PEERx SHARE A DOSE OF REALITY: PRESCRIPTION DRUG ABUSE IS DRUG ABUSE

Educators Guide Appendix

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DEPARTMENT OF HEALTH & HUMAN SERVICES · USA

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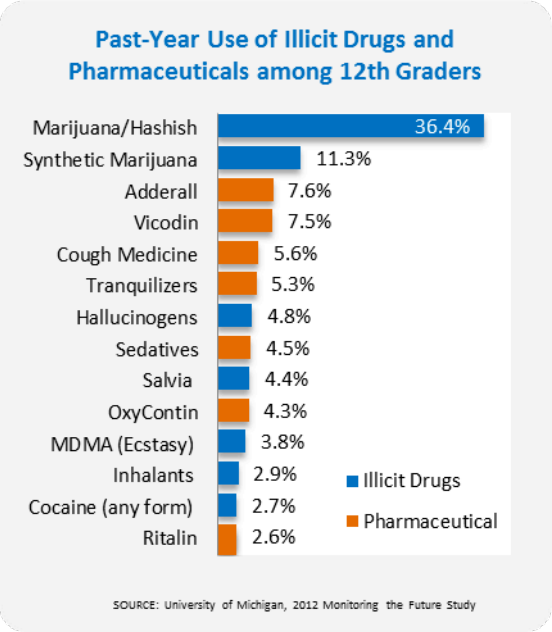
Prescription and Over-the-Counter Medications

Some medications have psychoactive (mind-altering) properties and, because of that, are sometimes abused—that is, taken for reasons or in ways or amounts not intended by a doctor, or taken by someone other than the person for whom they are prescribed. In fact, prescription and over-the-counter (OTC) drugs are, after marijuana (and alcohol), the most commonly abused substances by Americans 14 and older.



The classes of prescription drugs most commonly abused are: opioid pain relievers, such as Vicodin or Oxycontin; stimulants for treating Attention Deficit Hyperactivity Disorder (ADHD), such as Adderall, Concerta, or Ritalin; and central nervous system (CNS) depressants for relieving anxiety, such as Valium or Xanax.[1] The most commonly abused OTC drugs are cough and cold remedies containing dextromethorphan.

People often think that prescription and OTC drugs are safer than illicit drugs, but that's only true when they are taken exactly as prescribed and for the purpose intended. When abused, prescription and OTC drugs can be addictive and put abusers at risk for other adverse health effects, including overdose—especially when taken along with other drugs or alcohol.

How Are Prescription Drugs Abused?

Prescription and OTC drugs may be abused in one or more of the following ways:

Taking a medication that has been prescribed for somebody else. Unaware of the dangers of sharing medications, peopl often unknowingly contribute to this

[1] These are proprietary names of particular drug products. Generic versions may also exist.

form of abuse by sharing their unused pain relievers with their family members.

Most teenagers who abuse prescription drugs are given them for free by a friend or relative.

Taking a drug in a higher quantity or in another manner than prescribed. Most prescription drugs are dispensed orally in tablets, but abusers sometimes crush the tablets and snort or inject the powder. This hastens the entry of the drug into the bloodstream and the brain and amplifies its effects.

Taking a drug for another purpose than prescribed. All of the drug types mentioned can produce pleasurable effects at sufficient quantities, so taking them for the purpose of getting high is one of the main reasons people abuse them.

ADHD drugs like Adderall are also often abused by students seeking to improve their academic performance. However, although they may boost alertness, there is little evidence they improve cognitive functioning for those without a medical condition.

How Do Prescription and OTC Drugs Affect the Brain?

Taken as intended, prescription and OTC drugs safely treat specific mental or physical symptoms. But when taken in different quantities or when such symptoms aren't present, they may affect the brain in ways very similar to illicit drugs.

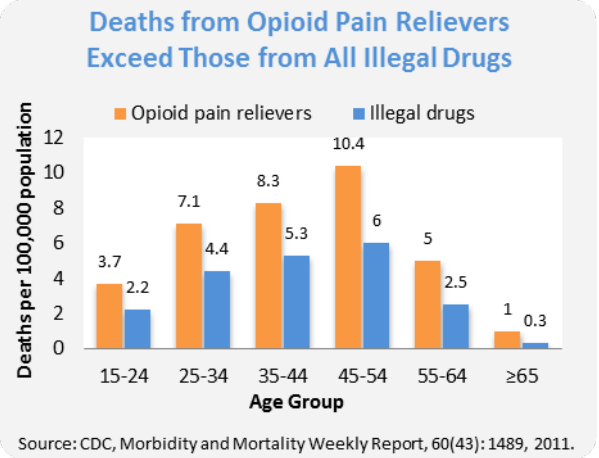
For example, stimulants such as Ritalin achieve their effects by acting on the same neurotransmitter systems as cocaine. Opioid pain relievers such as OxyContin attach to the same cell receptors targeted by illegal opioids like heroin. Prescription depressants produce sedating or calming effects in the same manner as the club drugs GHB and rohypnol. And when taken in very high doses, dextromethorphan acts on the same cell receptors as PCP or ketamine, producing similar out-of-body experiences.

When abused, all of these classes of drugs directly or indirectly cause a pleasurable increase in the amount of dopamine in the brain's reward pathway. Repeatedly seeking to experience that feeling can lead to addiction.

What Are the Other Health Effects of Prescription and OTC Drugs

Stimulants can have strong effects on the cardiovascular system. Taking high doses of a stimulant can dangerously raise body temperature and cause irregular heartbeat or even heart failure or seizures. Also, taking some stimulants in high doses or repeatedly can lead to hostility or feelings of paranoia.

Opioids can produce drowsiness, cause constipation, and—depending upon the amount taken—depress breathing. The latter effect makes opioids particularly dangerous, especially when they are snorted or injected or combined with other drugs or alcohol. More people die from overdoses of prescription opioid than from all other drugs combined, including heroin and cocaine (see graph below).



CNS depressants slow down brain activity and can cause sleepiness and loss of coordination. Continued use can lead to physical dependence and withdrawal symptoms if discontinuing use.

Dextromethorphan can cause impaired motor function, numbness, nausea or vomiting, and increased heart rate and blood pressure. On rare occasions, hypoxic brain damage—caused by severe respiratory depression and a lack of oxygen to the brain—has occurred due to the combination of dextromethorphan with decongestants often found in the medication.

All of these drugs have the potential for addiction, and this risk is amplified when they are abused. Also, as with other drugs, abuse of prescription and OTC drugs can alter a person's judgment and decision making, leading to dangerous behaviors such as unsafe sex and drugged driving.

Prescription Opioid Abuse: A First Step to Heroin Use?

Prescription opioid pain medications such as Oxycontin and Vicodin can have effects similar to heroin when taken in doses or in ways other than prescribed, and research now suggests that abuse of these drugs may actually open the door to heroin abuse.

Nearly half of young people who inject heroin surveyed in three recent studies reported abusing prescription opioids before starting to use heroin. Some individuals reported taking up heroin because it is cheaper and easier to obtain than prescription opioids.

Many of these young people also report that crushing prescription opioid pills to snort or inject the powder provided their initiation into these methods of drug administration.

Learn More

For more information on prescription and OTC drugs, visit http://www.drugabuse.gov/publications/research-reports/prescription-drugs

Commonly Abused Prescription Drugs

Visit NIDA at www.drugabuse.gov

Substances: Category and Name	Examples of *Commercial* and Street Names	DEA Schedule*/How Administered	*Intoxication Effects*/Health Risks
Depressants			
Barbiturates	*Amytal, Nembutal, Seconal, Phenobarbital:* barbs, reds, red birds, phennies, tooies, yellows, yellow jackets	II, III, IV/injected, swallowed	*Sedation/drowsiness, reduced anxiety, feelings of well-being, lowered inhibitions, slurred speech, poor concentration, confusion, dizziness, impaired coordination and memory/*slowed pulse, lowered blood pressure, slowed breathing, tolerance, withdrawal, addiction; increased risk of respiratory distress and death when combined with alcohol
Benzodiazepines	*Ativan, Halcion, Librium, Valium, Xanax, Klonopin:* candy, downers, sleeping pills, tranks	IV/swallowed	
Sleep Medications	*Ambien (zolpidem), Sonata (zaleplon), Lunesta (eszopiclone)*	IV/swallowed	*for barbiturates—euphoria, unusual excitement, fever, irritability/*life-threatening withdrawal in chronic users
Opioids and Morphine Derivatives**			
Codeine	*Empirin with Codeine, Fiorinal with Codeine, Robitussin A-C, Tylenol with Codeine:* Captain Cody, Cody, schoolboy; (with glutethimide: doors & fours, loads, pancakes and syrup)	II, III, IV/injected, swallowed	*Pain relief, euphoria, drowsiness, sedation, weakness, dizziness, nausea, impaired coordination, confusion, dry mouth, itching, sweating, clammy skin, constipation/* slowed or arrested breathing, lowered pulse and blood pressure, tolerance, addiction, unconsciousness, coma, death; risk of death increased when combined with alcohol or other CNS depressants
Morphine	*Roxanol, Duramorph:* M, Miss Emma, monkey, white stuff	II, III/injected, swallowed, smoked	
Methadone	*Methadose, Dolophine:* fizzies, amidone, (with MDMA: chocolate chip cookies)	II/swallowed, injected	*for fentanyl*—80–100 times more potent analgesic than morphine
Fentanyl and analogs	*Actiq, Duragesic, Sublimaze:* Apache, China girl, dance fever, friend, goodfella, jackpot, murder 8, TNT, Tango and Cash	II/injected, smoked, snorted	*for oxycodone*—muscle relaxation/twice as potent analgesic as morphine; high abuse potential
Other Opioid Pain Relievers: Oxycodone HCL Hydrocodone Bitartrate Hydromorphone Oxymorphone Meperidine Propoxyphene	*Tylox, Oxycontin, Percodan, Percocet:* Oxy, O.C., oxycotton, oxycet, hillbilly heroin, percs *Vicodin, Lortab, Lorcet:* vike, Watson-387 *Dilaudid:* juice, smack, D, footballs, dillies *Opana, Numorphan, Numorphone:* biscuits, blue heaven, blues, Mrs. O, octagons, stop signs, O Bomb *Demerol, meperidine hydrochloride:* demmies, pain killer *Darvon, Darvocet*	II, III, IV/chewed, swallowed, snorted, injected, suppositories	*for codeine*—less analgesia, sedation, and respiratory depression than morphine *for methadone*—used to treat opioid addiction and pain; significant overdose risk when used improperly
Stimulants			
Amphetamines	*Biphetamine, Dexedrine, Adderall:* bennies, black beauties, crosses, hearts, LA turnaround, speed, truck drivers, uppers	II/injected, swallowed, smoked, snorted	*Feelings of exhilaration, increased energy, mental alertness/*increased heart rate, blood pressure, and metabolism, reduced appetite, weight loss, nervousness, insomnia, *seizures, heart attack, stroke*
Methylphenidate	*Concerta, Ritalin:* JIF, MPH, R-ball, Skippy, the smart drug, vitamin R	II/injected, swallowed, snorted	*for amphetamines—rapid breathing, tremor, loss of coordination, irritability, anxiousness, restlessness/*delirium, panic, paranoia, hallucinations, impulsive behavior, aggressiveness, tolerance, addiction *for methylphenidate*—increase or decrease in blood pressure, digestive problems, loss of appetite, weight loss
Other Compounds			
Dextromethorphan (DXM)	*Found in some cough and cold medications:* Robotripping, Robo, Triple C	not scheduled/swallowed	*Euphoria, slurred speech/*increased heart rate and blood pressure, dizziness, nausea, vomiting, confusion, paranoia, distorted visual perceptions, impaired motor function

** Schedule I and II drugs have a high potential for abuse. They require greater storage security and have a quota on manufacturing, among other restrictions. Schedule I drugs are available for research only and have no approved medical use. Schedule II drugs are available only by prescription and require a new prescription for each refill. Schedule III and IV drugs are available by prescription, may have five refills in 6 months, and may be ordered orally. Most Schedule V drugs are available over the counter.*

*** Taking drugs by injection can increase the risk of infection through needle contamination with staphylococci, HIV, hepatitis, and other organisms. Injection is a more common practice for opioids, but risks apply to any medication taken by injection.*

Facts About Prescription Drug Abuse

Medications can be effective when they are used properly, but some can be addictive and dangerous when abused. This chart provides a brief look at some prescribed medications that—when used in ways or by people other than prescribed—have the potential for adverse medical consequences, including addiction.

In 2010, approximately 16 million Americans reported using a prescription drug for nonmedical reasons in the past year; 7 million in the past month.

What types of prescription drugs are abused?

Three types of drugs are abused most often:

- Opioids—prescribed for pain relief
- CNS depressants—barbiturates and benzodiazepines prescribed for anxiety or sleep problems (often referred to as sedatives or tranquilizers)
- Stimulants—prescribed for attention-deficit hyperactivity disorder (ADHD), the sleep disorder narcolepsy, or obesity.

How can you help prevent prescription drug abuse?

- Ask your doctor or pharmacist about your medication, especially if you are unsure about its effects.
- Keep your doctor informed about all medications you are taking, including over-the-counter medications.
- Read the information your pharmacist provides before starting to take medications.
- Take your medication(s) as prescribed.
- Keep all prescription medications secured at all times and properly dispose of any unused medications.

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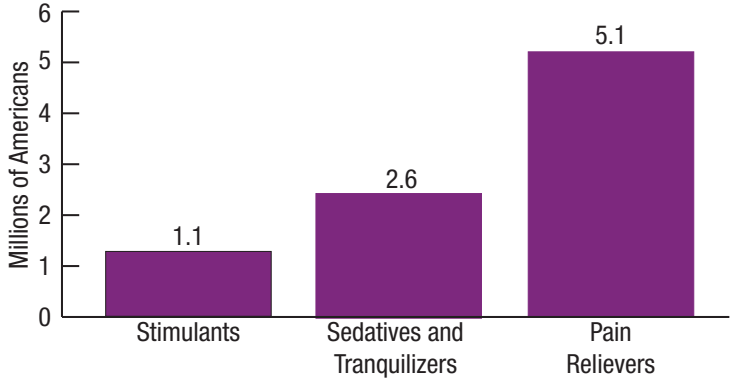
This chart may be reprinted. Citation of the source is appreciated.

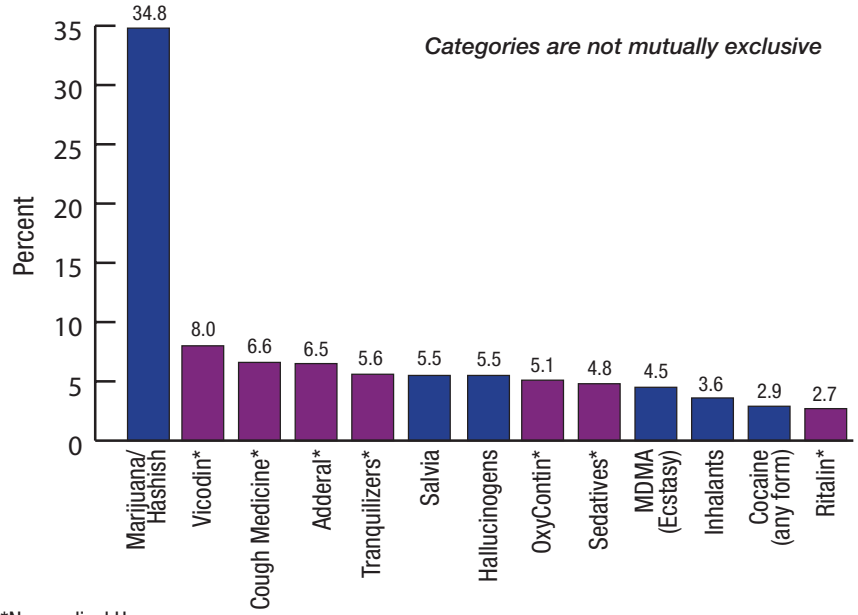
~7.0 Million Americans Reported Past-Month Use of Rx Drugs for Nonmedical Purposes in 2010



Source: Office of Applied Studies, Substance Abuse and Mental Health Services Administration, National Survey on Drug Use and Health, 2010

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



*Nonmedical Use

Source: University of Michigan, 2010 Monitoring the Future Study

Revised October 2011

Preventing and recognizing prescription drug abuse
See page 10.

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Report Series

Prescription Drugs: Abuse and Addiction

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.

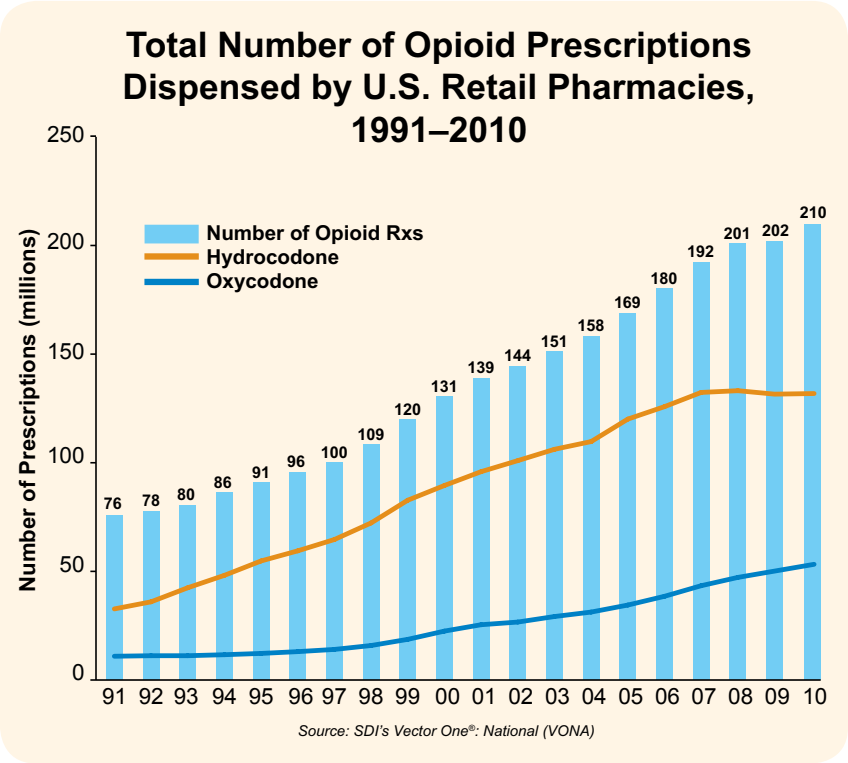
Nora D. Volkow, M.D.
Director
National Institute on Drug Abuse

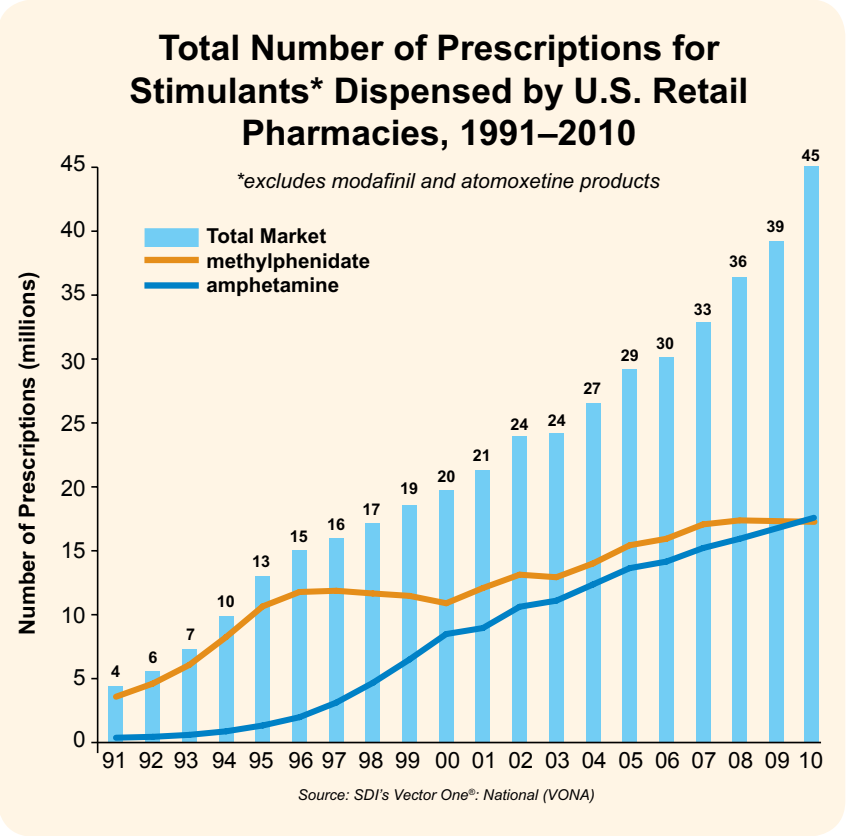
What is prescription drug abuse?

Prescription drug abuse[1] 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

[1] *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).*





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).

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

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.

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?

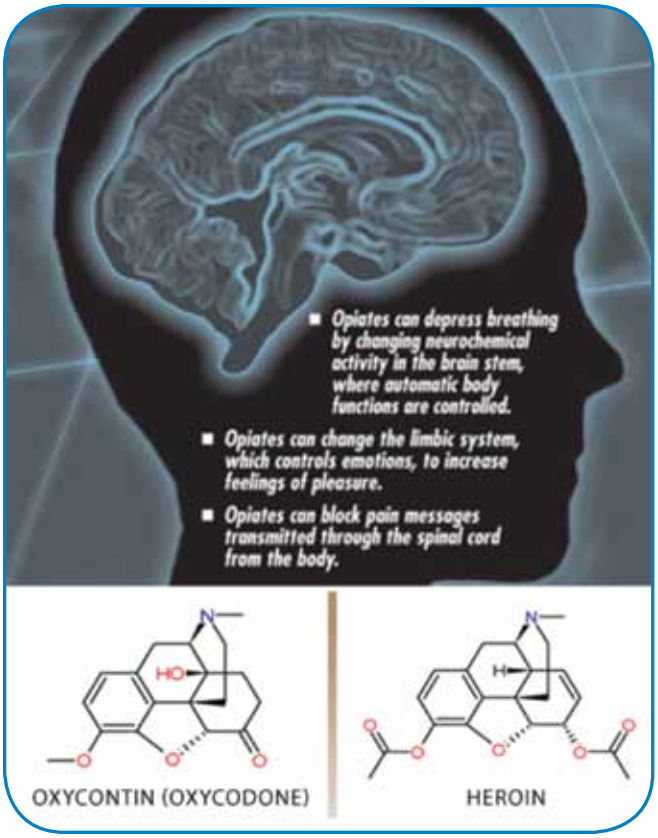
Opioids act by attaching to specific proteins called opioid receptors, which are found in the brain, spinal cord, gastrointestinal tract, and other organs in the body. When these drugs attach to their receptors, they reduce the perception of pain. Opioids can also produce drowsiness, mental confusion, nausea, constipation, and, depending 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,[2] 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.

