



Preventing and recognizing prescription drug abuse  
See page 10.

## from the director:

The nonmedical use and abuse of prescription drugs is a serious public health problem in this country. Although most people take prescription medications responsibly, an estimated 52 million people (20 percent of those aged 12 and older) have used prescription drugs for nonmedical reasons at least once in their lifetimes. Young people are strongly represented in this group. In fact, the National Institute on Drug Abuse's (NIDA) Monitoring the Future (MTF) survey found that about 1 in 12 high school seniors reported past-year nonmedical use of the prescription pain reliever Vicodin in 2010, and 1 in 20 reported abusing OxyContin—making these medications among the most commonly abused drugs by adolescents.

The abuse of certain prescription drugs—opioids, central nervous system (CNS) depressants, and stimulants—can lead to a variety of adverse health effects, including addiction. Among those who reported past-year nonmedical use of a prescription drug, nearly 14 percent met criteria for abuse of or dependence on it. The reasons for the high prevalence of prescription drug abuse vary by age, gender, and other factors, but likely include greater availability.

The number of prescriptions for some of these medications has increased dramatically since the early 1990s (see figures, page 2). Moreover, a consumer culture amenable to “taking a pill for what ails you” and the perception of prescription drugs as less harmful than illicit drugs are other likely contributors to the problem. It is an urgent one: unintentional overdose deaths involving opioid pain relievers have quadrupled since 1999, and by 2007, outnumbered those involving heroin and cocaine.

NIDA hopes to change this situation 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 abuse of these medications.

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## Research Report Series

# Prescription Drugs: Abuse and Addiction

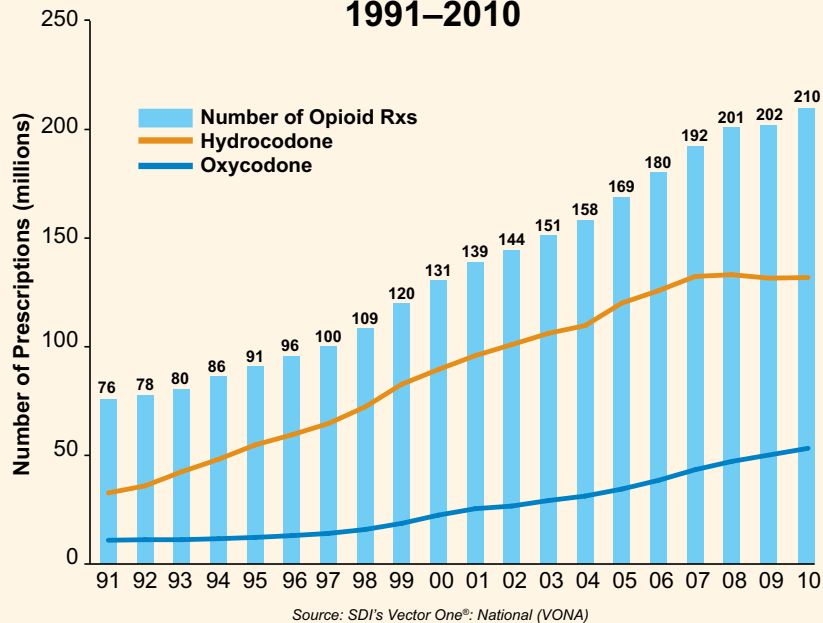
## What is prescription drug abuse?

**P**rescription drug abuse<sup>1</sup> is the use of a medication without a prescription, in a way other than as prescribed, or for the experience or feelings elicited. According to several national surveys, prescription medications, such as those used to treat pain, attention deficit disorders, and anxiety, are being abused at a rate second only to marijuana among illicit drug users. The consequences of this abuse have been steadily worsening, reflected in increased treatment admissions, emergency room visits, and overdose deaths.

*continued inside*

<sup>1</sup> Prescription drug abuse, as defined in this report, is equivalent to the term “nonmedical use,” used by many of the national surveys or data collection systems. This definition does not correspond to the definition of abuse/dependence listed in the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV).

