An Invitation to Health: Build Your Future

DIANNE HALES

15TH EDITION

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After studying the material in this chapter, you should be able to

- Describe the harmful effects of addictions on every dimension of health.
- Identify the risk factors for all addictions.
- Compare and contrast reasons students choose to use or not use drugs.
- Give examples of appropriate and inappropriate use of over-the-counter and prescription medications.
- Categorize the types of drug dependence, and discuss contributing factors.
- Identify common drugs of abuse, their street names, how they are abused, acute effects, and health risks.
- Describe the treatment methods available for individuals seeking help for drug dependence.
- Evaluate your personal drug use (legal and illegal) and identify strategies to decrease risky behaviors.
Avoiding Addictions

Navi had too many papers to write and too little time to finish them. One of the guys in his fraternity suggested a prescription stimulant a friend took for an attention deficit disorder. The jolt felt like just what Navi needed. During midterms Navi bought another prescription stimulant from a classmate. As finals approached, he started hoarding stimulants from several people. He popped the final ones to rev up for the last bash of the school year parties. Without realizing it, Navi put himself at risk for drug-related problems—physical, psychological, and legal.

People who try drugs or engage in addictive behaviors don’t think they’ll ever lose control. Even regular users believe they are smart enough, strong enough, lucky enough not to get caught or hooked. However, over time addictions produce changes in an individual’s body, brain, and behavior. In time they can outweigh everything else a person values and holds dearest.

The impact of addictions in college ranges from short-term consequences, such as academic difficulties, to long-term physical and psychological problems. The toll of drug abuse, for instance, includes more than 1,700 deaths, 700,000 assaults, and almost 100,000 sexual attacks and rapes. But knowing the risks isn’t enough to keep young people from heading down the dead-end road of addiction. Substance abuse is rising among American teens. In the most recent Monitoring the Future survey of drug, alcohol, and cigarette use, the percentage of high school seniors who used marijuana in the past 30 days was higher than the percentage who smoked cigarettes.1

Going beyond warnings, this chapter provides information about and insights into how addictions start, why students use and abuse drugs, the nature and effect of drugs, and the most commonly used, misused, and abused drugs. It also offers practical strategies for preventing, recognizing the signs of, and seeking help for addiction.

Risky Behaviors

College is a time when students want to experiment, enjoy, stretch—and take some risks. But there is a difference between the risks of smoking marijuana and the risks of forming a band or trying out for a team. One is an illegal activity that can get you in serious trouble in the short term and cause adverse health consequences in the long run. The others impart the thrill that comes with trying something new and mastering a challenge. Are
Develop a Positive Addiction

When you’re anxious, bored, restless, or confused, when drugs seem all too appealing as a “quick fix,” there are real solutions, “positive addictions” that can help you solve your problems without creating new and bigger ones. A positive addiction—whether it is exercising, mountain climbing, or listening to music—can produce very real “highs,” often for very little money. There’s a crucial difference between this sort of stimulation and drug dependency: one is real, the other is chemical. With one, you’re in control; with the other, drugs are.

Here are some examples:

- **If you feel a need for physical relaxation**, if you want more energy or distraction from physical discomforts, you can turn to athletics, exercise (including walking and hiking), dance, or outdoor hobbies.

- **If you want to stimulate your senses**, enhance sexual stimulation, or magnify the sensations of sight, sound, and touch, train yourself to be more sensitive to nature and beauty. Take time to appreciate the sensations you experience when you’re walking in the woods or in love. Through activities like sailing or skydiving, you can literally fill up your senses without relying on chemicals.

- **If you want to escape mental boredom**, gain new understanding of the world around you, study better, experiment with your levels of awareness, or indulge your intellectual curiosity, you can challenge your mind through reading, classes, creative games, discussion groups, memory training, or travel.

- **If you’re looking for kicks**, adventure, danger, and excitement, sign up for a wilderness survival course. Take up an adventurous sport, like hang gliding or rock climbing. Set a challenging professional or personal goal and direct your energies to meeting it.

You taking risks that don’t make sense and that don’t add pleasure or passion to your life? Or are you taking risks that empower and inspire you?

The vast majority of college students do not engage in addictive behaviors. However, some do, and the reasons why are complex. According to recent research, the brain’s “reward center” responds to both pleasurable and exciting experiences, such as eating chocolate or bungee-jumping, by producing dopamine, a “feel good” chemical in the brain. In individuals with fewer dopamine “auto-receptors,” exciting or dangerous activities may trigger higher levels of dopamine than normal, which encourages thrill-seeking behavior. However, biology is not destiny. Although there are promising treatments for addictions (discussed later in this chapter), prevention is the smarter, safer—and far less costly—choice (see Health on a Budget).

Addictive Behaviors and the Dimensions of Health

Young adults have the highest rates of illicit drug use. Many do not realize that substance abuse and other self-destructive behaviors, such as gambling or compulsive eating, can affect every dimension of health. Some of the harmful effects are:

- **Physical health.** As shown in this and the following chapter, the abuse of alcohol, tobacco, and drugs takes a toll on every organ system in the body, increasing the likelihood of disease, disability, and premature death.

- **Psychological health.** Sometimes people begin abusing substances or engaging in addictive behavior as a way of “self-medicating” symptoms of anxiety or depression. However, alcohol or drugs provide only temporary relief. As abuse continues, shame and guilt increase, and coping with daily stressors becomes more difficult. Depression and anxiety are as likely to be the consequences as the causes of substance abuse.

- **Spiritual health.** Addictive behavior blocks the pursuit of meaning and inner fulfillment. As they rely more and more on a chemical or behavioral escape, individuals lose their sense of self and of connection with others and with a higher power.

- **Social health.** Addictive behavior strains and, in time, severs the ties that bind an individual to family, friends, colleagues, and classmates. The primary relationship in the life of alcoholics or addicts is with a behavior or a drug. They withdraw from others and become increasingly isolated.

- **Intellectual health.** The brain is one of the targets of alcohol and drugs. Under their influence, logic and reasoning break down. Impulses become more difficult to control. Judgment falters. Certain substances, such as ecstasy, can lead to permanent changes in brain chemistry.
• **Environmental health.** The use of some substances, such as tobacco, directly harms the environment. Abusers of alcohol and drugs also pose indirect threats to others because their behavior can lead to injury and damage.

## Gambling on Campus

Problem gambling has become more common among American adults than alcohol dependence. According to recent national surveys, levels of gambling, frequent gambling, and problem gambling increase during the teen years (even though underage gambling is illegal in most states), reach the highest point in the 20s and 30s, and decline after age 70. Men, who are more than twice as likely to be frequent gamblers as women, reach their highest gambling rates in their late teens. Whites are much more likely to report any gambling in the past year than blacks or Asians, but both African Americans and Native Americans report higher levels of frequent gambling.1

Gambling also is becoming a more serious and widespread problem on college campuses. Many college students buy lottery or scratch tickets, bet on sporting events, or go to casinos. About half of those who gamble at least once a month experience significant problems related to their gambling, including poor academic performance, heavy alcohol consumption, illicit drug use, unprotected sex, and other risky behaviors. An estimated 3 to 6 percent of college students engage in “pathological gambling,” which is characterized by “persistent and recurrent maladaptive gambling behavior.”

Researchers identified key indicators associated with “pathological” gambling: gambling more than once a month, gambling more than two hours a month, and wagering more than 10 percent of monthly income. A combination of parental gambling problems, gambling frequency, and psychological distress also is associated with college gambling.

College students who gamble say they do so for fun or excitement, to socialize, to win money, or to “just have something to do”—reasons similar to those of adults who gamble. Simply having access to casino machines, ongoing card games, or Internet gambling sites increases the likelihood that students will gamble.

Although most people who gamble limit the time and money they spend, some cross the line and lose control of their gambling “habit.” The term *problem gambling* refers to all individuals with gambling-related problems, including mild or occasional ones.

Researchers now view problem or pathological gambling as an addiction that runs in families. Individuals predisposed to gambling because of their family history are more likely to develop a problem if they are regularly exposed to gambling. Alcoholism and drug abuse often occur along with gambling, leading to chaotic lives and greater health risks.

## Risk Factors for Problem Gambling

Among young people (ages 16 to 25) the following behaviors indicate increased risk of problem gambling:

• Being male.

• Gambling at an early age (as young as age 8).

• Having a big win earlier in one’s gambling career.

• Consistently chasing losses (betting more to recover money already lost).

• Gambling alone.

• Feeling depressed before gambling.

• Feeling excited and aroused during gambling.

• Behaving irrationally during gambling.

• Having poor grades at school.

• Engaging in other addictive behaviors (smoking, drinking alcohol, illegal drug use).

• Being in a lower socioeconomic class.

• Having parents with a gambling or other addiction problem.

• Having a history of delinquency or stealing money to fund gambling.

• Skipping class to go gambling.
Pathological Gamblers

Adult pathological gamblers are more likely to be male, single, nonwhite, and less educated. Women start gambling later than men, but they progress more rapidly to pathological gambling. Genetics and exposure to gambling in childhood are significant influences. More than half of pathological gamblers report at least one first-degree relative with symptoms consistent with gambling problems.

Gamblers typically progress through various stages. In the winning phase, they feel empowered by their winnings and success. Next comes the losing phase, during which gamblers try to win back their losses. This is followed by the desperation phase, during which a gambler may resort to illegal activity, including stealing, to continue gambling. Some gamblers experience a fourth phase, the giving-up phase, where they desperately try to stay afloat in a game even though they realize they can’t win.

As many as three-fourths of adult pathological gamblers suffer from depression. They also have high rates of nicotine dependence, alcoholism, and anxiety disorders. An estimated 20 percent suffer from attention-deficit/hyperactivity disorder (ADHD). Even more—30 to 50 percent of pathological gamblers—abuse drugs or alcohol.

No standard or proven treatment exists for pathological gambling, but inpatient treatment centers, self-help groups, cognitive-behavioral psychotherapy, and addiction-based psychotherapy can help.

Do You Have a Gambling Problem?

- Do you gamble more than once a month?
- Do you wager more than 10 percent of your monthly income?
- Have you ever felt that your gambling or betting was out of control?
- Have you ever gotten into a fight with your family or friends because of gambling or betting?
- Have you ever felt that you lost too much money in gambling or betting?
- Have you ever felt the need to bet more and more money?
- Have you ever had to lie to people important to you about how much you gamble?

Even a single yes answer may indicate a problem. Go online or check with a counselor on campus to find resources, such as a local chapter of Gamblers Anonymous.

Drug Use on Campus

More than six in ten college students have never used marijuana or other illegal drugs. (See How Do You Compare?, p. 387.) Yet substance abuse remains a serious health risk for the minority of undergraduates who do use drugs.

Marijuana remains the most widely used illicit drug on campus, but the nonmedical use of prescription drugs now outranks other forms of substance abuse. In a recent national survey of college women, 7.8 percent reported that they had used a prescription drug for nonmedical purposes in the past year. According to various national surveys, about 12 percent of college students report that they have misused prescription opioids (discussed later in this chapter) at least once in the past, while 7 percent did so in the last year.

Students who engage only in nonmedical use of prescription pills (dubbed “pill-poppers” in one study) and those who use only illicit drugs
(“dopers” in the same study) are similar in some ways and different in others.

Characteristics of illicit drug users:

• Most in late teens and early 20s.
• More likely to be male.
• More likely to be white.
• Lower GPA.
• More likely to be sexually active.
• Less likely to report strong religious values.
• More likely to not be or have never been married.
• Less likely to report good physical or mental health.
• More likely than nonusers to misuse prescription drugs.

Characteristics of users of prescription drugs for nonmedical reasons:

• Unclear if women or men have higher rates.
• More likely to be white.
• Lower GPA.
• Less likely to report good physical or mental health.
• More likely to report knowing a member of the faculty or administration (possibly because of grades and academic performance).

**Why Students Don’t Use Drugs**

The majority of undergraduates do not use illegal drugs or abuse prescription drugs. What keeps them drug-free? Here are some important factors:

**Spirituality and religion.** The greater a student’s religiosity—a term that encompasses hours spent in prayer, attendance at religious services, and reading spiritual materials—the less likely the student is to use alcohol, illegal drugs, or tobacco. Unfortunately, researchers have noted a drop in students’ religiosity during college, along with an increase in their alcohol and marijuana use.

**Academic engagement.** Illicit drug use is much less common among students who actively participate in classes and feel connected with the subject matter. However, many students report never working closely with a faculty member, never being inspired by an educational experience, or never having an educational or extracurricular experience that motivates them to make an active contribution to a greater goal.

**Perceived harmfulness.** Although nonmedical use of prescription drugs has increased on college campuses, students—about one in four in a recent survey—who perceived a great risk of harm from repeated or occasional use were the least likely to misuse medications.

**Athletics.** Although male and female college athletes drink at higher rates than nonathletes, they are less likely to use illegal drugs. One exception is the use of anabolic steroids (discussed in Chapter 8), which college athletes use more than other students.

**Why Students Use Drugs**

Various factors influence which students use drugs, including the following:

**Genetics and family history.** Some college students inherit a genetic or biological predisposition to substance abuse. Researchers have identified specific genes tied to all types of

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**HOW DO YOU COMPARE?**

**STUDENT DRUG USE**

<table>
<thead>
<tr>
<th></th>
<th>Percent</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never used any drug*</td>
<td>64.2</td>
<td></td>
</tr>
<tr>
<td>Used, but not in last 30 days</td>
<td>22.0</td>
<td></td>
</tr>
<tr>
<td>Used in the last 30 days</td>
<td>13.8</td>
<td></td>
</tr>
<tr>
<td>Used all 30 days</td>
<td>1.8</td>
<td></td>
</tr>
</tbody>
</table>

*Excluding alcohol, cigarettes, tobacco from a water pipe, and marijuana; including club drugs, methamphetamine, cocaine, other stimulants, sedatives, hallucinogens, anabolic steroids, opiates, inhalants, smokeless tobacco, cigars, other illegal drugs

**HOW DO YOU COMPARE?**

Did you know that almost two-thirds of undergraduates have never used drugs? What has been your experience? If you are among the majority, what are the factors that have enabled you to say no to drugs? If you have used drugs, what were your reasons? What role do drugs now play in your life? What has been their impact? Write down your feelings about how drugs might affect your health and your life in your online journal.

Source: American College Health Association, American College Health Association-National College Health Assessment II: Reference Group Executive Summary Spring 2010 (Linthicum, MD: American College Health Association, 2010).
addictions. Some of the genes associated with alcohol dependence are closely linked with addictions to marijuana, nicotine, cocaine, heroin, and other substances. Also, the risk for problem drinking and alcohol abuse is higher among children of substance abusers.

- **Parental attitudes and behavior.** Parents’ concerns or expectations influence whether or how much most students drink, smoke, or use drugs. Those who perceive that their parents approve of their drinking, for instance, are more likely to report a drinking-related problem, such as memory loss or missing class. More than one in five underage students report acquiring alcohol from their parents or relatives.

- **Substance use in high school.** Many students start abusing drugs or alcohol well before getting to college. Only 8 percent of undergraduate marijuana users and even fewer cocaine users began their use in college. Misusing prescription drugs before age 16 increases the risk of a substance abuse disorder later in life.

- **Social norms.** College students tend to overestimate drug use on campus. In the American College Health Association National College Health Assessment survey, students reported believing that 8.6 percent of undergraduates had never used marijuana. In fact, 63.2 percent never had. (See Table 12.1.)

