

# Quick Facts on the Risks of E-cigarettes for Kids, Teens, and Young Adults

## What's the Bottom Line on the Risks of E-cigarettes for Kids, Teens, and Young Adults?

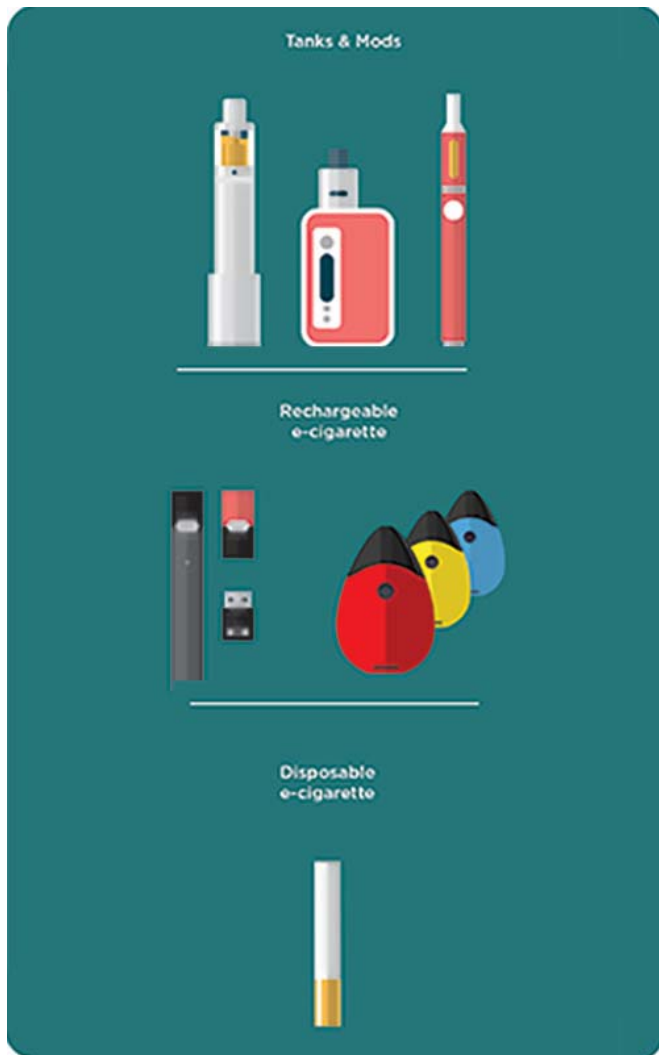
- The use of e-cigarettes is unsafe for kids, teens, and young adults.
- Most e-cigarettes contain nicotine. Nicotine is highly addictive and can harm adolescent brain development, which continues into the early to mid-20s.<sup>1</sup>
- E-cigarettes can contain other harmful substances besides nicotine.
- Young people who use e-cigarettes may be more likely to smoke cigarettes in the future.



**The use of e-cigarettes is unsafe for kids, teens, and young adults.**

## What Are E-cigarettes?

- E-cigarettes are electronic devices that heat a liquid and produce an aerosol, or mix of small particles in the air.
- E-cigarettes come in many shapes and sizes. Most have a battery, a heating element, and a place to hold a liquid.
- Some e-cigarettes look like regular cigarettes, cigars, or pipes. Some look like USB flash drives, pens, and other everyday items. Larger devices such as tank systems, or "mods," do not look like other tobacco products.
- E-cigarettes are known by many different names. They are sometimes called "e-cigs," "e-hookahs," "mods," "vape pens," "vapes," "tank systems," and "electronic nicotine delivery systems (ENDS)."
- Using an e-cigarette is sometimes called "vaping" or "JUULing."



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### **How Do E-cigarettes Work?**

- E-cigarettes produce an aerosol by heating a liquid that usually contains nicotine, flavorings, and other chemicals that help to make the aerosol.
- The liquid used in e-cigarettes often contains nicotine and flavorings. This liquid is sometimes called "e-juice," "e-liquid," "vape juice," or "vape liquid."
- Users inhale e-cigarette aerosol into their lungs. Bystanders can also breathe in this aerosol when the user exhales it into the air.
- E-cigarette devices can be used to deliver marijuana and other drugs.

