

## E-cigarettes become more common, but there is uncertainty about long-term health effects

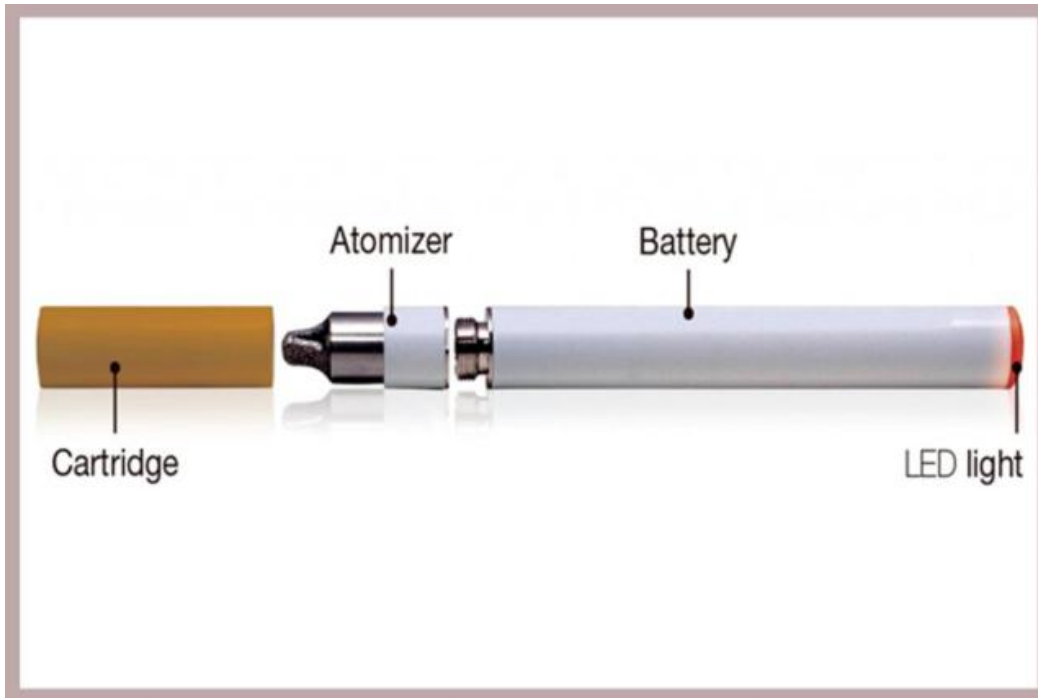
by Michele Brannan, MPAS, PA-C  
October 27 2015 12:37 PM

Electronic cigarettes (e-cigarettes), or "vapors," are becoming increasingly common.

E-cigarettes are a battery-operated nicotine delivery system. They were invented in China in 2003 and hit European and United States markets about nine years ago. (1) Tobacco companies are monetizing these products (2), which are widely available at traditional outlets as well as online.

Unfortunately, with the e-cigarette still considered new, there is uncertainty about its long-term health effects and whether or not it helps its user quit smoking. (3) There is also a public health concern about e-cigarette use in adolescents, where the use is rising. (4)

From 2011 to 2014, e-cigarette use increased from 1.5 to 13.4 percent in high school students and from 0.6 to 3.9 percent in middle school students. (4,5)



Most e-cigarettes consist of a cartridge containing a liquid, a chamber for the heating element to produce the vapor (atomizer), and a battery. (6) The user activates the atomizer by inhaling or pushing a button which causes the atomizer to heat the liquid creating a vapor. This "vaping" is not actually tobacco smoke, but does mimic it.

The liquid in the device doesn't burn tobacco as a cigarette does, but usually contains nicotine and other components such as propylene glycol and flavorings.

**Nicotine**, the addictive component, has been shown to vary in its content from one e-cigarette to another. It can be "nicotine-free" or come in concentrations from 6 to 36 mg/mL. (7) However, the amount of nicotine claimed to be in the device by its manufacturer and indicated on its label has been found to vary from its actual amount when tested. What's more, some cartridges labeled nicotine-free have been found to contain nicotine. (8)

Inhalation of nicotine from the e-cigarette has the same effect as it does when coming from a standard cigarette, including raising one's blood pressure and heart rate and subjecting the user to addiction of the substance.

**Propylene glycol** or ethylene glycol typically comprises the liquid. (6)

**Flavorings** are available in wide variety, and with more than 7000 on the market to choose from (such as fruit, candy, and alcohol flavors), these may increase the enticement of e-cigarettes to youths. (9,10) Fruit, candy, and alcohol-flavored cigarettes have been banned by the 2009 Family Smoking Prevention Control Act, but these attractive components are still present in varying e-cigarettes. (10)

**Other components** such as tin, lead, nickel, and chromium have been found in e-cigarette liquids and vapor. (6,7)

An advantage of the e-cigarette over conventional cigarettes is, with the former, the user is not exposed to many of the cigarette constituents such as tars and carbon monoxide that are attributed to tobacco-related diseases. (6)

Although most experts do believe that inhaling e-cigarette vapor is less likely to cause harm than its counterpart, the long-term consequences of inhaling e-cigarette vapor are unknown. (1,6) There are a plethora of data regarding cigarettes, but the e-cigarette novelty creates a big question mark as to what effects it will have on its user years from now.

