

High Nicotine E-Cigarettes Are Addicting A New Generation of Youth



Nicotine is a highly addictive drug that can harm the adolescent brain, particularly the parts of the brain responsible for attention, learning, mood and impulse control.¹ Today's e-cigarettes deliver massive doses of nicotine, with some products containing as much or more nicotine as 20 packs of cigarettes. Increasing levels of nicotine in today's e-cigarettes, masked by kid-friendly flavors that reduce the harshness of these products, has created a youth addiction crisis. Over 1.4 million youth, including 7.1% of U.S. high schoolers, reporting current e-cigarette use in 2025.² Each day, more than 3,500 kids try their first e-cigarette.³

Kids are Not Just “Experimenting” with E-Cigarettes

Kids are not just experimenting with e-cigarettes, but are using them frequently, leading to an addiction that is difficult to break. Adolescents are more likely to experience nicotine dependence at lower levels of exposure than adults and can feel dependent after just minimal exposure and within a relatively short period of time.⁴ According to the FDA, “Teens who vape may end up addicted to nicotine faster than teens who smoke cigarettes. This is because vapes may expose users to more nicotine and may be used more frequently. Plus, e-cigarettes may come in flavors that appeal to youth. Appealing flavors may cause teens to vape longer and more often, putting them at risk for nicotine addiction.”⁵



Despite declines in youth e-cigarette use over the past several years, frequent use has remained stable, with 43.1% of high school e-cigarette users vaping on 20 or more days/month, and 29.6% vaping every day, according to the 2025 National Youth Tobacco Survey (NYTS). In total, 590,000 million middle and high school students are vaping on a frequent basis, including 390,000 daily users.⁶ Indicators of addiction among youth have increased over time. From 2014 to 2021, median days of use increased from 3-5 days/month to 10-19 days/month in 2021.⁷ In addition, the percentage of exclusive e-cigarette users who vaped within 5 minutes of waking increased from less than 1% between 2014 and 2017 to 10.3% in 2021.⁸ The 2021 NYTS also found that among high school e-cigarette users, the most commonly reported reason for using e-cigarettes was “to get a high or buzz from the nicotine,” reported by 45.3% of users.⁹

Other youth surveys show similar findings. According to the Monitoring the Future (MTF) study of 8th, 10th and 12th graders, the prevalence of daily vaping among youth who currently vaped increased from 15.4% in 2020 to 28.8% in 2024.¹⁰ Data from the 2021-2023 MTF surveys also found that 42.7% of 12th graders who reported vaping on a near-daily basis reported that they vape because they are “hooked.”¹¹ Data from the International Tobacco Control Policy Evaluation Project (ITC) Youth and Young Adult Tobacco and Vaping Survey found that in 2023, over half (56%) of youth and young adult (ages 16-19) e-cigarette users used an e-cigarette within an hour of waking (including 23% who used an e-cigarette within 5 minutes of waking and 22% who use an e-cigarette within 30 minutes of waking). This survey also found that youth and young adult e-cigarette users are using the products intensely—42% reported vaping more than 10 times per day, including 28% who reported vaping more than 20 times per day.¹² Similarly, data from the August-December 2025 wave of the Tobacco Epidemic Evaluation Network (TEEN+) Study found that 37.7% of youth e-cigarette users are vaping more than 10 times per day.¹³

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The addictiveness of today's e-cigarettes is also reflected in the difficulty that young people have quitting. According to the MTF study, prevalence of unsuccessful quit attempts among youth who vaped daily increased from 28.2% in 2020 to 53% in 2024.¹⁴ The 2021 NYTS found that among youth who report current use of any tobacco products, 65.3% reported seriously thinking about quitting.¹⁵ Similarly, data from the February-June 2024 wave of the TEEN+ Study show that more than three-quarters of youth (76.5%) e-cigarette users reported ever trying to completely stop using e-cigarettes and 43.2% of youth e-cigarette users indicated that they were seriously thinking about quitting within the year.¹⁶

Compounding the youth addiction crisis is that many youth misunderstand nicotine labeling, which can lead to unintentional exposure to higher nicotine levels. Early studies found that most youth did not know that JUUL contained any nicotine.¹⁷ Other studies have found that youth misinterpret a 5% nicotine concentration as being low,¹⁸ when it is one of the highest concentrations available.

