Addictive Behaviors, Licit and Illicit Drugs

USE, MISUSE, AND ABUSE

- How can I recognize the signs of addiction in a loved one or even myself?
- Is my roommate’s obsessive gambling an addiction?
- Should I be concerned about the safety of prescription drugs?
- Are there any negative long-term effects from marijuana use?

OBJECTIVES
- Identify the signs of addiction and discuss types of addictions, including compulsive behaviors such as gambling and shopping.
- Discuss the six categories of drugs and their routes of administration.
- Compare choices in prescription and over-the-counter drugs, and understand how to use them safely and how hazardous drug interactions can occur.
- Profile illicit drug use in the United States, including who uses illicit drugs, financial impact, and impact on college campuses and the workplace.
- Discuss the use and abuse of controlled substances, including cocaine, amphetamines, marijuana, opiates, hallucinogens, designer drugs, inhalants, and steroids.
Defining Addiction

Addiction is continued involvement with a substance or activity despite ongoing negative consequences. Addictive behaviors initially provide a sense of pleasure or stability that is beyond the addict’s power to achieve in other ways. Eventually, the addicted person needs to be involved in the behavior to feel normal.

In this chapter, addiction is used interchangeably with physiological addiction. However, physiological dependence, the adaptive state that occurs with regular addictive behavior and results in withdrawal symptoms, is only one indicator of addiction. Psychological dynamics play an important role, which explains why behaviors not related to the use of chemicals—gambling, for example—may also be addictive. A person who possesses a strong desire to continue engaging in a particular activity is said to have developed a psychological dependence. In fact, psychological and physiological dependence are so intertwined that it is not really possible to separate the two. For every psychological state, there is a corresponding physiological state. In other words, everything you feel is tied to a chemical process occurring in your body. Thus, addictions once thought to be entirely psychological in nature are now understood to have physiological components.

To be addictive, a substance or behavior must have the potential to produce a positive mood change. Chemicals are responsible for the most profound addictions, not only because they produce dramatic mood changes, but also because they cause cellular changes to which the body adapts so well that it eventually requires the chemical to function normally. Yet other behaviors, such as gambling, spending money, working, and sex, also create changes at the cellular level along with positive mood changes. Although the mechanism is not well understood, all forms of addiction probably reflect dysfunction of certain biochemical systems in the brain.

Traditionally, diagnosis of an addiction was limited to drug addiction and was based on four criteria as defined by the American Psychological Association:

1. Use for the purpose of relieving withdrawal symptoms—a series of temporary physical and psychological symptoms that occurs when the addicted person abruptly stops using the drug.
2. Continued use of the substance despite knowledge of the harm it causes oneself and others (deterioration in work performance, relationships, and social interaction).
3. Unsuccessful efforts to cut down or cease using the drug, including relapse, the tendency to return to the addictive behavior after a period of abstinence.
4. Tolerance or an acquired reaction to a drug in which continued intake of the same dose has diminished effects. In response to tolerance, drug users must increase the dose to achieve the desired effect.

Until recently, health professionals were unwilling to diagnose an addiction until medical symptoms appeared in the patient. Now we know that although withdrawal, pathological behavior, relapse, and tolerance are valid indicators of addiction, they do not characterize all addictive behavior.
As a result of the growing popularity of poker games, betting on sports events, and online gambling, college students have a problem gambling rate two or three times that of the general population.

and an overwhelming need to perform it; (2) loss of control, or the inability to predict reliably whether any isolated occurrence of the behavior will be healthy or damaging; (3) negative consequences, such as physical damage, legal trouble, financial problems, academic failure, or family dissolution, which do not occur with healthy involvement in any behavior; and (4) denial, the inability to perceive that the behavior is self-destructive. These four components are present in all addictions, whether chemical or behavioral.

Compulsive or Pathological Gambling

Gambling is a form of recreation and entertainment for millions of Americans. Most people who gamble do so casually and moderately to experience the excitement of anticipating a win.

However, over 3 million Americans are compulsive, or pathological, gamblers (addicted to gambling), and 15 million more are considered to be at risk for developing a gambling addiction. The American Psychiatric Association (APA) recognizes pathological gambling as a mental disorder and lists ten characteristic behaviors, including preoccupation with gambling, unsuccessful efforts to cut back or quit, using gambling to escape problems, and lying to family members to conceal the extent of involvement with gambling.

