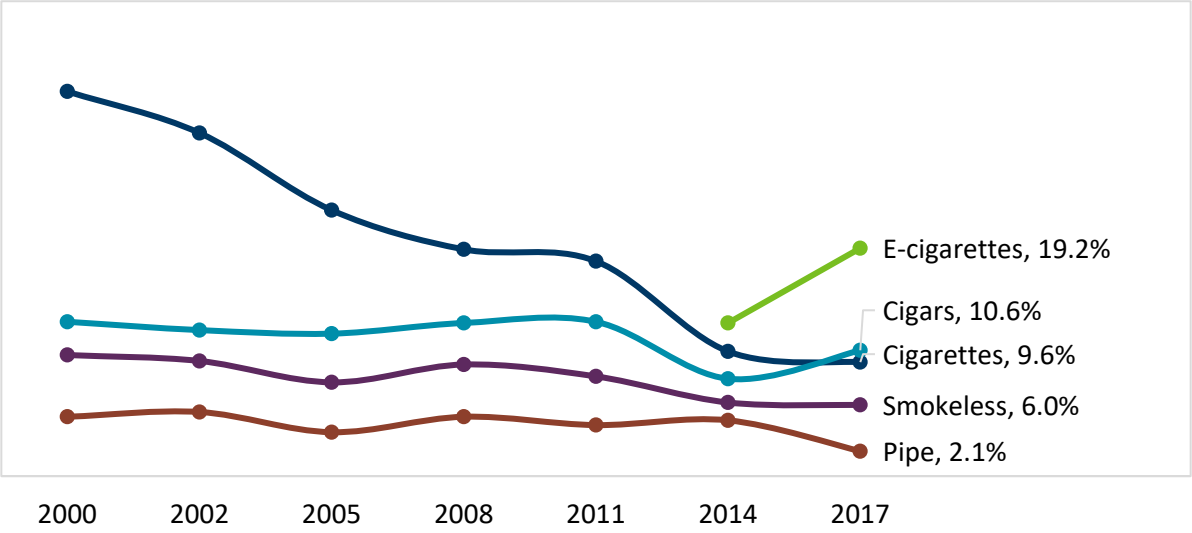
E-Cigarettes and other product types

Tobacco use by product type

Tobacco policy and tobacco control efforts effectively reduce tobacco use among youth. However, the tobacco industry adapts by changing promotional tactics, modifying existing products, and introducing new ones. As a result, the mix of tobacco products used by students is changing, and cigarettes no longer dominate the tobacco market. Marketed as an alternative to smoking cigarettes, E-cigarettes were introduced to the U.S. in 2007. E-cigarettes are battery-powered devices that allow users to inhale, or "vape," aerosolized liquid (e-juice). The tobacco industry introduced these products with sleek designs and appealing flavors, causing adolescents to use them in increasing numbers.

E-cigarettes pose a serious health risk for youth.[5] E-liquids commonly contain nicotine, and no amount of nicotine is safe for youth. Furthermore, the chemicals used to flavor e-liquids are not proven safe for inhalation, and some are known to cause serious and irreversible lung damage[6] or cancer.[7]

Figure 3. Percent of high school students who used various tobacco products in the past 30 days, by type of tobacco product: 2000-2017.



Source: Minnesota Youth Tobacco Survey, 2000-2017.
** Questions about e-cigarettes, hookah, and snus were added to the MYTS for the first time in 2014.*

In 2017, while the use of many tobacco products continues to decline, data show a striking increase in e-cigarette use. Just over nineteen percent (19.2) of high school students used e-cigarettes in the past 30 days, a 49 percent increase from the previous measure. About four in ten high school students (37.7 percent) reported having tried e-cigarettes. In addition, current cigar use rose to 10.6 percent, a 29 percent increase from 2014 (Figure 3).