[2] *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?

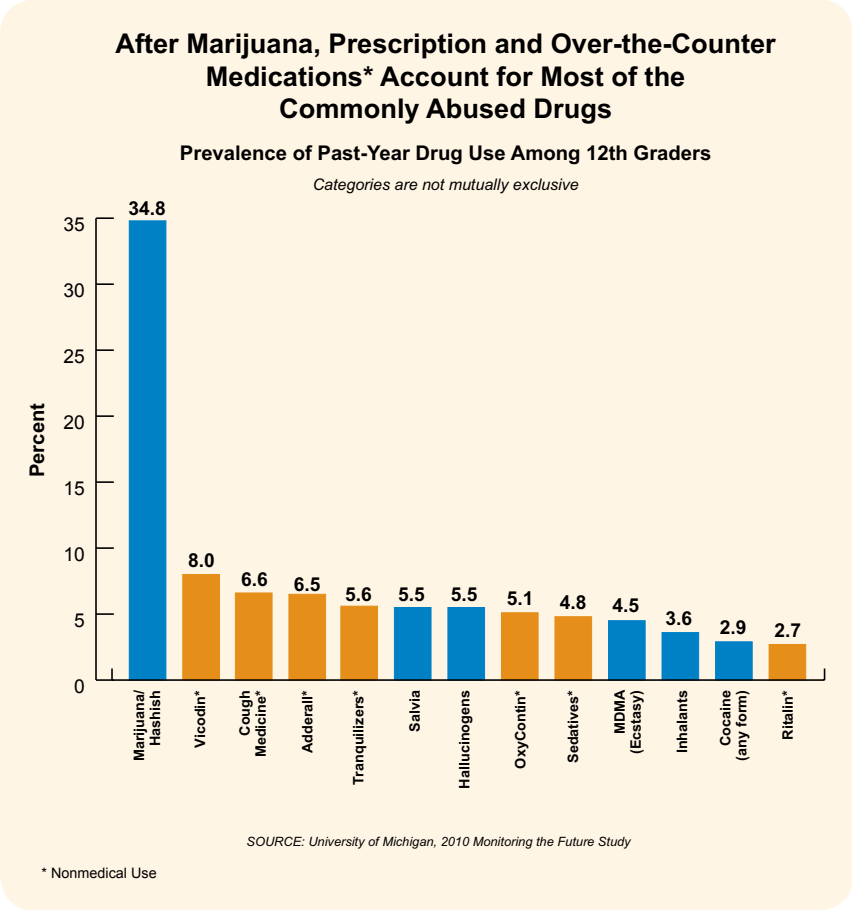
Most CNS depressants act on the brain by affecting the neurotransmitter gamma-aminobutyric acid (GABA). Neurotransmitters are brain chemicals that facilitate communication between brain cells. Although the different classes of CNS depressants work in unique ways, it is through their ability to increase 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.



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—

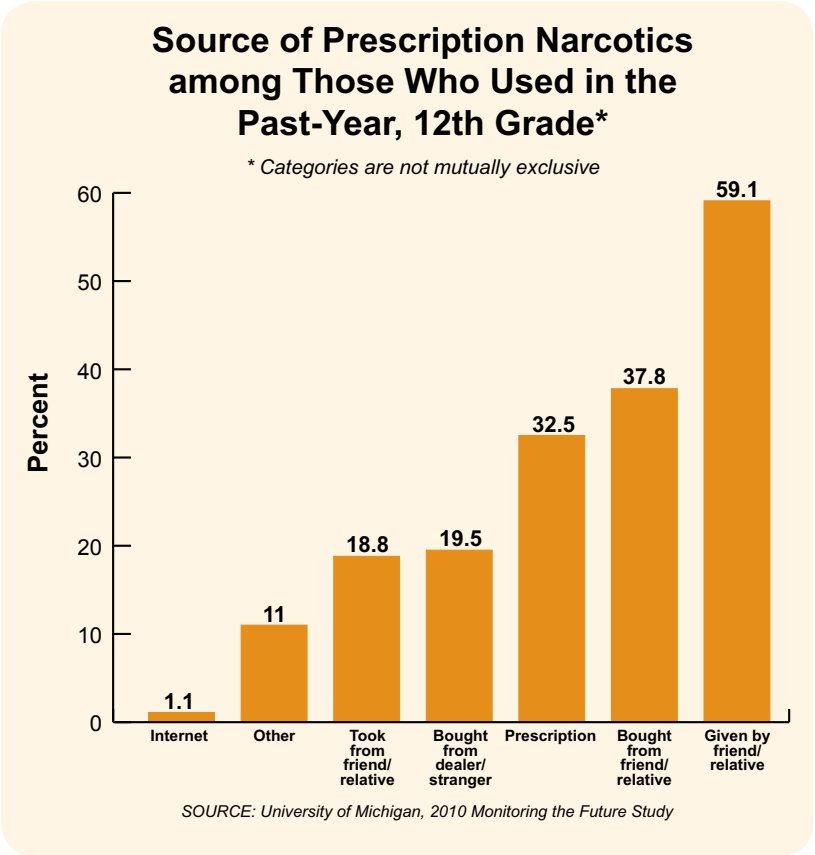
What are stimulants?

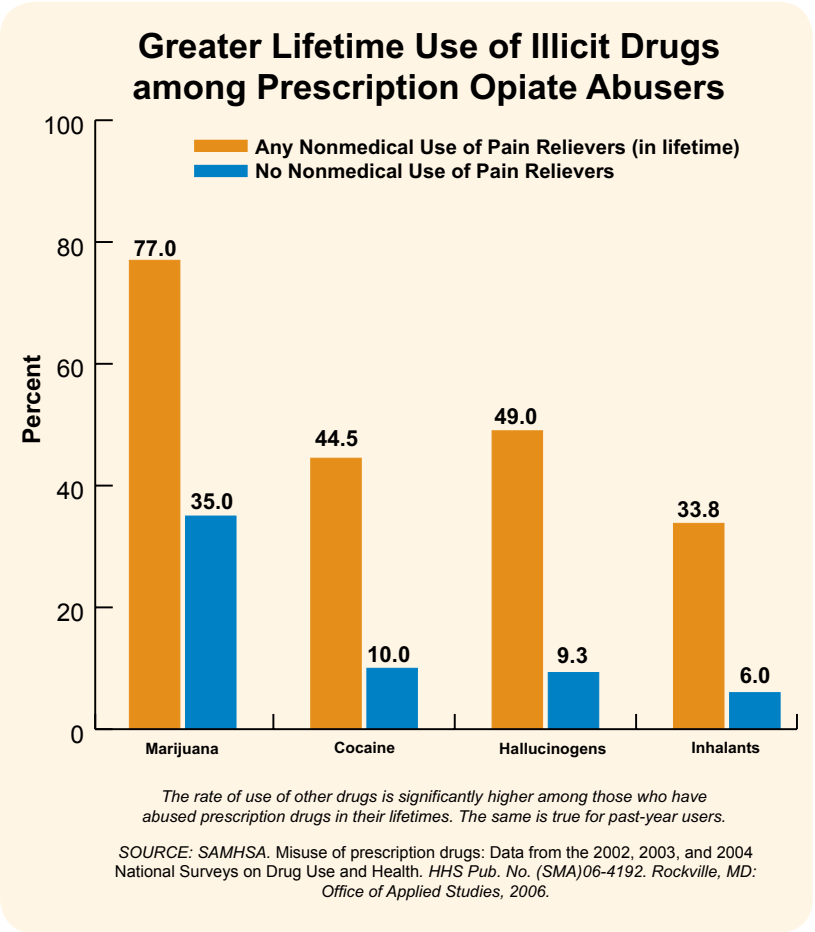
As the name suggests, stimulants increase alertness, attention, and energy, as well as elevate blood pressure, heart rate, and respiration. Stimulants historically were used to treat asthma and other respiratory problems, obesity, neurological disorders, and a variety of other ailments. But as their 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.





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).

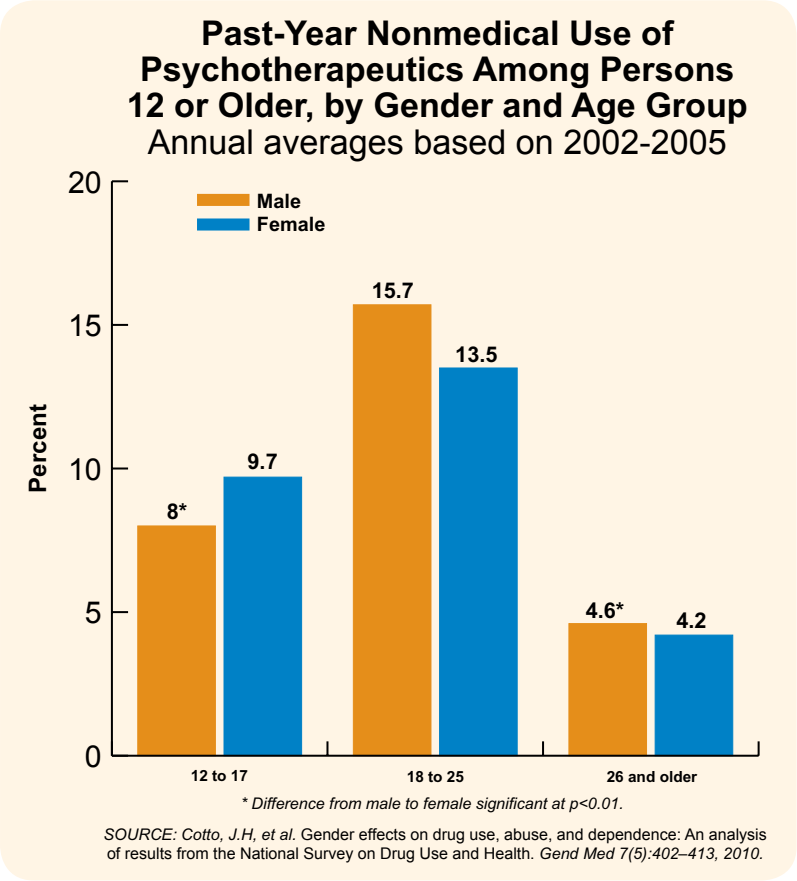
Youth who abuse prescription medications are also more likely to report use of other drugs. Multiple studies have revealed associations between prescription drug abuse and higher rates of cigarette smoking; heavy episodic drinking; and marijuana, cocaine, and other illicit drug use among adolescents,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

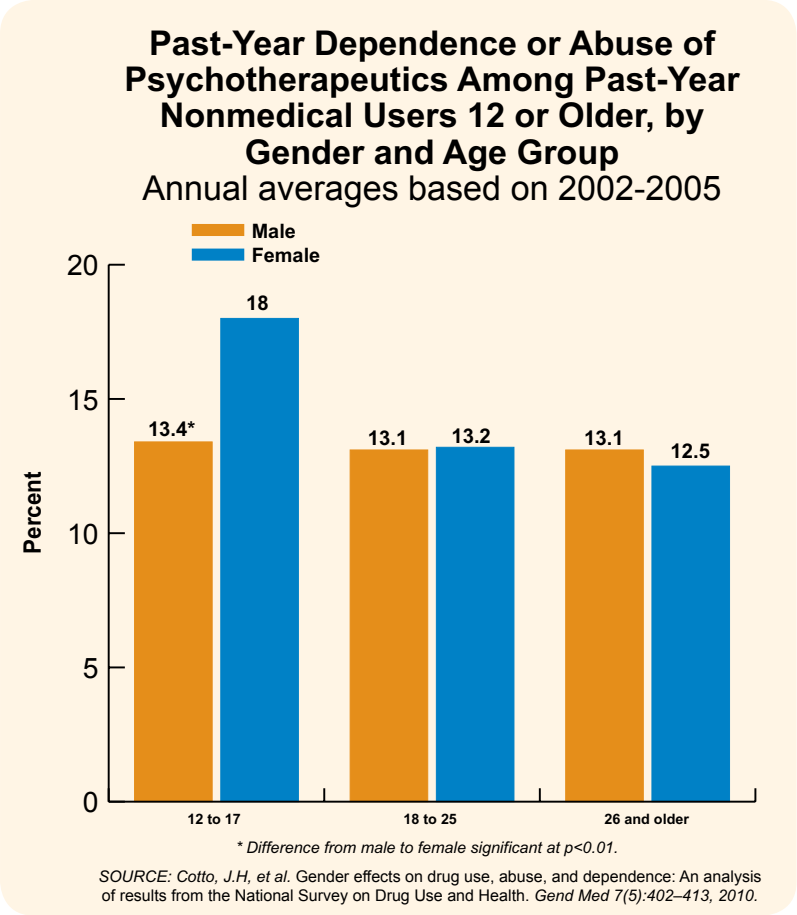
Older adults

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.



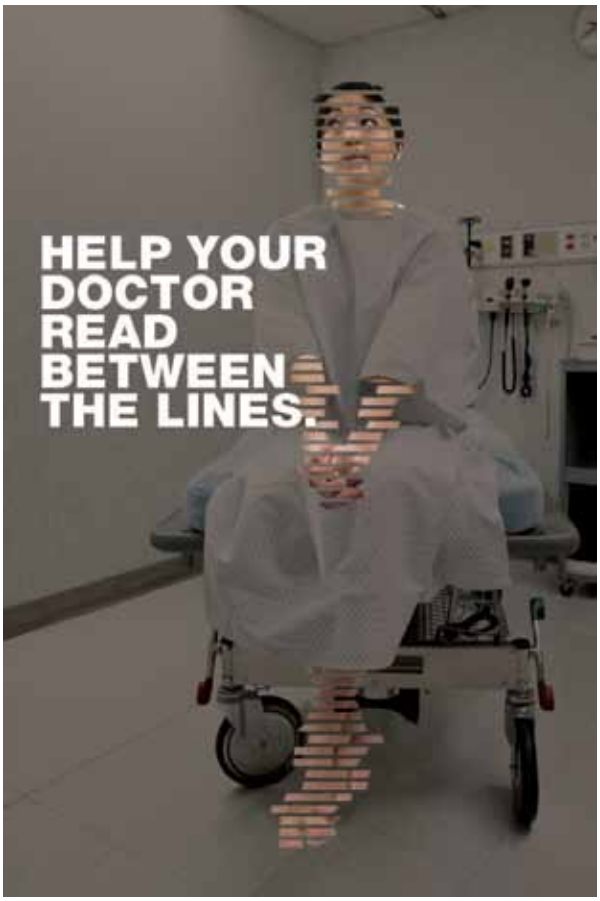


Gender differences

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.

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** 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
backtoschool.drugabuse.gov
clubdrugs.gov
teens.drugabuse.gov

For Physician Information

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*

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Stimulant ADHD Medications: Methylphenidate and Amphetamines

Stimulant medications (e.g., methylphenidate and amphetamines) are often prescribed to treat individuals diagnosed with attention-deficit hyperactivity disorder (ADHD). ADHD is characterized by a persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequently displayed and more severe than is typically observed in individuals at a comparable level of development. This pattern of behavior usually becomes evident in the preschool or early elementary years, and the median age of onset of ADHD symptoms is 7 years. For many individuals, ADHD symptoms improve during adolescence or as age increases, but the disorder can persist into adulthood. In the United States, ADHD is diagnosed in an estimated 8 percent of children ages 4–17 and in 2.9–4.4 percent of adults.[1,2,3]

How Do Prescription Stimulants Affect the Brain?

All stimulants work by increasing dopamine levels in the brain—dopamine is a brain chemical (or neurotransmitter) associated with pleasure, movement, and attention. The therapeutic effect of stimulants is achieved by slow and steady increases of dopamine, which are similar to the natural production of the chemical by the brain. The doses prescribed by physicians start low and increase gradually until a therapeutic effect is reached. However, when taken in doses and routes other than those prescribed, stimulants can increase brain dopamine in a rapid and highly amplified manner—as do most other drugs of abuse—disrupting normal communication between brain cells, producing euphoria, and increasing the risk of addiction.

What Is the Role of Stimulants in the Treatment of ADHD?

Treatment of ADHD with stimulants, often in conjunction with psychotherapy, helps to improve the symptoms of ADHD, as well as the self-esteem, cognition, and social and family interactions of the patient. The most commonly prescribed medications include amphetamines (e.g., Adderall—a mix of amphetamine salts) and methylphenidate (e.g., Ritalin and Concerta—a formulation that releases medication in the body over a period of time). These medications have a paradoxically calming and "focusing" effect on individuals with ADHD. Researchers speculate that because methylphenidate amplifies the release of dopamine, it can improve attention and

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focus in individuals who have dopamine signals that are weak.[4]

One of the most controversial issues in child psychiatry is whether the use of stimulant medications to treat ADHD increases the risk of substance abuse in adulthood. Research thus far suggests that individuals with ADHD do not become addicted to their stimulant medications when taken in the form and dosage prescribed by their doctors. Furthermore, several studies report that stimulant therapy in childhood does not increase the risk for subsequent drug and alcohol abuse disorders later in life.[5,6,7] More research is needed, however, particularly in adolescents treated with stimulant medications.

Why and How Are Prescription Stimulants Abused?

Stimulants have been abused for both "performance enhancement" and recreational purposes (i.e., to get high). For the former, they suppress appetite (to facilitate weight loss), increase wakefulness, and increase focus and attention. The euphoric effects of stimulants usually occur when they are crushed and then snorted or injected. Some abusers dissolve the tablets in water and inject the mixture. Complications from this method of use can arise because insoluble fillers in the tablets can block small blood vessels.

What Adverse Effects Does Prescription Stimulant Abuse Have on Health?

Stimulants can increase blood pressure, heart rate, body temperature, and decrease sleep and appetite, which can lead to malnutrition and its consequences. Repeated use of stimulants can lead to feelings of hostility and paranoia. At high doses, they can lead to serious cardiovascular complications, including stroke.

Addiction to stimulants is also a very real consideration for anyone taking them without medical supervision. This most likely occurs because stimulants, when taken in doses and routes other than those prescribed by a doctor, can induce a rapid rise in dopamine in the brain. Furthermore, if stimulants are used chronically, withdrawal symptoms—including fatigue, depression, and disturbed sleep patterns—can emerge when the drugs are discontinued.

How Widespread Is Prescription Stimulant Abuse?

Monitoring the Future Survey[†]

Each year, the Monitoring the Future (MTF) survey assesses the extent of drug use among 8th-, 10th-, and 12th-graders nationwide. For amphetamines and methylphenidate, the survey measures only past-year use, which refers to use

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at least once during the year preceding an individual's response to the survey. Use outside of medical supervision was first measured in the study in 2001; nonmedical use of stimulants has been falling since then, with total declines between 25 percent and 42 percent at each grade level surveyed. MTF data for 2008 indicate past-year nonmedical use of Ritalin by 1.6 percent of 8th-graders, 2.9 percent of 10th-graders, and 3.4 percent of 12th-graders.

Since its peak in the mid-1990s, annual prevalence of amphetamine use fell by one-half among 8th-graders to 4.5 percent and by nearly one-half among 10th-graders to 6.4 percent in 2008. Amphetamine use peaked somewhat later among 12th-graders and has fallen by more than one-third to 6.8 percent by 2008. Although general nonmedical use of prescription stimulants is declining in this group, when asked, "What amphetamines have you taken during the last year without a doctor's orders?" 2.8 percent of all 12th-graders surveyed in 2007 reported they had used Adderall. Amphetamines rank third among 12th-graders for past-year illicit drug use.

Other Information Sources

For more information on treating ADHD, visit the Web site for the National Institute of Mental Health, National Institutes of Health, at **www.nimh.nih.gov.**

For street terms searchable by drug name, street term, cost and quantities, drug trade, and drug use, visit **www.whitehousedrugpolicy.gov/streetterms/default.asp.**

Data Source

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

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Heads Up: Real News About Drugs and Your Body

Brought to you by Scholastic and the scientists at the National Institute on Drug Abuse, *Heads Up* gives you the facts about the real effects of drugs on the teen brain and body. Check out the articles and features inside to get the latest news so you can make informed choices about your health and your future.

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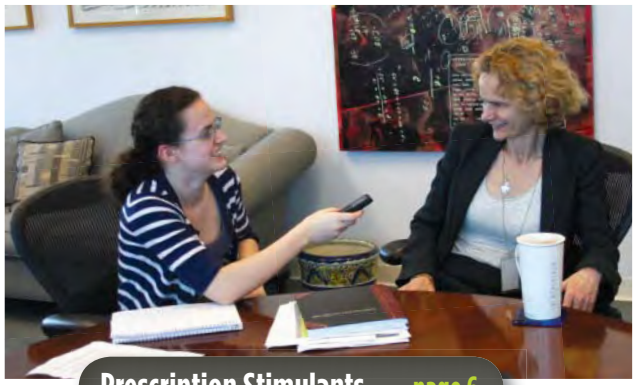

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For more real news about drugs and your body, visit **www.scholastic.com/headsup** and **http://teens.drugabuse.gov**. To order additional copies of this *Heads Up* Student Edition at no charge, call **1-877-643-2644** and refer to **NIH Pub No.: 11-7649** or visit **www.nida.nih.gov/scholastic.html**.

FROM SCHOLASTIC AND THE SCIENTISTS OF THE NATIONAL INSTITUTE ON DRUG ABUSE, NATIONAL INSTITUTES OF HEALTH, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

STRAIGHT TALK ON PRESCRIPTION DRUGS

Reporter Marie French

A teen reporter interviews the director of the nation's leading research agency on drug abuse and addiction

Overall teen drug use is declining, but prescription-drug abuse remains high. This is mainly because teens do not see the dangers, says one of the nation's top scientists.

"Teenagers believe that if a doctor gives a drug to you, it cannot be so terrible," says Dr. Nora D. Volkow, director of the National Institute on Drug Abuse in Bethesda, Md. "They think prescribed drugs are safer than illegal drugs. They are not."

In a sit-down interview with teen reporter Marie French, Dr. Volkow explains why prescription-drug abuse can be just as dangerous as illegal drugs in terms of health risks and addiction.

What's the worst that can happen?

"Death," says Dr. Volkow.

MYTHS VS. FACTS PRESCRIPTION DRUGS

What are the effects of prescription-drug abuse—either one-time or long-term use?

