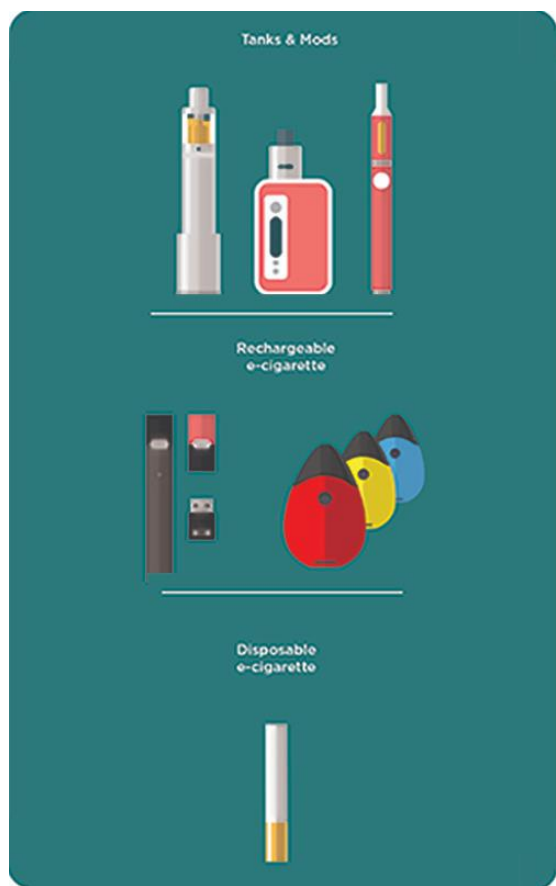


## E-cigarettes: Preventing Youth & Young Adult Use

The U.S. Surgeon General declared youth e-cigarette use to be an epidemic.<sup>i</sup> E-cigarettes are the most used tobacco product among youth and, like any tobacco product, are unsafe.<sup>ii</sup> E-cigarette use is also most common among younger adults.<sup>iii</sup> Action is urgently needed to reverse these dangerous trends.



### WHAT ARE E-CIGARETTES?

E-cigarettes are battery-operated devices that heat a liquid to inhale an aerosol usually made of nicotine and other chemicals.

- E-cigarettes can come in many shapes and sizes, resembling other tobacco products, or look like everyday items like USB drives. E-cigarettes that are easy to conceal, like those that look like USB drives, are popular with youth.
- E-cigarettes can be disposable, one-time use products, or rechargeable, and can come in mod or tank systems that allow for more customization. Cartridges or pods of e-liquids are used in the devices.
- E-cigarettes can have other names including e-cigs, e-pen, e-hookah, mods, and Juul – a brand with high youth popularity.
- Using an e-cigarette can also be called “vaping” or “Juuling.”

Source: CDC.

### E-cigarette Use

Nationwide, the use of e-cigarettes by youth has rapidly increased. In 2011, 1.5% of high school students and 0.6% of middle school students reported using e-cigarettes.<sup>iv</sup> By 2019, those numbers rose dramatically to 27.5% of high school students and 10.5% of middle school students.<sup>v</sup> In 2022, more than 2.5 million youth reported current e-cigarette use, 14.1% of high school students and 3.3% of middle school students.<sup>vi</sup>

Frequency of e-cigarette use can be an indication of dependence. In 2022, among high school students who currently use e-cigarettes, 46% used on 20 or more of the past 30 days and among middle school students who currently use e-cigarettes, 20.8% used e-cigarettes on 20 or more of the past 30 days.<sup>vii</sup>

