

# Research Report

S E R I E S

The nonmedical use or abuse of prescription drugs is a serious and growing public health problem in this country. The elderly are among those most vulnerable to prescription drug abuse or misuse because they are prescribed more medications than their younger counterparts. Most people take prescription medications responsibly; however, an estimated 48 million people (ages 12 and older) have used prescription drugs for nonmedical reasons in their lifetimes. This represents approximately 20 percent of the U.S. population.

Also alarming is the fact that the 2004 National Institute on Drug Abuse's (NIDA's) Monitoring the Future survey of 8th-, 10th-, and 12th-graders found that 9.3 percent of 12th-graders reported using Vicodin without a prescription in the past year, and 5.0 percent reported using OxyContin—making these medications among the most commonly abused prescription drugs by adolescents.

The abuse of certain prescription drugs—opioids, central nervous system (CNS) depressants, and stimulants—can alter the brain's activity and lead to addiction. While we do not yet understand all of the reasons for the increasing abuse of prescription drugs, we do know that accessibility is likely a contributing factor. In addition to the increasing number of medicines being prescribed for a variety of health problems, some medications can be obtained easily from online pharmacies. Most of these are legitimate businesses that provide an important service; however, some online pharmacies dispense medications without a prescription and without appropriate identity verification, allowing minors to order the medications easily over the Internet.

NIDA hopes to decrease the prevalence of this problem by increasing awareness and promoting additional research on prescription drug abuse. Prescription drug abuse is not a new problem, but one that deserves renewed attention. It is imperative that as a Nation we make ourselves aware of the consequences associated with the misuse and abuse of these medications.

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Director

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from the director

## PRESCRIPTION DRUGS Abuse and Addiction

### What is prescription drug abuse?

Although most people take prescription medications responsibly, there has been an increase in the nonmedical use of or, as NIDA refers to it in this report, abuse<sup>1</sup> of prescription drugs in the United States.

### What are some of the commonly abused prescription drugs?

Although many prescription drugs can be abused, there are several classifications of medications that are commonly abused.

The three classes of prescription drugs that are most commonly abused are:

- Opioids, which are most often prescribed to treat pain;
- Central nervous system (CNS) depressants, which are used to treat anxiety and sleep disorders; and
- Stimulants, which are prescribed to treat the sleep disorder narcolepsy and attention-deficit hyperactivity disorder (ADHD).



<sup>1</sup>A common vocabulary has not been established in the field of prescription drug abuse. Because much of the data collected in this area focuses on nonmedical use of prescription drugs, the definition of abuse used in this report does not correspond to the definition of abuse/dependence listed in the Diagnostic and Statistical Manual of Mental Disorders (DSM).

## Opioids—

### What are opioids?

Opioids are commonly prescribed because of their effective analgesic, or pain-relieving, properties. Medications that fall within this class—referred to as prescription narcotics—include morphine (e.g., Kadian, Avinza), codeine, oxycodone (e.g., OxyContin, Percodan, Percocet), and related drugs. Morphine, for example, is often used before and after surgical procedures to alleviate severe pain. Codeine, on the other hand, is often prescribed for mild pain. In addition to their pain-relieving properties, some of these drugs—codeine and diphenoxylate (Lomotil) for example—can be used to relieve coughs and diarrhea.

### How do opioids affect the brain and body?

Opioids act on the brain and body by attaching to specific proteins called opioid receptors, which are found in the brain, spinal cord, and gastrointestinal tract. When these drugs attach to certain opioid receptors, they can block the perception of pain. Opioids can produce drowsiness, nausea, constipation, and, depending upon the amount of drug taken, depress respiration. Opioid drugs

## Over-the-Counter (OTC) Medicines Can Be Abused

Over-the-counter (OTC) medicines, such as certain cough suppressants (including dextromethorphan); sleep aids (such as doxylamine, an ingredient in Unisom); antihistamines (such as diphenhydramine, found in Benadryl); and dimenhydrinates (in Gravol or Dramamine) can be abused for their psychoactive effects. OTC medicines also can be abused when not taken as directed. It is also important to note that OTC medications can produce dangerous health effects when taken with alcohol.

also can induce euphoria by affecting the brain regions that mediate what we perceive as pleasure. This feeling is often intensified for those who abuse opioids when administered by routes other than those recommended. For example, OxyContin often is snorted or injected to enhance its euphoric effects, while at the same time increasing the risk for serious medical consequences, such as opioid overdose.<sup>2</sup>

### What are the possible consequences of opioid use and abuse?

Taken as directed, opioids can be used to manage pain effectively. Many studies have shown that the properly managed, short-term medical use of opioid analgesic drugs is safe and rarely causes addiction—defined as the compulsive and uncontrollable use of drugs despite adverse

consequences—or dependence, which occurs when the body adapts to the presence of a drug, and often results in withdrawal symptoms when that drug is reduced or stopped. Withdrawal symptoms include restlessness, muscle and bone pain, insomnia, diarrhea, vomiting, cold flashes with goose bumps (“cold turkey”), and involuntary leg movements. Long-term use of opioids can lead to physical dependence and addiction. Taking a large single dose of an opioid could cause severe respiratory depression that can lead to death.