### Table 12.1 Marijuana Use on Campus

<table>
<thead>
<tr>
<th>Actual Use</th>
<th>Perceived Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
</tr>
<tr>
<td>Never used</td>
<td>59.5</td>
</tr>
<tr>
<td>Used, but not in the last 30 days</td>
<td>19.4</td>
</tr>
<tr>
<td>Used 1–9 days</td>
<td>11.6</td>
</tr>
<tr>
<td>Used 10–29 days</td>
<td>5.3</td>
</tr>
<tr>
<td>Used all 30 days</td>
<td>4.2</td>
</tr>
<tr>
<td>Any use within the last 30 days</td>
<td>21.1</td>
</tr>
</tbody>
</table>

Source: American College Health Association, American College Health Association-National College Health Assessment II: Reference Group Executive Summary Spring 2010 (Linthicum, MD: American College Health Association, 2010).

- **Positive expectations.** Many students expect a drug to make them feel less stressed or anxious, more relaxed or confident, less shy or inhibited. Among students who use illicit drugs, many say they do so to relieve stress. Others self-medicate, taking drugs to relieve depression or anxiety. Some abuse prescription medications, such as Adderall and Ritalin, because they think these drugs will energize them to study longer or perform better. Even when drugs don’t live up to students’ expectations, they may continue taking them for some short-term relief or because they have become addicted and cannot stop.

- **Mental health problems.** Students with feelings of hopelessness, sadness, depression, and anxiety as well as those with clinical mental disorders have higher rates of prescription drug abuse and illegal drug use. Students diagnosed with depression in the past school year have higher rates of marijuana, cocaine, alcohol, and tobacco use. Students with a history of ADHD (discussed in Chapter 3) are also more vulnerable to substance abuse. In a recent study, undergraduates with a history of ADHD were more likely to report having used marijuana and other illicit drugs, to begin use at a younger age, and to suffer higher levels of impairment.

- **Social influences.** More than nine in ten students who use illegal drugs were introduced to the habit through friends; most use drugs with friends. Sorority and fraternity members, who tend to socialize more often, are likelier to abuse prescription stimulants, but students who live off campus have higher rates of marijuana and cocaine use.

- **Alcohol use.** Often individuals engage in more than one risky behavior. Researchers have found that those students who report binge drinking are much more likely than other students to report current or past use of marijuana, cocaine, or other illegal drugs.

- **Race/ethnicity.** In general, white students have higher levels of alcohol and drug use than do African American students. In a comparison of African American students at predominantly white and predominantly black
colleges, those at historically black colleges had lower rates of alcohol and drug use than did either white or African American students at white schools. The reason, according to the researchers, may be that these colleges provide a greater sense of self-esteeem, which helps prevent alcohol and drug use.

- **Sexual identity.** Gay, lesbian, and bisexual teens may rely on alcohol and marijuana to lessen social anxiety and boost self-confidence when they first come out. However, once they become more involved in the gay community, many are less likely to do so. Nonetheless, lesbians are significantly more likely than heterosexual women to use marijuana, Ecstasy, and other drugs. Gay and bisexual men are significantly less likely than heterosexual men to drink heavily but more likely to use drugs.

### Understanding Drugs and Their Effects

A **drug** is a chemical substance that affects the way you feel and function. In some circumstances, taking a drug can help the body heal or relieve physical and mental distress. In other circumstances, taking a drug can distort reality, undermine well-being, and threaten survival. No drug is completely safe; all drugs have multiple effects that vary greatly in different people at different times. Knowing how drugs affect the brain, body, and behavior is crucial to understanding their impact and making responsible decisions about their use.

**Drug abuse** is the widely used term for the improper use of drugs, but some researchers have broken down the behavior into several categories:

- **Drug abuse** is a pattern of substance use resulting in negative consequences or impairment.
- **Drug dependence** is a pattern of continuing substance use despite cognitive, behavioral, and physical symptoms.
- **Drug misuse** is taking a drug for a purpose or by a person other than that for which it was intended or not taking the recommended doses.

- **Drug diversion** is the transfer of a medication from the individual to whom it was prescribed to another person.

Risks are involved with all forms of drug use. Even medications that help cure illnesses or soothe symptoms have side effects and can be misused. Some substances that millions of people use every day, such as caffeine, pose some health risks. Others—like the most commonly used drugs in our society, alcohol and tobacco—can lead to potentially life-threatening problems. With some illicit drugs, any form of use can be dangerous.

Many factors determine the effects a drug has on an individual. These include how the drug enters the body, the dosage, the drug action, and the presence of other drugs in the body—as well as the physical and psychological makeup it was intended for.
of the person taking the drug and the setting in which the drug is used.

**Routes of Administration**

Drugs can enter the body in a number of ways (Figure 12.1). The most common way of taking a drug is by swallowing a tablet, capsule, or liquid. However, drugs taken orally don’t reach the bloodstream as quickly as drugs introduced into the body by other means. A drug taken orally may not have any effect for 30 minutes or more.

Drugs can enter the body through the lungs either by inhaling smoke—for example, from marijuana—or by inhaling gases, aerosol sprays, or fumes from solvents or other compounds that evaporate quickly. Young users of such inhalants, discussed later in this chapter, often soak a rag with fluid and press it over their nose. Or they may place inhalants in a plastic bag, put the bag over their nose and mouth, and take deep breaths—a practice called *huffing* and one that can produce serious, even fatal consequences.

Drugs can also be injected with a syringe subcutaneously (beneath the skin), intramuscularly (into muscle tissue, which is richly supplied with blood vessels), or intravenously (directly into a vein). **Intravenous** (IV) injection gets the drug into the bloodstream immediately (within seconds in most cases); **intramuscular** injection, moderately fast (within a few minutes); and **subcutaneous** injection, more slowly (within ten minutes).

Injecting drugs is extremely dangerous because many diseases, including hepatitis and infection with human immunodeficiency virus (HIV), can be transmitted by sharing contaminated needles. Injection-drug users who are HIV-positive are a major source of transmission of HIV among heterosexuals (see Chapter 16).

**Dosage and Toxicity**

The effects of any drug depend on the amount an individual takes. Increasing the dose usually intensifies the effects produced by smaller doses. Also, the kind of effect may change at different dose levels. For example, low doses of barbiturates may relieve anxiety, while higher doses can induce sleep, loss of sensation, even coma and death.

The dosage level at which a drug becomes poisonous to the body, causing either temporary or permanent damage, is called its **toxicity**. In most cases, drugs are eventually broken down in the liver by special body chemicals called detoxification enzymes.

**Individual Differences**

Each person responds differently to different drugs, depending on circumstances or setting. The enzymes in the body reduce the levels of drugs in the bloodstream; because there can be 80 variants of each enzyme, every person’s body may react differently.

Often drugs intensify the emotional state a person is in. If you’re feeling depressed, a drug may make you feel more depressed. A generalized physical problem, such as having the flu, may make your body more vulnerable to the effects of a drug. Genetic differences among individuals also may account for varying reactions.

Personality and psychological attitude also play a role in drug effects. Each user’s mind-set—his or her expectations or preconceptions about using the drug—affects the experience. Someone who takes a “club drug” (discussed further later in this chapter) to feel more “connected” may feel more sociable simply because that’s what he or she expects.
Setting

The setting for drug use also influences its effects. Passing around a marijuana joint at a friend’s is not a healthy or safe behavior, but the experience of going to a crack house is very different—and entails greater dangers.

Types of Action

A drug can act locally, as novocaine does to deaden pain in a tooth; generally, throughout a body system, as barbiturates do on the central nervous system; or selectively, as a drug does when it has a greater effect on one specific organ or system than on others, such as a spinal anesthetic. A drug that accumulates in the body because it’s taken in faster than it can be metabolized and excreted is called cumulative; alcohol is such a drug.

Interaction with Other Drugs or Alcohol

A drug can interact with other drugs in four different ways:

• An additive interaction is one in which the resulting effect is equal to the sum of the effects of the different drugs used.

• A synergistic interaction is one in which the total effect of the two drugs taken together is greater than the sum of the effects the two drugs would have had if taken by themselves on separate occasions. Mixing barbiturates and alcohol, for example, has up to four times the depressant effect that either drug has alone.

• A drug can be potentiating—that is, one drug can increase the effect of another. Alcohol, for instance, can increase the drowsiness caused by antihistamines (anti-allergy medications).

• Drugs can interact in an antagonistic fashion—that is, one drug can neutralize or block another drug with opposite effects. Tranquilizers, for example, may counter some of the nervousness and anxiety produced by cocaine.

The danger of mixing alcohol with other drugs cannot be emphasized too strongly. Alcohol and marijuana intensify each other’s effects, making driving and many other activities extremely dangerous. Some people who have mixed sedatives or tranquilizers with alcohol never regained consciousness.

Gender and Drugs

Beginning at a very early age, males and females show different patterns in drug use. Men generally encounter more opportunities to use drugs than women do, but given an opportunity to use drugs for the first time, both genders are equally likely to do so and to progress from initial use to dependence. Vulnerability to some drugs varies with gender. Both are equally likely to become addicted to or dependent on cocaine, heroin, hallucinogens, tobacco, and inhalants. Women are more likely than men to become addicted to or dependent on sedatives and drugs designed to treat anxiety or sleeplessness and less likely than men to abuse alcohol and marijuana.

Males and females may differ in their biological responses to drugs. In studies of animals given the opportunity to self-administer intravenous doses of cocaine or heroin, females began self-administration sooner than males and administered larger amounts of the drugs. Male and female long-term cocaine users showed similar impairment in tests of concentration, memory, and academic achievement following sustained abstinence, even though women in the study had substantially greater exposure to cocaine. Female cocaine users also were less likely than men to exhibit abnormalities of blood flow in the brain’s frontal lobes. These findings suggest a gender-related mechanism that may protect women from some of the damage cocaine inflicts on the brain. However, women are more vulnerable to poor nutrition and below-average weight, depression, physical abuse, and if pregnant, preterm labor or early delivery.

Caffeine and Its Effects

Caffeine, which has been drunk, chewed, and swallowed since the Stone Age, is the most widely used psychoactive (mind-affecting)
drug in the world. Genetics may determine how much caffeine one craves. Scientists have identified the genes that drive people to consume more—or less—of this stimulant.10

Eighty percent of Americans drink coffee, our principal caffeine source—an average of 3.5 cups a day. Coffee contains 100 to 150 milligrams of caffeine per cup; tea, 40 to 100 milligrams; cola, about 45 milligrams. Most medications that contain caffeine are one-third to one-half the strength of a cup of coffee. However, some, such as Excedrin, are very high in caffeine. A “cup” of coffee, according to Table 12.2, contains only 5 ounces, but the smallest size available at most coffee shops is 8 to 12 ounces. You may be ingesting more caffeine than you think.

As a stimulant, caffeine relieves drowsiness, helps in the performance of repetitive tasks, and improves the capacity for work. Caffeine improves performance and endurance during prolonged, exhaustive exercise and, to a lesser degree, enhances short-term, high-intensity athletic performance. Additional benefits include improved concentration, reduced fatigue, and sharpened alertness.

You’ll stay more alert, particularly if you are fighting sleep deprivation, if you spread your coffee consumption over the course of the day. For instance, rather than drinking two 8-ounce cups in the morning, try consuming smaller servings of an ounce or two during the course of the day.

In recent decades, some 19,000 studies have examined caffeine’s impact on health. Their conclusion: For most people, caffeine poses few serious health risks—and may convey a surprising range of benefits. Drinking up to six cups a day of decaffeinated or decaffeinated coffee won’t shorten your lifespan and may convey some health benefits, including a lower risk of type 2 diabetes and cardiovascular disease.11 Caffeine may also protect against Alzheimer’s disease, Parkinson’s disease, colon cancer, liver cirrhosis, gallstones, and stroke.12 There is some evidence that coffee may relieve migraines, boost mood, and even prevent cavities. Researchers have found no significant relationship between coffee and tea consumption and the risk of breast cancer.

Despite these positive findings, doctors still advise pregnant women, heart patients, and those at risk for osteoporosis to limit or avoid coffee. High doses of daily caffeine—whether from coffee, tea, decaffeinated soda, or hot chocolate—increase the risk of miscarriage. Too much caffeine, particularly in high-powered energy drinks, can be dangerous for everyone.

You can overdose on caffeine and develop symptoms such as restlessness, nervousness, excitement, insomnia, flushed face, increased urination, digestive complaints, muscle twitching, rambling thoughts and speech, rapid heart rate or arrhythmias, periods of inexhaustibility, and physical restlessness. Some people develop these symptoms after as little as 250 milligrams of caffeine a day; others, only with much larger doses. Higher doses may produce ringing in the ears or flashes of light, grand mal seizures, and potentially fatal respiratory failure.

Caffeine withdrawal for those dependent on this substance can cause headaches and other neurological symptoms. Those who must cut back should taper off gradually. One approach is to mix regular and decaffeinated coffee, gradually decreasing the quantity of the former.

Table 12.2 Caffeine Counts

<table>
<thead>
<tr>
<th>Substance (Typical Serving)</th>
<th>Caffeine (milligrams)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No-Doz, one pill</td>
<td>200</td>
</tr>
<tr>
<td>Coffee (drip), one 5-ounce cup</td>
<td>130</td>
</tr>
<tr>
<td>Excedrin, two pills</td>
<td>130</td>
</tr>
<tr>
<td>Espresso, one 2-ounce cup</td>
<td>100</td>
</tr>
<tr>
<td>Energy drink (Red Bull), one can</td>
<td>80</td>
</tr>
<tr>
<td>Instant coffee, one 5-ounce cup</td>
<td>74</td>
</tr>
<tr>
<td>Coca-Cola, 12 ounces</td>
<td>46</td>
</tr>
<tr>
<td>Tea, one 5-ounce cup</td>
<td>40</td>
</tr>
<tr>
<td>Dark chocolate, 1 ounce</td>
<td>20</td>
</tr>
<tr>
<td>Milk chocolate, 1 ounce</td>
<td>6</td>
</tr>
<tr>
<td>Cocoa, 5 ounces</td>
<td>4</td>
</tr>
<tr>
<td>Decaffeinated coffee, one 5-ounce cup</td>
<td>3</td>
</tr>
</tbody>
</table>
Medications

As many as half of all patients take the wrong medications, in the wrong doses, at the wrong times, or in the wrong ways. Every year these inadvertent errors lead to an estimated 125,000 deaths and more than $8.5 billion in hospital costs. Mistakes occur among people of all ages, both genders, and every race, occupation, level of education, and personality type. Their number one cause: not understanding directions (see Consumer Alert, p. 394).

Doctors occasionally make errors when it comes to prescription drugs. The most frequent are over- or underdosing, omitting information from prescriptions, ordering the wrong dosage form (a pill instead of a liquid, for example), and not recognizing a patient’s allergy to a drug.

Over-the-Counter Drugs

More than half a million health products—remedies for everything from bad breath to bunions—are readily available without a doctor’s prescription. This doesn’t mean that they’re necessarily safe or effective. Indeed, many widely used over-the-counter (OTC) drugs pose unsuspected hazards.

Federal regulators have issued warnings for many popular painkillers, including over-the-counter pills like Advil (ibuprofen) and Aleve (naproxin). Their labels cite risks to the heart, stomach, and skin. Tylenol (acetaminophen) and aspirin are generally considered safe for people with temporary pain like headaches and muscle aches. However, aspirin can cause stomach irritation and bleeding. Tylenol and other products containing acetaminophen account for 40 to 50 percent of all acute cases of liver failure, many the result of unintentional overdose. Doctors caution against taking more than eight Tylenol Extra Strength pills (which contain 500 mg per tablet) in a 24-hour period.