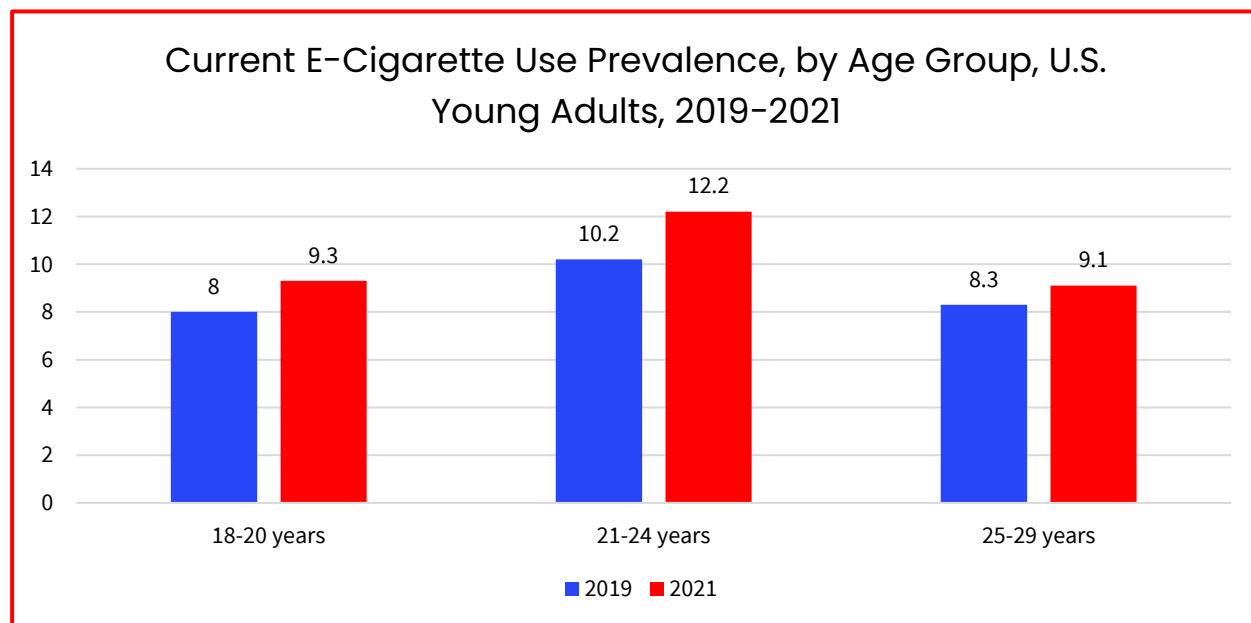
The 2022 survey also highlighted how students also use a variety of e-cigarette types.<sup>viii</sup> Among all students who used e-cigarettes, disposable e-cigarettes were the most common (55.3%). Among high school

