Welcome to the Safe Kids California Home Safety Online Training! This module is about e-cigarettes and was developed in collaboration with the California Department of Public Health.

**Learning Objectives**

By the end of the module, participants will be able to:

1. Describe what e-cigarettes and e-liquids are.
2. Discuss how e-cigarettes and flavored e-liquids are appealing to youth.
3. Describe the harmful health effects of e-cigarette use and the potential for e-liquid poisoning among youth.
4. Explain the impact of targeted e-cigarette marketing to youth.
5. Understand the current laws and regulations that pertain to e-cigarette use.
6. Use the information provided to talk to children about the harmful effects of e-cigarette use.
What are electronic cigarettes, also known as e-cigarettes? These products are battery-operated devices, often designed to resemble cigarettes, which generally deliver a nicotine-containing aerosol. Using e-cigarettes is similar to smoking but instead of burning tobacco, e-cigarettes heat a liquid solution until it turns into an aerosol that is inhaled.

The liquid solution, commonly referred to as e-liquid or e-juice, generally contains nicotine mixed with other chemicals, and is stored in the cartridge of the e-cigarette. When the e-cigarette is turned on, the atomizer is activated and converts the liquid into an aerosol. When the user inhales, the aerosol passes through the mouthpiece and into the user’s mouth.
E-cigarettes come in various shapes and sizes. Some devices look like traditional cigarettes and come with a pre-filled cartridge of e-liquids. These devices are typically disposable after a single use. Other e-cigarettes are bigger and may be re-used and refilled with e-liquids. “Tank systems” are the larger e-cigarettes that vary in shape and can hold a large volume of e-liquid.

While there are numerous types of e-cigarettes, they also have many names, especially among youth and young adults, such as e-cigs, e-hookahs, hookah pens, vapes, vape pens, vape pipes, mods, tanks, or advance personal vaporizers.
E-cigarette devices can even look like soda cans, mint boxes, cartoon characters, game consoles, or jewelry. Because many of these devices are similar in appearance to pens and toys, adults may be unaware that teens are actually using e-cigarettes or “vaping.”
E-cigarettes are marketed as only emitting water vapor. But is it really harmless water vapor that e-cigarette users are inhaling? The answer is, “No.” E-cigarettes are made up of toxic chemicals in the form of an aerosol. The e-liquid typically contains nicotine, a highly addictive neurotoxin, and using the device to vape e-liquids emit ultrafine particles, heavy metals, and contaminites.

E-liquids also come in thousands of flavors that are made of different types of flavoring agents. The base ingredients for e-liquids are propylene glycol or vegetable glycerin. These chemicals serve as a liquid carrier for nicotine, flavoring additives, and other chemicals in e-liquids. While propylene glycol is FDA-approved to be added in many edible food products, it is not approved for respiratory inhalation.
There are two ways our youth are exposed to e-cigarette aerosol including 1) Mainstream e-cigarette aerosol, which flows out of the device and into the air and 2) Secondhand aerosol, which is exhaled by the user. Exposure to mainstream e-cigarette and secondhand aerosol has been found to contain toxic chemicals like acetaldehyde, benzene, cadmium, formaldehyde, isoprene, lead, nickel, nicotine, N nitrosonornicotine, and toluene all of which are found on California’s Proposition 65 list of chemicals known to cause cancer, birth defects, and other reproductive harm. These chemicals are harmful to the human body because they travel through the circulatory system to the brain and all organs, which can inhibit regular function.
In addition to nicotine and the liquid carrying agents such as propylene glycol and vegetable glycerin, e-liquids also contain chemical flavoring agents. As of early 2014, there are over 7,700 e-liquid flavors available.
The wide variety of flavorings contained in e-liquids is concerning as these flavors are actually created from several different chemicals.
Furthermore, some of the chemicals that make up these flavorings are FDA-approved to be eaten, but not inhaled.
One chemical that is considered generally recognized as safe to be eaten is diacetyl which is used in popcorn butter flavoring. It is naturally found in alcoholic beverages such as chardonnay, which gives it a buttery taste. While diacetyl is generally considered safe to be consumed in foods such as popcorn, it is not safe for inhalation. In fact, exposure to aerosol that contains diacetyl has been linked to a lung condition called “bronchiolitis obliterans” which was found in workers of microwave popcorn factories, and is commonly referred to as “popcorn lung.” This condition is a severe lung disease that permanently damages the airways resulting in a decreased lung function and symptoms such as wheezing, dry cough, and shortness of breath with exertion.

