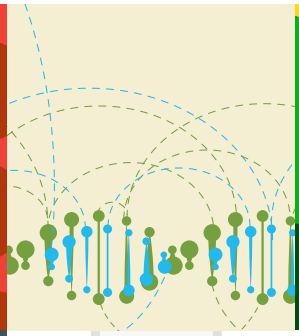
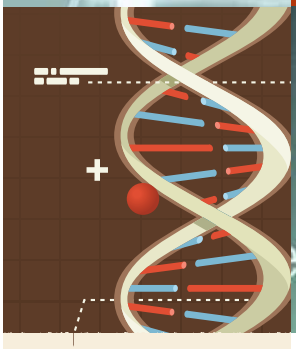
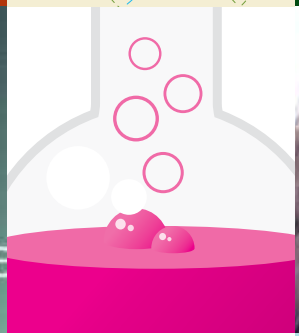
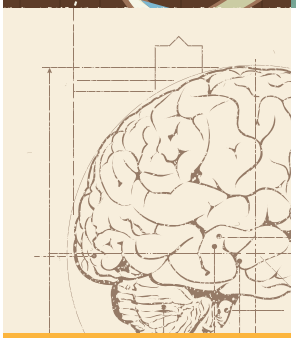






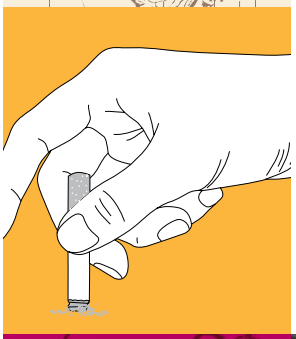


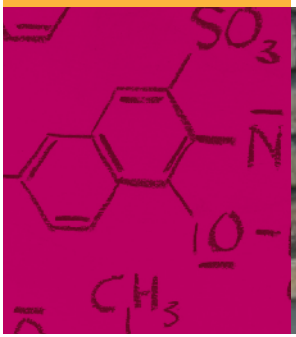
the NATIONAL INSTITUTE *on* DRUG ABUSE

MEDIA GUIDE

how to find what you need to know about drug abuse and addiction

www.drugabuse.gov





U.S. Department of Health and Human Services
National Institutes of Health

NIH

National Institute on Drug Abuse

quick reference/drugs & health

REPORTER'S QUICK REFERENCE GUIDE—WHO TO CALL FOR WHAT

WHAT	WHO
National Institutes of Health (NIH) (Within the U.S. Department of Health and Human Services [HHS])	
Science of drug and nicotine addiction; prescription drug abuse, prevention, and treatment; drug use and HIV/AIDS; drugged driving; and Monitoring the Future Survey (8th, 10th, and 12th graders)	**National Institute on Drug Abuse (NIDA)** Press Office: 301-443-6245 E-mail: media@nida.nih.gov Web: www.drugabuse.gov/news-events
Science of alcohol use, addiction, and abuse; drunk driving; and fetal alcohol spectrum disorder	**National Institute on Alcohol Abuse and Alcoholism (NIAAA)** Press Office: 301-443-2857 Web: www.niaaa.nih.gov/news-events/press-room
Science of mental health disorder prevention and treatment	**National Institute of Mental Health (NIMH)** Press Office: 301-443-4536 Web: www.nimh.nih.gov/news/index.shtml
To contact NIH Institutes not listed here	**NIH Media contacts:** Press Office: 301-496-5787 Web: www.nih.gov/news/media_contacts.htm
Other Relevant Agencies within HHS	
National Survey on Drug Use and Health (NSDUH), Behavioral Health Treatment Services Locator, and Treatment Block Grants	**Substance Abuse and Mental Health Services Administration (SAMHSA)** Press Office: 240-276-2130 Web: www.samhsa.gov
Safety and efficacy of medications	**U.S. Food and Drug Administration (FDA)** Press Office: 301-827-6250 Web: www.fda.gov/NewsEvents/Newsroom/MediaContacts
Smoking prevention and cessation	**Centers for Disease Control and Prevention (CDC), Office on Smoking and Health** Press Office: 202-395-6618 Web: www.cdc.gov/tobacco/
	FDA Center for Tobacco Products Web: www.fda.gov/TobaccoProducts/
HIV/AIDS	**AIDS.gov** Web: www.aids.gov
Relevant Offices Outside HHS	
Office of National Drug Control Policy (ONDCP) Executive Office of the President Press Office: 202-395-6618 Web: www.whitehouse.gov/ondcp/news-releases	**Drug Enforcement Administration (DEA), within the U.S. Department of Justice** Press Office: 202-307-7977 Web: www.dea.gov
Bureau of Justice Statistics Press Office: 202-307-1241 Web: http://bjs.ojp.usdoj.gov/index.cfm?ty=tp&tid=35	

the National Institute *on* Drug Abuse

MEDIA GUIDE

THE BASICS

1 The Science of Drug Use and Addiction: The Basics

6 Commonly Used Addictive Drugs

RESOURCES

15 Where to Find Nationwide Trends and Statistics

16 NIDA Resources

17 Other Government Web Sites for Health and Science Information

ABOUT NIDA

19 NIDA's History and Background

21 NIDAMED: NIDA Outreach and Education Activities

24 For Young People, Their Parents, and Educators

25 Health Education Campaigns

25 NIDA's Outreach to Clinicians

GLOSSARY

27 Commonly Used Terms in Addiction Science

34 Commonly Used Terms in Basic Neuroscience

DEAR JOURNALIST

We thank you for your interest in the vitally important issues of drug use and addiction.

Today, thanks to science, our views and responses to addiction have changed dramatically. After more than three decades of research, as well as the development of exciting new imaging technologies, we now know that drug addiction is a disease of the brain that affects behavior—a disease that can respond to treatment.

As the Director of the National Institute on Drug Abuse (NIDA), I am pleased to offer this guide to the important findings that are emerging as a result of research on addiction and its treatment. NIDA, part of the National Institutes of Health (NIH) under the U.S. Department of Health and Human Services (HHS), supports most of the world's research on drug use and addiction. Findings from basic and behavioral science address fundamental and essential questions relevant to drug abuse, ranging from its causes and consequences to its treatment and prevention.

FIGURES

RESEARCH

FACTS

The purpose of this guide is to give journalists fast and user-friendly access to the latest scientific information. In more than 30 years as a researcher, I have seen the impact that science and health journalists have in bringing scientific research to the public. It is through information that Americans gain hope and understanding.

I have come to know many of you over the years and remain committed to releasing scientific information as quickly as possible for rapid dissemination to the public. Please keep this guide nearby as a useful tool and let us know how NIDA's public liaison staff can help you reach your information and deadline needs.

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

NIDA's Public Information and Liaison Branch: NIDA's Link to the Media

We are committed to bringing timely, factual information on addiction and its treatment to the press and public. NIDA's Public Information and Liaison Branch (PILB) is part of NIDA's Office of Science Policy and Communications. Linking scientists, the scientific community, and the media, PILB supports the rapid dissemination of research information to inform policy and improve practice. NIDA's goal is to ensure that science—not ideology or anecdote—forms the foundation of public information on drug use and addiction.

Visit us online at **www.drugabuse.gov**, or contact the NIDA Press Office at **media@nida.nih.gov** or **301-443-6245** for information and access to experts, research, news, and information.

This guide was developed by PILB as part of NIDA's mission to close the gap between the public's impressions about drug addiction and the knowledge gained from scientific research on addiction and substance use.

the science of drug use and addiction: the basics

THE SCIENCE OF DRUG USE AND ADDICTION: THE BASICS

What is drug addiction?

Addiction is defined as a chronic, relapsing brain disease that is characterized by compulsive drug seeking and use, despite harmful consequences. It is considered a brain disease because drugs change the brain; they change its structure and how it works. These brain changes can be long lasting and can lead to many harmful, often self-destructive, behaviors.

Why study drug use and addiction?

