



NEW YORK
CENTER FOR LIVING

The Dangers of Vaping



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Introduction

Vaping is a popular pastime that skyrocketed to stardom just as tighter non-smoking laws were sweeping the country. E-cigarettes hit the market in 2007, and they became an instant hit among people who enjoyed being able to "smoke" anywhere or smoke without the associated odors. Many people who used e-cigarettes as a tool for quitting smoking believed that the dangers of vaping were at least safer than the dangers of smoking cigarettes.

Since the advent of e-cigarettes, vaping devices like vape pens, e-hookas and advanced personal vaporizers, known as MODS, have also become popular. A vaping device typically consists of a mouthpiece, a cartridge that contains the vaping liquid, a heating element, and a battery. When you inhale through the mouthpiece, the battery activates the heating element, which turns the liquid into an aerosol that you inhale and exhale, much like cigarette smoke.

Many who vape are unaware of the dangers of vaping. Here, we take a closer look at the dangers of vaping, including the risks of using e-cigarettes, vape pens and MODS.





Vaping Popularity
is on the Rise

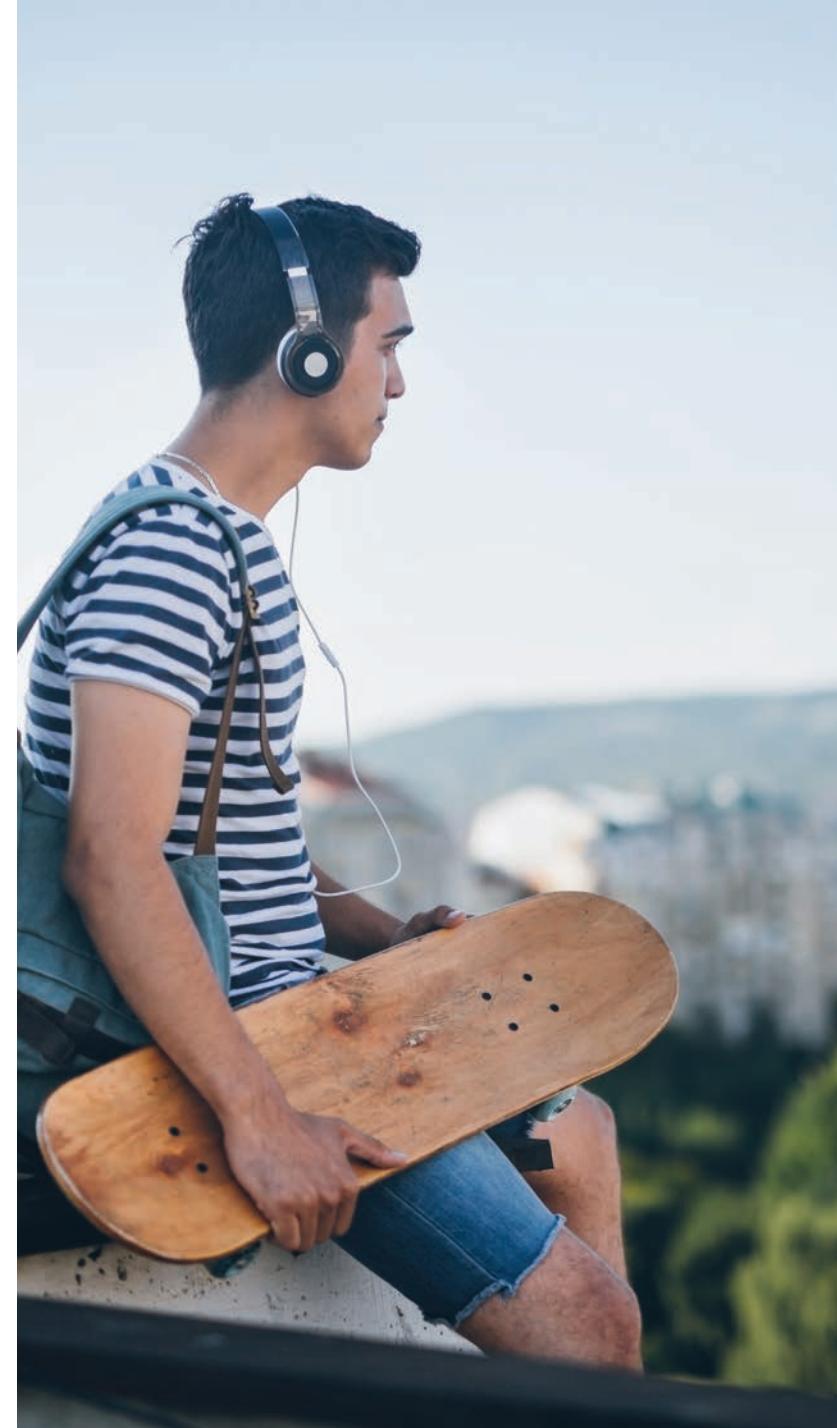
Despite the dangers of vaping, this practice is gaining more popularity every year.

