

TOBACCO FACT SHEET

ELECTRONIC CIGARETTES (E-CIGARETTES)



E-cigarettes (a product category that includes disposable cigarette-like, e-hookah, vape pens, and refillable tank-like or personal vaporizers) are devices that heat a solution (nicotine and other additives) producing a vapor that is inhaled without combustion. E-cigarettes vary in quality, safety, size, and efficiency of nicotine delivery. Current scientific evidence indicates that e-cigarettes are likely less harmful to individual users than combustible cigarettes. Since they have been on the market for under 10 years, their long-term effects are unclear. The science regarding how these evolving products impact patterns of tobacco use and public health is still in the early stages, but growing. This fact sheet contains information about e-cigarettes as it is known as of the date at the bottom of the page, and will be updated regularly as the science base grows.

SUMMARY OF LEGACY'S POSITION ON E-CIGARETTES

Policies and regulation of e-cigarettes must ensure they are as safe as possible and that individual and population benefits are maximized while harms are minimized especially to youth. One of the conclusions of the 2014 Surgeon General's Report on *The Health Consequences of Smoking* stated, "the burden of death and disease from tobacco in the United States is overwhelmingly caused by cigarettes and other combusted tobacco products; rapid elimination of their use will dramatically reduce this burden"¹. Thus, prudently regulated, e-cigarettes hold promise as one means to move smokers to a less harmful product and reduce the devastating death and disease burden caused by combustible tobacco products such as cigarettes, cigars, or hookah.²

Legacy's vision is a generation that rejects tobacco.

- Our primary goal is to achieve a society that rejects tobacco
- For those already using combustible tobacco and are unable or unwilling to stop, we support movement to the exclusive use of less harmful alternatives with the goal of eventually stopping all tobacco use

Legacy supports the following recommendations with regard to e-cigarettes:

- Prudent and expeditious regulation of e-cigarettes to maximize benefits and minimize harms to protect individuals and public health, especially youth
- Restriction and enforcement of e-cigarette sales and marketing so that it does not:
 - Target or appeal to youth
 - Mislead the public
 - Encourage dual use
 - Undermine smoke-free air laws
- Restricting sales of e-cigarettes to those 18 and older
- Elimination of candy flavorings that especially appeal to youth
- Inclusion of e-cigarettes in smoke-free indoor air laws
- Providing manufacturing and safety standards, including child-proof packaging of e-liquids and cartridges, accurate labeling of ingredients and nicotine levels, etc.

PRODUCT FEATURES

- Typically e-cigarettes have three integrated components³⁻⁷:
 1. a cartridge or reservoir containing solution,
 2. a breath or user-activated battery-powered heating element (atomizer) which vaporizes the solution, and
 3. a battery (at varying sizes and capacities)
- When activated, the heating element produces a vapor from a solution containing the humectant carrier (e.g., propylene glycol, glycerine), nicotine, flavorings, and other ingredients.^{3,6,8-12}

LEGAL STATUS AND REGULATION

Currently, there is little to no government oversight of e-cigarettes – either with regard to manufacturing and product standards, or their advertising and marketing. In April 2014, FDA proposed a rule that would deem e-cigarettes as tobacco products and allow FDA to regulate them.¹³ That proposal has not yet been finalized, and e-cigarettes remain unregulated at the federal level.

In the absence of federal regulation, states and localities have pursued legislation regarding e-cigarettes:

- As of May 2014, 34 states have prohibited the sale of e-cigarettes to minors.¹⁴
- As of April 29, 2014, three states (North Dakota, New Jersey, and Utah) and 172 local governments have included e-cigarettes in their indoor air laws and smoking bans.¹⁵
- The U.S. Department of Transportation has proposed a ban on the use of e-cigarettes on planes, but that rule has not been finalized.¹⁶ Several airlines have prohibited smoking e-cigarettes on their aircraft on their own accord.^{17,18}

