

TOBACCO FACT SHEET

ELECTRONIC CIGARETTES (E-CIGARETTES)



Electronic cigarettes (e-cigarettes or e-cigs), known formally as electronic nicotine delivery systems (ENDS), are devices designed to look similar to cigarettes in shape, size, and general appearance.¹ They operate by vaporizing a solution containing nicotine, creating a mist that is then inhaled.¹ The tips of these devices often have an indicator light, designed to emulate the burning ash of a traditional cigarette.¹ According to product manufacturers, e-cigarette cartridges are available in various flavors, such as vanilla,² menthol,² and piña colada,² and varying claimed levels of nicotine.¹ Using an e-cigarette is commonly referred to as “vaping.”¹ Popular brands of e-cigarettes, sold at convenience stores and gas stations, include “blu” and “NJOY.”

BACKGROUND

- The components of a typical e-cigarette are illustrated below:



- Cartridges generally contain up to 20 mg of nicotine.³
- Some users refill their own cartridges, which may be dangerous because it involves dealing with potentially dangerous concentrations of nicotine.⁴ Refill bottles contain up to 7 grams of nicotine;⁵ the fatal dose of nicotine in adults is estimated at 30-60 mg while for children it is estimated at only 10 mg⁶ — or approximately 4 drops of a maximum strength refill solution. This risk is more consistent with nicotine-based pesticides, rather than traditional tobacco products and pose a danger via inhalation, ingestion, and skin contact.⁷

PREVALENCE

- Between 6.4% and 7.1% of current smokers have ever used an e-cigarette, compared to ever use of e-cigarettes among never smokers (less than 1.0%).⁸

SAFETY & QUALITY

- On July 22, 2009 the U.S. Food and Drug Administration’s (FDA) Division of Pharmaceutical Analysis analyzed the ingredients in a small sample of cartridges from two leading brands of e-cigarettes and found that the tested products contained detectable levels of known carcinogens and toxic chemicals. Diethylene glycol, a potentially lethal organic compound,⁹ was found in one cartridge, while nitrosamines were detected in several cartridges.¹⁰
- Other important findings from the FDA include the following:
 - The quality control processes used to manufacture e-cigarettes seem to be inconsistent or non-existent. Three different e-cigarette cartridges with the same label were tested and each emitted a distinct amount of nicotine with each puff.⁹

- In all but one, the e-cigarette cartridges that were labeled as containing no nicotine had low levels of nicotine.⁹
- The vapor from one high-nicotine cartridge delivered twice as much nicotine when inhaled than was delivered by the control, a sample of FDA-approved nicotine inhalation products.⁹
- Studies^{11,12} suggest adverse effects associated with e-cigarettes, but additional non-biased national and international research is needed to understand the effects of both short- and long-term use.

LEGAL STATUS & REGULATION

- The FDA attempted to regulate e-cigarettes as drug-delivery devices but failed after the courts determined that e-cigarettes were properly regulated under the FDA's tobacco authority pursuant to the 2009 Family Smoking Prevention and Tobacco Control Act (FSPTCA) and not the FDA's drug delivery device authority.^{13,14}
- In April 2011, the FDA issued a statement announcing that they intend to regulate e-cigarettes as "tobacco products." This includes: (1) marketing restrictions, (2) mandated ingredient listing, and (3) pre-market review.¹² However, to date, FDA has not asserted its authority over e-cigarettes and they remain unregulated.
- Several state and local governments, including New Jersey¹⁵ and King County, Washington,¹⁶ have included or are in the process of adding e-cigarettes to their smoking bans. Additionally, the U.S. Department of Transportation has proposed banning the use of e-cigarettes on planes.¹⁷ However, several airlines have prohibited smoking e-cigarettes on their aircrafts on their own accord.^{18,19}
- California, Minnesota, New Hampshire, New Jersey, New York, Kansas, Vermont, and Utah have prohibited the sale of e-cigarette to minors since March 2011.²⁰

MARKETING & COMMERCIAL APPEAL

- The e-cigarette companies advertise their products as a better-smelling, cheaper, and guilt-free alternative to smoking.²¹ They are also marketed as a way to circumvent some smoking bans.²²
- E-cigarettes are promoted heavily online^{1,23} and are more widely searched than snus and NRTs (nicotine replacement therapy).¹⁹
- There is concern that e-cigarettes may appeal to youth because of their high-tech design, easy availability online or via mall kiosks, and the wide array of flavors of cartridges.²⁴