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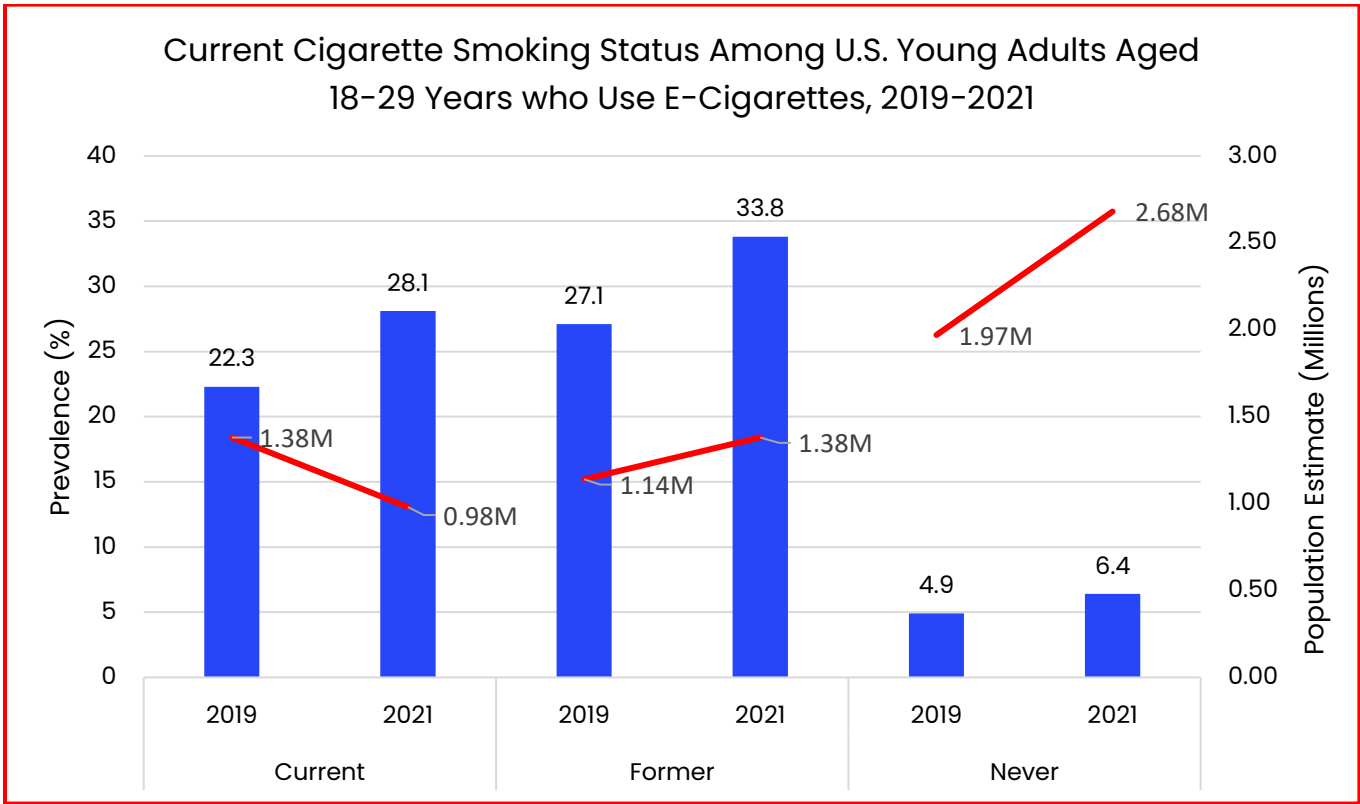
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students who currently use e-cigarettes, 57.2% used disposables, 25.7% used prefilled pods or cartridges, and 6.7% used tank systems. Among middle school students who currently use e-cigarettes, 45.8% used disposables, 21.6% used prefilled pods or cartridges, and 9.8% used tank systems. While 2022 survey results cannot be compared to previous years, this is the second year that disposable e-cigarettes were the most popular among students. From 2019 to 2020, the use of disposable e-cigarettes increased approximately 1,000% (from 2.4% to 26.5%) among high school students who currently use e-cigarettes and approximately 400% (from 3.0% to 15.2%) among middle school students who currently use e-cigarettes.<sup>ix</sup> A possible reason for the dramatic increase in youth disposable e-cigarette use during this time could be related to FDA an announcement in that they would prioritize the removal of illegal flavored tobacco products off the market, but excluded flavored disposable e-cigarettes. It is important to track how youth product popularity changes if policymakers are considering regulating types of products differently.

Recently the Centers for Disease Control and Prevention (CDC) released new data finding use of e-cigarettes rose to 4.5% in 2021, up from 3.7% in 2020, with young adults aged 18-24 being the largest users of e-cigarettes.<sup>x</sup> Researchers at the American Cancer Society recently released a journal article concluding that that the only age group with increase in e-cigarette use during 2019-2021 were younger adults ages 18-29 years from 8.8% to 10.2%. This increase in younger adults was primarily owing to an increase among those who had never smoked cigarettes. Prevalence increased from 4.9% in 2019 to 6.4% in 2021, translating to an increase of more than three-quarters of a million more younger adults using e-cigarettes in this group. This trend points to troubling ongoing increase in primary nicotine initiation with e-cigarettes among those vulnerable to the potential harms of nicotine and toxicant exposure.<sup>xi</sup>



Source: Bandi et al. Changes in E-Cigarette Use Among U.S. Adults, 2019-2021, *American Journal of Preventive Medicine*, April 18, 2023. DOI:<https://doi.org/10.1016/j.amepre.2023.02.026>



Source: Bandi et al. Changes in E-Cigarette Use Among U.S. Adults, 2019–2021, *American Journal of Preventive Medicine*, April 18, 2023. DOI: <https://doi.org/10.1016/j.amepre.2023.02.026>

## Flavors Encourage E-cigarette Use

Flavors are a key tactic the tobacco industry uses to lure new users, especially youth, into using their highly addictive products. According to the 2022 National Youth Tobacco Survey, among all students who currently use e-cigarettes, 84.9% used flavored e-cigarettes, including 85.5% of high schoolers who use and 81.5% of middle schoolers who use e-cigarettes.<sup>xii</sup> In other words, 2.11 million middle and high school students are currently using flavored e-cigarettes.

