

The Deadly Effects of Tobacco Addiction

Teens and Tobacco

The Facts

According to the Monitoring the Future Survey for 2005, cigarette smoking among students is at the lowest levels in the history of the survey. Since 1975 the survey has measured drug, alcohol, cigarette use, and related attitudes among students in 8th, 10th, and 12th grades nationwide. This decrease in use corresponds to a continuous increase in the number of teens who believe there are “great” health risks from cigarette smoking.

While this is good news, research suggests that teens who do use tobacco are more likely than adults to become addicted. Even occasional smoking can result in tobacco addiction in some teens. In animal research, investigators have shown adolescents to be more susceptible to the effects of nicotine than adults. (For more about teen health dangers, see **Latest Research** on the next page.)

Addiction:

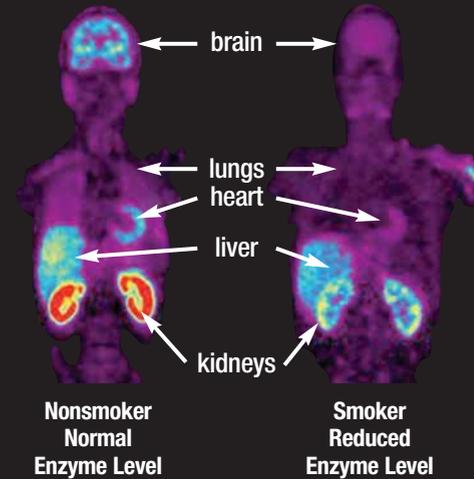
A chronic disease characterized by compulsive drug seeking and abuse and by long-lasting chemical and molecular changes in the brain.

Tobacco is one of the most heavily used addictive products in the United States, according to the National Institute on Drug Abuse (NIDA). In 2004, 70.3 million people used tobacco at least once in the month before being interviewed. That is more than 25 percent of the U.S. population 12 and older.

Nicotine is the main ingredient in tobacco that causes addiction. Research shows that nicotine activates the parts of the brain that control feelings of pleasure. Nicotine works fast. Drug levels peak within 10 seconds of inhalation. (Cigar and pipe smokers and smokeless tobacco users absorb nicotine more slowly.) Within a few minutes, the effects of nicotine disappear. To keep feeling good, a smoker takes another puff or lights another cigarette.

Smoking harms every organ in the body. Cigarette smoking accounts for about one-third of all cancer deaths, including those from lung cancer. In fact, cigarette smoking has been linked to about 90 percent of all lung cancer cases. Research shows that smoking increases the risk of heart disease. Smokers harm others as well as themselves through secondhand smoke.

Cigarette Smoking Affects Enzyme Levels Throughout the Body



These PET (positron emission tomography) scans show the concentration of an important enzyme, MAO B, in the internal organs of a smoker and a nonsmoker. MAO B plays a role in nerve cell communication and in the regulation of blood pressure. The nonsmoker's scan shows normal enzyme levels. (Red is the highest concentration.) The smoker's organs show lower concentrations of MAO B; in some organs, the enzyme is virtually absent.

“An improved overall understanding of addiction and of nicotine as an addictive drug has been instrumental in developing medications and behavioral treatments for tobacco addiction.”

Nora D. Volkow, M.D., Director, National Institute on Drug Abuse

Secondhand Smoke: A Real Danger

Cigarette smoke contains thousands of dangerous chemicals that are unhealthy for both smokers and nonsmokers. **Secondhand smoke** refers to the smoke from the burning end of a cigarette and the smoke exhaled by smokers. More than 126 million Americans are regularly exposed to secondhand smoke at home, at work, and in enclosed public spaces.

