

KEY E-CIGARETTE INFORMATION

What are they called?

The formal name is Electronic Nicotine Delivery Systems, or ENDS. The most common name is E-cigarettes, or E-cigs for short. Street names include E-hookah, Vape sticks, and Vape pens.

How do they work?

E-cigarettes are a relatively new product that delivers **nicotine** through a liquid (also called E-juice) consisting of glycerin and/or propylene glycol, as well as flavorings such as fruit, bubble gum, candy, gummy bear, and other flavors very attractive to youth. The basic components of an E-cigarette are a cartridge containing a nicotine solution, a heating element that aerosolizes the solution, and a power source for the heating element, which is usually a rechargeable lithium battery.

E-cigarettes emit fewer and less dense toxicants than combustible tobacco products. However, some deliver higher levels of nicotine and formaldehyde than conventional cigarettes. E-cigarette aerosol is not harmless “water vapor” and is not as safe as clean air.

What is in them?

While E-cigarettes do not contain tobacco, most contain nicotine and other harmful chemicals found in conventional cigarettes. The process of heating the nicotine solution to produce the aerosol also produces aldehyde, acetaldehyde, and acrolein, which are **known carcinogens**. The glycerin/propylene glycol and 8,000+ flavorings in E-cigarettes are found in many food products and are generally considered safe for human consumption. However, safety for these substances was established for eating them, not for aerosolizing and inhaling them into the lungs.

How harmful are they?

Besides containing known carcinogens and ingredients whose safety for inhalation has not been established, most E-cigarettes contain nicotine. E-cigarettes contain nicotine levels equivalent to and higher than conventional cigarettes. They can be purchased in several concentrations of nicotine, ranging from 0% to 36%. There is no known safe level of nicotine exposure to the developing fetus, and exposure during childhood is not recommended. Nicotine delivered by E-cigarettes during pregnancy could result in multiple adverse health consequences for normal child growth and development, including sudden infant death syndrome, altered brain corpus callosum, obesity, deficits in auditory processing causing delayed speech, deficits in attention and cognition, and various detrimental effects on appetitive behaviors. Research clearly shows that nicotine exposure during adolescence can quickly escalate into nicotine addiction. The younger the exposure to nicotine, the stronger the influence on the developing brain. Preteen exposure is associated with stronger nicotine addiction, impulse control problems and disruptive behaviors, and early engagement with other substances such as alcohol, marijuana, and other drug use. What typically begins as youthful experimentation can easily lead to a lifetime of nicotine addiction—and possibly drug abuse.³

³ Yuan M, Cross SJ, Loughlin SE, Leslie FM. Nicotine and the adolescent brain. *Journal of Physiology* 2015;593(16):3397–3412. See online <http://onlinelibrary.wiley.com/doi/10.1113/JP270492/epdf>

Because they are so new, few studies have examined the short- and long-term health effects of E-cigarettes. What we do know is E-cigarettes contain nicotine, a highly addictive substance.

Because many E-liquids are custom-mixed by individuals at home, in homemade chemistry sets, and without safety regulations, the potential exists for additional health risks to E-cigarette users. Even commercial E-liquids are produced with unknown manufacturing procedures, packaging materials, and purity standards. Should children be smoking an E-liquid produced in a basement or garage?

E-cigarettes are a source of extremely high doses of ultrafine particles in the human respiratory system. These particles have been linked to cardiovascular disease in smokers, and early evidence suggests that the same biologic mechanism may apply to E-cigarette vapor.

Of greater concern are the 8,000+ added unique flavorings that are considered safe for use in food but have not been widely tested for their potential sensitizing, toxic, or irritating characteristics.

Stanford Research into the Impact of Tobacco Advertising
Electronic Cigarettes » Sweet Flavors



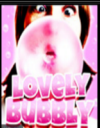









 Chocolate (74 images)	 Ice Cream (72 images)	 Candy (220 images)	 Cookies (68 images)
 Donuts (67 images)	 Cakes & Pies (116 images)	 Cupcakes (36 images)	 Breakfast (60 images)
 Mint (57 images)	 Soda Pops/Beverages (85 images)	 Flavor Varieties (274 images)	 eJuice Companies (190 images)

Image selected from
http://tobacco.stanford.edu/tobacco_main/subtheme_ecigs.php?token=fm_ecigs_mt037.php on 8/15/2016

Nicotine and Child Health

- Nicotine is *much more* harmful to the immature teen brain compared to the developed adult brain.
- Even a little nicotine can lead to ADHD and compulsive disruptive disorders, which can contribute to classroom behavior problems.
- E-cigarettes can deliver nicotine in doses larger than regular cigarettes.
- Children and youth become addicted to nicotine faster than adults.
- Nicotine is a social and biological “gateway” for use of harder drugs.
- Nicotine is extremely harmful to the developing fetus. Pregnant teens need to know this!
- Drinking nicotine in E-juice is harmful and possibly fatal for babies and toddlers. It should be locked up!
- Nicotine overdose symptoms include rapid heart rate, nausea, elevated blood pressure, vomiting, diarrhea, dizziness, convulsion, and potentially seizure and death.

