



What Health Care Professionals Need to Know to Help Protect Children, Teens and Young Adults

Introduction

Vaping has become one of the most popular forms of substance use among young people, despite growing evidence of its health risks and harms. Vaping is the act of inhaling and exhaling the aerosol produced when using an electronic vapor device. Typically, the ingredients include nicotine, flavorings and other chemicals, many of which are toxic. Some vaping products contain marijuana or other drugs.

According to the U.S. Centers for Disease Control and Prevention (CDC), 27.5% of high school students and 10.5% of middle school students in 2019 reported using a vaping product (also known as an electronic or e-cigarette) in the past 30 days. These numbers represent a 32% increase among high school students and a staggering 114% increase among middle school students since just the year before, despite growing awareness about the dangers of vaping.

In caring for our country’s youth, we want to do all that we can to reduce the negative effects of vaping on adolescents’ brains and bodies. Whether a child has not yet tried vaping, has already begun to vape or vapes regularly, this guide can help you. We break down what vaping is, why it appeals to youth, what the health risks are and what you can do to protect young people from its harms.

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**More than 1 in
4 high school
students reported
vaping in the
past month.**

CDC’s National Youth
Tobacco Survey, 2019

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Teen using a JUUL

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What is Vaping?

Vaping is the act of inhaling and exhaling the aerosol that is produced by an electronic vapor device when it heats up its liquid ingredients. Because of the rise in popularity of JUUL, currently the most popular brand of vaping device, many teens and young adults use the term “JUUL” (pronounced Jewel) or “JUULING” (pronounced Jewelring), instead of vaping, when referring to the use of these products. More formally, these products are sometimes referred to as electronic cigarettes, or e-cigarettes. Less formally, some simply call them “vapes.” The contents of most vaping liquids (e-liquids) include nicotine, flavoring chemicals and other chemicals. Some vaping products contain (or are modified to contain) marijuana or THC, the psychoactive ingredient in marijuana.

What do vaping devices look like?

Vaping products, or vapes, come in many shapes and designs. Original devices intentionally looked like cigarettes, cigars or pipes so that they would feel familiar and appealing to smokers. Larger devices, known as tank systems or “mods,” do not look like cigarettes or other tobacco products but can be customized or modified by the consumer to have different flavors, nicotine doses or temperature limits. Today, vapes are small and discreet and resemble modern technology products, such as USB sticks/flash drives or cell phones, and other everyday objects like a pen, eraser or lipstick. Some are disposable while others can be reused by charging the device in the USB port of a computer or outlet charger and by replacing the e-liquid, either by filling the chamber or by using a replacement pre-filled pod or cartridge.

What is being vaped?

Although many substances can be vaped, teens and young adults most commonly vape flavored e-liquids with nicotine or marijuana (THC).

Thousands of flavoring chemicals. Vapes come in thousands of tasty, unmistakably child-friendly flavors, many with fun and enticing names. The flavors mask the harsh taste of nicotine and other chemicals contained in the e-liquid, making it easier to inhale the aerosol. Sweet, fun flavors like gummy bear and cotton candy often remind teens of happy childhood experiences, making them feel harmless. Recent crackdowns on flavors by federal, state and local governments have begun to shift the landscape of preferred vaping products among youth. Now that flavors, aside from menthol and tobacco, are

Vaping is illegal for anyone under the age of 21, according to federal law and many state and local laws.

The 21-age limit applies to all tobacco-nicotine products and to all marijuana products in states where marijuana is legal.



Some vaping devices look like regular cigarettes, cigars or pipes, while others resemble USB sticks, guitar picks, small cellphones, lipstick, watches or other everyday items and tech devices.

generally banned in pod-based or closed-system devices like JUUL, [loopholes in the regulations](#) are driving kids to flavored disposable vapes that have even higher nicotine content and come in countless enticing flavors.

High levels of nicotine. Nicotine doses can range from 2mg/ml to more than 59mg/ml, and some companies are engaging in “a nicotine arms race,” trying to raise the dose to levels that exceed those found in regular cigarettes or competing vapes. Currently, one of the most popular vapes, JUUL, contains 59mg/ml of nicotine in each pod in the United States – an amount equal to about 1-2 packs of cigarettes.

Other chemicals, metals and ultrafine particles. The aerosol, which many teens believe is harmless water vapor, actually consists of many chemicals, heavy metals and fine particles – many of which are toxic and dangerous – and seep deep into the lungs and bloodstream when vaping.

Marijuana or other drugs. Increasingly, marijuana ingredients are found in vapes, including THC (the psychoactive compound in marijuana that creates a sense of being high), the leaf form of marijuana or CBD. Vapes are sometimes used to inhale other drugs as well.

What is vaping’s appeal?