Like other drugs, OTC medications can be used improperly, often simply because of a lack of education about proper use. Among those most often misused are the following:

• Nasal sprays. Nasal sprays relieve congestion by shrinking blood vessels in the nose. If they are used too often or for too many days in a row, the blood vessels widen instead of contracting, and the surrounding tissues become swollen, causing more congestion. To make the vessels shrink again, many people use more spray more often. The result can be permanent damage to nasal membranes, bleeding, infection, and partial or complete loss of smell.

• Laxatives. Believing that they must have one bowel movement a day (a common misconception), many people rely on laxatives. Brands that contain phenolphthalein irritate the lining of the intestines and cause muscles to contract or tighten, often making constipation worse rather than better. Bulk laxatives are less dangerous, but regular use is not advised. A high-fiber diet and more exercise are safer and more effective remedies for constipation.

• Eye drops. Eye drops make the blood vessels of the eye contract. However, as in the case of nasal sprays, with overuse (several times a day for several weeks), the blood vessels expand, making the eye look redder than before.

Always read the consumer-information label before using an over-the-counter drug.

over-the-counter (OTC) drugs Medications that can be obtained legally without a prescription from a medical professional.
Avoid Medication Mistakes

Whenever you get a prescription, be sure to find out from your doctor and pharmacist the name of the drug, what it’s supposed to do, and how and when to take it and for how long. Are there foods, drinks, other medications, or activities you should avoid while taking the medication? Ask if the drug causes any side effects and what you should do if any occur.

Facts to Know

- Popular herbal supplements like gingko biloba and common over-the-counter drugs like aspirin can interact with many prescription drugs to cause serious problems, such as excessive bleeding. Inform your doctor if you take any.
- Don’t use a kitchen spoon to dispense liquid medications. Household teaspoons can hold between 3 and 7 milliliters; a prescription “teaspoon” means 5 milliliters. Either measure the dose in the cup or dropper that came with the medicine or ask the pharmacist for a measuring device.
- Don’t crush or chew a medicine without checking with your doctor or pharmacist first. Some medications are designed for gradual release rather than all at once and could be harmful if absorbed too quickly.

Steps to Take

- Keep a record of all your medicines, listing both their brand and generic (chemical) names and the reason you are taking them, and update it regularly. Give a copy of this list to every physician and every pharmacy providing health-care services.
- Always turn on the lights when you take your medication. Familiarize yourself with the imprint on each tablet or capsule so you can recognize each pill. If a refill looks different, check with your pharmacist or doctor before taking it.
- Never take someone else’s medications. They could interact with your medications or the dose may be different.
- Always check labels for warnings on interactions with alcohol and instructions on whether or not to take before, with, or after meals.
- Don’t take medicine with grapefruit juice, which can interact with more than 200 medications, including cholesterol-lowering statins, sleeping pills, and antianxiety agents.
- Don’t leave medicines in a car for prolonged periods. Temperature extremes, along with moisture, light, and oxygen, can affect the potency of many medications.

• Sleep aids. Although OTC sleeping pills are widely used, there has been little research on their use and possible risks. A national consensus panel on insomnia concluded that they are not effective and cause side effects such as morning-after grogginess. Medications like Tylenol PM and Excedrin PM combine a pain reliever with a sleep-inducing antihistamine, the same ingredient that people take for hay fever or cold symptoms. Although they make people drowsy, they can leave a groggy feeling the next day, and they dry out the nose and mouth.

• Cough syrup. Many of the “active” ingredients in over-the-counter cough preparations may be ineffective. Young people may chug cough syrup (called rooting) after the OTC medication Robitussin because they think of dextromethorphan (DXM), a common ingredient in cough medicine, as a “poor man’s version” of the popular drug Ecstasy.

• Painkillers. Men younger than age 50 who take acetaminophen (the main ingredient in Tylenol) more than two times a week have roughly double the risk of hearing loss compared to men who do not. Men of similar ages who take ibuprofen (the main ingredient in Motrin or Advil) at least twice a week have a nearly two-thirds higher risk of hearing loss. Men who take aspirin twice a week have a one-third higher risk. However, the absolute risk of hearing loss remains small in young and middle-aged men.\(^{13}\)

Prescription Drugs

Most undergraduates have used prescription drugs for medical reasons at some point in their lives. The most widely used ones are pain medications, sedative or anxiety medications, sleeping medications, and stimulant medications. College women use more pain, anxiety, and sleeping pills; college men, more medically prescribed stimulants. (See Table 12.3.)

Nonadherence Many prescribed medications aren’t taken the way they should be; millions simply aren’t taken at all. As many as 70 percent of adults have trouble understanding dosage information and 30 percent can’t read
standard labels, according to the FDA, which has called for larger, clearer drug labeling. The dangers of nonadherence (not properly taking prescription drugs) include recurrent infections, serious medical complications, and emergency hospital treatment. The drugs most likely to be taken incorrectly are those that treat problems with no obvious symptoms (such as high blood pressure), require complex dosage schedules, treat psychiatric disorders, or have unpleasant side effects.

The most common reason that college students fail to take medicines as directed is forgetting. Others are concerned about cost, or they stop when they feel better.

**Physical Side Effects** Most medications, taken correctly, cause only minor complications. However, no drug is entirely without side effects for all individuals taking it. Serious complications that may occur include heart failure, heart attack, seizures, kidney and liver failure, severe blood disorders, birth defects, blindness, memory problems, and allergic reactions. Even legitimate use of some drugs, such as opioid painkillers, can lead to potentially fatal overdoses.14

Allergic reactions to drugs are common. The drugs that most often provoke allergic responses are penicillin and other antibiotics (drugs used to treat infection). Aspirin, sulfa drugs, barbiturates, anticonvulsants, insulin, and local anesthetics can also provoke allergic responses.

**Psychological Side Effects** Dozens of drugs—both over-the-counter and prescription—can cause changes in the way people think, feel, and behave. Unfortunately, neither patients nor their physicians usually connect such symptoms with medications. Doctors may not even mention potential mental and emotional problems because they don’t want to scare patients away from what otherwise may be a very effective treatment. What you don’t know about a drug’s effects on your mind can hurt you.

Among the medications most likely to cause psychiatric side effects are drugs for high blood pressure, heart disease, asthma, epilepsy, arthritis, Parkinson’s disease, anxiety, insomnia, and depression. Some drugs—such as the powerful hormones called corticosteroids, used for asthma, autoimmune diseases, and cancer—can cause different psychiatric symptoms, depending on dosage and other factors. The older you are, the sicker you are, and the more medications you’re taking, the greater your risk of developing some psychiatric side effects.

**Drug Interactions** OTC and prescription drugs can interact in a variety of ways. For example, mixing some cold medications with tranquilizers can cause drowsiness and coordination problems, thus making driving dangerous. Moreover, what you eat or drink can impair or completely wipe out the effectiveness of drugs or lead to unexpected effects on the body. For instance, aspirin takes five to ten times as long to be absorbed when taken with food or shortly after a meal than when taken on an empty stomach. If tetracyclines encounter calcium in the stomach, they bind together and cancel each other out.

To avoid potentially dangerous interactions, check the label(s) for any instructions on how or when to take a medication, such as “with a meal.” If the directions say that you should take a drug on an empty stomach, take it at least one hour before eating or two or three hours after eating. Don’t drink a hot beverage with a medication; the temperature may interfere with the effectiveness of the drug.

Whenever you take a drug, be especially careful of your intake of alcohol, which can change the rate of metabolism and the effects of many

<table>
<thead>
<tr>
<th>Table 12.3 Unauthorized Prescription Drug Use by College Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of college students who reported using prescription drugs that were not prescribed to them within the last 12 months:</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Antidepressants</td>
</tr>
<tr>
<td>Erectile dysfunction drugs</td>
</tr>
<tr>
<td>Painkillers</td>
</tr>
<tr>
<td>Sedatives</td>
</tr>
<tr>
<td>Stimulants</td>
</tr>
<tr>
<td>Used one or more of the above</td>
</tr>
</tbody>
</table>

Source: American College Health Association, American College Health Association-National College Health Association: Reference Group Executive Summary Spring 2010 (Linthicum, MD: American College Health Association, 2010).
Different drugs. Because it dilates the blood vessels, alcohol can add to the dizziness sometimes caused by drugs for high blood pressure, angina, or depression. Also, its irritating effects on the stomach can worsen stomach upset from aspirin, ibuprofen, and other anti-inflammatory drugs.

**Generic Drugs** The generic name is the chemical name for a drug. A specific drug may appear on the pharmacist’s shelf under a variety of brand names, which may cost more than twice the generic equivalent. About 75 percent of all prescriptions specify a brand name, but pharmacists may—and in some states must—switch to a generic drug unless the doctor specifically tells them not to. Prescriptions filled with generic drugs cost 20 to 85 percent less than their brand-name counterparts.

Generic drugs have the same active ingredients as brand-name prescriptions, but their fillers and binders, which can affect the absorption of a drug, may be different. For some serious illnesses, the generics may not be as effective; some experts recommend sticking with brand names for heart medications, psychiatric drugs, and anticonvulsant drugs (for epilepsy and other seizure disorders).

To determine whether you should buy the generic version of a drug, ask your physician whether it matters if you get a brand-name or generic drug. If it does, ask which brand name is best. Also, find out if switching to a generic or from one generic to another might harm your condition in any way.

**Buying Drugs Online** Millions of people in the United States purchase prescription medications online. Although some websites fill only faxed prescriptions from medical doctors, others ignore or sidestep traditional regulations and safeguards. Cyberspace distributors often ship pills across state lines without requiring a physical examination by a medical doctor. Instead, a “cyberdoc,” who may or may not be qualified or up-to-date in a given specialty, reviews information submitted by a “patient.” International pharmacies sometimes sell drugs that are not available or approved in the United States. And patients themselves use bulletin boards and other online resources to sell unused or unwanted medications to each other.

Many individuals turn to the Internet for “lifestyle” drugs such as pills for erectile dysfunction, weight control, and smoking cessation. Customers like the convenience and anonymity of buying drugs online. Although many assume drugs cost less on the Internet, shipping costs tend to drive prices up to the same amount or more than the price at a pharmacy.

The dangers of unregulated distribution of medications have alarmed government agencies and medical groups. The American Medical Association has declared it unethical for physicians to write prescriptions for people they’ve never met. The National Association of Boards of Pharmacy has developed a seal of approval to help customers determine which sites are legitimate. The FDA and other federal agencies, such as the Federal Trade Commission, which regulates advertising, are trying to find ways to impose some controls.

Consumers have to be wary. Ordering a drug like Accutane, an acne treatment, online may seem harmless. However, without close monitoring by a physician, you could develop complications, such as a bad reaction that aggravates hepatitis or inflames the pancreas. Quality control is another concern. Counterfeit drugs, increasingly sold online, may do little, if any, good and could be harmful. Cyberspace pharmacies provide no information on how the drug was stored or whether its expiration date has passed. In addition, since importing medications without a prescription is against the law, you could find yourself in legal trouble.

**Prescription Drug Abuse on Campus**

One of every five teenagers and adults—about 50 million Americans—have used a prescription drug for a nonmedical purpose. Nonmedical use of any prescription medication is highest among young adults between the ages of 18 and 25, compared with other age groups, and opioid painkillers (discussed later in this chapter) are the most widely misused.\(^\text{15}\)
The abuse of prescription medications on college campuses has increased in the last 15 years. As many as one in five college students misuses or abuses a prescription medication every year. Young adults (between ages 18 and 25) have the highest rates of prescription painkiller abuse of any age group in the country. Only marijuana use is more widespread on campus.

College men have higher rates of prescription drug abuse than women. White and Hispanic undergraduates are significantly more likely to abuse medications than are African American and Asian students. Many students taking prescription drugs for medical purposes report being approached by classmates seeking drugs. Undergraduates who misuse or abuse prescription medications are much more likely to report heavy binge drinking and use of illicit drugs. College women who do so are at greater risk for sexual victimization and assault.

Students who abuse prescription drugs may use both stimulants and painkillers. However, most students choose these agents for different reasons. Students who abuse stimulants say they do so to help improve performance at school, to increase alertness, or to enjoy partying more. A much smaller number take stimulants to lose weight or prevent weight gain. Students who abuse prescription painkillers say they do so to relax or get high, although some report taking the drugs to help with depression and anxiety or for chronic pain.

**Prescription Stimulants**

The most widely abused prescription drugs are stimulant medications such as Ritalin. Students often view illicit stimulant use as physically harmless and morally acceptable. Many think that stimulants can help them focus, concentrate, and study longer. Yet users of these drugs actually have lower GPAs than nonusers, and there is little evidence that stimulants provide any boost.

In various studies, 5 to 35 percent of college-age individuals have reported nonprescribed use of stimulants, and 16 to 29 percent of students prescribed stimulants for ADHD reported being asked to give, sell, or trade their medications.

Students who are white, are traditional college age (under 24), belong to fraternities or sororities, have lower grade-point averages, and report some symptoms of ADHD are most likely to misuse or pass on stimulants to others. Most illicit users obtain the drugs from friends or peers for free or at a cost of $1 to $5. In a study of 1,550 undergraduates at a large southern university, about four in ten reported illicit stimulant use. These users, along with students with ADHD, reported significantly greater drug use than others.

Although proper medical use of this agent appears safe, misuse or abuse of any stimulant medication can be dangerous, even deadly. When taken in high doses, either orally or nasally, the risk of addiction increases. Physical side effects include cardiorespiratory complications, increased blood pressure, and headache. High doses can trigger panic attacks, aggressive behavior, and suicidal or homicidal impulses. Overdoses can kill.

**Prescription Painkillers**

Abuse of prescription painkillers, such as OxyContin and Vicodin, is also widespread on campuses. Students who are members of fraternities and sororities, enrolled at more competitive schools, earning lower grade-point averages, and engaging in substance use and other risky behaviors are more likely to abuse these drugs. Smokers also are more prone to long-term prescription abuse.

Like other addictions, a prescription painkiller “habit” is a treatable brain disease. Recovery usually requires carefully supervised detoxification, appropriate medications (similar to those used for opioid dependence), behavioral therapy, and ongoing support.

**Substance-Use Disorders**

People have been using psychoactive chemicals for centuries. Citizens of ancient Mesopotamia and Egypt used opium. More than 3,000
years ago, Hindus included cannabis products in religious ceremonies. For centuries the Inca in South America have chewed the leaves of the coca bush. Yet while drugs existed in most societies, their use was usually limited to small groups. Today millions of people regularly turn to drugs to pick them up, bring them down, alter perceptions, or ease psychological pain.

The word addiction, as used by the general population, refers to the compulsive use of a substance, loss of control, negative consequences, and denial. Mental health professionals, who describe drug-related problems in terms of dependence and abuse, have identified warning signs of a potential problem. (See Health in Action for advice on recognizing substance-use disorders.)

Dependence

Individuals may develop psychological dependence and feel a strong craving for a drug because it produces pleasurable feelings or relieves stress and anxiety. Physical dependence occurs when a person develops tolerance to the effects of a drug and needs larger and larger doses to achieve intoxication or another desired effect. Individuals who are physically dependent and have a high tolerance to a drug may take amounts many times those that would produce intoxication or an overdose in someone who was not a regular user.