The most used flavors of e-cigarettes among middle and high school students who were currently using e-cigarettes were fruit (69.1%), candy, desserts, or other sweets (38.3%), mint (29.4%), and followed by menthol (26.6%).<sup>xiii</sup> Importantly, menthol is derived from mint products and can be found naturally or developed synthetically.<sup>xiv</sup> While these reports asked youth separately about mint and menthol, the user

In 2022, among all students who currently use e-cigarettes

**84.9%**

used **flavored** e-cigarettes



that's **6 out of 7 (85.5%)** of **high schoolers** who use e-cigarettes &



**4 out of 5 (81.5%)** of **middle schoolers** who use e-cigarettes

In other words, **2.11 million middle & high school students** are currently using **flavored e-cigarettes**.

Source: Cooper M, Park-Lee E, Ren C, Cornelius M, Jamal A, Cullen KA. Notes from the Field: E-cigarette Use Among Middle and High School Students — United States, 2022. *MMWR Morb Mortal Wkly Rep* 2022;71:1283–1285. DOI: <http://dx.doi.org/10.15585/mmwr.mm7140a3>.

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may not necessarily distinguish between these flavors since one is a derivative of the other. Menthol and mint flavors are also often combined with fruit, dessert, or other sweet flavors. **Policies to prohibit flavors in tobacco products or to prohibit the sale of flavored tobacco products, including e-cigarettes, should not distinguish between mint and menthol and instead include all flavors.**

## E-cigarette Use Associated with Cigarette and Cigar Use

The 2016 Surgeon General’s Report concluded that “e-cigarette use is strongly associated with the use of other tobacco products among youth and young adults, particularly combustible tobacco products.<sup>xv</sup>” In 2018, a National Academies of Science, Engineering, and Medicine report concluded that: “There is substantial evidence that e-cigarette use increases risk of ever using combustible tobacco cigarettes among youth and young adults.<sup>xvi</sup>” Furthermore, the report concluded that there was moderate evidence that e-cigarette use increases the intensity and frequency of cigarette smoking.

More recent studies have quantified the association between e-cigarette and cigarette use among youth. A 2019 study concluded that youth who use e-cigarettes are more than 4 times as likely to try cigarettes and nearly 3 times as likely to currently smoke cigarettes than those youth who never tried e-cigarettes.<sup>xvii</sup> Cigarette use by the end of the study was higher among youth who had previously used e-cigarettes (20.5%) and youth who previously used other tobacco products (21.1%), compared with those who had not used tobacco before (3.8%). Also concerning, the link between prior e-cigarette use and trying cigarette smoking was stronger for youth who would be considered “low-risk” for smoking. The researchers estimated that more than 43,000 youth ages 12-15 years who currently smoke got their start with e-cigarettes.

A 2021 study analyzed longitudinal data from the PATH study to look at youth and young adults who progressed to daily cigarette smoking from 2013-2014 to 2017.<sup>xviii</sup> Youth who had ever tried an e-cigarette were three times more at risk of later daily cigarette smoking than those youth who had never used an e-cigarette.

In addition to the connections between e-cigarette use and cigarette use, research has shown associations between e-cigarette use and cigar use among youth and young adults. A longitudinal analysis of e-cigarette use and cigar, little cigar or cigarillo (CLCC) initiation among youth and young adults between 2017-2019, found that young people who previously used e-cigarettes had a three times higher odds of using flavored CLCC compared to individuals who had never used e-cigarettes, with a slightly higher odds among young people who used of the Juul brand e-cigarette.<sup>xix</sup>

The 2022 National Youth Tobacco Survey found that 30.3% of any tobacco product users in high school and 33.3% of any tobacco product users in middle school currently used a combination of two or more tobacco products.<sup>xx</sup> After e-cigarettes, cigars were the most commonly used tobacco product (2.8%) followed by cigarettes (2.0%) among high school students who currently used tobacco products.<sup>xxi</sup>

## E-CIGARETTES & MARIJUANA

E-cigarettes can be used to inhale marijuana as well as nicotine. Not surprisingly, youth use of e-cigarettes for marijuana has a similar trend to youth use of e-cigarettes for nicotine. In fact, “vaping” of marijuana increased from 2017 to 2019 by two-fold among 8<sup>th</sup>, 10<sup>th</sup>, and 12<sup>th</sup> graders and remained level in 2020.<sup>xxiii</sup> There is some evidence that youth who use e-cigarettes and other tobacco products are more likely to use marijuana than youth who don’t use tobacco products.<sup>xxvi</sup>