### Is it safe to use opioid drugs with other medications?

Only under a physician’s supervision can opioids be used safely with other drugs. Typically, they should not be used with other substances that depress the CNS, such as

<sup>2</sup>This does not apply only to opioids. Changes in routes of administration also contribute to the abuse of other prescription medications, and this practice can lead to serious medical consequences.

alcohol, antihistamines, barbiturates, benzodiazepines, or general anesthetics, because these combinations increase the risk of life-threatening respiratory depression.

## CNS depressants—

### What are CNS depressants?

**C**NS depressants, sometimes referred to as sedatives and tranquilizers, are substances that can slow normal brain function. Because of this property, some CNS depressants are useful in the treatment of anxiety and sleep disorders. Among the medications that are commonly prescribed for these purposes are the following:

- **Barbiturates**, such as mephobarbital (Mebaral) and pentobarbital sodium (Nembutal), are used to treat anxiety, tension, and sleep disorders.
- **Benzodiazepines**, such as diazepam (Valium), chlordiazepoxide HCl (Librium), and alprazolam (Xanax), are prescribed to treat anxiety, acute stress reactions, and panic attacks. The more sedating benzodiazepines, such as triazolam (Halcion) and estazolam (ProSom) are prescribed for short-term treatment of sleep disorders. Usually, benzodiazepines are not prescribed for long-term use.

### How do CNS depressants affect the brain and body?

There are numerous CNS depressants; most act on the brain by affecting the neurotransmitter gamma-aminobutyric acid (GABA). Neurotransmitters are brain chemicals that facilitate communication between brain cells. GABA works by decreasing brain activity. Although the different classes of CNS depressants work in unique ways, it is through their ability to increase GABA activity that they produce a drowsy or calming effect that is beneficial to those suffering from anxiety or sleep disorders.

### What are the possible consequences of CNS depressant use and abuse?

Despite their many beneficial effects, barbiturates and benzodiazepines have the potential for abuse and should be used only as prescribed. During the first few days of taking a prescribed CNS depressant, a person usually feels sleepy and uncoordinated, but as the body becomes accustomed to the effects of the drug, these feelings begin to disappear. If one uses these drugs long term, the body will develop tolerance for the drugs, and larger doses will be needed to achieve the same initial effects. Continued use can lead to physical

dependence and—when use is reduced or stopped—withdrawal. Because all CNS depressants work by slowing the brain's activity, when an individual stops taking them, the brain's activity can rebound and race out of control, potentially leading to seizures and other harmful consequences. Although withdrawal from benzodiazepines can be problematic, it is rarely life threatening, whereas withdrawal from prolonged use of other CNS depressants can have life-threatening complications. Therefore, someone who is thinking about discontinuing CNS depressant therapy or who is suffering withdrawal from a CNS depressant should speak with a physician or seek medical treatment.

### Is it safe to use CNS depressants with other medications?

CNS depressants should be used in combination with other medications only under a physician's close supervision. Typically, they should not be combined with any other medication or substance that causes CNS depression, including prescription pain medicines, some OTC cold and allergy medications, and alcohol. Using CNS depressants with these other substances—particularly alcohol—can slow both the heart and respiration and may lead to death.

## Stimulants—

### What are stimulants?

As the name suggests, stimulants increase alertness, attention, and energy, as well as elevate blood pressure and increase heart rate and respiration. Stimulants historically were used to treat asthma and other respiratory problems, obesity, neurological disorders, and a variety of other ailments. But as their potential for abuse and addiction became apparent, the medical use of stimulants began to wane. Now, stimulants are prescribed for the treatment of only a few health conditions, including narcolepsy, ADHD, and depression that has not responded to other treatments.

### How do stimulants affect the brain and body?

Stimulants, such as dextroamphetamine (Dexedrine and Adderall) and methylphenidate (Ritalin and Concerta), have chemical structures similar to a family of key brain neurotransmitters called monoamines, which include norepinephrine and dopamine. Stimulants enhance the effects of these chemicals in the brain. Stimulants also increase blood pressure and heart rate, constrict blood vessels, increase blood glucose, and open up the pathways of the respiratory system. The increase in dopamine is

associated with a sense of euphoria that can accompany the use of these drugs.

