

SMOKING AND VAPING ADDICTION



# VAPING

The New Cool Way to a Shorter Life

# **SMOKING AND VAPING ADDICTION**

## **CIGARETTES AND TOBACCO PRODUCTS**

The Predatory Drug

## **DEADLY VAPING ADDITIVES**

CBD, THC, and Contaminants

## **FACTS AND FIGURES**

Smoking and Vaping

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Fighting to Breathe Again

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Negative Effects on the Adolescent Brain

## **PEER PRESSURE TO SMOKE OR VAPE**

Finding the Strength in You

## **VAPING**

The New Cool Way to a Shorter Life

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# VAPING

The New Cool Way to a Shorter Life

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Printed in the United States of America

First printing

9 8 7 6 5 4 3 2 1

Series ISBN: 978-1-4222-4579-8

Hardcover ISBN: 978-1-4222-4586-6

ebook ISBN: 978-1-4222-7233-6

Cataloging-in-Publication Data on file with the Library of Congress

Developed and Produced by National Highlights, Inc.

Cover and Interior Design: Tara Raymo • CreativelyTara

Layout: Priceless Digital Media

Publisher's Note: Websites listed in this book were active at the time of publication. The publisher is not responsible for websites that have changed their address or discontinued operation since the date of publication. The publisher reviews and updates the websites each time the book is reprinted.



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## KEY ICONS TO LOOK FOR:



**Words to Understand:** These words with their easy-to-understand definitions will increase the reader’s understanding of the text while building vocabulary skills.



**Sidebars:** This boxed material within the main text allows readers to build knowledge, gain insights, explore possibilities, and broaden their perspectives by weaving together additional information to provide realistic and holistic perspectives.



**Educational videos:** Readers can view videos by scanning our QR codes, providing them with additional educational content to supplement the text. Examples include news coverage, moments in history, speeches, iconic sports moments, and much more!



**Text-Dependent Questions:** These questions send the reader back to the text for more careful attention to the evidence presented there.



**Research Projects:** Readers are pointed toward areas of further inquiry connected to each chapter. Suggestions are provided for projects that encourage deeper research and analysis.



**Series Glossary of Key Terms:** This back-of-the-book glossary contains terminology used throughout this series. Words found here increase the reader’s ability to read and comprehend higher-level books and articles in this field.



*A variety of nicotine products are on display on a shop counter, including cigarettes, several types of e-cigarettes and pod vapes, and smokeless tobacco. In recent years, electronic vapor products have become the fastest-growing segment of the tobacco industry.*



## WORDS TO UNDERSTAND

**cognitive:** referring to the ability of the mind to process various types of information

**refilling fluid:** nicotine-rich fluids that go inside of open-system vaping pens to provide users with their buzz or high

**smoking-cessation tools:** devices or products designed to help people quit smoking tobacco products, such as nicotine-flavored gum, nicotine patches, and electronic vapor devices

**vaping:** the use of small, hand-held vaporizing devices to inhale nicotine, marijuana, or flavored fluids

**vaporizing:** to turn a liquid into vapor using heat or other energy sources

# The Popularity of Vaping

At one time, cigarette smoking was a popular, although unhealthy, activity among teenagers around the world. Today, however, teens have been taught about the health risks of cigarettes and the rate of teen smoking has dropped sharply. Now, young people are much more likely to try using electronic nicotine **vaporizing** devices, which have been promoted as being a healthier alternative to cigarettes. **Vaping**, as the use of these devices is called, can affect a person's health in both the short term and the long term, so it is important that young people fully understand the potential dangers of vaping.

## WILDLY POPULAR

Though many smoking-cessation products—including patches and gums with nicotine—have been developed over the years as ways to help cigarette smokers quit, few have become as immediately popular as vaping. A study by the World Health Organization found that the number of vapers expanded by almost five times between 2011 and 2016, meaning that every year millions of new users were trying vaping devices. In 2011, around 7 million people used electronic vapor products around the world—not a huge number but not minor either. However, by 2016, the number of vapers had increased to 35 million.



*Electronic vapor devices have been promoted as a healthier nicotine-based alternative to cigarettes. However, federal and state health officials have investigated hundreds of cases of vaping-related lung disease in otherwise-healthy young people.*

The marketing group Euromonitor believes that the number of adults who vape will rise even higher to hit 55 million by the year 2021.

By comparison, the number of cigarette smokers worldwide has been slowly but steadily decreasing. In 2000, about 1.14 billion people around the world smoked cigarettes. By 2016, the number of smokers had dropped by about 40 million. Many of those former cigarette smokers have switched to vaping. The rapidly expanding popularity of the market is also driven by teenagers, who prefer vaping to smoking cigarettes.

In 2018, the Centers for Disease Control and Prevention reported that nationwide, 42 percent of U.S. students had used an electronic vapor product (including e-cigarettes, e-cigars, e-pipes, vape pipes, vaping pens, e-hookahs, and hookah pens) at least once during the past year. The CDC projected in its annual *Youth Risk Behavior Survey* that more than 60 percent of students would try vaping by twelfth

grade and reported that 35 percent of twelfth graders had vaped in the previous month.

The rising number of teenagers who use electronic vapor products is a trend that concerns many medical professionals, who believe that vaping is not as safe as has been advertised. Nicotine, they point out, is a dangerously addictive substance that alters the way that the mind works. Whether this drug is delivered through a cigarette or an electronic device makes no difference, as it can still have an adverse effect on the minds of teenagers, decreasing their **cognitive** skills, impacting the health of their heart, affecting their lung capacity, and much more.

Medical professionals have yet to confirm whether vaping is actually safer than other **smoking-cessation tools**. By the fall of 2019, some preliminary studies were beginning to appear, indicating that vaping is not any safer than cigarette smoking. Additional studies need to be undertaken to ensure that teen and adult vapers can be fully informed about the potential risks of this habit. However, the increasing popularity of vaping has created a lucrative market for the devices, so combating aggressive marketing techniques is also a concern.

## SPENDING IS INCREASING

The worldwide economy for electronic vapor products has become exponentially larger over the last several years. Since the earliest e-cigarettes were introduced in 2011, the market for electronic vaping products has expanded to be worth about \$22.6 billion annually. Electronic vapor devices are most commonly used in the world's most developed countries, such as the United States, Japan, and the United Kingdom. These three markets account for a total of \$16.3 billion in annual vaping-related tobacco sales, or over 70 percent of the global market.



*Since 2014, e-cigarettes have been the tobacco product that is used most commonly among American teenagers. By 2018, more than 3.6 million Americans under the age of eighteen were regularly using an electronic vapor device.*

There are several reasons that vaping is popular in these three countries. All three have a very high concentration of smokers, which would explain the large number of people who try electronic vapor devices to help them quit smoking. These three countries are also three of the most financially prosperous in the world, which means people have more disposable income to use on products like vaping pens. And since all three countries also have strict controls on tobacco products, prices of cigarettes and other tobacco products are often higher than those of vaping products. By contrast, in countries where fewer people can afford electronic vapor devices, cigarettes are probably a cheaper alternative, because they may be less regulated.

Today, vaping is also popular in many European countries like Sweden, Italy, Germany, and Norway. Popularity in Asian and African

countries is minimal by comparison and limited partially due to lack of interest and also the lack of availability of these products in many countries. In some areas that are farther away from countries where these electronic vapor products are manufactured, vaporizers may not even be available for purchase yet.

## OPEN SYSTEMS ARE THE MOST POPULAR

Currently, the types of electronic vapor devices that are popular on the market can be divided into two groups: closed systems and open systems. Closed systems use ready-made refills or canisters that are added to the vaper's battery, while open systems have a tank that can be filled with various types of vaping fluid. The most popular option for most users is an open system, and the popularity level isn't even close between the two types.



### DOES VAPING LEAD TO SMOKING AMONG TEENS?

Vaping may do more harm than good for potential teen smokers. While some medical professionals believe that vaping and e-cigarettes may help adults quit smoking, others are more concerned about the effect they may have on teens. A study by the National Institute on Drug Abuse found that 30.7 percent of teen e-cigarette users started smoking within six months of their first e-cigarette use. This rate is over three times higher than the rate for those who don't want to vape (8.1 percent).



*"The recent surge in e-cigarette use among youth, which has been fueled by new types of e-cigarettes that have recently entered the market, is a cause for great concern," reported US Surgeon General Jerome Adams in 2018. "We must take action now to protect the health of our nation's young people."*

Experts believe that vapers will spend close to \$9 billion worldwide this year on open system e-cigarettes or vaping pens. This amount is more than double what will be spent on closed systems. The reasons for this popularity include the lower cost of buying **refilling fluids** and the ability to change the flavor of the e-cigarette in the open system. The choices of cherry, orange, and other sweet fluids are a controversial way of marketing vaporizing pens that many believe focus heavily on children or teens.

Many users prefer open systems because they don't like installing the closed-system chambers near the battery or worrying about interfering with the battery's operation. And while open systems continue to be more popular, closed ones are likely to remain on the market because they still provide a huge profit margin for companies selling vaping products.

## REASONS FOR VAPING'S POPULARITY

As vaping continues to increase in popularity, many experts and medical professionals are speculating as to the reasons why. Many experts have put together several theories to explain why more people are vaping each year. For example, states that have banned smoking inside public areas, such as bars and restaurants, may see high increases of vaping usage among adults as well as teenagers. Individuals who want to smoke in these areas can bring their electronic vapor products and relax with friends instead of having to go outside to smoke a cigarette. Though some cities, or even businesses, have banned the use of vaping devices in indoor areas, no national ban on such activities exists. As a result, people can take a vaping pen just about anywhere and get a hit of nicotine.

