



National Institute  
on Drug Abuse

# Drug Facts

[www.drugabuse.gov](http://www.drugabuse.gov)

## Electronic Cigarettes (e-Cigarettes)

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.

While e-cigarettes are often promoted as safer alternatives to traditional cigarettes, which deliver nicotine by burning tobacco, little is actually known yet about the health risks of using these devices.

### 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").



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### Are e-Cigarettes Safer than Conventional Cigarettes?

Unfortunately, this question is difficult to answer because insufficient information is available on these new products.

Cigarette smoking remains the leading preventable cause of sickness and mortality, responsible for over 400,000 deaths in the United States each year. The worst health consequences associated with smoking (e.g., cancer and heart disease) are linked to inhalation of tar and other chemicals produced by tobacco combustion; the pleasurable, reinforcing, and addictive properties of smoking are produced mostly by the nicotine contained in tobacco.

E-cigarettes are designed to simulate the act of tobacco smoking by producing an appealingly flavored aerosol that looks and feels like tobacco smoke and delivers nicotine but with less of the toxic chemicals produced by burning tobacco leaves. Because they deliver nicotine without burning tobacco, e-cigarettes appear as if they may be a safer, less toxic alternative to conventional cigarettes.

Although they do not produce tobacco smoke, e-cigarettes still contain nicotine and other potentially harmful chemicals. Nicotine is a highly addictive drug, and recent research suggests nicotine exposure may also prime the brain to become addicted to other substances. Also, testing of some e-cigarette products found the vapor to contain known carcinogens and toxic chemicals (such as formaldehyde and acetaldehyde), as well as potentially toxic metal nanoparticles from the vaporizing mechanism. The health consequences of repeated exposure to these chemicals are not yet clear.

Another worry is the refillable cartridges used by some e-cigarettes. Users may expose themselves to potentially toxic levels of nicotine when refilling them. Cartridges could also be filled with substances other than nicotine, thus possibly serving as a new

and potentially dangerous way to deliver other drugs.

### **Can e-Cigarettes Help a Person Quit Smoking?**

Some people believe e-cigarette products may help smokers lower nicotine cravings while they are trying to discontinue their tobacco use. However, at this point it is unclear whether e-cigarettes may be effective as smoking-cessation aids. There is also the possibility that they could perpetuate the nicotine addiction and thus interfere with quitting.

#### **E-Cigarette Use by Youth**

E-Cigarettes are increasingly popular among adolescents. Although they contain nicotine derived from tobacco, they are not yet subject to regulation as tobacco products, including the requirement that purchasers be a certain age. Some states have banned sale of e-cigarettes to minors, but they can get around that by ordering online. Their easy availability (online or via mall kiosks), in addition to their wide array of cartridge flavors (such as coffee, mint, candy, and fruit flavors), may make them particularly 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 smokable tobacco products within the next year (Rigotti, 2015).

Because e-cigarettes are not currently marketed either as tobacco products or as devices having a therapeutic purpose, they are not regulated by the FDA. In addition, there is currently no regulation of the liquids that are used in e-cigarettes. So, there are no accepted measures to confirm their purity or safety.

These products have not been thoroughly evaluated in scientific studies. This may change in the near future, but for now, very little data exists on the safety of e-cigarettes, and consumers have no way of knowing whether there are any therapeutic benefits or how the health effects compare to conventional cigarettes.

## Learn More

For more information about e-cigarettes, visit:  
[www.fda.gov/forconsumers/consumer-updates/ucm225210.htm](http://www.fda.gov/forconsumers/consumer-updates/ucm225210.htm).

Also see our NIDA TV Spotlight:  
[www.youtube.com/watch?v=Iz67lqkLwYs&feature=youtu.be](https://www.youtube.com/watch?v=Iz67lqkLwYs&feature=youtu.be).

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## References

Rigotti NA. e-Cigarette Use and Subsequent Tobacco Use by Adolescents: New Evidence About a Potential Risk of e-Cigarettes. *JAMA*. 2015;314(7):673-674.