## What Is JUUL?



### **News outlets and social media sites report widespread use of JUUL by students in schools, including classrooms and bathrooms.**

- JUUL is a brand of e-cigarette that is shaped like a USB flash drive. Like other e-cigarettes, JUUL is a battery-powered device that heats a nicotine-containing liquid to produce an aerosol that is inhaled.
- All JUUL e-cigarettes have a high level of nicotine. According to the manufacturer, a single JUUL pod contains as much nicotine as a pack of 20 regular cigarettes.<sup>2</sup>
- JUUL is one of a few e-cigarettes that use nicotine salts, which allow particularly high levels of nicotine to be inhaled more easily and with less irritation than the free-base nicotine that has traditionally been used in tobacco products, including e-cigarettes.
- News outlets and social media sites report widespread use of JUUL by students in schools, including classrooms and bathrooms.
- Approximately two-thirds of JUUL users aged 15 – 24 do not know that JUUL always contains nicotine.
- Although JUUL is currently the top-selling e-cigarette brand in the United States, other companies sell e-cigarettes that look like USB flash drives. Examples include the MarkTen Elite, a nicotine delivery device, and the PAX Era, a marijuana delivery device that looks like JUUL.



## Why Is Nicotine Unsafe for Kids, Teens, and Young Adults?

- Most e-cigarettes contain nicotine—the addictive drug in regular cigarettes, cigars, and other tobacco products.
- A recent CDC study found that 99% of the e-cigarettes sold in assessed venues in the United States contained nicotine.
- Some e-cigarette labels do not disclose that they contain nicotine, and some e-cigarettes marketed as containing 0% nicotine have been found to contain nicotine.
- Nicotine can harm the developing adolescent brain.<sup>1</sup> The brain keeps developing until about age 25.
- Using nicotine in adolescence can harm the parts of the brain that control attention, learning, mood, and impulse control.<sup>1</sup>
- Each time a new memory is created or a new skill is learned, stronger connections – or synapses – are built between brain cells. Young people’s brains build synapses faster than adult brains. Nicotine changes the way these synapses are formed.
- Using nicotine in adolescence may also increase risk for future addiction to other drugs.<sup>1</sup>

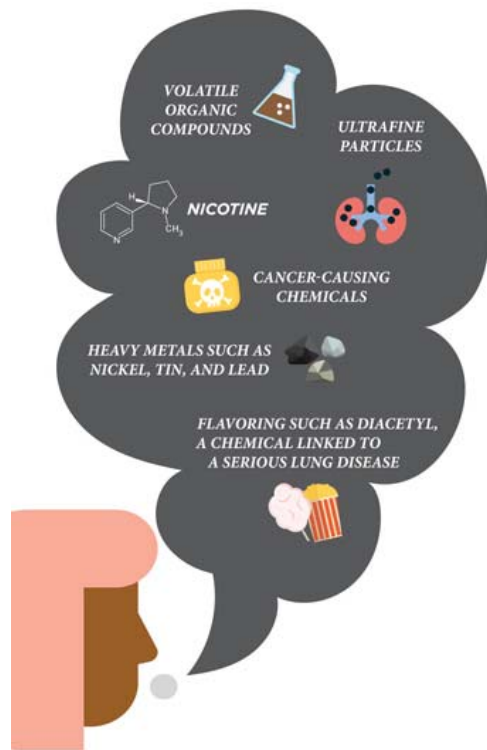


## What Are the Other Risks of E-cigarettes for Kids, Teens, and Young Adults?

- Scientists are still learning about the long-term health effects of e-cigarettes.
- Some of the ingredients in e-cigarette aerosol could also be harmful to the lungs in the long-term. For example, some e-cigarette flavorings may be safe to eat but not to inhale because the gut can process more substances than the lungs.<sup>1</sup>
- Defective e-cigarette batteries have caused some fires and explosions, a few of which have resulted in serious injuries.
- Children and adults have been poisoned by swallowing, breathing, or absorbing e-cigarette liquid through their skin or eyes. Nationally, approximately 50% of calls to poison control centers for e-cigarettes are for kids 5 years of age or younger.

