Key Findings

- Marijuana and e-cigarettes are harmful products, especially for children and adolescents.
- The majority of Montana high school students do not use marijuana or e-cigarettes.
- One in six (16%) students report currently using both marijuana and e-cigarettes.
- Frequent use of e-cigarettes among Montana high school students increased by 243% from 2017 to 2019.
- Older students are more likely to engage in use of marijuana or e-cigarettes compared to younger students.
- The average age to first try marijuana or tobacco occurs between 13-14 years old.

Use of E-Cigarettes and Marijuana Among Montana High School Students, 2017 and 2019

In 2018, the U.S. Surgeon General described e-cigarette use, or vaping, among youth as an epidemic, emphasizing a 78% increase in current e-cigarette use from 2017 to 2018. One in five high school students and one in 20 middle school students used e-cigarettes nationwide (1). E-cigarettes are electronic devices designed to vaporize and aerosolize products, typically nicotine, for inhalation and delivery into the lungs. Among U.S. youth, marijuana is the second most commonly used drug, exceeded only by alcohol (2). Given the epidemic of youth e-cigarette use, the popularity of marijuana among youth, and the recent outbreak of e-cigarette, or vaping, product use-associated lung injury (EVALI), it is critical to understand the use and co-use of substances associated with these products. The purpose of this surveillance report is to describe the use and trends of e-cigarette and marijuana use among high school students in Montana.

Methods

Data for this report came from the Youth Risk Behavior Survey (YRBS) data for Montana for the years 2017 and 2019. The survey was administered to high school students on odd-numbered years nationwide. The 2019 sample size for Montana was 3,819 students. Values were reported as proportions of students reporting using e-cigarettes or marijuana within their lifetime (hereafter referred to as *ever use*), in the 30 days prior to the survey (hereafter referred to as *current use*), and 20 or more times in the past 30 days (hereafter referred to as *frequent use*).

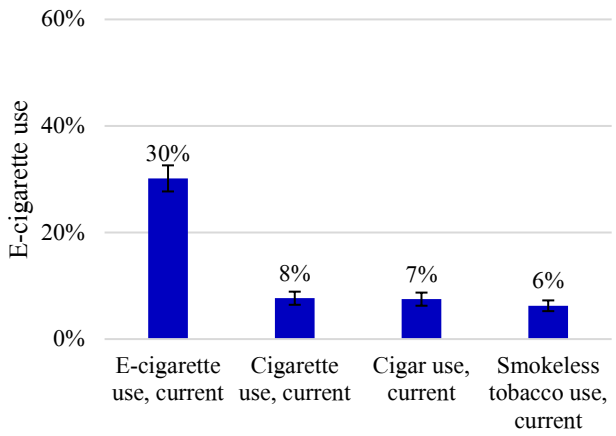
We determined correlation between marijuana and e-cigarette use by calculating a Pearson correlation coefficient (r). Percent change was tested for significance using a Chi-square test for equality of proportions. This report presents significant results only ($p \leq 0.05$). Demographic differences were reported according to 2019 data only. For comparisons by race non-Hispanic white students were used as the reference population. Additional racial categories include single-race non-Hispanic American Indian and Alaska Native students (AI/AN) and students of other racial profiles not already described. Males were used as the referent population for conducting comparisons in gender.

Montana Office of Epidemiology and Scientific Support
1400 E Broadway
Helena, Montana 59260-2951
(406) 444-4198
https://dphhs.mt.gov/publichealth/Epidemiology

Data and Results

E-cigarette use

- More students reported current e-cigarette use than any other tobacco products (Figure 1).
- From 2017 to 2019 frequent e-cigarette use increased 243%, current use increased 34%, and ever use increased 25% (Figure 2).
- E-cigarette use increased with grade for all levels of use (Figure 3).
- Frequent e-cigarette use was lowest among AI/AN students and highest among students of other non-white races (Figure 3).
- Frequent use of e-cigarettes was higher among males than females (Figure 3).
- The median age of first using tobacco was 13-14 years old.