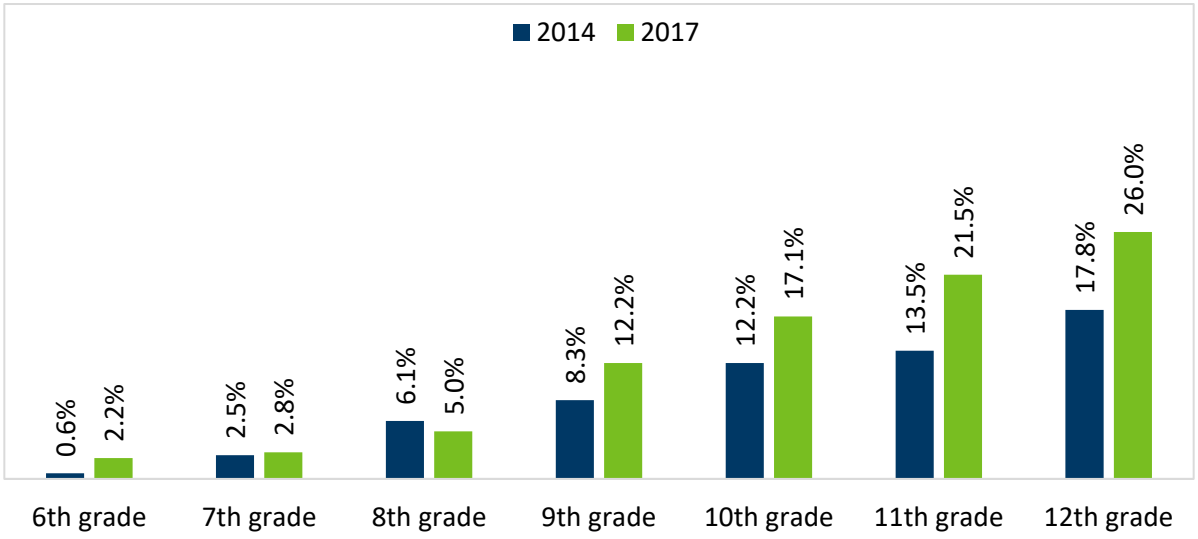
Many students used e-cigarettes exclusively; 21.5 percent of current e-cigarette users had never tried either combustible (cigarettes, cigars, pipe, bidis, or hookah) or smokeless (chewing tobacco, snuff or snus) tobacco products. Research indicates that youth use of e-cigarettes is predictive of later use of other tobacco products. A recent meta-analysis showed that adolescents and young adults who used e-cigarettes in the past month were more likely to smoke conventional cigarettes in the future than those who had not used e-cigarettes.[8] Consistent with this finding, in 2017 older students were less likely to use e-cigarettes exclusively; 20.6 percent of high school students had used e-cigarettes in the past 30 days and had never tried any conventional tobacco product compared with 26.7 percent of middle school current e-cigarette users. More than half of high school students who are current e-cigarette users (57.3 percent) also used conventional tobacco products in the past 30 days.

Despite increases in e-cigarette and cigar use, the youth cigarette-smoking rate dropped below ten percent for the first time in the history of the MYTS; 9.6 percent of high school students smoked cigarettes in the past 30 days (Figure 3).

Current use of e-cigarettes by grade in school

Tobacco research has shown for many years that the proportion of students who have tried or regularly use tobacco increases with age.

Figure 4. Percent of students who used e-cigarettes in the past 30 days, by grade, 2014-2017.



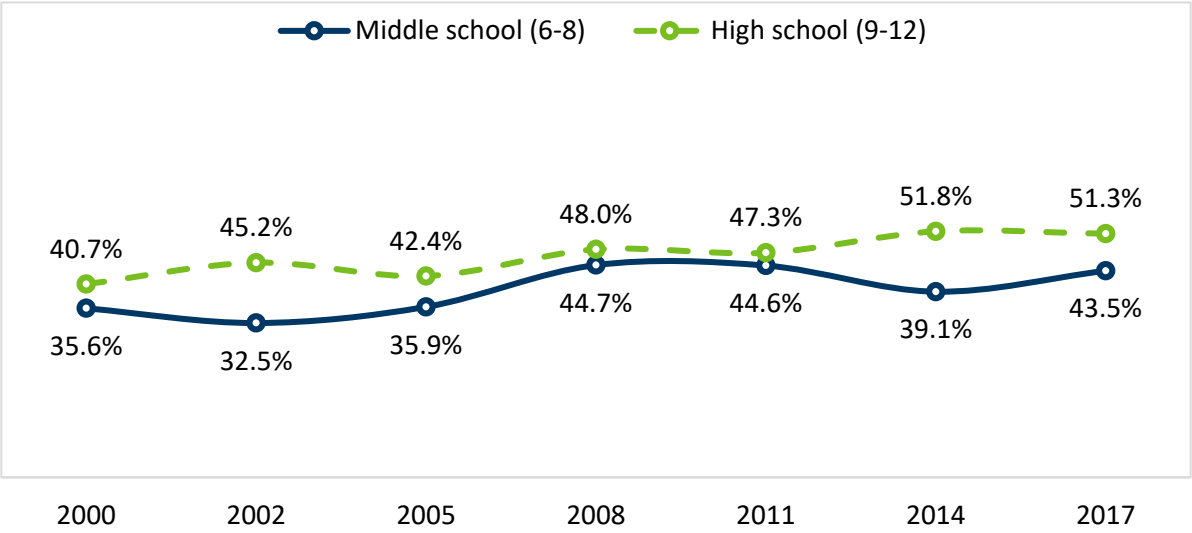
Source: Minnesota Youth Tobacco Survey, 2014-2017.

