



THE SCIENCE  
BEHIND DRUG ABUSE

## Drug Facts Tobacco

### What Is Tobacco Addiction?

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When people are addicted, they have a compulsive need to seek out and use a substance, even when they understand the harm it can cause. Tobacco products—cigarettes, cigars, pipes, and smokeless tobacco—can all be addictive. Everyone knows that smoking is bad for you, and most people that do it want to quit. In fact, nearly 35 million people make a serious attempt to quit each year. Unfortunately, most who try to quit on their own relapse—often within a week.



### Is Nicotine Addictive?

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Yes. It is actually the nicotine in tobacco that is addictive. Each cigarette contains about 10 milligrams of nicotine. Because the smoker inhales only some of the smoke from a cigarette, and not all of each puff is absorbed in the lungs, a smoker gets about 1 to 2 milligrams of the drug from each cigarette. Although that may not seem like much, it is enough to make someone addicted.

### Is Nicotine the Only Harmful Part of Tobacco?

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No. Nicotine is only one of more than 7,000 chemicals, many of which are poisonous, found in the smoke from tobacco products. Smokeless tobacco products also contain many toxins, as well as high levels of nicotine. Many of these other ingredients are things we would never consider putting in our bodies, like tar, carbon monoxide, acetaldehyde, and nitrosamines. Tar causes lung cancer, emphysema, and bronchial diseases. Carbon monoxide causes heart problems, which is one reason why smokers are at high risk for heart disease.

## How Is Tobacco Used?

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Tobacco can be smoked in cigarettes, cigars, or pipes. It can be chewed or, if powdered, sniffed. “Bidis” are an alternative cigarette. They originally came from India and were hand-rolled. In the United States, bidis were popular with teens because they come in colorful packages with flavor choices. Some teens think that bidis are less harmful than regular cigarettes, but in fact they have more nicotine, which may make people smoke more, giving bidis the potential to be even more harmful than cigarettes. Hookah—or water pipe smoking—practiced for centuries in other countries, has recently become popular among teens in the United States as well. Hookah tobacco comes in many flavors, and the pipe is typically passed around in groups. Although many hookah smokers think it is less harmful than smoking cigarettes, water pipe smoking still delivers the addictive drug nicotine and is at least as toxic as cigarette smoking.

## What Are the Common Street Names for Tobacco Products?

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You might hear cigarettes referred to as “smokes,” “cigs,” or “butts.” Smokeless tobacco is often called “chew,” “dip,” “spit tobacco,” “snus,” or “snuff.” People may refer to hookah smoking as “narghile,” “argileh,” “shisha,” “hubble-bubble,” or “goza.”

## How Many Teens Abuse Tobacco?

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The good news is that smoking is at historically low levels among 8th, 10th, and 12th graders, according to NIDA’s Monitoring the Future study. In 2012, rates for smoking in the past month were reported as 17.1 percent for 12th graders, 10.8 percent for 10th graders, and 4.9 percent for 8th graders.

Use of smokeless tobacco had been showing a decline over the past decade—until 2009, when use began to rise. Since then, it has remained steady. In 2012, current use of smokeless tobacco was reported by 2.8 percent of 8th graders, 6.4 percent of 10th graders, and 7.9 percent of 12th graders. Other ways of smoking tobacco remain at high levels, including smoking tobacco using a hookah and smoking small cigars, which is done by 18.3 percent and 19.9 percent of 12th graders, respectively.

## How Does Tobacco Deliver Its Effects?

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With each puff of a cigarette, a smoker pulls nicotine and other harmful substances into the lungs, where it is absorbed into the blood. It takes just 8 seconds for nicotine to hit the brain. Nicotine is shaped like the natural brain chemical acetylcholine. Acetylcholine is one of many chemicals called neurotransmitters that carry messages between brain cells. Neurons (brain cells) have specialized proteins called receptors, into which specific neurotransmitters can fit, like a key fitting into a lock. Nicotine locks into acetylcholine receptors, rapidly causing changes in the brain and body. For instance, nicotine increases blood pressure, heart rate, and respiration (breathing).

Nicotine also attaches to acetylcholine receptors on neurons that release a neurotransmitter called dopamine. Dopamine is released normally when you experience something pleasurable like good food, your favorite activity, or the company of people you love. But smoking cigarettes causes neurons to release excess dopamine, which is responsible for the feelings of pleasure. However, this effect wears off rapidly, causing people who smoke to get the urge to light up again for another dose of the drug.

Nicotine may be the primary addictive component in tobacco, but it's not the only one. Using advanced neuroimaging technology, scientists have found that people who smoke have a significant reduction in the levels of an enzyme called monoamine oxidase (MAO) in the brain and throughout the body. This enzyme is responsible for the breakdown of dopamine, other neurotransmitters involved in mood regulation, and in a variety of bodily functions. Having lower amounts of MAO in the brain may lead to higher dopamine levels and be another reason that people who smoke continue to do so—to sustain the pleasurable feelings that high dopamine levels create.

Also, researchers have recently shown in animals that acetaldehyde, another chemical constituent of tobacco smoke, dramatically increases the rewarding properties of nicotine—particularly in adolescent animals—which may be one reason why teens are more vulnerable to becoming addicted to tobacco than adults.

## What Happens When Someone Uses Tobacco for Long Periods of Time?

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Long-term use of nicotine frequently leads to addiction. Research is just beginning to document all of the changes in the brain that accompany nicotine addiction. The behavioral consequences of these changes are well documented, however.

The way that nicotine is absorbed and metabolized by the body enhances its addictive potential. Each inhalation brings a rapid distribution of nicotine to the brain—peaking within 10 seconds and then disappearing quickly, along with the associated pleasurable feelings. Over the course of the day, tolerance develops—meaning that higher (or more frequent) doses are required to produce the same initial effects. Some of this tolerance is lost overnight, and people who smoke often report that the first cigarette of the day is the strongest or the “best.”