## What Is in E-cigarette Aerosol?

- E-cigarette aerosol is NOT harmless “water vapor.”
- The e-cigarette aerosol that users breathe from the device and exhale can contain harmful and potentially harmful substances, including:
  - Nicotine
  - Ultrafine particles that can be inhaled deep into the lungs
  - Flavorings such as diacetyl, a chemical linked to a serious lung disease
  - Volatile organic compounds
  - Cancer-causing chemicals
  - Heavy metals such as nickel, tin, and lead<sup>1</sup>
- The aerosol that users inhale and exhale from e-cigarettes can expose both themselves and bystanders to harmful substances.
- It is difficult for consumers to know what e-cigarette products contain. For example, some e-cigarettes marketed as containing zero percent nicotine have been found to contain nicotine.<sup>3</sup>



## Flavors and Marketing Make E-cigarettes Appealing to Youth

- Many e-cigarettes come in fruit, candy, and other kid-friendly flavors, such as mango, fruit and crème.
- A majority of youth e-cigarette users report using flavored varieties, most youth e-cigarette users first start using e-cigarettes with a flavored variety, and flavors are the primary reason youth report using e-cigarettes.
- E-cigarettes are also advertised using the same themes and tactics that have been shown to increase youth initiation of other tobacco products, including cigarettes. In 2016, about 8 in 10 middle school and high school students—more than 20 million youth—said they had seen e-cigarette advertising.

- Widespread advertising for these products, including via media for which advertising for conventional tobacco products is prohibited (e.g., TV), and the lower costs of some of these products relative to conventional cigarettes has contributed to the increase in e-cigarette use among youth.
- Many youth also report using e-cigarettes because they are curious about these new products, and because they believe these products to be less harmful than conventional cigarettes.

## Can Using E-cigarettes Lead to Future Cigarette Smoking Among Kids, Teens, and Young Adults?

- Many young people who use e-cigarettes also smoke cigarettes.<sup>1</sup> There is some evidence that young people who use e-cigarettes may be more likely to smoke cigarettes in the future.
- Specifically, a 2018 National Academy of Medicine report found that there was some evidence that e-cigarette use increases the frequency and amount of cigarette smoking in the future.<sup>4</sup>
- E-cigarettes also can be used to deliver other drugs, including marijuana; in 2016, approximately one-third of U.S. middle and high school students who have ever used an e-cigarette reported using marijuana in the device.

- But e-cigarette use among young people is unsafe, even if they do not progress to future cigarette smoking.

### **Aren't E-cigarettes Safer Than Cigarettes?**

- E-cigarettes expose users to fewer harmful chemicals than burned cigarettes.<sup>1</sup> But burned cigarettes are extraordinarily dangerous, killing half of all people who smoke long-term.
- The use of any tobacco product, including e-cigarettes, is unsafe for young people.

### **Are E-cigarettes Regulated at the Federal Level?**

- Yes. In August 2016, the regulatory authority of the FDA was extended to cover e-cigarettes through the agency's "deeming rule."
- Through authority granted by the Family Smoking Prevention and Tobacco Control Act (FSPTCA), FDA has authority to develop regulations that address the manufacturing, marketing, and sale of e-cigarettes.
- However, the FSPTCA does not prevent states and communities from adopting many strategies related to e-cigarettes. There are also many strategies that FDA does not have authority to implement and that states can do, such as including e-cigarettes in smoke-free policies, pricing strategies, and increasing the age of sale for tobacco products to 21.

### **Are There Any National Public Education Prevention Campaigns Focused on Youth and E-cigarettes?**

- Yes. In 2018, the FDA expanded its successful youth tobacco prevention campaign, "The Real Cost," to reach the more than 10 million youth aged 12–17 who have used e-cigarettes or are open to trying them. The campaign educates youth about the potential risks of using e-cigarettes.
- The "Real Cost" reaches teens where they spend most of their time: in school and online. The campaign is also placing e-cigarette prevention materials in high schools across the nation, both in school bathrooms and on educational digital platforms accessed by students during the school day.
- The Truth Initiative® launched the "Safer ≠ Safe" campaign in 2018, focusing on correcting youth misperceptions and providing accurate information about e-cigarettes and youth. The campaign is being promoted on digital and social media, including the Safer ≠ Safe website (<https://www.thetruth.com/articles/hot-topic/safer-safe>) which features videos, articles and interactive activities for youth.