Most vapes are discreet, easy to hide and generally seen as cool and relatively harmless. They come in thousands of tasty flavors that help cover the harsh taste of the chemicals and override the sense that these products might be harmful. They also produce a brief positive sensation or ‘head rush’ that some people like.

Most also have very high doses of nicotine, which can rapidly make those who vape develop an addiction or become dependent on the product. Some young people are also drawn to the “vape tricks” and “cloud competitions,” where they form cloud-like shapes or patterns when exhaling the vape’s aerosol. These tricks are usually performed with modifiable devices, or ‘mod’ style vapes. People will breathe aerosol deep into their lungs and then exhale it through their ears, eyes or nose.

Teens say they vape for many reasons. Curiosity is one, and peer pressure is another. They see friends or family members vaping and they are drawn to the appealing flavors. For others, it’s to do vape tricks. Some also say they do it because they feel it is less harmful than other tobacco products and it’s also discreet.



Vaping tricks, such as “The Dragon,” shown above, are another major attraction of vaping.

What are the Health Effects of Vaping?

It is now [widely recognized](#) that vaping is unhealthy and dangerous, even if it might not be quite as unhealthy and dangerous as smoking traditional, combustible cigarettes.

The more immediate health effects include coughing and wheezing, behavioral and mood changes, headaches, seizures, vomiting and potential severe lung injury. Vaping also negatively affects teens' attention, learning, and impulse control in a way that can harm them in school, sports and social situations.

Nearly all vapes contain nicotine, one of the most addictive substances, and in many cases as much as or more than in traditional cigarettes. Nicotine negatively affects the cardiovascular system (increasing heart rate and blood pressure and the risk of heart attack and stroke), respiratory/lung functioning (including inflammation, asthma and wheezing) and reproductive organs. People who vape can quickly become addicted and are at increased risk of starting to smoke cigarettes or use other addictive products. Taking in high doses of nicotine can lead to nicotine toxicity, which in severe cases can give rise to seizures as well as nausea, vomiting, diarrhea, excessive salivation, dizziness, respiratory failure, coma and paralysis.

The other ingredients in vapes, including the flavorings, are harmful as well. Most contain cancer-causing and other toxic chemicals, heavy metals and tiny particles that go deep into the lungs and cause lung damage, cell damage and reduced ability to fight off infections.

Exposure to Nicotine

Nicotine is a stimulant that makes the nervous system prepare the body for physical and mental activity. It causes breathing to become more rapid and shallow, as well as increases heart rate and blood pressure. Nicotine exposure from vaping varies considerably depending upon the contents of the e-liquid, the type of device used and how it is used.

Vaping exposes young people to nicotine at a time when the human brain is most at risk for addiction. Because the brain continues to develop until early adulthood, roughly age 25-30, use of any addictive substance prior to these years is especially risky. Young people who vape are affected more intensely than are adults by nicotine.



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Exposure to toxic chemicals and other harmful ingredients

Vapes contain a number of chemicals, metals and ultrafine particles that are poisonous when they are heated to form an aerosol and then inhaled. Because of their chemical makeup, certain popular flavors – such as cinnamon, vanilla, butter and mint – are especially harmful. Although some of the flavoring chemicals have been deemed safe when eating or drinking, once they are heated to produce an aerosol, they form additional harmful compounds that have been found to cause lung damage. There also is evidence that some metals and other components of vapes can seep into the e-liquid and enter the lungs during the heating and inhalation process, causing lung damage ranging from mild to severe.

Addiction

Nicotine is a highly addictive substance. People who vape can quickly become addicted to the nicotine that is in nearly all vapes, and are at increased risk of starting to smoke cigarettes or use other addictive substances. When a person stops vaping, even for a short period, they can experience withdrawal symptoms including strong cravings, irritability, fatigue, headache, sleeplessness and difficulty concentrating. These symptoms can be quite intense, driving them right back to the nicotine product, even when they want to quit. In fact, many people who are able to stop smoking cigarettes by switching to vaping find it extremely difficult to quit vaping due to the very high doses of nicotine and the ease of consuming it through vapes.

Cigarette smoking

Teens and young adults who vape are significantly more likely than those who do not vape – [about four times as likely](#) – to end up smoking traditional cigarettes. This is true of young people who never smoked cigarettes and had no intention of, likelihood of or interest in doing so. Strong and consistent research also shows that vaping is not a safe or reliable way to quit smoking. For many people, vaping can actually [make it more difficult to quit smoking](#).