Abuse of and addiction to alcohol, nicotine, and illicit and prescription drugs cost Americans more than $700 billion a year in increased health care costs, crime, and lost productivity.[1,2,3] Every year, illicit and prescription drugs and alcohol contribute to the death of more than 90,000 Americans, while tobacco is linked to an estimated 480,000 deaths per year.[4,5] (Hereafter, unless otherwise specified, *drugs* refers to all of these substances.)

How are drug disorders categorized?

NIDA continues to use the term "addiction" to describe compulsive drug seeking despite negative consequences. However, "addiction" is not considered a specific diagnosis in the fifth edition of The Diagnostic and Statistical Manual of Mental Disorders (DSM-5)—a diagnostic manual used by clinicians that contains descriptions and symptoms of all mental disorders classified by the American Psychiatric Association (APA).

In 2013, APA updated the DSM, replacing the categories of substance abuse and substance dependence with a single category: substance use disorder. The symptoms associated with a substance use disorder fall into four major groupings: impaired control, social impairment, risky use, and pharmacological criteria (i.e., tolerance and withdrawal).

1. National Drug Intelligence Center. *The Economic Impact of Illicit Drug Use on American Society*. Washington, DC: United States Department of Justice, 2011.
2. Rehm J, Mathers C, Popova S, Thavorncharoensap M, Teerawattananon Y, Patra J. Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. *Lancet* 373(9682):2223-2233, 2009.
3. Centers for Disease Control and Prevention. *Best Practices for Comprehensive Tobacco Control Programs — 2014*. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2014.
4. Centers for Disease Control and Prevention (CDC). *Alcohol-Related Disease Impact (ARDI)*. Atlanta, GA: CDC.
5. U.S. Department of Health and Human Services. *The Health Consequences of Smoking—50 Years of Progress: A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2014.

The new DSM describes a problematic pattern of use of an intoxicating substance leading to clinically significant impairment or distress, as manifested by at least two of the following, occurring within a 12-month period:

1. The substance is often taken in larger amounts or over a longer period than was intended.
2. There is a persistent desire or unsuccessful effort to cut down or control use of the substance.
3. A great deal of time is spent in activities necessary to obtain the substance, use the substance, or recover from its effects.
4. Craving, or a strong desire or urge to use the substance.
5. Recurrent use of the substance resulting in a failure to fulfill major role obligations at work, school, or home.
6. Continued use of the substance despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of its use.
7. Important social, occupational, or recreational activities are given up or reduced because of use of the substance.
8. Recurrent use of the substance in situations in which it is physically hazardous.
9. Use of the substance is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance.
10. Tolerance, as defined by either of the following:
    a. A need for markedly increased amounts of the substance to achieve intoxication or desired effect.
    b. A markedly diminished effect with continued use of the same amount of the substance.
11. Withdrawal, as manifested by either of the following:
    a. The characteristic withdrawal syndrome for that substance (as specified in the DSM-5 for each substance).
    b. The substance (or a closely related substance) is taken to relieve or avoid withdrawal symptoms.

Please Note: Current national surveys of drug use have not yet been modified to reflect the new DSM-5 criteria of substance use disorders and therefore still report substance abuse and dependence separately.

How does NIDA use the terms drug abuse and addiction?

People use substances for a variety of reasons. It becomes drug abuse when people use illegal drugs or use legal drugs inappropriately. This includes the repeated use of drugs to produce pleasure, alleviate stress, and/or alter or avoid reality. It also includes using prescription drugs in ways other than prescribed or using someone else's prescription. Addiction occurs when a person cannot control the impulse to use drugs even when there are negative consequences—the defining characteristic of addiction. These behavioral changes are also accompanied by changes in brain functioning, especially in the brain's natural inhibition and reward centers. NIDA's use of the term addiction corresponds roughly to the DSM definition of substance use disorder. The DSM does not use the term addiction.

What is the difference between physical dependence, dependence, and addiction?

Physical dependence is not equivalent to dependence or addiction, and may occur with the regular (daily or almost daily) use of any substance, legal or illegal, even when taken as prescribed. It occurs because the body naturally adapts to regular exposure to a substance (e.g., caffeine or a prescription drug). When that substance is taken away, symptoms can emerge while the body re-adjusts to the loss of the substance. Physical dependence can lead to craving the drug to relieve the withdrawal symptoms. Drug dependence and addiction refer to substance use disorders, which may include physical dependence but must also meet additional criteria.

How do drugs work in the brain to produce pleasure?

Nearly all addictive drugs directly or indirectly target the brain's reward system by flooding the circuit with dopamine. Dopamine is a neurotransmitter present in regions of the brain that regulate movement, emotion, cognition, motivation, and feelings of pleasure. The overstimulation of this system, which rewards our natural behaviors, produces the euphoric effects sought by people who use drugs and teaches them to repeat the behavior.

Is drug use a voluntary behavior?

The initial decision to take drugs is mostly voluntary. However, when addiction takes over, a person's ability to exert self-control can become seriously impaired. Brain-imaging studies from people addicted to drugs show physical changes in areas of the brain that are critical for judgment, decisionmaking, learning, memory, and behavior control. Scientists believe that these changes alter the way the brain works and may help explain the compulsive and destructive behaviors of an addicted person.

Can addiction be treated successfully?

Yes. Addiction is a treatable, chronic disease that can be managed successfully. Research shows that combining behavioral therapy with medications, where available, is the best way to ensure success for most patients. Treatment approaches must be tailored to address each patient's drug use patterns and drug-related medical, psychiatric, and social problems.

Does relapse to drug use mean treatment has failed?

No. The chronic nature of addiction means that relapsing to drug use is not only possible but also likely. Relapse rates are similar to those for other well-characterized chronic medical illnesses such as diabetes, hypertension, and asthma, which also have both physiological and behavioral components. Treatment of chronic diseases involves changing deeply imbedded behaviors. For the addicted patient, lapses back to drug use indicate that treatment needs to be reinstated or adjusted, or that alternate treatment is needed.

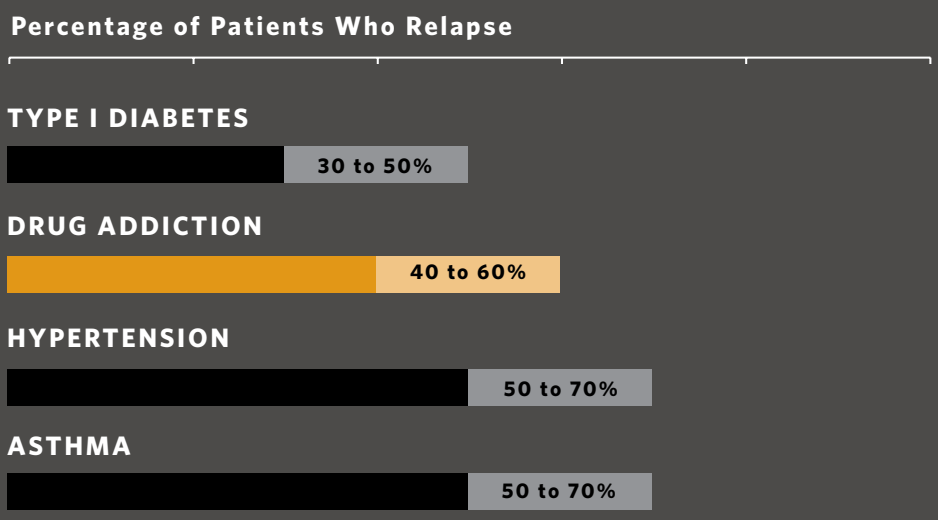
How many people die from drug use?

The Centers for Disease Control and Prevention (CDC) report that there were more than 40,000 unintentional drug overdose deaths in the United States in 2011, a 118-percent increase since 1999. More than 22,000 people die every year from prescription drug abuse,[6] more than heroin and cocaine combined.[7]

6. Centers for Disease Control and Prevention. *Prescription Drug Overdose in the United States: Fact Sheet.* Available at: www.cdc.gov/homeandrecreationalsafety/overdose/facts.html. Last accessed: September 15, 2014.