Diacetyl is also found in flavorings that give the peanut butter, graham cracker, vanilla, and caramel taste to name a few. These flavors are also commonly used in e-liquids. In December 2015, Harvard published a study where researchers tested e-liquids for diacetyl, and two other flavoring chemicals: 2,3-pentanedione and acetoin. They discovered that at least one of these chemicals was found in 75% of the 51 e-liquids that they tested.
We are also concerned about e-liquid flavors like peanut butter, graham cracker, and cereals flavors like Fruit Loops and Captain Crunch because they are enticing to kids. For this reason, Congress banned flavored traditional cigarettes in 2009 except for menthol.

In fact, a 2014 Yale study that surveyed teens found that the top reasons they tried e-cigarettes were:

- Curiosity (54%)
- Appealing flavors (44%)
- Peer influences (32%)
Concurrent with the explosive growth of appealing flavors in recent years is the increasing rate of e-cigarette use among youth. In 2014, teen use of e-cigarettes surpassed the use of traditional cigarettes for the first time. In California, in 2013, preliminary data of more than 430,000 middle and high school students from the California Healthy Kids Survey showed that, current e-cigarette use among 11th graders was twice the rate of cigarettes (6.8% smoked vs. 14.3% used e-cigarettes).

For 7th and 9th graders, it was three times as high (7th grade: 2.0% smoked vs. 6.3% used e-cigarettes; 9th grade: 4.3% smoked vs. 12.4% used e-cigarettes).
Are e-cigarettes a gateway to using traditional cigarettes? A growing body of evidence demonstrates that, yes, e-cigarettes serve as a “starter product” for young people towards use of combustible tobacco products. Studies have found that 14-year-olds who used e-cigarettes were 3-4 times more likely to smoke traditional cigarettes or other combustible tobacco products a year after baseline than non-e-cigarette users.
Exposure to e-cigarette aerosol may lead to some adverse health effects. The ingredients in e-liquid, like propylene glycol and flavoring agents, are known to cause inflammation of the respiratory system, which plays a role in the development of cancer and chronic obstructive pulmonary disease.

Preliminary studies have shown that using a nicotine-containing e-cigarette for just 5 minutes causes lung irritation, inflammation, and have an effect on blood vessels. In addition, exposure to propylene glycol can cause eye and respiratory irritation.
One of the primary health concerns about the e-cigarette aerosol and e-liquids is that they contain the neurotoxin, nicotine. Adolescents are still going through critical periods of brain growth and development and are especially vulnerable to the toxic effects of nicotine. Research shows that adolescent smokers report some symptoms of nicotine dependence even at low levels of cigarette consumption. Exposure to nicotine during adolescence can harm brain development and affect future tobacco use and smoking-related harms. Even a brief period of continuous or intermittent nicotine exposure in adolescence elicits lasting neurobehavioral damage, such as impaired attention and memory and increased risk-taking behavior.
Nicotine adversely affects maternal and fetal health during pregnancy. It contributes to preterm delivery, low birth weight, and stillbirth. The neurotoxin is also known to cross the placenta and is detectable in the breast milk of smoking mothers as well as mothers exposed to secondhand smoke. In addition, nicotine has been linked to sudden infant death syndrome, life-long reduced lung function, and congenital malformations. Although there is limited research on the health outcomes of pregnant women who use e-cigarettes, it is not advised for them to use this device or be around someone using e-cigarettes as there is potential for the fetus to be exposed to nicotine and other harmful chemicals from the aerosol.
The variety of fruit and candy flavored e-cigarette smells entice small children to engage with the product and some of those children may accidentally ingest the e-liquid or try to vape the e-liquid because of the flavored taste. E-cigarette cartridges often leak and are not equipped with child-resistant caps, creating a potential source of poisoning through ingestion and skin or eye contact. Even a fraction of e-liquid may be lethal to a small child.

Calls to the poison control centers in California and the rest of the U.S. have risen significantly for both adults and children who are accidently exposed to e-liquids. In California, from 2012 to 2013, the number of calls to the poison control center involving e-cigarette exposures in children ages five and under increased sharply from 7 to 154. By the end of 2014, e-cigarette poisonings to young children tripled in one year, making up more than 60% of all e-cigarette poisoning calls.
Ingestion of liquid nicotine can lead to adverse health effects such as nausea, vomiting, abnormal heart rhythm, seizure, and even death. In December 2014, an 18-month old child from New York died after swallowing liquid nicotine from his parents’ e-liquid bottle.
Another danger of e-cigarette use is the risk of the product exploding due to a faulty battery or other causes. In 2015, there were several cases of explosions across the U.S. that left the e-cigarette user severely injured with burns and in some cases, internal damage.
Marketing

E-cigarettes have quickly gained popularity in the past few years. Some people, especially youth and young adults, see e-cigarettes as cool, and marketing by the tobacco and e-cigarette industries is largely responsible for making these products seem so appealing.