### What are the possible consequences of stimulant use and abuse?

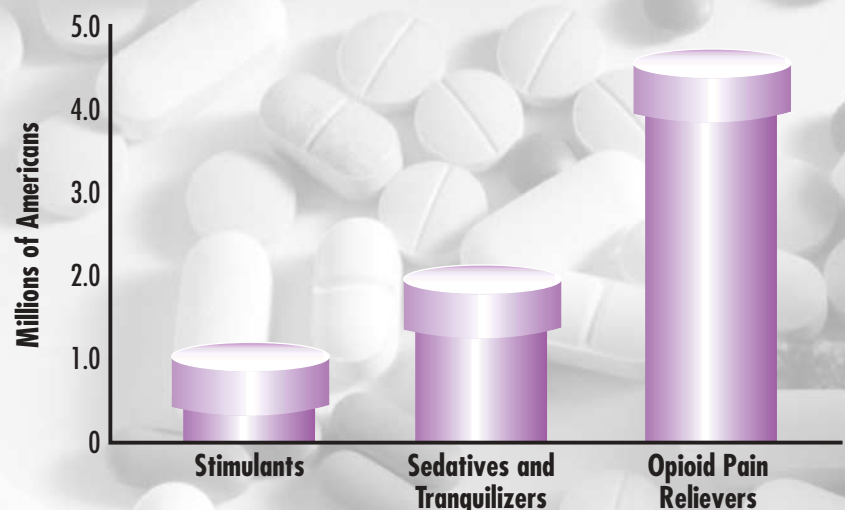
As with other drugs of abuse, it is possible for individuals to become dependent upon or addicted to many stimulants. Withdrawal symptoms associated with discontinuing stimulant use include fatigue, depression, and disturbance of sleep patterns. Repeated use of some stimulants over a short period can lead to feelings of hostility or paranoia. Further, taking high doses of a stimulant may result in dangerously

high body temperature and an irregular heartbeat. There is also the potential for cardiovascular failure or lethal seizures.

### Is it safe to use stimulants with other medications?

Stimulants should be used in combination with other medications only under a physician's supervision. Patients also should be aware of the dangers associated with mixing stimulants and OTC cold medicines that contain decongestants; combining these substances may cause blood pressure to become dangerously high or lead to irregular heart rhythms.

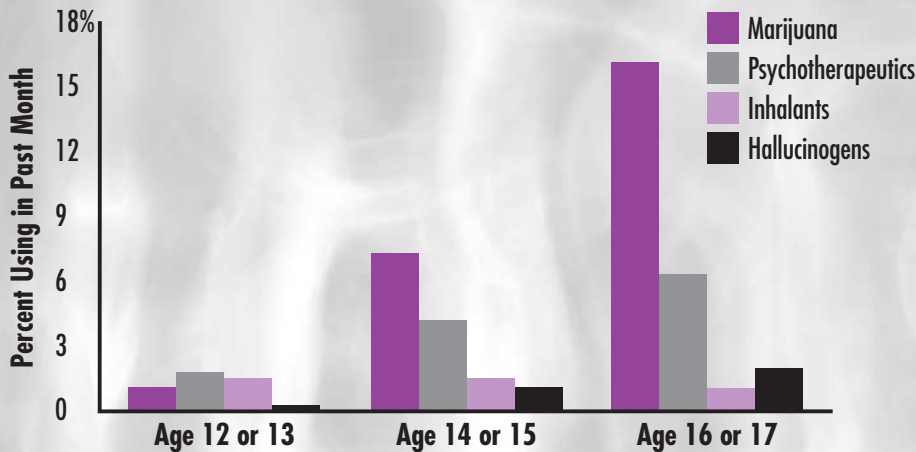
## More than 6.3 Million Americans Reported Current Use of Prescription Drugs for Nonmedical Purposes in 2003



Source: Office of Applied Studies, Substance Abuse and Mental Health Services Administration. *National Survey on Drug Use and Health, 2004.*



## Past Month Use of Selected Illicit Drugs Among Youths, by Age: 2003



Source: Office of Applied Studies, Substance Abuse and Mental Health Services Administration. *National Survey on Drug Use and Health, 2004.*

## Trends in prescription drug abuse

Although prescription drug abuse affects many Americans, some concerning trends can be seen among older adults, adolescents, and women. Several indicators suggest that prescription drug abuse is on the rise in the United States. According to the 2003 National Survey on Drug Use and Health (NSDUH), an estimated 4.7 million Americans used prescription drugs nonmedically for the first time in 2002—

- 2.5 million used pain relievers
- 1.2 million used tranquilizers

- 761,000 used stimulants
- 225,000 used sedatives

Pain reliever incidence increased—from 573,000 initiates in 1990 to 2.5 million initiates in 2000—and has remained stable through 2003. In 2002, more than half (55 percent) of the new users were females, and more than half (56 percent) were ages 18 or older.

The Drug Abuse Warning Network (DAWN), which monitors medications and illicit drugs reported in emergency departments (EDs) across the Nation, recently found that two of the most frequently reported prescription medications in drug abuse-related cases are benzodiazepines (e.g., diazepam, alprazolam, clonazepam, and lorazepam)