7. Centers for Disease Control and Prevention. *Prescription Painkiller Overdoses in the US.* Available at: www.cdc.gov/vitalsigns/PainkillerOverdoses/index.html. Last accessed: September 15, 2014.

Comparison of Relapse Rates Between Drug Addiction and Other Chronic Illnesses



Relapse rates for drug-addicted patients are compared with those suffering from diabetes, hypertension, and asthma. Relapse is common and similar across these illnesses (as is adherence to medication). Thus, drug addiction should be treated like any other chronic illness, with relapse serving as a trigger for renewed intervention.

Source: McLellan et al., JAMA, 284:1689–1695, 2000.

MOST COMMONLY USED ADDICTIVE DRUGS

In recent years, Monitoring the Future, the NIDA-funded annual survey of drug, alcohol, and tobacco use in 8th-, 10th-, and 12th-grade students, has shown persistently high rates of marijuana and nonmedical prescription drug use in our Nation's teens. More information on the Monitoring the Future survey can be found at **www.drugabuse.gov/related-topics/trends-statistics/monitoring-future**.

Marijuana

Marijuana (cannabis) is the most commonly used illicit substance. This drug impairs short-term memory and learning, the ability to focus, and coordination. It also increases heart rate, can harm the lungs, and may increase the risk of psychosis in vulnerable people. Research suggests that when regular marijuana use begins in the teen years, addiction is more likely: 1 in 6 users, compared to 1 in 9 among adults. In addition, recent research suggests that heavy cannabis use that starts in the teen years is associated with declines in IQ scores in adulthood. More information on marijuana can be found at **www.drugabuse.gov/drugs-abuse/marijuana**.

Marijuana Research at NIDA

As part of its mandate to study drug use and addiction and other health effects of both legal and illegal drugs, NIDA funds a wide range of research on marijuana; its main psychoactive ingredient, delta-9-tetrahydrocannabinol (THC); and chemicals related to THC (cannabinoids such as cannabidiol [CBD]). More information on marijuana research at NIDA can be found at **www.drugabuse.gov/drugs-abuse/marijuana/marijuana-research-nida.**

Medical Marijuana

Although many have called for the nationwide legalization of marijuana to treat medical conditions, the scientific evidence to date is not sufficient for the marijuana plant to gain U.S. Food and Drug Administration (FDA) approval, for two main reasons.

First, there have not been enough clinical trials showing that marijuana's benefits outweigh its health risks. The FDA requires carefully conducted studies in large numbers of patients (hundreds to thousands) to accurately assess the benefits and risks of a potential medication.

Second, to be considered a legitimate medicine, a substance must have well-defined and measureable ingredients that are consistent from one unit to the next (such as a pill or injection). This consistency allows doctors to determine the dose and frequency. As the marijuana plant contains hundreds of chemical compounds that may have different effects and that vary from plant to plant, its use as a medicine is difficult to evaluate.

However, THC-based drugs to treat pain and nausea are already FDA approved and prescribed. Scientists continue to investigate the medicinal properties of cannabinoids—or the individual components of the marijuana plant (e.g., THC, CBD). The therapeutic potential lies in developing medications based upon cannabinoids that have therapeutic value but with limited-to-no risk for addiction, such as CBD. For more information, see our "Is Marijuana Medicine?" DrugFacts at **www.drugabuse.gov/publications/drugfacts/marijuana-medicine**.

Any of the 27 NIH Institutes could fund research in this area. To find out more about NIH-funded research into the therapeutic potential of cannabinoids, contact NIH at **mylesr@mail.nih.gov.** For more information on research that NIDA is supporting to explore this issue, go to **www.drugabuse.gov/drugs-abuse/marijuana/nida-research-therapeutic-benefits-cannabis-cannabinoids**.

K2/Spice

"K2" or ***"Spice"*** refers to a wide variety of herbal mixtures that produce experiences similar to marijuana. Of the illicit drugs most used by high school seniors, Spice is second only to marijuana. It is sometimes called "synthetic" marijuana, but this is a misperception. Labels on Spice products often claim that they contain "natural" psychoactive material taken from a variety of plants; however, chemical analyses show that their active ingredients are synthetic (or designer) cannabinoid compounds.

Poison Control Centers report a variety of K2/Spice symptoms, including rapid heart rate, vomiting, agitation, confusion, hallucinations, raised blood pressure and reduced blood supply to the heart, and, in a few cases, heart attacks. Because the chemicals used in Spice have a high addictive potential and no medical benefit, the Drug

MOST COMMONLY USED DRUGS (continued)

Enforcement Administration (DEA) has made it illegal to sell, buy, or possess the main chemicals in these drugs. More information can be found at **www.drugabuse.gov/drugs-abuse/k2spice-synthetic-marijuana.**

Prescription and Over-the-Counter Medications

Prescription medications and some over-the-counter medications are increasingly being abused (used in ways other than intended or without a prescription). This practice can lead to addiction, and in some cases, overdose. Among the most disturbing aspects of this emerging trend is its prevalence among teenagers and young adults, as well as the common misperception that because these are used medically or prescribed by physicians, they are safe even when not used as intended. Commonly abused classes of prescription drugs include opioid painkillers, stimulants, and depressants.

- Opioids are usually prescribed for pain relief. Commonly prescribed opioids include hydrocodone (e.g., Vicodin®), oxycodone (e.g., OxyContin®), morphine, fentanyl, and codeine. In the United States, more people now die from opioid painkiller overdoses than from heroin and cocaine combined.
- Stimulants: Methylphenidate (Ritalin®, Concerta®, Focalin®, and Metadate®) and amphetamines (Adderall®, Dexedrine®) are stimulants commonly prescribed for attention-deficit hyperactivity disorder (ADHD).
- Depressants are usually prescribed to promote sleep or to reduce anxiety. As measured by national surveys, depressants are often categorized as sedatives or tranquilizers. Sedatives primarily include barbiturates (e.g., phenobarbitol) but also include sleep medications such as Ambien® and Lunesta®. Tranquilizers primarily include benzodiazepines such as Valium® and Xanax®, but also include muscle relaxants and other anti-anxiety medications.
- "Syrup," "Purple Drank," "Sizzurp," or "Lean" describes soda mixed with prescription-strength cough syrup containing codeine and promethazine—these cough syrups are available by prescription only. Users may also flavor the mixture with hard candies. Drinking this combination has become increasingly popular among some celebrities and youth in several areas of the country. Codeine is an opioid that can produce relaxation and euphoria when consumed in sufficient quantities. Promethazine

is an antihistamine that also acts as a sedative. More information can be found at www.drugabuse.gov/drugs-abuse/emerging-trends.

Commonly abused over-the-counter drugs include cold medicines containing dextromethorphan (DMX), a cough suppressant. Products containing DMX can be sold as cough syrups, gel capsules, and pills (that can look like candies). They are frequently abused by young people, who refer to the practice as "robo-tripping" or "skittling." Pseudoephedrine, a decongestant found in many over-the-counter cold medicines, is another over-the-counter medication that is used illicitly. Although not typically abused in itself, it is one ingredient used to produce methamphetamine. For more information about prescription drug abuse and related health consequences, go to **www.drugabuse.gov/drugs-abuse/prescription-drugs-cold-medicines.**

OTHER COMMONLY USED ADDICTIVE DRUGS

Alcohol

Alcohol consumption can damage the brain and most body organs, including the heart, liver, and pancreas. It also increases the risk of some cancers, weakens the immune system, puts fetal development at risk, and causes deadly vehicle accidents. Areas of the brain that are especially vulnerable to alcohol-related damage are the cerebral cortex (largely responsible for our higher brain functions, including problem-solving and decisionmaking), the hippocampus (important for memory and learning), and the cerebellum (important for movement coordination).

More information can be found on the Web site of the National Institute on Alcohol Abuse and Alcoholism at **www.niaaa.nih.gov**.

OTHER COMMONLY USED DRUGS (continued)

Amphetamines/ Methamphetamine

Amphetamines, including methamphetamine, are powerful stimulants that can produce feelings of euphoria and alertness. Methamphetamine is a white, odorless, bitter-tasting crystalline powder that easily dissolves in water or alcohol and is taken orally, intra-nasally (snorting the powder), by needle injection, or by smoking. Methamphetamine's effects are particularly long lasting and harmful to the brain. Amphetamines can cause high body temperature and can lead to serious heart problems and seizures.