### Total Number of Opioid Prescriptions Dispensed by U.S. Retail Pharmacies, 1991–2010

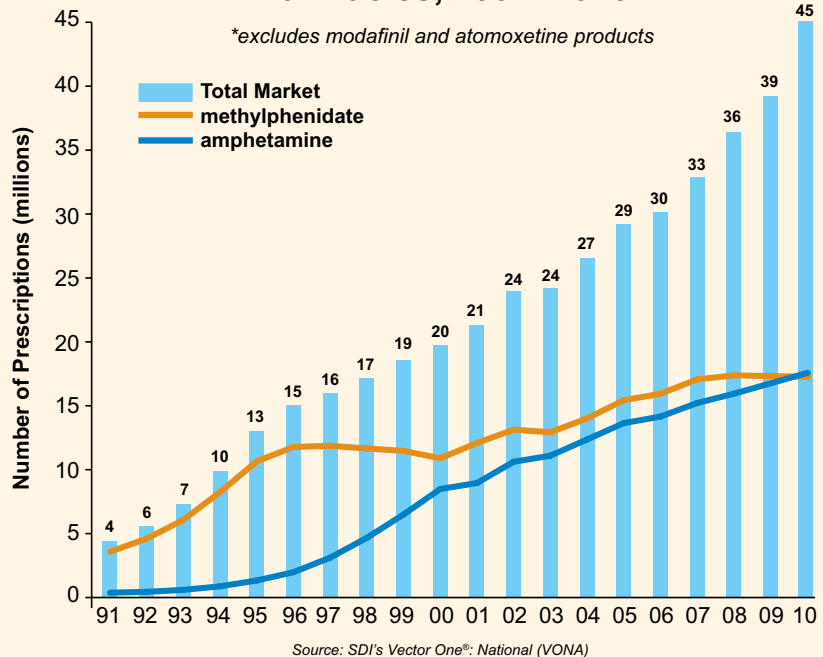


### What are some of the commonly abused prescription drugs?

Although many medications can be abused, the following three classes are most commonly abused:

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

### Total Number of Prescriptions for Stimulants\* Dispensed by U.S. Retail Pharmacies, 1991–2010



### Opioids—

#### What are opioids?

Opioids are medications that relieve pain. They reduce the intensity of pain signals reaching the brain and affect those brain areas controlling emotion, which diminishes the effects of a painful stimulus. Medications that fall within this class include hydrocodone (e.g., Vicodin), oxycodone (e.g., OxyContin, Percocet), morphine (e.g., Kadian, Avinza), codeine, and related drugs. Hydrocodone products are the most commonly prescribed for a variety of painful conditions, including dental and injury-related pain. Morphine



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 severe diarrhea.

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

Opioids act by attaching to specific proteins called opioid receptors, which are found in the brain, spinal cord, gastrointestinal tract, and other organs in the body. When these drugs attach to their receptors, they reduce the perception of pain. Opioids can also produce drowsiness, mental confusion, nausea, constipation, and, depending

**Dependence vs. Addiction**

Physical dependence occurs because of *normal* adaptations to chronic exposure to a drug and is not the same as addiction. Addiction, which can include physical dependence, is distinguished by compulsive drug seeking and use despite sometimes devastating consequences.

Someone who is physically dependent on a medication will experience withdrawal symptoms when use of the drug is abruptly reduced or stopped. These symptoms can be mild or severe (depending on the drug) and can usually be managed medically or avoided by using a slow drug taper.

Dependence is often accompanied by tolerance, or the need to take higher doses of a medication to get the same effect. When tolerance occurs, it can be difficult for a physician to evaluate whether a patient is developing a drug problem, or has a real medical need for higher doses to control their symptoms. For this reason, physicians need to be vigilant and attentive to their patients’ symptoms and level of functioning to treat them appropriately.

upon the amount of drug taken, can depress respiration. Some people experience a euphoric response to opioid medications, since these drugs also affect the brain regions involved in reward. Those who abuse opioids may seek to intensify their experience by taking the drug in ways other than those prescribed. For example, OxyContin is an oral medication used to treat moderate to severe pain through a slow, steady release of the opioid. People who abuse OxyContin may snort or inject it,<sup>2</sup> thereby increasing their risk for serious medical complications, including overdose.

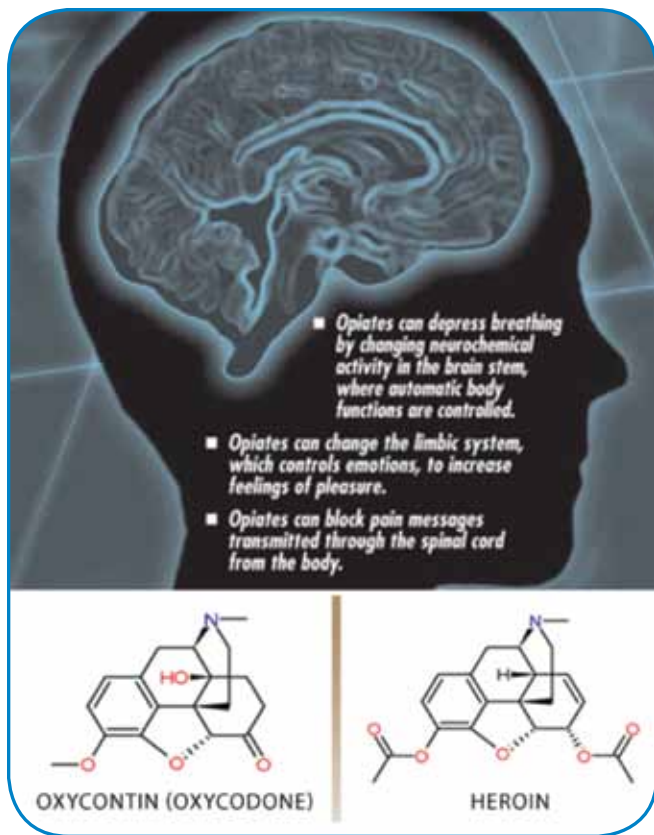
**What are the possible consequences of opioid use and abuse?**

Taken as prescribed, opioids can be used to manage pain safely and effectively. However, when abused, even a single large dose can cause severe respiratory depression and death. Properly managed, short-term medical use of opioid analgesics rarely causes addiction—characterized by compulsive drug seeking and use despite serious adverse consequences. Regular (e.g., several times a day, for several weeks or more) or longer term use or abuse of opioids can lead to physical dependence and, in some cases,



***In 2007, the number of overdose deaths from prescription opioids outnumbered deaths from heroin and cocaine combined.***

<sup>2</sup> Changing the route of administration also contributes to the abuse of other prescription medications, including stimulants, a practice that can lead to serious medical consequences.



