

HOME | ABOUT NIDA | NEWS & EVENTS | FUNDING | PUBLICATIONS

RESEARCHERS & HEALTH PROFESSIONALS

PARENTS & TEACHERS

STUDENTS & YOUNG ADULTS

EN ESPAÑOL

SELECT A TOPIC...

NIDA Home > Publications > Research Reports > Tobacco Addiction

## Research Report Series - Tobacco Addiction

### What is the extent and impact of tobacco use?

According to the 2004 National Survey on Drug Use and Health, an estimated 70.3 million Americans age 12 or older reported current use of tobacco—59.9 million (24.9 percent of the population) were current cigarette smokers, 13.7 million (5.7 percent) smoked cigars, 1.8 million (0.8 percent) smoked pipes, and 7.2 million (3.0 percent) used smokeless tobacco, confirming that tobacco is one of the most widely abused substances in the United States. While these numbers are still unacceptably high, they represent a decrease of almost 50 percent since peak use in 1965.

NIDA's 2005 Monitoring the Future Survey of 8th-, 10th-, and 12th-graders, used to track drug use patterns and attitudes, has also shown a striking decrease in smoking trends among the Nation's youth. The latest results indicate that about 9 percent of 8th-graders, 15 percent of 10thgraders, and 23 percent of 12thgraders had used cigarettes in the 30 days prior to the survey. Despite cigarette use being at the lowest levels of the survey since a peak in the mid-1990s, the past few years indicate a clear slowing of this decline. And while perceived risk and disapproval of smoking had been on the rise, recent years have shown the rate of change to be dwindling. In fact, current use, perceived risk, and disapproval leveled off among 8th-graders in 2005, suggesting that renewed efforts are needed to ensure that teens understand the harmful consequences of smoking.

Moreover, the declining prevalence of cigarette smoking among the general U.S. population is not reflected in patients with mental illnesses. For them, it remains substantially higher, with the incidence of smoking in patients suffering from post-traumatic stress disorder, bipolar disorder, major depression, and other mental illness twofold to fourfold higher than the general population, and smoking incidence among people with schizophrenia as high as 90 percent.

### Index

[Letter from the Director](#)

[What is the extent and impact of tobacco use?](#)

[How does tobacco deliver its effects?](#)

[Is nicotine addictive?](#)

[Are there other chemicals that may contribute to tobacco addiction?](#)

[What are the medical consequences of tobacco use?](#)

[Are there safe tobacco products?](#)

[Smoking and pregnancy—What are the risks?](#)

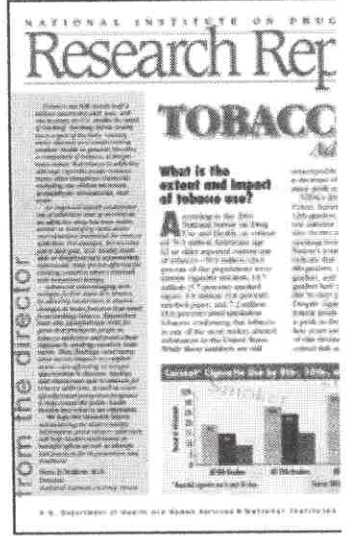
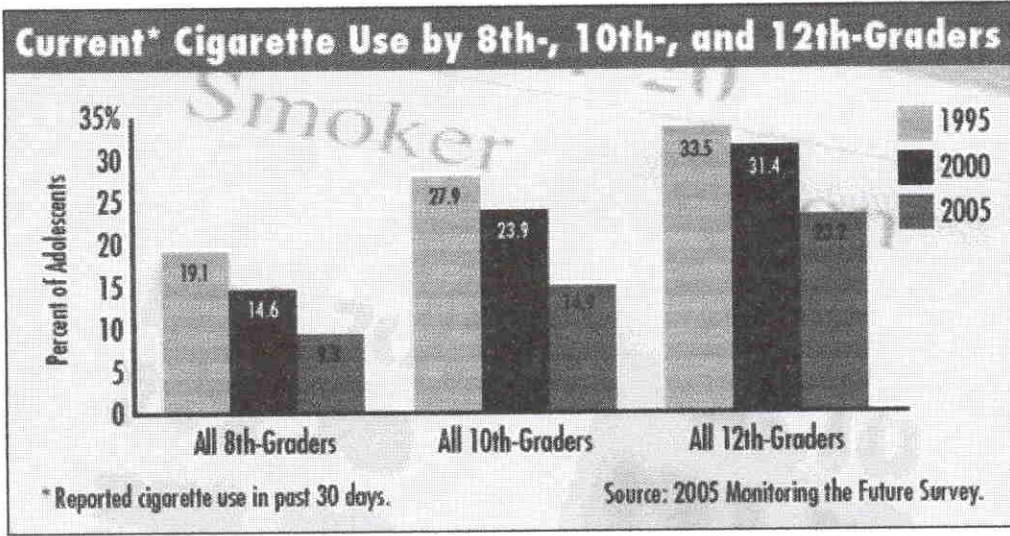
[Are there gender differences in tobacco smoking?](#)

