E-Cigarettes

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E-cigarettes

Definition

E-cigarettes, more properly known as electronic cigarettes, are personal electronic devices that heat a nicotine solution with a battery-powered electric coil called an atomizer. When the solution is heated, an aerosol resembling smoke is released, which the user can Page 1254 | Top of Articleinhale as if he or she were puffing on a cigarette. Ecigarettes are also called e-cigs, personal vaporizers (PVs), and electronic nicotine delivery systems (ENDS). The use of an e-cigarette is popularly termed vaping. Although e-cigarettes do provide users with a dose of nicotine (whose strength varies considerably from manufacturer to manufacturer), they are considered by many to be safer than cigarettes because they do not release the tar and other harmful compounds given off by burning tobacco.

Description

Since their introduction to the worldwide market in 2004, e-cigarettes have undergone considerable evolution. Early models were designed to resemble conventional cigarettes or cigars; they are called cig-a-likes. Some are designed to look like ballpoint pens and are popularly known as pen-styles. A third type of e-cigarette in use as of 2017 are advanced mods, called mods for short, which may resemble a box or flashlight; however, mods can be found in all shapes and sizes with their common element being a large removable and rechargeable battery. While most e-cigarettes use solutions containing nicotine, a significant minority of PVs use nicotine-free solutions that release vapors flavored to resemble coffee, fruits, vanilla, or alcoholic beverages like piña colada. Some users prefer

to call these devices e-hookahs or vape pens to distinguish them from PVs that use nicotine-based solutions. In fact, the emergence of nicotine-free PVs has intensified the controversy over the possible health consequences of ecigarettes.

Some observers trace the origin of e-cigarettes back to the mid-1960s, when a so-called smokeless non-tobacco cigarette was patented. After 1965, some inventors were experimenting with a charcoal-based vaporizer used to heat a nicotine solution, but the devices were clumsy as well as expensive to use. Ironically, it was the invention of cell phones that led to the development of contemporary ecigarettes. The need to shrink the size of cell phones and invent longer-lasting batteries to power them made it possible to fit a battery and electric coil, along with a cartridge containing a nicotine solution, inside a cylinder the size and shape of a standard tobacco cigarette.

The invention of the first e-cigarette is usually credited to Hon Lik, a Chinese pharmacist, who first sold the device as a smoking cessation aid in 2004. From China (where most e-cigarettes are still manufactured as of 2017), e-cigarettes were exported to Vietnam, where they were discovered by a Belgian entrepreneur, J. Andries Verleur. Verleur had the Chinese manufacturers improve the design of Hon Lik's original product; he then formed a company and began selling e-cigarettes worldwide in 2009. While the devices were slow to find acceptance at first, they have grown explosively. According to the National Institute on Drug Abuse, as of late 2016, there are at least 250 brands of e-cigarettes on the market. The number of e-cigarettes sold in North America expanded from 50,000 in 2008 to 3.5 million in 2012. There are an estimated nine million users of PVs in the United States. Two and a half million users vape regularly in the United Kingdom as of 2015. A survey conducted by the Centers for Disease Control and Prevention (CDC) found that 1.78 million American adolescents had tried e-cigarettes in 2012, up from half that number just a year earlier; and that 10% of those teenage users had never tried conventional cigarettes or other tobacco products.

The cost of vaping in comparison to the cost of cigarettes is a point that many vapers make to justify switching to e-cigarettes. With a pack of cigarettes costing as much as $8 or even $9 in parts of the United States, ecigarettes look like a way to satisfy a craving for nicotine at a lower cost. E-cigarettes, however, are not cheap: typical starter kits begin at $50 on up to several hundred dollars. One popular kit costs about $80; it includes a battery charger that also serves as a storage container, two batteries, and five nicotine cartridges, each good for about 150 puffs. The kit's total cost is about the same as 8 to 16 packs of cigarettes.