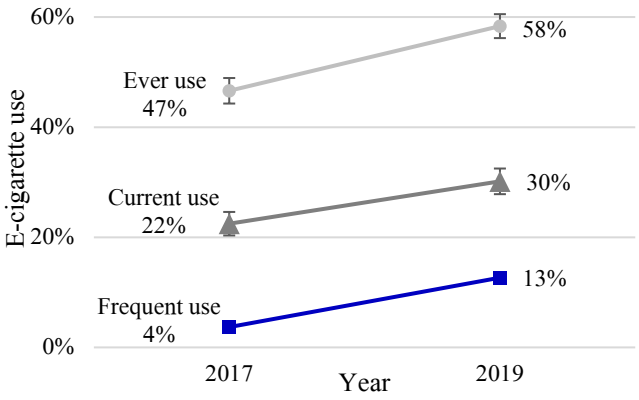
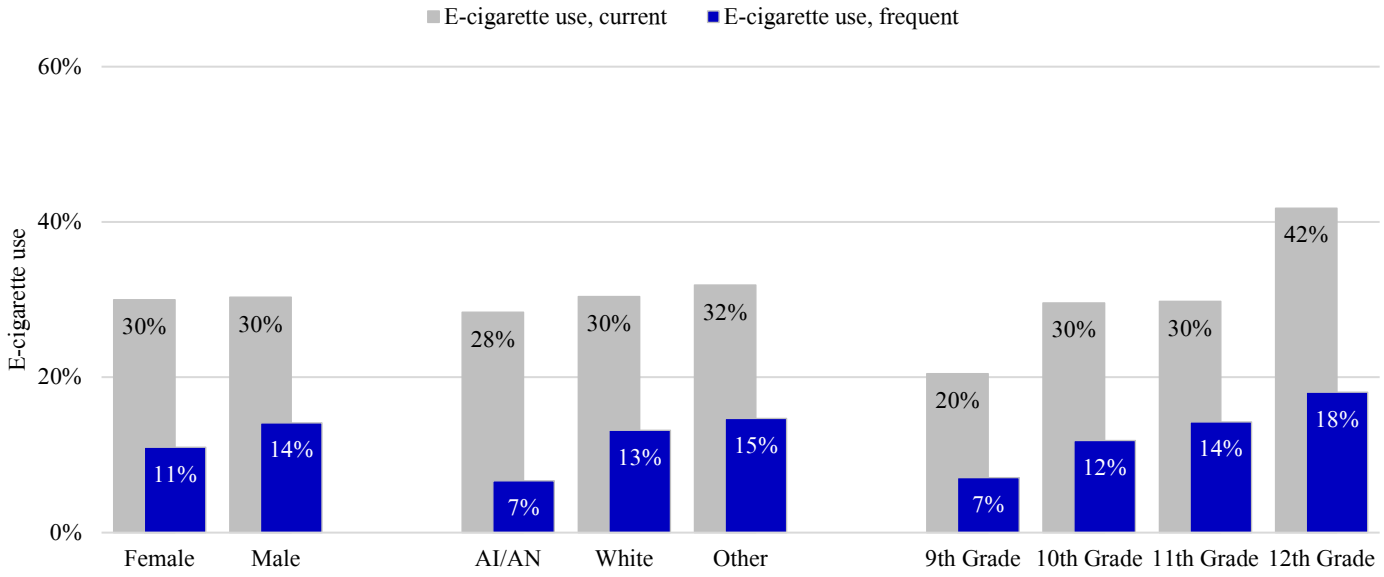
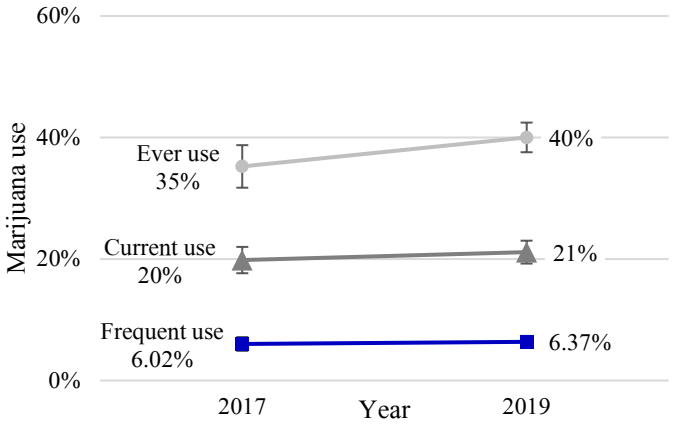