Vaping Among Youth

According to the Centers for Disease Control, vaping among middle and high school students tripled from around 660,000 vapers in 2013 to more than two million in 2014.¹ E-cigarettes are now the most commonly used tobacco product among youth in the U.S.

Flavoring agents found in vaping liquids particularly appeal to young people, and in 2014, a congressional report accused manufacturers of using flavors--such as bubblegum, gummy bears and chocolate--to attract young people to vaping. While the flavorings and preservatives found in vaping liquids are classified as "generally recognized as safe" by the Food and Drug Administration, this classification is based on ingestion, not inhalation.

Mitch Zeller, director of the FDA's Center for Tobacco Products, says that the increase in young people's use of vaping devices despite the dangers of vaping undercuts the progress made in reducing youth cigarette smoking. "These staggering increases in such a short time underscore why the FDA intends to regulate these additional products to protect public health," Zeller says.





Vaping Among Adults

In 2014, according to the Centers for Disease Control, 12.6 percent of American adults had a history of vaping, and around 3.7 percent of adults currently used e-cigarettes or other vaping devices.² Among adults who were current cigarette smokers, more than half had used an e-cigarette, and more than 20 percent were current e-cigarette users. However, among all adults who had never smoked cigarettes, only 3.2 percent had ever tried vaping. But among adults aged 18 to 24 who had never smoked cigarettes, that percentage was higher, with nearly 10 percent having tried vaping.

Because the dangers of vaping aren't yet completely known, many states have passed laws placing the same restrictions on vaping devices that are in place for cigarette smoking. As vaping continues to grow in popularity and new research reveals new dangers of vaping, more states are looking at the laws and putting new restrictions on vaping in public spaces. In 2017, New York passed a law banning vaping everywhere cigarettes are already prohibited in an effort to protect onlookers from the potential dangers of vaping.



**What's in Your
E-Cigarette?**

Although the marketing materials for vaping liquids and devices would have consumers believe that they're inhaling a harmless water vapor, the truth is that only a small portion of the vapor is water. Mostly, the vapor is an aerosol produced from solvents in the liquid, according to an article in the journal Environmental Health Perspectives.³

The Centers for Disease Control points out that the aerosol contains potentially harmful substances, including solvents, nicotine, flavoring agents, ultra-fine particles, volatile organic compounds, carcinogenic compounds, and heavy metals. All of these ingredients contribute to the dangers of vaping.⁴

Solvents

E-cigarettes and vaping liquids contain propylene glycol and/or glycerin, the solvents that produce the vapor. The dangers of vaping these substances include the effects of potentially toxic carbonyls that can form when the liquid is heated at high temperatures. Carbonyls identified in a study of vaping liquids include formaldehyde, acetaldehyde, acetone, and butanol. It should be noted that Dow Chemical Company, which makes propylene glycol, recommends in its product safety assessment that individuals avoid inhaling this chemical.



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Nicotine

Some research on the dangers of vaping focuses on nicotine toxicity, which can produce nausea, vomiting, an elevated heart rate and seizures. This is a particular concern for young people, who are more sensitive to chemicals than adults. Since the amount of nicotine indicated on the refill cartridges rarely matches the true nicotine content of the liquid, it's difficult to know how much nicotine you're getting each time you inhale.