DR. VOLKOW: There isn't much research on one-time use, so it's hard to say overall what the negative effects may be, except, of course, that you may overdose. Another risk is that you may love the way it makes you feel, and that starts to change your brain. The brain is wired to learn very rapidly about things that you like, that give you pleasure. So if, for example, you take a prescription painkiller and you like it, you might take it again in the future. And if you keep taking it, you could become addicted, which is why I say, Why risk it?—unless it's something a physician prescribes for you to treat a problem. **Do you really want to reach a point where you are doing something only because you cannot stop, as if you've lost control of your own brain?** It's just not worth it.

What's the likelihood of someone becoming addicted to prescription drugs?

DR. VOLKOW: Your likelihood of becoming addicted is dependent on a number of factors—the drug itself, how you take it, your genes, and your age. If you abuse a pain medication like OxyContin®, **the risk of becoming addicted can be equivalent to that of heroin**—especially if you snort or inject the drug. Actually, if a teen starts with a prescribed painkiller and gets hooked, he or she may shift to heroin because it is cheaper.

What long-term health effects do addicted teens face?

DR. VOLKOW: When you become addicted, there are many negative health and social effects. With smoking, there is damage to your heart and lungs, and it puts you at risk for a variety of cancers. When you are an alcoholic, you increase your risk of getting into an accident or damaging your liver and your brain. Even if you are not addicted, when you are high or drunk, you become uninhibited and could do things you wouldn't ordinarily do—like drive drunk or drugged. **When you become addicted to drugs, they rule your behavior. The things that are normally important to you become unimportant.** You may get into fights with your family, even steal from them. **If you have ever loved someone**

Photo: Janet French.

who is addicted, then you know it's pretty horrible.

I've heard of people taking stimulants, like Adderall® or Ritalin®, when they have a test—like the SATs. Why shouldn't they?

DR. VOLKOW: There are many reasons why you shouldn't do it. One is that there is not really good scientific evidence that stimulants will even improve your performance—unless you are being treated for ADHD. So some students may take these drugs to help them stay awake at night to study, but coffee does the same thing. **The disadvantage of stimulants over coffee is that, for people who are vulnerable, they may become psychotic and paranoid.** That's not the best way to go into an exam.

More than 50 percent of teens have reported getting the prescription drugs they abuse from their friends or from their home medicine cabinets. Does that show a need for physicians to be more aware when they're prescribing drugs?

DR. VOLKOW: Absolutely. You are touching on the responsibility of physicians and parents. **Anyone prescribing an addictive medication should consider the risks and determine what's most helpful for each patient.** For example, you might just need two or three days of a prescription or maybe just an over-the-counter pain reliever will do. Once a prescription medication is in your medicine cabinet, it could become a temptation for abuse. It is for this very reason that we are working to raise awareness of this concern among medical students, physicians, and dentists—as well as parents, many of whom don't realize they are leaving something potentially dangerous around for their kids to abuse.

> "People who are addicted end up taking drugs—not to feel high and good—but instead to feel less bad."
> —Dr. Nora D. Volkow

What would you say to teenagers to stop them from abusing prescription drugs?

DR. VOLKOW: Well, I think kids start abusing them because they want to get high or feel good at a party. Or they want to use them to help them study, lose weight, or for pain relief. We've already discussed some of the reasons not to use stimulants to study or painkillers without a prescription. But as far as getting high—my advice is that there are many things that can make you feel very good that don't require drugs. Sports, for example, or dancing, or going out with friends. It's whatever you like. You really don't need drugs. You don't. **When you take drugs, your brain resets itself.** So what that means is that when you take a drug—especially when you keep taking it—and its effects eventually wear off, you become much less sensitive to normal pleasures, like social interactions, going to a movie, chocolate. Now, that tends to recover, especially if you are just taking drugs occasionally. But if you continue, then the capacity of the brain to recover becomes diminished. When you're addicted, you will feel less pleasure in general. People who are addicted end up taking drugs—not to feel high and good—but instead to feel less bad. They feel awful when they are not taking the drug.

Resources

http://teens.drugabuse.gov
NIDA's teen site containing information, videos, games, and real stories about drug abuse (including prescription drugs) and its consequences.

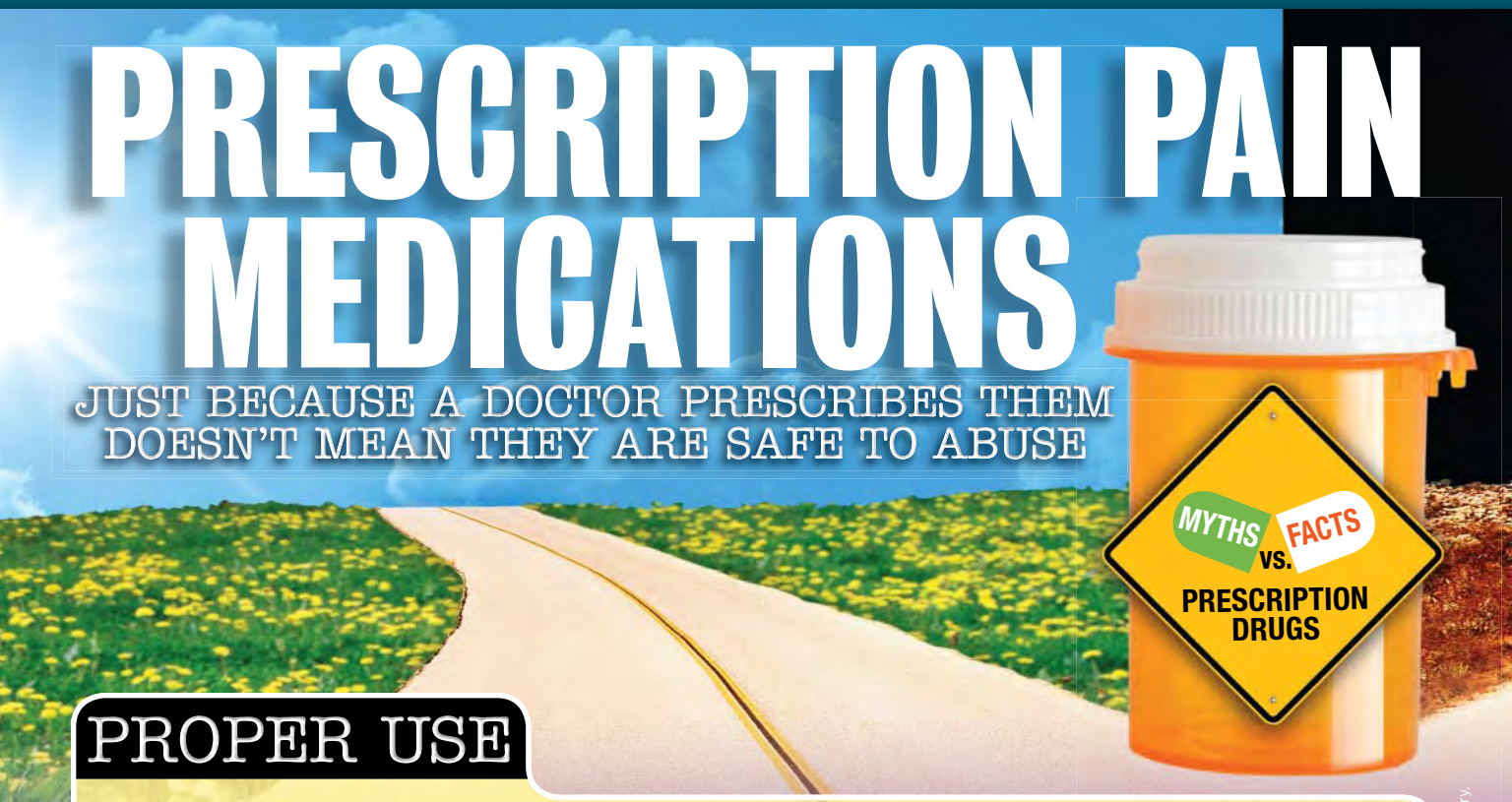
http://teens.drugabuse.gov/blog
NIDA's teen blog features the latest news from NIDA, as well as answers to teen questions about drugs and drug abuse.

http://findtreatment.samhsa.gov
A searchable directory of drug treatment centers sponsored by the Substance Abuse and Mental Health Services Administration (SAMHSA) for those seeking treatment. You can also reach the referral hotline at **1-800-662-HELP.**

Photos: left and right, © Rachel Lienesch; middle photo, © National Institute on Drug Abuse.

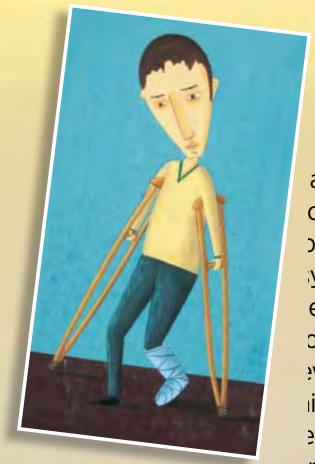
PRESCRIPTION PAIN MEDICATIONS

JUST BECAUSE A DOCTOR PRESCRIBES THEM DOESN'T MEAN THEY ARE SAFE TO ABUSE



PROPER USE

What Are Prescripti Painkillers?



Prescription painkillers ar strong pain relievers tha include the *opioid* class of drugs, including hydrocodon (e.g., Vicodin®) and oxycodo (e.g., OxyContin®). Opioids work by mimicking the body's natural pain-relieving chemicals, but they are more powerful and longer lasting.

When the body senses pain following an injury or surgery, specialized nerve cells relay "pain" messages to the spinal cord and brain. In response to these messages, natural pain-relieving chemicals—endorphins and enkephalins—are released and attach themselves to the body's opioid receptors, where they have several functions. In the spinal cord, they decrease pain-related signals being transmitted to the brain. In the brain, they act in a number of areas, including those that interpret pain-related information and are involved in emotional responses. This reduces the sensation of pain and any associated feelings of suffering. Although our natural opioid ystem can relieve ertain types of pain, it's ot equipped to handle evere and prolonged in. That's when opioid edications can be pful.

Why Do Opioids Require a Prescription?

Opioids require a prescription because they are powerful medications. Although they are used safely each year by millions of Americans who are in pain, if not taken properly, opioids can result in severe health complications, or even death.

Before writing a prescription for opioids, your doctor must evaluate several factors, including your level of pain (or expected pain after surgery), weight, other medical conditions, any other medications you are taking, and your current or past drug-use history. The doctor will then decide:

- whether an opioid pain reliever is necessary;
- if a prescription opioid will safely and effectively treat your pain; and
- the correct dosage and how long you should take it.

Your doctor will instruct you on how to safely take the medication, including which medications or over-the-counter drugs to avoid and the warning signs to watch for in case you have a bad reaction.

By following your doctor's instructions carefully, you'll be less likely to suffer serious side effects as a result of taking the drug.

Images: sunny blue sky, © konradlew/iStockphoto; grass with daisies, © Media Bakery; prescription bottle, © Steven Poe/Workbook Stock/Getty Images; yellow diamond-shaped road sign, © Alex Slobodkin/iStockphoto; teen on crutches, © Media Bakery.

You know that abusing drugs like cocaine and heroin can lead to addiction and other serious health consequences. But did you know that abusing prescription painkillers—taking someone else's prescription, or even taking your own in ways other than as prescribed—can be just as dangerous?

The fact is, it can. But with nearly 1 in 10 high school seniors reporting nonmedical use of Vicodin® in the past year, some teens haven't gotten the message.[1] Why are these teens risking their health and maybe even their lives? They may think prescription drugs are *safer* to abuse than illegal "street" drugs—after all, the thinking goes, doctors prescribe them, so they must be safe. But that's not the whole story. Read on to find out the facts.

[1] "Monitoring the Future Survey, Overview of Findings 2009," National Institute on Drug Abuse, http://drugabuse.gov/newsroom/09/MTF09overview.html.

ABUSE

Why Is Abusing Prescription Opioids Dangerous?

Abusing prescription opioids can put your health and life at serious risk. Opioids can make you drowsy, nauseous, constipated, and confused. They can also depress your breathing and lead to addiction or overdose.

- **Overdose:** Abuse of opioids, alone or in combination with alcohol or other drugs, can slow or even stop your breathing and result in a loss of consciousness, a coma, or worse. In fact, the number of accidental fatal poisonings involving prescription pain relievers has more than tripled since 1999.
- **Physical Dependence:** Long-term use of opioids can make the body dependent, and when you stop taking them, you could experience withdrawal symptoms, like muscle and bone pain, diarrhea, vomiting, or cold flashes. If you are under a doctor's care, he or she can help you avoid or manage these symptoms.
- **Addiction:** Opioid receptors are found in the parts of the brain involved in emotional responses, including pleasure. In fact, heroin is an illegal opioid drug that acts on the same receptor system as prescription opioids. However, the dose and the way a drug is taken can affect how a person responds to it. People who abuse opioids often take them in doses or by methods (crushed, snorted, or injected) other than prescribed. This can lead to high doses reaching the brain rapidly, increasing the risk of overdose and addiction.

You are abusing opioids if . . .	Risks
they were prescribed to you, but you take more (higher doses or more often) than you were directed.	If the pain medication isn't relieving your pain, why not go back to the doctor? Your condition may be getting worse and a different remedy might be needed. By taking more medication, you could be masking important symptoms.
you got them from a friend to help relieve your pain.	Pain medications come in different varieties and doses. Some are made for people who have chronic pain and need high doses to relieve their pain. Their bodies have adapted to the repeated opioid exposure, but yours has not. Taking one of their pills could have serious repercussions for you.
you take them to get high.	Whether or not they were prescribed to you, if you are taking opioids to get high, you are setting yourself up to become addicted. The risks increase when you take them in combination with other drugs (like alcohol or marijuana or other prescription medications) or by methods other than those prescribed.

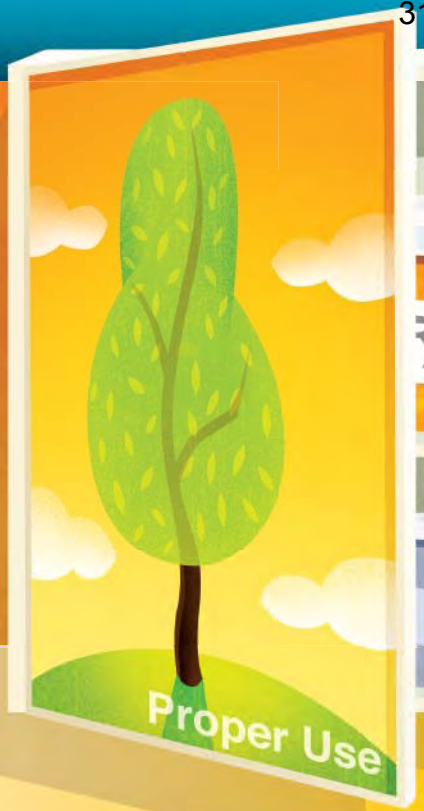
Important Resources

- For information on drugs: http://teens.drugabuse.gov or www.scholastic.com/headsup
- For help with a crisis: 1-800-273-TALK
- To find a treatment center: 1-800-662-HELP or http://findtreatment.samhsa.gov

Images: dark sky with lightning streaks, © Chee Ming Wong/Stockphoto; fork in road, © Ron Chapple/Taxi Images.

PRESCRIPTION STIMULANTS

WHEN USED AS PRESCRIBED, PRESCRIPTION STIMULANTS ARE SAFE DRUGS THAT HELP MILLIONS OF TEENS. BUT ABUSING THEM IS DANGEROUS AND CAN BE ADDICTIVE.



The most recent *Monitoring the Future* survey shows a disturbing fact: Prescription stimulants such as Adderall® and Ritalin® are two of the drugs most frequently abused by high school seniors, with 6.5 percent reporting nonmedical use of Adderall® in the past year.[1] Doctors prescribe stimulants to treat attention deficit hyperactivity disorder (ADHD), narcolepsy (a sleep disorder), and, occasionally, depression.

When taken as prescribed, these medications help a lot of people. Unfortunately, they are too often abused by being taken in doses and/or in ways other than intended, or by being used by someone for whom they were not prescribed. Prescription stimulants are powerful drugs, and when they are abused there can be serious health consequences, including addiction. Read on to get the facts about prescription stimulants and why abusing them is dangerous.

[1] "Monitoring the Future survey, Overview of Findings 2010," National Institute on Drug Abuse, http://drugabuse.gov/newsroom/10/mtf10overview.html.

What Are Prescription Stimulants?

Prescription stimulants include medications such as methylphenidate (Ritalin® and Concerta®) and amphetamines (Dexedrine® and Adderall®). These medications, which are in the same class of drugs as cocaine and methamphetamine ("meth"), increase alertness, energy, and attention. Like all stimulant drugs, prescription stimulants increase levels of dopamine in the brain. Dopamine is a neurotransmitter associated with pleasure, movement, and attention.

How Do Prescription Stimulants Treat ADHD?

People with ADHD have problems maintaining attention (e.g., fidgeting or trouble concentrating), and may be more hyperactive and impulsive than others of the same age. For teens, this can result in difficulty with completing schoolwork or other tasks. Doctors prescribe stimulants such as Concerta® and Adderall®, sometimes in combination with counseling, to treat these symptoms. These stimulants can have a calming effect on people with ADHD that helps them focus, dramatically improving their ability to stay organized and complete tasks.

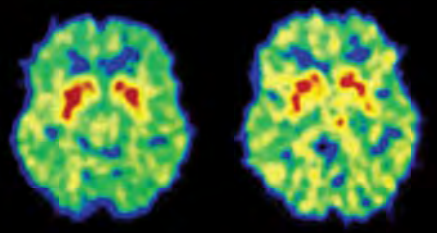
When prescribed, stimulant medications are usually started at a low dose and gradually increased until symptoms subside, or until side effects become problematic. When taken as directed, prescription stimulants produce slow, steady increases of dopamine in the brain. Scientists think that these gradual increases may help to correct abnormal dopamine signaling that may occur in the brains of people with ADHD.

Why Do They Require a Prescription?

Prescription stimulants are strong medications, and their proper use needs a doctor's supervision. The first step is an accurate diagnosis of a physical or mental disorder, such as ADHD, by a qualified doctor. Then, if appropriate, stimulants may be prescribed. A doctor should monitor both the positive and possibly negative effects of the medication to make sure it's treating symptoms as intended.

Prescription Stimulants and Cocaine Act on the Same Parts of the Brain

The two brain scans below show how cocaine and methylphenidate (Ritalin®) both act on the same dopamine sites in the brain. Dopamine is a brain chemical associated with attention and pleasure.



Cocaine Methylphenidate

Note: In this study, both drugs were given intravenously to demonstrate that they affect similar mechanisms in the brain. However, when taken orally, methylphenidate causes a much slower increase in dopamine levels, and does not create the same euphoria experienced with cocaine.

You are abusing prescription stimulants if . . .	Risks
. . . you take them to cram for a test.	Stimulants can help you stay awake, but they can also make you feel jittery, anxious, irritable, and even paranoid. Stimulants may improve certain skills (e.g., focused attention) at the expense of others (e.g., creative thinking). There is no evidence that stimulants improve academic performance in someone who does not have ADHD.
. . . you take them to try to lose weight.	Abusing stimulants can decrease appetite, which can lead to weight loss and malnutrition. Plus, when a person stops taking the stimulants, he or she usually gains the weight back, and sometimes puts on a few more pounds. Thus, stimulants do not provide a long-term weight-loss solution, and chronic use increases the risk of addiction and other health consequences.
. . . you take them to get high.	To get high on stimulants, people may take them in higher doses than prescribed or by routes other than oral (e.g., snorted, smoked, or injected). This practice increases the risk of serious health consequences. High doses can cause blood vessels to narrow, forcing the heart to work harder, and possibly lose its normal rhythm. This could lead to a heart attack or a stroke.

Why Are Prescription Stimulants Abused?

Many teens report abusing prescription stimulants to get high because they mistakenly believe that prescription drugs are a "safer" alternative to illicit drugs. Teens also report abusing prescription stimulants to try to lose weight or increase wakefulness and attention. Some even abuse them to get better grades. Research, however, shows that stimulant abuse is actually linked to poorer academic performance. Why? Because people who abuse stimulants often take other drugs and engage in behavior that puts their academic performance at risk (e.g., skipping classes).

Is Abusing Prescription Stimulants Dangerous?

Yes. In fact, taking prescription stimulants in high doses, or by injection, smoking, or snorting, can affect the brain in ways similar to cocaine or other drugs of abuse (see above right). Prescription stimulant abuse can result in abnormally high levels of dopamine, producing euphoria, an intense feeling of happiness. This increases the risk for abusing again, and ultimately for becoming addicted.

Abusing prescription stimulants can also result in increased blood pressure, heart rate, and body temperature, as well as nausea, headaches, anxiety, psychosis, seizures, stroke, and heart failure. Individuals who chronically abuse prescription stimulants may experience withdrawal symptoms when they stop using them. These symptoms can include fatigue, depression, and disturbed sleep patterns. Although not life threatening, these symptoms often prompt a return to drug use.

Important Resources

- **For more information on drugs, go to http://teens.drugabuse.gov or www.scholastic.com/headsup.**
- **For immediate help with a crisis, call 1–800–273–TALK.**
- **To locate a treatment center, call 1-800-662-HELP or visit http://findtreatment.samhsa.gov.**

Brain scan images from: Arch Gen Psychiatry 1995;52(6):456–463. Copyright © 2011 American Medical Association. All rights reserved.

WEB HUNT:

Myths vs. Facts: Prescription Drugs

There's a lot of information out there about prescription drugs, and it can be tough to distinguish myths from facts. When it comes to drugs and drug abuse, it's important to get the facts from reliable sources. In the Web Hunt below, discover facts about prescription drugs from the scientists at the National Institute on Drug Abuse (NIDA), the leading supporter of research on drug abuse and addiction in the United States.

This handy sheet will help you keep track of the facts you learn about prescription drugs and prescription-drug abuse.

1. Some teens mistakenly believe that abusing prescription drugs is a "safer" alternative to abusing illegal drugs. Why is this myth untrue?

http://headsup.scholastic.com/articles/qanda-on-prescription-drugs/

_____

_____

_____

2. Before writing a prescription for medication, what factors does a doctor evaluate?

http://headsup.scholastic.com/articles/qanda-on-prescription-drugs/

http://headsup.scholastic.com/articles/prescription-pain-medications/

http://headsup.scholastic.com/articles/prescription-stimulants/

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Composite image: magnifying glass, © DNY59/iStockphoto; question mark, © Kulev/iStockphoto; prescription bottles, © Steven Poe/Workbook Stock/Getty Images.