Purpose

Personal satisfaction

The basic purpose of an e-cigarette is to deliver a pleasurable vapor, usually though not always containing nicotine, to the user by inhalation. Most e-cigarettes contain the following components:

The mouthpiece: also known as the cartridge, the mouthpiece contains a heating coil that vaporizes thePage 1255 | Top of Article e-liquid when the user sucks on the mouthpiece. Other names for the larger cartridges in newer e-cigarettes are cartomizer or tank.
The atomizer. The atomizer is the heating device (usually an electric coil) that vaporizes the e-liquid. It requires replacement every 3–6 months.
The battery: The battery is the power source of an ecigarette. It is the largest component of most e-cigarettes and takes up most of the space inside the external cylinder. Most new models of e-cigarettes contain rechargeable lithium-ion batteries. Early e-cigarettes had a switch that turned the battery on and off, while an LED at the other end of the e-cigarette glowed when the user inhaled. Newer e-cigarette batteries contain airflow sensors that activate the battery when the user inhales through the mouthpiece.

Advanced mods may allow for variable power output or a wide variety of battery and atomizer configurations.
The e-liquid: The e-liquid, also called juice, may or may not contain nicotine. In most cases it is a mixture of propylene glycol (which is the source of the vapor that appears when the e-cigarette is used); vegetable glycerine; and flavorings. The cartridge can either be replaced or refilled by the user when the liquid is gone. E-liquid is also sold in bottles or in kits that allow users to make their own juice and modify or intensify its flavor.

Smoking cessation

One of the major controversies about e-cigarettes is whether they can serve the purpose of smoking cessation. As noted above, the pharmacist who invented the first e-cigarette marketed it as a smoking cessation device. As of 2017, medical researchers were sharply divided as to whether e-cigarettes are useful in weaning users from conventional tobacco products, or whether they are gateway products that will create a new generation of nicotine addicts. The fact that many teenagers as well as adults who have never smoked tobacco are using e-cigarettes is grounds for worry in the minds of some researchers. At present, the medical and scientific communities disagree strongly about the merits of e-cigarettes as aids to smoking cessation. Most researchers acknowledge that further research is necessary. One of the complications to doing such research, however, is the lack of standardization in regard to the nicotine content, flavoring agents, and other components of e-cigarettes. The sheer variety of models and flavors would add to the difficulty of setting up a controlled clinical trial.

The social dimension of smoking is another cause for concern among health researchers about e-cigarettes. It has been known for years that one of the reasons that smoking is a difficult habit to break is the ritual behaviors associated with it. For many shy people, the ritual of lighting up, sharing cigarettes with others, and smoking as part of a convivial get-together helps to ease the way into social situations. Smoking was also associated with glamor and sophistication up through the 1970s, when it became increasingly stigmatized as a cause not only of lung disease in smokers themselves but also a danger to nonsmokers through secondhand smoke.

Some researchers fear that the increasing use of high-end e-cigarettes, particularly the expensive customized models, will reverse the stigma presently associated with smoking and make the habit socially acceptable or even prestigious again. This concern is based partly on the fact that the vapor of an e-cigarette is much less noticeable (thus much less annoying) to others nearby than the smoke of a conventional cigarette or cigar, and partly on the emergence of a distinct subculture based on vaping. Some members of the so-called vaping community are attracted to the lifestyle of vaping, others consider it a hobby, while most are attracted to it as a safer alternative to smoking. Members of the vaping subculture spend thousands of dollars on vaping devices, hold gatherings around the United States, and have formed a National Vapers Club, which raises funds for research about e-cigarettes.

Risks

The risks associated with e-cigarettes can be summarized as follows:

The social risk of undoing 50 years of successful antismoking campaigns and health regulations, increasing the total number of people addicted to nicotine worldwide.
Increasing the popularity of nicotine-based products among teenagers, particularly by the creation of sweet or candy-like e-cigarette flavors that are attractive to youngsters.
The possibility that the vapor from e-cigarettes poses some health risks to others, even though the nicotine content of the vapor is considerably lower than that of conventional cigarettes and contains no tar. The vapor does, however, contain heavy metals, some by-products of nicotine, and ultrafine particles, but whether these pose health hazards on the level of secondhand tobacco smoke is far from certain.

