

Cigarettes and Other Tobacco Products

Tobacco use is the leading preventable cause of disease, disability, and death in the United States. Between 1964 and 2004, cigarette smoking caused an estimated 12 million deaths, including 4.1 million deaths from cancer, 5.5 million deaths from cardiovascular diseases, 1.1 million deaths from respiratory diseases, and 94,000 infant deaths related to mothers smoking during pregnancy.¹ According to the Centers for Disease Control and Prevention (CDC), cigarette smoking results in more than 400,000 premature deaths in the United States each year—about 1 in every 5 U.S. deaths.²

How Does Tobacco Affect the Brain?

Cigarettes and other forms of tobacco—including cigars, pipe tobacco, snuff, and chewing tobacco—contain the addictive drug nicotine. Nicotine is readily absorbed into the bloodstream when a tobacco product is chewed, inhaled, or smoked. A typical smoker will take 10 puffs on a cigarette over a period of 5 minutes that the cigarette is lit. Thus, a person who smokes about 1½ packs (30 cigarettes) daily gets 300 “hits” of nicotine each day.

Upon entering the bloodstream, nicotine immediately stimulates the adrenal glands to release the hormone

epinephrine (adrenaline). Epinephrine stimulates the central nervous system and increases blood pressure, respiration, and heart rate. Glucose is released into the blood while nicotine suppresses insulin output from the pancreas, which means that smokers have chronically elevated blood sugar levels.

Like cocaine, heroin, and marijuana, nicotine increases levels of the neurotransmitter dopamine, which affects the brain pathways that control reward and pleasure. For many tobacco users, long-term brain changes induced by continued nicotine exposure result in addiction—a condition of compulsive drug seeking and use, even in the face of negative consequences. Studies suggest that additional compounds in tobacco smoke, such as acetaldehyde, may enhance nicotine’s effects on the brain.³ A number of studies indicate that adolescents are especially vulnerable to these effects and may be more likely than adults to develop an addiction to tobacco.

When an addicted user tries to quit, he or she experiences withdrawal symptoms including powerful cravings for tobacco, irritability, difficulty paying attention, sleep disturbances, and increased appetite. Treatments can help smokers manage these symptoms and improve the likelihood of successfully quitting.

What Other Adverse Effects Does Tobacco Have on Health?

Cigarette smoking accounts for about one-third of all cancers, including 90 percent of lung cancer cases. In addition to cancer, smoking causes lung diseases such as chronic bronchitis and emphysema, and increases the risk of heart disease, including stroke, heart attack, vascular disease, and aneurysm. Smoking has also been linked to leukemia, cataracts, and pneumonia.^{1,2} On average, adults who smoke die 14 years earlier than nonsmokers.²

Although nicotine is addictive and can be toxic if ingested in high doses, it does not cause cancer—other chemicals are responsible for most of the severe health consequences of tobacco use. Tobacco smoke is a complex mixture of chemicals such as carbon monoxide, tar, formaldehyde, cyanide, and ammonia—many of which are known carcinogens. Carbon monoxide increases the chance of cardiovascular diseases. Tar exposes the user to an increased risk of lung cancer, emphysema, and bronchial disorders. Smokeless tobacco (such as chewing tobacco and snuff) also increases the risk of cancer, especially oral cancers.

Pregnant women who smoke cigarettes run an increased risk of miscarriage, stillborn or premature infants, or infants with low birthweight.² Maternal

smoking may also be associated with learning and behavioral problems in children. Smoking more than one pack of cigarettes per day during pregnancy nearly doubles the risk that the affected child will become addicted to tobacco if that child starts smoking.⁴

While we often think of medical consequences that result from direct use of tobacco products, passive or secondary smoke also increases the risk for many diseases. Secondhand smoke, also known as environmental tobacco smoke, consists of exhaled smoke and smoke given off by the burning end of tobacco products. According to CDC, approximately 38,000 deaths per year can be attributed to secondhand smoke.² Nonsmokers exposed to secondhand smoke at home or work increase their risk of developing heart disease by 25 to 30 percent⁵ and lung cancer by 20 to 30 percent.² In addition, secondhand smoke causes respiratory problems in nonsmokers, such as 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.

Although quitting can be difficult, the health benefits of smoking cessation are immediate and substantial—including reduced risk for cancers, heart disease, and stroke. A 35-year-old man who quits smoking will, on average, increase his life expectancy by 5 years.⁶

Are There Effective Treatments for Tobacco Addiction?

Tobacco addiction is a chronic disease that often requires multiple attempts to quit. Although some smokers are able to quit without help, many others need assistance. Generally, rates of relapse for smoking cessation are highest in the first few weeks and months and diminish considerably after about 3 months. Both behavioral interventions (counseling) and medication can help smokers quit; the combination of medication with counseling is more effective than either alone.

Behavioral Treatments

Behavioral treatments employ a variety of methods to assist smokers in quitting, ranging from self-help materials to individual counseling. These interventions teach individuals to recognize high-risk situations and develop coping strategies to deal with them. The U.S. Department of Health and Human Services' (HHS) national toll-free quitline, 800-QUIT-NOW, is an access point for any smoker seeking information and assistance in quitting.