*OxyContin and heroin have similar chemical structures and bind to the same receptors in the brain.*

addiction. Physical dependence is a *normal* adaptation to chronic exposure to a drug and is not the same as addiction (see text box on “Dependence vs. Addiction” on page 3). In either case, withdrawal symptoms may occur if drug use

is suddenly reduced or stopped. These symptoms can include restlessness, muscle and bone pain, insomnia, diarrhea, vomiting, cold flashes with goose bumps (“cold turkey”), and involuntary leg movements.

## Over-the-Counter Medicines

Over-the-counter (OTC) medications, such as certain cough suppressants, sleep aids, and antihistamines, can be abused for their psychoactive effects. This typically means taking doses higher than recommended or combining OTC medications with alcohol, or with illicit or prescription drugs. Either practice can have dangerous results, depending on the medications involved. Some contain aspirin or acetaminophen (e.g., Tylenol), which can be toxic to the liver at high doses. Others, when taken for their “hallucinogenic” properties, can cause confusion, psychosis, coma, and even death.

Cough syrups and cold medications are the most commonly abused OTC medications. In 2010, for example, 6.6 percent of high school seniors took cough syrup “to get high.” At high doses, dextromethorphan—a key ingredient found in cough syrup—can act like PCP or ketamine, producing dissociative or out-of-body experiences.

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

## CNS depressants—

### What are CNS depressants?

CNS depressants, sometimes referred to as sedatives and tranquilizers, are substances that can slow brain activity. This property makes them useful for treating anxiety and sleep disorders. Among the medications commonly prescribed for these purposes are the following:

- **Benzodiazepines**, such as diazepam (Valium) and alprazolam (Xanax), are sometimes 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 because of the risk for developing tolerance, dependence, or addiction.

- **Non-benzodiazepine sleep medications**, such as zolpidem (Ambien), eszopiclone (Lunesta), and zalepon (Sonata), have a different chemical structure, but act on some of the same brain receptors as benzodiazepines. They are thought to have fewer side effects and less risk of dependence than benzodiazepines.
- **Barbiturates**, such as mephobarbital (Mebaral), phenobarbital (Luminal Sodium), and pentobarbital sodium (Nembutal), are used less frequently to reduce anxiety or to help with sleep problems because of their higher risk of overdose compared to benzodiazepines. However, they are still used in surgical procedures and for seizure disorders.

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

Most CNS depressants act on the brain by affecting the neurotransmitter gamma-aminobutyric acid (GABA). Neurotransmitters are brain chemicals that facilitate communication between brain cells. Although the different classes of CNS depressants work in unique ways, it is through their ability to increase GABA—and thereby inhibit brain activity—that they produce a drowsy or calming effect 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, benzodiazepines and barbiturates have the potential for abuse and should be used only as prescribed. The use of non-benzodiazepine sleep aids is less well studied, but certain indicators have raised concern about their abuse liability as well. 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 and tolerance develops, these side effects begin to disappear. If one uses these drugs long term, larger doses may be needed to achieve the therapeutic effects. Continued use can also lead to physical dependence and withdrawal when use is abruptly reduced or stopped (see text box on “Dependence vs. Addiction” on page 3). Because all CNS depressants work by slowing the brain’s activity, when

an individual stops taking them, there can be a rebound effect, resulting in seizures or other harmful consequences. Although withdrawal from benzodiazepines can be problematic, it is rarely life threatening, whereas withdrawal from prolonged use of barbiturates 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 immediate medical treatment.

