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. They operate by vaporizing a solution containing nicotine, creating a mist that is then inhaled. The tips of these devices often have an indicator light, designed to emulate the burning ash of a traditional cigarette. According to product manufacturers, e-cigarette cartridges are available in various flavors, such as vanilla, menthol, and piña colada, and varying claimed levels of nicotine. Using an e-cigarette is commonly referred to as “vaping.” 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:

![Diagram of e-cigarette components]

- Cartridges generally contain up to 20 mg of nicotine.
- Some users refill their own cartridges, which may be dangerous because it involves dealing with potentially dangerous concentrations of nicotine. Refill bottles contain up to 7 grams of nicotine; the fatal dose of nicotine in adults is estimated at 30–60 mg while for children it is estimated at only 10 mg—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.

**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%).

**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, was found in one cartridge, while nitrosamines were detected in several cartridges.
- 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.
° 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
° Studies11,12 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 online1,23 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