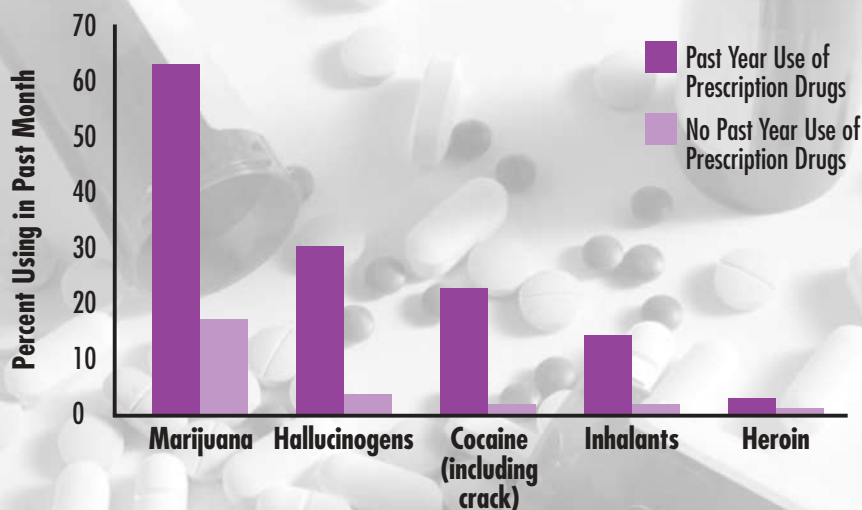
and opioid pain relievers (e.g., oxycodone, hydrocodone, morphine, methadone, and combinations that include these drugs). In 2002, benzodiazepines accounted for 100,784 mentions that were classified as drug abuse cases, and opioid pain relievers accounted for more than 119,000 ED mentions. From 1994 to 2002, ED mentions of hydrocodone and oxycodone increased by 170 percent and 450 percent, respectively. While ED visits attributed to drug addiction and drug-taking for psychoactive effects have been increasing, intentional overdose visits have remained stable since 1995.

## Older adults

Persons 65 years of age and above comprise only 13 percent of the population, yet account for approximately one-third of all medications prescribed in the United States. Older patients are more likely to be prescribed long-term and multiple prescriptions, which could lead to unintentional misuse.

The elderly also are at risk for prescription drug abuse, in which they intentionally take medications that are not medically necessary. In addition to prescription medications, a large percentage of older adults also use OTC medicines and dietary supplements. Because of their high rates of comorbid illnesses, changes

## Past-Year Use of Other Drugs Reported by Prescription Drug Abusers: Persons Aged 12 to 25, 2001



Source: Office of Applied Studies, Substance Abuse and Mental Health Services Administration. *The NHSDA Report*, January 16, 2003.

in drug metabolism with age, and the potential for drug interactions, prescription and OTC drug abuse and misuse can have more adverse health consequences among the elderly than are likely to be seen in a younger population. Elderly persons who take benzodiazepines are at increased risk for cognitive impairment associated with benzodiazepine use, leading to possible falls (causing hip and thigh fractures), as well as vehicle accidents. However, cognitive impairment may be reversible once the drug is discontinued.

### Adolescents and young adults

Data from the 2003 NSDUH indicate that 4.0 percent of

youth ages 12 to 17 reported nonmedical use of prescription medications in the past month. Rates of abuse were highest among the 18–25 age group (6.0 percent). Among the youngest group surveyed, ages 12–13, a higher percentage reported using psychotherapeutics (1.8 percent) than marijuana (1.0 percent).

The NIDA Monitoring the Future survey of 8th-, 10th-, and 12th-graders found that the nonmedical use of opioids, tranquilizers, sedatives/barbiturates, and amphetamines was unchanged between 2003 and 2004. Specifically, the survey found that 5.0 percent of 12th-graders reported using OxyContin without a prescription in the past year, and 9.3 percent reported using

Vicodin, making Vicodin one of the most commonly abused licit drugs in this population. Past year, nonmedical use of tranquilizers (e.g., Valium, Xanax) in 2004 was 2.5 percent for 8th-graders, 5.1 percent for 10th-graders, and 7.3 percent for 12th-graders. Also within the past year, 6.5 percent of 12th-graders used sedatives/barbiturates (e.g., Amytal, Nembutal) nonmedically, and 10.0 percent used amphetamines (e.g., Ritalin, Benzedrine).

Youth who use other drugs are more likely to abuse prescription medications. According to the 2001 National Household Survey on Drug Abuse (now the NSDUH), 63 percent of youth who had used prescription drugs non-medically in the past year had also used marijuana in the past year, compared with 17 percent of youth who had not used prescription drugs nonmedically in the past year.

### Gender differences

Studies suggest that women are more likely than men to be prescribed an abusable prescription drug, particularly narcotics and antianxiety drugs—in some cases, 55 percent more likely.

Overall, men and women have roughly similar rates of nonmedical use of prescription drugs. An exception is found among 12- to 17-year-olds. In this age group, young women are more likely than young men to use psychotherapeutic

drugs nonmedically. In addition, research has shown that women are at increased risk for nonmedical use of narcotic analgesics and tranquilizers (e.g., benzodiazepines).

## Preventing and recognizing prescription drug abuse

The risks for addiction to prescription drugs increase when the drugs are used in ways other than for those prescribed. Healthcare providers, primary care physicians, and pharmacists, as well as patients themselves, all can play a role in identifying and preventing prescription drug abuse.