Like nicotine, marijuana can have a negative and lasting impact on brain development, including cognitive impairment.<sup>xxv</sup> In addition, 2019 saw a multistate outbreak of e-cigarette, or vaping, product use-associated lung injuries (EVALI) which resulted in dozens of deaths. Most patients with EVALI reported using an e-cigarette product containing THC, the main psychotropic ingredient in marijuana, but some reported using nicotine alone. Vitamin E acetate was identified as a chemical of concern among people with EVALI, although no conclusive cause was determined. The CDC and FDA recommend no youth use an e-cigarette product.<sup>xxvi</sup>

### Adverse Health Effects of E-cigarettes

E-cigarettes can vary in the amount of nicotine present, and they often contain nicotine at much higher levels than cigarettes.<sup>xxvi</sup> Of note, a study using Nelson sales data for convenience and mass market stores found the average nicotine concentration in e-cigarettes based on manufacturers’ information and in-store audits increased by more than 80% for all e-cigarettes sold between 2013-2018.<sup>xxvii</sup> However, the study’s data did not take into account e-cigarettes sold online or in e-cigarette specific stores, such as vape shops and relied on e-cigarette product labels to evaluate the product’s specific nicotine content. Nicotine exposure during adolescence and young adulthood can affect the developing brain and may have lasting effects on cognitive function, decision-making, and impulse control.<sup>xxviii</sup> The brain develops until about age 25. Exposure to nicotine during adolescence puts the user at greater risk for a lifelong addiction, as the developing brain is more susceptible to addiction than an adult brain. In addition, nicotine exposure, through maternal use can also negatively affect fetal development leading to sudden infant death syndrome (SIDS), brain alterations, deficits in auditory processing, and obesity.

E-cigarette aerosol poses potential risk to both users and nonusers. The most recent Surgeon General’s report concluded that “e-cigarette aerosol is not harmless. It can contain harmful and potentially harmful constituents, including nicotine.”<sup>xxix</sup> Studies have found the aerosol to contain ultrafine particles that can be inhaled deeply into the lungs, heavy metals, volatile organic compounds and cancer-causing chemicals, among other potentially harmful chemicals.<sup>xxx, xxxi, xxxii</sup> E-cigarettes can vary on whether or how much of these chemicals are present in the products, and such information is often not known to consumers.<sup>xxxiii</sup>

### Industry Targeting Youth and Young Adults

E-cigarette manufacturers are using the same marketing practices effectively used by other tobacco manufacturers to target youth and mislead consumers about the effects of their products.<sup>xxxiv</sup> These practices include celebrity endorsements, sports and musical sponsorships, use of images of e-cigarettes as

rebellious, glamorous and cool, and the use of flavorings in their products.<sup>xxxv</sup> Particularly troubling is that e-cigarettes are not subject to the legal marketing restrictions to which cigarettes and other tobacco products are required to adhere. E-cigarettes are widely advertised on television, streaming, radio, online, in print magazines, including those with high youth readership, and at sports and music events.

Therefore, it is no surprise that youth are exposed to e-cigarette advertising. In 2021, 70.3% of middle and high school students – 17.7 million youth - reported seeing e-cigarette advertising and promotions.<sup>xxxvi</sup> Almost two-thirds of students reported seeing these advertisements in retail stores (58.7%), 36.0% on the Internet, 21.7% on TV, streaming or movies, and 34.8% in newspapers and magazines. Recent research shows that youth exposed to e-cigarette advertising are more likely to ever and currently use e-cigarettes, with a dose-response effect, even among youth who had never used an e-cigarette.<sup>xxxvii</sup>

## ACS CAN'S Position

**The epidemic of e-cigarette use by youth and young adults, aggressive marketing tactics by their manufacturers, including the use of flavors appealing to youth, and under-regulation of these products requires the public health community to take action to protect youth, young adults, and the public at-large. ACS CAN supports evidence-based strategies to reduce youth use of e-cigarettes:**