ATTITUDES & CONCERNS

- A nationally-representative survey found that 40.2% of Americans have heard of e-cigarettes and more than 70.0% of smokers believe that e-cigarettes are less harmful than regular cigarettes.²⁵
- The most commonly cited reasons for use by e-cigarette users include: the perception that they are healthier/less toxic than traditional cigarettes, aid in tobacco craving/withdrawal symptoms, smoking cessation facilitator, and relapse avoidance.²⁶
- In addition to the health concerns cited above, recent studies suggest that e-cigarettes could be worrisome regarding relapse of former smokers,²⁷ the "re-normalization" of tobacco,²³ and a gateway for cigarettes.^{23,28} It is also thought that e-cigarettes can contribute to tobacco use by allowing smokers to use nicotine despite ever-increasing smoking bans (dual use).²² Since they recently emerged on the market, however, more research must be done to fully understand the consequences.
- The World Health Organization (WHO) expressed concern with e-cigarettes, stating they may undermine tobacco control efforts, such as smoking bans and FDA-approved NRTs. Several countries, including Australia, China, and Brazil have banned the sale and marketing of e-cigarettes.²⁹

- ¹ Kuschner, WG, Reddy, S, Mehrotra, N, Paintal, HS. Electronic cigarettes and thirdhand tobacco smoke: Two emerging health care challenges for the primary care provider. *In Int J Gen Med*. 2011;4:115-120. doi: 10.2147/IJGM.S16908.
- ² Flavored cartridges (2012). blu Cig Web site. Available at: <http://www.blucigs.com/cartridges>. Accessed June 29, 2012.
- ³ Cobb NK, Abrams DB. E-cigarette or drug-delivery device? Regulating novel nicotine products. *N Engl J Med*. 2011;365(3):193-195.
- ⁴ Yamin, CK, Bitton, A, Bates, DW. E-cigarettes: A rapidly growing internet phenomenon. *Ann Intern Med*. 2010;153:607-609.
- ⁵ 100ml titanium ice 72mg unflavored - single bottle (5/29/2012). Totally Wicked E-Liquid Web site. Available at: <http://www.totallywicked-eliq.com/products/totally-wicked-eliq/titanium-ice-72mg-eliq/100ml-titanium-ice-72mg-unflavored-2-product.html>. Accessed June 20, 2012.
- ⁶ International Programme on Chemical Safety, INCHEM. Nicotine. [http://www.inchem.org/documents/pims/chemical/nicotine.htm#SubSectionTitle:7.2.1 Human data](http://www.inchem.org/documents/pims/chemical/nicotine.htm#SubSectionTitle:7.2.1%20Human%20data). Published March, 1991. Accessed June 15, 2012.
- ⁷ Cobb, NK, Byron, J, Abrams, DB, Shields, PG. Novel nicotine delivery systems and public health: The rise of the "e-cigarette". *Am J Public Health*. 2010;100(12):2340-2342. doi: 10.2105/AJPH.2010.199281.
- ⁸ Pearson, JL, Richardson, A, Niaura, RS, Vallone, DM, Abrams, DB. E-Cigarette awareness, use, and harm perceptions in U.S. adults. *Am J Public Health*. 2012;102(9):1758-1766. doi: 10.2105/AJPH.2011.300526.
- ⁹ Wax, PM. Elixirs, diluents, and the passage of the 1938 federal Food, Drug, and Cosmetic Act. *Ann Intern Med*. 1995;122:456-461.
- ¹⁰ U.S. Food and Drug Administration, Division of Pharmaceutical Analysis. Evaluation of e-cigarettes. www.fda.gov/downloads/Drugs/ScienceResearch/UCM173250.pdf. Accessed June 13, 2012.
- ¹¹ Vardavas, CI, Anagnostopoulos, N, Kougias, M, Evangelopoulou, V, Connolly, GN, Behrais, PK. Short-term pulmonary effects of using an electronic cigarette: Impact on respiratory flow resistance, impedance, and exhaled nitric oxide. [published online ahead of print December 22, 2011]. *CHEST*. 2012;141:1400-1406. doi: 10.1378/chest.11-2443.