Regular methamphetamine use significantly changes how the brain functions. Noninvasive human brain imaging studies have shown alterations in the activity of the dopamine system that are associated with reduced motor skills and impaired verbal learning, which may account for many of the emotional and cognitive problems observed in regular methamphetamine users.

More information on methamphetamine can be found at **www.drugabuse.gov/publications/drugfacts/methamphetamine.**

Anabolic Steroids

Anabolic steroids refer to synthetic variants of the male sex hormone testosterone. The proper term for these compounds is anabolic-androgenic steroids (abbreviated AAS)—"anabolic" referring to muscle building and "androgenic" referring to increased male sexual characteristics. Steroids can be prescribed for certain medical conditions; however, they are often abused to increase muscle mass and to improve athletic performance or physical appearance. Anabolic steroids are usually either taken orally or injected into the muscles, although some are applied to the skin as a cream or gel. Doses taken by abusers may be 10 to 100 times higher than doses prescribed to treat medical conditions.

Anabolic steroids work very differently from other addictive drugs, and they do not have the same acute effects on the brain. However, long-term steroid use can affect some of the same brain pathways and chemicals—including dopamine, serotonin, and opioid systems—that are affected by other drugs. They thereby may have a significant impact on mood and behavior.

Other serious consequences of steroid abuse can include heart disease, liver problems, stroke, infectious diseases, depression, and suicide. Less serious side effects include severe acne and changes in sex characteristics, like shrinking of the testicles in men and growth of facial hair in women. More information on steroids can be found at **www.drugabuse.gov/drugs-abuse/steroids-anabolic**.

Bath Salts

The term ***"bath salts"*** refers to an emerging family of drugs containing one or more synthetic chemicals related to cathinone, an amphetamine-like stimulant found naturally in the khat plant. Reports of severe intoxication and dangerous health effects associated with the use of bath salts have made these drugs a serious and growing public health and safety issue. Some users experience paranoia, agitation, hallucinatory delirium, and psychotic and violent behavior. Deaths have also been reported.

These synthetic cathinone products—marketed as "bath salts" to evade detection by authorities—should not be confused with products such as Epsom salts for bathing. Bath salts typically take the form of a white or brown crystalline powder and are sold in small plastic or foil packages labeled "not for human consumption." More information can be found at **www.drugabuse.gov/drugs-abuse/bath-salts-synthetic-cathinones.**

Cocaine

Cocaine is a short-acting stimulant, which can lead users to "binge"—take the drug many times in a single session. Cocaine use can lead to severe medical consequences related to the heart and the respiratory, nervous, and digestive systems. Cocaine users can also experience severe paranoia, in which they lose touch with reality.

The powdered form of cocaine is either inhaled through the nose (snorted), where it is absorbed through the nasal tissue, or dissolved in water and injected into the bloodstream. Crack is a form of cocaine that has been processed to make a rock crystal (also called "freebase cocaine") that can be smoked. The crystal is heated to produce vapors that are absorbed into the bloodstream through the lungs. (The term "crack" refers to the crackling sound produced by the rock as it is heated.)

More information can be found at **www.drugabuse.gov/drugs-abuse/cocaine.**

OTHER COMMONLY USED DRUGS (continued)

Hallucinogens

The effects of ***hallucinogens***—perception-altering drugs—are highly variable and unreliable, producing different effects in different people at different times. This is mainly due to differences in the amounts and chemistries of active compounds within the drugs. Because of their unpredictable nature, the use of hallucinogens can be particularly dangerous. Examples of hallucinogens include:

- **MDMA (Ecstasy, "Molly")** (3,4-methylenedioxymethamphetamine) produces both stimulant and mind-altering effects. It can increase body temperature, heart rate, blood pressure, and heart-wall stress. Ecstasy may also be toxic to nerve cells. It is taken orally, usually as a capsule or tablet. Its effects last approximately 3 to 6 hours, although it is not uncommon for users to take a second dose of the drug as the effects of the first dose begin to fade. Ecstasy is commonly taken in combination with alcohol and other drugs.

  Molly—slang for "molecular"—refers to the pure crystalline powder form of ecstasy. Users may seek out Molly to avoid the adulterants or substitutes known to be commonly found in ecstasy, but those who purchase what they think is pure ecstasy may actually be exposing themselves to the same risks, since Molly often contains toxic additives. In fact, Molly is often nothing more than repackaged ecstasy.

  More information can be found at **www.drugabuse.gov/publications/drugfacts/mdma-ecstasy**.

- **LSD** is one of the most potent hallucinogenic drugs. Its effects are unpredictable, and users may see vivid colors and images, hear sounds, and feel sensations that seem real but do not exist. Users also may have traumatic experiences and emotions that can last for many hours. Some short-term effects can include increased body temperature, heart rate, and blood pressure; sweating; loss of appetite; sleeplessness; dry mouth; and tremors.

- **PCP** (phencyclidine) was developed in the 1950s as an intravenous anesthetic. Its legitimate use has since been discontinued due to serious adverse effects.

- **Psilocybin** is obtained from certain types of mushrooms that are found in tropical and subtropical regions of South America, Mexico, and the United States. These mushrooms typically contain less than 0.5 percent psilocybin plus trace amounts of psilocin, another hallucinogenic substance.

More information can be found at **www.drugabuse.gov/publications/drugfacts/hallucinogens-lsd-peyote-psilocybin-pcp.**

Heroin

Heroin is a powerful opioid drug that produces euphoria and feelings of relaxation. It slows respiration and can increase the risk of serious infectious diseases, especially when taken intravenously. Regular heroin use changes the functioning of the brain, causing tolerance and dependence. Other opioid drugs include morphine, OxyContin®, Vicodin®, and Percodan®, which have legitimate medical uses; however, using them in ways other than prescribed (or using them without a prescription) can result in the same harmful consequences as heroin use.

More information about heroin can be found at **www.drugabuse.gov/drugs-abuse/heroin.**

Inhalants

Inhalants are volatile substances found in many household products (such as oven cleaners, gasoline, spray paints, and other aerosols) that induce mind-altering effects. Inhalants are extremely toxic and can damage the heart, kidneys, lungs, and brain. Even a healthy person can suffer heart failure and death within minutes of a single session of the prolonged sniffing of an inhalant.

People tend to abuse different inhalant products at different ages. New younger users (ages 12–15) most commonly abuse glue, shoe polish, spray paints, gasoline, and lighter fluid. First-time older users (ages 16–17) most commonly abuse nitrous oxide, or "whippets." Adults most commonly abuse a class of inhalants known as nitrites (such as amyl nitrites, or "poppers").

More information on inhalants can be found at **www.drugabuse.gov/drugs-abuse/inhalants.**

OTHER COMMONLY USED DRUGS (continued)

Ketamine, Rohypnol, and GHB

Ketamine, ***Rohypnol***®, and ***GHB*** have come to be known as "date rape" drugs because they can cause someone to lose their memory of an assault. Rohypnol® and GHB can easily be added to beverages and ingested unknowingly. Any of these drugs can also cause someone to lose consciousness. Ketamine and GHB are predominantly central nervous system (CNS) depressants, whereas Rohypnol® is a benzodiazepine. More information can be found at **www.drugabuse.gov/drugs-abuse/club-drugs.**

Nicotine

Nicotine is an addictive stimulant found in cigarettes and other forms of tobacco. Tobacco smoke increases a user's risk of cancer, emphysema, bronchial disorders, and cardiovascular disease. Smoking rates have decreased in the United States in recent years, yet the mortality rate associated with tobacco addiction is still staggering, with more than 480,000 premature deaths in the United States each year—about 1 in every 5 deaths.[5] Tobacco use killed approximately 100 million people during the 20th century and, if current smoking trends continue, the cumulative death toll for this century is projected to reach 1 billion.[8] More information can be found at **www.drugabuse.gov/drugs-abuse/tobacco-addiction-nicotine.**

8. *WHO Report on the Global Tobacco Epidemic, 2008: The MPOWER package.* Geneva, World Health Organization, 2008

resources

WHERE TO FIND NATIONWIDE TRENDS AND STATISTICS

Major sources of data on the extent of drug use in the United States include the following:

Monitoring the Future (MTF)

The MTF survey measures drug, alcohol, and cigarette use and related attitudes among 8th-, 10th-, and 12th-grade students nationwide. Survey participants report their drug use behaviors across three time periods: lifetime, past year, and past month. The annual survey is funded by NIDA and is conducted by the University of Michigan. Results from the survey are released late each fall. For the latest survey results, go to **www.drugabuse.gov/DrugPages/MTF.html**.