- ❖ **Strong Federal Regulation:** The FDA should use its full authority over all tobacco products, including e-cigarettes to:
  - Enforce premarket review, continuing to issue marketing denial orders for flavored e-cigarettes.
  - Restrict the marketing of these products to youth,
  - Prohibit all characterizing flavors in any tobacco products,
  - Enforce the prohibition on unsubstantiated health claims, and
  - Require sound scientific evidence when evaluating marketing applications and proposing product standards for the protection of public health.
- ❖ **Strengthen State and Local Tobacco Control Measures:** Many states and localities are enacting regulations on the sale and use of e-cigarettes. E-cigarettes should be included in evidence-based state and local tobacco control laws.
  - E-cigarettes should be defined as tobacco products and included in the definitions of smoking to:
    - Prohibit e-cigarette use where smoking and/or tobacco use is prohibited.
    - End the sale of all flavored tobacco products including e-cigarettes.
    - Include e-cigarettes in tobacco sales restrictions, including retailer licensing requirements.
    - Tax e-cigarettes based on their price at a rate parallel to the tax on cigarettes and all other tobacco products.
  - Include education about e-cigarettes in all evidence-based state tobacco control programs.

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Empowered to Quit is a free email-based smoking cessation program offered by the American Cancer Society, based on American Cancer Society funded tobacco cessation research. Information about the program and quitting tips can be found at <https://www.cancer.org/cancer/risk-prevention/tobacco/empowered-to-quit.html>.