Men and women with a substance dependence disorder may use a drug to avoid or relieve withdrawal symptoms, or they may consume larger amounts of a drug or use it over a longer period than they’d originally intended. They may repeatedly try to cut down on control drug use without success; spend a great deal of time obtaining or using drugs or recovering from their effects; give up or reduce important social, occupational, or recreational activities because of their drug use; or continue to use a drug despite knowledge that the drug is likely to cause or worsen a persistent or recurring physical or psychological problem.

Specific symptoms of dependence vary with particular drugs. Some drugs, such as marijuana, hallucinogens, and phencyclidine, do not cause withdrawal symptoms. The degree of dependence also varies. In mild cases, a person may function normally most of the time. In severe cases, the person’s entire life may revolve around obtaining, using, and recuperating from the effects of a drug.

Individuals with drug dependence become intoxicated or high on a regular basis—whether every day, every weekend, or several binges a year. They may try repeatedly to stop using a drug and yet fail, even though they realize their drug use is interfering with their health, family life, relationships, and work.

Abuse

Some drug users do not develop the symptoms of tolerance and withdrawal that characterize dependence, yet they use drugs in ways that clearly have a harmful effect on them. These individuals are diagnosed as having a psychoactive substance abuse disorder. They continue to use drugs despite their awareness of persistent or repeated social, occupational, psychological, or physical problems related to drug use, or they use drugs in dangerous ways or situations (before driving, for instance).

Intoxication and Withdrawal

Intoxication refers to maladaptive behavioral, psychological, and physiologic changes that occur as a result of substance abuse. Withdrawal is the development of symptoms that cause significant psychological and physical distress when an individual reduces or stops drug use. (Intoxication and withdrawal from specific drugs are discussed later in this chapter.)

Polyabuse

Most users prefer a certain type of drug but also use several others; this behavior is called polyabuse. The average user who enters treatment is on five different drugs. The more drugs anyone uses, the greater the chance of side effects, complications, and possibly life-threatening interactions.

Coexisting Conditions

Mental disorders and substance abuse disorders have a great deal of overlap. Many individuals
with substance abuse disorders also have another psychiatric disorder, such as depression. Individuals with such dual diagnoses require careful evaluation and appropriate treatment for the complete range of complex and chronic difficulties they face. However, they can benefit from participation in 12-step groups, like Double Trouble in Recovery, that provide treatment for both.

Causes of Drug Dependence and Abuse

No one fully understands why some people develop drug dependence or abuse disorders, whereas others, who may experiment briefly with drugs, do not. Inherited body chemistry, genetic factors, and sensitivity to drugs may make some individuals more susceptible. These disorders may stem from many complex causes.

The Biology of Dependence

Scientists now view drug dependence as a brain disease triggered by frequent use of drugs that change the biochemistry and anatomy of neurons and alter the way they work. A major breakthrough in understanding dependence has been the discovery that certain mood-altering substances and experiences—a puff of marijuana, a slug of whiskey, a snort of cocaine, a big win at blackjack—trigger a rise in a brain chemical called dopamine, which is associated with feelings of satisfaction and euphoria. This brain chemical or neurotransmitter is one of the crucial messengers that links nerve cells in the brain and its level rises during any pleasurable experience, whether it be a loving hug or a taste of chocolate.

The mechanism governing the rise in dopamine levels is not the same for all drugs. Figure 12.2 shows the one for cocaine. Normally, after dopamine is released from the axon terminal of a neuron and activates dopamine receptors on the adjacent neuron, the dopamine is then transported back to its original neuron by “uptake pumps.” Cocaine binds to the uptake pumps and prevents them from transporting dopamine back into the neuron terminal. So more dopamine builds up in the synapse and is free to activate more dopamine receptors.

Addictive drugs have such a powerful impact on dopamine and its receptors that they change the pathways within the brain’s pleasure centers.

Health in Action

Recognizing Substance Abuse

How can you tell if a friend or loved one has a substance-use disorder? Look for the following warning signs:

- An abrupt change in attitude. Individuals may lose interest in activities they once enjoyed or in being with friends they once valued.
- Mood swings. Drug users may often seem withdrawn or “out of it,” or they may display unusual temper flareups.
- A decline in performance. Students may start skipping classes, stop studying, or not complete assignments; their grades may plummet.
- Increased sensitivity. Individuals may react intensely to any criticism or become easily frustrated or angered.
- Secrecy. Drug users may make furtive telephone calls or demand greater privacy concerning their personal possessions or their whereabouts.
- Physical changes. Individuals using drugs may change their pattern of sleep, spending more time in bed or sleeping at odd hours. They also may change their eating habits and lose weight.
- Money problems. Drug users may constantly borrow money, seem short of cash, or begin stealing.
- Changes in appearance. As they become more involved with drugs, users often lose regard for their personal appearance and look disheveled.
- Defiance of restrictions. Individuals may ignore or deliberately refuse to comply with deadlines, curfews, or other regulations.
- Changes in relationships. Drug users may quarrel more frequently with family members or old friends and develop strong allegiances with new acquaintances, including other drug users.

Various psychoactive chemicals create a craving for more of the same. According to this hypothesis, addicts do not specifically yearn for heroin, cocaine, or nicotine but for the rush of dopamine that these drugs produce. Some individuals, born with low levels of dopamine, may be particularly susceptible to this craving and thus to addiction.

The Psychology of Vulnerability

Although scientists do not believe there is an addictive personality, certain individuals are at greater risk of drug dependence because of psychological factors, including difficulty controlling impulses, a lack of values that might constrain drug use (whether based in religion, family, or society), low self-esteem, feelings of powerlessness, and depression. The one psychological trait most often linked with drug use is denial. Young people in particular are absolutely
Parents’ own attitudes and drug-use history affect their children’s likelihood of using marijuana, according to the Substance Abuse and Mental Health Services Administration. Parents who perceive little risk associated with marijuana use have children with similar attitudes, and the children of parents who used marijuana are more likely to try the drug than are children whose parents never used the drug.

**Drugged Driving**

Driving under the influence of any substance that acts on the brain can impair motor skills, reaction time, and judgment. Some state laws define “drugged driving” as driving when a drug “renders the driver incapable of driving safely.” Other states have “per se” laws, according to which it is illegal to operate a moving vehicle if there is any detectable level of a prohibited drug or its metabolites in a driver’s blood.

According to the National Highway Traffic Safety Administration, more than 16 percent of weekend, nighttime drivers test positive for illegal, prescription, or over-the-counter medications. An estimated 10.5 million Americans over age 12 have reported driving under the influence of illicit drugs during the previous year. The rate of drugged driving is highest among young adults ages 18 to 25 (12.8 percent).  

**Your Strategies for Prevention**

**How to Say No to Drugs**

If people offer you a drug, here are some ways to say no.

- Let them know you’re not interested. Change the subject. If the pressure seems threatening, just walk away.
- Have something else to do: “No, I’m going for a walk now.”
- Be prepared for different types of pressure. If your friends tease you, tease them back.
- Keep it simple. “No, thanks.” “No,” or “No way” all get the point across.
- Hang out with people who won’t offer you drugs.
Different drugs affect driving ability in different ways. Here are the facts from the National Institute on Drug Abuse:

- **Alcohol** affects perception, coordination, and judgment, and increases the sedative effects of tranquilizers and barbiturates.
- **Marijuana** affects a wide range of driving skills—including the ability to track (stay in the lane) through curves, brake quickly, and maintain speed and a safe distance between cars—and slows thinking and reflexes. Normal driving skills remain impaired for four to six hours after smoking a single joint.
- **Sedatives, sedative-hypnotics, and antianxiety agents** slow reaction time and interfere with hand–eye coordination and judgment; the greatest impairment is in the first hour after taking the drug. The effects depend on the particular drug: some build up in the body and can impair driving skills the morning after use; others make drivers very sleepy and therefore incapable of driving safely.
- **Amphetamines**, after repeated use, impair coordination. They can also make a driver more edgy and less coordinated and thus more likely to be involved in an accident.
- **Hallucinogens** distort judgment and reality and cause confusion and panic, thus making driving extremely dangerous.

**Common Drugs of Abuse**

Table 12.4 describes the common drugs of abuse within these categories: cannabinoids, “club drugs,” stimulants, dissociative drugs, hallucinogens, opioids, and other compounds.

**Cannabis**

Marijuana (pot) and **hashish** (hash)—the most widely used illegal drugs—are derived from the cannabis plant. The major psychoactive ingredient in both is **THC** (delta-9-tetrahydrocannabinol). Marijuana is the most widely abused substance, with more than 150 million people reporting they’ve used it at least once in the last year. Some 12 million Americans use cannabis; more than 1 million cannot control this use.

Teens and young adults who use marijuana are more likely to develop serious mental health problems. Researchers have documented an association between frequent marijuana use and increased anxiety and depression in young adults, regardless of whether they use other illicit drugs. Teens who use marijuana are more likely to develop psychotic symptoms within ten years.21

Some people, particularly advocates for its legalization, argue that marijuana is relatively harmless. However, scientific research has confirmed that long-term use causes many adverse health consequences, including significant brain injury. When used chronically, cannabis can produce dependence, respiratory disease, and psychotic symptoms, especially in vulnerable young adults. It also may interfere with normal brain development in adolescents and young adults. Another recently recognized danger is increased risk of a particularly aggressive form of testicular cancer, the most common cancer in men between ages 15 and 34.

Marijuana use is generally less pervasive than binge drinking (see Chapter 13) on most campuses, although at some schools as many as a third of students report smoking pot. Students who used marijuana in high school are more likely to do so in college. Roommates have very little impact.
on drug use. Men who have not used marijuana before college seem, if anything, turned off rather than turned on by roommates who have smoked pot. Peers have no clear impact on women’s marijuana use.

Different types of marijuana have different percentages of THC. Because of careful cultivation, the strength of today’s marijuana is much greater than that used in the 1970s. Today a marijuana joint contains 150 mg of THC, compared to 10 mg in the 1960s. Usually, marijuana is smoked in a joint (hand-rolled cigarette) or pipe; it may also be eaten as an ingredient in other foods (as when baked in brownies), though with a less predictable effect.

Marijuana has shown some medical benefits, including boosting appetite in patients who are HIV-positive or undergoing chemotherapy, alleviating cancer and neck pain, reducing pressure on the eyeball in glaucoma patients, and helping people with spasticity (extreme muscle tension) due to multiple sclerosis or injuries. (See Health in the Headlines: Marijuana.)

A growing number of states have passed voter referenda (or legislative actions) making marijuana available to smoke for a variety of medical conditions upon a doctor’s recommendation. However, the FDA, after a comprehensive investigation, concluded that “no sound scientific studies supported medical use of marijuana for treatment in the United States, and no animal or human data supported the safety or efficacy of marijuana for general medical use.” FDA-approved medications are available as treatment alternatives for many of the proposed uses of smoked marijuana, such as relief of nausea and vomiting induced by chemotherapy. Synthetic versions of the active ingredient in marijuana, developed for medical use, act on the brain like the THC in smoked marijuana but eliminate the need to inhale harmful smoke.

How Users Feel The circumstances in which marijuana is smoked, the communal aspects of its use, and the user’s experience all can affect the way a marijuana-induced high feels.

In low to moderate doses, marijuana typically creates a mild sense of euphoria, a sense of slowed time (five minutes may feel like an hour), a dreamy sort of self-absorption, and some impairment in thinking and communicating. Users report heightened sensations of color, sound, and other stimuli, relaxation, and increased confidence. The sense of being stoned peaks within half an hour and usually lasts about three hours. Even when alterations in perception seem slight, it is not safe to drive a car for as long as four to six hours after smoking a single joint.

Some users—particularly those smoking marijuana for the first time or taking a high dose in an unpleasant or unfamiliar setting—experience acute anxiety, which may be accompanied by a panicky fear of losing control. They may believe that their companions are ridiculing or threatening them and experience a panic attack, a state of intense terror.

The immediate physical effects of marijuana include increased pulse rate, bloodshot eyes, dry mouth and throat, slowed reaction times, impaired motor skills, increased appetite, and diminished short-term memory (Figure 12.3). High doses reduce the ability to perceive and to react; all the reactions experienced with low doses are intensified, leading to sensory distortion and, in the case of hashish, vivid hallucinations and LSD-like, psychedelic reactions. The drug remains in the body’s fat cells 50 hours or more after use, so people may experience psychoactive effects for several days after use. Drug tests may produce positive results for days or weeks after last use.

Risks Marijuana produces a range of effects in different body systems, such as depression, diminished immune responses, and impaired fertility in men. Other risks include damage to the brain, lungs, and heart and to babies born to mothers who use marijuana during pregnancy or while nursing (see Figure 12.3).

Brain As brain scans have documented, long-term marijuana use causes significant brain abnormalities, including shrinkage of key structures involved in memory, learning, and emotion, that can lead to memory loss, difficulty learning new information, and psychotic symptoms. Short-term effects include problems with memory and learning; distorted perceptions; difficulty thinking and problem solving; loss of coordination; increased anxiety; and panic attacks. Long-term heavy users of marijuana perform significantly worse on tests of verbal fluency, memory, and coordination than
short-term users or nonusers, even after abstaining from pot for more than 24 hours.

Over time, continued heavy marijuana use can disrupt sleep and interfere with students’ ability to learn and perform well in school and in challenging careers. Marijuana contributes significantly to accidental death and injury among adolescents, especially through motor vehicle crashes.

**Lungs** Smoking cannabis may cause effects similar to those of smoking tobacco, with many of them appearing at a younger age. They include chronic bronchitis, emphysema, and other lung disorders and increased risk of heart attacks and sudden death. The amount of tar inhaled by marijuana smokers and the level of carbon monoxide absorbed are three to five times greater than among tobacco smokers. The reasons may be that marijuana users inhale more deeply, hold the smoke in the lungs longer, and do not use filters. Smoking a single joint can be as damaging to the lungs as smoking five tobacco cigarettes. Someone who smokes five joints a week may take in as many cancer-causing chemicals as a person who smokes a pack of cigarettes a day.

**Heart** Otherwise healthy people have suffered heart attacks shortly after smoking marijuana. Experiments have also linked marijuana use to elevated blood pressure and decreased oxygen supply to the heart muscle. The risk of heart attack triples within an hour of smoking pot. Smoking marijuana while shooting cocaine can potentially cause deadly increases in heart rate and blood pressure.

**Pregnancy** Babies born to mothers who used marijuana during pregnancy are smaller than those born to mothers who did not use the drug, and the babies are more likely to develop health problems. A nursing mother who uses marijuana passes some of the THC to the baby in her breast milk. This may impair the infant’s motor development (control of muscle movement).

**Withdrawal** Marijuana users can develop a compulsive, often uncontrollable craving for the drug. More than 120,000 people enter treatment every year for marijuana addiction. Marijuana withdrawal has proven as difficult as quitting smoking. Stopping after long-term marijuana use can produce *marijuana withdrawal syndrome*, which is characterized by insomnia, restlessness, loss of appetite, and irritability. People who smoke marijuana daily for many years may become aggressive after they stop using it and may relapse to prevent aggression and other symptoms.

**Club Drugs**

*(Designer Drugs)*

The National Institute on Drug Abuse identifies a variety of drugs—alcohol, LSD (acid), MDMA (Ecstasy), GHB, GBL, ketamine (Special-K), fentanyl, Rohypnol, and nitrites—as “club drugs.” They first became popular among teens and young adults at nightclubs, bars, or night-long dances often held in warehouses or other unusual settings. Their use by teenagers has been dropping in recent years.