National Drug Early Warning System (NDEWS)

NDEWS will monitor emerging trends to help health experts respond quickly to potential outbreaks of illicit drug use and to identify increased use of designer synthetic compounds. The system will scan social media and Web platforms to identify new trends as well as use conventional national- and local-level data resources that are utilized by the Community Epidemiology Work Group (CEWG). Development of this project started August 2014. The system is expected to launch in 2015 as an enhancement (and eventual replacement) of the current system – the CEWG. Until then, project updates can be found on the CEWG Web site: **www.drugabuse.gov/about-nida/organization/workgroups-interest-groups-consortia/community-epidemiology-work-group-cewg**.

National Survey on Drug Use and Health (NSDUH)

The Substance Abuse and Mental Health Services Administration's (SAMHSA's) NSDUH (formerly called the National Household Survey on Drug Abuse) is the primary source of information on the prevalence, patterns, and consequences of alcohol, tobacco, and illicit drug use in the general U.S. civilian non-institutionalized population, ages 12 and older. Survey information can be found at **www.oas.samhsa.gov/nsduh.htm.**

Drug Abuse Warning Network (DAWN)

The DAWN report, also prepared by SAMHSA, provides information about the impact of drug use on hospital emergency departments in the United States. It reports the number of visits to the emergency department that were related directly to the use of an illegal drug or the nonmedical use of a legal drug, as well as drug-related deaths investigated by medical examiners and coroners. DAWN is not a measure of the prevalence of use but instead offers information complementary to the prevalence data found in the NSDUH. Survey information can be found at **www.samhsa.gov/data/DAWN.aspx**.

Treatment Episode Data Set (TEDS)

The TEDS system includes records for approximately 1.5 million substance abuse treatment admissions annually. While TEDS does not represent all substance abuse treatment activities, it comprises a significant proportion of all admissions to substance abuse treatment programs and includes those admissions that rely on public funds. Data are reported by sex, age, and race/ethnicity for each of 15 substance abuse categories. TEDS is maintained by SAMHSA's Office of Applied Studies, and can be found at **www.oas.samhsa.gov/dasis.htm#teds2.**

Youth Risk Behavior Survey (YRBS)

The YRBS, part of the Centers for Disease Control and Prevention's (CDC's) Youth Risk Behavior Surveillance System (YRBSS), is a school-based survey that collects data from students in grades 9–12. The survey includes questions on a wide variety of health-related risk behaviors, including substance use. More information is available at **www.cdc.gov/HealthyYouth/yrbs/index.htm**.

CDC's Home & Recreational Safety: Drug Overdose Data

CDC consolidates information from their Wide-ranging OnLine Data for Epidemiologic Research (WONDER) database, which tracks underlying cause of death, and SAMHSA's DAWN data to provide information on U.S. drug overdose deaths. More information is available at **www.cdc.gov/homeandrecreationalsafety/overdose/index.html**.

NIDA RESOURCES

A wealth of material regarding various aspects of drug use and addiction is available, free of charge, from NIDA.

NIDA Web Site

Through its online and mobile presence, NIDA strives to communicate its research findings to the wide-ranging audiences it serves, which include students, parents, teachers, researchers, scientists, prevention and treatment practitioners, health care professionals, policymakers, constituent groups, children and teens, underserved populations, and the general public.

Most of NIDA's publications are available on NIDA's Web site: **www.drugabuse.gov**. The site's responsive design allows users to access the information on handheld devices, including smart phones and tablets, and some resources can be ordered free in hard copy.

Other NIDA Sites:

- For low literacy users: www.easyread.drugabuse.gov
- For teens and people who work with teens: www.teens.drugabuse.gov
- Information for young adults on the link between HIV/AIDS and drugs: www.hiv.drugabuse.gov
- NIDA's intramural research program: www.irp.drugabuse.gov

NIDA's New Media Accounts:

- Twitter: @NIDAnews (www.twitter.com/nidanews)
- Facebook:
  - General audience: **www.facebook.com/NIDANIH**
  - For teens and their teachers and parents: **www.facebook.com/NIDA.Drug.Facts.Week**
- RSS feed: www.drugabuse.gov/nidanews.xml
- YouTube: www.youtube.com/user/NIDANIH
- Flickr: www.flickr.com/photos/nida-nih/collections/
- LinkedIn: www.linkedin.com/company/the-national-institute-on-drug-abuse-nida

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OTHER GOVERNMENT WEB SITES FOR HEALTH AND SCIENCE INFORMATION

National Institutes of Health (NIH) (www.nih.gov)

NIH is the steward of medical and behavioral research for the Nation. Its mission is to seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to extend health, lengthen life, and reduce illness and disability. NIH is part of the U.S. Department of Health and Human Services (HHS). The NIH site links to sites for its 27 Institutes and Centers.

RePORTER (www.projectreporter.nih.gov/reporter.cfm)

RePORTER includes information on research projects funded by the NIH as well as CDC, the Agency for Healthcare Research and Quality, the Health Resources and Services Administration, SAMHSA, and the U.S. Department of Veterans Affairs. RePORTER also includes links to publications and patents citing support from these projects.

Project results can be filtered according to specific parameters, such as Principal Investigator, Fiscal Year, keyword, etc.

Note: when doing a "Text Search" to filter by certain keywords, you will have to read the description of each study to determine if that research is actually focusing on your keyword of interest. In some cases, the term may be merely mentioned in the grant application but is not the topic of the study.

National Library of Medicine (NLM) (www.nlm.nih.gov)

NLM is the world's largest library dealing with a single scientific/professional topic. It cares for nearly 19 million holdings (including books, journals, reports, manuscripts, and audiovisual items) and sponsors MedlinePlus, a source of up-to-date, quality health care information from NLM and NIH.

ClinicalTrials.gov (www.clinicaltrials.gov)

ClinicalTrials.gov lists publicly and privately supported clinical studies of human participants conducted around the world. ClinicalTrials.gov does not contain all the clinical studies conducted in the United States because not all studies (for example, observational studies and trials that do not study a drug, biologic, or device) are required by law to be registered. The Web site is maintained by NLM.

Healthfinder (www.healthfinder.gov)

Healthfinder is a Government Web site providing resources on a wide range of health topics, selected from approximately 1,400 Government and non-profit organizations.

Office on Women's Health (OWH) (www.womenshealth.gov)

OWH provides up-to-date and commercial-free health information on topics that range from reproductive health to healthy aging. The site provides easy-to-understand health information, daily announcements, links to thousands of free health publications and Web sites, and statistics on women's health.

Office of Adolescent Health (OAH) (www.hhs.gov/ash/oah/)

OAH is dedicated to improving the health and well-being of America's adolescents, especially those who are most vulnerable.

about NIDA

NIDA'S HISTORY AND BACKGROUND

For important events in NIDA's history, visit **www.nih.gov/about/almanac/organization/NIDA.htm.**

Research Accomplishments

Keeping an eye on drug use trends among teens to guide intervention strategies. Substance use among American youth is a continually changing phenomenon. Through its Monitoring the Future Survey of 8th-, 10th-, and 12th-grade students nationwide, NIDA continues to monitor these changes and identify emerging substance use problems to better guide effective intervention approaches. For example, while overall teen drug use showed a significant decline from the mid-1990s to the mid- to late-2000s, recent years have seen an upward trend in marijuana use.