3. Give three examples of how prescription drugs can be abused.

http://headsup.scholastic.com/articles/qanda-on-prescription-drugs/

http://headsup.scholastic.com/articles/prescription-pain-medications/

http://headsup.scholastic.com/articles/prescription-stimulants/

4. Abusing prescription drugs can lead to changes in your brain. In what ways does this happen and how does it put you at risk for addiction?

http://headsup.scholastic.com/articles/straight-talk-on-prescription-drugs/

5. What factors play a role in whether someone becomes addicted to prescription drugs?

http://headsup.scholastic.com/articles/straight-talk-on-prescription-drugs/

6. What type of drugs are opioids and what do they treat?

http://headsup.scholastic.com/articles/prescription-pain-medications/

7. The number of accidental fatal poisonings involving prescription pain relievers has more than tripled since 1999. In addition to overdose, what are some of the other health risks of abusing prescription painkillers?

http://headsup.scholastic.com/articles/prescription-pain-medications/

8. Besides negative health effects, what other adverse effects can result from prescription drug abuse and addiction?

http://headsup.scholastic.com/articles/straight-talk-on-prescription-drugs/

9. What type of drugs are stimulants and how do they affect the brain and body?

http://headsup.scholastic.com/articles/prescription-stimulants/

10. Millions of kids (and adults) safely take prescription stimulants to effectively treat disorders such as ADHD. How do prescription stimulants treat ADHD?

http://headsup.scholastic.com/articles/prescription-stimulants/

11. What are the dangers of abusing prescription stimulants to help cram for a test or to try to lose weight?

http://headsup.scholastic.com/articles/prescription-stimulants/

http://headsup.scholastic.com/articles/straight-talk-on-prescription-drugs/

12. Why can abusing prescription stimulants have effects on the body that are similar to the effects of abusing cocaine?

http://headsup.scholastic.com/articles/prescription-stimulants/

Bonus Questions:

1. What are some of the treatments for addiction to prescription pain medications and to prescription stimulants?

   http://teens.drugabuse.gov/peerx/the-facts/opioids#opioids6

   http://teens.drugabuse.gov/peerx/the-facts/stimulants#stimulants6

2. How can you protect yourself from addiction or other potential negative health effects of abusing prescription drugs?

   http://teens.drugabuse.gov/facts/facts_rx2.php#protect_myself

Resources

Find more facts about prescription drugs at these NIDA sites:

PEERx: Rx Abuse IS Drug Abuse

http://teens.drugabuse.gov/peerx/

Resources and activities to give teens the facts about prescription-drug abuse so they can make smart decisions

NIDA for Teens

http://teens.drugabuse.gov

Facts about drugs and drug abuse, along with games and real-life stories

Heads Up: Real News About Drugs and Your Body

www.scholastic.com/headsup

Developed with NIDA and Scholastic, this series provides the latest scientific news about drugs, drug addiction, and your health.

Compilation 2010–11
Student Editions

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Heads Up: Real News About Drugs and Your Body

Brought to you by Scholastic and the scientists at the National Institute on Drug Abuse, *Heads Up* gives students the facts about the real effects of drugs on the teen brain and body. Check out the lessons and worksheets inside to get the latest news so students can make informed choices about their health and their futures.

Inside:

Straight Talk on Prescription Drugs… page 2

To order additional copies of the accompanying *Heads Up* **Student Edition Compilation** at no charge, call **1-877-643-2644** and refer to **NIH Pub No.: 11-7649** or visit **www.nida.nih.gov/scholastic.html**.

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FROM SCHOLASTIC AND THE SCIENTISTS OF THE NATIONAL INSTITUTE ON DRUG ABUSE, NATIONAL INSTITUTES OF HEALTH, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

STRAIGHT TALK ON PRESCRIPTION DRUGS

Lesson Overview: The student article and this accompanying lesson/student worksheet should be used together to encourage students to ask questions about prescription-drug abuse and apply the facts to discuss why this can be dangerous.

Alignment with National Standards

- *Science (NSES):* Life Science: Regulation and behavior; Science in Personal and Social Perspectives: Personal and community health
- *Life Skills (McREL):* Self-Regulation; Thinking and Reasoning

Student Article

Discussion Questions: Choose from the questions below to guide discussion before and after reading "Straight Talk on Prescription Drugs."

Before-Reading Discussion: Explain to students that the article is based on an interview conducted by a teen reporter. Discuss the following questions:

- Why is it important for teens to ask questions? How might answers to questions from another teen be helpful to you?
- What is a myth? How are myths generated and perpetuated?
- Think of sources where you might go to seek out information about drugs. Are these sources reliable or not?
- Have you heard information about prescription drugs that you think might be a myth? How would you find out if the information is true? What are some safe, reliable sources for answers?

After-Reading Discussion:

- What surprised you most about prescription-drug abuse?
- What effects of prescription drugs were unknown to you?
- Did the article change your opinion about prescription drugs and how they should be used?
- What other questions would you ask Dr. Volkow?

Writing Prompts:

- What do you think are the responsibilities of each of the following groups in combating teen prescription-drug abuse: parents, doctors, teens?
- What actions do you think teens can take to keep themselves safe from prescription-drug abuse?

Student Worksheet

Before-Worksheet Discussion: When you are prescribed a drug by your doctor, what information are you given on how to take the medication? Do you always follow those guidelines exactly?

Worksheet: Have students read the Q&A, and then answer the critical-thinking questions.

After-Worksheet Activity:

- Oral Argument: Have students choose one critical-thinking question and present a persuasive oral argument on the topic.

More Information

- More facts about prescription-drug abuse and addiction can be found at **www.drugabuse.gov/infofacts/PainMed.html**.
- For more frequently asked questions about prescription-drug abuse, visit **http://teens.drugabuse.gov/facts/facts_rx1.php**.
- For additional *Heads Up* articles on prescription drugs and addiction, check out **www.scholastic.com/headsup**.

For printable past and current articles in the **HEADS UP** series, as well as activities and teaching support, go to **www.drugabuse.gov/parent-teacher.html** or **www.scholastic.com/HEADSUP**.

Dear Teacher:

This *Heads Up* installment highlights the unique one-on-one interview I had with a teen reporter on the timely issue of prescription-drug abuse.

Although overall teen drug use continues to decline, levels of prescription-drug abuse remain unacceptably high among teens, according to NIDA's latest *Monitoring the Future* survey. Your students may mistakenly believe that prescription drugs are safer to abuse than illegal ones because a doctor prescribes them. While prescription drugs are beneficial when used properly, teens need to know how powerfully addictive and dangerous these medications can be when abused. They also need to know where they can get reliable, science-based answers to their questions.

My discussion with teen reporter Marie French highlights the risk of addiction to prescription drugs and the negative effects addiction can have on a person's health, family, and friends. The student worksheet contains additional helpful information to answer other questions teens might have regarding prescription medications.

We hope you share this important article and lesson with your students and encourage them to use the facts they learn to make smart choices.

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

In This Installment:

- **Student article:** Q&A with Dr. Nora D. Volkow discussing the dangers of prescription-drug abuse among teens.
- **Student worksheet:** Students apply factual information regarding prescription medications to respond to critical-thinking questions.

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Q & A ON PRESCRIPTION DRUGS

Assignment: You may hear information about prescription drugs in the news, online, or from friends. How do you know what's true? There's a lot to consider, and many teens have questions. Read on for answers to some frequently asked questions from teens.

Q: What exactly is a prescription?
A: A prescription is a doctor's written order that authorizes a pharmacist to supply a specific medication for a patient, with instructions on its use. It says who can take the medication, in what amount, and for what length of time. Used exactly according to a doctor's instructions, prescription drugs are usually safe and effective.

Q: How does a doctor determine the prescription a person needs?
A: A doctor writes a prescription based on a patient's medical history, symptoms, and other factors. The doctor asks questions such as, "Are you allergic to any medications?" and "Are you currently taking any other medicines?" These questions help the doctor decide which medications to prescribe and which ones not to.

Q: Doctors prescribe prescription medications, so how can they be unsafe?
A: Prescription medications are powerful drugs. Doctors and pharmacists each take several steps to keep prescription medications safe for people who need them. Doctors custom fit a prescription to a patient's medical history, age, weight, allergies, and other factors. Pharmacists dispense medication and help patients understand instructions for taking them. Oftentimes, this includes warning labels like: "Take with food" or "Avoid prolonged sunlight" or "Federal law prohibits the transfer of this drug to any person other than the patient for whom it was prescribed." When a friend gives you a prescription—whether it's to cure a sore throat or to get you high—there can be serious health consequences because the medication is tailored to your friend's needs, not yours.

Q: When is someone *abusing* prescription drugs?
A: Prescription-drug abuse is when someone takes a medication that was prescribed for someone else or purposely takes his or her own medication in a manner or dosage other than what was prescribed. Abuse can include taking a friend's or a relative's prescription to get high, to help you study, to lose weight, to build up muscle, or to treat pain. Even over-the-counter medications can be abused when not taken as directed.

Q: Are prescription drugs safer than illegal drugs such as cocaine?
A: Abusers of prescription medications may mistakenly believe that because the drugs come from a pharmacy and not from a drug dealer they are safer to take, even at high doses or without a prescription. The fact is that if someone takes prescription medications in a manner that is not as a doctor intended, he or she could face serious health risks—and for certain medications those risks could be addiction and death. Also, abusing prescription drugs—including sharing prescriptions with friends—is illegal.

Q: How can prescription drugs cause death?
A: Opiates, such as Vicodin® and OxyContin®, can depress respiration [slow down a person's breathing] or stop it altogether. They can shut down the part of your brain that tells you to breathe. That's how people die from an overdose. Mixing certain prescription drugs, and even over-the-counter medicines, with alcohol is especially dangerous. If both substances depress respiration, they may amplify each other's effects when taken together—meaning the risk of serious harm or death becomes much greater than when either one is taken alone.

CRITICAL-THINKING QUESTIONS

Answer the following questions on a separate piece of paper or discuss in a group.

1. Why is it important to tell your doctor about any medical conditions you have and all the medications you take, including prescription drugs, over-the-counter medicines, and dietary supplements?
2. What would you say to someone who asked you for pills that were prescribed only for you?
3. At a party a friend offers you alcohol and a pill. What would you do, and why?
4. Explain why the following statement is a myth: Prescription drugs come from a doctor and a pharmacy, so they must be safe.
5. Explain why the following statement is a myth: It's OK for me to use a prescription from the medicine cabinet that was prescribed for someone else in my family.

Dear Teacher:

This latest *Heads Up* installment focuses on prescription pain medications—what they are, how they work, and why they can be dangerous to abuse.

According to the *Monitoring the Future* survey, prescription pain medicines are among the most commonly abused drugs by teens after tobacco, alcohol, and marijuana. In fact, in 2009, 9.7 percent of 12th-graders reported nonmedical use of Vicodin®.

One reason that teens may be abusing prescription medications is misperceptions about their safety. Since doctors prescribe prescription painkillers, teens may assume they are safer than "street" drugs. This edition's student article and lesson will help to dispel this myth by giving facts about prescription painkillers and how abuse can lead to addiction and other serious adverse health effects.

I urge you to share this important article with your students.

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

In This Installment:

- **Student article:** Facts about how prescription pain medications affect the body and why abusing them is dangerous
- **Student worksheet:** A quiz to reinforce key facts and concepts presented in the student article

PRESCRIPTION PAIN MEDICATIONS

Overview: The lesson below and reproducible worksheet on the reverse side reinforce comprehension of facts and concepts in the student article "Prescription Pain Medications."

Alignment With National Standards

- *Science (NSES):* Life Science: Structure and Function in Living Systems; Science in Personal and Social Perspectives: Personal and Community Health
- *Life Skills (McREL):* Self-Regulation; Thinking and Reasoning

Student Article

Before-Reading Questions:

- What do you know about the difference between pain medicine you might take for a headache and prescription pain medicine?
- Why do you think pain medications such as Vicodin® and OxyContin® require a prescription?

After-Reading Questions (factual responses in *italics*):

- How do opioid medications help control severe pain? *(They mimic the body's natural pain-relieving chemicals but they're more powerful and longer lasting.)*
- What factors does a doctor consider when writing a prescription? *(A patient's other medical conditions or medications; drug-use history; whether an opioid pain reliever will safely and effectively treat the pain, etc.)*
- In what ways are prescription medications most often abused? *(Taking someone else's medicine; taking a medicine to get high; taking a different dosage, etc.)*
- Why is it dangerous to abuse prescription pain medications? *(Abuse has serious health risks, including adverse interactions with other medicines, overdose, and addiction.)*

Critical Thinking:

- If a pain medication prescribed to your friend is safe for him to use, why would it be unsafe for you to take?
- What would you say to a friend who tells you that abusing prescription painkillers is a "safer" way to get high?

Student Worksheet

Use the quiz to reinforce comprehension of facts about prescription pain medications. Answers: 1. A; 2. B; 3. B; 4. A; 5. B; 6. B; 7. D; 8. E; 9. D; 10. C; 11. D

Writing Extensions:

1) *Research/Essay assignment:* Research true stories of celebrities or athletes who abused and/or became addicted to prescription painkillers. Drawing upon facts about abuse and addiction, write an essay commenting on the person's story.
2) *Creative writing:* Write a story, poem, or play that depicts facts about prescription drug abuse and addiction. Outline why your main character starts taking a prescription medication, how he or she abuses the medicine, its effects on the body, signs of addiction, and how he or she gets help.

More Information

- For more facts about prescription-drug abuse, visit **http://teens.drugabuse.gov/peerx/**.
- For more facts about drugs, drug abuse, and addiction, visit **http://teens.drugabuse.gov** and **www.drugabuse.gov**.

For printable past and current articles in the **HEADS UP** series, as well as activities and teaching support, go to **www.drugabuse.gov/parent-teacher.html** or **www.scholastic.com/HEADSUP**.

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Name _____ Date _____

What Do You Know About Prescription Pain Medications?

Answer the questions below to find out what you learned about prescription pain medications.

1. Opioid medications relieve pain by mimicking the body's natural pain-relieving chemicals.

Ⓐ **True** Ⓑ **False**

2. Opioids require a prescription because they are expensive.

Ⓐ **True** Ⓑ **False**

3. Prescription drugs are safer to abuse than illegal "street" drugs because a doctor prescribes them.

Ⓐ **True** Ⓑ **False**

4. Taking opioid medications by methods other than how they are prescribed can lead to their reaching the brain very rapidly, increasing the risk of addiction and overdose.

Ⓐ **True** Ⓑ **False**

5. Prescription painkillers include medications from a class of drugs called:

Ⓐ **stimulants**
Ⓑ **opioids**
Ⓒ **inhalants**
Ⓓ **steroids**

6. The body's natural opioid system includes special receptors called opioid receptors, which bind natural pain-relieving chemicals as well as prescription opioids. Which of the following is NOT a part of the body where opioid receptors are found?

Ⓐ **brain**
Ⓑ **hair**
Ⓒ **spinal cord**
Ⓓ **all of the above**

7. Before writing a prescription for pain medication, a doctor first evaluates:

Ⓐ **any medical conditions you have**
Ⓑ **any past drug use**
Ⓒ **other medications you are taking**
Ⓓ **all of the above**

8. Opioids include the following drugs:

Ⓐ **Vicodin®**
Ⓑ **Advil®**
Ⓒ **OxyContin®**
Ⓓ **A and B**
Ⓔ **A and C**

9. Which of the following can be an adverse effect of opioids?

Ⓐ **nausea**
Ⓑ **constipation**
Ⓒ **overdose**
Ⓓ **all of the above**

10. Which of the following is NOT an example of abusing prescription painkillers?

Ⓐ **Taking a drug prescribed for you in higher doses than directed**
Ⓑ **Taking a drug with a friend to get high**
Ⓒ **Taking a drug prescribed for you according to instructions from your doctor**
Ⓓ **Taking a drug that was prescribed for your friend**

11. A doctor monitors safe use of prescription medications by:

Ⓐ **giving you warning signs of a bad reaction to look out for**
Ⓑ **telling you what other drugs you cannot take at the same time as the medication**
Ⓒ **giving you instructions on how to safely take the medication**
Ⓓ **all of the above**

Image: diamond-shaped road sign, © Alex Slobodkin/iStockphoto.

Dear Teacher:

The final installment of this year's *Heads Up* series focuses on prescription stimulants and why abusing them is dangerous.

When taken as prescribed by a doctor, prescription stimulants can safely and effectively treat disorders such as ADHD, improving the lives of millions of kids (and adults). But teens are also abusing these drugs. For example, Adderall® is one of the drugs most frequently abused by high school seniors, with 6.5 percent of them reporting nonmedical use in the past year.

By sharing this article with your students, you will help them to learn how these medications work, and why it is dangerous for them to take these drugs to get high, lose weight, or stay awake to study.

I encourage you to use the article and the exercises to help your students understand the dangers of prescription drug abuse.

Sincerely,

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

In This Installment:

- **Student article:** Facts about prescription stimulants, how they can safely treat ADHD, and why abusing them is dangerous
- **Student worksheet:** A quiz to reinforce key facts and concepts presented in the student article

PRESCRIPTION STIMULANTS

Overview: The lesson below and the reproducible worksheet on the reverse side reinforce student comprehension of key facts and concepts in the article "Prescription Stimulants."

Alignment With National Standards

- *Science (NSES):* Life Science: Structure and Function in Living Systems; Science in Personal and Social Perspectives: Personal and Community Health
- *Life Skills (McREL):* Self-Regulation; Thinking and Reasoning

Student Article

Before-Reading Questions:

- You may have ADHD, know someone with ADHD, or have learned about it in the news. What does ADHD stand for? What do you know about ADHD?
- What do you know about prescription stimulants such as Adderall® or Concerta®? What are some of the ways in which stimulants are used?

After-Reading Questions (factual responses in *italics*):

- How do prescription stimulants help to treat symptoms of ADHD? *(They have a calming effect that helps people with ADHD focus; doctors prescribe a dosage that is sufficient to decrease ADHD symptoms.)*
- Why can abusing prescription stimulants be just as dangerous as abusing an illicit drug like cocaine? *(Both prescription stimulants and cocaine increase levels of dopamine in the brain. However, when prescription stimulants are taken in high doses, or in ways that get the drug to the brain quickly (e.g., snorting, smoking, or injecting), they can produce abnormally high levels of dopamine in the brain, resulting in intense feelings of euphoria. This increases the risk of repeated use and also addiction.)*

Critical Thinking:

- Behavioral therapies can help treat people with prescription stimulant addiction. Considering this and other facts in the article, what do you think the center illustration in the article represents? Why do you think the artist included a single leaf on the tree on the abuse side?
- Imagine your friend is taking prescription stimulants to lose weight or because he or she believes it helps with studying. What are some facts you might share with your friend to explain why this behavior is risky?

Student Worksheet

Use the quiz to reinforce comprehension of facts about prescription stimulants in the student article. Answers: 1. A; 2. A; 3. B; 4. E; 5. C; 6. C; 7. B; 8. A; 9. D; 10. D

Poster Activity

Have students create a poster that shows facts about prescription stimulants and the health risks associated with abusing them. The poster should include a headline, images, and facts from the student article or additional independent research. Have students present their posters to the class.

More Information

- For more facts about prescription-drug abuse, visit **http://teens.drugabuse.gov/peerx/**.
- For more facts about drugs, drug abuse, and addiction, visit **http://teens.drugabuse.gov** and **www.drugabuse.gov**.

For printable past and current articles in the **HEADS UP** series, as well as activities and teaching support, go to **www.drugabuse.gov/parent-teacher.html** or **www.scholastic.com/headsup/teachers**.

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Name _____ Date _____

What Do You Know About Prescription Stimulants?

Answer the questions below to find out what you learned about prescription stimulants.

1. Prescription stimulants and cocaine are from the same class of drugs.

Ⓐ **True**

Ⓑ **False**

2. Many people use prescription stimulants to safely and effectively treat ADHD, narcolepsy, and sometimes depression.

Ⓐ **True**

Ⓑ **False**

3. Using someone else's prescription stimulants to help you study for a test is not drug abuse.

Ⓐ **True**

Ⓑ **False**

4. Which of the following is a prescription stimulant?

Ⓐ **dopamine**

Ⓑ **methylphenidate**

Ⓒ **amphetamine**

Ⓓ **A and B**

Ⓔ **B and C**

5. According to the 2010 *Monitoring the Future* survey, what percent of high school seniors have reported nonmedical use of Adderall® in the past year?