Flavoring Agents

A study of 35 different flavorings found in vaping liquids shows that the dangers of vaping include damage to three types of cells, including human pulmonary fibroblasts, human embryonic stem cells and the neural stem cells in mice.

Ultra-fine Particles

The dangers of vaping include damage to the body by particles produced by vaping, including ultra-fine particles of water, solvent, and nicotine. These particles appear to be deposited in the lungs similarly to the ultra-fine particles found in cigarette smoke.

Heavy Metals

A 2013 study by the University of California found that the dangers of vaping include exposure to heavy metals and silicates in the vapors produced by the liquids.⁵ These metal particles come from the heating element and are picked up by the liquid and carried to the lungs in the aerosol.

Other dangers of vaping include frequent headaches, respiratory tract infections, and appetite changes.

Popular Vaping Substances



The dangers of vaping are not limited to liquids containing nicotine, although nicotine is the most popular substance for vaping. It is impossible to know what's in someone's vape pen, and according to CNN, it could be a number of dangerous - or even deadly - psychoactive substances.⁶

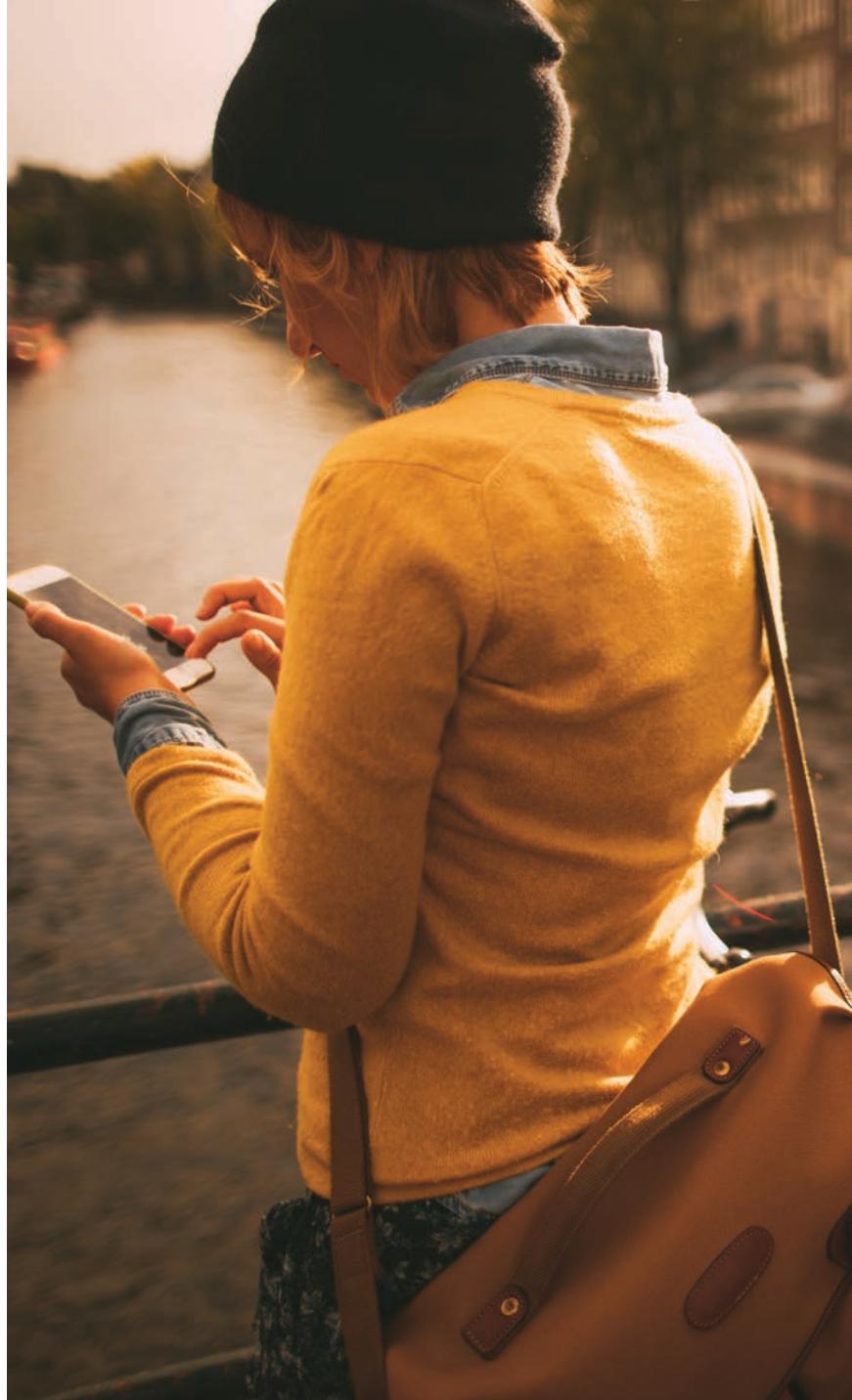
Water-soluble synthetics can easily be converted into a liquid concentrate that can be used with a vaping device. Special Agent John Scherbenske from the U.S. Drug Enforcement Administration points out that officers don't know what's in a vape pen until it's tested in a forensic laboratory, and often, the contents turn out to be dangerous drugs.