- <sup>i</sup> Office of the Surgeon General, “Surgeon General’s Advisory on E-Cigarette Use Among Youth,” December 18, 2018. <https://e-cigarettes.surgeongeneral.gov/documents/surgeon-generals-advisory-on-e-cigarette-use-among-youth-2018.pdf> Statement from FDA Commissioner Scott Gottlieb, M.D., on new steps to address epidemic of youth e-cigarette use. September 12, 2018. <https://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm620185.htm> Azar, Alex M, and Gottlieb, Scott. “We cannot let e-cigarettes become an on-ramp for teenage addiction.” The Washington Post, October 11, 2018. Op-ed.
- <sup>ii</sup> Park-Lee E, Ren C, Cooper M, Cornelius M, Jamal A, Cullen KA. Tobacco Product Use Among Middle and High School Students — United States, 2022. *MMWR Morb Mortal Wkly Rep* 2022;71:1429–1435. DOI: <http://dx.doi.org/10.15585/mmwr.mm7145a1>.
- <sup>iii</sup> Cornelius ME, Wang TW, Jamal A, Loretan CG, Neff LJ. Tobacco Product Use Among Adults — United States, 2019. *MMWR Morb Mortal Wkly Rep* 2020;69:1736–1742.
- <sup>iv</sup> Gentzke AS, Creamer M, Cullen KA, et al. Vital Signs: Tobacco Product Use Among Middle and High School Students — United States, 2011–2018. *MMWR Morb Mortal Wkly Rep* 2019;68:157–164.
- <sup>v</sup> Wang TW, Gentzke AS, Creamer MR, et al. Tobacco Product Use and Associated Factors Among Middle and High School Students — United States, 2019. *MMWR Surveill Summ* 2019;68(No. SS-12):1–22.
- <sup>vi</sup> Cooper M, Park-Lee E, Ren C, Cornelius M, Jamal A, Cullen KA. Notes from the Field: E-cigarette Use Among Middle and High School Students — United States, 2022. *MMWR Morb Mortal Wkly Rep* 2022;71:1283–1285. DOI: <http://dx.doi.org/10.15585/mmwr.mm7140a3>.
- <sup>vii</sup> Cooper M, Park-Lee E, Ren C, Cornelius M, Jamal A, Cullen KA. Notes from the Field: E-cigarette Use Among Middle and High School Students — United States, 2022. *MMWR Morb Mortal Wkly Rep* 2022;71:1283–1285. DOI: <http://dx.doi.org/10.15585/mmwr.mm7140a3>.
- <sup>viii</sup> Cooper M, Park-Lee E, Ren C, Cornelius M, Jamal A, Cullen KA. Notes from the Field: E-cigarette Use Among Middle and High School Students — United States, 2022. *MMWR Morb Mortal Wkly Rep* 2022;71:1283–1285. DOI: <http://dx.doi.org/10.15585/mmwr.mm7140a3>.
- <sup>ix</sup> Wang TW, Neff LJ, Park-Lee E, Ren C, Cullen KA, King BA. E-cigarette Use Among Middle and High School Students — United States, 2020. *MMWR Morb Mortal Wkly Rep* 2020;69:1310–1312.
- <sup>x</sup> Cornelius ME, Loretan CG, Jamal A, et al. Tobacco Product Use Among Adults – United States, 2021. *MMWR Morb Mortal Wkly Rep* 2023;72:475–483. DOI: <http://dx.doi.org/10.15585/mmwr.mm7218a1>.
- <sup>xi</sup> Bandi, Priti et al. Changes in E-Cigarette Use Among U.S. Adults, 2019–2021, *American Journal of Preventive Medicine*, Published 18 April 2023, retrieved from <https://doi.org/10.1016/j.amepre.2023.02.026>.
- <sup>xii</sup> Cooper M, Park-Lee E, Ren C, Cornelius M, Jamal A, Cullen KA. Notes from the Field: E-cigarette Use Among Middle and High School Students — United States, 2022. *MMWR Morb Mortal Wkly Rep* 2022;71:1283–1285. DOI: <http://dx.doi.org/10.15585/mmwr.mm7140a3>.
- <sup>xiii</sup> Cooper M, Park-Lee E, Ren C, Cornelius M, Jamal A, Cullen KA. Notes from the Field: E-cigarette Use Among Middle and High School Students — United States, 2022. *MMWR Morb Mortal Wkly Rep* 2022;71:1283–1285. DOI: <http://dx.doi.org/10.15585/mmwr.mm7140a3>.
- <sup>xiv</sup> Tobacco Products Scientific Advisory Committee. Menthol Cigarettes and Public Health: Review of the Scientific Evidence and Recommendations pdf icon[PDF–15.3 MB]external icon. Rockville, MD: US Department of Health and Human Services, Food and Drug Administration; 2011.
- <sup>xv</sup> U.S. Department of Health and Human Services. E-Cigarette Use Among Youth and Young Adults. A Report of the Surgeon General. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2016.
- <sup>xvi</sup> National Academies of Sciences, Engineering, and Medicine. 2018. Public health consequences of e-cigarettes. Washington, DC: The National Academies Press.
- <sup>xvii</sup> Berry KM, Fetterman JL, Benjamin EJ, et al. Association of Electronic Cigarette Use With Subsequent Initiation of Tobacco Cigarettes in US Youths. *JAMA Netw Open*. 2019;2(2):e187794.
- <sup>xviii</sup> Pierce JP, Chen R, Leas EC, et al. Use of E-cigarettes and Other Tobacco Products and Progression to Daily Cigarette Smoking. *Pediatrics*. 2021;147(2).
- <sup>xix</sup> Hair EC, Kreslake JM, Mowery P, Pitzer L, Schillo B, Vallone DM. A longitudinal analysis of e-cigarette use and cigar, little cigar or cigarillo initiation among youth and youth adults: 2017-2019. *Drug Alcohol Depend*. 2021 Sep 1;226:108821. doi: 10.1016/j.drugalcdep.2021.108821. Epub 2021 Jun 23. PMID: 34218009.
- <sup>xx</sup> Park-Lee E, Ren C, Cooper M, Cornelius M, Jamal A, Cullen KA. Tobacco Product Use Among Middle and High School Students — United States, 2022. *MMWR Morb Mortal Wkly Rep* 2022;71:1429–1435. DOI: <http://dx.doi.org/10.15585/mmwr.mm7145a1>.
- <sup>xxi</sup> Cooper M, Park-Lee E, Ren C, Cornelius M, Jamal A, Cullen KA. Notes from the Field: E-cigarette Use Among Middle and High School Students — United States, 2022. *MMWR Morb Mortal Wkly Rep* 2022;71:1283–1285. DOI: <http://dx.doi.org/10.15585/mmwr.mm7140a3>.
- <sup>xxii</sup> Monitoring the Future data. <https://www.drugabuse.gov/news-events/news-releases/2020/12/study-surge-of-teen-vaping-levels-off-but-remains-high-as-of-early-2020>. <https://www.drugabuse.gov/drug-topics/trends-statistics/monitoring-future>.

