

Young People,
Tobacco Use and
Nicotine Addiction:
THE FACTS



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It's no secret that tobacco use is bad for your health, but for teens and young adults, the effects are far different — and potentially more dangerous — than in adults. This toolkit provides research-based facts on the damage that tobacco use, including e-cigarettes, and nicotine addiction can have on you and your peers.

Which is Safer: E-Cigs, Hookah, Cigars or Smokeless Tobacco?

NONE OF THE ABOVE. They all can damage your health.

The facts don't lie. ALL tobacco and nicotine products can damage your health and your development. This is true whether you are already smoking, switching to try a "safer" product or you just used a product for the first time.

Bottom line:

The idea that alternative products to cigarettes — e-cigs, hookah, cigars, dip and smokeless tobacco — **are safe is so not true!**



Most young people are not using alternative products to try to stop smoking.¹ So, why would you be drawn into tobacco use anyway? Let's start with what is going on with your bodies.

Adolescence is the stage of your body development between the ages of 10 and 19. This is the time you physically develop into adulthood. Dynamic changes in your brain can cause behavioral changes that most young people experience, including²:

- **Increased interest in social interactions and taking risks**
- **The development of decision-making and impulse control**
- **The maturation of the dopamine system, the chemical neurotransmitters that help us think and plan**

As you grow into adulthood, you may want to try new experiences and experiment. When it's done with tobacco and nicotine products, the negative impact can last for the rest of your life!

Bottom line:

Nicotine and tobacco affect young bodies differently than full-grown adults.

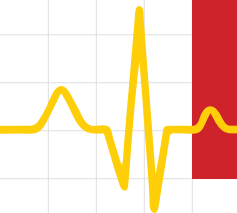


Studies show that nicotine may alter the development of the dopamine system by negatively impacting your limbic system.² The limbic system is responsible for memory, emotions and motivation. In fact, there is consistent evidence that adolescent limbic systems respond uniquely to nicotine.² This can make you more sensitive to the reward response that nicotine causes in your body.



Bottom line:

Because your body is still developing, it can be **EASIER** to get addicted. Science has shown in animal models, confirming what has been observed in clinical (human) research, that in adolescents the rewarding effects of nicotine are enhanced and sensitivity to the aversive effects is decreased. These may be properties of nicotine that rewards young people who use tobacco and nicotine.²



Stress Can Trigger Use

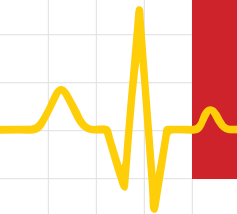
Growing up is more complicated — and stressful — than ever before. High school and middle school students who experience mental distress, such as depression and anxiety, are more likely to use tobacco products. As distress increases, so does the likelihood of tobacco use³:

- **Nearly 6% of young people** experiencing no distress use tobacco products
- **Nearly 10% of young people** experiencing mild distress use tobacco products
- **More than 11% of young people** experiencing moderate distress use tobacco products
- **More than 14% of young people** experiencing severe distress use tobacco products

Unfortunately, a lot of the research on the health effects of tobacco on young people is limited or quite new. We need more research to fully understand the short- and long-term health effects on adolescents using tobacco and nicotine.

Bottom line:

The American Heart Association is committed to funding research and empowering you with the knowledge to make good decisions.



What's Up with E-Cigarettes?

So, what's in most e-cigs? Chemical solvents! The two most common solvents in e-liquids are propylene glycol (PG or glycerol) and vegetable glycerin (VG or glycerin).⁴ When the e-liquid (vape juice) inside the e-cigarette is heated, it turns into an aerosol (sometimes called vapor) that can be inhaled.

Bottom line:

If you use e-cigarettes, you are heating up chemicals to turn them into aerosols and then inhaling those fumes.