Flakka

Flakka is a synthetic drug that's cheap and deadly. The dangers of vaping flakka include paranoid psychosis, a dangerous increase in body temperature, and insensitivity to pain, and fatigue. Overdose is one of the most important dangers of vaping flakka, since it's difficult to know how much flakka the liquid contains.

"Legal Weeds"

K2 and Spice are synthetic versions of marijuana that can be vaped as well as smoked. The dangers of vaping these "legal weeds," which are up to 100 times more psychoactive than THC, include spikes in blood pressure, seizures, kidney failure and chest pain. Overdose deaths involving synthetic marijuana have been on the rise for several years, and these drugs are known to cause deep confusion and violent behaviors.



THC

The psychoactive ingredient in marijuana, THC can be converted to an oil designed for a vape pen. In states where marijuana is legal, consumers can buy these liquids, which are available in different strengths. Cannabis oils are made with different strains, additives, and solvents. The dangers of vaping THC include harmful chemicals that are produced when thinning agents are added to the oil. Additionally, cuticle waxes, which are lipids on the outside of most plants, are commonly found in THC and hash oils. These are normally burned off when you smoke marijuana or hash, but vaping doesn't remove these waxes, which may build up in the lungs and cause respiratory problems.

DMT

Dimethyltryptamine, or DMT, is one of the strongest hallucinogens in the world, more powerful than LSD and other hallucinogens. The dangers of vaping DMT include intense nausea, fearful agitation, and lung and throat irritation.





What the Latest Research Says About the Dangers of Vaping

According to an article published in the journal *Addictive Behaviors*, 67 percent of respondents believed the dangers of vaping to be minimal compared to the dangers of smoking cigarettes.⁷ While research into the dangers of vaping is still fairly new, and long-term studies have yet to conclude, the best research available shows that vaping is dangerous on many levels.

Brain Health

Research into the dangers of vaping shows that vaping among youth has important implications for brain health and development. The Surgeon General reports that a developing brain is vulnerable to effects of nicotine, which include reduced impulse control, deficits in cognition and attention and mood disorders.⁸

Fetal Exposure to Nicotine

The dangers of vaping among pregnant women, which results in fetal exposure to nicotine, can lead to deficits in attention, cognition and auditory processing, and it increases the risk of sudden infant death syndrome, obesity and behavioral problems later on.

Gum Disease

When bloody mouth sores became a common complaint among teenage vapers, Irfan Rahman, a toxicologist at the University of Rochester, investigated the dangers of vaping on the cells of the mouth. He found that the vapors inflame mouth cells and promote gum disease and tooth loss.⁹ Moreover, the vapors made it more difficult for these mouth sores to heal.





Vaper's Cough

Inhaling the particles and other components of vaporized liquids has been shown to produce chronic bronchitis, or smoker's cough. A study of high school students found that current vapers were twice as likely to have chronic bronchitis as those who had never vaped. It's not yet clear whether the dangers of vaping include permanent lung damage.