Nicotine Replacement Treatments

Nicotine replacement therapies (NRTs), such as nicotine gum and the nicotine patch, were the first pharmacological treatments approved by the Food and Drug Administration (FDA) for use in smoking cessation therapy. NRTs deliver a controlled dose of nicotine to

a smoker in order to relieve withdrawal symptoms during the smoking cessation process. They are most successful when used in combination with behavioral treatments. FDA-approved NRT products include nicotine chewing gum, the nicotine transdermal patch, nasal sprays, inhalers, and lozenges.

Other Medications

Bupropion and varenicline are two FDA-approved non-nicotine medications that effectively increase rates of long-term abstinence from smoking. Bupropion, a medication that goes by the trade name Zyban, was approved by the FDA in 1997 for use in smoking cessation. Varenicline tartrate (trade name: Chantix) targets nicotine receptors in the brain, easing withdrawal symptoms and blocking the effects of nicotine if people resume smoking.

Current Treatment Research

Scientists are currently pursuing many other avenues of research to develop new tobacco cessation therapies. One promising intervention is a vaccine that targets nicotine, blocking the drug's access to the brain and preventing its reinforcing effects. Preliminary trials of this vaccine have yielded promising results.

How Widespread Is Tobacco Use?

Monitoring the Future Survey

Current smoking rates among high school students reached an all-time low

in 2008. According to the Monitoring the Future survey, 6.8 percent of 8th-graders, 12.3 percent of 10th-graders, and 20.4 percent of 12th-graders reported that they had used cigarettes in the previous month.[†] Although unacceptably high numbers of youth continue to smoke, these numbers represent a significant decrease from peaks reached in the late 1990s.

The decrease in smoking rates among young Americans corresponds to several years in which increased proportions of teens said they believe there is a “great” health risk associated with cigarette smoking and expressed disapproval of smoking one or more packs of cigarettes per day. Students’ personal disapproval of smoking has risen for some years: in the past 10 years, for example, the percentage of 12th-graders disapproving of smoking one or more packs of cigarettes per day increased significantly, from 68.8 percent in 1998 to 80.5 percent in 2008. During the same period, the number of 8th-graders who said it was “very easy” or “fairly easy” to get cigarettes declined from 73.6 percent in 1998 to 57.4 percent in 2008.

Current use of smokeless tobacco among 10th- and 12th-graders also reached an all-time low in 2008: 5 percent of 10th-graders and 6.5 percent of 12th-graders reported that they had used smokeless tobacco in the previous month. Current use for 8th-graders (3.5 percent) did not change significantly from the all-time low reached in 2007.

National Survey on Drug Use and Health (NSDUH)^{††}

In 2007, 28.6 percent of the U.S. population 12 and older (70.9 million people) used a tobacco product at least once in the month prior to being interviewed. This figure includes 3.1 million young people aged 12 to 17 (12.4 percent of this age group). In addition, 60 million Americans (24.2 percent of the population) were current cigarette smokers; 13.3 million smoked cigars; 8.1 million used smokeless tobacco; and 2 million smoked tobacco in pipes.

Between 2002 and 2007, past-month cigarette use among persons 12 or older decreased from 26 percent to 24.2 percent. Cigarette use in the past month among 12- to 17-year-olds declined from 13 percent in 2002 to 9.8 percent in 2007.

Other Information Sources

For additional information on tobacco abuse and addiction, please visit www.smoking.drugabuse.gov.

For more information on how to quit smoking, please visit www.smokefree.gov.

Data Sources

¹ These data are from the 2008 Monitoring the Future survey, funded by the National Institute on Drug Abuse, National Institutes of Health, HHS, and conducted by the University of Michigan's Institute for Social Research. The study has tracked 12th-graders' illicit drug abuse and related attitudes since 1975; in 1991, 8th- and 10th-graders were added to the study. The latest data are online at www.drugabuse.gov.

^{††} NSDUH (formerly known as the National Household Survey on Drug Abuse) is an annual survey of Americans age 12 and older conducted by the Substance Abuse and Mental Health Services Administration. Copies of the latest survey are available at www.samhsa.gov and from NIDA at 877-643-2644.

References

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² Centers for Disease Control and Prevention. *Smoking and Tobacco Use—Fact Sheet: Health Effects of Cigarette Smoking*. Updated January 2008. Available at: http://www.cdc.gov/tobacco/data_statistics/fact_sheets/health_effects/health_effects.htm.

³ Belluzzi JD, Wang R, Leslie FM. Acetaldehyde enhances acquisition of nicotine self-administration in adolescent rats. *Neuropsychopharmacology* 30:705–712, 2005.

⁴ Buka SL, Shenassa ED, Niaura R. Elevated risk of tobacco dependence among offspring of mothers who smoked during pregnancy: A 30-year prospective study. *Am J Psychiatry* 160:1978–1984, 2003.

⁵ Centers for Disease Control and Prevention. *Smoking and Tobacco Use—Fact Sheet: Secondhand Smoke Causes Heart Disease*. Updated May 2007. Available at: http://www.cdc.gov/tobacco/data_statistics/fact_sheets/secondhand_smoke/health_effects/HeartDisease.htm.

⁶ U.S. Department of Health and Human Services. *The Health Benefits of Smoking Cessation: A Report of the Surgeon General*. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 1990. Available at: <http://profiles.nlm.nih.gov/NN/B/B/C/T/>.