### **What Do We Know About Heated Tobacco Products?**

- Heated tobacco products (HTPs) like IQOS and Eclipse, sometimes marketed as "heat-not-burn" technology, represent a diverse class of products that heat the tobacco leaf to

produce an inhaled aerosol. They are different from e-cigarettes, which heat a liquid that can contain nicotine derived from tobacco.

- HTPs are available in at least 40 countries and have several have been authorized for sale in the United States by the FDA. In 2018, few U.S. adults (2.4% of all surveyed, including 6.7% of current smokers surveyed) had ever used HTPs. Youth use of HTPs is unknown, but monitoring is underway.
- Scientists are still learning about the short-term and long-term health effects of HTPs, but the available science shows they contain harmful and potentially harmful ingredients. Youth use of any tobacco products, including heated products, is unsafe.
- It is important that we continue to modernize proven tobacco prevention and control strategies to include newer products entering the market such as HTPs.

## **What Can I Do to Prevent My Child from Using E-cigarettes or to Help Them Stop?**



Talk to your child or teen about why e-cigarettes are harmful for them. It's never too late.

- Set a good example by being tobacco-free and ensure that your kid is not exposed to the secondhand emissions from any tobacco products, including e-cigarettes.
- If you use tobacco, it's never too late to quit. For free help, visit [smokefree.gov](http://smokefree.gov) or call 1-800-QUIT-NOW.
- Talk to your child or teen about why e-cigarettes are harmful for them. It's never too late.
- Start the conversation early with children about why e-cigarettes are harmful for them.
- Let your child know that you want them to stay away from all tobacco products, including e-cigarettes, because they are not safe for them. Seek help and get involved.
  - Set up an appointment with your child's health care provider so that they can hear from a medical professional about the health risks of tobacco products, including e-cigarettes.
  - Speak with your child's teacher and school administrator about enforcement of tobacco-free school grounds policies and tobacco prevention curriculum.
  - Encourage your child to learn the facts and get tips for quitting tobacco products at [Teen.smokefree.gov](http://Teen.smokefree.gov).



## **Outbreak of Lung Injury Associated with the Use of E-Cigarette, or Vaping, Products**



### **What We Know**

#### ***Laboratory Findings Reported December 20, 2019:***

- Laboratory data show that vitamin E acetate, an additive in some THC-containing e-cigarette, or vaping, products, is closely associated with EVALI.
  - A recent study analyzed samples from 51 EVALI cases from 16 states and a comparison group of samples from 99 healthy people for vitamin E acetate, plant oils, medium chain triglyceride (MCT) oil, coconut oil, petroleum distillates, and diluent terpenes.
  - Vitamin E acetate was identified in bronchoalveolar lavage (BAL) fluid samples (fluid samples collected from the lungs) from 48 of the 51 EVALI patients, but not in the BAL fluid from the healthy comparison group.
  - No other toxicants were found in BAL fluid from either group, except for coconut oil and limonene (1 EVALI patient each).
  - This study built upon a previously released CDC report, using a large number of BAL fluid samples from EVALI patients, and added healthy controls, and yielded the same finding.
  - These findings complement the ongoing work of FDA and some state public health laboratories to characterize e-liquid exposures and inform the ongoing multistate outbreak.

#### ***About the Outbreak:***

- CDC is only reporting hospitalized EVALI cases and EVALI deaths regardless of hospitalization status. CDC has removed non-hospitalized cases from previously reported case counts.

- **As of December 17, 2019**, a total of 2,506 hospitalized EVALI cases have been reported to CDC from all 50 states, the District of Columbia, and two U.S. territories (Puerto Rico and U.S. Virgin Islands).
  - Fifty-four deaths have been confirmed in 27 states and the District of Columbia (**as of December 17, 2019**).
- Syndromic data on emergency department (ED) visits suggest that the EVALI outbreak began in June 2019. Cases have been declining since a peak in September.
  - - Data suggest two distinct periods: a gradual increase in ED visits associated with e-cigarette use since 2017, followed by a sharp rise in June 2019.
    - Data suggest that that the EVALI outbreak began in the summer of 2019, and has been on the decline since September 2019.
    - These data align with recently released epidemiologic data among EVALI patients suggesting that the number of new hospitalized EVALI cases has also been declining since a peak in September.
    - While ED visits associated with possible EVALI have declined, they have not returned to levels before June 2019 and EVALI remains a concern.
- Although the number of reported cases appears to be declining, states are still reporting new hospitalized EVALI cases to CDC on a weekly basis and should remain vigilant with EVALI case finding and reporting.