**Physicians.** Because about 70 percent of Americans (approximately 191 million people) visit their primary care physician at least once every 2 years, these doctors are in a unique position—not only to prescribe medications, but also to identify prescription drug abuse when it exists, help the patient recognize the problem, set recovery goals, and seek appropriate treatment. Screening for prescription drug abuse can be incorporated into routine medical visits by asking about substance abuse history, current prescription and OTC use, and reasons for use. Doctors should take note of rapid increases in the amount of medication needed, or frequent, unscheduled refill requests. Doctors also should be alert to the fact that those

## Pain Treatment and Addiction

It is estimated that more than 50 million Americans suffer from chronic pain. When treating pain, healthcare providers have long wrestled with a dilemma: How to adequately relieve a patient's suffering, while avoiding the potential for that patient to become addicted to the pain medication.

Many healthcare providers underprescribe opioid pain relievers, such as morphine and codeine, because they overestimate the potential for patients to become addicted. This fear of prescribing opioid pain medications is known as "opiophobia." Although these drugs carry a risk for addiction and physicians should watch for signs of abuse and addiction in their patients, the likelihood of patients with chronic pain becoming addicted to opioids is low (with the exception of those with a personal or family history of drug abuse or mental illness). The risk of becoming addicted to prescription pain medications is also minimal in those who are treated on a short-term basis. More research is needed to better understand what other factors predispose people to addiction to prescription pain relievers, and what can be done to prevent addiction among those at risk.

Pain management for patients who have substance abuse disorders is particularly challenging, but these patients can still be treated successfully with opioid pain medications. Developing new and effective addiction and pain medications that are less likely to be abused is a priority for NIDA. For example, the medication buprenorphine/naloxone (Suboxone), developed by NIDA in collaboration with the pharmaceutical industry for treating opioid addiction, may provide an alternative medication for pain that has less abuse potential than other pain medications, while also having a much greater safety margin. However, further research is needed before this practice can be recommended.

addicted to prescription drugs may engage in "doctor shopping"—moving from provider to provider—in an effort to obtain multiple prescriptions for the drug(s) they abuse.

Preventing or stopping prescription drug abuse is an important part of patient care. However, healthcare providers

should not avoid prescribing or administering stimulants, CNS depressants, or opioid pain relievers if needed. (See text box on "Pain Treatment and Addiction.")

**Pharmacists.** By providing clear information on how to take a medication appropriately and describing possible side



effects or drug interactions, pharmacists also can play a key role in preventing prescription drug abuse. Moreover, by monitoring prescriptions for falsification or alterations and being aware of potential “doctor shopping,” pharmacists can be the first line of defense in recognizing prescription drug abuse. Some pharmacies have developed hotlines to alert other pharmacies in the region when a fraudulent prescription is detected.

**Patients.** There are also steps a patient can take to ensure that they use prescription medications appropriately. Patients should always follow the prescribed directions, be aware of potential interactions with other drugs, never stop or change a dosing regimen without first discussing it with their healthcare provider, and never use another person’s prescription. Patients should inform their healthcare professionals about all the prescription and OTC medicines and dietary and herbal supplements they are taking, in addition to a full description of their presenting complaint, before they obtain any other medications.

## Treating prescription drug addiction

Years of research have shown us that addiction to any drug (illicit or prescribed) is a brain disease that, like other chronic diseases, can be treated effectively. No single type of



treatment is appropriate for all individuals addicted to prescription drugs. Treatment must take into account the type of drug used and the needs of the individual. Successful treatment may need to incorporate several components, including detoxification, counseling, and in some cases, the use of pharmacological therapies. Multiple courses of treatment may be needed for the patient to make a full recovery.

The two main categories of drug addiction treatment are behavioral and pharmacological. Behavioral treatments encourage patients to stop drug use and teach them how to function without drugs, handle cravings, avoid drugs and situations that could lead to drug use, and handle a relapse should it occur. When delivered effectively, behavioral

treatments—such as individual counseling, group or family counseling, contingency management, and cognitive-behavioral therapies—also can help patients improve their personal relationships and their ability to function at work and in the community.

Some addictions, such as opioid addiction, can be treated with medications. These pharmacological treatments counter the effects of the drug on the brain and behavior, and can be used to relieve withdrawal symptoms, treat an overdose, or help overcome drug cravings. Although a behavioral or pharmacological approach alone may be effective for treating drug addiction, research shows that, at least in the case of opioid addiction, a combination of both is most effective.



## Treating addiction to prescription opioids

Several options are available for effectively treating prescription opioid addiction. These options are drawn from research regarding the treatment of heroin addiction, and include medications such as naltrexone, methadone, and buprenorphine, as well as behavioral counseling approaches.

Naltrexone is a medication that blocks the effects of opioids and is used to treat opioid overdose and addiction. Methadone is a synthetic opioid that blocks the effects of heroin and other opioids, eliminates withdrawal symptoms, and relieves drug craving. It has been used

successfully for more than 30 years to treat heroin addiction. The Food and Drug Administration (FDA) approved buprenorphine in October 2002, after more than a decade of research supported by NIDA. Buprenorphine, which can be prescribed by certified physicians in an office setting, is long lasting, less likely to cause respiratory depression than other drugs, and is well tolerated. However, more research is needed to determine the effectiveness of these medications for the treatment of prescription drug abuse.