Several smokers have used the e-cigarettes as a method to aid in smoking cessation. Unfortunately, there isn't enough evidence to support the claim that e-cigarettes help smokers quit. Studies have suggested, however, that the electronic devices may help curb cigarette cravings. (11) Another advantage of e-cigarettes is that they also can satisfy the hand-to-mouth habit. (12)



From a public health perspective, there has been concern about the e-cigarette's appeal to youth and it being a pathway to nicotine dependence. (13) As of this point, there is no regulation on or restriction of advertisement for these cigarettes as there are on conventional cigarettes. To the contrary, youth exposure to e-cigarette advertising has increased dramatically in recent years. (14)

Recent smoke-free laws that restricted tobacco use from public places for example, have afforded a subsequent decreased in tobacco prevalence. Since these laws do not apply to e-cigarettes, gains made from a public health perspective may be reduced since, at this point, e-cigarettes are generally allowed where standard cigarettes are not. (15)

Currently in the US, the Food and Drug Administration does not regulate electronic cigarettes. Unlike standard cigarettes, there is no minimum age to purchase the electronic ones and they can be bought with ease online. (16)

At the state level, several states have now prohibited the sale of e-cigarettes to minors. (16)

As of October 27, 2015, the Department of Transportation has banned airline passengers to transport electronic cigarettes in checked luggage due their fire hazard status. (17)

Although electronic cigarettes are probably less harmful than conventional cigarettes, there isn't enough information on exactly how harmful they may be. Unfortunately there's no proof that e-cigarettes help in smoking cessation. Your doctor will certainly support and congratulate his or her patient on the decision to stop smoking, but may be more likely to recommend FDA-approved medications.

**Michele Brannan is a certified Physician Assistant of Internal Medicine and has been in practice in the River Bend area for over 10 years.**

**The health information provided herein is not intended to replace the advice or discussion with a healthcare provider and is for educational purposes only. Before making any decisions regarding your health, speak with your healthcare provider.**

#### **REFERENCES:**

1. Hajek P, et al. *Electronic cigarettes: review of use, content, safety, effects on smokers and potential for harm and benefit.* *Addiction* 2014; 109:1801.
2. Tozzi J, Bachman J. "Big Tobacco Keeps Pushing Into E-Cigarettes." [www.businessweek.com/articles/2014-06-17/big-tobacco-keeps-pushing-into-e-cigarettes](http://www.businessweek.com/articles/2014-06-17/big-tobacco-keeps-pushing-into-e-cigarettes). (Accessed 21 October 2015).
3. Harrell PT, et al. *Electronic nicotine delivery systems ("e-cigarettes"): review of safety and smoking cessation efficacy.* *Otolaryngol Head Neck Surg* 2014; 151:381.
4. Arrazola RA, et al. *Tobacco use among middle and high school students - United States, 2011-2014.* *Morb Mortal Wkly Rep* 2015; 64:381.

5. Centers for Disease Control and Prevention. Notes from the field; e-cigarette use among middle and high school students - United States, 2011-2012. *Morb Mortal Wkly Rep* 2013; 62:729.
6. Grana R, et al. E-cigarettes: a scientific review. *Circulation* 2014; 129:1972.
7. Bhatnagar A, et al. Electronic cigarettes: a policy statement from the AHA. *Circulation* 2014; 130:1418.
8. Trehy MI, Ye W, Hadwiger ME, et al. Analysis of electronic cigarette cartridges, refill solutions, and smoke for nicotine and nicotine related impurities. *J Liq Chromatogr Relat Technol* 2011; 34:1442.
9. Zhu SH, et al. Four hundred and sixty brands of e-cigarettes and counting: implications for product regulation. *Tob Control* 2014.
10. FDA Should Prohibit Flavors in all Tobacco Products in the Current Rule Making. [tobacco.ucsf.edu/fda-should-prohibit-flavors-all-tobacco-products-current-rule-making](http://tobacco.ucsf.edu/fda-should-prohibit-flavors-all-tobacco-products-current-rule-making). (Accessed 21 October 2015).
11. Lee AH, Stater BJ, Close L, Rahmati R. Are e-cigarettes effective in smoking cessation? *Laryngoscope* 2015; 125:785.
12. Steinberg MB, Zimmermann MH, Delnevo CD, et al. E-cigarette versus nicotine inhaler: comparing the perceptions and experiences of inhaled nicotine devices. *J Gen Intern Med* 2014; 29:1444.
13. Collaco JM, Drummond MB, McGrath-Morrow SA. Electronic cigarette use and exposure in the pediatric population. *JAMA Pedia* 2015; 169:177.
14. Duke JC, Lee YO, Kim AE, et al. Exposure to electronic cigarette television advertisements among youth and young adults. *Pediatrics* 2014; 134:e29.
15. Glynn TJ. E-cigarettes and the future of tobacco control. *CA Cancer J Clin* 2014; 64:164.
16. Marynak K, Holmes CB, King BA, et al. State laws prohibiting sales to minors and indoor use of electronic nicotine delivery systems--United States, November 2014. *MMWR Morb Mortal Wkly Rep* 2014; 63:1145.
17. DOT bans e-cigarettes in checked luggage. *USA Today*. <http://www.usatoday.com/story/travel/flights/todayinthesky/2015/10/27/electronic-cigarette-checked-luggage-ban/74670944/> (Accessed 27 October, 2015).

[Listen to RiverBender Radio!](#)