Ⓐ **22.6 percent**

Ⓑ **85 percent**

Ⓒ **6.5 percent**

Ⓓ **1 percent**

6. Which of the following is NOT an effect of stimulants on the body?

Ⓐ **increased energy**

Ⓑ **increased alertness**

Ⓒ **increased appetite**

Ⓓ **increased attention**

7. Prescription stimulants are prescribed to treat ADHD because they:

Ⓐ **can decrease appetite so that people with ADHD can lose weight.**

Ⓑ **can have a calming effect on people with ADHD that helps them focus.**

Ⓒ **can help with feelings of anxiety, irritability, and paranoia.**

Ⓓ **all of the above**

8. Which of the following is NOT an example of abusing prescription stimulants?

Ⓐ **taking a prescription stimulant per doctor's orders**

Ⓑ **taking a prescription stimulant not prescribed to you to help you lose weight**

Ⓒ **taking a prescription stimulant that was prescribed for your friend**

Ⓓ **taking a prescription stimulant to get high**

9. Taking high doses of prescription stimulants can result in _____.

Ⓐ **a stroke**

Ⓑ **death**

Ⓒ **a heart attack**

Ⓓ **all of the above**

10. People who repeatedly abuse prescription stimulants may experience withdrawal symptoms when they stop using them, including:

Ⓐ **depression.**

Ⓑ **disturbed sleep patterns.**

Ⓒ **fatigue.**

Ⓓ **all of the above**

Compilation 2010–11
Teacher Editions

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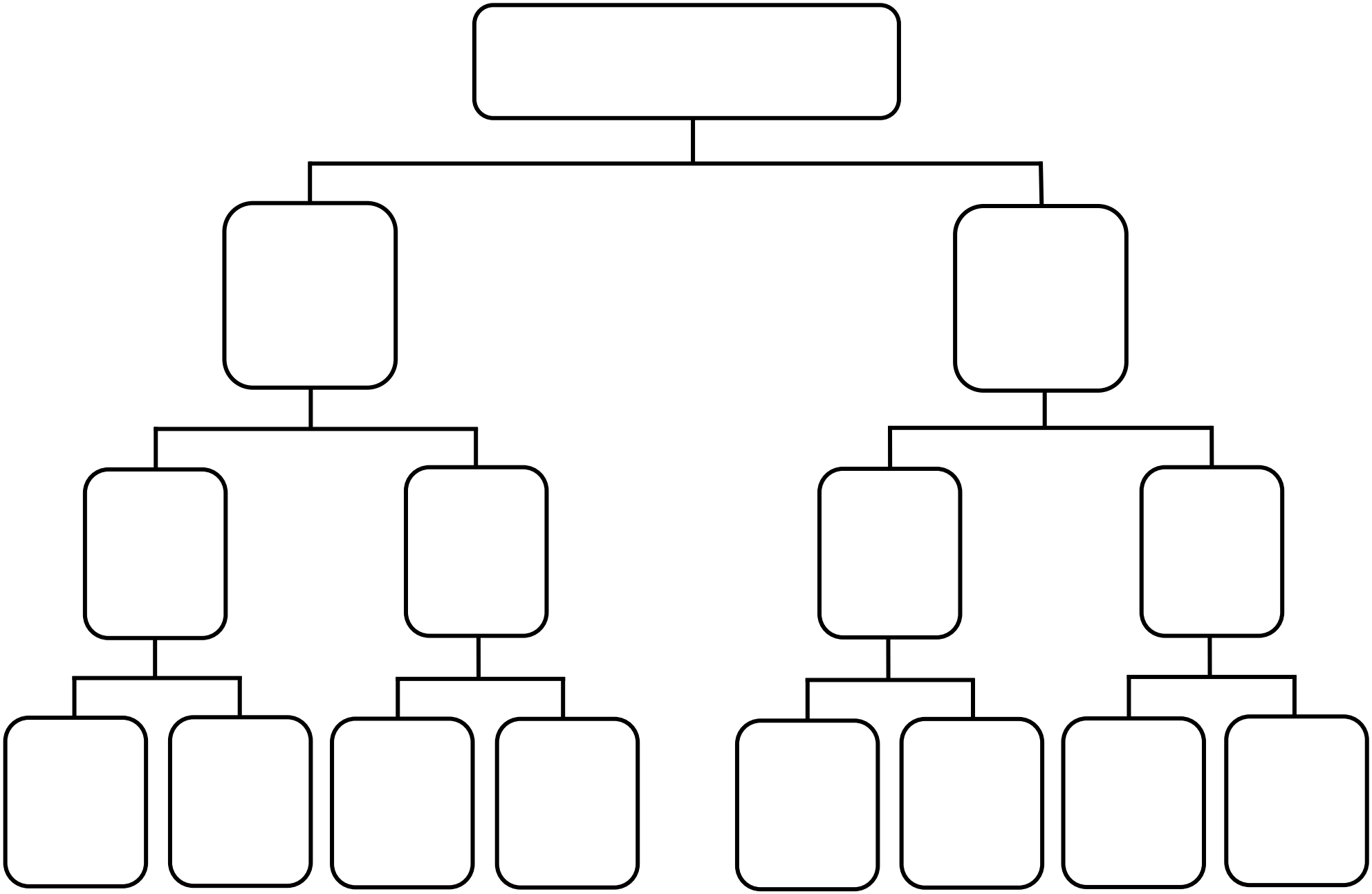
PRESCRIPTION DRUGS

When used as prescribed, prescription drugs are safe medications that help millions of people. But abusing them has many health risks, including addiction and overdose.

NIDA NATIONAL INSTITUTE ON DRUG ABUSE
National Institutes of Health
U.S. Department of Health and Human Services

drugabuse.gov

For more information or to order free copies of this Prescription Drugs poster, visit drugabuse.gov (click on the publications tab) or call 1-877-643-2644 and refer to Order Number: AVD222.



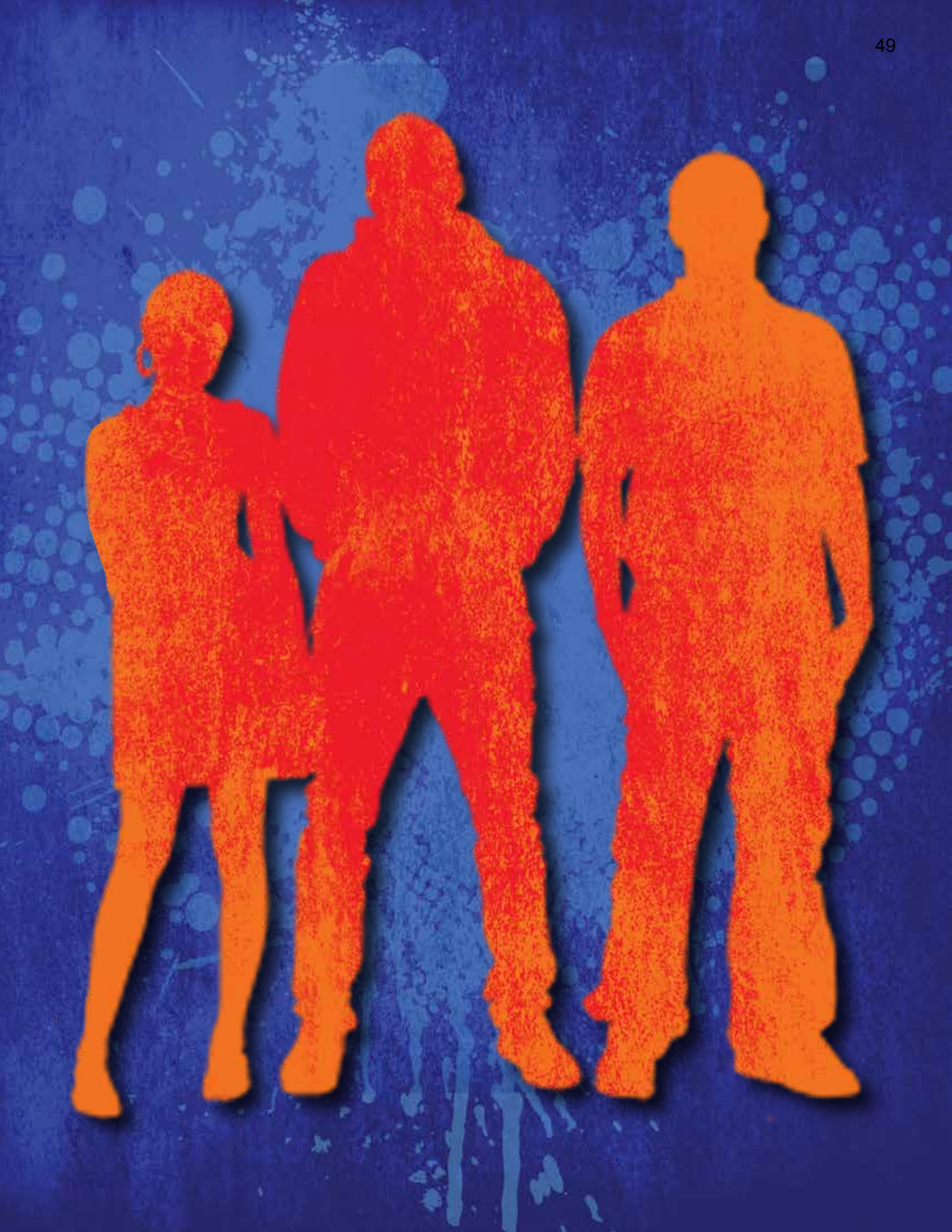
PEERx ACTIVITY GUIDE

Spread the word about prescription drug abuse

Creative ideas and step-by-step instructions empowering teens to educate their peers about the dangers of prescription drug abuse

NIDA NATIONAL INSTITUTE ON DRUG ABUSE
National Institutes of Health
U.S. Department of Health and Human Services

PEERx SHARE A DOSE OF REALITY: PRESCRIPTION DRUG ABUSE IS DRUG ABUSE.
www.teens.drugabuse.gov/peerx



PEERx is an online initiative developed by the National Institute on Drug Abuse to educate teens in 8th to 10th grades on the dangers of prescription drug abuse. Visit **www.teens.drugabuse.gov/peerx** to find unique ideas for engaging teens in the facts and encouraging them to "Share a dose of reality: Prescription drug abuse **IS** drug abuse." Students can:

- **Confront real-life choices** and call the shots in Choose Your Path, an interactive video activity that lets them assume the role of the main character and watch their decisions play out onscreen.
- **Get the facts** about different classes of prescription drugs that are frequently abused.
- **Download** free, colorful images to spread the message via t-shirts, stickers, and wallpaper.
- **Use the step-by-step instructions** in this Activity Guide to lead their peers in fun, educational activities.

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Wear the message.

"Wearing the message" is a super creative, fun, and simple way to raise awareness about the dangers of prescription drug abuse within your school and community. Get creative and develop your own messages and images to put on a t-shirt. Or keep it simple and use NIDA's PEERx downloadable images to spread the word. However you choose to do it, make sure it's unique and includes the message.

Here's what you'll need:

- **T-shirts.** Get some plain white or pale-colored t-shirts to use as your base.
- **Printer.**
- **Inkjet iron-on transfer paper** (available at your local craft or office supply store). Choose opaque transfer paper for dark-colored items and transparent transfer paper for light-colored items. Transparent transfer paper may help you avoid white outlines around your artwork. Always read the instructions that come with the transfer paper.
- **Iron.** If you are using the downloadables from the PEERx Web site, you will need to print your downloadable onto inkjet iron-on transfer paper so that you can easily transfer the image to your shirt.
- **Art supplies.** If you plan on creating your own artwork or writing your own messages about prescription drug abuse on your shirt, you will need supplies such as fabric paint, glue, patches, glitter, or fabric markers. Get as creative as you want!
- **Designs.** You can make your own designs, or use the downloadable designs from the PEERx Web site: **www.teens.drugabuse.gov/peerx/downloads.**

Here's how to do it:

- **Ask** your school's art department for extra plain t-shirts and other supplies to donate to help you create your t-shirts. If the art department is willing to help, make this a group activity. Set up a table during lunch or after school. Display the supplies and printed downloads from the PEERx Web site on a table so everyone can see them and feels invited to get involved. Entice your friends and classmates to join in on the fun and create a cool t-shirt with a message, a new image, or both about preventing prescription drug abuse.
- **If you are using the downloadables** from the PEERx Web site, you'll need to print your downloadable onto inkjet iron-on transfer paper. Use an inkjet printer to print your downloaded artwork onto the transfer paper. The artwork on the PEERx site comes in two forms: a flipped (backward) mirror image of the design and a regular (non-flipped) image.
- **Once you print** the image onto the paper, use an iron to transfer the image to the shirt. Have an adult supervise you.
- **Host a t-shirt campaign.** Have everyone who makes a shirt wear it on the same day for a successful t-shirt campaign. This way, all of you will spread a very powerful drug prevention message. There is always power in numbers!

Hold a school assembly.

There's no better way to spread the word throughout your school about the dangers of prescription drug abuse than to hold an assembly that everyone can attend. Here, your peers, teachers, and administrators can come together to voice their concerns about prescription drug abuse and address what steps the school can take as a whole to prevent it.

Here's what you'll need:

- **Friends** and fellow classmates
- **A great location**
- **Banners,** posters, or flyers to advertise the assembly to your school

Here's how to do it:

- **Gather a group** of friends and classmates who feel as passionately as you do about spreading the word on prescription drug abuse prevention.
- **Recruit** a drug abuse prevention expert to speak. Perhaps he or she can bring someone who has beaten an addiction to prescription drugs to discuss it firsthand.
- **Talk** to your teachers or school administrators about securing a space where you can hold your assembly. Make sure the size is appropriate: if you are holding an assembly for the whole school, ask about using the auditorium or gym. If your assembly is for smaller classes, a classroom should work great. Discuss an appropriate time and date during which to hold the assembly.
- **Confirm** the date, time, and place in writing with your guest speakers. Make sure they can be there!
- **Work** with your teachers to spread the word about this important assembly. If you can, talk to your school principal about making this a mandatory assembly for all students. Write a blurb for the school newsletter, or write something for someone to read during the morning announcements.
- **Make sure** that your advertisements are eye-grabbing by including attractive colors, images, interesting taglines, and more. Don't forget to include information about the assembly: who, what, when, where, why, and how.
- **Arrange** for someone to videotape the event if possible. Post the video on YouTube and link it to your school's Web site. Email the video to peerx@iqsolutions.com for it to be considered as a feature on the Sara Bellum Blog!

Predict the future.

Have you ever tried to predict the future? Making a paper fortuneteller is a cool and interactive way to predict the possible side effects of abusing prescription drugs. Have your friends choose a drug, and write the drug names on the outside of the fortuneteller. Write the explanation of the drug's effects on the inside. Although it's not really predicting the future, you'll be able to share and predict what happens after using certain drugs. Print the helpful template from the Web site below, and use it to construct your own fortuneteller. This activity is fun and really simple!

Here's what you'll need:

- **Fortuneteller** template **(http://teens.drugabuse.gov/peerx/pdf/PEERx_Toolkit_Fortuneteller.pdf)**
- **Printer**
- **Paper**
- **Friends** to participate

Here's how to do it:

- **Print out** the fortuneteller template from the PEERx Web site onto a sheet of plain white paper.
- **Fold** the template based on the directions (lines indicated on the paper) found on the template to make the shape of the fortuneteller.
- **Gather a group** of friends, and take turns doing the activity for each other. Pass the fortuneteller around until everyone has gotten a chance to see the outcomes of the choices they make.

Write a radio PSA.

Public service announcements (PSAs) are perfect for sharing health information that benefits the general public. PSAs inform people about important issues, such as getting a flu shot before flu season begins. They can also warn people about something that can harm them, such as the dangers of texting while driving.

Because PSAs are unpaid messages delivered over the public airways, the Federal Communications Commission (as well as individual radio stations) determines guidelines on the content, subject, and length of PSAs. Groups that are selling their service must pay to place ads on the radio or television, whereas groups that are sharing information for the public good usually can take advantage of free PSAs.

Most PSAs are limited to 30 or 60 seconds and can air only for a specified period of time. The sponsoring organization has little or no control over when PSAs are aired. Usually, they fill slots in the schedule when the station has no paid advertisements. Because they are so brief, PSAs must be written succinctly; include the facts such as who, what, where, when, why, and how; and use words that grab the listeners' attention.

Here's what you'll need:

- **Pen** and paper or a computer
- **A watch** or clock with a timer
- **The radio station's PSA guidelines**—the PSA lengths accepted and the name and contact information for the station's public service director

Here's how to do it:

- **Contact** the public service director at any local station(s) where you think the PSA will reach the best demographic for your message. For example, if you are trying to reach teens, consider a station that plays dance, hip hop, alternative, or pop music. If you are trying to reach parents, you might consider a soft rock, soft jazz, or news station. Request information from each station about specific requirements, guidelines for length and format, and any restrictions. Make certain that the stations will accept a script for a PSA rather than a spot digitally recorded in a professional sound studio. Request a sample PSA that you can listen to, so you can become familiar with the style.
- **Write down the key points** that your PSA must convey and how many seconds you have to convey them. Be sure to cover who, what, when, where, why, and how.
- **Think** about how you will grab the audience's attention at the beginning of the PSA. Will you pose a rhetorical question, state a hard-hitting statistic, or use a funny statement?
- **Write** the rest of the PSA script to explain briefly the key information and hold listeners' attention.
- **Time yourself** reading the PSA aloud at a slow pace, as a radio announcer would do. If the spot is too long, rewrite it until it matches the PSA length required by the radio station.

- **Type the final spot** in all capital letters, double-spaced. Boldface or underline anything that needs to be emphasized by the radio announcer.
- **Make sure** you title the PSA and note its length. Be sure to provide your name and contact information so the public service director can reach you to discuss any changes.
- **Proofread** the PSA for any errors. Check all phone numbers and Web addresses carefully to make absolutely certain they correctly lead listeners to your organization!
- **Send** the final PSA to the public service director of each radio station. Provide a cover letter with some background information about your organization and the overall issue of prescription drug abuse (check out our fact sheets at **www.teens.drugabuse.gov/peerx/the-facts** for statistics you can include) so the station understands who is sending the spot and why it is important to air it.
- **If you don't hear back** from the public service director within a few business days of sending the PSA, follow up by phone or email to inquire whether the station will use your spot.

Host a "Relieve the Stress Fest!"

Most students get a little stressed out from time to time—for example, in September when you're getting into the swing of a new school year, when midterms and final exams are approaching, and during report card time. To help your peers relieve their stress in a healthy way, host a "Relieve the Stress Fest" at school. Administrators, teachers, and even other students can demonstrate a variety of simple stress reduction techniques that help keep teens off drugs. Use the techniques you learn to relieve your stress instead of engaging in risky behaviors.

Students can take the stress relief techniques that they learn and apply them during stressful periods throughout the year, and for the rest of their lives. Teachers and administrators should be encouraged to participate as well. Everyone should get in on the fun! Not only will they serve as examples, but getting everyone involved will help build a sense of community. The best part is that most of the stress-relieving activities proposed for a "Relieve the Stress Fest" require only a small effort and a few resources that your school should already have on hand!

Here's what you'll need:

- **A large room.** A gymnasium, cafeteria, or a large classroom will work for your stress-relieving events!
- **Yoga mats or regular exercise mats.** You just need something to put between you and the floor. You will probably find mats in your school's gym supplies area, or you can ask a local gym or exercise studio if you can borrow their mats temporarily.
- **Music and music player.** Don't forget the speakers so everyone can hear! You might need to get approval on the music list from a school administrator before the event. Remember, yoga music should be calming and relaxing, and aerobics music should have a strong beat that makes people want to get up and move!
- **Volunteer instructors.** As an alternative, use TVs, DVD players, and workout DVDs.
- **Sports activities.** Offer sports activities, along with the appropriate equipment, for those who prefer not to do group exercise.
- **Poster board and markers.** Don't forget to advertise your "Relieve the Stress Fest" in the weeks leading up to it. Create posters with encouraging messages about eating well and getting enough sleep, and place them throughout the school.

Here's how to do it:

- **Contact** your principal and see if the activity you choose can be done for your entire grade. Don't forget to ask which date and time work best. Make sure you have your school principal's full approval before you announce the event or make any arrangements.
- **If you are able to do the activity** at your school, check with the facilities administrator or gym teachers to see when the gym is available for use.
- **If your grade has a lot of students,** you may have to divide groups by homeroom and offer different activities at different times or even on different days.

- **Once you know** when and where you will host your "Relieve the Stress Fest," visit your local gym or exercise studio and ask to speak with the manager or group exercise manager and ask if they know of an instructor who may be available to volunteer to showcase a few classes and techniques for a great cause. It benefits the gym or exercise studio, which could expand its client base with potential new members!
- **Check with your peers** and even teachers who may want to get involved. If you have more than one classroom available for your activities, you can set up stations and have students rotate from room to room at designated times. Consider breaking your event into a 2-hour block of time, with stations that students can go to every half-hour so that each student can visit many stations. One could teach meditation techniques, another could be a yoga lesson, and another might teach a short hip-hop dance routine.
- **Find a CD** or online radio station that plays relaxing music (be sure to get approval from your school administrator). Have everyone find a space on the mats you've provided, and share some relaxation tips and breathing techniques. You can find a variety of these pointers online. Teach students to meditate for a few minutes each day.
- **After everyone is relaxed,** introduce yoga as a fun way to stay flexible and reduce stress. If you can't find a yoga instructor to volunteer, check out a DVD from your school or local library (make sure you have a DVD player and a compatible TV with good speakers).
- **Dance parties** are a fun way to reduce stress and get a great workout. Tune the radio to your favorite station and freestyle it, or find a dance DVD that students can follow. Teach students that it's a great way to squeeze in exercise, reduce stress, and have fun at the same time.
- **Set up** a bunch of different sports in your gym or on the sports fields outside, and encourage your peers to try each activity to see which they like best. Sports can include dodgeball, kickball, four square, jumping rope, basketball, volleyball, or whatever you'd like!
- **Talk** to your teachers and administrators about encouraging afterschool recreational sports that all students can play. This is a great way to reduce stress and have fun with friends.
- **A small, but informative poster campaign** can be an effective way to help give your peers tips on how they can reduce stress. Plan to make these posters in the weeks leading up to your "Relieve the Stress Fest."
- **Make some posters** to advertise the big event as well. Convey three things that can help manage stress: developing organizational skills, having good study habits, and maintaining proper eating habits. A poster should be dedicated to each one of these areas and should include helpful tips for maintaining these skills. Younger students may need help with juggling homework and playtime, while older students may need the tools to develop essential skills to prepare for tests. Also include a poster about keeping your brain healthy and staying off drugs. You can find lots of science-based information on this topic at **www.teens.drugabuse.gov.** Check out the PEERx section of this site for information about prescription drug abuse, and consider making a poster about this topic, too.
- **Make sure** you have the support of teachers and administrators, including guidance counselors who deal daily with mental, emotional, and physical health.
- **Arrange** for some photographers from your school's yearbook committee to cover your event for the yearbook.

Create a classroom CSI.

Ever seen "CSI: Crime Scene Investigation" or one of the many awesome detective shows on TV? Not only are they fun to watch, but creating your own crime scene investigation is a great way to learn about the dangers of prescription drug abuse. The objective is to work your way backward through a story that you create with your peers or teachers, so that you and your friends can use the facts to figure out what happened. In working to solve the case, you will investigate all the possible factors that may have led up to the "crime scene." You and your peers can use this chance to talk openly about which drugs may be in the victim's system, why, and what other factors may have served as a motivation to abuse prescription drugs.

Here's what you'll need:

- **Creativity!**
- **A teacher's help**
- **Researchers** to develop the clues and writers and a computer to draft the story and plan the scenario
- **An actor** to play the teen victim
- **An actor** to play the doctor or forensic scientist
- **Actors** to play the teen's parents
- **Actors** to play the teen's friends
- **Investigators or detectives** to examine the "crime scene" and figure out the victim's cause of death
- **Props**
- **A camera** and someone who will capture the event on film

Here's how to do it:

- **Ask your teacher** to host this event and make it a learning experience for you and your peers about the dangers of prescription drug abuse.
- **Designate actors,** researchers, investigators, and writers, and assign the necessary roles. Everyone can play a part.
- **Ask the writers** to create a crime scene scenario. They should think of a real-life scenario to which you and your friends can relate. Share the script or story with a few other people so they can help keep the discussion going. When they write the script for your story, the writers should consider the following:
  - ♦ **The plot.** We recommend starting it off with the story of a young person who dies or winds up in the hospital emergency room as a result of prescription drug abuse.
  - ♦ **Clues.** Start asking your peers to think about what substance could have caused this teen's death or health condition. Then, determine what clues could help the investigators identify the substance of abuse. Have your designated researchers explore the facts about the substance you choose to feature in your scenario, and make the side effects and consequences as realistic as possible. Check out the PEERx Web site **(www.teens.drugabuse.gov/peerx)** for facts about prescription drug abuse and side effects of commonly abused drugs.

- ♦ **Details.** How did the victim come into possession of the drugs? Why did he or she do it? What factors influenced his or her choices? How could this have been avoided?
- ♦ **Lesson.** Ask everyone to discuss what they've learned. What are the risks of using the drug you chose to include in the story? What can cause teens to use this drug? How can they say no when offered drugs?