Figure 1 (top right): Current use of tobacco products among Montana high school students, 2019. **Figure 2 (center right):** Use of e-cigarettes among Montana high school students from 2017-2019. **Figure 3 (bottom):** Current and frequent use of e-cigarettes among Montana high school students by demographic characteristic, 2019



Marijuana use

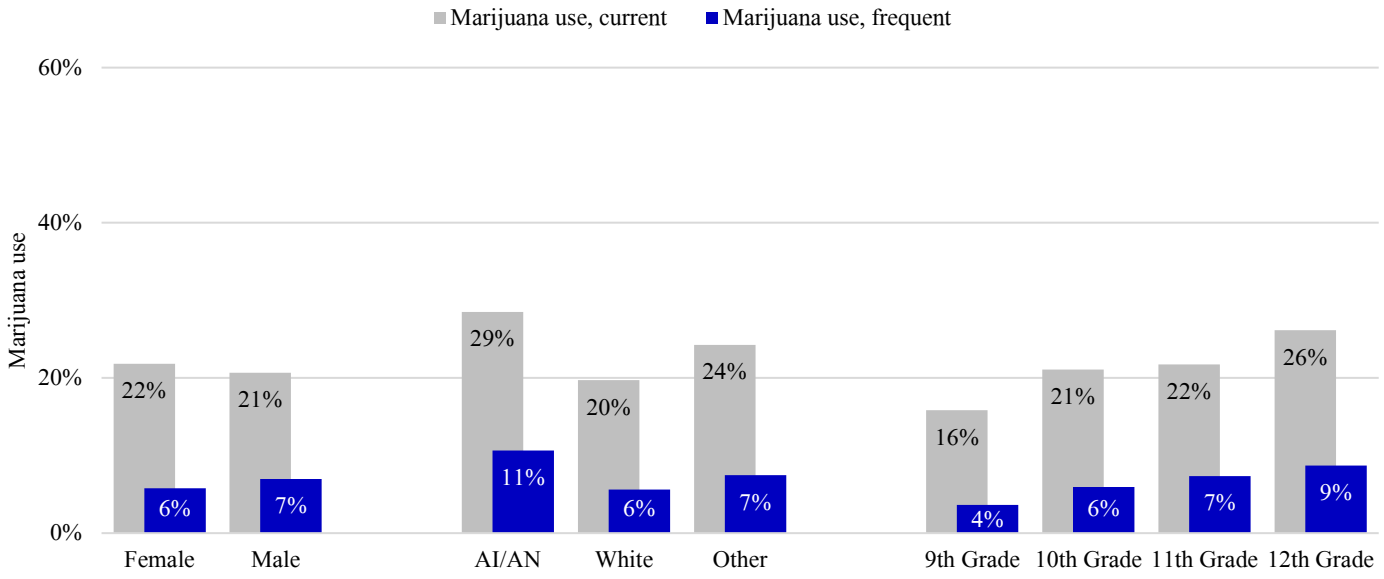
- Frequent marijuana use increased 6%, current use increased 7%, and ever use increased 14% from 2017 to 2019 (Figure 4).
- Marijuana use increased with grade for all levels of use (Figure 5).
- Marijuana use was highest among AI/AN students and lowest among white students for all levels of use (Figure 5).
- Frequent use of marijuana was higher among males than females (Figure 5).
- Current use of marijuana was higher among females than males (Figure 5).
- The median age of first using marijuana was 13-14 years old.