Gamblers and drug addicts describe many similar cravings and highs. A recent study supports what many experts believe to be true: that compulsive gambling is like drug addiction. Compulsive gamblers in this study were found to have decreased blood flow to a key section of the brain’s reward system. Much as with people who abuse drugs, it is thought that compulsive gamblers compensate for this deficiency in their brain’s reward system by overdoing it and getting hooked. Most compulsive gamblers state that they seek excitement even more than money. They place increasingly larger bets to obtain the desired level of excitement.

Who is at risk for getting hooked to the rush of gambling? Men are more likely to have gambling problems than women are. Gambling prevalence is also higher among lower-income individuals, those who are divorced, African Americans, older adults, and individuals residing within 50 miles of a casino. Residents in southern states, where opportunities to gamble have increased significantly over the past 20 years, also have higher gambling rates.

Gambling among college students appears to be on the rise across the nation. In a 2005 telephone poll conducted by University of Pennsylvania’s Annenburg Public Policy Center, 15.5 percent of college students reported gambling once a week, up from 8.3 percent in 2002, an 87 percent increase. Men dominated the gambling scene, with 26 percent reporting gambling each week, whereas 5.5 percent of women reported gambling weekly.

What accounts for this trend? College students have easier access to gambling opportunities than ever before with the advent of online gambling, a growing number of casinos, scratch tickets, lotteries, and sports betting networks. In particular, the largest boost has come from the increasing popularity of poker. Access to poker on the Internet and televised poker tournaments have revived the game, causing

loss of control  Inability to predict reliably whether a particular instance of involvement with an addictive substance or behavior will be healthy or damaging.

negative consequences  Physical damage, legal trouble, financial ruin, academic failure, family dissolution, and other severe problems associated with addiction.

denial  Inability to perceive or accurately interpret the self-destructive effects of an addictive behavior.

compulsive (pathological) gambler  A person addicted to gambling.

Addictive Behaviors

Clearly, tobacco, alcohol, and other drugs are addictive, and addictions to these drugs create multiple problems for addicted individuals as well as their families and society. Later in this chapter, and in other chapters in this book, we will discuss specific substance-related addictions. But first, we will examine two behaviors known to be addictive because they are mood-altering: compulsive gambling and shopping.
many young people to spend an unhealthy amount of time and money participating in online poker tournaments.

On campus, it is more common for men to gamble than women. Other characteristics associated with gambling among college students include spending more time watching TV, using computers for nonacademic purposes, spending less time studying, earning lower grades, participating in intercollegiate athletics, and engaging in heavy, episodic drinking and using illicit drugs in the past year.7

Whereas casual gamblers can stop anytime they wish and are capable of seeing the necessity to do so, compulsive gamblers are unable to control the urge to gamble even in the face of devastating consequences: high debt, legal problems, and the loss of everything meaningful, including homes, families, jobs, health, and even their lives. Gambling can also have a detrimental affect on health: cardiovascular problems affect 38 percent of compulsive gamblers, and their suicide rate is 20 times higher than that of the general population.

Compulsive Shopping and Borrowing

Although compulsive spending has been a pervasive problem in the United States for some time, a more insidious form of the addiction lurks in the new “plastic generation.” Credit card companies entice you with fantasies of having it all, right now—whether or not you can afford it.

The credit card companies seem to be succeeding. There are 400 million MasterCards and Visas out there. Add to that cable shopping stations, catalog shopping, and shopping over the Internet, and the opportunity to overspend is greater than ever before. The resulting debt from all this spending is phenomenal. After bankruptcies, formerly a last resort, reached a record high in 2005, new laws came into effect in 2006 reducing the number of bankruptcy filings by 70 percent to 618,000 for 2006. But consumer debt remains high, and it is expected that the number of bankruptcies filed will soon increase again.8 On average, compulsive spenders are $23,000 in debt, usually in the form of credit card debt or mortgages against their homes.9

Although most people can manage debt with careful planning, some spend money to meet emotional needs they can’t fulfill elsewhere. Anxiety, self-doubt, and anger all lead to spending as a way of coping with daily stressors. College students may be particularly vulnerable to spending problems because advertisers and credit card companies heavily target them.

Compulsive gambling and shopping can frequently lead to compulsive borrowing to help support the addiction. Irresponsible investments and purchases lead to debts that the addict tries to repay by borrowing more. Compulsive debtors borrow money repeatedly from family, friends, or institutions in spite of the problems this causes. Whereas most people incur overwhelming debt through a combination of hardship and ignorance about financial management, compulsive debtors incur debt primarily as a result of buying or gambling behaviors in which they have engaged to relieve painful feelings.