In 2017, use of e-cigarettes in the past 30 days increased steadily and dramatically by grade in school. Among eighth-graders, 5 percent had used e-cigarettes in the past 30 days; the share climbed to 12.2 percent among ninth-graders, 17.1 percent among 10th-graders, 21.5 percent among 11th-graders, and 26.0 percent among 12th-graders. The past 30-day e-cigarette use rate among 12th-graders (26.0 percent) represents a 46 percent increase from 2014 (Figure 4).

Use of multiple types of tobacco products

The CDC reports that youth who use more than one type of tobacco product - so called “polytobacco” users - are at higher risk for developing nicotine dependence and may be more likely to continue using tobacco into adulthood.[9] Polytobacco use is common among adolescents who use tobacco: national data on high school students in 2014 showed that just over half of current tobacco users used more than one form of tobacco in the past 30 days.[10]

Figure 5. Percent of current tobacco-using students who used more than one type of tobacco product in the past 30 days: 2000-2017.



Source: Minnesota Youth Tobacco Survey, 2000-2017.
** Questions about e-cigarettes, hookah, and snus were added to the MYTS for the first time in 2014.*

In 2017, one in two students (50.3 percent) in Minnesota who had recently used a tobacco product reported using more than one type of tobacco product in the past 30 days. Just over half of high school students (51.3 percent) and 43.5 percent of middle school students who use tobacco products reported using two or more types of tobacco (Figure 5). These percentages represent 13.5 percent of high school and 2.3 percent of middle school students overall who are at increased risk of nicotine dependence.

Polytobacco users were most likely to use both cigars and e-cigarettes in the past 30 days (13.4 percent), followed by the combination of cigarettes and e-cigarettes (11.7 percent), and the combination of cigarettes, cigars, and e-cigarettes (9.2 percent).

Use of flavored tobacco products

Menthol is a natural or synthetic ingredient added to cigarettes and other tobacco products to give them a minty flavor. For decades, tobacco companies have added menthol to make smoking easier for new or younger smokers because it masks the harshness and irritation that smokers may feel when they inhale cigarette smoke. Youth who experiment with menthol cigarettes are more likely to become established smokers and have higher levels of nicotine dependence than those who start with non-menthol cigarettes.[11]

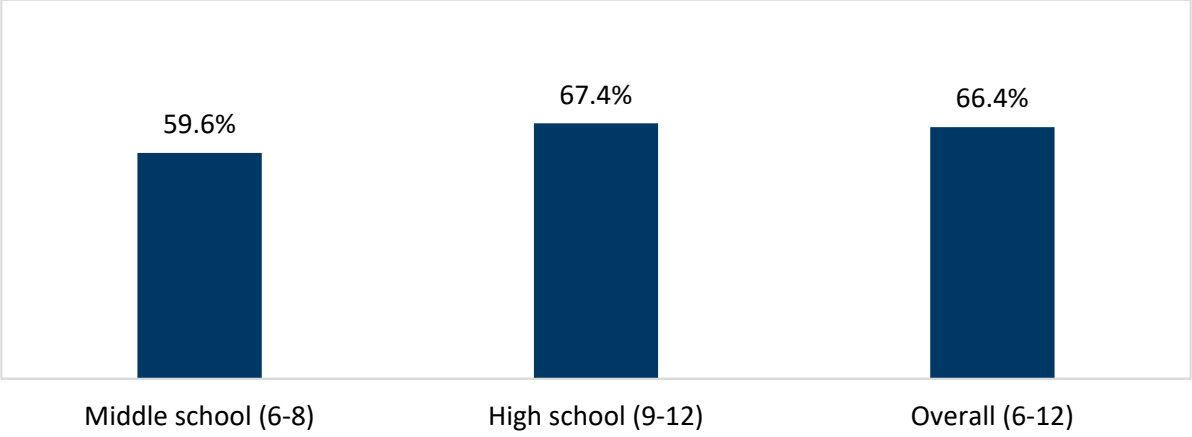
The tobacco industry also has a long history of adding sweet, spicy, and other flavors to tobacco products that particularly appeal to adolescents and young adults. Tobacco companies were legally prohibited from adding flavors to cigarettes in 2009 (menthol was excepted), but they continue to flavor cigars, e-cigarettes, and other tobacco products with such flavors as “raspberry cream” and “fruit punch” to hook a new generation of tobacco users.