[Smoking and adolescence](#)

[Are there effective treatments for tobacco addiction?](#)

[Where can I get further scientific information about tobacco addiction?](#)

[Glossary and References](#)



Tobacco use is the leading preventable cause of death in the United States. The impact of tobacco use in terms of morbidity and mortality costs to society is staggering. Economically, more than \$75 billion of total U.S. healthcare costs each year is attributable directly to smoking. However, this cost is well below the total cost to society because it does not include burn care from smoking-related fires, perinatal care for low birth-weight infants of mothers who smoke, and medical care costs associated with disease caused by secondhand smoke. In addition to healthcare costs, the costs of lost productivity due to smoking effects are estimated at \$82 billion per year, bringing a conservative estimate of the economic burden of smoking to more than \$150 billion per year.

### How does tobacco deliver its effects?

There are more than 4,000 chemicals found in the smoke of tobacco products. Of these, nicotine, first identified in the early 1800s, is the primary reinforcing component of tobacco that acts on the brain.

Cigarette smoking is the most popular method of using tobacco; however, there has also been a recent increase in the sale and consumption of smokeless tobacco products, such as snuff and chewing tobacco. These smokeless products also contain nicotine, as well as many toxic chemicals.



The cigarette is a very efficient and highly engineered drug delivery system. By inhaling tobacco smoke, the average smoker takes in 1 to 2 mg of nicotine per cigarette. When tobacco is smoked, nicotine rapidly reaches peak levels in the bloodstream and enters the brain. 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 1-1/2 packs (30 cigarettes) daily gets 300 "hits" of nicotine to the brain each day. In those who typically do not inhale the smoke—such as cigar

and pipe smokers and smokeless tobacco users--nicotine is absorbed through the mucosal membranes and reaches peak blood levels and the brain more slowly.

Immediately after exposure to nicotine, there is a "kick" caused in part by the drug's stimulation of the adrenal glands and resulting discharge of epinephrine (adrenaline). The rush of adrenaline stimulates the body and causes a sudden release of glucose, as well as an increase in blood pressure, respiration, and heart rate. Nicotine also suppresses insulin output from the pancreas, which means that smokers are always slightly hyperglycemic (i.e., they have elevated blood sugar levels). The calming effect of nicotine reported by many users is usually associated with a decline in withdrawal effects rather than direct effects of nicotine.

---

### Is nicotine addictive?

---

Yes. Most smokers use tobacco regularly because they are addicted to nicotine. Addiction is characterized by compulsive drug seeking and use, even in the face of negative health consequences. It is well documented that most smokers identify tobacco use as harmful and express a desire to reduce or stop using it, and nearly 35 million of them want to quit each year. Unfortunately, only about 6 percent of people who try to quit are successful for more than a month.

Research has shown how nicotine acts on the brain to produce a number of effects. Of primary importance to its addictive nature are findings that nicotine activates reward pathways—the brain circuitry that regulates feelings of pleasure. A key brain chemical involved in mediating the desire to consume drugs is the neurotransmitter dopamine, and research has shown that nicotine increases levels of dopamine in the reward circuits. This reaction is similar to that seen with other drugs of abuse, and is thought to underlie the pleasurable sensations experienced by many smokers. Nicotine's pharmacokinetic properties also enhance its abuse potential. Cigarette smoking produces a rapid distribution of nicotine to the brain, with drug levels peaking within 10 seconds of inhalation. However, the acute effects of nicotine dissipate in a few minutes, as do the associated feelings of reward, which causes the smoker to continue dosing to maintain the drug's pleasurable effects and prevent withdrawal.

Nicotine withdrawal symptoms include irritability, craving, cognitive and attentional deficits, sleep disturbances, and increased appetite. These symptoms may begin within a few hours after the last cigarette, quickly driving people back to tobacco use. Symptoms peak within the first few days of smoking cessation and may subside within a few weeks. For some people, however, symptoms may persist for months.

While withdrawal is related to the pharmacological effects of nicotine, many behavioral factors can also affect the severity of withdrawal symptoms. For some people, the feel, smell, and sight of a cigarette and the ritual of obtaining, handling, lighting, and smoking the cigarette are all associated with the pleasurable effects of smoking and can make withdrawal or craving worse. While nicotine gum and patches may alleviate the pharmacological aspects of withdrawal, cravings often persist. Other forms of nicotine replacement, such as inhalers, attempt to address some of these other issues, while behavioral therapies can help smokers identify environmental triggers of withdrawal and

craving so they can employ strategies to prevent or circumvent these symptoms and urges.

---

[NIDA Home](#) | [Site Map](#) | [Search](#) | [FAQs](#) | [Accessibility](#) | [Help](#) | [Privacy](#) | [FOIA \(NIH\)](#) | [Employment](#) | [Print Version](#)

---



The National Institute on Drug Abuse (NIDA) is part of the [National Institutes of Health \(NIH\)](#), a component of the [U.S. Department of Health and Human Services](#). Questions? See our [Contact Information](#). *Last updated on Friday, July 7, 2006.*