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- <sup>xxiii</sup> Pierce JP, Chen R, Leas EC, et al. Use of E-cigarettes and Other Tobacco Products and Progression to Daily Cigarette Smoking. *Pediatrics*. 2021;147(2).
- <sup>xxiv</sup> Marijuana Research Report. National Institute on Drug Abuse; National Institutes of Health; U.S. Department of Health and Human Services. July 2020. <https://www.drugabuse.gov/download/1380/marijuana-research-report.pdf?v=d9e67cbd412ae5f340206c1a0d9c2bfd>.
- <sup>xxv</sup> CDC. Most EVALI Patients Used THC-Containing Products as New Cases Continue To Decline. January 17, 2020. <https://www.cdc.gov/media/releases/2020/p0117-evali-cases-decline.html>.
- <sup>xxvi</sup> Goniewicz ML et al. Nicotine levels in electronic cigarette refill solutions: a comparative analysis of products from the U.S., Korea, and Poland. *International Journal of Drug Policy* 2015; 26(6): 583-8. Zhu SH et al. Four hundred and sixty brands of e-cigarettes and counting: implications for product regulation. *Tobacco Control* 2014; 23(Suppl 3): iii3-iii9.
- <sup>xxvii</sup> Romberg AR, Miller Lo EJ, Cuccia AF, et al. Patterns of nicotine concentrations in electronic cigarettes sold in the United States, 2013– 2018. *Drug Alcohol Depend* 2019;203:1–7. PMID:31386973 <https://doi.org/10.1016/j.drugalcdep.2019.05.029>.
- <sup>xxviii</sup> U.S. Department of Health and Human Services. The Health Consequences of Smoking – 50 Years of Progress: A Report of the Surgeon General. Atlanta (GA): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. 2014.
- <sup>xxvii</sup> Zhu, S-H, et al. Four Hundred and Sixty Brands of E-cigarettes and Counting: Implications for Product Regulation. *Tobacco Control*, 2014; 23(Suppl 3): iii3-iii9.
- <sup>xxiii</sup> Zhu, S-H, et al. Evolution of Electronic Cigarette Brands from 2013-2014 to 2016-2017: Analysis of Brand Websites. *Journal of Medical Internet Research*, 20(3), published online March 12, 2018.
- <sup>xxix</sup> Food and Drug Administration. Draft Guidance for Industry: Modifications to Compliance Policy for Certain Deemed Tobacco Products. March 2019
- <sup>xxix</sup> U.S. Department of Health and Human Services. E-Cigarette Use Among Youth and Young Adults: A Report of the Surgeon General. Atlanta (GA): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. 2016.
- <sup>xxx</sup> Cheng, T. Chemical evaluation of electronic cigarettes. *Tobacco Control* 2014; 23: ii11-ii17.
- <sup>xxxi</sup> Goniewicz, ML et al. Levels of selected carcinogens and toxicants in vapour from electronic cigarettes. *Tobacco Control* 2014; 23:122-9.
- <sup>xxxii</sup> U.S. Department of Health and Human Services. E-Cigarette Use Among Youth and Young Adults. A Report of the Surgeon General. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2016.
- <sup>xxxiii</sup> Goniewicz ML et al. Nicotine levels in electronic cigarette refill solutions: a comparative analysis of products from the U.S., Korea, and Poland. *International Journal of Drug Policy* 2015; 26(6): 583-8. Zhu SH et al. Four hundred and sixty brands of e-cigarettes and counting: implications for product regulation. *Tobacco Control* 2014; 23(Suppl 3): iii3-iii9.
- <sup>xxxiv</sup> U.S. Department of Health and Human Services. E-Cigarette Use Among Youth and Young Adults: A Report of the Surgeon General. Atlanta (GA): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. 2016.
- <sup>xxxv</sup> U.S. Surgeon General. *Preventing Tobacco Use Among Youth and Young Adults*. Atlanta, GA: Department of Health and Human Services, Centers for Disease Control and Prevention; 2012
- <sup>xxxvi</sup> Gentzke AS, Wang TW, Cornelius M, et al. Tobacco Product Use and Associated Factors Among Middle and High School Students — National Youth Tobacco Survey, United States, 2021. *MMWR Surveill Summ* 2022;71(No. SS-5):1–29. DOI: <http://dx.doi.org/10.15585/mmwr.ss7105a1>.
- <sup>xxxvii</sup> Mantey DS et al. E-Cigarette Marketing Exposure is Associated with E-Cigarette Use Among US Youth. *Journal of Adolescent Health*, 2016; 58: 686-690.