A recent study showed that more than 80 percent of teenagers reported the first tobacco product they used was flavored with menthol or another flavor (e.g., candy, fruit, or chocolate), and teen tobacco

users report they are drawn to the products because they come in flavors they like.[12] In response, many cities have restricted sales of menthol and other flavored tobacco to keep young people from accessing these products.

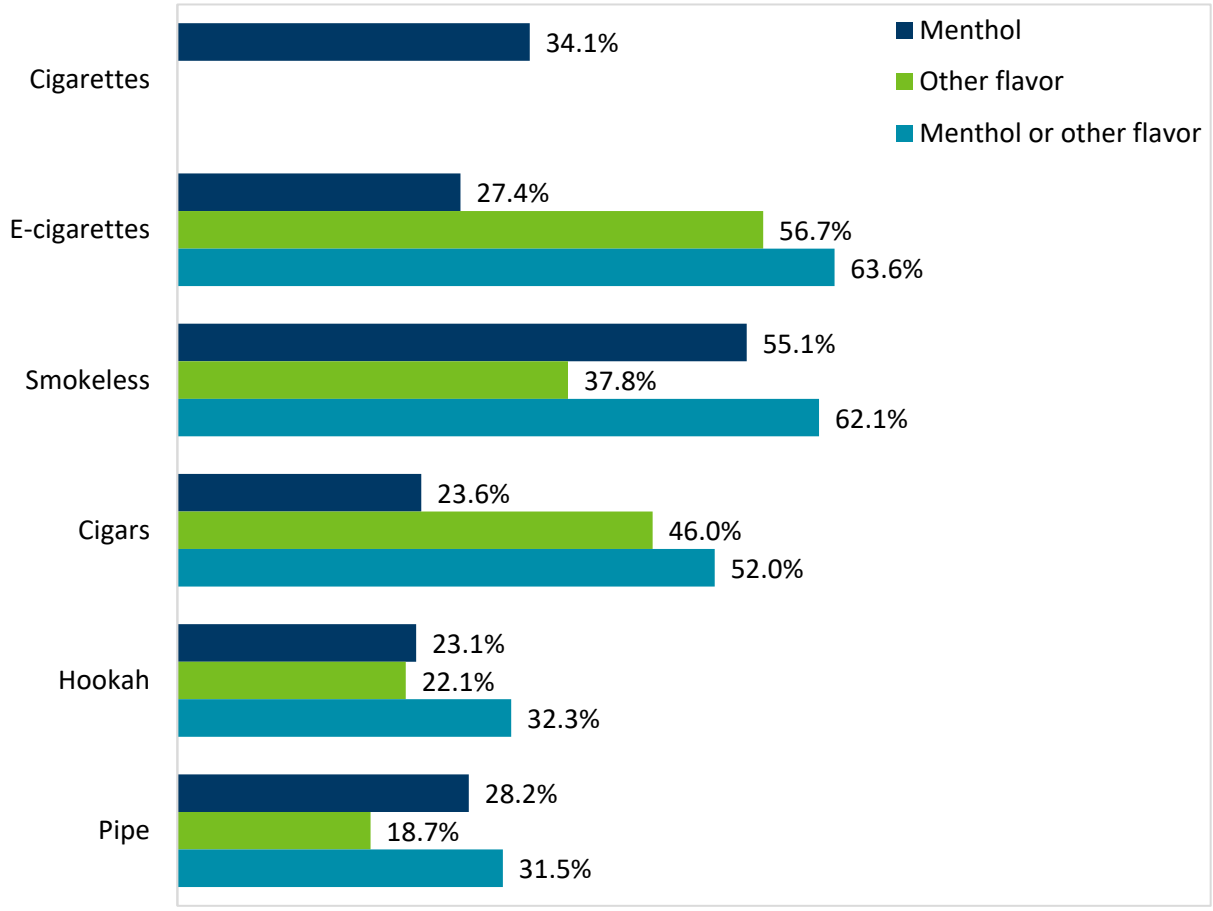
In 2017, more than half of current tobacco users used menthol or other flavored tobacco during the past 30 days (Figure 6).

Figure 6. Percent of current tobacco users who used a menthol or other flavored tobacco product in the past 30 days, 2017.



Source: Minnesota Youth Tobacco Survey, 2017.

Figure 7. Percent of students who used a flavored version of a tobacco product within the past 30 days, by type of product used: 2017.