Vaping popularity may also be fueled by the belief that vaping is safer than smoking. Many lifelong or even casual smokers are switching to vaping as a way of weaning off the habit or because they

believe it is healthier than cigarettes. However, no studies have yet confirmed that vaping is truly safe for users, and preliminary studies have found that vaping is problematic in a variety of ways.

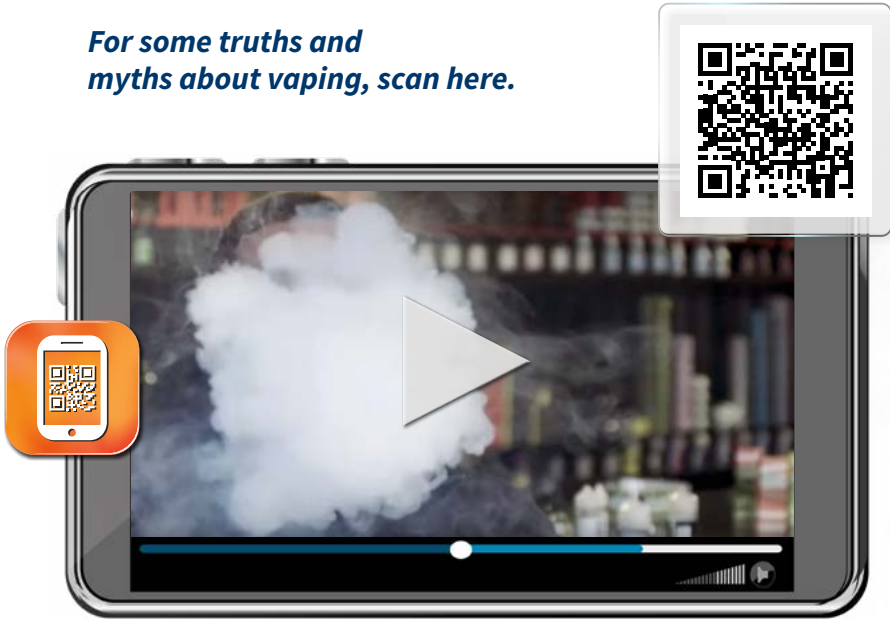
There is also a growing subculture of competitive vaping that has helped fuel its popularity. Vapers try to create huge clouds of vapor or even make shapes with the vapor when they exhale. The popularity of these events continues to grow, which could capture the imagination of someone who may otherwise have ignored vaping.

Vaping popularity among younger users is also potentially fueled by a large number of factors. For example, many vaping companies produce flavored vaping fluids that younger children who may have



*By the fall of 2019, state and federal health officials were investigating thousands of cases of vaping-related lung illnesses, including dozens of deaths reported to the Centers for Disease Control and Prevention. Nearly half of the cases involved e-cigarette users under the age of twenty-five.*

*For some truths and myths about vaping, scan here.*



never smoked might enjoy. Some companies even market their products using child-friendly cartoons or pictures, which may entice younger users to utilize these products.

This increasing popularity is also helped out immeasurably by the easy accessibility of vaping products. As they have yet to undergo any type of consistent control, vaping products are often available in stores. People can buy vaping pens and refill canisters in gas stations and supermarkets. As a result, they don't need to visit a specialty store to purchase a vaping product.

And vaping produces less mess than smoking (which results in cigarette butts and messy ashtrays) and is often easier for many people to do on the go. For example, mothers who don't want to smoke in front of their baby or child may take a hit off a vaping pen instead. Or people going for hikes or walks may prefer their electronic vapor products for an occasional quick puff instead of having to stop and light a cigarette.

Many experts believe that marketing is also key to this uptake in popularity. “Marketing nicotine expressly to youth isn’t new,” said Michael Eriksen, dean of the School of Public Health at Georgia State University and a former director of the Centers for Disease Control and Prevention’s Office on Smoking and Health. He noted that tobacco companies targeted their ads at young people. “They were consolidating around the imagery of the cowboy, [signaling] independence,” he said. But what’s new, said Eriksen, is “this combination of innovation, social media spread, and the fact that it’s unfortunately addicting at the same time.”

## THE FDA’S RESPONSE

The rising popularity in vaping among both adult and youth users has concerned many medical professionals. Vaping has yet to undergo the kind of rigorous medical testing that other nicotine addiction treatment methods have used, though tests are finally being started in many areas. As a result, the US Food and Drug Administration (FDA) has tried to react to this popularity in a variety of ways, including attempting to limit the sales of these products to minors.

“Based on our evidence, we believe the presence of flavors is one component making these products especially attractive to kids,” said FDA Commissioner Dr. Scott Gottlieb. “The mandate to reverse this trend in youth addiction to nicotine is one of my highest priorities. E-cigarettes have become an almost ubiquitous—and dangerous—trend among youth that we believe has reached epidemic proportions.”

As a result, in 2018 the FDA proposed ending the sales of all e-cigarette products that featured flavors that children might enjoy. These include options such as cherry, vanilla, melon, and any other sweet flavor that could entice younger users to try e-cigarettes. More general flavors, such as tobacco and mint, would not be banned, to ensure that e-cigarettes can be used as a smoking-cessation tool.



*President Donald J. Trump, joined by First Lady Melania Trump, Acting FDA Commissioner Norman Sharpless (left) and Secretary of Health and Human Services Alex Azar (right), announces that the Food and Drug Administration is working on a plan to remove flavored e-cigarette products from sale across the nation, September 2019.*

Other elements of the proposal included banning little cigars and the use of child-friendly marketing techniques for electronic vapor products. This marketing ban included limiting the use of animated characters or anything marketed to look like soda or candy products. This 2018 proposal followed an action in which the FDA issued warning letters and fines to those who sold these products illegally to minors.

These steps may be hindered by the fact that such fines are often not high enough to impact the profitability of selling these products to minors. As use increases, and more minors purchase these products illegally, companies that sell electronic vapor products may still come out ahead due to the limited range of control and fining capability the FDA currently has over the vaping market. Therefore, some professionals have called for stricter control measures, such as higher fines and even jail time.

Others have criticized the FDA for not doing more to help minimize the dangers of this phenomenon. For example, Dr. Colleen Kraft of the American Academy of Pediatrics called for the banning of menthol cigarettes and flavored cigars. She stated that these products were often starter tools for beginning smokers and should be banned as a way of protecting children from this addictive substance.





## TEXT DEPENDENT QUESTIONS

1. What are three reasons why vaping is so popular?
2. How much is spent on vaping every year?
3. Does research find that vaping is safer than other smoking-cessation tools?



## RESEARCH PROJECT

Ask people who vape about their history. Why did they start using these devices? Did they smoke before they started? Did they start smoking after they started? How old were they when they started? Did marketing techniques or peer pressure interest them? Compile all of this information, and create charts that showcase the common influences behind vaping and the positive and negative reactions each user feels about their vaper.



*More than 400 different brands of e-cigarettes or electronic vapor devices are sold in stores today. Because e-cigarettes were not regulated by the US Food and Drug Administration prior to 2016, JUUL and other popular brands were never tested by the government to determine whether they were safe to use.*



## WORDS TO UNDERSTAND

**amateur:** a beginner or someone who does something without professional training

**atomizer:** a component inside an electronic vaping device that uses low heat to produce vapor

**dexterity:** an aptitude and ability to perform a specific task

# A Variety of Vaping Devices

Although electronic vaporizing products are readily available in many stores, some people do not understand the many options that are available on the market. Manufacturers have created a vast array of items that can be used for vaping, each of which is designed for specific purposes and for certain types of users. For example, some models are less expensive and useful for beginners, while others are more advanced and require more skilled vaping **dexterity**.

These products are often advertised as more healthy than other tobacco products. However, the magazine *Tech Times* notes, “despite all that is listed as a benefit to the buyer ... researches and studies publicized so far [do] not bring enough proofs that vaping products are or aren’t less dangerous than smoking.”

## E-CIGARETTES

When **amateur** vapers get started on their habit, they typically begin with a simple e-cigarette. These items are designed to be easy to use and often are the same size and shape as a typical cigarette. This familiarity makes them more comfortable for smokers as they transition to a vaporizing device.

Most of these units come in a one-piece design that is disposable and inexpensive. Two-piece e-cigarettes are also available. These use a recharging cartridge that fits inside of the e-cigarette, near the battery. Beyond their ease of use, these options are also very small and easy to carry. Many people can fit them in their front pocket, in a wallet, or even in a purse. Often, teenagers who want to vape prefer this option because they can take a quick hit of vapor and put their e-cigarette away before getting caught. As a result, these are often the most discrete option available.

E-cigarettes are also very affordable and cost a fraction of the price for other devices. While some electronic vapor products may cost



*E-cigarettes use a small battery unit to heat liquid until it becomes an aerosol vapor, which can be inhaled.*

hundreds of dollars to buy and maintain, an e-cigarette may cost less than \$20, and the pods are around the same price or even cheaper.

The downside of this option is that e-cigarettes' lower price usually means that they aren't as sturdy or reliable as other types of electronic vapor products. As a result, owners must be careful when they use them, to avoid breaking or damaging them. A broken vaping container could spill nicotine fluid on a person and cause stains or ruin their clothes. While this option is cheaper, users may end up spending the same amount if they have to buy many e-cigarettes over the years, whereas a sturdier alternative would have lasted the same time.

Regardless, all of these design elements—particularly the price—make e-cigarettes popular among teens who want to vape. Though users cannot get the kind of large vapor clouds that they would with other options, the simplicity of the design and the low price make them a starter option for many people, or a transition choice for those trying to quit smoking.