Identifying the molecular sites and systems in the brain where every major addictive drug has its effect. Such discoveries have led to the development and approval of nicotine replacement therapies for cigarette smoking cessation and new medications like buprenorphine, now prescribed by physicians in office settings, for opioid addiction.

Discovering a new communications network that opens the way to novel medical therapies. NIDA-supported research was pivotal to the discovery of a cannabinoid system that is distributed throughout the brain and body and is composed of the body's own compounds that are chemically related to marijuana's active ingredient. This network promises new and novel interventions for a range of diseases and conditions, including addiction, obesity, pain, osteoporosis, multiple sclerosis, and anxiety disorders.

Demonstrating that addiction is a treatable disease. Medications and behavioral treatments can provide long-lasting benefits for people trying to overcome addiction, especially when used together. Addiction treatment promotes continued abstinence, which can reverse some of the detrimental brain changes caused by addiction, as shown in pioneering imaging studies. Successful drug abuse treatment also reduces crime and other societal costs, including health costs, now in the billions.

Optimizing research findings to create individually tailored treatments. Researchers are taking advantage of ongoing discoveries from the Human Genome Project, identifying genetic markers of complex disorders such as addiction. Now, gene variants are being discovered that can predict who will respond to a medication and who will not. These breakthroughs herald a new era of individualized therapies that will optimize outcomes, promote cost efficiency, and relieve suffering.

Decreasing the spread of HIV. Through the development of treatments for injection drug use (IDU), NIDA has contributed to the decline in IDU-associated HIV infections. Innovative community-based research shows that drug abuse treatment reduces risk behaviors leading to HIV transmission; thus, drug abuse treatment is HIV/AIDS prevention.

Changing the course of drug abuse treatment in this country. NIDA engages in myriad efforts to "translate" the results of basic and clinical research for real-world use. Our goal is to get research-based treatments into the hands of providers in community treatment centers, the criminal justice system, and physicians' offices. To that end, NIDA has established collaborative networks of researchers and practitioners, Federal agencies, and State substance abuse directors to integrate research findings into drug abuse treatment settings nationwide.

National Advisory Council on Drug Abuse. Congress, under 42 U.S.C. 284a of the Public Health Service Act, requires that each NIH Institute (including NIDA) have an Advisory Council that assists the Institute in its efforts to identify, review, and support the highest caliber of scientific research. As part of its responsibilities, each Advisory Council participates in the grant review process for its Institute, providing recommendations on which research applications will best advance the Institute's research goals and mission.

NIDA's Advisory Council, the National Advisory Council on Drug Abuse, was established on January 3, 1973. It consists of 18 members: 12 scientific experts and six people from the general public who are leaders in the fields of public policy, law, health policy, economics, or management. The Council also consists of five non-voting members or their designees—the HHS Secretary, the NIH Director, the NIDA Director, the Chief Medical Director of the Department of Veterans Affairs, and the Assistant Secretary of Defense for Health Affairs. More information on the Council can be found at **www.drugabuse.gov/about-nida/advisory-boards-groups/national-advisory-council-drug-abuse-nacda.**

NIDA Outreach and Education Activities

For the Professional Community

NIDA Notes, an e-newsletter that disseminates research findings to 100,000 professionals worldwide.

www.drugabuse.gov/news-events/nida-notes

NIDANotes

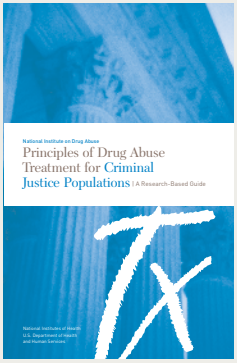
Preventing Drug Use among Children and Adolescents: A Research-Based Guide, which describes the most successful concepts for preventing drug use among young people.

www.drugabuse.gov/publications/preventing-drug-use-among-children-adolescents

Treatment Principles Series

Principles of Drug Addiction Treatment: A Research-Based Guide, developed for use in community and clinical settings.

www.drugabuse.gov/publications/principles-drug-addiction-treatment



Principles of Drug Abuse Treatment for Criminal Justice Populations: A Research-Based Guide, to inform drug treatment programs in criminal justice settings.

www.drugabuse.gov/publications/principles-drug-abuse-treatment-criminal-justice-populations

Principles of Adolescent Substance Use Disorder Treatment: A Research-Based Guide, describing the many treatment approaches available to address the unique needs of teens with substance use disorders.

www.drugabuse.gov/publications/principles-adolescent-substance-use-disorder-treatment-research-based-guide

For the General Public

Drug Facts
www.drugabuse.gov

NIDA DrugFacts is a series of plain language fact sheets highlighting specific drugs, trends in use, and prevention and treatment issues. The fact sheets are available in English, with some also available in Spanish.

www.drugabuse.gov/publications/term/160/DrugFacts

NATIONAL INSTITUTE ON DRUG ABUSE
NIDA DRUGPUBS

NIDA *Research Reports* are online reports simplifying current research findings for the educated lay public, legislators, educational groups, and practitioners. Some reports are also available in Spanish.

www.drugabuse.gov/publications/term/162/Research%2520Reports

Seeking Drug Abuse Treatment: Know What to Ask, distills NIDA's Treatment Principles into easy-to-understand language. It offers families guidance in seeking drug abuse treatment and lists five questions to ask when searching for a treatment program.

www.drugabuse.gov/publications/seeking-drug-abuse-treatment

Drugs, Brains, and Behavior: The Science of Addiction is a plain language booklet that discusses the reasons that people take drugs, why some people become addicted while others do not, how drugs work in the brain, and how addiction can be prevented and treated.

www.drugabuse.gov/publications/science-addiction

FAMILY CHECKUP
POSITIVE PARENTING PREVENTS DRUG ABUSE

Family Checkup is an online resource that equips parents with research-based skills to help keep their children drug free.

www.drugabuse.gov/family-checkup

Easy-to-Read DrugFacts Web site on drug abuse provides plain language information on neuroscience, and drug abuse prevention and treatment. It is also a resource for adult literacy educators.

www.easyread.drugabuse.gov

Public Education

NIDA TV is a central location for all NIDA videos and public service announcements.

www.drugabuse.gov/nida-tv

For Young People, Their Parents, and Educators

NIDA for Teens: The Science Behind Drug Abuse is an interactive Web site that includes information about various addictive drugs and their consequences, focused on ages 11-15.

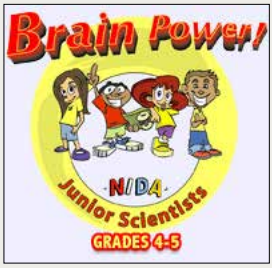
www.teens.drugabuse.gov

Marijuana: Facts for Teens and *Marijuana: Facts Parents Need to Know are* two of NIDA's most popular publications.

www.drugabuse.gov/publications/marijuana-facts-teens and **www.drugabuse.gov/publications/marijuana-facts-parents-need-to-know**

The *Mind Over Matter* series is for grades 5–9. The series, complete with a teacher's guide, highlights the effects of drugs on the brain and encourages the study of science. Spanish translation also available.

www.teens.drugabuse.gov/educators/lesson-plans-and-materials/mind-over-matter



Brain Power! The NIDA Junior Scientist Program, for use in K–5th-grade classrooms.

www.drugabuse.gov/brain-power

NIDA teams with *Scholastic*, a leading provider of educational materials for children and teachers, to bring ongoing science-based information about drug use to millions of U.S. school children between the ages of 3-12.

http://headsup.scholastic.com/

Health Education Campaigns

National Drug Facts Week (NDFW), a health observance week at the end of January, connects teens with experts to shatter the myths about drugs. *Drug Facts Chat Day*, held during NDFW, provides an online opportunity for students from around the country to ask questions about drugs and to have them answered by top NIDA scientists via a Web chat.

www.teens.drugabuse.gov/national-drug-facts-week

PEERx, a campaign for teens highlighting the dangers of prescription drug abuse, offers interactive videos allowing teens to make decisions about everyday dilemmas.

www.teens.drugabuse.gov/peerx

Game Plan, a public awareness campaign, reminds young people about the dangers of using steroids to enhance performance. Spanish translation also available.

www.drugabuse.gov/news-events/public-education-projects/public-service-announcements/game-plan-keep-your-body-healthy

Drug Abuse and HIV: Learn the Link campaign educates young people about the connection between substance use and HIV infection. Spanish translation also available.

www.hiv.drugabuse.gov

NIDAMED: NIDA's Outreach to Clinicians

NIDA**MED**

Screening Tools: NIDAMED provides tools and resources clinicians can use to screen patients for tobacco, alcohol, and illicit and prescription drug abuse, including an interactive online drug use screening tool.

www.drugabuse.gov/nmassist/

Continuing Medical Education Courses: NIDA (along with the Office of National Drug Control Policy) offers online training tools for health care providers on proper prescribing and patient management practices for opioid analgesics (painkillers).

www.drugabuse.gov/nidamed/etools

Medical School Curricula: NIDA's Centers of Excellence for Physician Information program provides scientifically accurate information on substance use, addiction, and its consequences to help meet the educational needs of medical students, residents, and medical school faculty.
www.drugabuse.gov/coe

All NIDAMED resources can be found at **www.drugabuse.gov/nidamed-medical-health-professionals**.