Young people may take club drugs to relax, energize, and enhance their social interactions, but they should be aware of the dangers. Club drugs are not legally manufactured psychoactive drugs that have dangerous physical and psychological effects.
but a large number also experience negative consequences. As many as three in four report side effects such as profuse sweating, hot and cold flashes, tingling or numbness, blurred vision, trouble sleeping, hallucinations, depression, confusion, anxiety, irritability, paranoia, and loss of libido (sex drive). Some also experience difficulty with their usual daily activities and financial and work troubles.

**Ecstasy** Ecstasy (E, XTC, X, hug, beans, love drug) is the most common street name for methylenedioxymethamphetamine (MDMA), a synthetic compound with both stimulant and mildly hallucinogenic properties.

According to various studies, students who take Ecstasy were more likely to use marijuana, binge-drink, smoke cigarettes, have multiple sexual partners, spend more time socializing with friends and less time studying, and consider parties important and religion less important. However, researchers who compared students who used Ecstasy and other illicit drugs with those who used only marijuana have concluded that undergraduates who use Ecstasy may be a subgroup of marijuana users who tend to engage in many risk-taking behaviors. Ecstasy users also think that their peers smoke more marijuana and use more Ecstasy than they actually do.

**How Users Feel** Although it can be smoked, inhaled (snorted), or injected, Ecstasy is almost always taken as a pill or tablet. Its effects begin in 45 minutes and last for three to six hours. Ecstasy pills often contain a variety of other chemicals that increase the danger to users.22

MDMA belongs to a family of drugs called *enactogens*, which literally means “touching within.” As a mood elevator, it produces a relaxed, euphoric state but does not produce hallucinations. Users of Ecstasy often say they feel at peace with themselves and a sense of connectedness with others. In some settings, they reveal intimate details of their lives (which they may later regret); in other settings, they join in collective rejoining. Like hallucinogenic drugs, MDMA can enhance sensory experience, but it rarely causes visual distortions, sudden mood changes, or psychotic reactions. Regular users may experience depression and anxiety the week after taking MDMA.

**Risks** Ecstasy is more likely than other stimulants, such as methamphetamine, to kill young, healthy people between the ages of 16 and 24 who are not known to be regular drug users. Researchers theorize that young people’s brains, which are still developing in late adolescence and early adulthood, may be more vulnerable to the effects of the drug.

Ecstasy poses risks similar to those of cocaine and amphetamines. These include psychological difficulties (confusion, depression, sleep problems, drug craving, severe anxiety, and paranoia) and physical symptoms (muscle tension, involuntary teeth clenching, nausea, blurred vision, rapid eye movement, faintness, chills, sweating, and increases in heart rate and blood pressure that pose a special risk for people with circulatory or heart disease).

Medical emergencies related to the drug increased 75 percent in recent years. Most of those requiring emergency care were between ages 18 and 29.23

Ecstasy can produce nausea, vomiting, and dizziness. When combined with extended physical exertion like dancing, club drugs can lead to hyperthermia (severe overheating), severe dehydration, serious increases in blood pressure, stroke, and heart attack. Without sufficient water, dancers at raves may suffer dehydration and heat stroke, which can be fatal. Individuals with high blood pressure, heart trouble, or liver or kidney disease are in the greatest danger. Several deaths have occurred in teens who suffered brain damage by drinking large amounts of water to counteract the raised body temperature induced by the drug.

MDMA has been implicated in some cases of acute hepatitis, which can lead to liver failure. Even after liver transplantation, the mortality rate for individuals with this condition is 50 percent. Another danger comes from the practice of taking SSRIs (see Chapter 2), which modulate the mood-altering brain chemical serotonin, before Ecstasy. This can cause jaw clenching, nausea, tremors, and, in extreme cases, potentially fatal elevations in body temperature.

Although not a sexual stimulant (if anything, MDMA has the opposite effect), Ecstasy fosters strong feelings of intimacy that may lead to risky sexual behavior. The psychological effects of Ecstasy become less intriguing with repeated
## Table 12.4 Commonly Abused Drugs

<table>
<thead>
<tr>
<th>Substances: Category and Name</th>
<th>Examples of Commercial and Street Names</th>
<th>How It's Used</th>
<th>Acute Effects/Health Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cannabinoids</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marijuana</td>
<td>Blunt, dope, ganja, grass, herb, joint, bud, Mary Jane, pot, reefer, green, trees, smoke, sinsemilla, skunk, weed</td>
<td>Smoked, swallowed</td>
<td>Euphoria; relaxation; slowed reaction time; distorted sensory perception; impaired balance and coordination; increased heart rate and appetite; impaired learning, memory; anxiety; panic attacks; psychosis/cough, frequent respiratory infections; possible mental health decline; addiction</td>
</tr>
<tr>
<td>Hashish</td>
<td>Boom, gangster, hash, hash oil, hemp</td>
<td>Smoked, swallowed</td>
<td></td>
</tr>
<tr>
<td><strong>Club Drugs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MDMA (methylenedioxy-methamphetamine)</td>
<td>Ecstasy, Adam, clarity, Eve, lover’s speed, peace, uppers</td>
<td>Swallowed, snorted, injected</td>
<td>MDMA—mild hallucinogenic effects; increased tactile sensitivity; empathic feelings; lowered inhibition; anxiety; chills; sweating; teeth clenching; muscle cramping/sleep disturbances; depression; impaired memory; hyperthermia; addiction</td>
</tr>
<tr>
<td>Flunitrazepam***</td>
<td>Rohypnol: forget-me pill, Mexican Valium, R2, roach, Roche, roofies, roofinol, rope, rophies</td>
<td>Swallowed, snorted</td>
<td>Flunitrazepam—sedation; muscle relaxation; confusion; memory loss; dizziness; impaired coordination/addiction</td>
</tr>
<tr>
<td>GHB***</td>
<td>Gamma-hydroxybutyrate: G, Georgia home boy, grievous bodily harm, liquid ecstasy, soap, scoop, goop, liquid X</td>
<td>Swallowed</td>
<td>GHB—drowsiness; nausea; headache; disorientation; loss of coordination; memory loss/unconsciousness; seizures; coma</td>
</tr>
<tr>
<td><strong>Stimulants</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cocaine</td>
<td>Cocaine hydrochloride: blow, bump, C, candy, Charlie, coke, crack, flake, rock, snow, toot</td>
<td>Snorted, smoked, injected</td>
<td>Increased heart rate, blood pressure, body temperature, metabolism; feelings of exhilaration; increased energy, mental alertness; tremors; reduced appetite; irritability; anxiety; panic; paranoia; violent behavior; psychosis/weight loss, insomnia; cardiac or cardiovascular complications; stroke; seizures; addiction</td>
</tr>
<tr>
<td>Amphetamine</td>
<td>Biphetamine, Dexedrine: bennies, black beauties, crosses, hearts, LA turnaround, speed, truck drivers, uppers</td>
<td>Swallowed, snorted, smoked, injected</td>
<td></td>
</tr>
<tr>
<td>Methamphetamine</td>
<td>Desoxyr: meth, ice, crank, chalk, crystal, fire, glass, go fast, speed</td>
<td>Swallowed, snorted, smoked, injected</td>
<td>Also, for cocaine—nasal damage from snorting</td>
</tr>
<tr>
<td><strong>Dissociative Drugs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ketamine</td>
<td>Ketalar SV: cat Valium, K, Special K, vitamin K</td>
<td>Injected, snorted, smoked</td>
<td>Feelings of being separate from one’s body and environment; impaired motor function/ anxiety; tremors; numbness; memory loss; nausea</td>
</tr>
<tr>
<td>PCP and analogs</td>
<td>Phencyclidine: angel dust, boat, hog, love boat, peace pill</td>
<td>Swallowed, smoked, injected</td>
<td>Also, for ketamine—analgesia; impaired memory; delirium; respiratory depression and arrest; death</td>
</tr>
<tr>
<td>Salvia divinorum</td>
<td>Salvia, Shepherdess’s Herb, Maria Pastora, magic mint, Sally-D</td>
<td>Chewed, swallowed, smoked</td>
<td>Also, for PCP and analogs—analgesia, psychosis; aggression; violence; slurred speech; loss of coordination; hallucinations</td>
</tr>
<tr>
<td>Dextromethorphan (DXM)</td>
<td>Found in some cough and cold medications: Robotripping, Robo, Triple C</td>
<td>Swallowed</td>
<td>Also, or DXM—euphoria; slurred speech; confusion; dizziness; distorted visual perceptions</td>
</tr>
</tbody>
</table>

***Associated with sexual assaults.

continued
Table 12.4 Commonly Abused Drugs (continued)

<table>
<thead>
<tr>
<th>Substances: Category and Name</th>
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<th>How It’s Used</th>
<th>Acute Effects/Health Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hallucinogens</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LSD</strong></td>
<td>Lysergic acid diethylamide: acid, blot-</td>
<td>Swallowed,</td>
<td>Altered states of perception and feeling; hallucinations; nausea</td>
</tr>
<tr>
<td></td>
<td>ter, boomers, cubes, microdot, yellow</td>
<td>absorbed</td>
<td>Also, LSD and mescaline—increased body temperature, heart rate, blood pressure; loss of appetite; sweating; sleeplessness; numbness, dizziness, weakness, tremors; impulsive behavior; rapid shifts in emotion</td>
</tr>
<tr>
<td></td>
<td>sunshine, blue heaven</td>
<td>through mouth tissues</td>
<td></td>
</tr>
<tr>
<td><strong>Mescaline</strong></td>
<td>Buttons, cactus, mesc, peyote</td>
<td>Swallowed,</td>
<td>Also, for LSD—Flashbacks, Hallucinogen Persisting Perception Disorder</td>
</tr>
<tr>
<td></td>
<td></td>
<td>smoked</td>
<td>Also for psilocybin—nervousness; paranoia; panic</td>
</tr>
<tr>
<td><strong>Psilocybin</strong></td>
<td>Magic mushrooms, purple passion, shrooms, little smoke</td>
<td>Swallowed</td>
<td></td>
</tr>
<tr>
<td>Opioids</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Heroin</strong></td>
<td>Diacetylmorphine: smack, horse, brown sugar, dope, H, junk, skag, skunk, white horse, China white; cheese (with OTC cold medicine and antihistamine)</td>
<td>Injected, smoked, snorted</td>
<td>Euphoria; drowsiness; impaired coordination; dizziness; confusion, nausea; sedation; feeling of heaviness in the body; slowed or arrested breathing/constipation; endocarditis; hepatitis; HIV; addiction; fatal overdose</td>
</tr>
<tr>
<td><strong>Opium</strong></td>
<td>Laudanum, paregoric: big O, black stuff, block, gun, hop</td>
<td>Swallowed, smoked</td>
<td></td>
</tr>
<tr>
<td>Other Compounds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Anabolic steroids</strong></td>
<td>Anadrol, Oxandrin, Durabolin, Depo-Testosterone, Equipoise: roids, juice, gym candy, pumpsers</td>
<td>Injected, swallowed, applied to the skin</td>
<td>Steroids—no intoxication effects/hypertension; blood clotting and cholesterol changes; liver cysts; hostility and aggression; acne; in adolescents—premature stoppage of growth; in males—prostate cancer, reduced sperm production, shrunken testicles, breast enlargement; in females—menstrual irregularities, development of beard and other masculine characteristics</td>
</tr>
<tr>
<td><strong>Inhalants</strong></td>
<td>Solvents (paint thinners, gasoline,</td>
<td>Inhaled through nose or mouth</td>
<td>Inhalants (varies by chemical)—stimulation; loss of inhibition; headache; nausea or vomiting; slurred speech; loss of motor coordination; wheezing/cramps; muscle weakness; depression; memory impairment; damage to cardiovascular and nervous systems; unconsciousness; sudden death</td>
</tr>
</tbody>
</table>

GHB (gamma hydroxybutyrate) A brain messenger chemical that stimulates the release of human growth hormone, commonly abused for its high and its alleged ability to trim fat and build muscles. Also known as “blue nitro” or the “date rape drug.”

GBL (gamma butyrolactone) The main ingredient in gamma hydroxybutyrate (GHB); once ingested, GBL converts to GHB and can cause the ingester to lose consciousness.

GHB and GBL Once sold in health-food stores for its muscle-building and alleged fat-burning properties, gamma hydroxybutyrate (GHB, G, Georgia home boy, grievous bodily harm, liquid ecstasy) was banned because of its effects on the brain and nervous system. The main ingredient is GBL (gamma butyrolactone), an industrial solvent often used to strip floors, which converts into GHB once ingested. GHB acts as a sedative while use, and the physical side effects become more uncomfortable. Ecstasy poses risks to a developing fetus, including a greater likelihood of heart and skeletal abnormalities and long-term learning and memory impairments in children born to women who used MDMA during pregnancy.
producing feelings of euphoria and heightened sexuality. Because of its amnesic properties, GHB has been used as a “date rape” drug, similar to Rohypnol. Alcohol intensifies its effects, which typically last up to four hours.

Large doses can cause someone to pass out in 15 minutes and fall into a coma within half an hour. Death can occur. Other side effects include nausea, amnesia, hallucinations, decreased heart rate, convulsions, and sometimes blackouts. Long-term use at high doses can lead to a withdrawal reaction: rapid heartbeat, tremor, insomnia, anxiety, and occasionally hallucinations that last a few days to a week.

GHB is addictive. Users who attempt to quit may experience significant withdrawal symptoms, including anxiety, tremors, and insomnia. Most symptoms decrease within one to two weeks of cessation, but severe psychological effects can last for weeks to months.

Nitrites Nitrites (amyl, butyl, and isobutyl nitrite) are clear, amber-colored liquids that have had a history of abuse for more than three decades, especially in gay and bisexual men. Popular in dance clubs, they are used recreationally for a high feeling, a slowed sense of time, a carefree sense of well-being, and intensified sexual experiences.

Sold in small glass ampules containing individual doses, nitrites are usually inhaled and rapidly absorbed into the bloodstream. Users feel their physiological and psychological impact in seconds. Acute adverse effects include headache, dizziness, a drop in blood pressure, changes in heart rate, increased pressure within the eye, and skin flushing. Some individuals develop respiratory irritation and cough, sneezing, or difficulty breathing. Chronic use can lead to crusty skin lesions and chemical burns around the nose, mouth, and lips.

Herbal Ecstasy Herbal ecstasy, also known as herbal bliss, cloud 9, and herbal X, is a mixture of stimulants such as ephedrine, pseudoephedrine, and caffeine. Sold in tablet or capsule form as a “natural” and safe alternative to Ecstasy, its ingredients vary greatly. Herbal ecstasy can have dangerous and unpleasant side effects, including stroke, heart attack, and a disfiguring skin condition.

Stimulants

Central nervous system stimulants are drugs that increase activity in some portion of the brain or spinal cord. Some stimulants increase motor activity and enhance mental alertness, and some combat mental fatigue. Amphetamine, methamphetamine, caffeine, cocaine, and khat are stimulants. Stimulant medications are used to treat conditions such as ADHD.

Amphetamine Amphetamines trigger the release of epinephrine (adrenaline), which stimulates the central nervous system. They were once widely prescribed for weight control because they suppress appetite, but they have emerged as a global danger. Amphetamines are sold under a variety of names: amphetamine (brand name Benzedrine, street name bennies), dextroamphetamine (Dexedrine, dex), methamphetamine (Methodrine, meth, speed, crank), and Desoxyn (copilots). Related uppers include the prescription drugs methylphenidate (Ritalin), pemoline (Cylert), and phenmetrazine (Preludin). Amphetamines are available in tablet or capsule form.