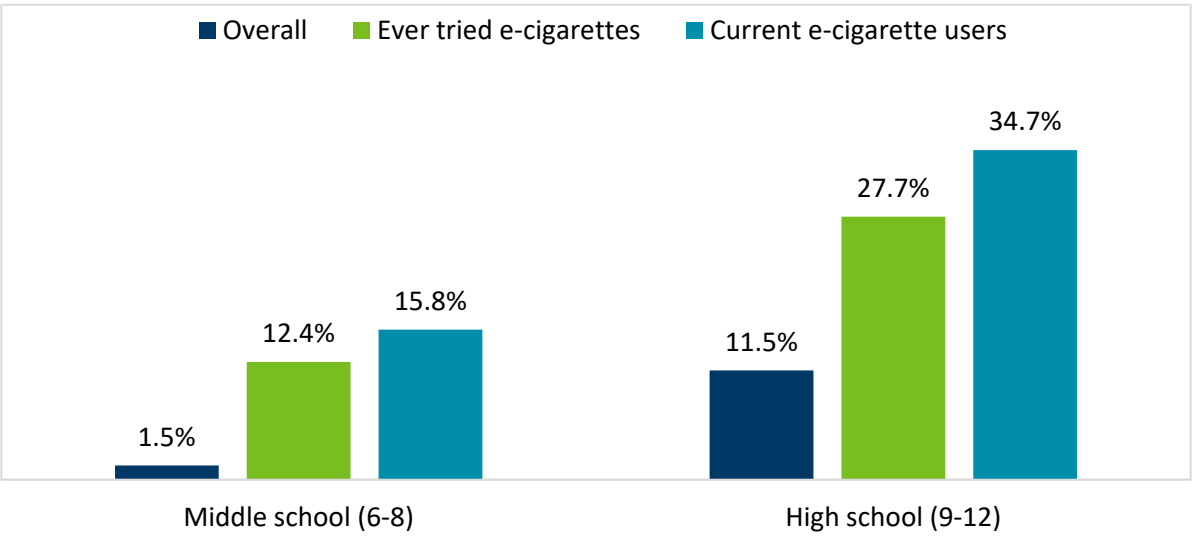
Source: Minnesota Youth Tobacco Survey, 2017.
** Cigarettes are not available in flavors other than menthol.*

Students who used e-cigarettes or smokeless tobacco in the past 30 days were most likely to report using flavored versions of those products, either menthol or another flavor, during that period (Figure 7). In 2017, fewer current smokers smoked menthol cigarettes in the past 30 days compared to 2014 (34.1 percent vs. 41.5 percent), a 22 percent decrease though still higher than the share of Minnesota adult smokers who usually smoke menthol cigarettes (25.1 percent in 2014)[13].

E-cigarettes and recreational marijuana

E-cigarettes can be used to vaporize marijuana, THC oil, or THC wax (THC is the primary psychoactive ingredient in marijuana). "Vaping" marijuana for recreational use may appeal to youth, because the method produces less odor than smoking marijuana through a joint, blunt (marijuana-filled cigar), or pipe. THC concentrations in vaporized hash oil or wax can be considerably higher and therefore more potent than smoking or eating marijuana. The 2017 MYTS asked students for the first time whether they had ever used an e-cigarette device with marijuana, THC or hash oil, or THC wax.

Figure 8. Percent of students who have ever used an e-cigarette device to vape marijuana/THC, 2017.



Source: Minnesota Youth Tobacco Survey, 2017.

More than one in ten high school students (11.5 percent) reported they had ever (at least once in their lifetimes) used an e-cigarette device to vaporize marijuana, THC or hash oil, or THC wax. About one in three current e-cigarette users had ever used an e-cigarette device to vape marijuana or THC oil or wax (Figure 8).

Youth access to tobacco products

Minnesota law prohibits anyone from selling or providing tobacco and tobacco-related products to persons under age 18. However, a substantial number of underage youth report purchasing tobacco products themselves,[14] underscoring the need for better enforcement of existing tobacco restrictions.

Most adolescents usually obtain their tobacco products, whether cigarettes, cigars, smokeless tobacco, or e-cigarettes, through other people rather than buying them directly. To address this problem, many municipalities and several states have implemented "Tobacco 21" policies. Raising the minimum age to buy tobacco from 18 to 21 can prevent underage tobacco use by lowering the odds that high school students have friends who are old enough to legally buy tobacco products.

Table 1. Access to cigarettes by high school cigarette smokers under age 18, 2014-2017*.