How Addiction Affects Family and Friends

The family and friends of an addicted person also suffer many negative consequences. Often they struggle with codependence, a self-defeating relationship pattern in which a person is “addicted to the addict.” It is the primary outcome of dysfunctional relationships or families.

Codependence is not accurately defined by isolated incidents, but rather by a pattern of behavior. Codependents find it hard to set healthy boundaries and often live in the chaotic, crisis-oriented mode that naturally occurs around addicts. They assume responsibility for meeting others’ needs to the point that they subordinate or even cease being aware of their own needs. They may be unable to perceive their needs because they have repeatedly been taught that their needs are inappropriate or less important than someone else’s. Their behavior goes far beyond performing kind services for another person. Codependents feel less than human if they fail to respond to the needs of someone else, even when their help was not requested. Although the term codependent is used less frequently today, treatment professionals still recognize the importance of helping addicts see how their behavior affects those around them and of working with family and friends to establish healthier relationships and boundaries.

Family and friends can play an important role in getting an addict to seek treatment. They are most helpful when they refuse to be enablers. Enablers are people who knowingly or unknowingly protect addicts from the natural consequences of their behavior. If they don’t have to deal with the consequences, addicts cannot see the self-destructive nature of their behavior and will therefore continue it. Codependents are the primary enablers of their addicted loved ones, although anyone who has contact with an addict can be an enabler and thus contribute (perhaps powerfully) to continuation of the addictive behavior. Enablers are generally unaware that their behavior has this effect. In fact, enabling is rarely conscious and certainly not intentional.

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**codependence** A self-defeating relationship pattern in which a person is “addicted to the addict.”

**enablers** People who knowingly or unknowingly protect addicts from the natural consequences of their behavior.
**receptor sites**  Specialized locations on cell membranes to which drugs can attach themselves.

**FIGURE 7.1** How the Body Metabolizes Drugs

**Steps in Drug Breakdown**
1. Drug is introduced.
2. Drug circulates in bloodstream.
3. Drug attaches to specific receptor sites.
4. Liver breaks down drugs circulating in bloodstream.
5. Drugs at receptor sites dissipate.
6. Lungs, bowels, skin, and kidneys excrete chemicals metabolized by the liver.

**what do you THINK?**

Why do we tend to protect others from the natural consequences of their destructive behaviors? ■ Have you ever confronted someone you were concerned about? If so, was the confrontation successful? ■ What tips would you give someone who wants to confront a loved one about an addiction?

**Drug Dynamics**

Drug misuse and abuse are problems of staggering proportions in our society. Each year, drug and alcohol abuse contributes to the destruction of families and jobs and to the deaths of more than 120,000 Americans. Drug abuse costs taxpayers more than $294 billion in preventable health care costs, extra law enforcement, vehicle crashes, crime, and lost productivity. It’s impossible to put a dollar amount on the pain, suffering, and dysfunction that drugs cause in our everyday lives.

Although overall use of drugs in the United States has fallen by 50 percent in the last 20 years, the past 10 years have shown an increase in the use of certain drugs by adolescents. It is important to understand how drugs work and why people use them. Humans appear to have a need to alter their consciousness, or mental state. We like to feel good or escape the normal. Consciousness can be altered in many ways: children spinning until they become dizzy and adults enjoying the rush of thrilling extreme sports are examples. To change our awareness, many of us listen to music, skydive, ski, read, daydream, meditate, pray, or have sexual relations. Others turn to drugs to alter consciousness.

Drugs work because they physically resemble the chemicals produced naturally within the body (Figure 7.1). Most bodily processes result from chemical reactions or from changes in electrical charge. Because drugs possess an electrical charge and chemical structure similar to those of chemicals that occur naturally in the body, they can affect physical functions in many different ways. For example, many painkillers resemble the endorphins (meaning "morphine within") that are manufactured in the body.

A current explanation of how drugs work is the receptor site theory, which states that drugs bind to specific receptor sites in the body. These sites are locations on the membranes of some cells to which, because of their size, shape, electrical charge,
and chemical properties, drugs can attach themselves. Most drugs attach to multiple receptor sites on cells located throughout the body in places such as the heart and circulatory system, the lungs, liver, kidneys, brain, and gonads (testicles or ovaries).