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

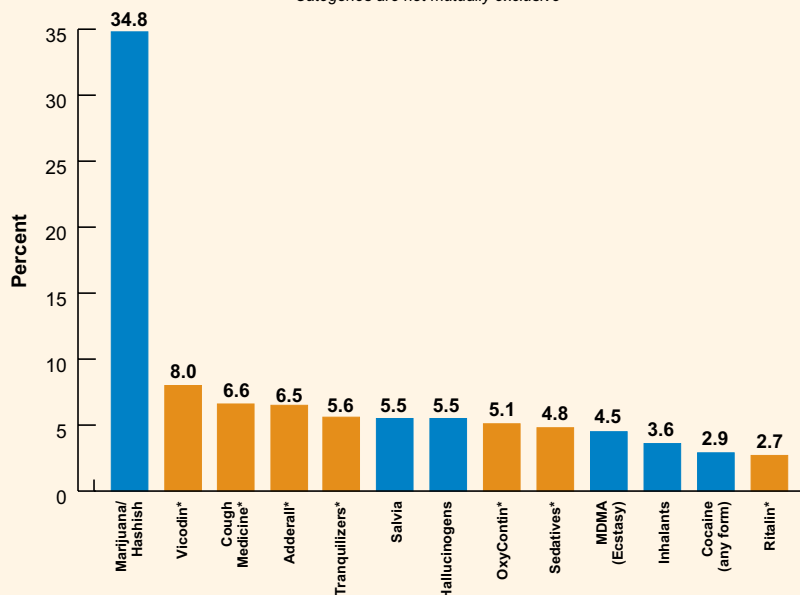
Only under a physician’s supervision is it safe to use CNS depressants with other medications. Typically, they should not be combined with any other medication or substance that causes CNS depression, including prescription pain medicines, some OTC cold and allergy medications, and alcohol. Using CNS depressants with these other substances—particularly alcohol—can affect heart rhythm, slow respiration, and even lead to death.



## After Marijuana, Prescription and Over-the-Counter Medications\* Account for Most of the Commonly Abused Drugs

Prevalence of Past-Year Drug Use Among 12th Graders

Categories are not mutually exclusive



SOURCE: University of Michigan, 2010 Monitoring the Future Study

\* Nonmedical Use

only a few health conditions, including ADHD, narcolepsy, and occasionally depression—in those who have 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), act in the brain similarly to a family of key brain neurotransmitters called monoamines, which include norepinephrine and dopamine. Stimulants enhance the effects of these chemicals in the brain. The associated increase in dopamine can induce a feeling of euphoria when stimulants are taken nonmedically. Stimulants also increase blood pressure and heart rate, constrict blood vessels, increase blood glucose, and open up breathing passages.

## Stimulants—

### What are stimulants?

As the name suggests, stimulants increase alertness, attention, and energy, as well as elevate blood pressure, 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 to treat

## Cognitive Enhancers

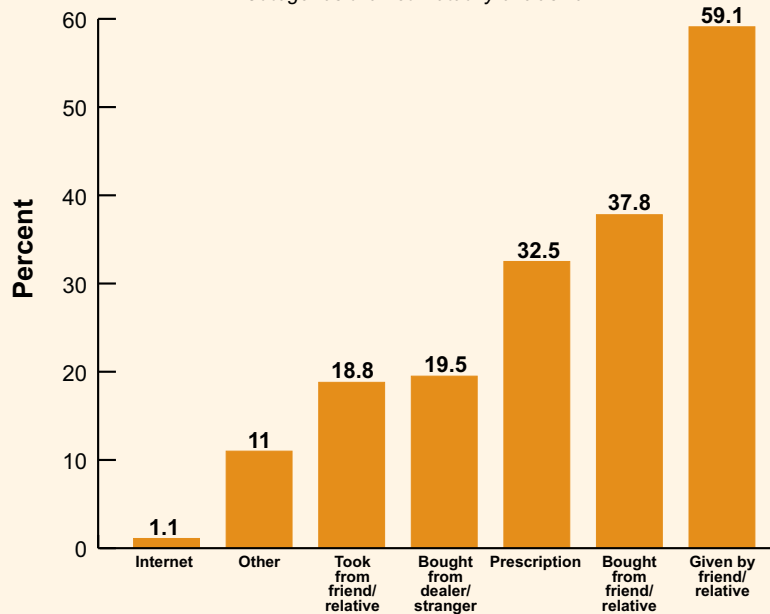
The dramatic increases in stimulant prescriptions over the last 2 decades have led to their greater environmental availability and increased risk for diversion and abuse. For those who take these medications to improve properly diagnosed conditions, they can be transforming, greatly enhancing a person's quality of life. However, because they are perceived by many to be generally safe and effective, prescription stimulants, such as Concerta or Adderall, are increasingly being abused to address nonmedical conditions or situations. Indeed, reports suggest that the practice is occurring among some academic professionals, athletes, performers, older people, and both high school and college students. Such nonmedical cognitive enhancement poses potential health risks, including addiction, cardiovascular events, and psychosis.