During the past 30 days, how did you get your own cigarettes (high school current users only)?	2014 (%)	2017 (%)	Percent Change 2014-17 (%)	Sig.
Direct Purchase: Bought them myself	14.9	19.0	27.5	ψ
Social sources	75.2	74.0	-1.6	ψ
Had someone else buy them for me	42.4	40.2	-5.2	ψ
Borrowed or bummed them	37.9	44.7	17.9	ψ
Someone gave them to me without my asking	12.0	8.1	-32.5	ψ
Other sources	16.6	17.6	1.0	ψ
Took them from a store or another person	2.8	5.5	96.4	ψ
Got them some other way	13.8	12.1	-12.2	ψ

Source: Minnesota Youth Tobacco Survey, 2014-2017.
** Students could check more than one source, so percentages add to more than 100%.*
ψ Differences between the stated years are statistically significant at p<.05.

In 2017, high school students under age 18 who smoked cigarettes in the past 30 days often got their cigarettes by having someone else buy them (40.2 percent) or borrowing/"bumming" them from someone (44.7 percent). Nearly one in five high school current smokers under age 18 (19.0 percent) bought their own cigarettes, a 28 percent increase from 2014 (Table 1).

Table 2. Access to E-cigarettes by current users* under age 18, 2017.

During the past 30 days, where did you get or buy your own e-cigarettes?	Middle School (%)	High School (%)
Retail outlets	19.9	32.2
Gas station or convenience store	5.2	4.2
Grocery store	0.0	1.6
Drug store	2.8	1.4
Mall or shopping center kiosk/stand	0.0	1.7
Internet	2.9	7.3
Vape shop or store that sells only e-cigarettes	4.3	18.4
Some other place not listed here	5.8	2.6
People	77.0	74.1
Family member	25.8	11.5
Friend	57.4	62.4
Other person not family or friend	6.9	6.3

Source: Minnesota Youth Tobacco Survey, 2017.
** Used e-cigarettes in the past 30 days.*
*** Students could check more than one source, so percentages add to more than 100%.*

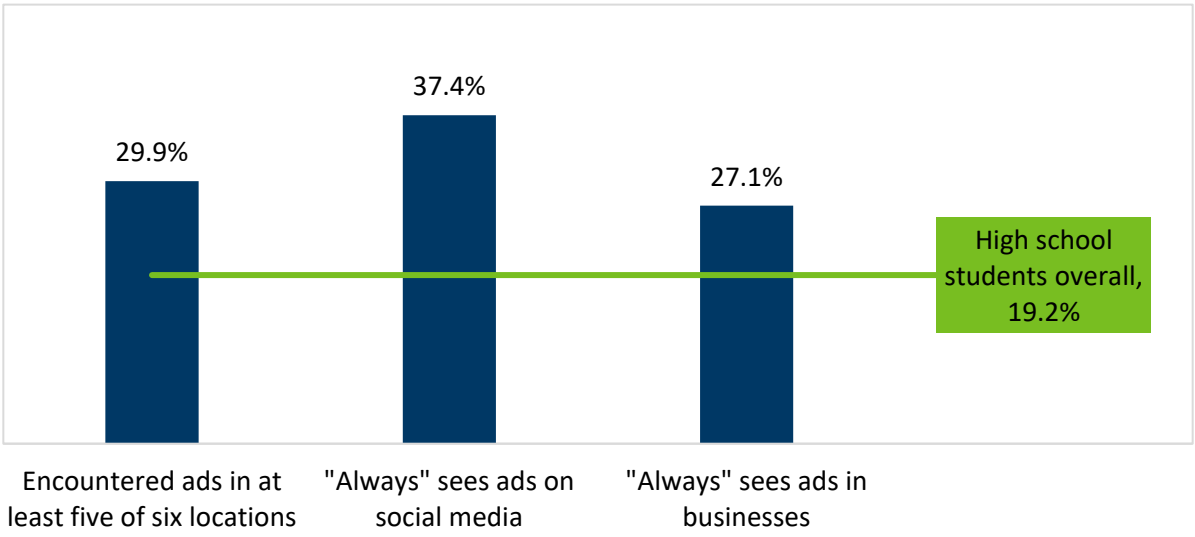
Nearly three of four high school students under age 18 who used e-cigarettes in the past 30 days reported they got their e-cigarettes from a friend, family member, or some other person. Nearly a third

(32.2 percent) bought them from a retail outlet, the most common retail outlet reported was a store that sells only e-cigarettes (i.e., a vape shop) (18.4 percent) (Table 2).

Tobacco advertising

The tobacco industry spent nearly $9 billion dollars in 2015 marketing their products,[15] outspending prevention funding by about 12 to 1.[16] E-cigarette advertising is pervasive and uses the same themes of sex, independence, and rebellion that were used to market cigarettes.[17] The CDC notes that e-cigarette use has increased considerably among U.S. teens in recent years along with expenditures in e-cigarette advertising by the tobacco industry.[18]

Figure 9. Percent of high school students who used e-cigarettes in past 30 days, by exposure to e-cigarette advertising, 2017.