How Users Feel Amphetamines produce a state of hyper-alertness and energy. Users feel confident in their ability to think clearly and to perform any task exceptionally well—although amphetamines do not, in fact, significantly boost performance or thinking. Higher doses make users feel wired: talkative, excited, restless, irritable, anxious, moody.

If taken intravenously, amphetamines produce a characteristic rush of elation and confidence, as well as adverse effects, including confusion, rambling or incoherent speech, anxiety, headache, and palpitations. Individuals may become paranoid; be convinced they are having profound thoughts; feel increased sexual interest; and experience unusual perceptions, such as ringing in the ears, a sensation of insects crawling on their skin, or hearing their name called. Methamphetamine users may feel high and sleepy or may hallucinate and lose contact with reality.

Risks Dependence on amphetamines can develop with episodic or daily use. Bingeing—taking high doses over a period of several days—can lead to an extremely intense and unpleasant crash, characterized by a craving
Methamphetamine is a stimulant that is less expensive and possibly more addictive than cocaine or heroin, has become America’s leading drug problem. More than 12 million Americans have tried methamphetamine, and 1.5 million are regular users, according to federal estimates. Its estimated annual economic cost is $23.4 billion.

Methamphetamine is chemically related to amphetamine, but its effects on the central nervous system are greater. Made in illegal laboratories, street methamphetamine is referred to by many names, such as speed, crystal, fire, glass, meth, and chalk. Methamphetamine hydrochloride, clear chunky crystals resembling ice that can be inhaled by smoking, is called ice, crystal, glass, and tina. Methamphetamine can be snorted, smoked, injected, or ingested orally.

**How Users Feel** Methamphetamine causes the release of large amounts of dopamine, which creates a sensation of euphoria, increased self-esteem, and alertness. Users also report a marked increase in sexual appetite, which often leads to risky sexual behaviors while under the drug’s influence.

Smoking or intravenous injection leads to an intense, pleasurable sensation, called a rush or flash, that lasts only a few minutes. Oral or intranasal use produces a high but not a rush. Users may become addicted quickly, using more methamphetamine more and more frequently.

Some college students try stimulants to stay alert while cramming for exams, but these medications do not improve academic performance and can cause harmful effects.

for the drug, shakiness, irritability, anxiety, and depression. Two or more days are required for recuperation.

Amphetamine intoxication may cause the following symptoms:

- Feelings of grandiosity, anxiety, tension, hypervigilance, anger, social hypersensitivity, fighting, jitteriness or agitation, paranoia, and impaired judgment in social or occupational functioning.
- Increased heart rate, dilated pupils, elevated blood pressure, perspiration or chills, and nausea or vomiting.
- Less frequent effects such as speeding up or slowing down of physical movement; muscular weakness; impaired breathing, chest pain, heart arrhythmia; confusion, seizures, impaired movements or muscle tone; or even coma.
- In high doses, a rapid or irregular heartbeat, tremors, loss of coordination, and collapse.

The long-term effects of amphetamine abuse include malnutrition, skin disorders, ulcers, insomnia, depression, vitamin deficiencies, and, in some cases, brain damage that results in speech and thought disturbances. Sexual dysfunction and impaired concentration or memory also may occur.

**Withdrawal** When the immediate effects of amphetamines wear off, users experience a crash and become shaky, irritable, anxious, and depressed. Amphetamine withdrawal usually persists for more than 24 hours after cessation of prolonged, heavy use. Its characteristic features include fatigue, disturbing dreams, much more or less than usual sleep, increased appetite, and speeding up or slowing down of physical movements. Those who are unable to sleep despite their exhaustion often take sedative-hypnotics (discussed later in this chapter) to help them rest and may then become dependent on them in addition to amphetamines. Symptoms usually reach a peak in two to four days, although depression and irritability may persist for months. Suicide is a major risk.
Despair and suicidal thinking can develop when the stimulant effect wears off.

**Risks** Even small amounts of methamphetamine can increase wakefulness and physical activity, depress appetite, and raise body temperature. Other effects on the central nervous system include irritability, insomnia, confusion, tremors, convulsions, anxiety, paranoia, and aggressiveness.

Methamphetamine increases heart rate and blood pressure and can cause irreversible damage to blood vessels in the brain, producing strokes. Other effects of methamphetamine include respiratory problems, irregular heartbeat, and extreme loss of appetite and weight. During intoxication, the body (and probably brain) temperature rises, sometimes resulting in convulsions. High fevers or collapse of the circulatory system can cause death.

Common psychiatric symptoms are insomnia, irritability, and aggressive behavior. The drug causes intellectual impairment, anxiety, and depression. Chronic users become disorganized and unable to cope with everyday problems. The risk of developing psychotic symptoms—hallucinations and delusions—is very high. They may persist for months or years after use stops.

Another side effect is called meth mouth. In short periods of time, sometimes just months, teeth can turn a grayish-brown, twist, begin to fall out, and take on a peculiar texture. About 40 percent of meth users have serious dental problems. This may be the result of methamphetamine’s effects on the metabolic system, plus the huge quantities of sugary soft drinks that users consume for the dry mouth caused by the drug.

Meth users engage in more sex, more carelessly. Meth has become popular among gay and bisexual men, and it has been linked to an increase in unsafe sex practices. Methamphetamine use and needle sharing have been linked to a spike in HIV and hepatitis C infections in gay communities.

Methamphetamine causes abnormalities in brain regions associated with selective attention and in those associated with memory. The brain may recover somewhat after months of abstinence, but problems often remain. Long-term use causes changes in brain chemistry that may lead to compulsive drug-seeking and make addiction especially hard to overcome. Former methamphetamine addicts may suffer from chronic apathy and anhedonia (inability to experience pleasure) for years.

**The Toll on Society** Law enforcement officials consider methamphetamine their biggest drug problem. Meth-related arrests have soared. Meth addicts are pouring into prisons and recovery centers at an ever-increasing rate. “Meth babies” are crowding the foster-care system. Meth-making operations have been uncovered in all 50 states, with the greatest number in Missouri. Production releases poisonous gases and results in toxic waste that is often dumped down household drains, in a backyard, or at a roadside. The cost of cleaning up the environment is a growing problem for many communities.

Over-the-counter cold medicines (ephedrine and pseudoephedrine) are commonly used in meth production, which is one reason for federal and state restrictions on their sale. As drugstores and retailers have placed nonprescription cold pills behind the pharmacy counter, meth
In addition to respiratory problems, brain damage, and mental impairment, methamphetamine damages teeth. This is how “meth-mouth” looks.

In addition to respiratory problems, brain damage, and mental impairment, methamphetamine damages teeth. This is how “meth-mouth” looks.

manufacturing has moved into Mexico, where labs produce hundreds of pounds of meth a year and smuggle it into the United States.

Withdrawal Methamphetamine addiction is difficult to treat. As with cocaine, coming off methamphetamine causes intense distress, so users often seek out the drug to relieve their pain. Treatment usually requires the intervention of the patient’s family as well as a substance abuse specialist team experienced in treating methamphetamine addiction. Standard substance abuse treatment methods such as education, behavior therapy, individual and family counseling, and support groups may be effective for some. Methamphetamine abusers often use other illicit drugs as well, a problem that can be addressed as part of a comprehensive program.

Cocaine Cocaine (coke, snow, lady) is a white crystalline powder extracted from the leaves of the South American coca plant. Usually mixed with various sugars and local anesthetics like lidocaine and procaine, cocaine powder is generally inhaled. When sniffed or snorted, cocaine anesthetizes the nerve endings in the nose and relaxes the lung’s bronchial muscles.

Cocaine can be dissolved in water and injected intravenously. The drug is rapidly metabolized by the liver, so the high is relatively brief, typically lasting only about 20 minutes. This means that users will commonly inject the drug repeatedly, increasing the risk of infection and damage to their veins.

Cocaine alkaloid, or freebase, is obtained by removing the hydrochloride salt from cocaine powder. Freebasing is smoking the fumes of the alkaloid form of cocaine. Crack, pharmacologically identical to freebase, is a cheap, easy-to-use, widely available, smokeable, and potent form of cocaine named for the popping sound it makes when burned. Because it is absorbed rapidly into the bloodstream and large doses reach the brain very quickly, it is particularly dangerous. However, its low price and easy availability have made it a common drug of abuse in poor urban areas.

How Users Feel A powerful stimulant to the central nervous system, cocaine targets several chemical sites in the brain, producing feelings of soaring well-being and boundless energy. Users feel they have enormous physical and mental ability, yet are also restless and anxious. After a brief period of euphoria, users slump into a depression. They often go on cocaine binges, lasting from a few hours to several days, and consume large quantities of cocaine.

With crack, dependence develops quickly. As soon as crack users come down from one high, they want more crack. Whereas heroin addicts may shoot up several times a day, crack addicts need another hit within minutes. Thus, a crack habit can quickly become more expensive than heroin addiction.

Risks Cocaine dependence is an easy habit to acquire. With repeated use, the brain becomes tolerant of the drug’s stimulant effects, and users must take more of it to get high. Those who smoke or inject cocaine can develop dependence within weeks. Those who sniff cocaine may not become dependent on the drug for months or years. It is thought that 5 to 20 percent of all coke users—a group as large as the estimated total number of heroin addicts—are dependent on the drug.

The physical effects of acute cocaine intoxication include dilated pupils, elevated or lowered blood pressure, perspiration or chills, nausea or vomiting, speeded up or slowing down of physical activity, muscular weakness, impaired breathing, chest pain, and impaired movements or muscle tone. Prolonged cocaine sniffing can result in ulceration of the mucous membrane of
the nose and damage to the nasal septum (the membrane between the nostrils) severe enough to cause it to collapse.

Although some users initially try cocaine as a sexual stimulant, it does not enhance sexual performance. At low doses, it may delay orgasm and cause heightened sensory awareness, but men who use cocaine regularly have problems maintaining erections and ejaculating. They also tend to have low sperm counts, less active sperm, and more abnormal sperm than nonusers. Both male and female chronic cocaine users tend to lose interest in sex and have difficulty reaching orgasm.

Cocaine use can cause blood vessels in the brain to clamp shut and can trigger a stroke, bleeding in the brain, and potentially fatal brain seizures. Cocaine users can also develop psychiatric or neurological complications (Figure 12.4). Repeated or high doses of cocaine can lead to impaired judgment, hyperactivity, nonstop babbling, feelings of suspicion and paranoia, and violent behavior. The brain never learns to tolerate cocaine's negative effects; users may become incoherent and paranoid and may experience unusual sensations, such as ringing in their ears, feeling insects crawling on the skin, or hearing their name called.

Cocaine can damage the liver and cause lung damage in freebasers. Smoking crack causes bronchitis as well as lung damage and may promote the transmission of HIV through burned and bleeding lips. Some smokers have died of respiratory complications, such as pulmonary edema (the buildup of fluid in the lungs).

Cocaine can trigger the symptoms of a heart attack in young people; the wrong therapeutic responses can be fatal. Cocaine causes the heart rate to speed up and blood pressure to rise suddenly. Its use is associated with many cardiac complications, including arrhythmia (disruption of heart rhythm), angina (chest pain), and acute myocardial infarction (heart attack).

The combination of alcohol and cocaine is particularly lethal. The liver combines the two agents and manufactures cocaethylene, which intensifies cocaine's euphoric effects, while possibly increasing the risk of sudden death. Cocaine users who inject the drug and share needles put themselves at risk for another potentially lethal problem: HIV infection.

Cocaine is dangerous for pregnant women and their babies, causing miscarriages, developmental disorders, and life-threatening complications during birth. Cocaine can reduce the fetal oxygen supply, possibly interfering with the development of the fetus's nervous system.

Withdrawal When addicted individuals stop using cocaine, they often become depressed. This may lead to further cocaine use to alleviate depression. Other symptoms of cocaine withdrawal include fatigue, vivid and disturbing dreams, excessive or too little sleep, irritability, increased appetite, and physical slowing down or speeding up. This initial crash may last one to three days after cutting down or stopping the heavy use of cocaine. Some individuals become violent, paranoid, and suicidal.

Symptoms usually reach a peak in two to four days, although depression, anxiety, irritability, lack of pleasure in usual activities, and low-level cravings may continue for weeks. As memories of the crash fade, the desire for cocaine intensifies. For many weeks after stopping, individuals may feel an intense craving for the drug.

Figure 12.4 Some Effects of Cocaine on the Body
Treatment  Overcoming an addiction to cocaine or other stimulant drug can be challenging. Among the behavioral approaches that have shown the greatest success are:

- Cognitive-behavioral therapy (CBT), which helps patients recognize and avoid drug triggers and learn new ways of coping with them.
- Contingency management, which uses tangible rewards such as vouchers for movies, to encourage abstinence.
- The Matrix Model, which combines a 12-step program, behavioral therapy, family education, and individual counseling.

The FDA has not approved any medications for these addictions, but several drugs have shown promise. These include Antabuse, widely used for alcohol dependence; the muscle relaxant baclofen (Lioresal); the anticonvulsant topiramate (Topamax); and the stimulant modafinil (Provigil), used to treat narcolepsy.

Khat (Kat, Catha, Chat, Abyssinian Tea)  For centuries people in East Africa and the Arabian peninsula consumed the fresh young leaves of the Catha edulis shrub in ways similar to our drinking coffee. Its active ingredients are two controlled substances, cathinone and cathine. Chewing alleviates fatigue and reduces appetite. Compulsive use may result in manic behavior, grandiose illusions, paranoia, and hallucinations.

Synthetic Stimulants  Bath salts and plant food are slang terms for powders sold legally online and in drug paraphernalia stores in most states under various names, such as ivory wave, purple wave, red dove, blue silk, zoom, bloom, cloud nine, ocean snow, lunar wave, vanilla sky, white lightning, scarf, and hurricane charlie. Usually these products, marked “not for human consumption” to avoid government regulation, contain various amphetamine-like chemicals, such as methylenedioxypyrovalerone (MDPV), mephedrone, and pyrovalerone, typically swallowed, sniffed, or injected. Snorting and intravenous administration produce the greatest danger.

These chemicals, touted as cocaine substitutes, act in the brain like stimulant drugs and trigger intense cravings not unlike those experienced by methamphetamine users. The medical risks include chest pains, increased blood pressure, increased heart rate, agitation, hallucinations, extreme paranoia, delusions, violent behavior, and death. Emergency room visits related to bath salts have soared in recent years. A common cause of death is suicide. Those who survive suicide attempts may suffer long-term psychiatric symptoms.

Several states, counties, cities, and local municipalities have taken action to ban these products. Nations such as Great Britain and Germany also have taken steps to ban or control MDPV and similar chemicals.

Depressants  Depressants depress the central nervous system, reduce activity, and induce relaxation, drowsiness, or sleep. They include the benzodiazepines and the barbiturates, the opioids, and alcohol.

Benzodiazepines and Barbiturates  These depressants are the sedative-hypnotics, also known as anxiolytic or anxiolytic drugs. The benzodiazepines—the most widely used drugs in this category—are commonly prescribed for tension, muscular strain, sleep problems, anxiety, panic attacks, and anesthesia, and in the treatment of alcohol withdrawal. They include such drugs as chlordiazepoxide (Librium), diazepam (Valium), oxazepam (Serax), lorazepam (Ativan), flurazepam (Dalmane), and alprazolam (Xanax). They differ widely in their mechanism of action, absorption rate, and metabolism, but all produce similar intoxication and withdrawal symptoms.