- **Give out some resources** so your friends and peers can learn more about the dangers of prescription drug abuse. Refer them to the PEERx Web site **(www.teens.drugabuse.gov/peerx)** or the Sara Bellum Blog **(www.teens.drugabuse.gov/blog)** to get their questions answered, read about drugs in the news, and learn more about drug abuse prevention. Do a read-through. You and a few of your peers can create a script, reading certain sections at a time and guiding the discussion.
- **After** you do a dry run in your classroom, invite others from your school to come to your "crime scene" and solve the crime.
- **After each scene,** ask others to discuss what just happened and how the disastrous outcome of the featured scene could have been prevented. As your classmates get closer to figuring it out, act out the next scene and provide more clues.
- **Students should discuss** openly what may have happened to this person, and how he or she could have died. If students need more from a particular clue, the victim can speak to offer information about that clue, offering helpful hints that could lead to the next clue or help solve the mystery.
- **Can't think of a scenario?** Here are a few ideas to get you started:
  - ♦ **Start at the end.** A teen is in the hospital as a result of prescription drug abuse. Work backward to find out what drug the person took and whether he or she mixed it with other drugs or alcohol or took an excessive dose of prescription medications. Don't forget to include where he or she got the drugs.
  - ♦ **Show an older teen** who now lives at home, is no longer in school, and doesn't have a job. Work backwards to reveal that, although the teen meant only to try the drug a few times with other friends, his or her friends all stopped using and moved on with their lives, while this person continued to abuse the prescription drug for the "high" and became addicted. What are the consequences for this person's actions? You decide. Focus on what this teen has missed as a result of this addiction.

Participate in Drug Facts Chat Day.

NIDA's Drug Facts Chat Day takes place during National Drug Facts Week. During Chat Day, students can log onto any computer at their school and ask some of our Nation's experts about illicit drug use and prescription drug abuse, a big problem among teens in the United States.

Your school must register and obtain a user code to participate. This is a unique, interactive, and fun opportunity to ask experts anything you want about drug use and abuse. All questions are welcomed!

Here's what you'll need:

- **Ask a teacher** or administrator if your school has already registered for Chat Day. If your school hasn't registered, let the teacher or administrator know that Chat Day is a great opportunity for students to learn more about the science behind drug abuse and addiction, and show the teacher or administrator the Chat Day Web site **(www.drugfactsweek.drugabuse.gov/chat)** to learn more. If your school is not able to register, you can still watch the live Chat Day discussion on the NIDA Web site.
- **Reserve a computer lab,** or use the school's library or media center. This is a great event for you and your peers in science, health, and gym classes—any class that addresses health education. Each student can log into a computer and watch the live chat, or students can gather around their teacher's computer and ask questions as a group.

Here's how to do it:

- **Brainstorm** and discuss. Sit down with your friends or classmates before the chat to think of questions you want to ask NIDA scientists.
- **Make sure** that you take advantage of the resources you have so that you can ask NIDA scientists a thoughtful question.
- **Check out the Sara Bellum Blog (www.teens.drugabuse.gov/blog).** Written just for teens, this blog connects you with the latest scientific research and news.
- **Check out *Drugs, Brains, and Behavior: The Science of Addiction* (www.drugabuse.gov.scienceof addiction).** This 30-page full-color booklet explains the science behind drug abuse and addiction in a way that everyone can understand.
- **Check out *Heads Up: Real News About Drugs and Your Body* (http://headsup.scholastic.com).** These science-based facts and lesson plans from Scholastic and NIDA address the effects drugs have on the teen brain and body.
- **During the chat, type your question** into the chat box, and have scientists answer it in real time. If your questions aren't answered during the chat, check back later to read the Chat Day transcript and see if your questions have been answered. Check out the transcript from Chat Day 2011 at **www.drugfactsweek.drugabuse.gov/chat/2011.**
- **Spread the word!** Let your friends, peers, and teachers know about Chat Day, and encourage them to get involved.
- **After the chat, hold a discussion** with your peers based on the answers received and talk about what you have learned.

Hold an artwork contest or poster campaign.

Show off your creative skills! Hold an artwork contest or poster campaign where you, your friends, and your peers create illustrations to showcase what you've learned about prescription drug abuse. Start by researching the effects of different types of drugs such as OxyContin, Vicodin, Adderall, Ritalin, Xanax, and Valium. Create a painting, drawing, poster, sculpture, or whatever creative medium you like best to illustrate what you have discovered. You might want to focus on the behavioral or physical effects that prescription drug abuse can have on a person. Make sure you have fun with your creation, and don't forget to display your art so that your school and community can see it!

Here's what you'll need:

- **A place to showcase your artwork.** Check with your teacher or principal to make sure you and your peers have a secure and large enough space to display your work.
- **Materials to create your masterpiece.** What you'll need depends entirely on what you decide to create. Check with your school to see if you can use school art supplies or ask your parents to help you purchase some materials at a local art supply store. Don't forget to check with your art supply store of choice to see if they have a student discount.
- **A description of your piece.** Write a brief summary on an index card about what your artwork is trying to say. You can make this description as fancy and artistic as you want!

Here's how to do it:

- **Find inspiration!** Click around the PEERx Web site at **www.teens.drugabuse.gov/peerx** and find something that is important or interesting to you. Brainstorm the best way to portray it, and let your imagination run wild! You might choose to create a painting, a collage, a poster, or a sculpture. It's totally up to you. If you need more inspiration, don't hesitate to research images and drawings online or in good old-fashioned books.
- **Consider making this project a group activity!** Get together with a few of your friends and collect scrap materials and items from your homes or wherever you can find assorted objects. Use these items any way you want to come up with a cool final product that depicts the consequences of prescription drug abuse. One idea is to create two opposite images. One can depict life as a drug-free teen, and the other can convey the opposite—what happens to a teen's brain after abusing prescription drugs. If you need help, ask your parents or teachers for assistance.

Issue a proclamation for Prescription Drug Abuse Awareness Day.

A proclamation is made when your governor, mayor, county executive, or state legislator designates that an event is official. For example, in 2010, NIDA held the first annual National Drug Facts Week, and many state and city officials proclaimed that it would be recognized as an official week-long event throughout the local community. A proclamation is a great way to spread the word!

For this activity, you can ask your mayor or governor to issue a specific proclamation for a Prescription Drug Abuse Awareness Day.

Here's what you'll need:

- **Template** to customize **(www.drugfactsweek.drugabuse.gov/files/ndfw_proclamation.doc).**
- **Computer** with Internet connection. Take a look around the PEERx Web site **(www.teens.drugabuse.gov/peerx)** for facts about prescription drug abuse.
- **Phone.**

Here's how to do it:

- **It's best to start** this process 6 to 8 weeks in advance and to enlist the help of an adult to act as your advisor.
- **Contact** the communications or press office for your mayor or governor. You can find contact information for these public officials online. Ask what steps you need to take to get a proclamation issued. Tell the communications official your intentions in educating your community about prescription drug abuse by instituting a day-long or week-long observance.
- **Determine** how your community can get involved. Set up an information table at your school with fact sheets about prescription drug abuse (printed from the PEERx Web site at **www.teens.drugabuse.gov/peerx).** You can even recommend that your school register for National Drug Facts Week Chat Day. Customize a sample proclamation **(www.drugfactsweek.drugabuse.gov/files/ndfw_proclamation.doc)** with relevant statistics for your city or state. The proclamation should be written to include information on the importance of this event, as well as to emphasize the importance of peer-to-peer education, inquisitiveness, and the value of scientifically backed responses.
- **Send** your proposed proclamation to the mayor or governor. Don't forget to mention how and why it's important to educate your community about such a serious problem.
- **If the mayor or governor** seems unwilling to issue the proclamation, ask other officials in your community to lend their support and to encourage the mayor or governor to sign the proclamation.
- **Declare** any day or week of your choice as Prescription Drug Abuse Prevention Day or Week. Make sure to have the proclamation signed by your local government official. After the proclamation has been issued, thank your mayor or governor by inviting him or her to your event to present the proclamation publicly.
- **Send the proclamation** to local television stations, and ask them to inform the community about the special event you are holding. If the mayor or governor has agreed to present the proclamation at your event, inform the media a few days in advance of the date, time, and place of this presentation, so they can be there.
- **After your event,** don't forget to send thank-you letters to everyone who helped you out!

Activity Guide Feedback Survey

Evaluation is an important component of any marketing campaign. It enables you to assess the effects that a program is having and make adjustments based on that information.

Please complete this survey to evaluate the success of the event that you organized and implemented from the PEERx Activity Guide. If needed, you may ask for the help of an adult advisor in answering some of these questions. Send your completed survey to us at: IQ Solutions—NIDA RD, 11300 Rockville Pike, Suite 901, Rockville, MD 20852 or scan the form and email it to peerx@iqsolutions.com. You can also fax your completed evaluation to 301-984-4416 (attention: NIDA/PEERx).

Which event(s) as listed in the Activity Guide did you organize?

- ❑ Wear the message!
- ❑ Hold a school assembly
- ❑ Predict the future
- ❑ Write a radio PSA
- ❑ Host a "Relieve the Stress Fest!"
- ❑ Make a classroom version of the TV show, CSI: Crime Scene Investigation
- ❑ Participate in Drug Facts Chat Day
- ❑ Hold an artwork contest for a poster campaign
- ❑ Issue a proclamation for Prescription Drug Abuse Awareness Day

When (day, time) did you hold your event? _____

Where did you hold your event?

- ❑ In my school
- ❑ At a Community Center
- ❑ At a park
- ❑ Other (please describe) _____

_____

What was the goal of your event?

- ❑ To change attitudes and perceptions surrounding Rx abuse
- ❑ To increase students' knowledge about the dangers of Rx drug abuse
- ❑ To change behaviors and reduce Rx drug abuse in my school/community group
- ❑ To encourage interaction with the PEERx materials
- ❑ All of the above

How many volunteers helped plan and run the event? _____

CONTINUED ON PAGE 14

How far in advance did you begin planning for this event?

- ❑ 2-3 months
- ❑ 1+ month
- ❑ 3-4 weeks
- ❑ 1-2 weeks

How many people attended your event? _____

If participants gave you any feedback on the event, were the comments :

- ❑ Very positive
- ❑ Somewhat positive
- ❑ Neutral (it was okay)
- ❑ Somewhat negative
- ❑ Very negative

How many of your participants gave you feedback?

- ❑ A few
- ❑ Half
- ❑ More than half
- ❑ All

Did you notify the local media about your event? If so, did you get any news coverage?

_____

_____

Were the instructions in the Activity Guide helpful? Is there anything you would change about them?

_____

_____

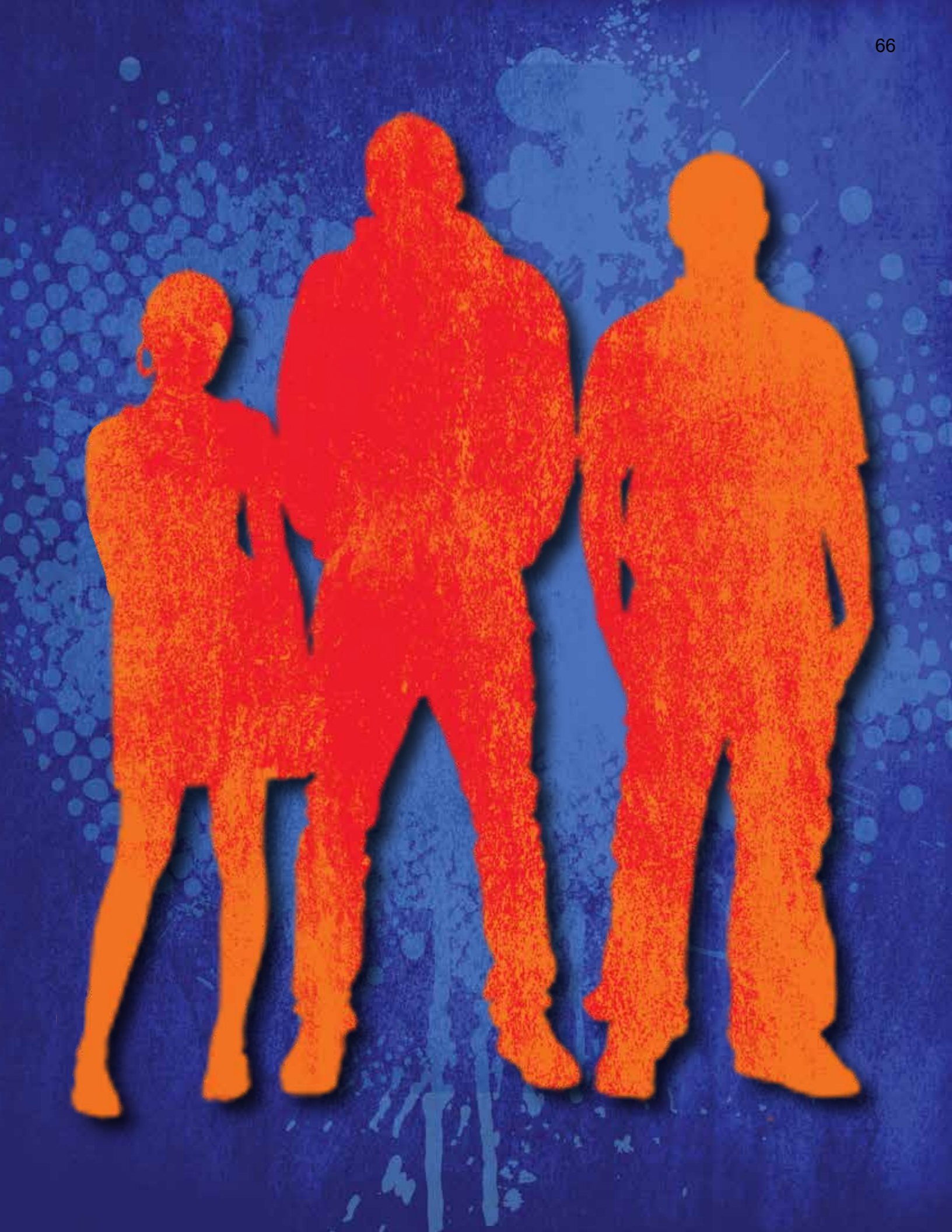
_____

Do you have photos or video you would be willing to share with NIDA and would you be willing to have your event featured on NIDA's Sara Bellum Blog?

_____

_____

_____



NIDA's mission is to lead the Nation in bringing the power of science to bear on drug abuse and addiction.

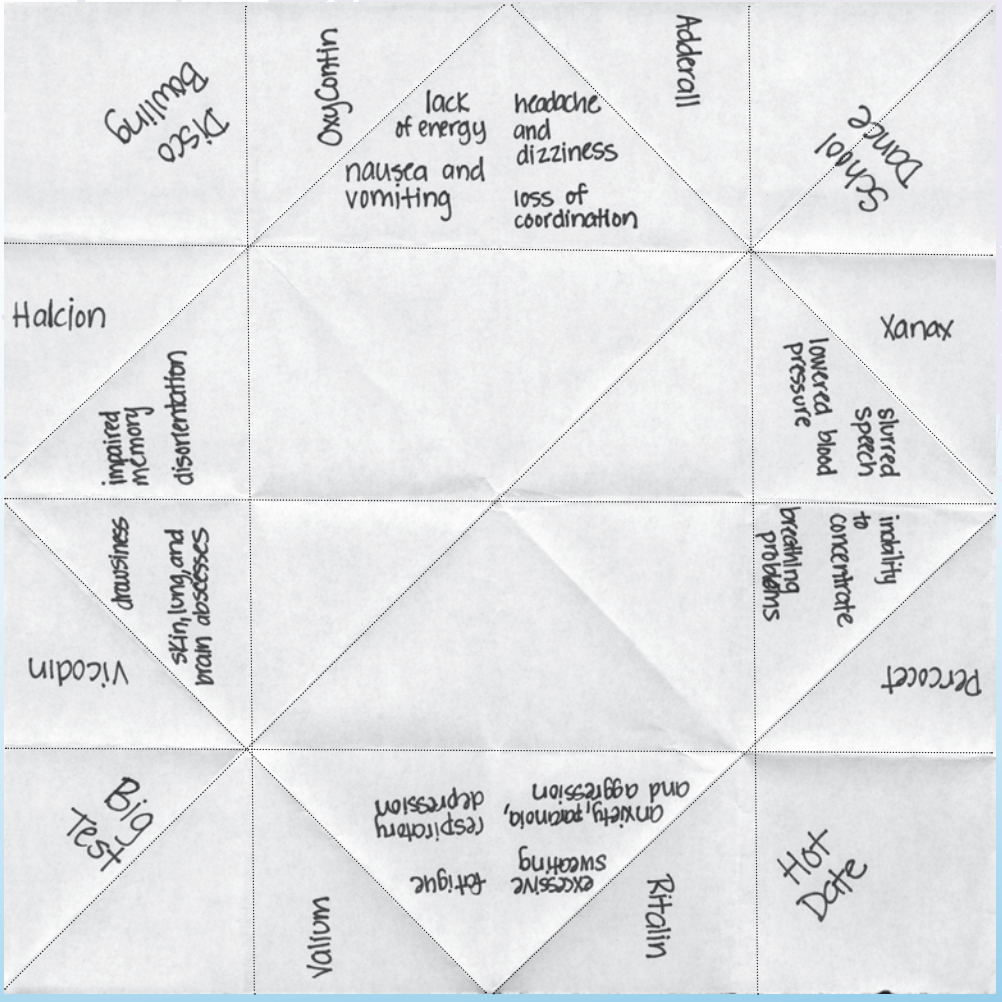
This charge has two critical components. The first is the strategic support and conduct of research across a broad range of disciplines. The second is ensuring the rapid and effective dissemination and use of the results of that research to significantly improve prevention and treatment and to inform policy as it relates to drug abuse and addiction.

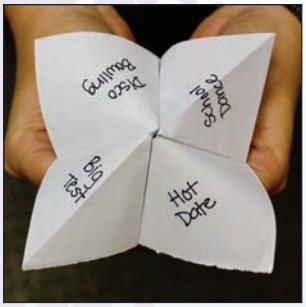
NIDA NATIONAL INSTITUTE ON DRUG ABUSE
National Institutes of Health
U.S. Department of Health and Human Services

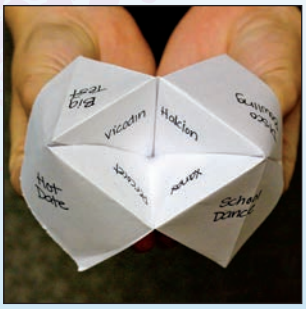
PEERx SHARE A DOSE OF REALITY:
PRESCRIPTION DRUG ABUSE IS DRUG ABUSE.
www.teens.drugabuse.gov/peerx

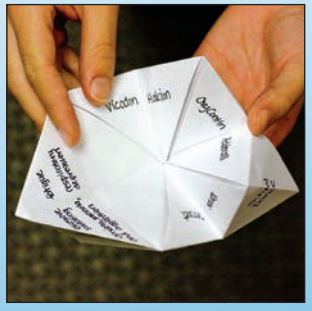
PREDICT THE EFFECTS OF PRESCRIPTION DRUG ABUSE!

Get interactive the old school way with the paper fortune teller! It's a fun (and safe) way to discover the effects of prescription drug abuse. Just choose an activity, select a prescription drug, and voila! See the possible outcome for yourself. Check out the next page for a template to make your very own today. This low-tech guide is brought to you by the National Institute on Drug Abuse.









Is this for real? You bet. These side effects can happen when you abuse or misuse prescription drugs. Although not all of the side effects will happen to everyone, taking prescription drugs without a prescription or ignoring your doctor's instructions is dangerous. You never know what you're getting into.

U.S. Department of Health and Human Services
NATIONAL INSTITUTES OF HEALTH
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PEERx: RxABUSE IS DRUG ABUSE

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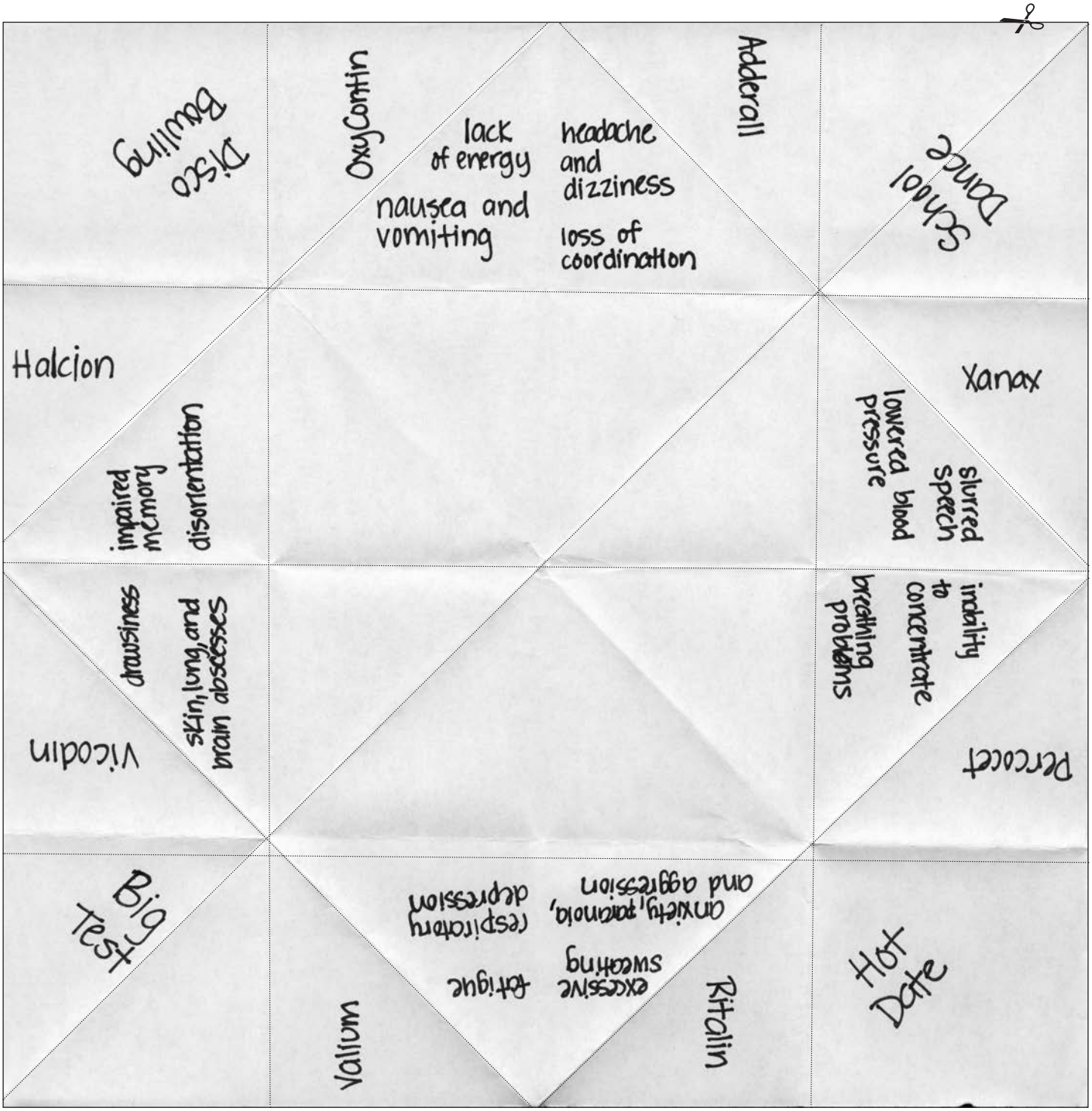
October 2009

The paper fortune teller template

It's easy—all you have to do is print, cut, and fold this paper fortune teller template! Then consult this "interactive" predictor to discover possible side effects of prescription drug abuse. Enjoy!