Other Initiatives

Addiction is an Emmy Award–winning HBO documentary produced in collaboration with NIDA, the Robert Wood Johnson Foundation, and the National Institute on Alcohol Abuse and Alcoholism. The film explores drug and alcohol abuse through the eyes of those who suffer from this devastating disease, with the added perspective of scientific and clinical experts working to better understand and treat it.

Addiction Science Awards are the first National Institutes of Health awards given at the Intel International Science and Engineering Fair, the world's largest high school science fair.

The Blending Initiative, in partnership with the Substance Abuse and Mental Health Services Administration, accelerates the dissemination of research-based treatment findings into community-based practice.

To see what publications are available free, in hard copies, contact NIDA DRUGPubs at **1-877-NIDA-NIH** or **drugpubs@nida.nih.gov**.

glossary

COMMONLY USED TERMS IN ADDICTION SCIENCE

A

Adderall®: A combination of amphetamine and dextroamphetamine (both central nervous system stimulants). It has a notably calming and "focusing" effect on patients with attention-deficit hyperactivity disorder (ADHD), particularly children.

Addiction: A chronic, relapsing disease characterized by compulsive drug-seeking and use despite negative consequences and by long-lasting changes in the brain.

Amphetamine: A stimulant drug with effects similar to cocaine.

Anabolic/androgenic steroids: Male hormones, principally testosterone, that are partially responsible for the tremendous developmental changes that occur during puberty and adolescence. Male hormones can accelerate growth of muscle, bone, and red blood cells; decrease body fat; enhance neural conduction (anabolic effects); and produce changes in primary and secondary sexual characteristics (androgenic effects).

Analgesics: A group of medications that reduce pain.

Anesthetic: An agent that causes insensitivity to pain and is used for surgeries and other medical procedures.

B

Barbiturate: A type of central nervous system (CNS) depressant often prescribed to promote sleep.

Bath salts: An emerging family of drugs containing one or more synthetic chemicals related to cathinone, an amphetamine-like stimulant found naturally in the khat plant.

Benzodiazepine: A type of CNS depressant often prescribed to relieve anxiety. Valium® and Xanax® are among the most widely prescribed benzodiazepine medications.

Brainstem: The lower portion of the brain. Major functions located in the brainstem include those necessary for survival, e.g., breathing, heart rate, blood pressure, and arousal.

Buprenorphine: Medication approved by the U.S. Food and Drug Administration in October 2002 for the treatment of opioid addiction.

C

Cannabidiol: A non-psychoactive cannabinoid that may be useful in reducing pain and inflammation and in controlling epileptic seizures.

Cannabinoid receptor: The receptor in the brain that recognizes and binds cannabinoids that are produced in the brain (anandamide) or outside the body (for example, THC and cannabidiol).

Cannabinoids: Chemicals that bind to cannabinoid receptors in the brain. They are found naturally in the brain (anandamide) and are also chemicals found in marijuana (for example, THC and CBD). They are involved in a variety of mental and physical processes, including memory, thinking, concentration, movement, pain regulation, food intake, and reward.

Cannabis: The botanical name for the plant that produces marijuana.

Carcinogen: A substance that may cause cancer.

Cardiovascular system: The heart and blood vessels.

Central nervous system (CNS): The brain and spinal cord.

Cerebellum: A portion of the brain that helps regulate posture, balance, and coordination.

Cerebral cortex: Region of the brain responsible for higher cognitive functions, including language, reasoning, decisionmaking, and judgment.

Cerebral hemispheres: The two specialized halves of the brain. In right-handed people, the left hemisphere is specialized for speech, writing, language, and calculation; the right hemisphere is specialized for spatial abilities, face recognition, and some aspects of music perception and production.

Cerebrum: The upper part of the brain consisting of the left and right hemispheres.

CNS depressants: A class of drugs (also called sedatives and tranquilizers) that slow CNS function; some are used to treat anxiety and sleep disorders (includes barbiturates and benzodiazepines).

Coca: The plant, Erythroxylon, from which cocaine is derived. Also refers to the leaves of this plant.

Cocaine: A highly addictive stimulant drug derived from the coca plant that produces profound feelings of pleasure.

Cognitive-behavioral treatments: A set of treatments that focus on modifying thinking, motivation, coping mechanisms, and/or choices made by people.

Comorbidity: When two disorders or illnesses occur in the same person, they are called comorbid. Drug addiction and other mental illnesses are often comorbid. Also referred to as co-occurring disorders.

Crack: Slang term for a smokeable form of cocaine.

Craving: A powerful, often overwhelming desire for drugs.

D

Dependence: A physiological state that can occur with regular drug use and results in withdrawal symptoms when drug use is abruptly discontinued.

Depressants: Drugs that relieve anxiety and promote sleep. Depressants include barbiturates, benzodiazepines, and alcohol.

Detoxification: A process that enables the body to rid itself of a drug. Medically assisted detoxification may be needed to help manage an individual's withdrawal symptoms. Detoxification alone is not treatment but is often the first step in a drug treatment program.

Dopamine: A brain chemical, classified as a neurotransmitter, found in regions of the brain that regulate movement, emotion, motivation, and pleasure.

Drug: A chemical compound or substance that can alter the structure and function of the body. Psychoactive drugs affect the function of the brain.

Drug abuse: The repeated use of illegal drugs or the inappropriate use of legal drugs to produce pleasure, alleviate stress, and/or alter or avoid reality.

Drugged driving: Driving a vehicle while impaired due to the lingering, intoxicating effects of recent drug use.

E

Ecstasy (3,4-methylenedioxy-methamphetamine, MDMA): A mood- and perception-altering drug that is chemically similar to hallucinogens and stimulants.

Endogenous: Something produced by the brain or other parts of the body.

F

Forebrain: The largest division of the brain, which includes the cerebral cortex and basal ganglia. It is credited with the highest cognitive functions.

H

Hallucinations: Perceptions of something (such as an image or a sound) that does not exist in the real world. Hallucinations usually arise from a disorder of the nervous system or as an effect of a hallucinogenic drug, such as LSD.

Hallucinogens: A diverse group of drugs that alter perceptions, thoughts, and feelings. Hallucinogenic drugs include LSD, mescaline, PCP, and psilocybin (magic mushrooms).

Heroin: A synthetic opioid related to morphine. It is more potent than morphine and is highly addictive.

Hippocampus: An area of the brain crucial for learning and memory.

Hypothalamus: A part of the brain that controls many bodily functions, including feeding, drinking, body temperature regulation, and the release of many hormones.

I

Ingest: Take food or other substances into the body through the mouth.

Inhalant: Any drug administered by breathing in its vapors. Inhalants are commonly organic solvents, such as glue and paint thinner, or anesthetic gases, such as nitrous oxide.

Inhalation: Taking air or a substance into the lungs by breathing it in through the nose or mouth. Nicotine in tobacco smoke enters the body by inhalation.

Injection: Taking a substance into the skin, subcutaneous tissue, muscle, blood vessels, or body cavities - usually by means of a needle.