Rohypnol, a trade name for flunitrazepam—called roofies, rophi, roche, or the forget-me pill—is one of the benzodiazepines that has been of particular concern for the last few years because of its abuse in date rape. When mixed with alcohol, Rohypnol, which is tasteless and odorless, can incapacitate victims and prevent them from resisting sexual assault. It produces “anterograde amnesia,” which means individuals may not remember events they experienced while under the effects of the drug. Other adverse effects include decreased blood pressure, drowsiness, visual disturbances, dizziness, confusion, urinary retention, and digestive problems. Rohypnol may be lethal when mixed with alcohol or other depressants.
Benzodiazepine sleeping pills have largely replaced the *barbiturates*, which were used medically in the past for inducing relaxation and sleep, relieving tension, and treating epileptic seizures. These drugs are usually taken by mouth in tablet, capsule, or liquid form. When used as a general anesthetic, they are administered intravenously.

**How Users Feel**  Low doses of these drugs may reduce or relieve tension, but increasing doses can cause a loosening of sexual or aggressive inhibitions. Individuals using this class of drugs may experience rapid mood changes, impaired judgment, and impaired social or occupational functioning.

**Risks**  All sedative-hypnotic drugs can produce physical and psychological dependence within two to four weeks. A complication specific to sedatives is *cross-tolerance* (cross-addiction), which occurs when users develop tolerance for one sedative or become dependent on it and develop tolerance for other sedatives as well.

Intoxication with these drugs can produce changes in mood or behavior, such as inappropriate sexual or aggressive acts, mood swings, and impaired judgment. Physical signs include slurred speech, poor coordination, unsteady gait, involuntary eye movements, impaired attention or memory, and stupor or coma.

Taken in combination with alcohol, these drugs have a synergistic effect that can be dangerous or even lethal. For example, an individual’s driving ability, already impaired by alcohol, will be made even worse, increasing the risk of an accident. Alcohol in combination with sedative-hypnotics leads to respiratory depression and may result in respiratory arrest and death. Regular users of any of these drugs who become physically dependent should not try to cut down or quit on their own. If they try to quit suddenly, they run the risk of seizures, coma, and death.

**Withdrawal**  Withdrawal from sedative-hypnotic drugs may range from relatively mild discomfort to a severe syndrome with grand mal seizures, depending on the degree of dependence. Withdrawal symptoms include malaise or weakness, sweating, rapid pulse, coarse tremors (of the hands, tongue, or eyelids), insomnia, nausea or vomiting, temporary hallucinations or illusions, physical restlessness, anxiety or irritability, and grand mal seizures. Withdrawal may begin within two to three days after stopping drug use, and symptoms may persist for many weeks.

**Opioids**  The *opioids* include opium and its derivatives (morphine, codeine, and heroin) and synthetic drugs that have similar sleep-inducing and pain-relieving properties. The opioids come from a resin taken from the seedpod of the Asian poppy. Synthetic opioids, such as meperidine (Demerol), methadone, and propoxyphene (Darvon), are synthesized in a chemical laboratory. Whether natural or synthetic, these drugs are powerful *narcotics*, or painkillers.

Heroin (also known as horse, junk, smack, or downtown), the most widely abused opioid, is illegal in this country. In other nations it is used as a potent painkiller for conditions such as terminal cancer. There are an estimated 600,000 heroin addicts in the United States, with men outnumbering women addicts by three to one. Among people ages 18 to 25, the percentage of heroin users who inject the drug has doubled in the last decade. While the number of young heroin users in major cities has dropped by 50 percent, their numbers have almost tripled in suburban and rural areas.

Heroin users typically inject the drug into their veins. However, individuals who experiment with recreational drugs often prefer *skin-popping* (subcutaneous injection) rather than *mainlining* (intravenous injection); they also may snort heroin as a powder or dissolve it and inhale the vapors. To try to avoid addiction, some users begin by *chipping*, taking small or intermittent doses. Regardless of the method of administration, tolerance can develop rapidly.

Morphine, used as a painkiller and anesthetic, acts primarily on the central nervous system, eyes, and digestive tract. By producing mental clouding, drowsiness, and euphoria, it does not decrease the physical sensation of pain as much as it alters a person’s awareness of the pain; in effect, he or she no longer cares about it.

**How Users Feel**  All opioids relax the user. When injected, they can produce an immediate rush (high) that lasts 10 to 30 minutes. For two to six hours thereafter, users may feel indifferent, lethargic, and drowsy; they may slur their words and have problems paying attention, remembering, and going about their normal routine. The primary attractions of heroin are

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*barbiturates*  Antianxiety drugs that depress the central nervous system, reduce activity, and induce relaxation, drowsiness, or sleep; often prescribed to relieve tension and treat epileptic seizures or as a general anesthetic.

*opioids*  Drugs that have sleep-inducing and pain-relieving properties, including opium and its derivatives and nonopioid, synthetic drugs.
Because Rohypnol is colorless, tasteless, and odorless, it can be added to beverages without your knowledge.

the euphoria and pain relief it produces. However, some people experience very unpleasant feelings, such as anxiety and fear. Other effects include a sensation of warmth or heaviness, dry mouth, facial flushing, and nausea and vomiting (particularly in first-time users).

**Risks** Addiction is common. Almost all regular users of opioids rapidly develop drug dependence, which can lead to lethargy, weight loss, loss of sex drive, and the continual effort to avoid withdrawal symptoms through repeated drug administration. In addition, they experience anxiety, insomnia, restlessness, and craving for the drug. Users continue taking opioids as much to avoid the discomfort of withdrawal, a classic sign of opioid addiction, as to experience pleasure.

Physical symptoms include constricted pupils (although pupils may dilate from a severe overdose), drowsiness, slurred speech, and impaired attention or memory. Morphine affects blood pressure, heart rate, and blood circulation in the brain. Both morphine and heroin slow down the respiratory system; overdoses can cause fatal respiratory arrest.

Over time, users who inject opioids may develop infections of the heart lining and valves, skin abscesses, and lung congestion. Infections from unsterile solutions, syringes, and shared needles can lead to hepatitis, tetanus, liver disease, and HIV. Depression is common and may be both an antecedent and a risk factor for needle sharing.

Opioid abuse during pregnancy can cause miscarriage, stillbirth, or low birth weight. Babies born to addicted mothers experience withdrawal symptoms after birth.

**Withdrawal** If a regular user stops taking an opioid, withdrawal begins within 6 to 12 hours. The intensity of the symptoms depends on the degree of the addiction; they may grow stronger for 24 to 72 hours and gradually subside over a period of 7 to 14 days, though some symptoms, such as insomnia, may persist for several months. Individuals may develop craving for an opioid, irritability, nausea or vomiting, muscle aches, runny nose or eyes, dilated pupils, sweating, diarrhea, yawning, fever, and insomnia. Opioid withdrawal usually is not life-threatening.

**Hallucinogens**

The drugs known as hallucinogens produce vivid and unusual changes in thought, feeling, and perception. Hallucinogens do not produce dependence in the same way as cocaine or heroin. Individuals who have an unpleasant experience after trying a hallucinogen may stop using the drug completely without suffering withdrawal symptoms. Others continue regular or occasional use because they enjoy the effects.

**LSD** *(lysergic acid diethylamide, acid)* was initially developed as a tool to explore mental illness. It became popular in the 1960s and resurfaced among teenagers in the 1990s. LSD is taken orally, either blotted onto pieces of paper that are held in the mouth or chewed along with another substance, such as a sugar cube. Peyote (whose active ingredient is mescaline) is another hallucinogen, but it is much less commonly used in this country.

**Dissociative Drugs**

Drugs such as PCP *(phencyclidine)* and ketamine, initially developed as general anesthetics
for surgery, distort perceptions of sight and sound and produce feelings of dissociation or detachment from the environment and self. They alter distribution of the neurotransmitter glutamate, which is involved in perception of pain, responses to the environment, and memory, in the brain.

Because these mind-altering effects are not hallucinations, scientists refer to PCP and ketamine as “dissociative anesthetics.” High doses of dextromethorphan, a widely available cough suppressant, and the herb salvia can produce effects similar to those of PCP and ketamine.

**Ketamine** Ketamine—called K, Special-K, and vitamin K—is an anesthetic used by veterinarians. When cooked, dried, and ground into powder for snorting, ketamine blocks chemical messengers in the brain that carry sensory input. As a result, the brain fills the void with hallucinations. Users may report an “out-of-body” experience with distorted perceptions of time and space. The effects typically begin within 30 minutes and last for approximately two hours.

Ketamine has become common in club scenes and has been used as a date rape drug. Low doses can cause impaired attention and memory, anxiety, agitation, paranoia, and vomiting. Higher doses can cause delirium, amnesia, impaired motor function, high blood pressure, depression, and potentially deadly breathing problems. Repeated ketamine use can be addictive and even a single use can occasionally produce audiovisual “flashbacks,” similar to those described by phencyclidine (PCP) users, and long-term memory loss.

**PCP** PCP (phencyclidine, brand name Sernyl; street names angel dust, peace pill, lovely, and green) is an illicit drug manufactured as a tablet, capsule, liquid, flake, spray, or crystal-like white powder that can be swallowed, smoked, sniffed, or injected. Sometimes it is sprinkled on crack, marijuana, tobacco, or parsley, and smoked. A fine-powdered form of PCP can be snorted or injected.

PCP use peaked in the 1970s, but it remains a popular drug of abuse in both inner-city ghettos and suburban high schools. Users often think that the PCP they take together with another illegal psychoactive substance, such as amphetamines, coke, or hallucinogens, is responsible for the highs they feel, so they seek it out specifically.

The effects of PCP are utterly unpredictable. It may trigger violent behavior or irreversible psychosis the first time it is used, or the twelfth time, or never. In low doses, PCP produces changes—from hallucinations or euphoria to feelings of emptiness or numbness—similar to those produced by other psychoactive drugs. Higher doses may produce a stupor that lasts several days, increased heart rate and blood pressure, skin flushing, sweating, dizziness, and numbness.

Some people experience repetitive motor movements (such as facial grimacing), hallucinations, and paranoia. Suicide is a definite risk. Intoxication typically lasts four to six hours, but some effects can linger for several days. Delirium may occur within 24 hours of taking PCP or after recovery from an overdose and can last as much as a week.

**Salvia** Salvia (Salvia divinorum) is an herb grown in southern Mexico and Central and South America. Its main active ingredient, salvinorin A, activates kappa opioid receptors that differ from those activated by the more commonly known opioids, such as heroin and morphine. Traditionally ingested by chewing fresh leaves or drinking their extracted juices, *S. divinorum* when dried can also be smoked as a joint, consumed in water pipes, or vaporized and inhaled.

People who abuse salvia generally experience hallucinations or “psychotomimetic” episodes.
(a transient experience that mimics a psychosis) that occur in less than a minute and last less than 30 minutes. They include psychedelic-like changes in visual perception, mood and body sensations, emotional swings, feelings of detachment, and a greatly altered perception of external reality and the self. The long-term effects of salvia abuse have not been investigated systematically.

The Drug Enforcement Agency has listed salvia as a drug of concern and is considering classifying it as a drug with high potential for abuse, like LSD or marijuana.

**Inhalants**

**Inhalants** or *deleriants* are chemicals that produce vapors with psychoactive effects. The most commonly abused inhalants are solvents, aerosols, model-airplane glue, cleaning fluids, and petroleum products like kerosene and butane. Some anesthetics and nitrous oxide (laughing gas) are also abused.

Young people who have been treated for mental health problems, have a history of foster care, or already abuse other drugs have an increased risk of abusing or becoming dependent on inhalants. In addition, adolescents who first begin using inhalants at an early age are more likely to become dependent on them. Approximately 11 percent of adolescents nationwide report having used inhalants in their lifetime. Teens with inhalant use disorders report coexisting multiple drug abuse and dependence, mental health treatment, and delinquent behaviors. Only alcohol is a more widely used intoxicant among preteens and teens. More 12-year-olds admit to sniffing potentially deadly inhalants than to smoking marijuana.

Inhalants very rapidly reach the lungs, bloodstream, and other parts of the body. At low doses, users may feel slightly stimulated; at higher doses, they may feel less inhibited. Intoxication often occurs within five minutes and can last more than an hour. Inhalant users do not report the intense rush associated with other drugs; nor do they experience the perceptual changes associated with LSD. However, inhalants interfere with thinking and impulse control, so users may act in dangerous or destructive ways.

Often there are visible external signs of use: a rash around the nose and mouth; breath odors; residue on face, hands, and clothing; redness, swelling, and tearing of the eyes; and irritation of throat, lungs, and nose that leads to coughing and gagging. Nausea and headache also may occur.

Regular use of inhalants leads to tolerance, so the sniffer needs more and more to attain the desired effects. Younger children who use inhalants several times a week may develop dependence. Older users who become dependent may use the drugs many times a day.

Although some young people believe inhalants are safe, this is far from true. Inhalation of butane from cigarette lighters displaces oxygen in the lungs, causing suffocation. Users also can suffocate while covering their heads with a plastic bag to inhale the substance or from inhaling vomit into their lungs while high. The effects of inhalants are unpredictable, and even a single episode can trigger asphyxiation or cardiac arrhythmia, leading to disability or death. Abusers also can develop difficulties with memory and abstract reasoning, problems with coordination, and uncontrollable movements of the extremities.

**Treating Substance Dependence and Abuse**

An estimated 6.1 million Americans are in need of drug treatment, but the majority—some 5 million—never get treatment. The most difficult step for a drug user is to admit that he or she is in fact an addict. If drug abusers are not forced to deal with their problem through some unexpected trauma, such as being fired or going bankrupt, those who care—family, friends, coworkers, doctors—may have to confront them and insist that they do something about their addiction. Often this intervention can be the turning point for addicts and their families. Treatment has proved equally successful for young people and for older adults.

Some universities offer interventions for students who violate college...
substance abuse policies. *Motivational interviewing*, a brief intervention in which counselors express empathy to support personal change, has proved effective in reducing alcohol and drug consumption.

Treatment may take place in an outpatient setting, a residential facility, or a hospital. Increasingly, treatment thereafter is tailored to address coexisting or dual diagnoses. A personal treatment plan may consist of individual psychotherapy, marital and family therapy, medication, and behavior therapy. Once an individual has made the decision to seek help for substance abuse, the first step usually is detoxification, which involves clearing the drug from the body.

Controlled and supervised withdrawal within a medical or psychiatric hospital may be recommended if an individual has not been able to stop using drugs as an outpatient or in a residential treatment program. Detoxification is most likely to be complicated in a polysubstance abuser, who may require close monitoring and treatment of potentially fatal withdrawal symptoms. Other reasons for inpatient treatment include lack of psychosocial support for maintaining abstinence and the absence of a drug-free living environment. Restrictions on insurance coverage may limit the number of days of inpatient care. Increasingly, once individuals complete detoxification, they continue treatment in residential programs or as outpatients.

Anti-addiction medications that target neurotransmitters in the brain are becoming safer and more effective. With treatment, substance abusers are less prone to relapse. If they do return to drug use, their relapses tend to be shorter and less frequent.

The aim of chemical dependence treatment is to help individuals establish and maintain their recovery from alcohol and drugs of abuse. Recovery is a dynamic process of personal growth and healing in which the drug user makes the transition from a lifestyle of active substance use to a drug-free lifestyle.27

**Principles of Drug Addiction Treatment**

More than three decades of scientific research show that treatment can help drug-addicted individuals stop drug use, avoid relapse, and successfully recover their lives. Based on this research, NIDA has developed fundamental principles that characterize effective drug abuse treatment. They include the following:

- **Addiction is a complex but treatable disease that affects brain function and behavior.** Drugs alter the brain’s structure and how it functions, resulting in changes that persist long after drug use has ceased. This may help explain why abusers are at risk for relapse even after long periods of abstinence.