The hotter the liquid in a vaping device becomes, the greater the dangers of vaping. A disturbing trend among youth, called "dripping," involves taking the cover off of the vaping device and using an eye dropper to drip the liquid directly onto the heating coil. This gets the liquid far hotter, creating a bigger vapor cloud and a more intense throat hit. Researchers point out that even harmless chemicals that are heated up to these temperatures can become toxic, making the dangers of vaping even more concerning.





Can You Get Addicted to Vaping?



Perhaps one of the most important dangers of vaping is addiction. Some people become addicted to the nicotine in vaporizers, while others, particularly youth, can become addicted to the behavior of vaping even when nicotine isn't present in the liquid. A recent New York Times article noted that a panel of public health experts found that teens who vape have a higher risk than non-vapers of becoming addicted cigarette smokers, although the vaping industry argues that vaping isn't a gateway to smoking cigarettes or to developing an addiction.¹⁰

How Addiction Affects the Brain

Addiction is a chronic brain disease. It's characterized by compulsive behaviors despite the negative consequences of these behaviors. The result of changes in the brain's physical structures and chemical functions, addiction almost always requires professional help to overcome, according to the National Institute on Drug Abuse, which points out that the dangers of vaping include an increased risk of developing a nicotine addiction.¹¹

The dangers of vaping nicotine are, in part, related to these changes in the brain. Nicotine stimulates the release of the hormone epinephrine, or adrenaline. It also increases the activity of dopamine, the neurotransmitter that is responsible for feelings of pleasure and which plays an important role in the reward, learning, and memory systems of the brain.

Over time, these brain changes lead to compulsive nicotine use, driven by intense cravings. The brain changes associated with addiction affect thought and behavior patterns and can lead to dysfunctional ways of thinking and behaving that perpetuate the addiction and cause other problems, such as relationship and health problems.