Injection drug use: Taking drugs directly into blood vessels using a hypodermic needle and syringe. Also called intravenous drug use.

L

Limbic system: Area of the brain that is involved with feelings, emotions, and motivations. It is also important for learning and memory.

LSD (lysergic acid diethylamide): A hallucinogenic drug that acts on the serotonin receptor.

M

Marijuana: A psychoactive drug, usually smoked but sometimes vaporized or ingested, that is typically made from the flowers, leaves, and stems of the female cannabis plant. The main psychoactive ingredient is THC.

Medication: A drug that is used to treat an illness or disease according to established medical guidelines. If

the medication contains one or more controlled substances, it must be prescribed by a licensed physician.

Methadone: A long-acting synthetic opioid medication that is effective in treating pain and opioid addiction.

Methamphetamine: An addictive, potent stimulant drug that is part of the larger class of amphetamines.

Methylphenidate (Ritalin®/Concerta®): A CNS stimulant that has effects similar to, but more potent than, caffeine and less potent than amphetamines. It has a notably calming and "focusing" effect on patients with ADHD, particularly children.

N

Neuron (nerve cell): A unique type of cell found in the brain and throughout the body that specializes in the transmission and processing of information.

Neurotransmitter: A chemical produced by neurons to carry messages to adjacent neurons.

Nicotine: The addictive drug in tobacco. Nicotine activates a specific type of acetylcholine receptor.

Nitrous oxide: A medical anesthetic gas, often used in dentistry, that is also called "laughing gas." It is abused as an inhalant found in whipped cream dispensers.

Noradrenaline: A neurotransmitter that is made in the brain and influences, among other things, the function of the heart.

Nucleus accumbens: A part of the brain reward system, located in the limbic system, that processes information related to motivation and reward. Nearly all addictive drugs act directly or indirectly on the nucleus accumbens to reinforce drug taking.

O

Opioids (or opiates): Controlled substances most often prescribed for the management of pain. They are natural or synthetic chemicals similar to morphine that work by mimicking the actions of enkephalin and endorphin (endogenous opioids or pain-relieving chemicals produced in the body).

P

Pre-frontal cortex: Located in the frontal lobe (one of the four divisions of each cerebral hemisphere) of the brain. This area is important for decisionmaking, planning, and judgment.

Prescription drug abuse: The use of a medication by someone other than for whom it is prescribed, in ways or amounts other than intended by a doctor, or for the experience or feeling it causes.

Propofol: A common type of anesthetic used for surgery.

Psychedelic drug: A drug that distorts perception, thought, and feeling. This term is typically used to refer to drugs with hallucinogenic effects like those of LSD.

Psychoactive: Having a specific effect on the brain.

Psychotherapeutics: Therapeutic drugs that have an effect on brain function; some are used to treat psychiatric disorders. They include antidepressants, mood stabilizers, CNS depressants, stimulants, and opioids.

R

Relapse: In drug addiction, relapse is the resumption of drug use after an attempt to stop taking it. Relapse is a common occurrence in many chronic disorders, including addiction, that require frequent behavioral and/or pharmacologic adjustments to be treated effectively.

Reward: The process that reinforces behavior or increases its likelihood of recurrence. It is mediated, at least in part, by the release of dopamine into the nucleus accumbens. Human subjects report that reward is associated with feelings of pleasure.

Reward system (or brain reward system): A brain circuit that, when activated, reinforces behaviors. The circuit includes the dopamine-containing neurons of the ventral tegmental area, the nucleus accumbens, and part of the prefrontal cortex.

Route of administration: The way a drug is taken into the body. Drugs are most commonly taken by eating, drinking, inhaling, injecting, snorting, or smoking.

Rush: A surge of pleasure (euphoria) that rapidly follows the administration of some drugs.

S

Salvia: An herb in the mint family native to southern Mexico that is used to produce hallucinogenic experiences.

Sedatives: Drugs that promote sleep, suppress anxiety, and relax muscles; the National Survey on Drug Use and Health (NSDUH) classification includes benzodiazepines, barbiturates, and other types of CNS depressants.

Serotonin: A neurotransmitter that regulates many functions, including mood, appetite, and sensory perception.

Spice/K2: Dried plant material containing synthetic (or designer) cannabinoid compounds that produce

mind-altering effects as well as other compounds that vary from product to product.

Stimulants: A class of drugs that elevates mood, increases feelings of well-being, and increases energy and alertness. Some stimulants, such as cocaine and methamphetamine, produce euphoria and are powerfully rewarding. Other stimulants, such as methylphenidate (Ritalin® and Concerta®) or Adderall® (a mix of amphetamine salts), are often prescribed to treat ADHD.

T

Tetrahydrocannabinol: See "THC."

Thalamus: The key relay station for sensory information flowing to the cortex, which is located deep within the brain. It filters important messages out from the background noise, produced by the many signals entering the brain.

THC: Delta-9-tetrahydrocannabinol; the main psychoactive ingredient in marijuana, which acts on the brain to produce marijuana's psychoactive effects.

Tobacco: A plant widely cultivated for its leaves, which are used primarily for smoking; the *tabacum* species is the major source of tobacco products.

Tolerance: A condition in which higher doses of a drug are required to produce the same effect achieved during initial use, which often leads to dependence.

Tranquilizers: Drugs prescribed to promote sleep or reduce anxiety; the NSDUH classification includes benzodiazepines, barbiturates, and other types of CNS depressants.

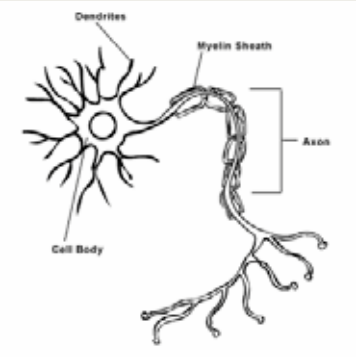
V

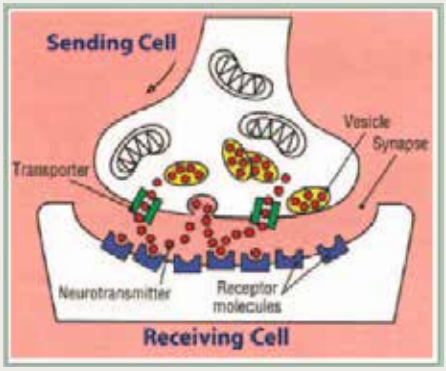
Ventral tegmental area: The group of dopamine-containing neurons that make up a key part of the brain reward system. This region is part of the brain reward pathways that also include the nucleus accumbens and prefrontal cortex.

W

Withdrawal: Symptoms that occur after regular use of a drug has been abruptly reduced or stopped. Symptom severity depends on the type of drug, the dosage, and how long and how frequently it has been taken.

COMMONLY USED TERMS IN BASIC NEUROSCIENCE





Axon: The portion of a neuron that carries information from the cell body to the end of the neuron (axon terminal).

Axon terminal: The structure at the end of an axon that produces and releases chemicals (neurotransmitters) to transmit the neuron's message across the synapse and to an adjacent neuron.

Cell body (or soma): The central structure of a cell (e.g., neuron) that contains the cell nucleus. The cell body contains both the genetic information and the molecular machinery that translates the information into proteins that determine the function and regulate the activity of the cell.

Dendrite: Located on a neuron's cell body, these specialized branches receive messages from other neurons.

Myelin: Fatty material that surrounds and insulates axons of most neurons to maximize the transmission of information along the axon.

Receptor: A large molecule located on the surface of a cell that recognizes specific chemicals (normally neurotransmitters, hormones, and similar endogenous substances) and transmits the chemical message into the cell.

Reuptake: The process by which neurotransmitters are removed from the synapse by being "pumped" through transporters back into the axon terminals that first released them.

Synapse: The small gap separating two adjacent neurons.

Transporter: A large protein on the cell membrane of the axon terminals. It removes neurotransmitter molecules from the synapse and transports them back into the neuron that released them.

Vesicle: A membranous sac within an axon terminal that stores neurotransmitters and releases them when needed.

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is the science of addiction,
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