MARKETING

- Widespread marketing of e-cigarettes and the entry of the three big U.S. tobacco companies into the e-cigarette market have contributed to increased attention to these products. Sales of e-cigarettes approached \$2 billion in 2013, and are estimated to surpass \$10 billion by 2017.¹⁹
- Unlike traditional tobacco products such as cigarettes and smokeless tobacco, e-cigarettes and associated components (solution, atomizers) are currently not subject to regulations in terms of where (e.g., broadcast, print) and to whom (e.g., minors) they are marketed.
- E-cigarettes have been endorsed by several celebrities and have appeared on cable television, in a variety of print and web media, and at sponsorships of events.²⁰⁻²² These marketing strategies are of concern because of their potential to reach youth audiences.^{23,24}
- Some e-cigarette companies have advertised their products using health-related claims. E-cigarettes have also been marketed as a way to circumvent smoking bans and indoor air restrictions.²⁵⁻²⁸
- Lorillard Tobacco Company, owner of blu e-cigarettes, has made by far the largest advertising expenditures to date.²⁹ Lorillard and others have advertised in channels where youth have high exposure levels to those ads.²⁴ Further, some companies use marketing messages reminiscent of historic cigarette marketing or that encourages dual use of tobacco products rather than complete switching to e-cigarettes³⁰ (D.M. Vallone, unpublished data, February 2014). However, this is not necessarily the case for all e-cigarette companies.

CONSUMER PERCEPTIONS

Awareness

- Overall awareness of e-cigarettes is growing among U.S. adults aged 18 and older, doubling from 16.4% in 2009 to 32.2% in 2010³¹ and increasing again to 75.4% in 2012.³² Awareness is highest among current smokers and young adults.³²⁻³⁴

Harm Perceptions & Reasons for Use

- E-cigarettes are generally perceived to be less harmful than regular cigarettes by e-cigarette users.³⁵
- The most commonly cited reasons for use include perceptions that e-cigarettes:
 - are less harmful/less toxic than regular cigarettes,^{32,36-38}
 - are less expensive than regular cigarettes,^{32,39}
 - help reduce tobacco craving/withdrawal symptoms,³⁷
 - reduce amount smoked and use as a reduction/cessation aid,^{32,36,38,40,41} and
 - prevent relapse to regular cigarettes.^{35,37}
- Other reasons for use include ability to avoid smoking restrictions in public venues, and that e-cigarettes are less likely to bother nonsmokers via secondhand exposure.³⁵

PATTERNS OF USE

Adults

- Ever use of e-cigarettes is highest among current cigarette smoking adults in the U.S. and increased from 9.8% in 2010 to 21.2% in 2011 to 32% in 2012^{32,33}
- About 8.1% of adults have ever tried e-cigarettes, with higher rates in young adults (9.3% among 18-24 year olds) and those with less education (8.6% ≤12 years education). This study also showed that 18% of those who have ever used e-cigarettes continue as current users.³²

Youth

- Ever use of e-cigarettes more than doubled from 3.3% in 2011 to 6.8% in 2012 among U.S. middle and high school students.⁴²
- The majority of youth e-cigarette users are current smokers, and data from 2012 showed that 80.5% of high school students who were past 30-day e-cigarette users were also past 30-day regular cigarette smokers.⁴²
- Dual use of e-cigarettes and regular cigarettes increased from 0.8% to 1.6% among middle school students from 2011-2012 and from 0.8% to 1.9% among high school students from 2010-2011.^{42,43}
- Current data is insufficient to determine whether e-cigarettes are a gateway to cigarette use, a gateway out of cigarette use or have no influence on cigarette use. More data is needed in this area.
- Youth who have tried e-cigarettes also indicate greater motivation to quit smoking, suggesting they may want to stop using combustible cigarettes.⁴⁴

CIGARETTE SMOKING CESSATION/REDUCTION

- Two randomized controlled trials to date showed that e-cigarettes were effective in helping adult smokers to quit or to reduce their cigarette consumption.^{45,46} In one of these studies, rates of smoking cessation in the e-cigarette study group were similar to those reported in the nicotine patch group and also to those seen in previous clinical trials of nicotine replacement therapy.^{45,47}
- Several observational studies suggest that e-cigarettes can help adult smokers quit smoking

combustible cigarettes or reduce the number smoked.^{5,36,48-54} Other studies report use of e-cigarettes may be associated with no change or less cessation, but these associations may be due to other factors (e.g. smokers who are more nicotine dependent are more likely to try e-cigarettes).^{40,55,56}

- More research is needed to further determine whether and how e-cigarettes can be an effective cigarette cessation or harm reduction aid.