Vape pens are a variation on e-cigarettes and are designed to be larger and operate better than their cousin unit. Like e-cigarettes, they have a simple shape but are designed to be more efficient and powerful. They also have a longer battery life, replaceable coils and cartridges, and other advantages. However, they do cost more than e-cigarettes.

## POD VAPES

Although e-cigarettes were the first type of vaping product to hit the market, manufacturers have expanded their range over the years to produce a vast array of vaporizing equipment. Pod vapes are perhaps the most recent addition to the market. They have a two-piece design that includes a battery/heating device and a refillable pod. Their shape and size are a little bulkier than those of e-cigarettes, which may make them more awkward for some to use. However, they have advantages over e-cigarettes.

Pod vapes are almost as affordable and as easy to use as e-cigarettes. Users simply need to put their mouth on the inhaling device, press a button, and inhale the vapor. Pod vapes are also more efficient than e-cigarettes in many ways, because users don't have to buy an entirely new unit when theirs is exhausted. And they typically don't require as much work to refill or recharge the pod.

Just as importantly, pod vapes are very practical and convenient. Most are still quite small, usually hand-sized, which means a person can be unobtrusive when using these vaporizers. However, they



*A pod vape contains two elements: a pod filled with vape juice (right) that snaps into a small battery unit (left). Some pre-filled pods are disposable, while others can be refilled. Since 2017, the JUUL brand of pod vapes has become the most popular e-cigarette in the United States, particularly among teenagers.*



## VAPING COMPETITIONS

Competitive vaping is actually a thing. During competitive events, vapers inhale large amounts of vapor and try to exhale huge clouds. There are also trick competitions, which include a variety of different elements like creating specific shapes. Typically, a competitive vaping device's ohm is set at a regulated level to ensure that the competition is fair. The first known vaping competition was held in 2012 and was known as the West Coast of the USA competition. Health professionals are concerned that such events could draw even more people into what they consider a harmful habit. Others worry that such events normalize excessive nicotine use.

also produce a higher volume of vapor with each button press than e-cigarettes do.

When compared to e-cigarettes, these units also utilize their nicotine fluid more efficiently, due to higher and more focused temperature levels. This means they use less fluid to produce a high volume of vapor, because the pod units have a higher ohm setting than e-cigarettes. (In electrical devices, *ohms* are units of resistance. The lower the resistance of your electronic vapor device, the greater the amount of current flowing through it.) Thus refillable devices don't need to be changed out nearly as often as they do in e-cigarettes, making them potentially more cost-efficient.

Downsides of these pods include the lack of ohm control that is common on more substantial and more expensive vaping items. As a result, users may be stuck at a specific vaping level with no ability to increase their intake. However, there are many other options that they can utilize if they want to improve their vaping pull.

## BOX MOD

Those who want the most vapor often go with a “box mod” option. Box mods are larger kits that can be easily adjusted in a variety of ways. For example, a user can add extra tanks or adjust the ohm level to produce higher levels of vapor when using this equipment than the user could with pods or e-cigarettes. As a result, this option is typically a better choice for those who have some experience using electronic vapor devices.

Most starting kits of this type come with a single-battery mod that includes variable wattage options and temperature-control choices. Temperature control allows the user to decide how hot the vapor is coming out of the pen. Hotter vapor typically produces



*A box mod, which gets its name from its distinctive box-like shape, is larger than the typical e-cigarette or pod vape.*

*To learn how electronic vapor products work, scan here.*



a stronger reaction in users but may be hard for some users to tolerate. As a result, users need to be prepared to adjust their intake, as needed, to avoid burns.

This adaptability makes the box mod option very popular for many users. Paired with this adaption capability is the longer battery life of the average mod unit. As a result, the user typically doesn't have to swap out batteries nearly as often, thus saving money on each unit. Some units use rechargeable batteries, which provides another benefit.

Most box mods also have more powerful **atomizers**, which means that the user can produce a higher volume of vapor in a shorter period. A large number of competitive vapers use either a box mod or a variation on one when they compete. These users also like box mods because they can be swapped out with other tanks, which expands their utility by allowing more power and more diverse taste options.



*Electronic vapor devices can be modified in many ways to improve their performance. Here, a technician replaces the titanium wires that heat the nicotine “vape juice.”*

Those who have mastered box mod options often switch to high-wattage choices later on in their vaping career. This option has typically the same average size and shape of the standard box mod. However, they also have more options and more power that make them a good choice for those who have already gotten as much as they could out of less-powerful box mods.

High-wattage box mods are also designed to be among the easiest to adjust and modify if the user has the skills. As a result, these units are often highly personalized and include additions to their designs that make them more powerful and easier to use. Power is typically dictated by the number of batteries installed in each unit—two is the weakest, while three is about average. Mods with four or more batteries are available but often must be modified before use.

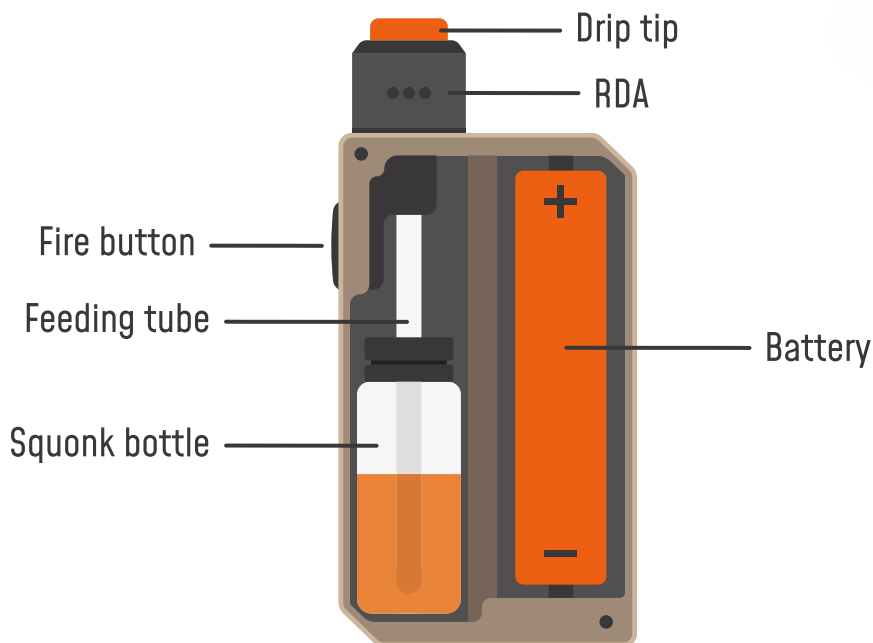
## SQUONK MOD

Although technically a type of box mod starter kit, the squonk mod is something that advanced users create using a variety of modifications.

This setup uses a bottom-fed tank and a squeezable bottle. The bottle for these units is an external storage tank that the user can squeeze to add more fluid as needed. Users enjoy this modification because it gives them a more extended usage out of their kit without requiring refilling or tank replacement.

Most of these kits use a single-battery design that makes them about the same size as a dual-battery mod. Users are particularly enamored with squonk mods because they don't need to drip fluid into them, due to the unique design. Their power and adaptability levels are also quite high. However, their higher level of nicotine production could make them more harmful, overall, than less expensive options.

## Squonk mod



*Users enjoy the squonk mod because it gives them more extended use of their kit without requiring refilling or tank replacement.*

# TANKS ARE NECESSARY

Tanks are critical for any vaporizer because they serve a variety of different purposes for vaporizing equipment. At the basic level, a tank is a container that holds the nicotine liquid used in a vaporizer. These tanks are typically clear to make it easier to track the amount of liquid left inside. Tanks also dictate the usage time of a vaporizer, as the user will need to swap them out as they run out of fluid. And the size and shape of a tank will vary, depending on various factors, including the type of vaporizer in use.



*Vape juices derived from marijuana are often produced illegally, so they are not subject to government safety standards on manufacturing or to FDA testing. Such products are thought to have contributed to the rise of vaping-related lung illnesses and deaths in 2019 and 2020.*



*Refillable tanks like these hold the nicotine liquid that is used in an electronic vapor device.*

E-cigarettes often have very small tanks or don't have tanks at all. Pod vapes utilize a separate refillable tank, while box mods utilize an even more substantial option for vapers. Some units may also have adjustable tanks based on how much vaping fluid the user wants in the unit. And each container hooks up to a vaping unit near the bottom, which is where the fluid is fed into the heating unit for vaporization.

As the nicotine fluid heats, it produces vapor that the user can then inhale. The tank will regulate how much fluid gets heated when the user pushes the ignition button. A small door will open to allow in a certain amount of liquid, and will close when the chamber is full. In this way, the rest of a tank's fluid doesn't get vaporized.

“Vaping technologies will not stop here, so we can most certainly expect more advanced products of the next generations,” predicts Christina Matthews in *Tech Times*. “Vaporizers will likely have a smaller size, higher efficiency, safer and more user-friendly features, and become more entertaining and personalized to match a user's needs.”



*Most box mods have powerful atomizers, which means that the user can produce a higher volume of vapor in a shorter period.*



## TEXT DEPENDENT QUESTIONS

1. What vaporizer is designed for advanced users?
2. What does the atomizer do for a vaping unit?
3. How does the ohm level affect the quality of a vaping unit?



## RESEARCH PROJECT

Visit a local dealer who sells vaporizers, and ask how the various items operate. Does the ease of use influence what sort of person will use a particular vaporizing unit? With input from the dealer, create a chart that shows the most popular features of vaporizing equipment.