### ***About Patient Exposure:***

- All EVALI patients have reported a history of using e-cigarette, or vaping, products.
  - Vitamin E acetate has been identified as a chemical of concern among people with e-cigarette, or vaping, product use-associated lung injury (EVALI).
  - THC is present in most of the samples tested by FDA to date, and most patients report a history of using THC-containing products.
  - The latest national and state findings suggest THC-containing e-cigarette, or vaping, products, particularly from informal sources like friends, family, or in-person or online dealers, are linked to most of the cases and play a major role in the outbreak.
- CDC has analyzed national data on use of THC-containing product brands by EVALI patients.
  - Overall, 152 different THC-containing product brands were reported by EVALI patients.
  - Dank Vapes, a class of largely counterfeit THC-containing products of unknown origin, was the most commonly reported product brand used by patients nationwide, although there are regional differences. While Dank Vapes was most commonly reported in the Northeast and South, TKO and Smart Cart brands were more commonly reported by patients in the West and Rove was more common in the Midwest.
  - The data further support that EVALI is associated with THC-containing products and that it is not likely associated with a single THC-containing product brand.

## **What We Don't Know**

- While it appears that vitamin E acetate is associated with EVALI, there are many different substances and product sources that are being investigated, and there may be more than one cause.

## **What CDC Recommends**

- CDC and FDA recommend that people should not use THC-containing e-cigarette, or vaping, products, particularly from informal sources like friends, family, or in-person or online sellers.
- Vitamin E acetate should not be added to e-cigarette, or vaping, products. Additionally, people should not add any other substances not intended by the manufacturer to products, including products purchased through retail establishments.
- While it appears that vitamin E acetate is associated with EVALI, there are many different substances and product sources that are being investigated, and there may be more than one cause. Therefore, the best way for people to ensure that they are not at risk while the investigation continues is to consider refraining from the use of all e-cigarette, or vaping, products.
- Adults using e-cigarettes or vaping products as an alternative to cigarettes should not go back to smoking; they should weigh all available information and consider utilizing FDA-approved cessation medications. They should contact their healthcare provider if they need help quitting tobacco products, including e-cigarettes.
- Adults who continue to use an e-cigarette, or vaping, product should carefully monitor themselves for symptoms and see a healthcare provider immediately if they develop symptoms like those reported in this outbreak.

## **If you are an adult trying to quit smoking:**

- Contact a healthcare provider for help quitting tobacco products, including e-cigarettes.
- Use evidence-based treatments, including counseling and FDA-approved cessation medication.

If you are concerned about your health after using an e-cigarette, or vaping, product, contact your healthcare provider or local poison control center at 1-800-222-1222.

Adults with ongoing cannabis (marijuana) use that leads to significant impairment or distress should seek out evidence-based behavioral treatment.

- Effective treatments are available, and recovery is possible. A number of therapy-based treatments such as cognitive-behavioral therapy, contingency management, motivational enhancement therapy, and multi-dimensional family therapy have been shown to be effective.

- Visit Substance Abuse and Mental Health Services Administration's Treatment Locator to locate treatment in your area or call 1-800-662-HELP (4357).

For adults currently using marijuana/THC-containing e-cigarette, or vaping, products for medical use: We do not know if there are different health effects of using different forms of marijuana, such as smoking, vaping, and edibles, or whether transitioning from one form to another might reduce harm. Talk with your healthcare provider about other available treatment options for the conditions.

- Regardless of the ongoing investigation:
  - E-cigarette, or vaping, products should never be used by youths, young adults, or women who are pregnant.
  - Adults who do not currently use tobacco products should not start using e-cigarette, or vaping, products. There is no safe tobacco product. All tobacco products, including e-cigarettes, carry a risk.
  - THC use has been associated with a wide range of health effects, particularly with prolonged frequent use. The best way to avoid potentially harmful effects is to not use THC-containing e-cigarette, or vaping, products. Persons engaging in ongoing cannabis (marijuana) use that leads to significant impairment or distress should seek evidence-based treatment by a healthcare provider.

CDC will continue to update guidance, as appropriate, as new data becomes available from this complex outbreak.