- ¹² McCauley, L, Markin, C, Hosmer, D. An unexpected consequence of electronic cigarette use. *CHEST*. 2012;141:1110-1113. doi: 10.1378/chest.11-1334
- ¹³ *Sottera v. FDA*, 627 F. 3d 891 (D.C. Cir. 2010)
- ¹⁴ Deyton, LR, Woodcock, J. Regulation of e-cigarettes and other tobacco products. Letter to stakeholders. U.S Food and Drug Administration Web site. 2011. <http://www.fda.gov/newsevents/publichealthfocus/ucm252360.htm>. Accessed June 13, 2012.
- ¹⁵ Blumenfeld, K. Electronic cigarettes (E-cigarettes). http://www.njgasp.org/E-Cigs_White_Paper.pdf. Published June 2012. Accessed June 29, 2012.
- ¹⁶ Metropolitan King County Council. Board of Health approves electronic cigarette regulations. 2010. http://www.kingcounty.gov/council/news/2010/December/JP_Ecig.aspx. Accessed June 15, 2012.
- ¹⁷ Smoking of electronic cigarettes on aircraft, Final Rule, 76 Fed. Reg. 57008-57012 (September 15, 2011) (to be codified at 14 C.F.R. pt. 252).
- ¹⁸ JetBlue Airlines. Electronic/Smokeless Cigarettes. Retrieved June 6, 2013, from <http://help.jetblue.com/SRVS/CGI-BIN/webisapi.dll/?St=276,E=0000000000113349029,K=9756,Sxi=1,Case=obj%28395995%29>
- ¹⁹ American Airlines. 2008. Keeping Passengers and Employees Safe at All Times. Retrieved June 6, 2013, from <http://www.aa.com/i18n/amrcorp/corporateinformation/facts/safety.jsp>
- ²⁰ American Lung Association. State Legislated Actions on Tobacco Issues 2010. http://www.lungusa2.org/slati/reports/SLATI_2010_Final_Web.pdf. Accessed June 21, 2012.
- ²¹ Green Smoke. Green Smoke Web site. <http://www.greensmoke.com/>. 2012. Accessed June 21, 2012.
- ²² U.S. Food and Drug Administration. Transcript for FDA's media briefing on electronic cigarettes (July 22, 2009). Available at: <http://www.fda.gov/newsevents/publichealthfocus/ucm172906.htm>. Accessed June 21, 2012.
- ²³ Ayers, JW, Ribisl, KM, Brownstein, JS. Tracking the rise in popularity of electronic nicotine delivery systems (electronic cigarettes) using search query surveillance. *Am J Prev Med*. 2011;40(4):448-453. <http://archive.tobacco.org/news/314895.html>. Accessed June 13, 2012.
- ²⁴ U.S. Food and Drug Administration. FDA and public health experts warn about electronic cigarettes [press release]. July, 2009. <http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm173222.htm>. Accessed June 15, 2012.
- ²⁵ Pearson, JL, Richardson, A, Niaura, RS, Vallone, DM, Abrams, DB. E-Cigarette awareness, use, and harm perceptions in U.S. adults. *Am J Public Health*. 2012;102(9):1758-1766. doi: 10.2105/AJPH.2011.300526.
- ²⁶ Etter, J-F, Bullen, C. Electronic cigarette: User profile, utilization, satisfaction and perceived efficacy. *Addiction*. 2011;106:2017-2028. doi: 10.1111/j.1360-0443.2011.03505.
- ²⁷ McMillen, R, Maduka, J, Winickoff, J. Use of emerging tobacco products in the United States. *J Environ Public Health*. 2012;2012(Article ID 989747):8 pages. doi: 10.1155/2012/989747.
- ²⁸ Regan, AK, Promoff, G, Dube, SR, Arrazola, R. Electronic nicotine delivery systems: Adult use and awareness of the 'e-cigarette' in the U.S.A. [published online ahead of print October 27, 2011]. *Tob Control*. 2011. doi: 10.1136/tobaccocontrol-2011-050044.
- ²⁹ WHO Study Group on Tobacco Product Regulation. Report on the scientific basis of tobacco product regulation: Third report of a WHO study group. whqlibdoc.who.int/publications/2009/9789241209557_eng.pdf. Accessed June 13, 2012.