The Food and Drug Administration (FDA) recognizes that both propylene glycol and vegetable glycerin are safe to eat and drink, but have not released information regarding inhalation safety.⁴ In fact, when propylene glycol is heated, its chemical makeup changes, turning the chemical into propylene oxide.⁴ The International Agency for Research on Cancer categorizes propylene oxide as cancer causing.⁴

Liquid Nicotine

Most e-cig liquids contain nicotine. Enough that they can cause toxic poison responses and seizures. The FDA reported 117 cases of seizures related to vaping in primarily young people and young adults between April 3 and June 30, 2019.⁴

When people use e-cigarettes, they also breathe in a variety of metals from the aerosol. The human body absorbs these metals and expels them in urine. Samples taken from people who use e-cigarettes show metal levels similar to — and even higher — than found in people who smoke cigarettes.⁴

When an e-cigarette with flavored e-liquid is heated, some of the flavor compounds can form microscopic particles that can penetrate your lungs.⁴ The Flavor and Extract Manufacturers Association of the United States identified 27 flavoring agents that may pose a risk to your respiratory health if inhaled.⁴ A component of mint oil extracts that is found in mint and menthol flavored e-liquids is associated with increased risk of cancer.⁴

Using e-cigarettes can impair immune defenses and increase the susceptibility to viral and bacterial illnesses.⁵



Your Brain and Mental Health

E-cigarette use reduces sleep quality, potentially affecting mental health and leading to addiction (adolescents may become lifelong tobacco or nicotine users).⁵

Unfortunately, disposable e-cigs are the most popular product among young people who smoke and the most popular brand is Puff Bar.⁶ Unlike cigarettes, they don't burn out and lack the forced "time stop" of cigarettes. This paired with amount of nicotine found in a single e-cigarette device — can be nearly three to 10 times the amount of a pack of cigarettes — just increases the dangers.⁷

How Much Nicotine?

A single Puff Bar e-cig can have 3 to 10 times the amount of nicotine as a pack of cigarettes.⁷ Using an e-cig is like continuously chain smoking. You don't stop when you come to the end as with a regular cigarette.

Your Oral and Dental Health

Like cigarettes, e-cigarettes cause mouth and dental problems including increased risk of dental disease, gingivitis, cavities, oral pain, tooth discoloration, tooth loss and mouth and throat cancers, and reduced ability to repair periodontal tissues.^{8,9}

Bonus Yucky Fact: With e-cigarettes, there's the added risk of cracked and broken teeth.¹⁰

The flavors in e-cigarettes also are associated with an increase in cavities, possibly because of the stickiness of the e-liquid and the sweet flavorings added to the e-liquid.⁹ And e-cigarette aerosols cause cell damage to the soft tissues inside the mouth tissue.⁹ Aerosols from flavorings are associated with pro-inflammatory cytokines, which trigger inflammatory reactions by the immune system.⁹

Your Lungs and Pulmonary Health

E-cigarette use harms your lung function, plain and simple. And if you have asthma, e-cigarette use increases inflammation. E-cigarette use is associated with increased odds of an asthma diagnosis and increased asthma-related school absences.^{1, 5} Additionally, young people who use e-cigarettes are twice as likely to experience bronchitis symptoms.¹

E-cigarette use puts adolescents at risk for stunting lung development; likely resulting in lower lung function.⁵ This could leave them at risk for more severe cases of asthma, chronic obstructive pulmonary disease, pneumonia and other lung diseases.⁵

How E-Cigs Hurt Kids

E-cigarette use increases your odds of being diagnosed with asthma.⁵ It also increases the amount of time you will have asthma-related problems.¹ And, you are twice as likely to get bronchitis as teens who don't use e-cigs!¹

People who have used e-cigarettes in the past 30 days are prone to experiencing increased coughing, shortness of breath, chest tightness and wheezing.¹⁰

And these health harms don't just affect the person vaping. Like secondhand cigarette smoke, secondhand e-cig exposure can negatively affect the lung function of anyone breathing in the aerosol.¹

Some e-liquid manufacturers add diacetyl to their products for enhanced flavor.⁴ It's a chemical compound that can cause an illness known as popcorn lung — bronchiolitis obliterans. It's a scarring of the tiny air sacs in your lungs, resulting in the thickening and narrowing of the airways.