A useful precursor to long-term treatment of opioid addiction is detoxification. Detoxification in itself is not a treatment. Rather, its primary objective is to relieve with-

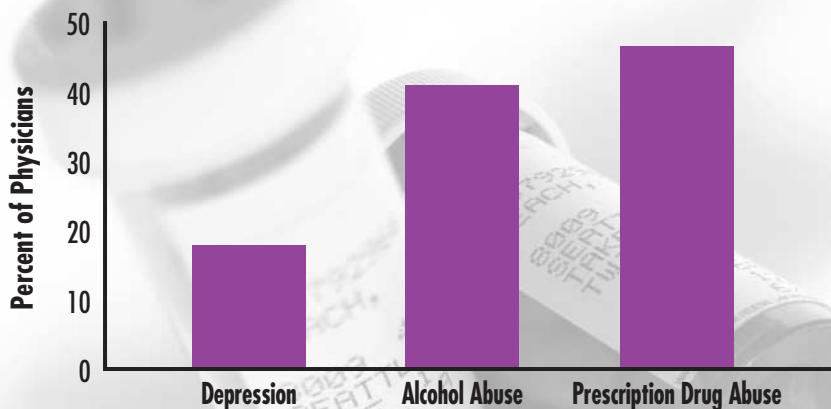
drawal symptoms while the patient adjusts to being drug free. To be effective, detoxification must precede long-term treatment that either requires complete abstinence or incorporates a medication, such as methadone or buprenorphine, into the treatment program.

## Treating addiction to CNS depressants

Patients addicted to barbiturates and benzodiazepines should not attempt to stop taking them on their own. Withdrawal symptoms from these drugs can be problematic, and—in the case of certain CNS depressants—potentially life-threatening. Although no research regarding the treatment of barbiturate and benzodiazepine addiction exists, addicted patients should undergo medically supervised detoxification because the treatment dose must be gradually tapered. Inpatient or outpatient counseling can help the individual during this process. Cognitive-behavioral therapy, which focuses on modifying the patient's thinking, expectations, and behaviors, while at the same time increasing skills for coping with various life stressors, also has been used successfully to help individuals adapt to the discontinuation of benzodiazepines.

Often barbiturate and benzodiazepine abuse occurs in conjunction with the abuse of another substance or drug,

## Many Physicians Have Difficulty Discussing Substance Abuse With Patients



Over 40% of physicians report having difficulty discussing substance abuse, including abuse of prescription drugs, with their patients. In contrast, less than 20% have difficulty discussing depression.

National Center on Addiction and Substance Abuse at Columbia University (CASA). *Missed Opportunity: National Survey of Primary Care Physicians and Patients on Substance Abuse*, New York: CASA, 2000.

## Use and Consequences of Commonly Prescribed Medications

### OPIOIDS

- Oxycodone (OxyContin, Percodan, Percocet)
- Propoxyphene (Darvon)
- Hydrocodone (Vicodin, Lortab, Lorcet)
- Hydromorphone (Dilaudid)
- Meperidine (Demerol)
- Diphenoxylate (Lomotil)
- Morphine (Kadian, Avinza, MS Contin)
- Codeine
- Fentanyl (Duragesic)
- Methadone

### Generally prescribed for

- Postsurgical pain relief
- Management of acute or chronic pain
- Relief of cough and diarrhea

### In the body

Opioids attach to opioid receptors in the brain and spinal cord, blocking the perception of pain.

### Effects of short-term use

- Alleviates pain
- Drowsiness
- Constipation
- Depressed respiration (depending on dose)

### Effects of long-term use

- Potential for physical dependence and addiction

### Possible negative effects

- Severe respiratory depression or death following a large single dose

### Should not be used with

Other substances that cause CNS depression, including:

- Alcohol
- Antihistamines
- Barbiturates
- Benzodiazepines
- General anesthetics

### CNS DEPRESSANTS

#### Barbiturates

- Mephobarbital (Mebaral)
- Pentobarbital sodium (Nembutal)

#### Benzodiazepines

- Diazepam (Valium)
- Chlordiazepoxide hydrochloride (Librium)
- Alprazolam (Xanax)
- Triazolam (Halcion)
- Estazolam (ProSom)
- Clonazepam (Klonopin)
- Lorazepam (Ativan)

### Generally prescribed for

- Anxiety
- Tension
- Panic attacks
- Acute stress reactions
- Sleep disorders
- Anesthesia (at high doses)

### In the body

CNS depressants slow brain activity through actions on the GABA system, producing a calming effect.

### Effects of short-term use

- A “sleepy” and uncoordinated feeling during the first few days; as the body becomes accustomed (tolerant) to the effects, these feelings diminish.