U.S. Department of Health and Human Services
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PEERx: RX ABUSE IS DRUG ABUSE

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October 2009

Follow the Directions

Prescription painkillers, drugs to treat sleep disorders, anti-anxiety drugs, and stimulants are powerful drugs. It is important to follow a doctor's, health care provider's, or pharmacist's instructions about how much to take and what things to avoid. For example, taking more than the prescribed amount of any prescription drug can lead to an overdose. People who overdose may vomit or even fall into a coma, depending on the drug. In addition, a person may have serious side effects from mixing prescription drugs with other medicines, over-the-counter drugs, or alcohol.

Surprising Facts

- Prescription painkillers can cause nausea and vomiting.
- Mixing anti-anxiety or sleep disorder drugs with other drugs, particularly alcohol, can slow breathing, slow heart rate, and possibly lead to death.
- Abusing stimulants while taking a cold medicine with decongestants can cause dangerous increases in blood pressure and irregular heart rhythms.

The Search Continues

There is much that scientists have yet to discover about the effects of prescription drugs on the brain and body. Maybe you will make the next big discovery! Until then, follow me—Sara Bellum—in the other magazines in my series, as we explore how drugs affect the brain and nervous system.

NIDA goes back to school
Science-based drug abuse education

For more information, visit:
www.teens.drugabuse.gov

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 http://www.drugabuse.gov or contact the DrugPubs Research Dissemination Center at 877-NIDA-NIH (877-643-2644; TTY/TDD: 240-645-0228).**

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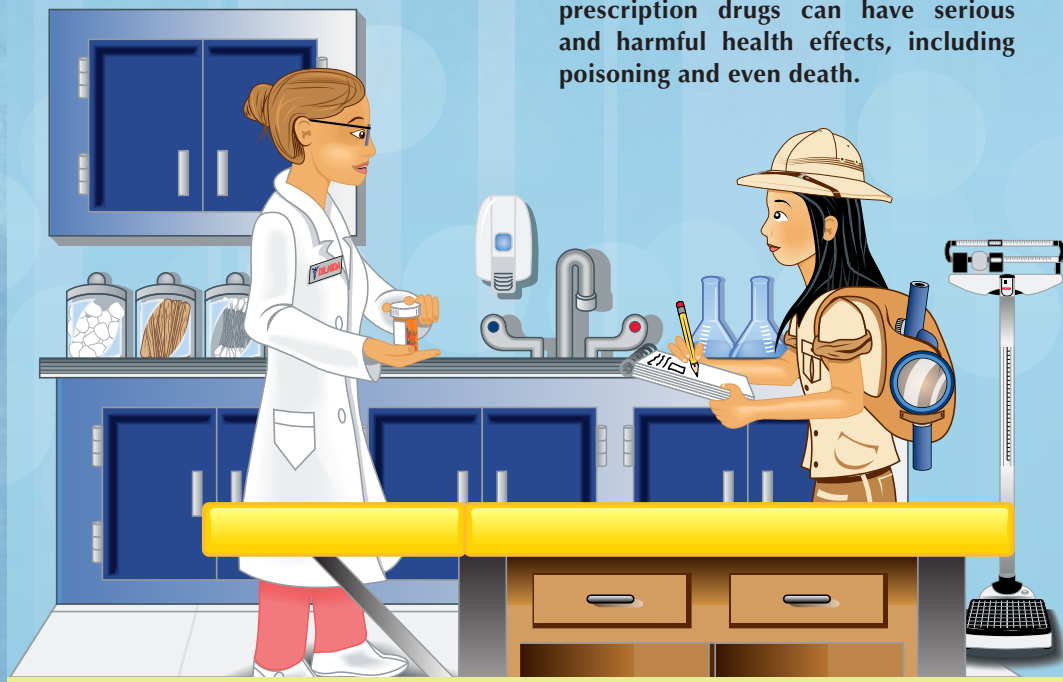
MIND OVER MATTER

The Brain's Response to Prescription Drugs

Hi! My name is Sara Bellum. Welcome to my magazine series that explores the brain's response to drugs. In this issue, we will investigate fascinating facts about prescription drugs.

Prescription drugs are medicines that are prescribed to a person by his or her doctor to treat diseases. Some prescription drugs affect the brain—especially those used to treat pain, or mental disorders such as anxiety or attention-deficit hyperactivity disorder (ADHD).

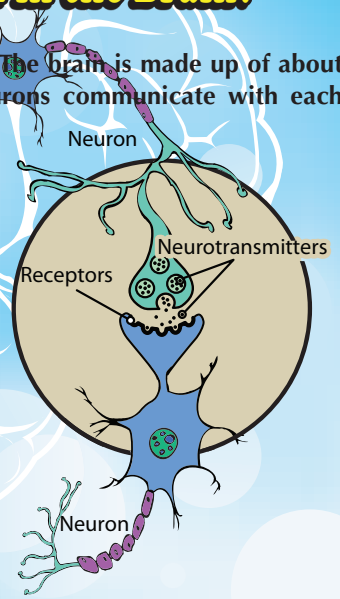
Doctors decide how much of a drug to give a person based on that person's age, size, and medical history. By doing so, doctors oversee the safe and proper use of prescription drugs. Abuse is when someone takes a prescription drug without a doctor's prescription or in a way or amount that is different from what was prescribed. Abuse of prescription drugs can have serious and harmful health effects, including poisoning and even death.



National Institute on Drug Abuse

How Do Prescription Drugs Work in the Brain?

Prescription drugs change the chemistry of the brain. The brain is made up of about 100 billion neurons, also known as nerve cells. Neurons communicate with each other by using chemical messengers called neurotransmitters. There are many types of neurotransmitters, and each one carries a specific message. Neurotransmitters deliver their messages by attaching to special places on nerve cells called receptors. Prescription drugs act by mimicking certain neurotransmitters. Below, we will learn more about specific types of prescription drugs that can be dangerous when abused.



Types of Prescription Drugs

Prescription Painkillers

Prescription painkillers are powerful drugs that reduce pain. These drugs are very helpful to people with severe pain from injuries, and cancer and other diseases.

Prescription painkillers attach to particular sites in the brain called opioid receptors, which carry messages about pain. With proper use of prescription painkillers, the pain messages sent to the brain are changed and are no longer perceived as painful. Patients who are prescribed painkillers for a long period of time may develop a "physical dependence" on them. This is *not* the same as addiction. Physical dependence happens because the body adapts to having the drug around, and when its use is stopped abruptly, the person can experience symptoms of withdrawal. That is why these drugs are carefully monitored and should be taken or stopped only under a doctor's orders.

Prescription painkillers can be highly addictive when used improperly—without a doctor's prescription or in doses higher than prescribed. Addiction means that a person will strongly crave the drug and continue to use it despite severe consequences to their health and their life. Prescription painkillers also affect the brain areas controlling respiration, and when used improperly (or mixed with other drugs) can cause a severe decrease in breathing that can lead to death.

Prescription Drugs for Sleep Disorders

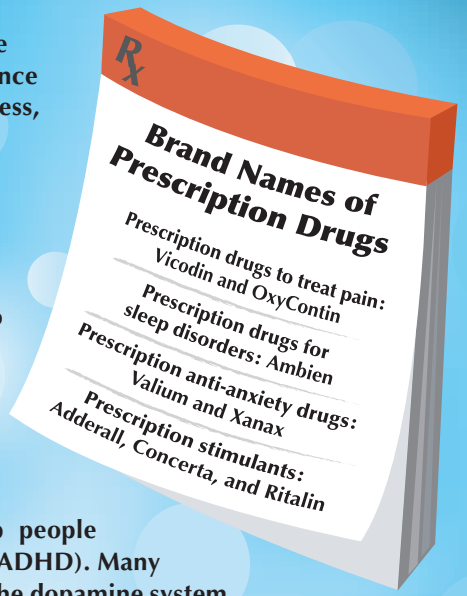
Prescription drugs for sleep disorders increase levels of a neurotransmitter named gamma-aminobutyric acid (GABA). GABA sends messages that slow down bodily functions and make a person feel drowsy.

Prescription drugs for sleep disorders may have side effects, including headache, muscle aches, daytime sleepiness, trouble concentrating, and dizziness. Prescription drugs for sleep disorders should never be mixed with any other drugs that cause drowsiness, such as over-the-counter cold medicine, alcohol, or painkillers. If combined, they can slow a person's heart rate and respiration, which can be fatal.

Prescription Anti-anxiety Drugs

Doctors may prescribe drugs to help people with anxiety disorders. Some anti-anxiety drugs affect the neurotransmitter GABA.

After taking anti-anxiety drugs for a long time and suddenly stopping, a person may experience withdrawal symptoms such as anxiety, shakiness, headache, dizziness, and, in extreme cases, seizures. Abusing prescription anti-anxiety drugs can result in addiction or overdose.



Prescription Stimulants

Prescription stimulants cause neurons to release two neurotransmitters: dopamine and norepinephrine. Dopamine carries messages in the brain about feeling good. Norepinephrine is a chemical in the brain that helps people pay attention and focus.

Doctors often prescribe stimulants to help people with attention-deficit hyperactivity disorder (ADHD). Many scientists believe that in people with ADHD, the dopamine system works slightly differently than in people without the disorder. Prescription stimulants can bring brain dopamine function back to normal and help people with ADHD focus better and pay more attention.

Stimulants can be addictive and dangerous when abused. In fact, abusing stimulants can cause chest pain, stomachaches, and feelings of fear or anger. They can also cause seizures and irregular heartbeats that can cause death.

Module 3—Drugs in the Cupboard

Overview

Summary

This module explains how prescription drugs and some household products can damage the brain and body when used improperly. Household products are called inhalants when they are abused. These drugs are particularly prone to abuse because they are often found in the home and are easily accessible. Prescription drugs and inhalants are not dangerous when they are used as intended. However, they can lead to serious side effects, even death, when used inappropriately.

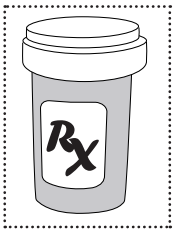
Learning Objectives

At the end of this module:

- Students can explain the effects of prescription drugs.
- Students can explain how prescription drugs affect the functioning of the brain and body when not used properly.
- Students understand how inhalants can change the brain.
- Students understand why it is important to use medication as instructed.

Summary

PRESCRIPTION DRUGS



Drugs prescribed by a physician can relieve pain and control the symptoms of many disorders and diseases. People who use prescription drugs as directed by a doctor (at the prescribed dose and for the recommended length of time) are at very low risk for addiction or other negative side effects. However, intentional misuse of prescription drugs can be dangerous. Three commonly abused prescription drugs are opioids, central nervous system (CNS) depressants, and CNS stimulants.

The Internet makes prescription drugs more easily accessible for abuse. E-mail inboxes are often full of spam e-mails offering the sale of prescription drugs without a prescription. When discussing these drugs with your students, bring up the topic of dangerous and misleading spam e-mails, and how it is important to respect prescription drugs.

Effects of Prescription Drugs on the Brain and Body

Opioids

Opioids, such as morphine, codeine, oxycodone (Oxycontin), and hydrocodone (Vicodin), are prescribed for pain relief. Used correctly, opioids are helpful for people suffering from chronic pain or pain from surgery. These drugs act by attaching to opioid receptors in the brain and spinal cord, and blocking the transmission of pain messages to the brain. Opioids also cause initial feelings of pleasure by acting on the reward system in the brain. Side effects of opioids include drowsiness and constipation.

CNS Depressants

CNS depressants include barbiturates and benzodiazepines (e.g., diazepam [Valium], alprazolam [Xanax], and lorazepam). These medications are prescribed to treat anxiety, tension, and sleep disorders. They slow brain function by increasing the activity of the neurotransmitter GABA. GABA decreases brain activity and causes feelings of drowsiness and calmness, which is helpful in people with anxiety or sleep disorders.

CNS Stimulants

CNS stimulants, such as dextroamphetamine (Dexedrine) and methylphenidate (Ritalin), are prescribed for attention-deficit hyperactivity disorder (ADHD), narcolepsy (a sleeping disorder), and depression that has not responded to other treatments. Stimulants copy the activity of the neurotransmitters dopamine and norepinephrine by stimulating their specific receptors. This results in increased alertness, attention, and energy. Stimulants also result in increased feelings of pleasure, higher blood pressure and heart rate, and increased blood glucose levels.

Scientists propose that there is less dopamine transmission in the brains of persons with ADHD when compared to other individuals. Because stimulants correct this shortfall, individuals with ADHD are at low risk for becoming addicted to stimulant medications. Individuals that have not been prescribed Ritalin abuse the drug by swallowing the tablets or by crushing and then snorting them. This causes wakefulness and euphoria. In people who do not need the medication, the increased dopamine transmission caused by ingesting Ritalin can be highly addictive.

Prescription Drug	Examples	Drug Effects
Opioids	Morphine, Codeine, Oxycodone, Hydrocodone	Attach to opioid receptors in the brain and body to block transmission of pain messages.
CNS Depressants	Barbiturates and Benzodiazepines	Slow brain function by increasing the activity of the neurotransmitter GABA, which decreases brain activity and causes feelings of drowsiness and calmness. These drugs also decrease heart rate and blood pressure.
CNS Stimulants	Dextroamphetamine and Methylphenidate	Activate dopamine and norepinephrine receptors, which results in increased alertness, attention, and energy. Stimulants also cause higher blood pressure and heart rate.

Prescription Drugs in Combination with Other Drugs

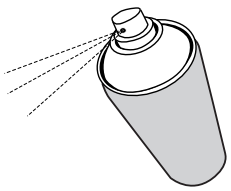
In order to be safe and healthy, patients taking prescription drugs must comply with the medication guidelines set by their doctor. It is important to know how much medicine to take, how long to take it, and what else can have an impact on its effects on the body. Possible interactions with other drugs, vitamins, certain activities, or environmental factors such as sun exposure need to be thoroughly understood by the patient for the prescribed medication. Prescription medications should never be shared.

Misusing prescription drugs can have very negative consequences. At large doses, opioids can be fatal because they can cause heart and breathing rates to slow down or stop. High doses of stimulants can cause an irregular heartbeat, seriously high body temperatures, and the potential for heart attacks and death. Taking stimulants in combination with over-the-counter cold medications can cause abnormalities in blood pressure and heart rhythm. Taking opioids and CNS depressants in combination with other drugs, such as alcohol or antihistamines, can cause severe respiratory problems and death.

Prescription Drug Withdrawal

Long-term abuse of prescription drugs may cause addiction and produce withdrawal symptoms if the drug is discontinued. The withdrawal symptoms from prescription drug abuse vary, depending on the particular drug being abused. The withdrawal symptoms that result from opioid abuse include restlessness, insomnia, vomiting, muscle and bone pain, diarrhea, and cold flashes with goose bumps.

Withdrawal from CNS depressants may cause the brain's activity to rebound and race out of control, resulting in seizures and other harmful consequences. The withdrawal symptoms of CNS stimulants include depression, fatigue, insomnia, loss of appetite, and craving for more stimulants.



INHALANTS

Inhalants are a class of chemicals that have many useful purposes in households but were never meant to enter the body. They are intentionally misused by sniffing or inhaling. They can be sprayed directly into the nose or mouth, inhaled from substances dropped into a bag ("bagging"), inhaled from a soaked rag ("huffing"), or inhaled from a balloon. Inhalants enter the bloodstream directly through the lungs and rapidly travel to the brain. Users experience an immediate "head rush" or high.

Many inhalants are commonly found in the home. They can be classified into four categories: volatile solvents, aerosols, gases, and nitrites.

The student materials for this module do not mention specific household products. This was intentional. Young people are often highly curious about these easily accessible drugs. To guard against such curiosity, we recommend you avoid mentioning specific products in your discussion. They are listed in the following chart for your information only.

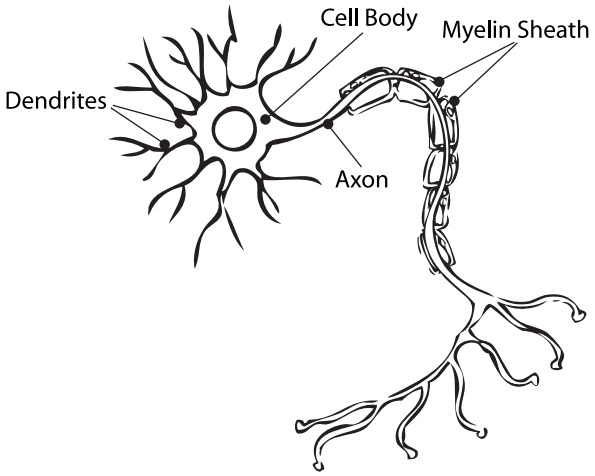
Volatile solvents	Paint thinners and removers, dry-cleaning fluids, degreasers, gasoline, glues, correction fluids, felt-tip marker fluids
Aerosols	Sprays containing propellants and solvents, including spray paints, deodorants and hair sprays, vegetable oil sprays for cooking, fabric protector sprays, whipped cream
Gases	Household gases and medical anesthetics: ether, chloroform, halothane, nitrous oxide (laughing gas)
Nitrates	Cyclohexyl nitrite, isoamyl (amyl) nitrite, isobutyl (butyl) nitrite; sold under the name of "poppers," or found in certain room deodorizing sprays

Inhalant abuse can damage areas of the brain involved in cognitive functions and produce symptoms ranging from mild impairment to dementia. Inhalant abuse can also damage brain areas responsible for movement and vision.

Permanent hearing loss and irreversible damage to nerves throughout the body can occur from using inhalants. Inhalants can cause hepatitis, liver failure, and muscle weakness. They also interfere with the production of red blood cells, which can result in a life-threatening condition known as aplastic anemia. A condition called "sudden sniffing death" may occur when inhaled fumes replace oxygen in the lungs and brain and cause suffocation. Finally, inhalants can interfere with heart rhythm, leading to a heart attack. This can occur from a single session of repeated inhalant use.

Effects of Inhalants on the Brain

Scientists are investigating the exact way in which inhalants slow and stop the activities of neurons. Some inhalants also damage the structure of the brain, particularly the myelin, or insulation, that covers the axons. Because myelin helps messages travel through the neurons, this damage can be very serious. The parts of the brain most affected by inhalants are the cerebral cortex, cerebellum, hippocampus, and brain stem. Because of the damage to the cerebellum, heavy users of inhalants often show signs of decreased coordination, moving slowly and clumsily.



Inhalants damage the myelin, or insulation of neurons.

Background

The frontal cortex of the brain, important for solving problems, and the hippocampus, a part of the brain involved in memory, are also affected by inhalant abuse. Researchers think that inhalants deprive the brain of oxygen. This causes the death of nerve cells and a decrease in nerve cell activity. Thinking, memory, and the ability to learn are all negatively affected.

Many inhalants activate the brain's reward system and stimulate the release of dopamine. This is thought to be responsible for the pleasurable feelings associated with inhalant use.

Long-Term Inhalant Abuse

People who use inhalants over a long period of time feel a strong urge to continue using them. Effects of long-term abuse include weight loss, muscle weakness, disorientation, inattentiveness, lack of coordination, irritability, and depression.

Preparation

- Read the Background section of this module for more information about the effects of prescription drugs and inhalants on the brain and body.
- Provide students with the Module 3 magazine *Drugs in the Cupboard* for background knowledge.
- Determine which activities you want the class to complete.
- Arrange for computer lab time or prepare the classroom computer for students' Internet and CD-ROM use.
- Photocopy and pass out the Prescription Drugs, Inhalants, and the Brain Fact Sheet for students to complete during the lecture.
- Prepare transparencies and photocopies for the lesson.
- Gather colored paper for Activity 1.

Introduction

Reading: Begin by giving students adequate time to read the student magazine. Have students pay particular attention to the following sections: Background, Stats and Facts, and Science in the Spotlight.

Discussion: After students have read the magazine, facilitate a discussion about the brain using the following questions. If necessary, review this information with your students using the diagrams provided.

Time:

15–20 minutes

Handouts:

Module 3 magazine

Introduction

Prescription Drugs and Inhalants

- Who should take prescription drugs? When?
- What are the three classes of prescription drugs?
- Should a person use a prescription drug that has been prescribed for someone else?
- How does inhalant abuse injure the brain and body?
- What is the name of the insulation around neurons that is damaged by inhalants?

Handouts:

Module 3 magazine

Activities

Activity 1: Choose a Color

Time:

20 minutes

Supplies:

Each student needs a piece of red, orange, blue, and green paper

Markers

Tell students that this is the third activity of their competition. The group that does the best job will earn five points. Remind students of which groups they are in.

Give each student four different colored pieces of paper: one for opioids, one for CNS depressants, one for stimulants, and one for inhalants. Students should label each accordingly. Read each of the statements from the next page. Pause after reading each statement and tell the students to pick the colored paper (drug) that the statement describes and to hold it up. Create your own set of paper to hold up the correct answer(s) for students to see after they have made their own selection(s).

Red	=	Opioids
Orange	=	Depressants
Blue	=	Stimulants
Green	=	Inhalants

Warn students that sometimes they may have to hold up more than one colored piece of paper. Tell the students that if they hold up a paper with the wrong color, they will be out of the game. The game will continue until only one student is left or until all the statements have been read. If only one student is left, that student's team earns five points. If several students are left, each student earns one point for his or her team. When the game is over, record the winning group's points on the Group Scorecard.