Use of both e-cigarettes and marijuana

- 36% of students reported having ever used both e-cigarettes and marijuana (moderate correlation; r=0.55).
- Sixteen percent of students reported current use of both e-cigarettes and marijuana (moderate correlation; r=0.45).
- Three percent of students reported frequently use of both e-cigarettes and marijuana (weak correlation; r=0.27).

Figure 4 (above): Use of marijuana among Montana high school students from 2017-2019. **Figure 5 (below):** Current and frequent use of marijuana among Montana high school students by demographic characteristic.



Conclusion

This report reviewed the use of e-cigarettes and marijuana for the years 2017 and 2019 among Montana high school students. In 2019, nearly one in three high (30%) school students in Montana reported currently using e-cigarettes and one in five (21%) reported currently using marijuana. Use of either product was elevated among upper classmen when compared to their younger peers. While this data cannot determine if these products are used simultaneously, such as using an e-cigarette to deliver marijuana, the use of these products among youth is positively correlated. Sixteen percent of Montana high school students reported current use of both e-cigarettes and marijuana in 2019. E-cigarette use exceeded all other forms of nicotine delivery in the 2019. In addition, e-cigarette use also exceeded the prevalence of marijuana use in 2019. These trends present an alarming boom in e-cigarette use among Montana high school students.

AI/AN students experienced the highest prevalence of marijuana use at all levels; however, this group of students had the lowest current and frequent e-cigarette use.

This report is not without limitations: results reflect trends in e-cigarette use and marijuana use among high school students only. These results cannot be generalized to describe trends among other youth in Montana. Moreover, information regarding use among gender non-binary, trans, and non-heterosexual youth, all populations known to be at risk for substance use/ misuse (3; 4; 5), is not covered in the surveillance data and reported findings cannot be generalized to students who identify in these categories.

The U.S. Surgeon General emphasizes that risks of negative consequences of marijuana use, such as changes in brain development, impaired learning, early onset of psychotic disorders, dependence, and addiction, increase with earlier initiation into the use of the drug (9). Data indicates that the initiation of both marijuana and tobacco use typically occurs before the student even reaches high school (ages 13-14 for both substances), highlighting the importance of early interventions to strengthen the student's resistance against drugs before reaching high school.

The most common reasons cited by young people for why they began using e-cigarettes include curiosity, flavors, not realizing the risk of harm presented by e-cigarettes, and to circumvent indoor smoking restrictions (6). In Montana, possession or use of any vapor product is prohibited for minors (MCA § 45-5-637) as is the sale or distribution of a vapor product to a minor (MCA § 16-11-305). Smoke-free restrictions ban the use of vapor products on all public school property (MCA § 20-1-220). Additionally, eleven localities in Montana have incorporated e-cigarettes into their local smoke free laws.

Marijuana is the most widely used illicit drug in the United States and people who regularly use it risk forming a dependence to the drug as well as experiencing increases in heart rate and blood pressure, respiratory inflammation, several psychiatric disorders, and heavy onset of vomiting (7; 8; 9; 10; 11). Additionally, cessation of marijuana use is known to induce withdrawal symptoms including physical and social irritability, restlessness, difficulty sleeping, decrease in appetite, and cravings to return to use while the consumer readjusts to life without the drug (7; 12). A 2019 U.S. Surgeon General report recommended that no amount of marijuana use during pregnancy or adolescence is known to be safe. The report warned about the nation's misperceptions of safety and the increased availability is a dangerous combination and urged communities to act and spread awareness of the dangers the drug imposes (2).

Effective Strategies of Prevention

Effective Strategies for Parents

- Talk with your children about why marijuana and e-cigarettes, or vaping, are harmful for them.
- Adopt tobacco-free rules, including e-cigarettes, in your home and vehicle.
- Set a good example by being tobacco-free. For free help in quitting call 1-800-QUIT-NOW.
- ParentingMontana.org offers age-specific resources for parents to intervene in their child's substance use.