### Effects of long-term use

- Potential for physical dependence and addiction

### Possible negative effects

- Seizures following a rebound in brain activity after reducing or discontinuing use

### Should not be used with

Other substances that cause CNS depression, including:

- Alcohol
- Prescription opioid pain medicines
- Some OTC cold and allergy medications

### STIMULANTS

- Dextroamphetamine (Dexedrine and Adderall)
- Methylphenidate (Ritalin and Concerta)

### Generally prescribed for

- Narcolepsy
- Attention-deficit hyperactivity disorder (ADHD)
- Depression that does not respond to other treatment

### In the body

Stimulants enhance brain activity, causing an increase in alertness, attention, and energy.

### Effects of short-term use

- Elevated blood pressure
- Increased heart rate
- Increased respiration
- Suppressed appetite
- Sleep deprivation

### Effects of long-term use

- Potential for physical dependence and addiction

### Possible negative effects

- Dangerously high body temperature or an irregular heartbeat after taking high doses
- Cardiovascular failure or lethal seizures
- For some stimulants, hostility or feelings of paranoia after taking high doses repeatedly over a short period of time

### Should not be used with

- OTC decongestant medications
- Antidepressants, unless supervised by a physician
- Some asthma medications

such as alcohol or cocaine. In these cases of polydrug abuse, the treatment approach must address the multiple addictions.

## Treating addiction to prescription stimulants

Treatment of addiction to prescription stimulants, such as Ritalin, is often based on behavioral therapies that have proven effective in treating cocaine and methamphetamine addiction. At this time, there are no proven medications for the treatment of stimulant addiction. However, NIDA is supporting a number of studies on potential medications for treating stimulant addiction.

Depending on the patient's situation, the first steps in treating prescription stimulant addiction may be tapering the drug dosage and attempting to ease withdrawal symptoms. The detoxification process could then be followed by one of many behavioral therapies. Contingency management, for example, uses a system that enables patients to earn vouchers for drug-free urine tests. (These vouchers can be exchanged for items that promote healthy living.) Cognitive-behavioral therapy also may be an effective treatment for addressing stimulant addiction. Finally, recovery support groups may be helpful in conjunction with behavioral therapy.

## Glossary

**Addiction:** A chronic, relapsing disease characterized by compulsive drug seeking and use, despite harmful consequences, and by neurochemical and molecular changes in the brain.

**Barbiturate:** A type of CNS depressant often prescribed to promote sleep.

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

**Buprenorphine:** Medication approved by the FDA in October 2002 for treatment of opioid addiction.

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

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

**Detoxification:** A process that enables the body to rid itself of a drug, while at the same time managing the individual's symptoms of withdrawal; often the first step in a drug treatment program.

**Dopamine:** A neurotransmitter present in regions of the brain that regulate movement, emotion, motivation, and feelings of pleasure.

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

**Narcolepsy:** A disorder characterized by uncontrollable episodes of deep sleep.

**Norepinephrine:** A neurotransmitter present in some areas of the brain and the adrenal glands; decreases smooth muscle contraction and increases heart rate; often released in response to low blood pressure or stress.

**Opioids:** Controlled drugs or narcotics most often prescribed for the management of pain; natural or synthetic chemicals based on opium's active component—morphine—that work by mimicking the actions of pain-relieving chemicals produced in the body.

**Opiophobia:** A healthcare provider's fear that patients will become addicted to opioids even when using them appropriately; can lead to the underprescribing of opioids for pain management.

**Physical dependence:** An adaptive physiological state that can occur with regular drug use and results in withdrawal when drug use is discontinued. (Physical dependence alone is not the same as addiction, which involves compulsive drug seeking and use, despite its harmful consequences.)

**Polydrug abuse:** The abuse of two or more drugs at the same time, such as CNS depressants and alcohol.

**Prescription drug abuse:** The intentional misuse of a medication outside of the normally accepted standards of its use.

**Prescription drug misuse:** Taking a medication in a manner other than that prescribed or for a different condition than that for which the medication is prescribed.

**Psychotherapeutics:** Drugs that have an effect on the function of the brain and that often are used to treat psychiatric disorders; can include opioids, CNS depressants, and stimulants.

**Respiratory depression:** Depression of respiration (breathing) that results in the reduced availability of oxygen to vital organs.

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

**Stimulants:** Drugs that increase or enhance the activity of monamines (such as dopamine and norepinephrine) in the brain, which leads to increased heart rate, blood pressure, and respiration; used to treat only a few disorders, such as narcolepsy and ADHD.

**Tolerance:** A condition in which higher doses of a drug are required to produce the same effects as experienced initially.

**Tranquilizers:** Drugs prescribed to promote sleep or reduce anxiety; this National Survey on Drug Use and Health classification includes benzodiazepines, barbiturates, and other types of CNS depressants.