Nicotine Salts Disrupted the E-Cigarette Market

Like the tobacco industry's use of additives and design changes to make cigarettes more addictive and appealing to new users (particularly youth),¹⁹ JUUL pioneered the use of nicotine salts to deliver nicotine more effectively than earlier e-liquid formulations using free-base nicotine. According to a 2018 Surgeon General advisory, nicotine salts allow users to inhale high levels of nicotine more easily and with less irritation than e-cigarettes that use free-base nicotine. As a result, it could be easier for young people to initiate the use of nicotine with these products.²⁰ JUUL's use of nicotine salts allowed them to deliver an unprecedented level of nicotine to users. JUUL's advertised 5% nicotine level by weight in each cartridge (or "pod")—which they claimed is equivalent to the amount of nicotine in a pack of 20 cigarettes—made JUUL three or more times as powerful as most e-cigarettes on the market prior to 2015.²¹

JUUL's use of nicotine salts disrupted the e-cigarette market and launched a "nicotine arms race." JUUL's competitors, seeking to emulate the company's success, subsequently flooded the U.S. market with nicotine salt-based e-cigarettes and e-liquids, including some with nicotine levels even higher than 5%. An analysis of e-cigarette sales in retail-tracked channel found that products with 5% nicotine or higher increased from 5% to 81% of sales between January 2017 and March 2022.²² From February 2020 to March 2026, the total amount of e-cigarette nicotine sold per month more than tripled.²³

"Bigger, Stronger and Cheaper": Growing Nicotine Content of Disposable E-Cigarettes

In response to the epidemic of youth e-cigarette use driven by JUUL, FDA required the removal of unauthorized cartridge-based e-cigarettes in flavors other than tobacco and menthol from the market in February 2020. This action by FDA led to a surge in popularity of disposable e-cigarettes, which remain widely available in a range of kid-friendly flavors with similar high nicotine salt formulations that made cartridge-based products popular among kids. Today's disposable e-cigarettes are sleek, easily concealed, cheap, available in a wide variety of flavors, have increasingly high levels of nicotine, and have advanced features to entertain or engage users.²⁴ Disposable e-cigarettes are the preferred device type among youth, with two-thirds (66.3%) of youth e-cigarette users using disposable e-cigarettes in 2025.²⁵ The rise in popularity of disposable products among youth is also reflected in the sales growth of these products. From February 2, 2020 to March 22, 2026, disposable e-cigarette sales increased 163.1% (4.0 million units to 10.6 million units); their unit share increased from 25.9% to 57.7% of total e-cigarette sales. As of March 22, 2026, 91.6% of disposable e-cigarette unit sales were for flavored products.²⁶

Large capacity disposable e-cigarettes that allow for thousands of "puffs" are now widely available. One study aptly described current disposables on the market as "bigger, stronger and cheaper." From January 2017 through September 2022, disposable e-cigarettes nearly tripled in average nicotine strength.²⁷ A more recent study found that the average e-liquid volume in disposable e-cigarettes increased more than seven-fold from February 2020 to June 2024.²⁸ By June 2024, the average disposable device contained nine times

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more e-liquid than the average pre-filled cartridge.²⁹ Some of today's e-cigarettes can contain as much or more nicotine as 20 packs of cigarettes. These large-format disposable devices also deliver nicotine at a lower cost, making them more affordable to price-sensitive youth. From January 2017 through September 2022, disposable e-cigarettes decreased threefold in price per millileter of e-liquid.³⁰ A more recent study found that as of June 2024, the price per milligram of nicotine in pre-filled cartridges was 3.7 times greater than that of disposable devices.³¹

Nicotine Levels of Top-Selling E-Cigarettes	
Top-Selling Cartridge-Based E-Cigarettes	Top Selling Disposable E-Cigarettes
Vuse Alto - Nicotine Level: 5% (50 mg) - Volume: 1.8 mL 1 cartridge contains as much nicotine as 2 packs of cigarettes. 	Geek Bar Pulse - Nicotine level: 5% (50 mg) - Volume: 16 mL (15,000 puffs in regular mode, 7,500 in “pulse” mode) 1 device contains as much nicotine as 22 packs of cigarettes. 
JUUL - Nicotine Level: 5% (50 mg) - Volume: 1.8 mL 1 cartridge contains as much nicotine as 1 pack of cigarettes. 	Breeze Smoke - Nicotine level: 5% (50 mg) - Volume: 10 mL (6,000 puffs) 1 device contains as much nicotine as 14 packs of cigarettes. 