Some of the biggest and most heavily advertised e-cigarette brands are owned by tobacco companies. By the summer of 2014, R.J. Reynolds, Altria, and Imperial Tobacco each had at least one brand of e-cigarettes. Their e-cigarette brands are among the most widely available. Other types of electronic smoking devices can also be expected from the major tobacco companies, such as the recent news by Philip Morris International to test and launch a device that heats tobacco leaf instead of a liquid.
E-cigarette advertisements can be seen on TV and heard on the radio, where tobacco ads have been banned for more than 40 years. Most of the advertising and marketing methods being used today by e-cigarette companies were used long ago by tobacco companies to lure kids into a life-time addiction to nicotine. Currently, no regulations require e-cigarette companies to disclose the ingredients in their products, including nicotine. Furthermore, while it is illegal for traditional tobacco brands to sponsor music or sporting events, the same rules do not apply to e-cigarettes. So brands like NJOY and Vuse are able to host “vaping bars” while blu sponsors NASCAR races and music festivals.
It is no accident that the marketing tactics used by e-cigarette companies are eerily similar to those used in the past by tobacco companies to market traditional cigarettes to kids. Advertising include celebrity endorsements, and messages of rebelliousness, sexual appeal, and glamour — all of which strongly resonate with youth who have a desire to be cool and fit in. Some e-cigarette brands are even marketed as a way to regain smokers’ freedom to vape anywhere they choose or make claims that e-cigarettes are made of natural ingredients, implying that they are healthier than other products.
No federal regulations address the manufacturing, sale, or distribution of e-cigarettes. However, on January 28, 2016, the Child Nicotine Poisoning Prevention Act of 2015 was signed into law, mandating all bottles containing liquid nicotine to be packaged with child-resistant caps to prevent nicotine poisoning in children. In addition, the FDA has proposed a rule that would provide limited regulation on e-cigarettes, but the FDA does not have the authority to regulate “where” e-cigarettes may be used. Thus, the responsibility lies with state and local governments to implement restrictions that protect youth, workers, and the public from exposure to e-cigarette aerosol and e-liquids. In California, it is illegal to sell e-cigarettes to minors. State legislation to require child-resistant packaging and legislation to include e-cigarettes in smoke-free laws is currently pending.

Given that much of e-cigarette marketing focuses on the users’ ability to circumvent smoke-free laws and “smoke anywhere,” local communities play a critical role in protecting nonsmokers and youth from the secondhand exposure to the e-cigarette aerosol. Many California cities and counties are taking steps to treat e-cigarettes the same as cigarettes and other tobacco products. To date, more than two hundred cities and counties in California have passed policies regulating e-cigarettes in their jurisdictions, some requiring retailers to obtain a license to sell e-cigarettes, while others prohibit the use of e-cigarettes in indoor and or outdoor areas, including in multi-unit housing complexes.
As a parent, you are the first line of defense for preventing the next generation of smokers. But it’s often tough to know how to talk to your kids about a product or subject that is constantly evolving. Here are some tips on what you can do to educate and keep your children safe from the risks associated with e-cigarettes:

● **Talk to your kids.** E-cigarettes are purposefully designed to appeal to a younger audience by enticing youth with fruit and candy flavored “e-juice” marketed by celebrities. Have a conversation with your children clarifying that while commercials make e-cigarettes appear safe and trendy, there are many known health threats that accompany vaping.

● **Set Expectations.** Express disappointment, rather than anger toward the idea of your children vaping. Let them know that nicotine and the other chemicals found in e-cigarettes are dangerous and could be a gateway to smoking traditional cigarettes.

● **Be a role model.** E-cigarettes are everywhere today, and kids are receiving an abundance of exposure through advertisements, smoke shops and friends. If you smoke and/or use e-cigarettes, avoid doing either around your kids. The more they see you, the more legitimate your actions and behavior will appear to them. For free counseling to help you quit, call the California Smokers’ Helpline at 1-800-NO-BUTTS or visit www.nobutts.org.

● **Remove the threat:** The candy and fruit flavors smell of e-cigarettes greatly appeal to children, who may mistakenly drink the e-liquid. E-liquid and e-cigarette batteries are poisonous and can be life-threatening if swallowed. If you are using e-cigarettes, never leave e-cigarettes or e-liquid where children can get them. Contact the California Poison Control System right away at 1-800-222-1222 if any e-liquid is swallowed, gets on the skin.
or in the eyes, or shows adverse health effects from trying to “smoke” the device.

● **Get Involved.** Help protect youth from the potential harmful effects of e-cigarettes and e-liquid by encouraging their regulation, including the regulation of manufacturing practices, requiring childproof packaging, and the elimination of flavors.
Thank you for participating in the Safe Kids California Home Safety Online Training on e-cigarettes. For additional information on e-cigarettes, please visit the following webpages.