*Vaping juice includes a variety of chemicals and artificial flavorings. Some of these may be safe to eat, but cause problems when inhaled. For example, diacetyl, a buttery flavor often added to microwave popcorn, has been linked to obstructive lung disease when inhaled.*



## WORDS TO UNDERSTAND

**depressant:** a substance that decreases the activity of the neurotransmitters in the brain and also affects body organ operation

**overdose:** taking too much of a substance, which can cause very adverse side effects for a person, including death

**propylene glycol:** a petroleum by-product that lets users produce a “throat hit” when vaping

**stimulant:** a substance that increases the activity of the neurotransmitters in the brain and also affects body organ operation

**tachypnea:** the medical term for shallow and rapid breathing, a common side effect of excessive nicotine use

**vegetable glycerin:** a chemical derived from vegetable oils that thickens the vapor and produces a sweet taste

# How Nicotine Affects the Brain and Body in the Short Term

Vaping is billed as a safe way for smokers to quit their habit or as a complete nicotine-replacement system. However, users who vape for extended periods are likely to notice many short-term effects that affect how well they enjoy the vaping process.

Many of these effects are due to the nicotine in the vaping fluid, while others are connected to other ingredients in the fluid, including **propylene glycol** (PG) and **vegetable glycerin** (VG). More studies need to be taken to ensure that these issues are not severe or dangerous, which is one concern that many anti-vaping experts express regularly. Fortunately, long-term studies are finally being produced that confirm these issues as well as the following short-term concerns.

## SORE THROAT

Although smoking is known to cause throat problems, such as agitation of the throat muscles, many vaping companies advertise their units as being free from these issues and much less of a concern than smoking. This idea of “agitation-free” vaping is something that



*E-cigarettes have been promoted as being less harmful for adults to use than smoking regular cigarettes. This is because e-cigarettes do not burn tobacco, a process that produces at least seventy chemicals that cause cancer. However, the long-term health effects of electronic vapor devices are not known, and in 2018 the National Academies of Science, Engineering and Medicine reported that e-cigarette vapor contains a number of dangerous chemicals, including acetaldehyde and formaldehyde, that can cause lung and heart disease.*

honest vaporizer users will admit is inaccurate. Even the happiest user of a vaping pen is likely to complain about a sore throat from time to time, particularly if they use their vaporizer quite often.

As a result, many people who use vaporizing equipment find that they suffer from a sore throat after extended use. The triggering issue here lies in the very act of inhaling the vapor. Though vapor may not agitate the throat as much as smoke, it is still capable of causing



*Symptoms of vaping-related lung illnesses include constant coughing, shortness of breath, chest pain, and sometimes diarrhea or pain in the stomach or abdomen.*



*Sipping on a glass of water may help to minimize the sore throat pain caused by regular vaping.*

adverse reactions, especially due to its heat level. That said, the liquids involved in vaping (PG and VG) may also trigger a sore throat in many individuals.

Vaping site South Beach Smoke put it succinctly: “Vapor smoking is not an adequate source of hydration. Yes, it does involve liquids, but when you vape, you do nothing for your body’s need for water. Because e-liquids are comprised of PG and VG, both of which substances have a tendency to attract moisture, you may find the hydration is literally sucked right out of you! A dry mouth and sore throat can happen as a result.”

This reaction occurs because the vapor triggered by PG and VG will naturally absorb liquid in the user’s throat muscles and cause them to dehydrate quickly. This issue is particularly problematic for PG because of its nature as a by-product of petroleum. The sometimes harsher nature of this fluid can make it more upsetting for a person’s throat, and may cause even more dehydration.

The best way to avoid this problem is simply not to vape. However, those who want to vape and prevent a sore throat should take breaks between hits. This step should help minimize the risk of a sore throat. They may also want to have a glass of water nearby while they vape. Sipping on this glass may help to minimize the sore throat pain caused by regular vaping. Unfortunately, extended breaks may be hard for some users to tolerate if they heavily use their vaporizer or have it set at a high nicotine level.

## VERY MINOR MENTAL “BUZZ”

Like all other types of illicit and legal drugs, nicotine will alter its users’ body chemistry in a variety of ways. The most obvious way is how it creates a feeling of a “high” or “buzz” when used. This feeling occurs because of the ways that nicotine targets various pleasure centers in

the human brain. These receptors react heavily to various types of substances—particularly alcohol and opiates—but also respond to nicotine by releasing a very brief burst of pleasure.

However, the high produced by nicotine is among the shortest possible. Typically, the high that a person feels is common only in people who are smoking for the first time or those who smoke very infrequently. Those who start smoking heavily won't experience the



*Some people report feeling a mild “high” when they vape. However, according to the Centers for Disease Control, studies show that teenagers who use nicotine often see a decline in their memory, attention span, and ability to learn.*



## COMMONPLACE CHEMICALS

While many people outside of the vaping world have never heard of propylene glycol or vegetable glycerin, these chemicals are used in many products. For example, many kinds of toothpaste and other oral-health products contain PG, as do many pet foods and beauty products. VG is used in a similar range of products but is also used as a sweetener, in soaps, and as a thickener in medicinal creams. The FDA has ruled that both are safe for consumption, though only at relatively low levels. Anyone who vapes should try to limit their intake to avoid any type of adverse reaction or overdose.

buzz, because their body and mind will get used to the sensation and adapt to it instead of reacting to it. The same lack of a high is common in vaporizer users but may occur more quickly due to the higher level of nicotine contained in each cloud of vapor.

And even those who experience the buzz from their nicotine will notice that it lasts only a few seconds before it is gone. However, the body is still reacting in various ways to the substance as it is metabolized through the body. These short-term effects often include a feeling of calmness or relaxation that eventually gets replaced by a tingling sensation throughout the body. However, even these simple feelings or sensations typically go away after a few more minutes.

## FASTER HEART RATE

Lifelong smokers know that their heartbeat rises a bit every time they take a drag on a cigarette or cigar. However, vapers may be surprised to learn that this same increased heart rate occurs when they use their



*When an individual ingests nicotine, the chemical has an immediate effect on their neurotransmitters in the brain.*

vaporizer. The major contributing factor to the increased heart rate isn't inhalation of the smoke or vapor—though that plays a role—but the effect of the nicotine on the heart itself.

When nicotine hits the bloodstream, it is carried to the heart, causing it to race more quickly. The increase will be very temporary—sometimes no more than five to ten minutes after a person finishes smoking or vaping—but does occur. During this period, the nicotine user may also have higher blood pressure and a decreased blood flow to his or her fingers and toes, which may cause them to become cold or even numb.

The short-term effect caused to the heart may not be devastating to a vape user or enough to cause them permanent injury. However,

sustained use of electronic vapor products may cause a more widespread heart problem that could become a lingering health issue. And even in the short-term, increased heart rates may lead to dizziness, nausea, headaches, and even vomiting in some vaporizer users.

## ACTIVATED NEUROTRANSMITTERS

When an individual ingests nicotine from any source, the chemical has an immediate effect on their brain. Drugs of all types have some effect on the brain, and the reaction caused by nicotine is centered in the neurotransmitters there. These chemicals are released in the brain to provide a variety of reactions, and their release is often heavily affected by various substances. For example, a **depressant** like marijuana will decrease the speed at which these neurotransmitters work, to cause the calming effect common with use of this substance.

Changes in the release of the neurotransmitters also spread to other areas of the body, such as the lungs and the heart. The dangers of vaping to the heart have already been discussed, but the ways that nicotine affects the brain are important to understand fully. Unlike marijuana, nicotine is a **stimulant**—which may surprise many vapers who enjoy the calming effect that they eventually get from nicotine.

As a result of this stimulation of the release of neurotransmitters, a person may be able to think more quickly and accurately for a short period after taking a hit on a vaper. However, this clarity of thought is likely to pass very quickly when the nicotine is metabolized out of the body. And many people don't feel an increase in focus at all but, instead, a jittery feeling that decreases their ability to concentrate.

Unfortunately, these reactions may also become long-term issues due to the effects that nicotine has on the prefrontal cortex. Studies have shown that this drug adversely affects the growth of this part of the brain, which is crucial for various learning and cognitive skills. For developing teens, this slowing of their development could be permanent and could lead to more long-term concerns.

*To hear doctors speak about the long-term effects of vaping, scan here.*



## DIABETIC COMPLICATIONS

Although this factor has yet to be fully confirmed, a number of individuals who use electronic vapor products have reported that their blood glucose—or sugar—levels were heavily affected by vaping. This problem also affects people who smoke—long-term cigarette smoking has long been shown to adversely affect a person’s blood glucose and insulin levels, through either increases or decreases.

Though these concerns are perhaps not major for many people—high blood sugar will make most people feel confused or high strung for a short period—those with any type of diabetes should be very concerned. The delicate nature of their blood sugar level means that they cannot take risks raising and lowering their blood sugar or insulin levels in any way that may put them at risk.

The short-term effect of this situation will also be much higher in those with diabetes than in those without it. Those with extreme

diabetes can see increases and decreases in their blood sugar in a matter of seconds, which may put their health and well-being at risk. Though the attendant increase or decrease may be low in most cases, any change is problematic for someone with diabetes.

As a result, those with diabetes who want to utilize vaporizing equipment should make sure to understand the risk before they start. They may want to regularly check their blood glucose and insulin levels while they vape to ensure that they don't experience adverse reactions. And they may want to quit vaping or smoking entirely if they find that their levels are too heavily affected.



*Nicotine can affect a person's blood sugar levels, increasing the chance that the person will develop type 2 diabetes. This lifelong condition affects the way that a person's body can use glucose in the blood to provide energy for their cells.*

## OVERDOSE

While the amount of nicotine necessary to **overdose** is typically too high for the average cigarette, cigar, or pipe smoker to hit, ironically, those who vape or use other nicotine-replacement products are at a much higher risk. The amount of nicotine required for an overdose will vary, depending on the person. For example, body weight and the source of the nicotine can affect an overdose rate.