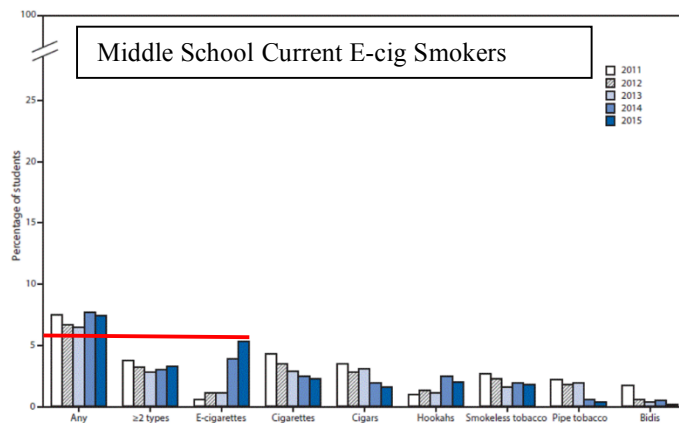
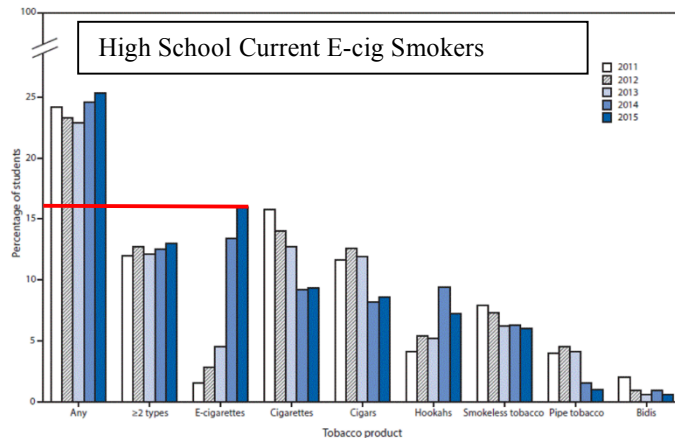
U.S. Department of Health and Human Services. *Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General*. Atlanta (GA): USDHHS, CDC, Office on Smoking and Health. 2012.

U.S. Department of Health and Human Services. *Smoking—50 Years of Progress: A Report of the Surgeon General*. Atlanta (GA): USDHHS, CDC, Office on Smoking and Health 2014.

From 2011 to 2015, a disturbing trend has emerged:

E-cigarette use by our children is on the rise. In some states over 40% of middle school kids have tried an E-cigarette (over 50% in high school). Notice in Figures 1 & 2 that current E-cigarette use is rising, while regular smoking is falling. This data points to the fact that large numbers of American children will become addicted to nicotine and are at risk for becoming a regular tobacco user. That's a death sentence.

FIGURE 1. Estimated percentage of high school students who currently use any tobacco products,* ≥2 tobacco products,[†] and select tobacco products[‡] – National Youth Tobacco Survey 2011–2015



A mistaken belief held by many people about E-cigarettes pertains to “vapor” vs. “aerosol.”

Most people think E-cigarette smoke is harmless “vapor,” and some users will call themselves “vapers.” The tobacco industry prefers “vapor” because this implies harmless water.

Technically, the smoke emitted is an “aerosol,” not a “vapor.” There is no water in E-cigarette aerosol.

Aerosol: (*aero* = air; *sol* = solution) A liquid or solid suspended in a gas medium. An aerosol contains particles that are small enough (1–1000 millimicrons) to remain airborne for a considerable period of time.

Vapor: Visible particles of moisture floating in the air, such as fog, mist, or steam; any cloudy or imperceptible exhalation, such as smoke or noxious fumes.

SOURCE: Arrazola RA, et al. Tobacco use among middle and high school students—United States, 2011–2015. MMWR Morb Mortal Wkly Rep. 2016 Apr 15;65 (14):361–7.

Helpful Video Resources: Watch and share with your colleagues and friends.

- <http://bit.ly/1UT2Wv6> Are E-cigarettes Harmful? (Time: 1 minute 38 seconds)
- <https://youtu.be/S3lgZ2-rSgs> Surgeon General of the United States talks about health and E-cigarettes. (Time: 27 minutes)
- <http://bit.ly/1KXJlhk> This is an excellent primer on E-cigarettes by Dr. Terry Pechacek from a public health perspective. (Time: 40 minutes 48 seconds)