While some manufacturers have marketed their products as "diacetyl free," at least three studies have found measurable amounts of the chemical in the products anyway.¹ Also, diacetyl substitutes are associated with adverse lung outcomes.⁴

Your Heart and Cardiovascular Health

E-cigarette use is associated with increased heart rate and blood pressure, as well as reduced blood flow.^{1,5} Adolescents with heart issues, even if they are unknown or undiagnosed, may be at increased risk for long-term heart damage!⁵

Although adolescents may not feel that e-cigarette use is affecting them, it is increasingly clear that the chemicals in e-cigarettes are leading to changes that could result in cardiovascular disease over time.⁵



What's Up with Hookah?

Hookah is a waterpipe.¹¹ The hookah consists of a part that holds the tobacco mixture (shisha), a chamber filled with water, a hose and mouthpiece. Aluminum foil and charcoal are used to heat the tobacco mixtures that are inhaled through a mouthpiece.^{11, 12}

People often smoke at a hookah lounge or restaurant that serves hookah along with food and drinks. While many cities have ordinances with age restrictions, you probably are able to get your hands on one if you really try. Kids between the ages of 12 and 17 report their top reasons for smoking a hookah are social aspects and for the flavors.

Bottom line:

Lots of people think that smoking a hookah isn't dangerous.¹¹
That's just dead wrong.

The shisha mixture is tobacco mixed with honey or molasses, and often fruit flavors.¹² There is no standard recipe for making shisha, so if you use it, you are probably inhaling varying levels of chemicals each time. The variations and the style of heating can greatly affect the chemicals and concentrations of compounds found in hookah smoke.¹²

Because people most commonly smoke hookah indoors, a single session of hookah smoking typically results in greater exposure to carbon monoxide and other harmful air particles related to both first- and secondhand smoke exposure.¹³

Hookah Smoke: Think Cigarettes On Steroids

- **10 to 200 times** the amount of tar
- **10 to 30 times** the amount of carbon monoxide
- **6 to 10 times** the amount of lead
- **3 times the amount** of formaldehyde and heavy metals, including copper, zinc and boron, not found in cigarette smoke

Hookah smoke contains very high levels of nicotine. And, when the urine of people who regularly smoke hookah was analyzed, there are significantly increased levels of heavy metals.¹⁴

Bottom line:

Smoking a single hookah bowl has the same amount of nicotine as smoking two to three cigarettes.¹⁵

As a social activity, most often a group of people will share a single hookah mouthpiece. Sharing a mouthpiece is associated with higher risk of transmitting diseases, including the flu and oral herpes. There are even accounts of people contracting hepatitis C and tuberculosis from repeatedly sharing a hookah that has not been properly sanitized.¹² That's one big yuck.

Your Oral and Dental Health

Smoking hookah causes all the mouth and dental problems as cigarettes including increased risk of dental disease, gingivitis, cavities, oral pain, tooth discoloration, tooth loss and mouth and throat cancers, and reduced ability for your body to naturally repair periodontal tissue.⁸

Your Lungs and Pulmonary Health

Hookah smoke contains noxious particles and gases at similar or higher rates than cigarette smoke. These toxins create an abnormal inflammatory response in the person exposed to the smoke, whether they are using the product or simply nearby.¹⁶

Bottom line:

People who smoke hookah are at a higher risk for esophageal cancer, lung cancer and stomach cancer.¹²

People who regularly smoke hookah have worse lung function than people who do not smoke, and similar reductions in lung function to people who regularly smoke cigarettes.¹²

Your Heart and Cardiovascular Health

One study evaluated people after a single hookah smoking session. They had significantly elevated heart rates and blood pressures, comparable to cigarette smoking.¹²

Hookah lounge employees report symptoms of carbon monoxide poisoning such as dizziness, headaches and fainting while at work,¹⁷ and when tested they have significantly higher levels of heavy metals than customers.¹⁴ Concentrations of heavy metals were significantly higher in employees who worked in hookah lounges offering flavored shisha tobacco mixtures.¹⁴

What is myocardial oxygen demand? It's the amount of oxygen your heart requires to maintain optimal function. The nicotine in hookah smoke increases myocardial oxygen demand just like cigarettes do, which increases the chances of inadequate blood supply to your heart.¹¹ This may be especially dangerous in young people with underlying heart disease.