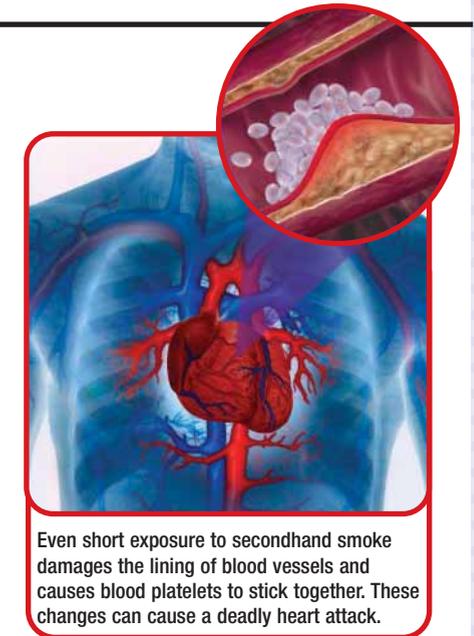
The Deadly Effects

- Secondhand smoke can cause heart disease and lung cancer in nonsmoking adults. Breathing secondhand smoke for even a short time increases risk for those diseases.
- Children and infants are especially vulnerable to the poisons in secondhand smoke. Almost 3 million children in the United States under the age of six breathe secondhand smoke at home at least four days per week.
- Secondhand smoke is a known cause of sudden infant death syndrome (SIDS), respiratory problems, ear infections, and asthma attacks in infants and children.
- Secondhand smoke in the home environment can slow the lung growth of exposed children. Older children whose parents smoke get bronchitis and pneumonia more often than the children of nonsmokers.

- Wheezing and coughing are also more common in children who breathe secondhand smoke.

Protecting Yourself and Others

The only way to fully protect yourself and loved ones from the dangerous chemicals in secondhand smoke is through 100 percent smoke-free environments. Opening a window; sitting in a separate area; or using ventilation, air conditioning, or a fan *cannot* eliminate secondhand smoke exposure. If you are a smoker, the single best way to protect your family is to quit smoking.



Even short exposure to secondhand smoke damages the lining of blood vessels and causes blood platelets to stick together. These changes can cause a deadly heart attack.

Overcoming Tobacco Addiction

Quitting Has Immediate Health Benefits

Within 24 hours of quitting, blood pressure goes down and chances of heart attack decrease. Long-term benefits of quitting include lower risk of stroke, lung and other cancers, and coronary heart disease.

Treating Withdrawal from Nicotine

- Nicotine withdrawal symptoms include irritability, craving, cognitive and attention deficits, sleep disturbances, and increased appetite.
- To reduce the symptoms, nicotine replacements—gum, patches, sprays, and

inhalers—are used. Another medication works on other areas of the brain to control craving.

- Newer medications under study act on nicotine receptors directly. Studies show that medications have better long-term success when combined with behavioral treatment.

More Information

- smoking.drugabuse.gov
- teens.drugabuse.gov
- cdc.gov/tobacco
- smokefree.gov
- 1-800-QUITNOW

LATEST Research

Addiction is a developmental disorder that begins in adolescence, and sometimes as early as childhood. Recent advances have provided more insight into why teens put themselves at risk for addiction through risk-taking and thrill-seeking behaviors. These behaviors are likely due to the fact that the part of the brain responsible for judgment, decision making, and control of emotional responses—the

prefrontal cortex—is the last area of the brain to mature. But there may be other factors.

Dr. James Belluzzi and colleagues have recently found that a chemical in tobacco smoke, **acetaldehyde**, may play a role in addicting adolescents to smoking.

In the study, adolescent laboratory rats increased their intake of nicotine when it was

combined with acetaldehyde. Adult rats did not.

All the rats were placed in cages where they could poke their noses through holes and receive either nicotine, saline, acetaldehyde, or a mixture of acetaldehyde and nicotine.

Over five days, with increasing frequency, the adolescent rats showed a preference for the acetaldehyde-nicotine

combination. The adult rats did not show any preference.

“Our results show that acetaldehyde, at the same relative concentration found in cigarette smoke, dramatically increases the reinforcing properties of nicotine,” says Dr. Belluzzi. “Furthermore, the effect is age-related, with adolescent animals far more sensitive than adults.”