Source: Minnesota Youth Tobacco Survey, 2017.
The straight line represents the statewide prevalence of e-cigarette use among high school students.

In 2017, nearly nine in ten students (88.4 percent) had seen ads promoting e-cigarettes in the past 30 days, down slightly from 90.1 percent in 2014. Half (50.9 percent) had seen ads in convenience stores and other stores in the past 30 days, up from 47.5 percent in 2014. In addition, 39.6 percent of students had seen ads on the internet, 38.6 percent on TV, 18.6 percent in magazines, 14.5 percent on billboards, and 6.8 percent had heard ads on the radio.

Minnesota high school students who report the highest levels of exposure to e-cigarette advertising and promotions are more likely to report current use of e-cigarettes. Notably, 37.4 percent of high school students who reported they “always” see ads for e-cigarettes on social media (such as Facebook, Instagram, or Twitter), had nearly twice the rate of e-cigarette use for high school students overall (Figure 9).

Exposure to secondhand smoke

Tobacco smoke contains more than 7,000 chemicals, including hundreds that are toxic and 70 known to cause cancer.[19] Children who are exposed to secondhand smoke (i.e., smoke from burning tobacco) are at increased risk for sudden infant death syndrome, acute respiratory infections, middle ear disease, more severe asthma, respiratory symptoms, and slowed lung growth.[20] Widespread smoke-free laws in workplaces and public buildings have substantially reduced exposure to secondhand smoke for nonsmoking adults, but the primary place children are repeatedly exposed to secondhand smoke, especially prolonged exposure, is at home.[21]

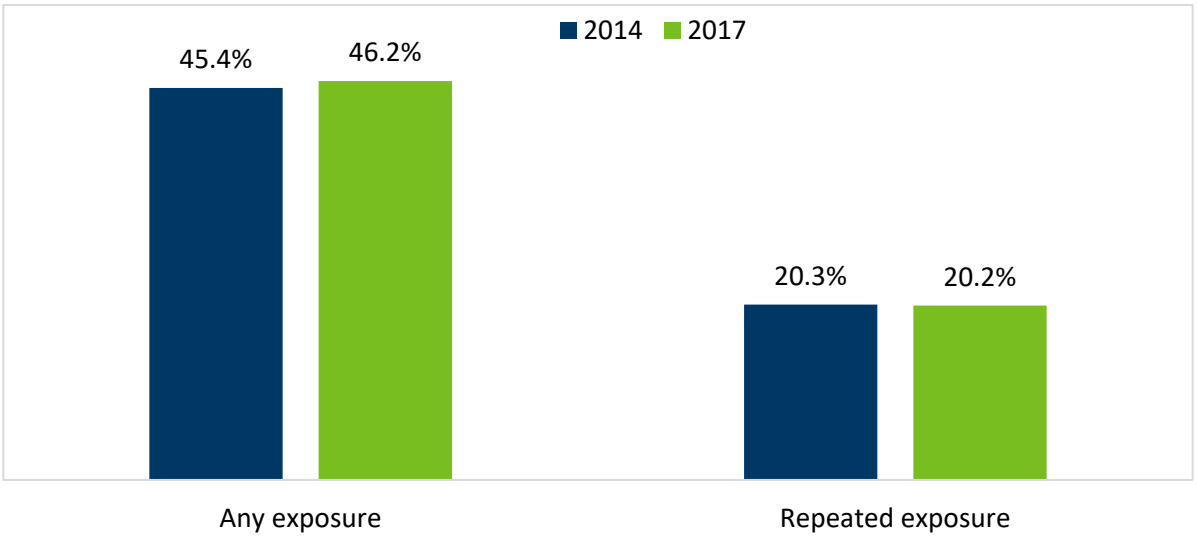
Table 3. Percent of Non-smokers* who were exposed to secondhand smoke in various locations, 2014-2017.