HEALTH & SAFETY

Nicotine

- Nicotine is derived from tobacco and has psychoactive and physiological effects. Nicotine can be harmful to those with cardiovascular diseases and diabetes or other chronic medical illnesses. Nicotine is a potent poison when mishandled, ingested or absorbed through the skin. It is known to cause birth defects during pregnancy and affects the developing brain so should not be used by youth.
- Nicotine is an addictive substance, but its level of addictiveness can vary depending on its mode of delivery. For example, in cigarettes, nicotine is highly addictive. On the other hand, FDA-approved NRTs are minimally addictive and can be used long term. Studies suggest that the current generation of e-cigarettes on the market are less addictive than combustible cigarettes and closer in profile to NRTs.^{9,57}
- User experience and e-cigarette product selection may influence nicotine delivery from e-cigarettes. Several studies indicate that e-cigarettes, under certain conditions, can deliver nicotine reliably and effectively.^{5,58-64} Some e-cigarette brands may yield little or minimal nicotine delivery due to design and/or mislabeling of the nicotine amount.^{3,8,10,65} Some e-cigarette solutions and vapors contain nicotine doses that are not consistent with manufacturer specifications.^{9-11,65-67}

Vapor

- Health effects associated with exposure to e-cigarette vapor are not fully studied, but available data suggest that e-cigarette vapor is less harmful than cigarette smoke.⁶⁸⁻⁷² However, e-cigarette vapor is not water vapor.
- E-cigarettes vary in quality and vapor constituents.
- In contrast to combustible products, existing studies of e-cigarettes report that e-cigarette vapor produces no carbon monoxide and fewer chemicals.^{64,69,73} The chemicals that are present are at lower levels of toxicity than in smoke from combustible tobacco products like cigarettes, cigars, pipes, or hookah.
- Potentially harmful constituents have been identified (typically 1-3 orders of magnitude lower than in cigarettes) in some e-cigarette liquid and vapor, including nitrosamines, heavy metals, and carbonyls.^{57,64,65,68,69,72,74,75}
- E-cigarettes contain propylene glycol, which has not been studied for long-term safety via inhalation.^{57,64,65}
- Mainstream vapor from e-cigarettes contains measurable levels of nicotine. Some studies also show that e-cigarette vapor when exhaled by the user emits low levels of nicotine and particulate matter into the air.^{64,69,70,72} There is concern with exposing bystanders, including youth and pregnant women, to nicotine in the air, even at low levels.⁶⁹

Adverse Events

- Studies demonstrate e-cigarettes do not produce the same acute adverse health effects observed with conventional cigarette smoking (e.g. eye, nose, and throat irritation, coughing and bronchitis,

inflammation of tissues in the mouth, nose, and throat, bronchitis, increased heart rate and blood pressure).^{5,76}

- Common adverse effects associated with e-cigarette use include minor complaints or irritation relating to the mouth, eyes, and upper respiratory system.⁷⁷
- Nicotine is a potent poison and can cause death if not properly stored and handled. Small ingestions could be deadly. With an estimated median lethal dose between 1 and 13 mg per kilogram of body weight, 1 teaspoon (5 ml) of a 1.8% nicotine solution could be lethal to a 90-kg person.⁷⁸
- The number of calls to poison centers involving e-cigarette liquids containing nicotine rose from one per month in September 2010 to 215 per month in February 2014. More than half of these calls involved young children 5 years old and under.⁷⁹ A serious poisoning of a 10 month old infant occurred.⁸⁰
- Poisoning related to the nicotine in e-cigarette liquid can occur by ingestion, inhalation, or absorption through the skin or eyes. The most common adverse health effects mentioned in e-cigarette calls were vomiting, nausea, and eye irritation.⁷⁹

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