The unknown risks of long-term inhalation of propylene glycol (PEG), the organic molecule that appears as visible vapor when an e-cigarette is used. Although PEGPage 1256 | Top of Article is considered safe for use in foods and is used in theatrical performances to create fog or mist onstage, no one knows whether years of inhaling it in an e-cigarette is safe.

Quality control issues with the flavorings used in eliquids. Some cartridges have been found to be contaminated, and there are no industry standards for the flavorings used; some ingredients may be potentially toxic. In addition, some flavoring agents may be carcinogenic.

A significant increase in the number of child poisonings reported to the CDC involving e-cigarette e-liquid refills containing nicotine. Nicotine is poisonous in even small amounts, and can cause vomiting, seizures, and death. The CDC reported that calls to poison control centers concerning poisoning from e-cigarette cartridges rose from an average of one per month in 2010 to 215 per month by early 2014. Children or adults can take in nicotine from e-liquids in one of three ways: inhalation, swallowing, or absorption through the skin or eyes.

KEY TERMS

Atomizer—
The battery-powered electric coil inside an e-cigarette that vaporizes the e-liquid. It contains a wick that draws in the e-liquid for vaporization.

E-hookah—
An informal term for a personal vaporizer that does not use a fluid containing nicotine. E-hookahs are also called hookah pens or vape pens.

E-liquid—
The solution contained in an e-cigarette that is vaporized when the device is used. Also called juice, it typically contains propylene glycol, vegetable glycerine, flavorings of various types, and (in most cases) nicotine.

Vaping—
An informal term for the use of e-cigarettes.

Unsurprisingly, the exponential increase in the popularity of e-cigarettes in just a few years has led to calls for government regulation. In August 2014, the World Health Organization released a report on ENDS urging member countries to 1) restrict the use of ecigarettes indoors; 2) ban candy-like, fruit-based, or alcoholic beverage-based flavors; and 3) limit sales to persons over the age of 18. Most researchers note, however, that any such restrictions will take years to implement.

The U.S. Food and Drug Administration (FDA) regulations went into affect in August 2016, prohibiting the sale of e-cigarettes to minors. In addition, manufacturers of e-cigarettes and all other tobacco manufacturers must submit their products for premarket review to the FDA. Products that were on the market and sold prior to February 2007 are exempt from the review. All states will follow the regulations set by the FDA.

Some countries, including Singapore and the United Arab Emirates, ban all e-cigarettes as illegal, while some European countries ban only those containing nicotine, and others restrict only the indoor use of e-cigarettes.

Full Text:

See also **Nicotine and related disorders ; Smoking' Smoking cessation .**

Resources

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ORGANIZATIONS

Centers for Disease Control and Prevention (CDC), 1600 Clifton Rd., Atlanta, GA, United States 30333, (800) 232-4636, http://wwwn.cdc.gov/dcs/RequestForm.aspx , www.cdc.gov .

Food and Drug Administration (FDA), 10903 New Hampshire Avenue, Silver Spring, MD, United States 20993, (888) INFO-FDA (463-6332), http://www.fda.gov/AboutFDA/ContactFDA/default.htm , http://www.fda.gov/default.htm .

National Institute on Drug Abuse (NIDA), 6001 Executive Boulevard, Room 5213, MSC 9561, Bethesda, MD, United States 20892-9561, (301) 443-1124, http://www.drugabuse.gov/about-nida/contact-nida , http://www.drugabuse.gov/ .

National Vapers Club, [no other contact information], http://www.vapersclub.com/contact/ , http://www.vapersclub.com/ .

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