A paper entitled “Can You Overdose on Too Much Nicotine?” by Jayne Leonard stated, “According to research by the Centers for Disease Control and Prevention (CDC), the number of calls to poison centers involving nicotine poisoning from these sources rose from 1 per month in September 2010 to 215 per month in February 2014. The number of calls regarding nicotine poisoning from traditional cigarettes did not change.”

Typically, most professionals claim that anywhere from 50 to 1,000 milligrams can be deadly to a person. The lower (50 to 60 milligrams) level is the equivalent of five cigarettes smoked all at once. Since nicotine is metabolized very quickly from a person’s body—often in as little as 30 to 60 minutes—obtaining this level via smoking is nearly impossible. And since many professionals believe that only high levels—like 500 to 1,000 milligrams—are deadly, a fatal overdose via smoking is very unlikely.

However, an overdose may occur at lower levels of consumption and cause a myriad of symptoms. Typically, a person will start to notice the first stage of nicotine poisoning about 15 to 60 minutes after the excessive exposure. These signs include excessive salivation, nausea, vomiting, dehydration, headaches, dizziness, tremors, confusion, sweating, increased heart rate, and rapid breathing.

During the next stage, the nicotine will start to leave the body and cause a myriad of other symptoms. These often include low blood pressure, **tachypnea**, diarrhea, fatigue, pale skin, and general



*An e-cigarette user would probably need to vape non-stop for hours before his or her body reaches the sustained nicotine level necessary for an overdose.*

weakness. Severe cases of nicotine overdose may cause a person to experience seizures, coma, breathing difficulties, and even respiratory failure. All of these problems can occur in the short term if a person abuses his or her vaporizing equipment.

Fortunately, even an overdose with electronic vapor products is very unlikely and only occurs under extreme circumstances. However, a person who feels lightheaded or sick when vaping should take a break and consider visiting a doctor if adverse reactions occur.



*Vape juice can be dangerous if it is left out where young children or pets can reach it. Drinking vape juice could result in a nicotine overdose.*



## TEXT DEPENDENT QUESTIONS

1. Why is the buzz caused by nicotine so short in long-term users?
2. What is the potentially deadly level of nicotine overdose?
3. How are the neurotransmitters affected by vaping?



## RESEARCH PROJECT

Visit local doctors and ask about the short-term reactions caused by vaping. Write a one-page paper on the ways that these short-term effects could complicate a teen's life.



*Studies have found that the use of nicotine products during adolescence can increase the likelihood that a user will try, and possibly become addicted to, other drugs in the future.*



## WORDS TO UNDERSTAND

**acetal:** a type of chemical that is potentially hazardous to human health

**adversely:** affecting something negatively or in a bad way

**degradation:** the worsening of something over an extended period

**nasopharyngeal cancer:** a cancer that affects the upper part of the throat, behind the nose

**residual:** referring to a small or minor amount of a substance that is left behind

**toxicity:** the potential of a substance to cause an adverse or dangerous reaction

**unregulated:** not overseen by an outside controlling body, such as the US Food and Drug Administration

# Long-Term Effects of Vaping and Nicotine

Although the short-term effects of vaping may seem minor under many circumstances, a growing body of evidence is discovering the potential for long-term issues. The relatively new nature of vaping and vaporizers meant that some time was necessary before such findings would be available to science and the general public.

The first few studies of these types are now being published, and not all of the news is good. The still relatively **unregulated** nature of vaping and electronic vapor products could find itself in jeopardy if more adverse effects are found in those using vaporizers over an extended period.

## UNPROVEN LONG-TERM RISKS

Before discussing the possible long-term risks and dangers of vaping, it is important to understand that many medical professionals have stated that vaping remains a safer option than smoking. For example, a study authored by Drexel University examined the chemical measurements of many e-liquid brands. The focus was to see what chemicals were involved and their levels of danger.



*The regular use of e-cigarettes among high school students increased from 11.7 percent in 2017 to 20.8 percent in 2018, according to a report by the US Surgeon General.*

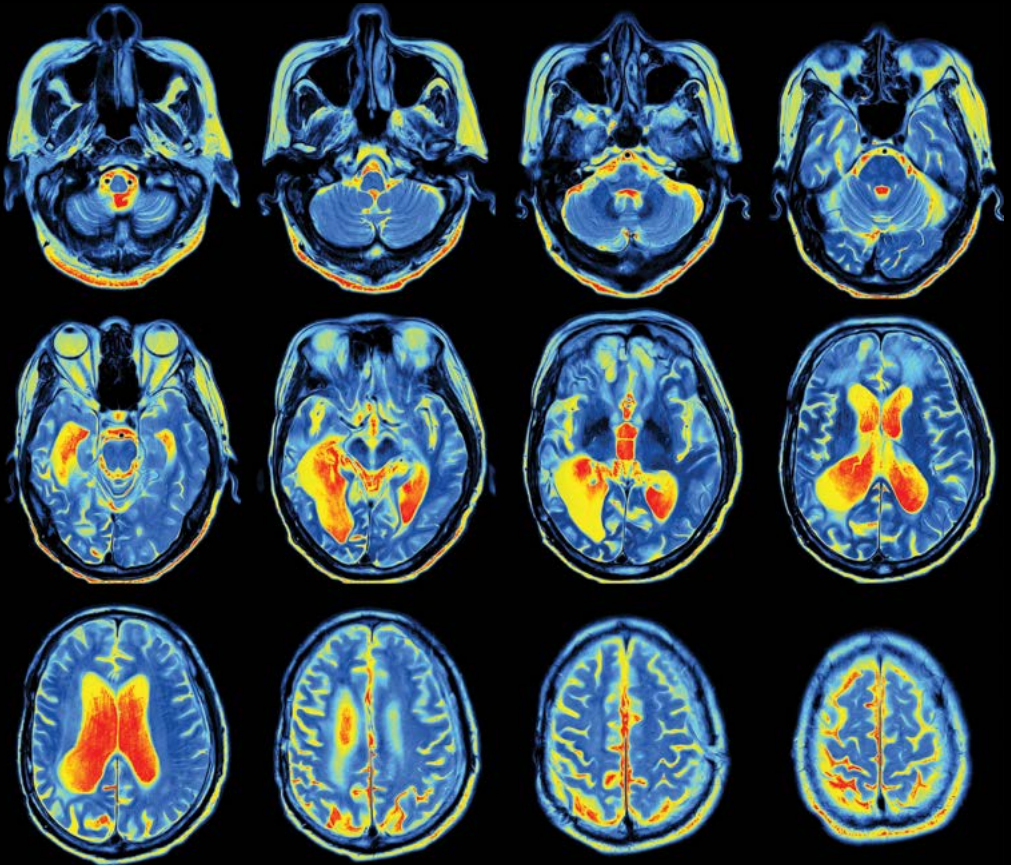
Research specialist Igor Burstyn believed that, while there were potentially dangerous chemicals in e-liquid, they were at a level that was 1 to 5 percent of what is present in cigarettes. They concluded that, while not 100 percent safe, vaping was a better alternative to smoking, even in the long-term. However, the researchers did not rule out the possibility of unforeseen side effects being discovered in the future.

A later study in 2016—published by the UK’s Royal College of Physicians—came to the same result in their study. They believed that the harmful chemicals in electronic vapor products were only 5 percent of what would be found in cigarettes. And while they ruled that vaping was safer than smoking, they stated that risk still existed and that vaping was only safe in the context of a smoking-cessation program, not as a long-term activity.

Likewise, another study in 2014 took a look at 114 different case examples to gauge the general safety level of e-cigarettes and vaping. The conclusion was similar to that of other preliminary studies: vaping was, in general, a safer alternative to smoking. The head of the study even criticized the ways that some health professionals had presented the dangers of vaping, saying that **residual** risk was obvious but exaggerated by those wishing to make a political point.

In each of these studies, however, the importance of further testing—particularly into the long-term effects of vaping—was heavily emphasized. Making a ruling on the safety of vaping is impossible without these tests, which are now in the early stages of being conducted. In fact, a study in October 2019 that was funded by the National Institutes of Health reversed the conventional wisdom about the safety of vaping compared to cigarettes. That study, conducted by researchers at New York University and published in the journal *Proceedings of the National Academy of Sciences*, reported that e-cigarette vapor causes lung cancer in lab mice, and could potentially cause bladder cancer as well. Although the long-term effects are still

being studied, the report concluded that vaping will probably cause some human cancers, as well as other diseases. Many of the newly discovered long-term effects are common with nicotine use in general, while others are found more strictly in vaping.



*Nicotine exposure during adolescence can hamper a young person's brain development. Scientists have found that the brain continues to develop until a person is about twenty-five years old.*



## UNKNOWN EFFECTS

The first generation of vapers will help medical science learn more about the dangers of this habit. The Truth Initiative, a group designed to help promote tobacco- and nicotine-free living, has come out strongly against the sale of electronic vapor products, particularly to minors. They are particularly disturbed by the fact that medical researchers are treating the first generation of users like “guinea pigs,” because they do not fully understand the dangers of vaping. Unfortunately, this uncertainty about health effects is often the case with new products. Although animal tests have been done using vaping devices, the results of such tests don’t always correlate with the actual effect on humans.

