# Electronic Cigarettes

- Electronic cigarettes are battery-operated devices designed to deliver nicotine with flavorings and other chemicals to users in vapor instead of smoke.
- Although they do not produce tobacco smoke, e-cigarettes still contain nicotine and other potentially harmful chemicals.
- Early evidence suggests that e-cigarette use may serve as an introductory product for youth who then go on to use other tobacco products.

Electronic cigarettes (also called e-cigarettes or electronic nicotine delivery systems) are battery-operated devices designed to deliver nicotine with flavorings and other chemicals to users in vapor instead of smoke. They can be manufactured to resemble traditional tobacco cigarettes, cigars or pipes, or even everyday items like pens or USB memory sticks; newer devices, such as those with fillable tanks, may look different. More than 250 different e-cigarette brands are currently on the market including JUULs, a sleek, small e-cigarette that resembles a flash drive. Unlike other types of e-cigarettes, JUUL does not look like a traditional cigarette and thus may not be immediately identifiable as a vaping device. Due to their size, JUUL devices are discrete and can be easily concealed in a fist or a pocket.

## How Do E-Cigarettes Work?

Most e-cigarettes consist of three different components, including:

- A cartridge, which holds a liquid solution containing varying amounts of nicotine, flavorings, and other chemicals
- A heating device (vaporizer)
- A power source (usually a battery)

In many e-cigarettes, puffing activates the battery-powered heating device, which vaporizes the liquid in the cartridge. The resulting aerosol or vapor is then inhaled (called "vaping").

## How Do E-Cigarettes Affect The Brain?

The nicotine in e-liquids is readily absorbed from the lungs into the bloodstream when a person uses an e-cigarette. Upon entering the blood, nicotine stimulates the adrenal glands to release the hormone epinephrine (adrenaline). Epinephrine stimulates the central nervous system and increases blood pressure, breathing, and heart rate. As with most addictive substances, nicotine activates the brain's reward circuits and also increases levels of a chemical messenger in the brain called dopamine, which reinforces rewarding behaviors. Pleasure caused by nicotine's interaction with the reward circuit motivates some people to use nicotine again and again, despite risks to their health and well-being.

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## E-Cigarette Use By Youth

E-cigarettes are popular among teens and are now the most commonly used form of tobacco among youth in the United States. Their easy availability, alluring advertisements, various e-liquid flavors, and the belief that they're safer than cigarettes have helped make them appealing to this age group.

In addition to the unknown health effects, early evidence suggests that e-cigarette use may serve as an introductory product for youth who then go on to use other tobacco products, including conventional cigarettes, which are known to cause disease and lead to premature death. A recent study showed that students who have used e-cigarettes by the time they start 9th grade are more likely than others to start smoking traditional cigarettes and other tobacco products.

Another study supports these findings, showing that high school students who used e-cigarettes in the last month were about 7 times more likely to report that they smoked cigarettes when asked approximately 6 months later, as compared to students who said they didn't use e-cigarettes. Notably, the reverse was not true, students who said they smoked cigarettes were no more likely to report use of e-cigarettes when asked approximately 6 months later. Like the previous study, these results suggest that teens using e-cigarettes are at a greater risk for smoking cigarettes in the future.

## Connecticut Resources

**Department of Mental Health and Addiction Services**
**Tobacco Prevention and Education Program**
**www.ct.gov/dmhas/**

**Department of Public Health**
**CT Quitline**
**www.ct.gov/dph**
**1.800.QUIT-NOW**

## National Resources

**American Lung Association**
**www.lung.org**

**Centers for Disease Control and Prevention**
**www.smokefree.gov**
**www.SurgeonGeneral.gov**

**Food and Drug Administration**
**www.fda.gov**

## Health Effects For Teens

The teen years are critical for brain development, which continues into young adulthood. Young people who use nicotine products in any form, including e-cigarettes, are uniquely at risk for long-lasting effects. Because nicotine affects the development of the brain's reward system, continued e-cigarette use can not only lead to nicotine addiction, but it also can make other drugs such as cocaine and methamphetamine more pleasurable to a teen's developing brain.

Nicotine also affects the development of brain circuits that control attention and learning. Other risks include mood disorders and permanent problems with impulse control—failure to fight an urge or impulse that may harm oneself or others.

## Can E-Cigarettes Help A Person Quit Smoking?

Some people believe e-cigarettes may help lower nicotine cravings in those who are trying to quit smoking. However, e-cigarettes are not an FDA-approved quit aid, and there is no conclusive scientific evidence on the effectiveness of e-cigarettes for long-term smoking cessation. It should be noted that there are seven FDA-approved quit aids that are proven safe and can be effective when used as directed.

E-cigarettes haven't been thoroughly evaluated in scientific studies. For now, not enough data exists on the safety of e-cigarettes, how the health effects compare to traditional cigarettes, and if they are helpful for people trying to quit smoking.

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