**Youth who abuse prescription medications are also more likely to report use of other drugs.**

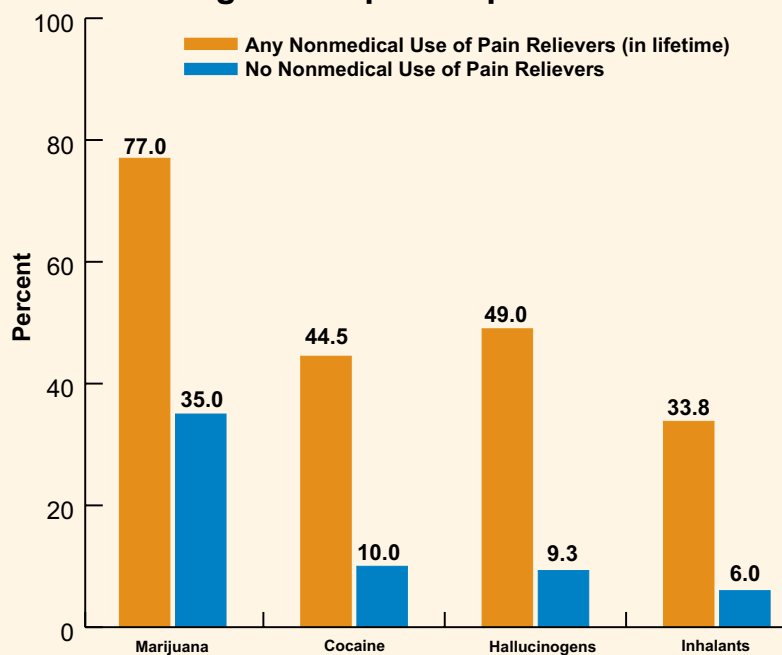
## Source of Prescription Narcotics among Those Who Used in the Past-Year, 12th Grade\*

\* Categories are not mutually exclusive



SOURCE: University of Michigan, 2010 Monitoring the Future Study

## Greater Lifetime Use of Illicit Drugs among Prescription Opiate Abusers



The rate of use of other drugs is significantly higher among those who have abused prescription drugs in their lifetimes. The same is true for past-year users.

SOURCE: SAMHSA. Misuse of prescription drugs: Data from the 2002, 2003, and 2004 National Surveys on Drug Use and Health. HHS Pub. No. (SMA)06-4192. Rockville, MD: Office of Applied Studies, 2006.

## 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 stimulants. Withdrawal symptoms associated with discontinuing stimulant use include fatigue, depression, and disturbance of sleep patterns. Repeated abuse of some stimulants (sometimes within a short period) can lead to feelings of hostility or paranoia, even psychosis. 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 seizures.

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

Stimulants should not be used with other medications unless authorized by a physician. Patients also should be aware of the dangers associated with mixing stimulants and OTC cold medicines that contain decongestants, as combining these substances may cause blood pressure to become dangerously high or lead to irregular heart rhythms.

## Trends in prescription drug abuse

### How many people abuse prescription drugs?

According to results from the 2010 National Survey on Drug Use and Health (NSDUH), an estimated 2.4 million Americans used prescription drugs nonmedically for the first time within the past year,

which averages to approximately 6,600 initiates per day. More than one-half were females and about a third were aged 12 to 17. Although prescription drug abuse affects many Americans, certain populations, such as youth, older adults, and women, may be at particular risk.

### Adolescents and young adults

Abuse of prescription drugs is highest among young adults aged 18 to 25, with 5.9 percent reporting nonmedical use in the past month (NSDUH, 2010). Among youth aged 12 to 17, 3.0 percent reported past-month nonmedical use of prescription medications.

According to the 2010 MTF, prescription and OTC drugs are among the most commonly abused drugs by 12th graders (see figure on page 6), after alcohol, marijuana, and tobacco. While past-year nonmedical use of sedatives and tranquilizers decreased among 12th graders over the last 5 years, this is not the case for the nonmedical use of amphetamines or opioid pain relievers.

When asked how prescription opioids were obtained for nonmedical use, more than half of the 12th graders surveyed said they were given the drugs or bought them from a friend or



relative. Interestingly, the number of students who purchased opioids over the Internet was negligible (see top chart on previous page).

Youth who abuse prescription medications are also more likely to report use of other drugs. Multiple studies have revealed associations between prescription drug abuse and higher rates of cigarette smoking; heavy episodic drinking; and marijuana, cocaine, and other illicit drug use among adolescents, young adults, and college students in the United States (see bottom chart on previous page).

### Older adults

Persons aged 65 years and older comprise only 13 percent of the population, yet account for more than one-third of total outpatient spending on prescription medications in the United States. Older patients are more likely to be prescribed long-term and multiple prescriptions, and some experience cognitive decline, which could lead to improper use of medications. Alternatively, those on a fixed income may abuse another person's remaining medication to save money.

The high rates of comorbid illnesses in older populations, age-related changes in drug metabolism, and the potential for drug interactions may make any of these practices more dangerous than in younger populations. Further, a large percentage of older adults also use OTC medicines and dietary supplements, which (in addition to alcohol) could compound any adverse health consequences resulting from prescription drug abuse.