## INCREASED MENTAL DEGRADATION

Although nicotine does produce a pleasant boost in mental energy in the short-term, its long-term effects on mental capacity are sharply negative and could even be dangerous to some teens. Multiple studies on cigarette smokers have shown that cigarette use decreases a person’s cognitive abilities by altering brain chemistry, slowing brain development, and affecting how nerve cells function in the brain.

For example, a report entitled “The Dynamic Effects of Nicotine on the Developing Brain” by Jennifer B. Dwyer, Susan C. McQuown, and Frances M. Leslie stated, “nicotine interferes with catecholamine and brainstem autonomic nuclei development during the prenatal period ... and influences limbic system and late monoamine maturation during adolescence.”

These findings are troubling for many medical professionals, because many e-cigarettes and vaporizing equipment utilize a high



*Regular exposure to high levels of nicotine may cause damage to the brain, which could cause seizures and other complications.*

volume of nicotine that is much more potent than that present in cigarettes. Brands such as JUUL are designed to produce a higher exposure of nicotine and are advertised as such for their high intensity. However, researchers believe that they could have a very harmful effect on many users, particularly those who are not prepared for this high level of nicotine content.

Their particular fear is that teens who have taken heavily to vaping as an alternative to cigarette smoking may be the most seriously impacted. The mental chemistry and capacity of the average teenager are still developing even into the eighteenth year of a person's life. As a result, the high levels of nicotine common in JUUL and other vaporizers and e-cigarettes could **adversely** affect their mental development for years.

## POTENTIAL FOR SEIZURES

As the use of vaporizing equipment has spread and expanded into millions of users all around the world, the FDA has grown more and more concerned. These worries center around the short- and long-term effects of vaping. In April of 2019, the agency opened up a case to investigate whether vaping had triggered a series of severe seizures during the early part of that year.

This investigation was launched after many people—up to 127 by August of that year—were suffering seizures after using vaporizing equipment. The idea behind the investigation was to check into potential influences on these seizures, including the various chemicals used in the e-cigarette e-fluids and the nicotine levels. The FDA was not yet certain that these products could cause this type of reaction in potential users or why they would if there were a connection.

One thesis put forth by medical professionals states that the high concentration of nicotine present in many of these products could



# COPD

## Chronic Obstructive Pulmonary Disease

### COPD Symptoms

- Chronic Cough
- Production of Mucus
- Fatigue
- Shortness of Breath
- Dyspnea
- Chest Discomfort

### COPD Causes



Smoking

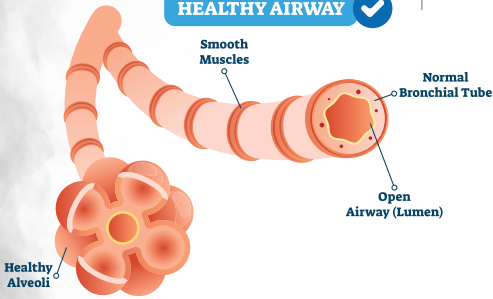


Air Pollutants



Genes

### HEALTHY AIRWAY ✓



Smooth Muscles

Normal Bronchial Tube

Open Airway (Lumen)

Healthy Alveoli

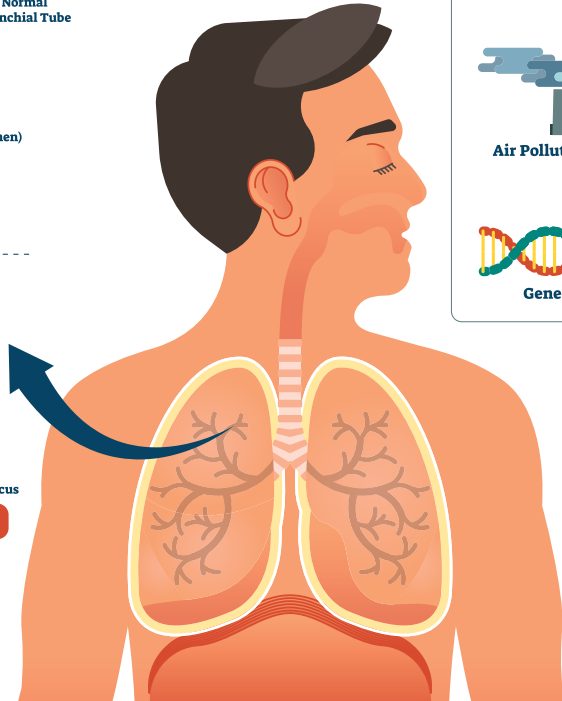
Inflammation and Excess Mucus

CHRONIC BRONCHITIS



Alveolar Membranes Break Down

EMPHYSEMA



Long-term exposure to substances that irritate and damage the lungs can cause a breathing disorder called chronic obstructive pulmonary disease, or COPD. Some forms of COPD include chronic bronchitis and emphysema, both of which make it hard for a person to breathe.

*Scan here to learn about potentially dangerous chemicals in vape juices.*



trigger problematic and damaging seizures in the short and long term for regular vaporizer users. For example, a high dose of nicotine could cause nicotine **toxicity**, which makes the brain react in unpredictable ways. And regular exposure to such high levels of nicotine may cause damage to the brain, which could cause seizures and other complications over a person's life.

## RESPIRATORY PROBLEMS

Although the long-term studies examining the effects of vaping are just starting to be published, a startling number have shown the possibility for serious respiratory problems in regular vaporizer users. When studying the chemicals utilized in various forms of e-liquids and liquid nicotine, researchers found at least sixty different compounds, with more also being present in the aerosol produced by the vaporizer.



*There could be thousands of teenagers switching to cigarettes and still using their vaporizers every day when they can't smoke cigarettes, such as when they are in school or at home.*

Many of these chemicals—such as propylene glycol and other types of solvents—have been shown to produce adverse respiratory problems with lengthy exposure. Problems include infections throughout the upper respiratory tract that could spread and become more serious. Even worse, high-potency liquids produced by JUUL and other manufacturers may contain **acetals** that could be harmful. And although many of the chemicals used in vape juices may be safe to ingest by themselves, there is little data on how the human body reacts to them when mixed with the other chemicals in the vape juice. Many of these chemicals were never meant to be heated or inhaled.

The troubling thing about this finding is that manufacturers utilize different chemical compounds in their fluids, as there is no regulation on a specific formula. As a result, individuals may find that some brands produce a higher risk for respiratory problems than others. Other complications that could affect a person over the long term include inflammation and irritation that cause damage to tissues in the throat and the lungs.

## HIGHER RISK OF HEART ATTACKS

Having already talked about the short-term effect that nicotine and vaping present to the heart, it should be no surprise that vaping could have a long-term effect on heart health. For example, a study by the University of California San Francisco (UCSF) found that vaping was connected to an increased risk of heart attacks. This increase wasn't small—the initial research found that vaporizer users had a doubled risk of heart attacks over those who didn't vape at all.

This study was published in 2018 and was one of the first—if not the first—to take a look at the long-term effects of vaping on the general public. It examined 70,000 people who used e-cigarettes over a decade. Heart attacks were at the top of the list of long-term effects noted during this period, though researchers did find other

concerns that could be problematic—such as respiratory infections and lung **degradation**.

Researchers in the study stated, “The finding of increased heart attack risk for e-cigarette use, in addition to the risks of any smoking, is particularly troubling, because most people who use e-cigarettes continue to smoke cigarettes.”



*Nicotine use during pregnancy can result in many health complications for the baby, including low birth weight and developmental delays.*

Unfortunately, this study also found that heart attack risk also tripled when a person smoked cigarettes every day. And since many e-cigarette and vaping users may combine both of these habits to get their nicotine input every day, they may experience an increased risk of five times over those who do not smoke cigarettes or use e-cigarettes. This problem will worsen, the longer someone abuses both substances.

Even worse, similar studies found that teenagers who used vaporizing equipment were more—not less—likely to start smoking and using their vaporizers as well. As a result, there could be thousands of teenagers switching to cigarettes and still using their vaporizers every day when they can't smoke cigarettes, such as when they are in school or at home. Many believe that the damage that they're doing to their heart could be enough to trigger a wave of early heart attacks in an entire generation.

## BIRTH COMPLICATIONS

A recent study uncovered a disturbing fact: four percent of pregnant women are vaping while they are pregnant. This percentage is higher than among women who are not pregnant. And this vaping use was also higher in women who smoked cigarettes than in those who did not. Researchers found that these pregnant women believed that vaping was “safe” for their baby and a good way to get through their pregnancy without smoking.

Surprisingly, many pregnant women using vaporizing equipment didn't even know whether their e-cigarettes had nicotine in them at all. (Most do unless advertised as non-nicotine fluids.) Even these supposedly nicotine-free liquids sometimes contain trace levels of this drug. Unfortunately, those who believe that vaping is safe for their babies are wrong. Nicotine is always a harmful substance for developing fetuses, no matter what the form of its delivery is.

Even worse, pregnant women who use high-intensity electronic vapor products may expose their unborn children to more nicotine than if they had just smoked cigarettes. And while the levels of dangerous chemicals may be lower due to the lack of smoke, the babies will still adversely react to the nicotine. As a result, children may be born with birth complications and other problems. Some researchers are worried that a new epidemic of congenital disabilities could affect the children of millions of vape users around the world.

## EXPOSURE TO DANGEROUS CHEMICALS

While manufacturers of e-cigarettes may try to claim that they use safe chemicals in their products, that isn't always true. As mentioned previously, there are many potentially dangerous ingredients in a broad array of e-cigarettes and vaporizing equipment. One of the worst of these is formaldehyde, a substance that is also found in cigarette smoke and hazardous to ingest in any way.