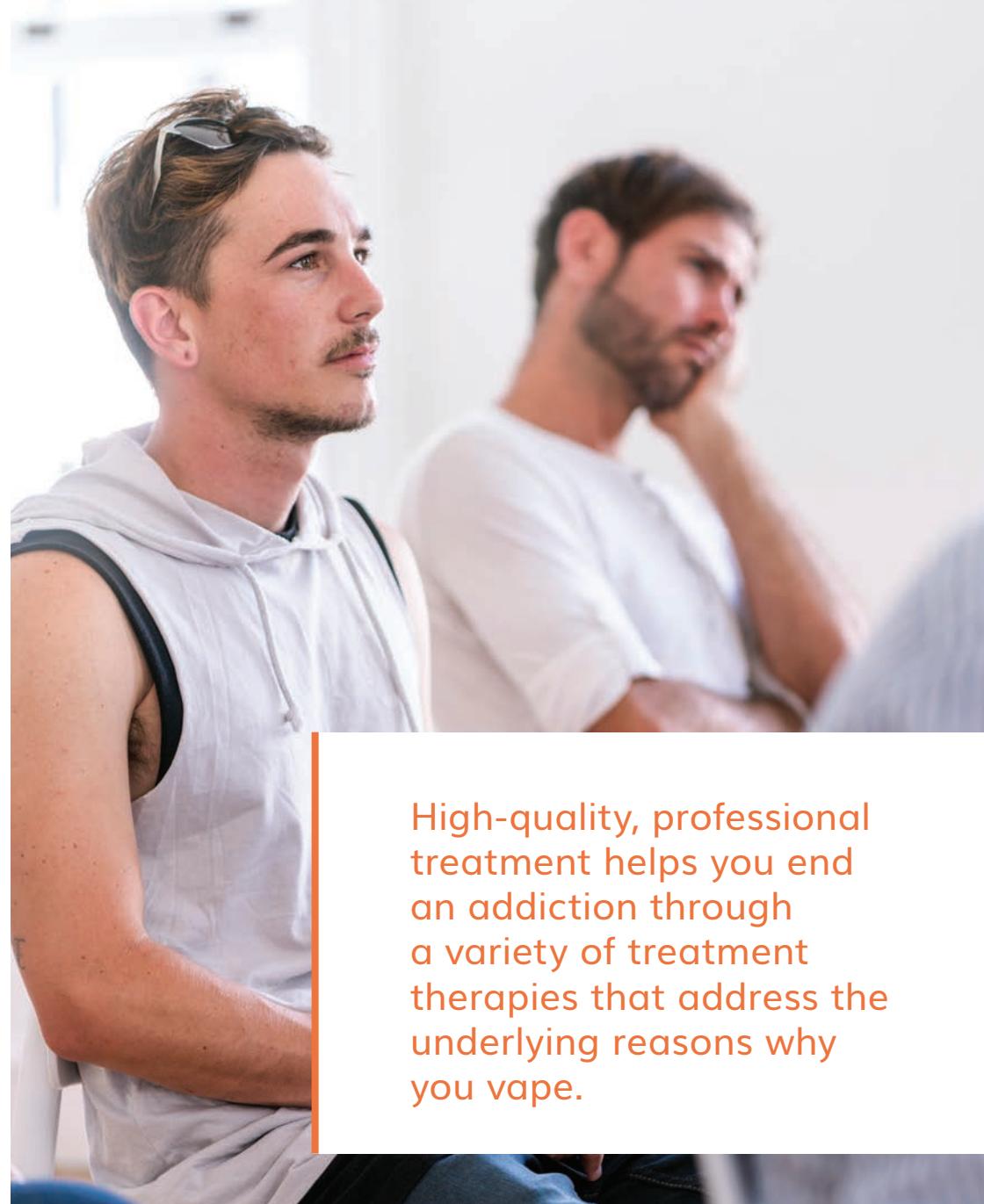


Treating an Addiction to Vaping

Ending an addiction to vaping also puts an end to the dangers of vaping. High-quality, professional treatment helps you end an addiction through a variety of treatment therapies that address the underlying reasons why you vape, whether it's to fit in, reduce stress, relax with friends, or cope with unpleasant emotions or life circumstances.

If you vape and worry that the dangers of vaping can lead to long-term physical and mental health problems, treatment can help you end an addiction to vaping for a healthier body and higher quality of life.

The dangers of vaping are still being investigated, but the bottom line is that vaping is not safe, and indeed, it may be very harmful to your health.

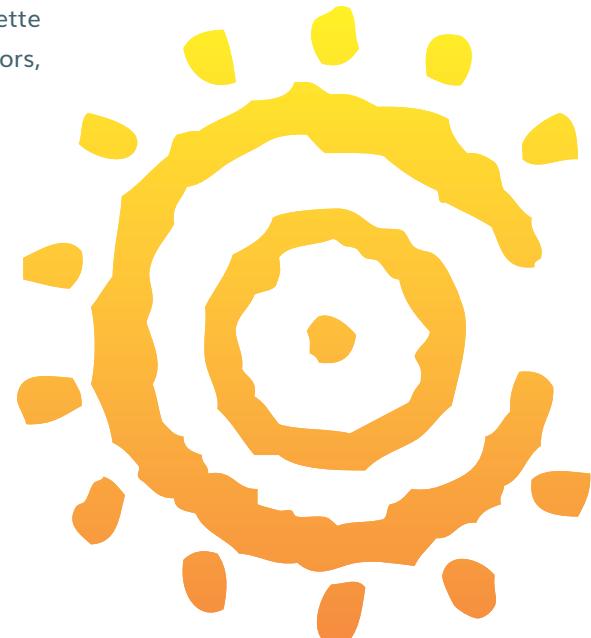


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NEW YORK CENTER FOR LIVING

Located in Manhattan, NY, New York Center for Living is a 501(c)(3) non-profit providing addiction and mental health care for adolescents, young adults and families since 2007. Built on the conviction that addiction is a disease of the family rather than the individual, New York Center for Living believes in the importance of early intervention, peer support networks and strong family relationships for successful treatment outcomes.

New York Center for Living specializes in treatment, education, assessment and referral and is a valuable resource for anyone searching to learn more about addiction and mental health. Our team of experts in psychiatry, social work, substance abuse, nutrition, academia and the wellness sciences provide an evidence-based and holistic approach to combating addiction.

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