**Withdrawal:** A variety of symptoms that occur after chronic use of some drugs is reduced or stopped.



## References

- American Chronic Pain Association. Press Release: Survey Shows Myths, Misunderstanding about Pain Common Among Americans, 2000.
- Baillargeon, L.; et al. Discontinuation of benzodiazepines among older insomniac adults treated with cognitive-behavioural therapy combined with gradual tapering: a randomized trial. *CMAJ* 169:1015–1020, 2003.
- Baum, C.; Kennedy, D.L.; Knapp, D.E.; Juergens, J.P.; and Faich, G.A. Prescription drug use in 1984 and changes over time. *Med Care* 26(2):105–114, 1988.
- Boyer, E.W. Dextromethorphan abuse. *Pediatr Emerg Care* 20(12):858–863, 2004.
- Cowan, D.R.; Wilson-Barnett, J.; Griffiths, P.; and Allan, L.G. A survey of chronic noncancer pain patients prescribed opioid analgesics. *Pain Medicine* 4(4):340–351, 2003.
- CSAT. *Substance Abuse Among Older Adults (TIP #26)*. DHHS Pub. No. BKD250. SAMHSA, 1997.
- Fishbain, D.A.; Rosomoff, H.L.; and Rosomoff, R.S. Drug abuse, dependence and addiction in chronic pain patients. *Clin J Pain* 8:77–85, 1992.
- Helling, D.K.; Lemke, J.H.; Semla, T.P.; Wallace, R.B.; Lipson, D.P.; and Cornoni-Huntley, J. Medication use characteristics in the elderly: the Iowa 65+ Rural Health Study *J Am Geriatr Soc* 35(1):4–12, 1987.
- Johnston, L.D.; O'Malley, P.M.; and Bachman, J.G. Monitoring the Future: *National Survey Results on Drug Use, Overview of Key Findings 2004*. Bethesda, MD, NIDA, NIH, DHHS (2005). Available at: [www.monitoringthefuture.org](http://www.monitoringthefuture.org).
- Joransson, D.E.; Ryan, K.M.; Gilson, A.M.; and Dahl, J.L. Trends in medical use and abuse of opioid analgesics. *JAMA* 283(13):1710–1714, 2000.
- Michna, E.; Ross, E.L.; Hynes, W.L.; Nedeljkovic, S.S.; Soumekh, S.; Janfaza, D.; Palombi, D.; and Jamison, R.N. Predicting aberrant drug behavior in patients treated for chronic pain: importance of abuse history. *J Pain Symptom Manage* 28(3):250–258, 2004.
- NIDA. Buprenorphine Approval Expands Options for Addiction Treatment. *NIDA NOTES* 17(4), 2002.
- NIDA. Research Eases Concerns About Use of Opioids to Relieve Pain. *NIDA NOTES* 15(1), 2000.
- Office of Applied Studies (OAS). *Emergency Department Trends from the Drug Abuse Warning Network, Final Estimates 1995–2002*. DHHS Pub. No. (SMA) 03-3780. SAMHSA, 2003.
- OAS. *Results from the 2001 National Household Survey on Drug Abuse: Volume I. Summary of National Findings*. DHHS Pub. No. (SMA) 02–3758. SAMHSA, 2002.
- OAS. *Results from the 2003 National Survey on Drug Use and Health: National Findings*. DHHS Pub. No. (SMA) 04-3964. SAMHSA, 2004.
- Paterniti, S.; Dufouil, C.; and Alperovitch, A. Long-term benzodiazepine use and cognitive decline in the elderly: The Epidemiology of Vascular Aging Study. *J Clin Psychopharmacol* 22(3):285–293, 2002.
- Shorr, R.I.; Bauwens, S.F.; and Landefeld, C.S. Failure to limit quantities of benzodiazepine hypnotic drugs for outpatients: placing the elderly at risk. *Am J Med* 89(6):725–732, 1990.
- Simoni-Wastila, L.; Ritter, G.; and Strickler, G. Gender and other factors associated with the nonmedical use of abusable prescription drugs. *Subst Use Misuse* 39(1):1–23, 2004.
- Simoni-Wastila, L. The use of abusable prescription drugs: The role of gender. *J Women's Health and Gender-based Medicine* 9(3):289–297, 2000.
- Turnheim K. When drug therapy gets old: pharmacokinetics and pharmacodynamics in the elderly. *Exp Gerontol* 38(8):843–853, 2003.

## Access information on the NIDA Web site

- Information on prescription drugs and other drugs of abuse
- Selected Prescription Drugs with Potential for Abuse chart ([www.drugabuse.gov/DrugPages/PrescripDrugsChart.html](http://www.drugabuse.gov/DrugPages/PrescripDrugsChart.html))
- Publications and communications (including *NIDA NOTES*)
- Calendar of events
- Links to NIDA organizational units
- Funding information (including program announcements and deadlines)
- International activities
- Links to related Web sites (access to Web sites of many other organizations in the field)

### NIDA Web Sites

[www.drugabuse.gov](http://www.drugabuse.gov)  
[www.steroidabuse.org](http://www.steroidabuse.org)  
[www.clubdrugs.org](http://www.clubdrugs.org)

### National Clearinghouse for Alcohol and Drug Information (NCADI)

Web Site: [www.health.org](http://www.health.org)  
 Phone No.: 800-729-6686

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