Bottom line:

Smoking hookah may compromise your health more than other tobacco products.

When vital signs of regular hookah-only users are compared to those of mixed smokers (hookah plus another product), cigarette-only smokers and nonsmokers, the hookah-only users experienced higher blood pressure, higher heart rates and more severe coronary artery disease.¹²

Compared to cigarette smokers, regular hookah-only users have more frequent myocardial ischemia (when blood flow to your heart is reduced, preventing the heart muscle from receiving enough oxygen), and a higher number of additional heart attacks.¹¹

Bottom line:

Compared to cigarette smokers, regular hookah-only smokers when hospitalized have poorer outcomes — with higher mortality rates.

Your exercise capacity is reduced immediately following hookah smoking. This is probably due to increased levels of carbon monoxide in the blood which reduces the oxygen-carrying capacity of blood.¹¹



What's Up with Cigars?

Cigars include everything from premium cigars to little cigars and cigarillos. Studies have found that cigar smoke has the same chemical makeup as cigarette smoke, including nicotine (though the amount of nicotine varies by product).^{18, 19}

Bottom line:

A single cigar may provide as much nicotine as an entire pack of cigarettes.²⁰

Your Oral and Dental Health

Cigar smoke and cigarette smoke are similar enough, we can assume the health consequences are similar. Although it might seem cool to have a cigar to celebrate with friends, the dental and oral health problems cigars cause are anything but pretty. The negative health impacts include increased risk of dental disease, gingivitis, cavities, oral pain, tooth discoloration, tooth loss, mouth and throat cancers, and reduced ability to repair periodontal tissues.⁸

Depending on the type of cigar, absorption of nicotine through the tissue of the mouth can be increased.²¹ All this is so not good.

Your Lungs and Pulmonary Health

Studies of flavored little cigars and cigarillos have found they kill cells in the airway the same as nonflavored cigars.²² And evidence suggests that fruit, candy and alcoholic beverage flavors are the most toxic of flavored products.²³ According to the National Cancer Institute, cigar smoking causes cancer of the mouth, larynx, esophagus and lungs.²⁰ Daily cigar smokers are at higher risk of heart disease and lung disease.²⁰



What's Up with Smokeless Tobacco?

Like other tobacco products, smokeless tobacco contains nicotine. And nicotine has been proven over and over to damage your health. The organic compounds found in the processed tobacco can cause cancer in the esophagus, pancreas, lungs and cervix (in females); and increase cardiovascular disease risk.⁸

Dip and Chew: 10 Times Worse for You

The nicotine exposure for someone who uses moist tobacco (dip or chew) eight to 10 times per day is about the same as a person who smokes one- to one-and-a-half packs of cigarettes per day.²⁴



Bottom line:

You may have heard that using smokeless tobacco, including dip, chew or snuff, is safer because you're not inhaling smoke. Ah, so wrong! These products are highly carcinogenic.

Your Oral and Dental Health

Because people hold smokeless tobacco in the mouth, you increase your risk of dental decay and disease, including dental erosion, gum recession and periodontal attachment loss — the destruction of fibers and ligaments in your mouth.⁸

What's Up with You?

You're growing. Exploring. Learning. Ready to try new things. All of that is great. But the thing about tobacco products and nicotine is this: They have been proven to be addictive and can really damage your health.

Bottom line:

Cigarettes, e-cigarettes, hookah, cigars, cigarillos, dip, smokeless tobacco
— no form of tobacco use is safe.

So, skip **any and all tobacco products** and go out and conquer your world! Your body will thank you.

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