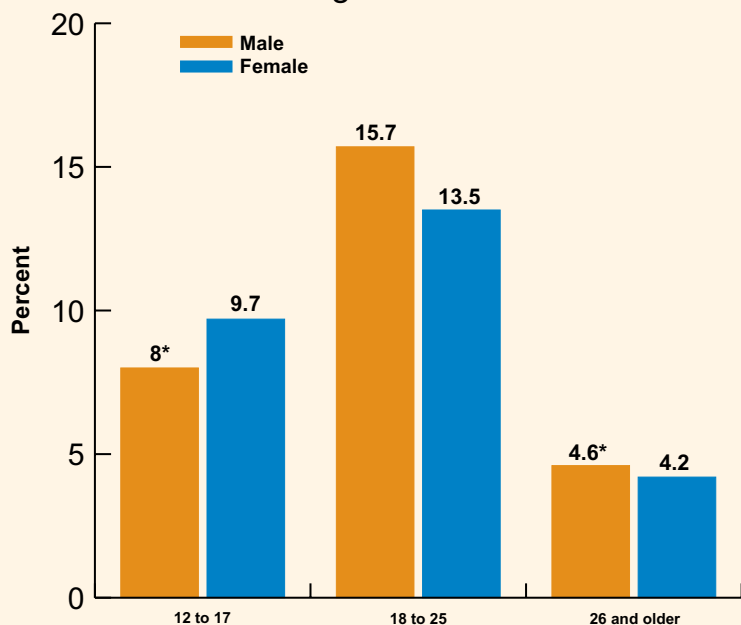


***Older patients are more likely to be prescribed long-term and multiple prescriptions, which could lead to improper use of medications.***



### Past-Year Nonmedical Use of Psychotherapeutics Among Persons 12 or Older, by Gender and Age Group

Annual averages based on 2002-2005

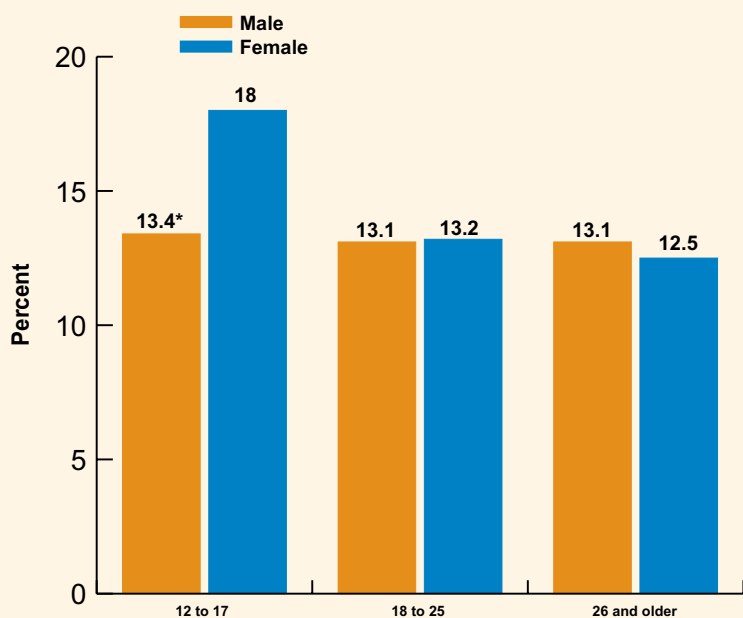


\* Difference from male to female significant at  $p < 0.01$ .

SOURCE: Cotto, J.H., et al. Gender effects on drug use, abuse, and dependence: An analysis of results from the National Survey on Drug Use and Health. *Gen Med* 7(5):402-413, 2010.

### Past-Year Dependence or Abuse of Psychotherapeutics Among Past-Year Nonmedical Users 12 or Older, by Gender and Age Group

Annual averages based on 2002-2005



\* Difference from male to female significant at  $p < 0.01$ .

SOURCE: Cotto, J.H., et al. Gender effects on drug use, abuse, and dependence: An analysis of results from the National Survey on Drug Use and Health. *Gen Med* 7(5):402-413, 2010.

#### Gender differences

Overall, more males than females abuse prescription drugs in all age groups except the youngest (aged 12 to 17 years); that is, females in this age group exceed males in the nonmedical use of *all* psychotherapeutics, including pain relievers, tranquilizers, and stimulants. Among *nonmedical users* of prescription drugs, females 12 to 17 years old are also more likely to meet abuse or dependence criteria for psychotherapeutics (see figure, left).

#### How many people suffer adverse health consequences from abusing prescription drugs?

The Drug Abuse Warning Network (DAWN), which monitors emergency department (ED) visits in selected areas across the Nation, reported that approximately 1 million ED visits in 2009 could be attributed to prescription drug abuse. Roughly 343,000 involved prescription opioid pain relievers, a rate more than double that of 5 years prior. ED visits also more than doubled for CNS stimulants, involved in nearly 22,000 visits in 2009, as well as CNS depressants (anxiolytics, sedatives, and hypnotics), involved in 363,000 visits. Of the latter, benzodiazepines (e.g., Xanax) comprised the vast majority. Rates for a popular prescribed non-benzodiazepine sleep aid, zolpidem (Ambien), rose from roughly 13,000 in 2004 to 29,000 in 2009. More than half of ED visits for prescription drug abuse involved multiple drugs.



*To ensure proper medical care, patients should discuss any and all drug use—including prescription and over-the-counter medications—with their doctors.*

## Preventing and recognizing prescription drug abuse

The risks for addiction to prescription drugs increase when they are used in ways other than as prescribed (e.g., at higher doses, by different routes of administration, or combined with alcohol or other drugs). Physicians, their patients, and pharmacists all can play a role in identifying and preventing prescription drug abuse.