Many people may know formaldehyde as a chemical used to preserve dead bodies and dead animals and insects. Unfortunately, regular exposure to this chemical is dangerous, particularly over an extended period. Short-term inhalation may cause irritation in the eyes, nose, and throat that makes vaping uncomfortable or even impossible for some to tolerate. The discomfort will vary, depending on the concentration of formaldehyde in the e-fluid.

Even worse, animal studies have found that high concentrations of formaldehyde could increase a person's risk for lung and **nasopharyngeal cancer**. Other studies have detected an increased risk of nasal squamous cell cancer, which is why the EPA currently lists formaldehyde as a probable human carcinogen. And while the doses that could cause cancer are quite high, sustained vaping use could make this a severe problem.



## TEXT DEPENDENT QUESTIONS

1. Why are studies of the long-term effects of vaping just starting to appear?
2. What chemicals may cause cancer in vaporizer users?
3. Does vaping increase a person's risk for heart attacks or strokes?



## RESEARCH PROJECT

Go to a store, or use online listings, to find the chemical compounds present in five different common e-liquid brands. Search these chemicals online, or visit a doctor to learn more about their potential dangers. Consult a doctor or poison-treatment facility to determine what levels of these chemicals are dangerous. List all of potential dangers of the chemicals, then talk with your class about why such items would be allowed in a product used for human consumption.



*In October 2019, New York became the first state to implement a statewide ban on many flavored nicotine vaping products like the ones pictured here. Several other states, including Michigan, Massachusetts, Rhode Island, and Washington, also imposed temporary bans on flavored vape juices.*



## WORDS TO UNDERSTAND

**alienate:** to feel isolated or purposefully limited from contact with others

**chronic:** long-lasting and challenging to eradicate; maybe recurring even after someone quits or seemingly manages the issue

**hotline:** a telephone number set up to quickly connect individuals with a specific service, such as ordering items or managing suicidal or addictive behaviors

**ideation:** the creation of thoughts or ideas centered on a particular purpose, such as focusing excessively on individual practices and concepts and trying to make them real

**sensual:** feelings relating to or involving gratification of the senses and physical pleasure

# Treating Vape-Related Nicotine Addiction

Vaping addiction is a rapidly spreading problem that has many medical professionals and users increasingly concerned. Ex-smokers who thought that they could transition away from cigarettes to a nicotine-free life may find themselves hooked just as much—if not more so—on their vaping units. This addictive quality is more potent than in cigarettes for many users, and very upsetting to those who want a nicotine-free life.

Unfortunately, the challenges associated with treating vaping addiction are also high, because medical science is only now just catching up with the effects that vaping has on the body. As a result, treatment methods may seem limited or hard to understand at first. However, a growing number of care centers are learning how to treat vaping addiction one user at a time. Much of the success of these programs lies with the user, who must fully commit to a nicotine-free life.



*Many e-cigarettes and pod vapes can be easily concealed in a backpack or case for school supplies, making it hard for adults to identify teenagers who vape.*

# UNIQUE CHALLENGES TO VAPING ADDICTION TREATMENT

A growing number of parents and medical professionals are concerned about the dangers of vaping addiction in teenagers. As the number of teen users grows—alongside the number of adult users—many are speculating that treating vaping nicotine addiction will be more of a challenge than treating standard nicotine addiction. There are many reasons for this concern.

First of all, the higher doses of nicotine delivered in a vaporizer could produce more serious withdrawal symptoms in users. Withdrawal symptoms for nicotine occur quickly—often as soon as an hour after the last dose—and include headaches, nausea, anger, jittery behavior, and more. Though not dangerous in most users, the intensity of these symptoms is likely to increase in vaporizer users.

Teens, in particular, are prone to this type of addiction. “Adolescents don’t think they will get addicted to nicotine, but when they do want to stop, they find it’s very difficult,” explains Yale neuroscientist Dr. Marina Picciotto. “The adolescent brain is more sensitive to rewards (from nicotine).”

As a result, these teens may be more prone to falling back into their habit as a way of avoiding the discomfort caused by withdrawal. Some medical professionals believe that traditional addiction treatments, such as antidepressants, may help some adults overcome these withdrawal symptoms but may not be appropriate for teenagers. Many medicines of this type drastically alter the brain chemistry and could trigger more adverse effects in teens—such as suicidal **ideation**—if they are misused or overprescribed.

Smoking-cessation treatments—such as nicotine gums or lozenges—may be an option, as well, but the lack of study on their effectiveness is a concern. Many specialists believe that these



*Group therapy and counseling sessions, in which addicts discuss their experiences, are often a component of drug rehabilitation programs.*

products wouldn't match the intensity of the nicotine doses in most vaping units. For example, some estimate that a single pod in a mod unit could produce as much nicotine as twenty standard cigarettes. As a result, some could abuse them by chewing too much nicotine gum at one time and triggering nicotine toxicity concerns.

In spite of these issues, medical professionals believe that quitting vaping products is something that all users should have the personal strength to manage. The critical aspects of quitting any substance are recognizing that there is a problem and committing to changing this issue. Beyond these elements, it is also important for vaping users to reach out for professional help if they need it at any time. However, the lack of treatment guidelines for proper vaping addiction

treatment could be a concern for those who want to ensure that they beat their addiction in a streamlined and effective way.

## TREATMENT GUIDELINES ARE NOT YET IN PLACE

The relatively new nature of vaping and its concurrent addiction means that treatment specialists have yet to create a singular treatment guideline for this problem. As a result, many may struggle to find ways to cope with their addiction. For example, one treatment specialist may suggest one option, while another suggests a different method. In this way, treatment professionals are scrambling to fully understand how vaping addiction develops and the unique ways in which it differs from cigarette smoking.



### EXERCISE AND ADDICTION TREATMENT

Exercise may help vaporizer users best manage their nicotine addiction. In a study published by the *British Journal of Pharmacology*, researchers examined the benefits of exercise in the treatment of nicotine addiction. Their findings were encouraging: they found that even low-intensity or moderate exercise could decrease nicotine-withdrawal symptoms. The benefit occurred because a receptor in the brain targeted by nicotine was activated by exercise. Experts hope to utilize this information to find useful treatment guidelines for vaping addiction.

The differences between cigarette and vaping addiction lie primarily in the nicotine-delivery methods and the intensity of the doses. As mentioned many times, nicotine levels are much higher in many vaping devices than those levels found in cigarettes. Therefore, treatment professionals need to learn how to cope with nicotine overdose—a concern almost never addressed before vaping became popular—and the different ways of helping users deal with the physical or even **sensual** nature of vaping. Like with cigarettes, many vapers get just as hooked on the physicality of vaping as they do on the nicotine.

In spite of this lack of standard treatment guidelines, a growing number of services are popping up to help manage vaping addiction. For example, a **hotline** created by Truth Initiative will send encouraging text messages to vaporizer users and resources that help them quit. Those interested in this free program can text the word “QUIT” to the number (202) 804-9884 to receive daily messages. Users of this service can also get real-time help from someone who can talk them down from withdrawal symptoms or help them cope with their addiction triggers.

Beyond this step, Truth Initiative has also created a guideline of behaviors that vape users can use to minimize their consumption. For example, they suggest that people should leave their e-cigarettes and vaporizing equipment at home during the school day or work day. This step eliminates nicotine use for at least seven to eight hours of a person’s day. They also suggest identifying the triggers for vape usage and coming up with coping strategies when these situations or triggers occur.

For example, individuals who feel compelled to vape when bored could take a walk or a jog to burn some extra energy. They could also take up a hobby—such as playing a musical instrument or putting together a puzzle—during those dull moments. Specialists suggest that active distraction of the mind—rather than a passive distraction



*The first step for teens who recognize that they are addicted to nicotine is to open up to their parents or guardians, and let them know what is happening. Most parents will gladly help their children find help for their vaping problem.*



## NO SMOKING

The University Campus is a smoke and vapour free zone. Please help us by not smoking or using e-cigarettes or any other electronic vapourising devices anywhere within the campus.

*Many schools and colleges have attempted to implement policies that would restrict the use of nicotine products, including e-cigarettes and other electronic vapor devices.*

from television or the radio—is a powerful way of breaking the patterns of behavior that lead to addiction and helping to manage the compulsion to use vaporizers.

## PREVENTION OFTEN WORKS BEST

An old saying goes that prevention is the best way to manage addiction, because then the person never has to go through treatment. As a result, many experts are trying to find a way to get teens—and even adults—to stop vaping or to keep them from trying it out at all. For example, many addiction-education programs help to showcase the potential dangers of vaping. These programs are designed both for teens and adults and highlight the many chemicals used in vaping fluids and the emerging proof of dangerous long-term damage associated with persistent and **chronic** vaping.

Other experts push for more parental insight into the dangers of vaping and opening up lines of communication between parents and their children. Handouts and various videos help educate parents on these dangers and how to talk about them in a way that won't **alienate** or annoy their children. Parents should also model appropriate behaviors for their children by either quitting smoking or not vaping and working to find a way to extend preventative methods outside of the home in a comprehensive manner.

For example, a growing number of schools—and even public buildings—are considering zero-tolerance policies for those who want to use electronic vapor products on their premises. Punishment for students caught using electronic vapor products would be strict, including suspension and expulsion, and are meant to deter teens from using these vaporizing units. Public buildings would reserve the right to remove individuals caught using electronic vapor products in banned zones. Proponents believe that banning would create a similar effect to that of smoking bans—decreased usage in almost every user group.

**WARNING: This product contains nicotine. Nicotine is an addictive chemical.**

my  
blu™

AVAILABLE  
HERE

NOT FOR SALE TO MINORS. ©2018 Fonten.