Multiple tobacco product use

Young people who vape [have five times the likelihood](#) of those who do not vape to use tobacco products such as cigarettes, hookah, cigars or pipes. The



Many people who are able to stop smoking cigarettes by switching to vaping find it **extremely difficult to quit vaping due to the very high doses of nicotine** and the ease of consuming it through vapes.



majority of people who vape to help them quit smoking end up becoming ‘dual users,’ smoking in places and situations where they can and vaping in places and situations where smoking is impossible. Dual users, therefore, actually take in more nicotine and other potentially toxic chemicals than people who only vape or only use other tobacco products.

Injuries and poisonings

Vaping devices, especially those with poor quality batteries that have been stored improperly or have been modified by the user, can malfunction or explode. This results in burns and other injuries. Young people exposed to e-liquids through the mouth, eye or skin contact can experience nicotine poisoning, resulting in vomiting, seizures, brain injury or death.

Cardiovascular, respiratory, reproductive and immunity effects

More and more, nicotine and other chemicals in vapes are being tied to increasing heart rate and blood pressure and the risk of heart attack and stroke, as well as inflammation, asthma and wheezing. They also can cause inflammatory processes and depress immune function in lungs, and are associated with chronic bronchitis and reduced ability to fight off bacterial and viral infections including [COVID-19](#).

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Marijuana and Vaping

The practice of using vaping devices to consume marijuana or cannabis products is becoming increasingly widespread. Recent data show that many youth who vape, especially older teens, are not just vaping nicotine. Many are vaping THC, the psychoactive ingredient in marijuana that produces a high. [National data from 2019](#) show that 21% of 12th graders, 19% of 10th graders and 7% of 8th graders reported vaping marijuana in the past year, each a significant increase over the previous year. [Other national data](#) show that 15% of middle and high school students, and 43% of those who ever used vapes, have vaped marijuana.

Different from most plant-based marijuana, the level of THC in marijuana vapes can be far higher. Therefore, vaped marijuana tends to be much more potent than smoked marijuana.

Some marijuana vapes look like nicotine vaping devices (e.g., PAX brand, which resembles JUUL products); come in loose leaf, concentrate or extract forms; are available in youth-friendly flavors and names; and are virtually odorless. The THC inhaled when vaping enters the bloodstream quickly and can lead to overuse, addiction and other negative health consequences. Vaping marijuana can cause bloodshot eyes, dry mouth, increased appetite, mood swings and can increase the risk of depression, psychosis and suicidality. Marijuana vaping has also been implicated in the [recent spate of vaping-related lung injuries and deaths](#) known as EVALI (E-cigarette, or Vaping, product use Associated Lung Injury).

Marijuana use, regardless of how it is ingested, can have long-lasting effects on the developing teen brain. **Negative effects include:**

- ▶ Impaired attention, learning, problem-solving skills, memory and other cognitive functions
- ▶ Impaired reaction time and coordination, especially related to driving
- ▶ Academic or job difficulties, school dropout
- ▶ Increased risk of mental health issues including depression, anxiety and, in some cases, psychosis and suicidal thoughts
- ▶ Marijuana use disorder (addiction) and other substance use and addiction

The likelihood of developing a marijuana use disorder, or addiction to marijuana, is about [twice as high](#) among teens than among adults who use marijuana.

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What Health Care Professionals Should Know and Do

How to screen a young patient for vaping and help those who screen positive

The following are some indicators that a teen or young adult may be vaping nicotine or marijuana:

Appearance and behavior changes	Vaping nicotine may lead to anxiety, irritability, difficulty concentrating and loss of appetite. Vaping marijuana can result in bloodshot eyes, dry mouth and thirst, increased appetite and shifts in behavior and mood. Sometimes, there is a noticeable change in friends and a decrease in activities that were once enjoyed.
Physical symptoms	Physical side effects of vaping may include trouble breathing, headaches, cough, dizziness, sore throat, chest pain, gastrointestinal symptoms, worsening of asthma symptoms and allergic reactions such as itchiness or swelling of the lips. More severe effects – some of which may indicate the presence of EVALI – include nausea, vomiting, abdominal pain, diarrhea, fever, chills, weight loss, respiratory disease or failure and cardiovascular disease.

EVALI - Vaping-Related Lung Injuries

In the past year, there has been a wave of severe lung injuries and deaths associated with vaping. The condition, known as [EVALI](#) (E-cigarette, or Vaping, product use Associated Lung Injury), has sickened more than 2,800 people and led to nearly 70 deaths across the country.

Symptoms include shortness of breath, weight loss, night sweats, fatigue, gastrointestinal problems, low oxygen levels and, in severe cases, lung failure and death. Most cases require admission to a hospital for treatment. While the federal government is investigating its precise cause, it has recommended avoiding use of any vapes, especially those containing THC, the psychoactive ingredient in marijuana, and those bought through illegal channels. Illegal sales appear to be the root in the majority of the tested cases (although several cases have been identified in which the adulterated vaping product came from a regulated marijuana dispensary). More than 150 different brands of THC-containing vapes have been implicated in cases of EVALI, and the ingredient

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that appears to be primarily responsible is Vitamin E Acetate. This ingredient is generally considered safe for eating in foods such as vegetable oils, cereals, meat, fruits and vegetables, or in vitamin or skin care products. However, it is not safe for inhalation into the lungs.