When a person quits smoking, they usually experience withdrawal symptoms, which often drive them back to tobacco use. Nicotine withdrawal symptoms include irritability, problems with thinking and attention deficits, sleep disturbances, increased appetite, and craving. Craving—an intense urge for nicotine that can persist for 6 months or longer—can be a major stumbling block to quitting.

Withdrawal symptoms usually peak within the first few days and may subside within a few weeks. Withdrawal is related to how nicotine acts in the brain and body, but many behavioral factors also affect the severity and persistence of withdrawal symptoms. For example, the cues associated with smoking—the end of a meal, the sight or smell of a cigarette, the ritual of obtaining, handling, lighting, and smoking the cigarette, the people you hung out with when you smoked, and alcohol use—all can be powerful triggers of craving that can last or re-emerge months or even years after smoking has ceased. While nicotine gum and patches may stop the physical aspects of withdrawal, cravings often persist.

## What Are Other Adverse Health Effects of Tobacco?

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Tobacco use harms every organ in the body. It has been conclusively linked to leukemia, cataracts, and pneumonia, and accounts for about one-third of all cancer deaths. The overall rates of death from cancer are twice as high among people who smoke as those who don't, with people who smoke heavily having rates that are four times greater than those of people who don't smoke. And, you guessed it—foremost among the cancers caused by tobacco use is lung cancer. In fact, cigarette smoking has been linked to about 90 percent of all lung cancer cases, the number-one cancer killer of both men and women. Tobacco abuse is also associated with cancers of the mouth, pharynx, larynx, esophagus, stomach, pancreas, cervix, kidney, ureter, and bladder.

People who smoke also lose some of their sense of smell and taste, don't have the same stamina for exercise and sports they once did, and may smell of smoke. After smoking for a long time, people find that their skin ages faster and their teeth discolor or turn brown.

Smoking doesn't just affect the person who smokes. People who do not smoke are exposed to "secondhand smoke," which comes from both the exhaled smoke and from the smoke floating from the end of a cigarette, cigar, or pipe. Inhaling secondhand smoke increases a person's risk of developing heart disease by 25 to 30 percent and lung cancer by 20 to 30 percent. In fact, secondhand smoke is estimated to contribute to as many as 46,000 deaths related to heart disease and about 3,400 lung cancer deaths per year among people who do not smoke. Secondhand smoke also causes respiratory problems in people who do not smoke, like coughing, phlegm, and reduced lung function.

Children exposed to secondhand smoke are at an increased risk for sudden infant death syndrome, acute respiratory infections, ear problems, and more severe asthma. And, believe it or not, dropped cigarettes are the leading cause of residential fire fatalities, leading to more than 700 deaths each year.

Each year, almost half a million Americans die from tobacco use. One of every five deaths, or about 440,000 deaths, in the United States is a result of tobacco use, making tobacco more lethal than all other addictive drugs combined.

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## Smoking and Pregnancy: What Are the Risks?

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In the United States, 20.7 percent of pregnant teens age 15 to 17 reported smoking cigarettes in the past month (based on combined data from 2008-2009). Carbon monoxide and nicotine from tobacco smoke may interfere with fetal oxygen supply—and because nicotine readily crosses the placenta, it can reach concentrations in the fetus that are much higher than maternal levels. Nicotine concentrates in fetal blood, amniotic fluid, and breast milk, exposing both fetuses and infants to toxic effects. These factors can have severe consequences for the fetuses and infants of mothers who smoke, including increased risk for stillbirth, infant mortality, sudden infant death syndrome, preterm birth, and respiratory problems. In addition, smoking more than a pack a day during pregnancy nearly doubles the risk that the affected child will become addicted to tobacco if that child starts smoking.

## How Is Tobacco Addiction Treated?

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The good news is that treatments for tobacco addiction do work. Although some people who smoke can quit without help, many people need help. Behavioral treatment programs help people learn about and change their behaviors using self-help materials, counselor-staffed telephone “quitlines,” and individual therapy. Over-the-counter medications, such as the nicotine patch, gum, inhalers, and lozenges, replace nicotine and relieve the symptoms of withdrawal. It is important to know that nicotine replacement medicines can be safely used as a medication when taken properly. They have lower overall nicotine levels than tobacco and they have little abuse potential since they do not produce the pleasurable effects of tobacco products. They also don’t contain the carcinogens and gases found in tobacco smoke, making them a good treatment approach for quitting.

There are also prescription medications now available for smoking cessation, such as bupropion (Zyban) and varenicline tartrate (Chantix), that have been shown to help people quit. But research shows that the most effective way to quit smoking is to use both medications and behavioral treatment programs.












The bottom line: People who quit smoking can have immediate health benefits. Believe it or not, within 24 hours of quitting, a person’s blood pressure decreases and they have less of a chance of having a heart attack. Over the long haul, quitting means less chance of stroke, lung and other cancers, and coronary heart disease, and more chance for a long and healthy life.

## What If a Person Wants To Quit Using Tobacco?

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If someone you know is smoking or using tobacco in another way, encourage him or her to talk to a parent, school guidance counselor, or other trusted adult. A national toll-free number, [1-800-QUIT-NOW](tel:1-800-QUIT-NOW) ( [1-800-784-8669](tel:1-800-784-8669) ), can help people get the information they need to quit smoking. Callers to the number are routed to their state’s smoking cessation quitline or, in states that have not established quitlines, to one maintained by the National Cancer Institute. In addition, a Web site—[www.smokefree.gov](http://www.smokefree.gov)—from the U.S. Department of Health and Human Services offers online advice and downloadable information to make stopping easier.

## Resources

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