During the past 7 days…	Number of days	2014 (%)	2017 (%)
…on how many days did someone smoke tobacco in your **home** while you were there?	0 days	84.5	84.2
	1 or 2 days	3.9	3.8
	3 or more days	11.6	12.0
…on how many days did you ride in a **vehicle** where someone was smoking tobacco?	0 days	81.2	83.4
	1 or 2 days	9.6	8.6
	3 or more days	9.2	8.0
…on how many days did you breathe the smoke from someone who was smoking tobacco at your **school**?	0 days	84.9	85.4
	1 or 2 days	9.6	9.4
	3 or more days	5.5	5.2
…on how many days did you breathe the smoke from someone who was smoking tobacco where you **work**?	0 days	96.5	95.6
	1 or 2 days	2.2	2.6
	3 or more days	1.3	1.8
…on how many days did you breathe the smoke from someone who was smoking tobacco in an indoor or outdoor **public place**?	0 days	69.5	67.1
	1 or 2 days	21.2	23.7
	3 or more days	9.4	9.2

Source: Minnesota Youth Tobacco Survey, 2014-2017.
**Non-smokers are those who did not use cigarettes, cigars, e-cigarettes, pipes, bidis, or hookah in the past 30 days.*
***Denominator includes those who do not have a job or who did not work during the past 7 days.*

Non-smoking Minnesota students were most likely to be exposed to secondhand smoke in outdoor public places. Twelve percent of students were exposed at home (Table 3).

Figure 10. Percent of Non-smokers* who were exposed and repeatedly exposed to secondhand smoke at home, at work, in a vehicle or public place in past 7 days, 2014-2017.**



Source: Minnesota Youth Tobacco Survey, 2014-2017.
**Non-smokers are those who did not use cigarettes, cigars, e-cigarettes, pipes, bidis, or hookah in the past 30 days.*
***Repeated exposure is 3 or more days of exposure in any of these settings: home, vehicle, workplace, or public place.*

In 2017, 46.2 percent of non-smoking middle school and high school students were exposed to secondhand smoke in the past 7 days; 20.2 percent of non-smoking students were repeatedly exposed to secondhand smoke (Figure 10).

Summary

For the first time since 2000, the Minnesota Youth Tobacco Survey measured an increase in use of tobacco products among middle school and high school students. This increase is attributable to the rising popularity of e-cigarettes. Flavored products continue to appeal to youth, and the tobacco industry's unrestricted ability to flavor e-cigarettes and cigars is effectively luring students to use these products. In addition, a substantial number of students are using e-cigarette devices to vape marijuana. Finally, repeated exposure to secondhand smoke, especially at home, is a serious health threat for one in five Minnesota middle school and high school students who are at increased risk for developing asthma and other health problems.

Overview of survey methodology

The Youth Tobacco Survey (YTS) was developed by the Centers for Disease Control and Prevention (CDC) in collaboration with U.S. states to provide trend surveillance in youth tobacco use, access, and perceptions. The Minnesota Department of Health has conducted the Minnesota Youth Tobacco Survey every 2-3 years since 2000. The school-based pencil-and-paper survey collects information on tobacco

use from middle school and high school students throughout the state. Each year the survey is administered, 100 schools are randomly selected to participate, where the probability of selection is proportional to the number of students in grades 6-8 for the middle school sample and grades 9-12 for the high school sample. Within each selected school, classrooms are randomly selected to ensure that each student had only one chance of being selected. In 2017, 4,112 students from 70 schools participated, resulting in an overall response rate of 62.7%. The data were adjusted for nonresponse and weighted to produce statewide prevalence estimates while accounting for the complex survey design.

Table 4. Respondent characteristics, 2017.

		Count	Percent
Number of surveys		4112	100.0%
Grade	6th	416	10.2%
	7th	599	14.6%
	8th	837	20.5%
	9th	531	13.0%
	10th	1086	26.6%
	11th	338	8.3%
	12th	283	6.9%
	Total	4090	100.0%
Grade level	Middle school (6-8)	1860	45.2%
	High school (9-12)	2252	54.8%
	Total	4112	100.0%
Gender	Male	2039	50.2%
	Female	2024	49.8%
	Total	4063	100.0%
Region school is located	Metro (7 counties)	1880	45.7%
	Greater MN (80 counties)	2232	54.3%
	Total	4112	100.0%
Do you get free or reduced price lunch?	No	2455	61.6%
	Yes	1530	38.4%
	Total	3985	100.0%
Race and ethnicity-mutually exclusive groups	American Indian Non-Hispanic	131	3.2%
	Asian Non-Hispanic	188	4.7%
	Black Non-Hispanic	354	8.8%
	Pacific Islander Non-Hispanic	16	0.4%
	White Non-Hispanic	2610	64.6%
	Multiple Races Non-Hispanic	272	6.7%
	Hispanic	470	11.6%
	Total	4041	100.0%

Source: Minnesota Youth Tobacco Survey, 2017.

End Notes

[1] Centers for Disease Control and Prevention. (n.d.). *Youth and tobacco use*. Retrieved February 13, 2018 from https://www.cdc.gov/tobacco/data_statistics/fact_sheets/youth_data/tobacco_use/index.htm

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