**Physicians.** More than 80 percent of Americans had contact with a healthcare professional in the past year, placing doctors in a unique position, not only to prescribe medications, but also to identify abuse (or nonmedical use) of prescription drugs and prevent the escalation to addiction. By asking about *all* drugs, physicians can help their patients recognize that a problem exists, set recovery goals, and seek appropriate treatment. Screening for prescription drug abuse can be incorporated into routine medical

visits. Doctors should also take note of rapid increases in the amount of medication needed or frequent, unscheduled refill requests. Doctors should be alert to the fact that those 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 stimulants, CNS depressants, or opioid pain relievers if needed. (See text box on “Chronic Pain Treatment and Addiction” on page 13.)

**Patients.** For their part, patients can take steps to ensure that they use prescription medications appropriately: 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 a healthcare provider, and never use another person’s prescription. In addition to describing their medical problem, patients should always inform their healthcare professionals about all the prescriptions, OTC medicines, and dietary and herbal supplements they are taking, before they obtain any other medications. Additionally, unused or expired medications should be properly



***Prescription Drug Monitoring Programs allow physicians and pharmacists to track prescriptions and help identify patients who are “doctor shopping.”***

discarded per U.S. Food and Drug Administration (FDA) guidelines or at U.S. Drug Enforcement Administration collection sites.

**Pharmacists.** Pharmacists dispense medications and can help patients understand instructions for taking them. By being watchful for prescription falsifications or alterations, pharmacists can serve as 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. Moreover, prescription drug monitoring programs (PDMPs), which require physicians and pharmacists to log each filled prescription into a State database, can assist medical professionals in identifying patients who are getting prescriptions from multiple sources. As of May 2011, 48 States and 1 territory have enacted legislation authorizing PDMPs, 34 of which are operational.

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## Treating prescription drug addiction

Years of research have shown that addiction to any drug (illicit or prescribed) is a brain disease that can be treated effectively. 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 sometimes the use of addiction medications. Multiple courses of treatment may be needed for the patient to make a full recovery.



*Although a behavioral or pharmacological approach alone may be sufficient for treating some patients, research shows that a combined approach may be best.*

The two main categories of drug addiction treatment are behavioral and pharmacological. Behavioral treatments help patients stop drug use by teaching them strategies to function without drugs, deal with 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, help overcome drug cravings, or treat an overdose. Although a behavioral or pharmacological approach alone may be sufficient for treating some patients, research shows that a combined approach may be best.

### Treating addiction to prescription opioids

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

Naltrexone is an *antagonist* medication that prevents opioids from activating their receptors. It is used to treat overdose and addiction, although its use for addiction has been limited due to



poor adherence and tolerability by patients. Recently, an injectable, long-acting form of naltrexone (Vivitrol), originally approved for treating alcoholism, has also received FDA approval to treat opioid addiction (i.e., heroin or other opioids). Because its effects last for weeks, Vivitrol is ideal for patients who do not have ready access to healthcare or who struggle with taking their medications regularly. Methadone is a synthetic opioid *agonist* that eliminates withdrawal symptoms and relieves drug cravings by acting on the same brain targets as other opioids like heroin, morphine, and opioid pain medications. It has been used successfully for more than 40 years to treat heroin addiction, but must be dispensed through opioid treatment programs. Buprenorphine is a partial opioid agonist (i.e., it has agonist and antagonist properties), which can be prescribed by certified physicians in an office setting. Like methadone, it

can reduce cravings and is well tolerated by patients. NIDA is supporting research needed to determine the effectiveness of these medications in treating addiction to opioid pain relievers.

#### **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. Research on treating barbiturate and benzodiazepine addiction is sparse; however, addicted patients should undergo medically supervised detoxification because the dosage they take should be gradually tapered. Inpatient or outpatient counseling can help individuals through this process. Cognitive-behavioral therapy, which focuses on modifying the patient's thinking,

expectations, and behaviors while increasing skills for coping with various life stressors, also has been used successfully to help individuals adapt to discontinuing benzodiazepines.

Often barbiturate and benzodiazepine abuse occurs in conjunction with the abuse of other drugs, such as alcohol or cocaine. In such cases of polydrug abuse, the treatment approach should address the multiple addictions.

#### **Treating addiction to prescription stimulants**

Treatment of addiction to prescription stimulants, such as Adderall and Concerta, is based on behavioral therapies used in treating cocaine and methamphetamine addiction. At this time, there are no medications that are FDA-approved for treating stimulant addiction. Thus, NIDA is supporting research in this area.

Depending on the patient's situation, the first steps in treating prescription stimulant addiction may be to taper the drug dosage and attempt to ease withdrawal symptoms. The detoxification process could then be followed by behavioral therapy. 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.