The latest versions of disposable e-cigarettes, often referred to as “smart vapes,” raise new risks to kids and are becoming increasingly popular. “Smart vapes” include screens with a wide range of features such as games, Bluetooth connectivity for phone notifications, and customizable screens.³² According to the Office of the Surgeon General, the gamification of vaping, “Accelerates the risk of nicotine addiction combining the behavioral addiction of both nicotine and gaming.”³³ Geek Bar, a “smart vape,” was the most popular brand among youth who used e-cigarettes in 2025, with nearly two-thirds reporting using that brand in the past 30 days. Three of the top five most popular e-cigarette brands among youth have “smart vape” products (Geek Bar, Raz and Lost Mary).³⁴ In addition, three of the top ten selling brands (Geek Bar Pulse, Foger Switch Pro, and RAZ) are “smart vapes.”³⁵

Health Concerns for Youth Exposure to Nicotine

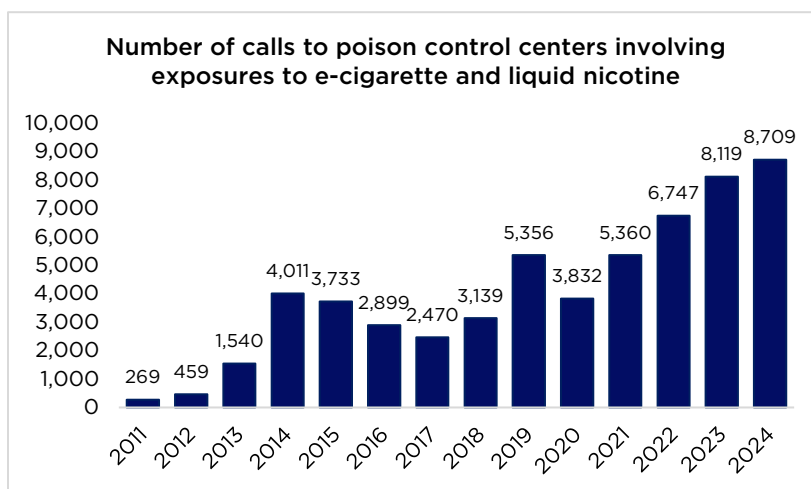
Nicotine is a highly addictive drug that can have lasting damaging effects on adolescent brain development—the brain keeps developing until about age 25. In particular, nicotine use can harm the parts of the adolescent brain responsible for attention, learning, mood and impulse control.³⁶ The Surgeon General concluded that, “The use of products containing nicotine in any form among youth, including in e-cigarettes, is unsafe.”³⁷ The Surgeon General also concluded that, “E-cigarette use poses a significant – and avoidable – health risk to young people in the United States. Besides increasing the possibility of addiction and long-term harm to brain development and respiratory health, e-cigarette use is associated with the use of other tobacco products that can do even more damage to the body.”³⁸ Nicotine addiction can make tobacco users more susceptible to addiction to other drugs such as cocaine and methamphetamine.³⁹

In general, nicotine has also been found to impact the cardiovascular system.⁴⁰ A 2018 report by the National Academies of Science, Engineering and Medicine (NASEM) found that the nicotine in e-cigarettes

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can increase heart rate and diastolic blood pressure in users shortly after use, but the long-term evidence was not available to determine an association between e-cigarette use and other cardiovascular outcomes such as heart disease and stroke. However, the NASEM report acknowledged that the nicotine in e-cigarettes could elevate cardiovascular disease risk in users with pre-existing cardiovascular disease.⁴¹

Delivered in high doses, nicotine can be lethal. The Surgeon General's report and the NASEM report both found that contact with e-liquids can cause adverse health effects and ingesting e-liquids can lead to death.⁴² Exposure to liquid nicotine found in e-cigarettes has resulted in tens of thousands of calls to poison control centers, according to the American Association of Poison Control Centers (AAPCC).⁴³ From 2011 to 2025, Poison Centers have managed over 59,000 e-cigarette and liquid nicotine related exposure cases.⁴⁴ To begin to address the poisoning risk that e-cigarettes and liquid nicotine pose to young children, Congress passed the Child Nicotine Poisoning Prevention Act in 2016, which gave the Consumer Product Safety Commission authority to enforce child resistant packaging standards for e-cigarette products. This law went into effect in July 2016, yet e-cigarette-associated cases reported to U.S. poison centers remain high. The vast majority of these cases involve young children. E-cigarette-associated cases among children under age 6 increased by almost 120% from 2020 to 2023.⁴⁵ From April 2022 to March 2023, 87.8% of e-cigarette-associated cases reported to U.S. poison centers occurred among children under age five.⁴⁶



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⁴ HHS, *How Tobacco Smoke Causes Disease: The Biology and Behavioral Basis for Smoking-Attributable Disease: A Report of the Surgeon General*, 2010; HHS, *Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General*, 2012

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¹² Hammond D, et al. Trends In Smoking And Vaping Among Young People: Findings From The ITC Youth and Young Adult Tobacco and Vaping Survey, 2017-2023. December 2024; University of Waterloo.

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