In light of the emergence of EVALI, which has sickened thousands of young people across the country, the Centers for Disease Control and Prevention (CDC) encourages clinicians to:

- ▶ Consider vaping in patients presenting with symptoms associated with EVALI
- ▶ Collect detailed information on the products the patients had used
- ▶ Report suspected cases to the state health department

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In the event of life-threatening symptoms, call your local poison control center at 1-800-222-1222 or emergency services at 911.

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What Health Care Professionals Should Do

The following guidelines have been provided by the [American Academy of Pediatrics](#) and the [Centers for Disease Control and Prevention](#) to help clinicians address youth nicotine use:

Inquire

Inquire about use of nicotine products, including e-cigarettes and vaping, and about exposure as part of routine health visits and visits for diseases that may be caused or exacerbated by exposure to vaping. When inquiring about vaping, use language that will be familiar to youth. (Most kids do not know what e-cigarettes are, but they do know what vapes and JUULs are.)

Educate and Intervene

Provide education about the health risks of vaping, including the specific risks of nicotine to teens, to pediatric patients and to parents. Offer brief interventions to prevent initiation or escalation of use of vaping. Messages should be clear, personally relevant and age-appropriate.

Offer Referral or Treatment

[Counsel young people who are addicted to nicotine vaping to quit](#) and refer patients to a quit line, a text message-based intervention or offer counseling and/or medication-based treatment.

The American Academy of Pediatrics also suggests the following screening [tools](#) to identify vaping-related nicotine dependence among adolescents:

- ▶ **Hooked on Nicotine Checklist (HONC):** A [brief instrument](#) designed to assess nicotine dependence in adolescents.
- ▶ **Patient-Reported Outcomes Measurement Information System (PROMIS-E):** A [brief measure](#) of youth e-cigarette dependence.

Finally, the American Academy of Pediatrics also provides [clinical guidelines](#) on screening youth for marijuana use and offering brief interventions/referrals to treatment for those who screen positive.

There are additional considerations for health professionals addressing youth marijuana use through vaping, including the need to educate patients about the risks of EVALI and to be prepared to identify signs and symptoms of the disease among patients who vape. Similar to nicotine vaping products, marijuana/THC vaping products come in countless appealing flavors, are highly discreet and may contain higher doses of THC than commonly found in smoked marijuana products. Teens also might refer to them using slang terms or brand names of THC vaping products.

Cigarettes & Vaping treatment tips

Advice & Support

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- Advise that "non-use" is best.
- Ask about cravings and symptoms of nicotine withdrawal (increased appetite, fatigue, headache, irritability, anxiety, depression). If patient is experiencing either, offer NRT.
- Assess for shortness of breath, decreased exercise tolerance or other respiratory symptoms. If present, refer to Pulmonary for evaluation.
- If possible, connect to counseling for support.
- Offer support lines: 1-800-QUIT-NOW and TEEN.SMOKEFREE.GOV.
- Ask patients to make a brief quit trial while trying NRT, or set a quit date.

Prescribe NRT

Nicotine Replacement Therapy

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Cigarettes/Day 1 pod equals 20 cigarettes	Patch Dose
< 10	7-14 mgs
10-20	14-21 mgs
21-40	21-42 mgs
> 40	42 mgs

ASAM Essentials, 3rd Edition, 2020.

Patch & Lozenges

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- Add 2mg Lozenges for cravings, may use one every 2 hours.
- If using multiple lozenges and still craving nicotine then increase dose of patch at next visit.
- When lozenge use decreases consider weaning dose of patch while continuing prn lozenges.
- Goal is to taper and stop the patch and then continue lozenges until they cravings stop or they can manage them without lozenges
- Use NRT liberally. Increase dose as needed to suppress withdrawal and cravings.
 - Follow up every 2-4 weeks while on NRT.

NRT not enough

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- Add Contingency Management: rewards provided for abstinence or decreased smoking.
- Consider Adding Bupropion SR 150mgs once a day x 7 days then increase to 150mgs bid.
- Or Adding Varenicline (Chantix) 0.5mgs once a day x 3 days then 0.5mgs bid x 4 days then 1mg bid for 12 to 24 weeks.
- Both bupropion and varenicline lower seizure threshold so do not prescribe together.

Do not recommend e-cigarettes, nicotine nasal spray or nicotine inhaler to adolescents as smoking cessation tool.
For support please call your regional MCPAP line.