## Chronic Pain Treatment and Addiction

Healthcare providers have long wrestled with how best to treat patients who suffer from chronic pain, roughly 116 million in this country. Their dilemma stems from the potential risks involved with long-term treatment, such as the development of drug tolerance (and the need for escalating doses), hyperalgesia (increased pain sensitivity), and addiction. Patients themselves may even be reluctant to take an opioid medication prescribed to them for fear



of becoming addicted. Estimates of addiction among chronic pain patients vary widely—from about 3 percent to 40 percent. This variability is the result of differences in treatment duration, insufficient research on long-term outcomes, and disparate study populations and measures used to assess abuse or addiction.

To mitigate addiction risk, physicians should screen patients for potential risk factors, including personal or family history of drug abuse or mental illness. Monitoring patients for signs of abuse is also crucial, and yet some indicators can signify multiple conditions, making accurate assessment challenging. Early or frequent requests for prescription pain medication refills, for example, could represent illness progression, the development of drug tolerance, or the emergence of a drug problem.

The development of effective, nonaddicting pain medications is a public health priority. A growing elderly population and an increasing number of injured military only add to the urgency of this issue. Researchers are exploring alternative medications that can alleviate pain but have less abuse potential. More research is needed to better understand effective chronic pain management, including identifying factors that predispose some patients to addiction and developing measures to prevent abuse.

## Glossary

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

**Agonist:** A chemical entity that binds to a receptor and activates it, mimicking the action of the natural (or abused) substance that binds there.

**Antagonist:** A chemical entity that binds to a receptor and blocks its activation. Antagonists prevent the natural (or abused) substance from activating its receptor.

**Barbiturate:** A type of CNS depressant prescribed to promote sleep (usually in surgical procedures) or as an anticonvulsant.

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

**Buprenorphine:** A mixed opiate agonist/antagonist medication approved by the FDA in October 2002 for the treatment of opioid addiction (e.g., heroin).

**Central Nervous System:** 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.

**Comorbidity:** The occurrence of two disorders or illnesses in the same person, also referred to as co-occurring conditions or dual diagnosis. Patients with comorbid illnesses may experience a more severe illness course and require treatment for each or all conditions.

**Detoxification:** A process in which the body rids itself of a drug (or its metabolites). During this period, withdrawal symptoms can emerge that may require medical treatment. This is often the first step in drug abuse treatment.

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

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

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

**Norepinephrine:** A neurotransmitter present in the brain and the peripheral (sympathetic) nervous system; and a hormone released by the adrenal glands. Norepinephrine is involved in attention, responses to stress, and it regulates smooth muscle contraction, heart rate, and blood pressure.

**Opioid:** A compound or drug that binds to receptors in the brain involved in the control of pain and other functions (e.g., morphine, heroin, hydrocodone, oxycodone).

**Physical Dependence:** An adaptive physiological state that occurs with regular drug use and results in a withdrawal syndrome when drug use is stopped; often occurs with tolerance. Physical dependence can happen with chronic—even appropriate—use of many medications, and by itself does not constitute addiction.

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

**Prescription Drug Abuse:** The use of a medication without a prescription; in a way other than as prescribed; or for the experience or feeling elicited. This term is used interchangeably with “nonmedical” use, a term employed by many of the national surveys.

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

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

**Sedatives:** Drugs that suppress anxiety and promote sleep; the NSDUH classification includes benzodiazepines, barbiturates, and other types of CNS depressants.

**Stimulants:** A class of drugs that enhances the activity of monamines (such as dopamine) in the brain, increasing arousal, heart rate, blood pressure, and respiration, and decreasing appetite; includes some medications used to treat attention-deficit hyperactivity disorder (e.g., methylphenidate and amphetamines), as well as cocaine and methamphetamine.

**Tolerance:** A condition in which higher doses of a drug are required to produce the same effect achieved during initial use; often associated with physical dependence.

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

**Withdrawal:** Symptoms that occur after chronic use of a drug is reduced abruptly or stopped.

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## Where Can I Get More Scientific Information on Prescription Drug Abuse?

To learn more about prescription drugs and other drugs of abuse, or to order materials on these topics free of charge in English or Spanish, visit the NIDA Web site at [www.drugabuse.gov](http://www.drugabuse.gov) or contact the *DrugPubs* Research Dissemination Center at 877-NIDA-NIH (877-643-2644; TTY/TDD: 240-645-0228).



### What's New on the NIDA Web Site

- Information on drugs of abuse
- Publications and communications (including *NIDA Notes* and *Addiction Science & Clinical Practice journal*)
- 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

[drugabuse.gov](http://drugabuse.gov)  
[backtoschool.drugabuse.gov](http://backtoschool.drugabuse.gov)  
[clubdrugs.gov](http://clubdrugs.gov)  
[teens.drugabuse.gov](http://teens.drugabuse.gov)

### For Physician Information



[www.drugabuse.gov/nidamed](http://www.drugabuse.gov/nidamed)

### Other Web Sites

Information on prescription drug abuse is also available through the following Web site:

- Substance Abuse and Mental Health Services Administration Health Information Network:  
[www.samhsa.gov/shin](http://www.samhsa.gov/shin)

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