- **No single treatment is appropriate for everyone.** Matching treatment settings, interventions, and services to an individual’s particular problems and needs is critical to his or her ultimate success.

- **Treatment needs to be readily available.** Because drug-addicted individuals may be uncertain about entering treatment, taking advantage of available services the moment people are ready for treatment is critical.

- **Effective treatment attends to multiple needs of the individual, not just his or her drug abuse.** To be effective, treatment must address the individual’s drug abuse and any associated medical, psychological, social, vocational, and legal problems.

- **Remaining in treatment for an adequate period of time is critical.** The appropriate duration for an individual depends on the type and degree of his or her problems and needs. Research indicates that most addicted individuals need at least three months in treatment to significantly reduce or stop their drug use and that the best outcomes occur with longer durations of treatment.

- **Counseling—individual and/or group—and other behavioral therapies are the most commonly used forms of drug abuse treatment.** Behavioral therapies vary in their focus and may involve addressing a patient’s motivations to change, building skills to resist drug use, replacing drug-using activities with constructive and rewarding activities, improving problem-solving skills, and facilitating better interpersonal relationships.
• Medications are an important element of treatment for many patients, especially when combined with counseling and other behavioral therapies. For example, methadone and buprenorphine are effective in helping individuals addicted to heroin or other opioids stabilize their lives and reduce their illicit drug use.

• Many drug-addicted individuals also have other mental disorders. Drug abuse and addiction—both of which are mental disorders—often co-occur with other mental illnesses. When these problems co-occur, treatment should address both (or all), including the use of medications as appropriate.

• Medically assisted detoxification is only the first stage of addiction treatment and by itself does little to change the long-term drug abuse. Although medically assisted detoxification can safely manage the acute physical symptoms of withdrawal, detoxification alone is rarely sufficient to help addicted individuals achieve long-term abstinence. Thus, patients should be encouraged to continue drug treatment following detoxification.

• Treatment does not need to be voluntary to be effective. Sanctions or enticements from family, the employment setting, and/or the criminal justice system can significantly increase treatment entry, retention rates, and the ultimate success of drug treatment interventions.

• Drug use during treatment must be monitored continuously, as lapses during treatment do occur. Knowing their drug use is being monitored can be a powerful incentive for patients and can help them withstand urges to use drugs.

12-Step Programs
Since its founding in 1935, Alcoholics Anonymous (AA)—the oldest, largest, and most successful self-help program in the world—has spawned a worldwide movement. As many as 200 different recovery programs are based on the spiritual 12-step program of AA. Participation in 12-step programs for drug abusers, such as Substance Anonymous, Narcotics Anonymous, and Cocaine Anonymous, is of fundamental importance in promoting and maintaining long-term abstinence.

The basic precept of 12-step programs is that members have been powerless when it comes to controlling their addictive behavior on their own. These programs don’t recruit members. The desire to stop must come from the individual, who can call the number of a 12-step program, listed in the telephone book, and find out when and where the next nearby meeting will be held. A representative may offer to send someone to the caller’s house to talk about the problem and to escort him or her to the next meeting.

Meetings of various 12-step programs are held daily in almost every city in the country. (Some clubs, whose members often include the disabled or those in remote areas, meet via Internet chat rooms or electronic bulletin boards.) There are no dues or fees for membership. Many individuals belong to several programs because they have several problems, such as alcoholism, substance abuse, and pathological gambling. All have only one requirement for membership: a desire to stop an addictive behavior.

To get the most out of a 12-step program:

• Try out different groups until you find one you like and in which you feel comfortable.

• Once you find a group in which you feel comfortable, go back several times (some recommend a minimum of six meetings) before making a final decision on whether to continue.

• Keep an open mind. Listen to other people’s stories and ask yourself if you’ve had similar feelings or experiences.

• Accept whatever feels right to you and ignore the rest. One common saying in 12-step programs is, “Take what you like and leave the rest.”

Relapse Prevention
The most common clinical course for substance abuse disorders involves a pattern of multiple relapses over the course of a lifespan. It is important for individuals with these problems and their families to recognize this fact. When relapses do occur, they should be viewed as neither a mark of defeat nor evidence of moral weakness. While painful, they do not erase the progress that has been achieved and ultimately
may strengthen self-understanding. They can serve as reminders of potential pitfalls to avoid in the future.

One key to preventing relapse is learning to avoid obvious cues and associations that can set off intense cravings. This means staying away from the people and places linked with past drug use. Some therapists use conditioning techniques to give former users some sense of control over their urge to use the drug. The theory behind this approach, which is called extinction of conditioned behavior, is that with repeated exposure—for example, to videotapes of dealers selling crack cocaine—the arousal and craving will diminish. While this technique by itself cannot ward off relapses, it does seem to enhance the overall effectiveness of other therapies.

Another important lesson that therapists emphasize is that every lapse does not have to lead to a full-blown relapse. Users can turn to the skills acquired in treatment—calling people for support or going to meetings—to avoid a major relapse. Ultimately, users must learn much more than how to avoid temptation; they must examine their entire view of the world and learn new ways to live in it without turning to drugs. This is the underlying goal of the recovery process.

Based on the Alcoholics Anonymous model, 12-step programs have helped many people overcome addiction. The one requirement for membership is a desire to end a pattern of addictive behavior.
Choosing an Addiction-Free Lifestyle

People with substance abuse disorders and addictive behaviors lose control of their choices and their lives. Their compulsion to gamble or to use a drug seems irresistible. You, in contrast, have a choice. You can create a life and a lifestyle with no need and no room for reliance on a substance or a self-destructive behavior. Check those that you have already implemented. Are there others you plan to incorporate into your life?

___ Set goals for yourself. Think about who you want to become, what you’d like to do, the future you wish for yourself. Focus on what it will take—years of education, perhaps, or specialized training—to achieve these goals. Understand that drugs can only get in the way and diminish your potential.

___ Participate in drug-free activities. If you’re bored or unfocused, drugs may appeal to you simply as something to do. Take charge of your time. Play a sport. Work out at the gym. Join a club. Volunteer. Start a blog.

___ Educate yourself. Much of the information that young people hear from friends, particularly drug-using friends, is wrong. Drugs that are used as medicines are not safe for recreational use. The fact that many people at a party or club are having fun doesn’t mean that some aren’t endangering their brains and their lives by taking club drugs. Get the facts for yourself from sites such as those on page 423.

___ Choose friends with a future. The world of drug users shrinks. Nothing matters more than the next hit, the next high, the next fix. Losing all sense of tomorrow, they focus on getting through the day with the help of drugs. Are these the people you want to spend time with? Choose friends who can broaden your world with new ideas, ambitious plans, and great dreams for tomorrow.

If you think you may have a problem with drugs, take the Self Survey “Do You Have a Substance-Use Disorder?” and read the Health Action Plan in Your Personal Wellness Guide.

Do You Have a Substance-Use Disorder?

Check the statements that apply to you.

- Use more of an illegal drug or a prescription medication or use a drug for a longer period of time than you desire or intend. ___
- Try, repeatedly and unsuccessfully, to cut down or control drug use. ___
- Spend a great deal of time doing whatever is necessary in order to get drugs, taking them, or recovering from their use. ___
- Be so high or feel so bad after drug use that you often cannot work or fulfill other responsibilities. ___
- Give up or cut back on important social, work, or recreational activities because of drug use. ___
- Continue to use drugs even though you realize that they are causing or worsening physical or mental problems. ___
- Use a lot more of a drug in order to achieve a “high” or desired effect or feel fewer such effects than in the past. ___

- Use drugs in dangerous ways or situations. ___
- Have repeated drug-related legal problems, such as arrests for possession. ___
- Continue to use drugs, even though the drug causes or worsens social or personal problems, such as arguments with a spouse. ___
- Develop hand tremors or other withdrawal symptoms if you cut down or stop drug use. ___
- Take drugs to relieve or avoid withdrawal symptoms. ___

The more blanks that you (or someone close to you) checks, the more reason you have to be concerned about drug use. The most difficult step for anyone with a substance-use disorder is to admit that he or she has a problem. Sometimes a drug-related crisis, such as being arrested or fired, forces individuals to acknowledge the impact of drugs. If not, those who care—family, friends, boss, physician—may have to confront them and insist that they do something about it. This confrontation, planned beforehand, is called an intervention and can be the turning point for drug users and their families.
Making Change Happen

Don’t Go There

The use of illegal drugs can lead to terrible, life-changing consequences for you and your family. Legal drugs, when used for reasons other than those for which they were prescribed, can be even stronger and more deadly. Drugs interfere with learning and education by making it more difficult to pay attention, concentrate, and remember. They create problems for and with people who love you. Drugs produce short- and long-term side effects that can range from mood changes to potentially fatal abnormalities in your breathing and heart rate. Most important, drugs can steal control of your life and your future—or can steal life itself.

But there are other, perhaps less obvious, reasons not to go down the path of drug use or other compulsive behaviors. For one thing, there is no need to. As you’ll learn in “Don’t Go There” in Labs for IPC, you can experience the sensations drugs can offer in other ways yet remain in charge and in control. Here’s a preview.

Get Real

In this stage you complete an inventory of your drug-related behaviors by means of a checklist with 26 items, including the following three:

- Used marijuana.
- Felt that you could not control or stop using a particular drug.
- Took any medicine, including painkillers and stimulants, for a reason other than that for which it was prescribed.

The more checks you see, the greater your risk of losing control of your life to a compulsive behavior or a substance of abuse . . .

In another exercise, you answer the question “What if?” by writing brief essays that begin with three different phrases, including:

- “As long as I stuck to prescription meds, I was sure I’d be able to stop whenever I wanted. But . . .”

Get Ready

In this stage you list all the advantages and benefits that your compulsive substance use has brought you. You might mention things such as:

- It made me feel that I fit in with a certain group.
- It was a way to blow off steam and relax . . .

You then list the disadvantages and negative consequences you’ve experienced as a result of your compulsive substance use, such as:

- Being unable to afford other things because of money spent on drugs or gambling.
- Side effects from drugs, which can include elevated blood pressure, heart rate, and breathing problems . . .

You also start tracking compulsive behavior or substance use by recording every time you engage in the behavior (such as gambling), when, how long, how much you gamble . . .

Get Going

This stage consists of five steps, including the following three:

- Consciously choosing an alternative behavior rather than your drug or escape of choice the next time you’re stressed out or feeling lonely, down, or anxious . . .

- Quitting for 90 days. If you claim you can stop any time, prove it . . . Just stop. Yes, stop. And don’t go back to your drug use or compulsive behavior for three consecutive months.

- Creating positive diversions, noncompulsive, nonchemical ways of achieving physical relaxation, sensory stimulation, greater creativity . . .

Lock It In

You continue self-monitoring to prove to yourself that you really are in the driver’s seat regarding your use of drugs, alcohol, and other addictive substances and behaviors. You also keep expanding your repertoire of positive activities and coping skills . . .
Review Questions

1. Individuals with substance-use disorders
   a. are usually not physically dependent on their drug of choice.
   b. have a compulsion to use one or more addictive substances.
   c. require less and less of the preferred drug to achieve the desired effect.
   d. suffer withdrawal symptoms when they use the drug regularly.

2. Which of the following statements about club drugs is true?
   a. Club drugs can produce many unwanted effects, including hallucinations and paranoia.
   b. Most club drugs do not pose the same health dangers as "hard" drugs such as heroin.
   c. MDMA is the street name for Ecstasy.
   d. When combined with extended physical exertion, club drugs can lead to hypothermia (lowered body temperature).

3. Which of the following statements about marijuana is false?
   a. People who have used marijuana may experience psychoactive effects for several days after use.
   b. Marijuana has shown some effectiveness in treating chemotherapy-related nausea.
   c. Unlike long-term use of alcohol, regular use of marijuana does not have any long-lasting health consequences.
   d. Depending on the amount of marijuana used, its effects can range from a mild sense of euphoria to extreme panic.

4. Which of the following statements about drugs is false?
   a. Toxicity is the dosage level of a prescription.
   b. Drugs can be injected into the body intravenously, intramuscularly, or subcutaneously.
   c. Drug misuse is the taking of a drug for a purpose other than that for which it was medically intended.
   d. An individual’s response to a drug can be affected by the setting in which the drug is used.

5. The opioids
   a. are not addictive if used in a prescription form such as codeine or Demerol.
   b. produce an immediate but short-lasting high and feeling of euphoria.
   c. include morphine, which is typically used for cough suppression.
   d. are illegal in the United States, although they are allowed in other countries to help control severe pain.

6. Which of the following statements about drug dependence treatment is false?
   a. Chemical dependence treatment programs usually involve medications to alleviate withdrawal symptoms.
   b. Detoxification is usually the first step in a drug treatment program.
   c. Relapses are not uncommon for a person who has undergone drug treatment.
   d. The 12-step recovery program associated with Alcoholics Anonymous has been shown to be ineffective with individuals with drug dependence disorders.

7. To help ensure that an over-the-counter or prescription drug is safe and effective:
   a. take smaller dosages than indicated in the instructions.
   b. test your response to the drug by borrowing a similar medication from a friend.
   c. ask your doctor or pharmacist about possible interactions with other medications.
   d. buy all of your medications online.

8. Cocaine dependence can result in all of the following except
   a. stroke.
   b. paranoia and violent behavior.
   c. heart failure.
   d. enhanced sexual performance.

9. Amphetamine is very similar to which of the following in its effects on the central nervous system?
   a. marijuana
   b. heroin
   c. cocaine
   d. alcohol

10. Prescription drug abuse on college campuses
    a. is not a problem.
    b. is higher among college women than college men.
    c. is more widespread than the use of marijuana.
    d. is more widespread than the use of Ecstasy, cocaine, and meth.

Answers to these questions can be found on page 672.
Critical Thinking

1. Suppose that a close friend is using amphetamines to keep her energy levels high so that she can continue to attend school full-time and hold down a job to pay her school expenses. You fear that she is developing a substance abuse disorder. What can you do to help her realize the dangers of her behavior? What resources are available at your school or in your community to help her deal with both her drug problem and her financial needs?

2. Some Web enthusiasts oppose any kind of government regulations on the Internet. Do you agree or disagree? How would you address the problems associated with distributing drugs online, including the sale of counterfeit drugs?

Media Menu

Visit www.cengagebrain.com to access course materials for this text, including the Behavior Change Planner, interactive quizzes, tutorials, and more.

Internet Connections

**www.nida.nih.gov**
This government site—a virtual clearinghouse of information for students, parents, teachers, researchers, and health professionals—features current treatment and research, as well as a comprehensive database on common drugs of abuse. The science of drug abuse and addictions is discussed with a focus on the major illegal drugs in use, with additional resources on drug testing, treatment research, and trends/statistics.

**www.clubdrugs.org**
This site is a service of the National Institute on Drug Abuse to provide information on club drugs.

**www.factsontap.org**
Facts On Tap is one of the programs of Phoenix House, the largest nonprofit alcohol and drug abuse treatment and prevention facility in the United States.

**www.drugfree.org**
This site features current resources and photographs on a wide spectrum of drugs, including performance-enhancing drugs, club drugs, and commonly abused prescription drugs. The drug guide even allows you to search for a drug using its slang name.

Key Terms

The terms listed are used on the page indicated. Definitions of the terms are in the Glossary at the end of the book.

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15. Lord, et al. “Connecting to Young Adults.”


17. Ibid.