*To learn more about nicotine withdrawal, scan here.*



There are some difficulties with this approach, however. “The schools that seem to be most effective are those that are, of course, enforcing their disciplinary code—they can’t do otherwise—but are using that as the floor and not the ceiling,” Bob Farrace, a spokesman for the National Association of Secondary School Principals, told the Associated Press. In other words, they are simply enforcing their disciplinary code without taking extra steps to stop tobacco use in teens.

Likewise, some anti-vaping advocates believe that zero-tolerance policies are too harsh on users. Rather than punish those who use vaporizers, they argue, treatment and care options should be utilized as a caring and healing way to manage addiction. They point to the bitter reaction that many smokers have against smoking bans and the way it causes some to double-down on their habit. However, some schools that pursue treatment often run into struggles with this option because of the previously mentioned lack of guidelines.

## NEW FEDERAL GUIDELINES

In December 2019, President Trump signed a new law raising the legal age at which people could purchase tobacco products, including e-cigarettes, from eighteen to twenty-one. Six states had previously raised the legal age for tobacco purchases, and organizations like Tobacco 21 had been advocating for this change for years. The idea was that twenty-one-year-olds would be more mature and could make better, more informed decisions about vaping or tobacco use.



*First Lady Melania Trump hugs a teen from the anti-tobacco group Truth Initiative following a discussion on the impact of youth vaping, October 9, 2019, at the White House.*

Public health organizations and anti-tobacco groups praised the new law, which passed Congress with bipartisan support. However, they argued that more still needed to be done to prevent vaping and tobacco use among young people.

In January 2020, the US Food and Drug Administration announced a nationwide ban on most flavored products used in e-cigarettes and closed system vaping products. The FDA ban prohibited fruit, candy, mint, and dessert flavors, which were the most popular used by teenagers, from being sold. It specifically targeted closed-system cartridge-based vape pens and e-cigarettes because they are the most commonly used by high school students.

However, some anti-tobacco advocates criticized the Trump Administration's vape flavor ban for not going far enough to address the problem. Under the new federal rules, menthol and tobacco-flavored closed-system products were still permitted to remain on the market. The new rules also permitted vape shops to sell flavors that could be added to tank-based electronic vapor devices. "Only the elimination of all flavored e-cigarettes can end the worsening youth e-cigarette epidemic and stop e-cigarette companies from luring and addicting kids with flavored products," complained Matthew Myers, president of the Campaign for Tobacco-Free Kids.

Government officials explained that these exemptions were made to accommodate the predominantly adult users of these products, who might be vaping as a way to quit cigarettes. The vape shops that sell these products generally don't admit customers under the age of twenty-one, especially now that the legal age for purchase has been raised. They also worried that banning menthol e-cigarettes would lead young people to turn to menthol cigarettes, which are still sold legally and have been proven to be even more harmful than regular cigarettes.



*A new federal law passed in late 2019 raised the age at which Americans could purchase e-cigarettes and other tobacco products legally from eighteen to twenty-one.*

## TRADITIONAL NICOTINE ADDICTION TREATMENT OUTLETS MAY HELP

In the absence of vaping-specific treatment programs, some individuals may want to consider traditional nicotine-addiction care. These options focus mostly on minimizing withdrawal symptoms as they occur, managing triggers and reducing impulse use, and providing counseling for those who need it. There are many different options for nicotine treatment, each of which has advantages and disadvantages. The most obvious way to quit is to give up and go cold turkey.

Some vape users may prefer this method because they want to get nicotine out of their system without being compelled to keep using with replacement medications. However, this means they will experience the full brunt of withdrawal symptoms. Even worse, the user often has to manage these symptoms without help, which can be a significant challenge. Cold turkey may also be a poor choice for vape users in particular, simply because their doses of nicotine will be so high and hard to quit without weaning off of it.

Those who can't handle the demands of cold turkey may want to consider nicotine-replacement tools to replace their vaporizer. These options utilize lower doses of nicotine and might be safe if used properly, though that might just replace one addictive substance with another. These include patches, gums, inhalers, nasal sprays, and lozenges. However, those who may smoke cigarettes while using these products should avoid them because the combined nicotine dosage may be too high. Following usage guidelines—including appropriate doses—is also important because overdose could occur if a person uses these products too heavily.

Other individuals may skip nicotine replacement but utilize other medicines to manage their withdrawal symptoms. A drug

called bupropion, sold under the trade name Zyban, increases the level of dopamine in the brain and may help to minimize the weight gain that often occurs when someone quits using nicotine. Another drug, varenicline, decreases withdrawal symptoms and also reduces pleasurable effects of nicotine; one popular brand of this drug is Chantix. Substances like these are not without drawbacks, including the risk of insomnia, depressed moods, headache, agitation, dry mouth, and even suicidal thoughts.

Counseling is also a great idea because it can help manage the mental health concerns related to nicotine addiction. These issues include problems like depression, anxiety, social concerns, peer pressure, and much more. There are many different groups like these. A call to 800-QUIT-NOW (800-784-8669) will provide information for a local withdrawal-coping organization that can help an addict through this difficult period. These hotlines also provide advice on how to stay nicotine-free and can even help addicted users meet others who are struggling through the same process.

Individual or group counseling sessions can also help addicts get the help that they need. Beyond this care option, residential programs are also available for those with nicotine addiction. These centers provide focused care, both physically and emotionally, to help manage addiction.

Nicotine Anonymous is a group similar to Alcoholics Anonymous, which provides support and help for those who need it. These groups often advocate against using nicotine-replacement medicines because they often replace the previous addiction. That is ironic, considering that electronic vapor products were originally designed as a way to manage cigarette addiction. Unfortunately, vaping addiction could be the new epidemic that medical specialists will have to fight for generations to come.



## TEXT DEPENDENT QUESTIONS

1. Why is there no single set of guidelines for treating vaping addiction?
2. What is one reason that the federal government exempted menthol e-cigarettes from its 2020 flavor ban?
3. What are some medicines that can help minimize the potency of nicotine withdrawal symptoms?



## RESEARCH PROJECT

Find high-school students who were addicted to e-cigarettes or vaping devices and who quit. Ask them what they did to quit and what methods were the most effective for them. Make sure that they discuss any outside pressure they may have gotten to stop, such as suggestions from their parents, an issue with their school, or even legal ramifications of their activities. Ask them about the potency of their withdrawal symptoms and whether they still get the impulse to use their vaporizer. Keep track of the number of individuals who also smoked cigarettes, and ask them whether it was harder to quit cigarettes or quit using an electronic vapor device.



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## SERIES GLOSSARY OF KEY TERMS

**Addiction**—a complex condition in which a person experiences an overpowering desire to use a substance, such as nicotine, despite its harmful consequences. Today, most scientists consider addiction to be a disease of the brain.

**Carbon monoxide**—a colorless, odorless highly poisonous gas found in tobacco smoke and in the lungs of people who have recently smoked, or (in smaller amounts) in people who have been exposed to tobacco smoke.

**Carcinogen**—a substance that damages the growth of cells, increasing the likelihood that cancer will develop.

**E-cigarette**—an electronic smoking device (including a vape or JUUL) that heats and vaporizes a liquid solution containing nicotine. The aerosol vapor is inhaled by the user when they draw on the device, as they would a regular tobacco cigarette, and the user exhales the aerosol into the environment.

**Nicotine**—an alkaloid derived from tobacco, responsible for the psychoactive and addictive effects of smoking.

**Secondhand aerosol**—emission from e-cigarettes and vaping devices that contains nicotine as well as low levels of cancer-causing toxins, which can be breathed by those around the device user.

**Secondhand smoke**—a mixture of smoke exhaled by smokers and smoke released from smoldering cigarettes, cigars, pipes, bidis, or other smoking materials. The smoke mixture contains gases and particulates, including nicotine, carcinogens, and toxins. Also known as “passive smoke” or “environmental tobacco smoke” (ETS).

**Tobacco**—the name for the dried leaves of the plant *Nicotiana tabacum*, which are rich in the alkaloid nicotine and can be smoked or chewed.

**Tolerance**—a condition that occurs when a user of an addictive substance no longer responds to the drug and requires higher dosages to achieve the same effect.

**Withdrawal**—a term for a group of unpleasant side effects that occur when a drug addict stops taking a particular substance such as nicotine. Symptoms of nicotine withdrawal can include fatigue, headache, irritability or depression, strong cravings to smoke, constipation, and anxiety.

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# INTERNET RESOURCES

**[www.hopkinsmedicine.org/health/wellness-and-prevention/5-truths-you-need-to-know-about-vaping](http://www.hopkinsmedicine.org/health/wellness-and-prevention/5-truths-you-need-to-know-about-vaping)**

An informative article from John Hopkins University on how vaping affects people.

**<https://www.samhsa.gov/find-help/national-helpline>**

The Substance Abuse and Mental Health Services Administration (SAMHSA) provides resources for helping people suffering from nicotine addiction.

**<https://nicotine-anonymous.org/>**

Nicotine Anonymous is an organization formed to help people who are trying to quit using tobacco products. The organization's website includes information about local support groups.

**<https://www.drugabuse.gov/publications/research-reports/tobacco-nicotine-e-cigarettes/what-are-treatments-tobacco-dependence>**

The National Institute on Drug Abuse provides information on nicotine and other drugs, as well as resources for fighting drug addiction.

**[https://www.cdc.gov/tobacco/data\\_statistics/fact\\_sheets/cessation/quitting/index.htm](https://www.cdc.gov/tobacco/data_statistics/fact_sheets/cessation/quitting/index.htm)**

The Centers for Disease Control and Prevention (CDC) provides health-related information on its website, including tips to help people quit smoking and live without vaping or nicotine.

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