Effective Strategies for Healthcare Providers

- Counsel teens and parents about marijuana use following guidelines from the American Academy of Pediatrics (13).
- Ask about e-cigarettes, including small, discreet devices such as JUUL, when screening patients for the use of any tobacco products (1).
- Educate patients about the risks of tobacco product use, including e-cigarettes, for young people (1).
- Encourage patients to quit (1). MyLifeMyQuit.com offers tobacco cessation assistance designed for assisting teens who want to stop vaping or using other tobacco products.
- AmericanIndian.QuitLogix.org provides resources for assisting American Indian patients with tobacco cessation.

Effective Strategies for Public Health Professionals

- Evidence-based prevention programs can be found at dphhs.mt.gov/amdd/SubstanceAbuse/preventiondocuments/evidence-based-programs.
- Implement evidence-based substance use prevention programs and interventions to prevent and reduce the use of e-cigarettes and marijuana among youth.
- Implement evidence-based population-level strategies to reduce e-cigarette use, such as including e-cigarettes in smoke-free indoor air policies, restricting access to e-cigarettes in retail settings, and developing educational initiatives targeting young people (1).
- American Indian communities are valuable allies in the path to preventing, intervening, and recovering from substance use. Use culturally appropriate targeted efforts to reduce marijuana use among AI/AN youth.

References

1. Office of the US Surgeon General. *Surgeon General's advisory on e-cigarette use among youth.* 2018.

2. Office of the US Surgeon General. *Surgeon General's advisory: Marijuana use & the developing brain.* 2019.

3. King, M., et al. *A systematic review of mental disorder, suicide, and deliberate self harm in lesbian, gay and bisexual people.* 2008, BMC Psychiatry, Vol. 8.

4. Prestage, G., et al. *Mental health, drug use and sexual risk behavior among gay and bisexual men.* 2018, International Journal of Drug Policy, Vol. 55, pp. 169-179.

5. Heinsbroek, E., et al. *Patterns of injecting and non-injecting drug use by sexual behavior in people who inject drugs attending services in England, Wales and Northern Ireland, 2013-2016.* 2018, International Journal of Drug Policy, Vol. 55, pp. 215-221.

6. Office of the US Surgeon General. *E-cigarette use among youth and young adults: A report of the Surgeon General.* s.l. : US Department of Health and Human Services, 2016.

7. Cousjin, J., Nunez, A. E. and Filbey, F. M. *Time to acknowledge the mixed effects of cannabis on health: A summary and critical review of the NASEM 2017 report on the health effects of cannabis and cannabinoids.* 2018, Addiction, Vol. 113 (5), pp. 958-966.

8. Centers for Disease Control and Prevention. *Marijuana and Public Health.* [Online] February 27, 2018. https://www.cdc.gov/marijuana/health-effects.html.

9. National Institute on Drug Abuse. *Marijuana: What are marijuana's effects on lung health?* [Online] September 2019. https://www.drugabuse.gov/publications/research-reports/marijuana/there-link-between-marijuana-use-psychiatric-disorders.

10. National Institute on Drug Abuse. *Marijuana: What are marijuana's long-term effects on the brain?* [Online] September 2019. https://www.drugabuse.gov/publications/research-reports/marijuana/what-are-marijuanas-effects-lung-health.

11. National Institute on Drug Abuse. *Marijuana: What are marijuana's effects on other aspects of physical health?* [Online] September 2019. https://www.drugabuse.gov/publications/research-reports/marijuana/what-are-marijuana%E2%80%99s-effects-on-other-aspects-of-physical-health%3F.

12. National Institute on Drug Abuse. *Marijuana: Is marijuana addictive?* [Online] September 2019. https://www.drugabuse.gov/publications/research-reports/marijuana/marijuana-addictive.

13. Ryan, S. A., Ammerman, S. D., and Committee on Substance Use and Prevention. *Counseling parents and teens about marijuana use in the era of legalization of marijuana.* [Online] 2017. https://pediatrics.aappublications.org/content/139/3/e20164069?utm_source=TrendMD&utm_medium=TrendMD&utm_campaign=Pediatrics_TrendMD_0.