1. These drugs should only be used when directed by a doctor.
   Answer: Red, Orange, Blue (opioids, CNS depressants, stimulants)

2. People should never use these drugs for anything other than their intended purposes.
   Answer: All colors (all four groups of drugs)

3. These drugs can cause addiction if used inappropriately.
   Answer: Red, Orange, Blue (opioids, CNS depressants, stimulants)

4. These drugs can cause death if used inappropriately.
   Answer: All colors (all four groups of drugs)

5. This group of drugs is prescribed to relieve severe pain.
   Answer: Red (opioids)

6. When one of these drugs is inhaled, it can cause sudden sniffing death.
   Answer: Green (inhalants)

7. These drugs are prescribed to patients with attention-deficit hyperactivity disorder (ADHD).
   Answer: Blue (stimulants)

8. When used inappropriately, this group of drugs can cause seizures.
   Answer: Blue (stimulants)

9. When used appropriately, this group of drugs causes calmness and helps with sleep and anxiety problems by increasing the release of the neurotransmitter GABA.
   Answer: Orange (CNS depressants)

10. When used appropriately, this group of drugs causes alertness by copying the activity of the neurotransmitters dopamine and norepinephrine.
    Answer: Blue (stimulants)

11. This type of prescription drug affects the neurotransmitter dopamine.
    Answer: Blue, Red (stimulants, opioids)

12. This group of drugs can deprive the brain of oxygen and decrease coordination.
    Answer: Green (inhalants)

13. When abused, these drugs can cause heart and breathing problems.
    Answer: All colors (all four groups of drugs)

Activity 2: Public Service Announcement

Public Service Announcements, or PSAs, are run on TV and radio to inform the community about safety and health information. Tell the students that they will be planning, writing, and performing their own PSA for the class. Divide students into groups of 4–6, and assign each group either "prescription drugs" or "inhalants" as their topic.

Give the students about 15 minutes to look through the student magazine, their notes, and other sources to gather information concerning their assigned topic. Inform the groups that all PSAs must educate the audience on the effects these drugs have on the brain and body, and other science-based facts. Allow them another 15 minutes to plan and write their PSA; then have all groups perform their PSA. To make sure that all students in each group are actively engaged in the planning, writing, and performing of tasks, you can assign roles such as writer, director, actors, and scientific researchers.

Keep the students on track by emphasizing key lecture points about the science behind drug use from the background section.

Wrap up the activity with a discussion and assessment of the strengths of each group's PSA.

Time:

40 minutes

Supplies:

Module 3 magazine

Pen or pencil

Paper

Handouts:

Prescription Drugs, Inhalants, and the Brain Fact Sheet

CD-ROM

The CD-ROM includes games and materials to supplement the information presented in the module. The room labeled "3" contains the following activities and specific information pertaining to this module:

- **Learning Objectives:** these are presented at the beginning of each CD-ROM module
- **Pill Poppers:** an activity where students must match drug effects to the correct class of prescription drugs: depressants, stimulants, and opioids
- **Synapse Sweep:** a game in which players must act quickly to get rid of the drugs in the synapse while avoiding the neurotransmitters
- **Myelin Sleuth:** an activity where students figure out which neuron on a microscope slide is from an inhalant abuser and which is the healthy brain cell
- **Module Quiz:** this quiz is the final part of the module, intended to assess students' learning

Extensions

1. Have students do research on ADHD using the student magazine, the Internet, and other magazines. Tell them to develop an outline summarizing ADHD: what it is, the symptoms, how common it is in children, behaviors associated with the disorder, and treatment. This will give students a better understanding of the disorder, as well as why many children take medication to treat ADHD.

Useful Web sites:
www.nimh.nih.gov/publicat/adhd.cfm
www.help4adhd.org/en/about

2. Distribute drawing paper and drawing supplies to students. Tell them that they are going to be making a brochure for younger students (elementary age) to explain the dangers of prescription drug and inhalant abuse. Encourage students to remember what they knew about these issues or drugs when they were younger, and help them brainstorm ideas for how to present the information to the younger audience.

Key to Icons

Art
Science
History
Business
Social Studies
English
Math

Assessment

As students complete the activities in the module, observe whether they have mastered the following:

1. Do students realize the importance of taking prescription medications only under a doctor's guidance? Do they understand the effects that prescription drugs can have on the brain and body when taken improperly?

2. Do students understand the various types of prescription medications and why they are prescribed? Do they understand the possible consequences of Ritalin use for someone who doesn't have ADHD?

3. Can students explain the consequences of prescription drug use in combination with other drugs, such as alcohol, antihistamines, or other over-the-counter medications?

4. Can students list some withdrawal symptoms of inhalants? Do they understand the connection between these symptoms and how the brain changes from the use of inhalants?

5. Do students understand the short- and long-term effects of inhalants on the brain and body? Do they realize the impact of these symptoms on brain functioning?

Resources

RESOURCES FOR TEACHERS

National Institute on Drug Abuse (NIDA)
www.drugabuse.gov, 301-443-1124
This Web site contains information about drug abuse as well as sections designed specifically for parents, teachers, and students.

Mind Over Matter Teacher's Guide
http://teens.drugabuse.gov/mom/tg_intro.asp
This printable/downloadable teacher's guide accompanies NIDA's Mind Over Matter series. The series is designed to educate teens about the biological effects of drug abuse on the body and brain.

National Clearinghouse for Alcohol and Drug Information (NCADI)
http://ncadi.samhsa.gov, 1-800-729-6686
NCADI is the world's largest resource for information and materials concerning substance abuse. Many free publications are available here.

Buzzed: The Straight Facts About the Most Used and Abused Drugs from Alcohol to Ecstasy. **Kuhn, C., Swartzwelder, S., and Wilson, W.** New York: W. W. Norton & Company, 2003. A highly informative, detailed review of widely abused drugs.

RESOURCES FOR STUDENTS

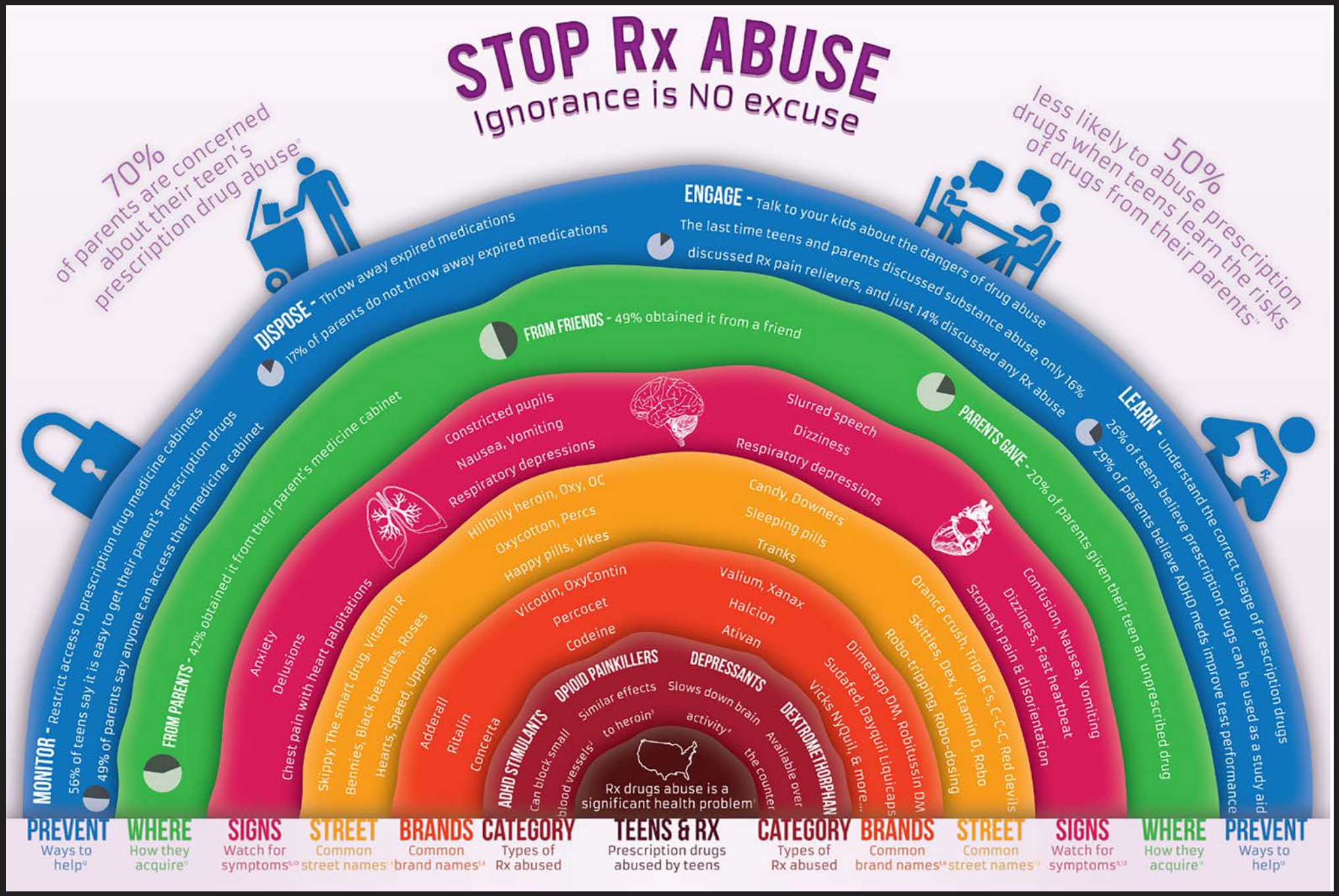
Mind Over Matter
http://teens.drugabuse.gov/mom
Designed for teens, this site includes information about how different drugs, including inhalants and opioids, affect the brain. Also available for free by calling 1-800-729-6686.

Free Vibe
www.freevibe.com
Designed for teens, this site covers the risks and consequences of various drugs and provides news, advice, and real-life stories.

Ritalin and Other Methylphenidate-Containing Drugs. **Ferreiro, C.** Philadelphia, PA: Chelsea House Publishers, 2003. *Part of the "Drugs: The Straight Facts" series.* The book provides a thorough discussion of Ritalin and ADHD, with facts about abuse.

Inhalants. **Lobo, I.A.** Philadelphia, PA: Chelsea House Publishers, 2004. Part of the *"Drugs: The Straight Facts"* series. Provides useful information about the different types of inhalants, how they act on the brain and body, usage trends, and health effects.

Prescription Pain Relievers. **Foster, O.M.** Philadelphia, PA: Chelsea House Publishers, 2005. Part of the *"Drugs: The Straight Facts"* series. Contains a thorough discussion of prescription pain relievers, including how they act in the brain, health effects, and usage trends. This book helps students understand the connection between these prescription pain relievers and how the brain changes as a result of the use of these substances.

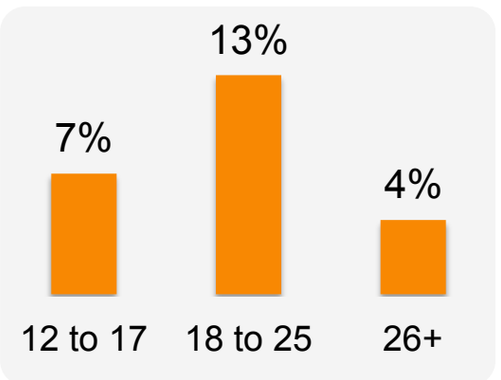

STOP Rx ABUSE
Ignorance is NO excuse
70% of parents are concerned about their teen's prescription drug abuse
50% less likely to abuse prescription drugs when teens learn the risks of drugs from their parents
DISPOSE - Throw away expired medications
17% of parents do not throw away expired medications
ENGAGE - Talk to your kids about the dangers of drug abuse
The last time teens and parents discussed substance abuse, only 16% discussed Rx pain relievers, and just 14% discussed any Rx abuse
FROM FRIENDS - 49% obtained it from a friend
PARENTS GAVE - 20% of parents given their teen an unprescribed drug
LEARN - Understand the correct usage of prescription drugs
26% of teens believe prescription drugs can be used as a study aid
29% of parents believe ADHD meds improve test performance
MONITOR - Restrict access to prescription drug medicine cabinets
56% of teens say it is easy to get their parent's prescription drugs
49% of parents say anyone can access their medicine cabinet
FROM PARENTS - 42% obtained it from their parent's medicine cabinet
Constricted pupils
Nausea, Vomiting
Respiratory depressions
Slurred speech
Dizziness
Respiratory depressions
Anxiety
Delusions
Chest pain with heart palpitations
Hillbilly heroin, Oxy, OC
Oxycotton, Percs
Happy pills, Vikes
Candy, Downers
Sleeping pills
Tranks
Skippy, The smart drug, Vitamin R
Bennies, Black beauties, Roses
Hearts, Speed, Uppers
Vicodin, OxyContin
Percocet
Codeine
Valium, Xanax
Halcion
Ativan
Orance crush, Triple C's, C-C-C, Red devils
Skittles, Dex, Vitamin D, Robo
Robo-tripping, Robo-dosing
Confusion, Nausea, Vomiting
Dizziness, Fast heartbeat
Stomach pain & disorientation
Adderall
Ritalin
Concerta
Dimetapp DM, Robitussin DM
Sudafed, Dayquil Liquicaps
Vicks NyQuil, & more...
ADHD STIMULANTS
Can block small blood vessels
OPIOID PAINKILLERS
Similar effects to heroin
DEPRESSANTS
Slows down brain activity
DEXTROMETHORPHAN
Available over the counter
Rx drugs abuse is a significant health problem
PREVENT Ways to help
WHERE How they acquire
SIGNS Watch for symptoms
STREET Common street names
BRANDS Common brand names
CATEGORY Types of Rx abused
TEENS & RX Prescription drugs abused by teens
CATEGORY Types of Rx abused
BRANDS Common brand names
STREET Common street names
SIGNS Watch for symptoms
WHERE How they acquire
PREVENT Ways to help

Abuse of Prescription (Rx) Drugs

Affects Young Adults Most

Young adults (age 18 to 25) are the biggest abusers of prescription (Rx) opioid pain relievers, ADHD stimulants, and anti-anxiety drugs. They do it for all kinds of reasons, including to get high, or because they think Rx stimulants will help them study better. But Rx abuse is dangerous: In 2010, almost 3,000 young adults died from prescription drug (mainly opioid) overdoses—more than died from overdoses of any other drug, including heroin and cocaine combined—and many more needed emergency treatment.

PAST YEAR USE



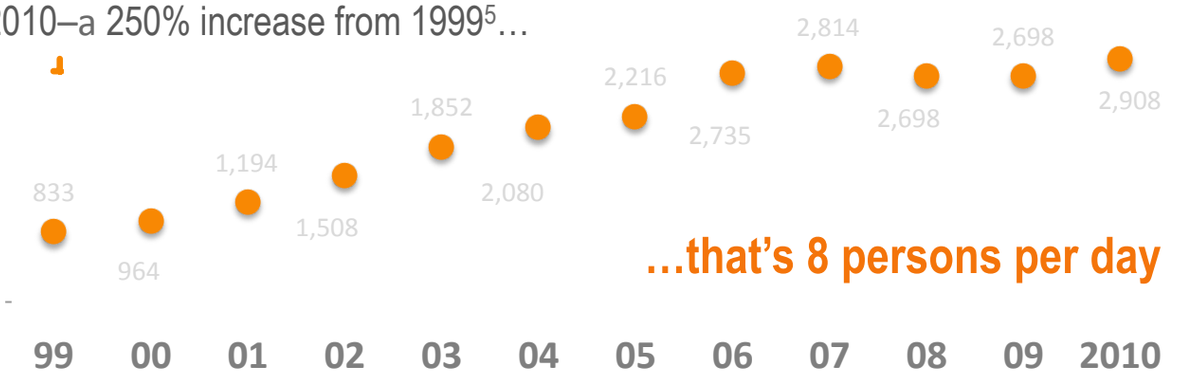
The nonmedical use of prescription drugs is highest among young adults.[1]

MOTIVATIONS FOR USE

Most young adults say they use Rx drugs to[2,3,4]

CONSEQUENCES

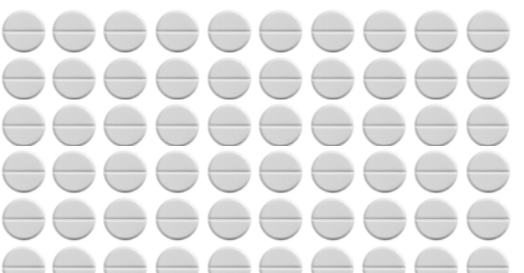
3,000 young adults died from Rx drug overdose in 2010–a 250% increase from 1999[5]…



…that's 8 persons per day

Among young adults, for every death due to Rx drug overdose, there were

17 Treatment Admissions[6]

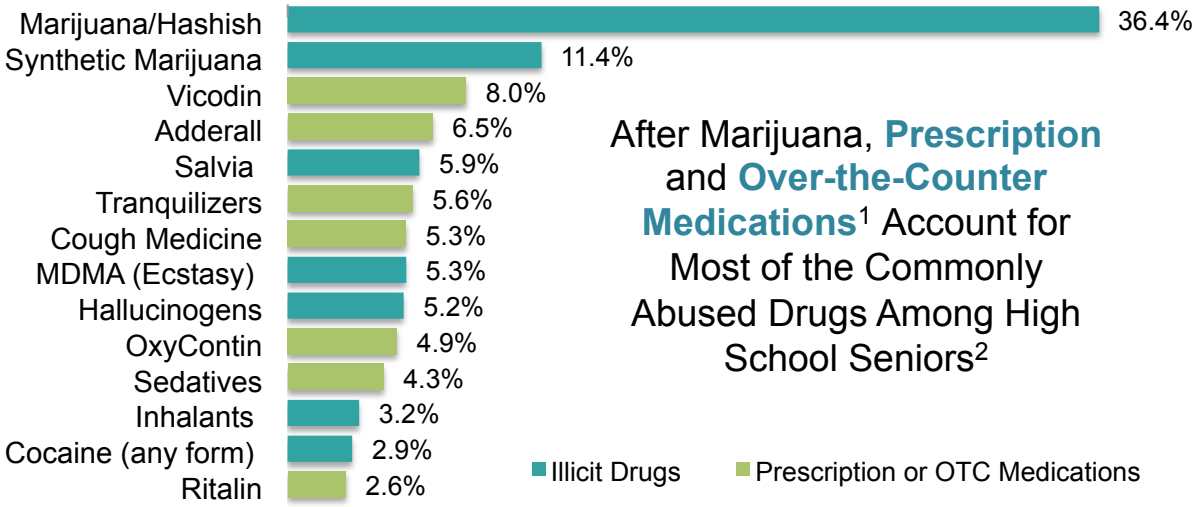


66 Emergency Room Visits[7]

[1] SAMHSA, NSDUH; [2] Rabiner et al 2009; [3] McCabe et al 2007; [4] Lord et al 2011; [5] CDC Wonder; 6 SAMHSA, TEDS; 7 SAHMSA, DAWN

Prescription Drug Abuse: Young People at Risk

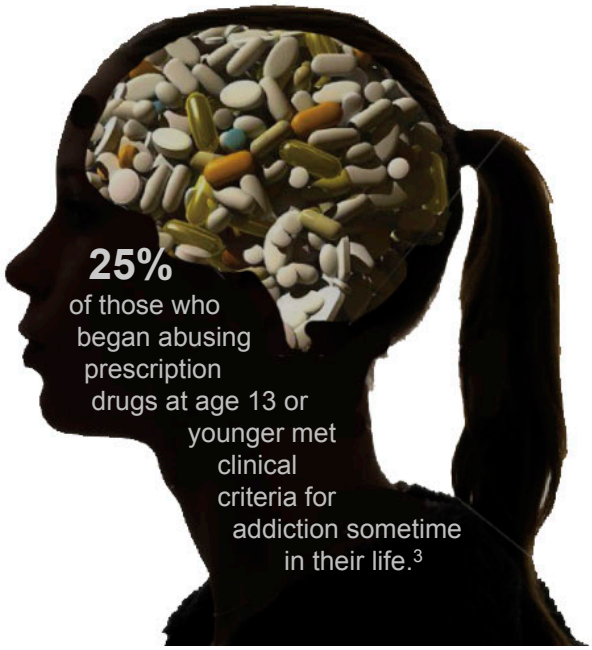
Young people are abusing prescription drugs at alarming rates. These drugs act on the same brain systems as illegal drugs and pose similar risks for dangerous health consequences, including later addiction.



After Marijuana, **Prescription** and **Over-the-Counter Medications**[1] Account for Most of the Commonly Abused Drugs Among High School Seniors[2]

About 1 in 9 youth

or 11.4 percent of young people aged 12 to 25 used prescription drugs nonmedically within the past year.[3]



[1] Past Year Use
[2] Monitoring the Future Survey, 2011
[3] National Survey on Drug Use and Health, 2010

Teens Mix Prescription Opioids with Other Substances

Nonmedical use of prescription (Rx) opioids by teens remains high, and a new study shows that 7 out of 10 teen nonmedical users combine opioid medications with other drugs and/or alcohol. This puts teens at much greater risk of overdose.

7 out of 10 teen nonmedical users combine Rx opioids with other substances[1]

The substances most commonly co-ingested were…

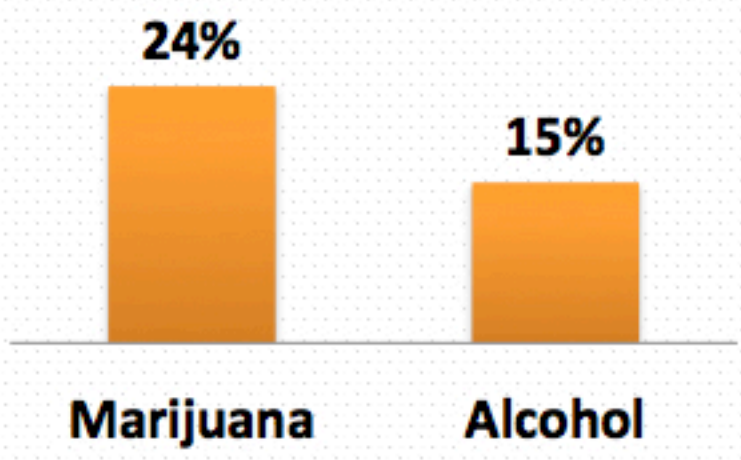
marijuana	alcohol	cocaine	tranquilizers	amphetamines
58.5%	52.1%	10.6%	10.3%	9.5%

Teens who reported co-ingestion of Rx opioids with other drugs were[2]…

8X more likely to report abusing marijuana

4X more likely to report being drunk ≥ 10 times

Percent of teens that usually or always combine Rx opioids with marijuana or alcohol[3]



(1) McCabe et al., Drug Alc. Dep., 2012; (2) Compared to no past year nonmedical use; (3) Among nonmedical users of Rx opioids