**try it NOW!**

*Achieve a drug-free and "natural high."* Many people become addicted to drugs because of the positive, short-term effects they can exert on mood. Right now, you can take a walk in a beautiful and sense-stimulating location, lose yourself in a favorite song, or visit an amusement park and ride the roller coaster to satisfy a craving for an endorphin rush or simply to lift your spirits.

### Types of Drugs

Scientists divide drugs into six categories: prescription, over-the-counter, recreational, herbal, illicit, and commercial drugs. These classifications are based primarily on drug action, although some are based on the source of the chemical in question. Each category includes some drugs that stimulate body functions and some that depress body functions. Each category also includes psychoactive drugs, which have the potential to alter a person’s mood or behavior.

- **Prescription drugs** can be obtained only with the written prescription of a licensed physician or other health care provider with prescription rights. More than 10,000 types of prescription drugs are sold in the United States, at an annual cost of over $200 billion to consumers.12
- **Over-the-counter (OTC) drugs** can be purchased without a prescription. Each year, Americans spend more than $20 billion on OTC products, and the market is increasing at the rate of 20 percent annually. More than 300,000 OTC products are available, and an estimated three out of four people routinely self-medicate with them.
- **Recreational drugs** belong to a somewhat vague category whose boundaries depend on how the term recreation is defined. Generally, these drugs contain chemicals used to help people relax or socialize. Most of them are legally sanctioned even though they are psychoactive. Alcohol, tobacco, coffee, tea, and chocolate products are usually included in this category.
- **Herbal preparations** form another vague category. Included among these are approximately 750 substances are herbal teas and other products of botanical (plant) origin that are believed to have medicinal properties. (See Chapter 17 for more on herbal preparations.)
- **Illicit (illegal) drugs** are the most notorious type of drug. Although laws governing their use, possession, cultivation, manufacture, and sale differ from state to state, illicit drugs generally are recognized as harmful. All of them are psychoactive.
- **Commercial preparations** are the most universally used yet least commonly recognized chemical substances. More than 1,000 of these substances exist, including seemingly benign items such as perfumes, cosmetics, household cleansers, paints, glues, inks, dyes, gardening chemicals, pesticides, and industrial by-products.

### Routes of Administration of Drugs

**Route of administration** refers to the way in which a given drug is taken into the body. The most common methods include oral ingestion (by mouth), inhalation (administration of drugs through the mouth or nostrils via sniffing or smoking), and injection into the muscles (intramuscular) bloodstream (intravenous), or just under the skin (subcutaneous). **Intravenous injection**, which involves the insertion of a hypodermic syringe directly into a vein, is the most common method of injection for drug misusers because the drug’s effect is felt rapidly. It is also the most dangerous method of administration because of the risk of contracting HIV and/or hepatitis B and damage to blood vessels. Drugs can also be absorbed through the skin or tissue linings (**inunction**)—the nicotine patch is a common example of a drug that is administered in this manner—or
through the vagina or anus in the form of suppositories. Suppositories are typically mixed with a waxy medium that melts at body temperature so the drug can be released into the bloodstream. However the drug enters the system, most drugs remain active in the body for several hours.

### Using, Misusing, and Abusing Drugs

Although drug abuse usually is referred to in connection with illicit psychoactive drugs, many people abuse and misuse prescription and OTC medications. Drug misuse involves the use of a drug for a purpose for which it was not intended. For example, taking a friend’s high-powered prescription painkiller for your headache is a misuse of that drug. This is not too far removed from drug abuse, the excessive use of any drug, and may result in serious harm.

The misuse and abuse of any drug may lead to addiction. Both risks and benefits are involved in the use of any chemical substance. Intelligent decision making requires a clear-headed evaluation of these risks and benefits.

### Types of Prescription Drugs

**Antibiotics** are drugs used to fight bacterial infection. Bacterial infections continue to be among the most common serious diseases throughout the world, but the vast majority can be cured with antibiotics. There are close to 100 different antibiotics, which may be dispensed by intramuscular injection or in tablet or capsule form. Some, called broad-spectrum antibiotics, are designed to control disease caused by a number of bacterial species. These medications may also kill off helpful bacteria in the body, thus triggering secondary infections. For example, some vaginal infections are related to long-term use of antibiotics. It is important to follow your health care provider’s directions when taking antibiotics and to use them only when you have a bacterial infection. The misuse of antibiotics has led to a dangerous increase in drug-resistant bacteria in recent years.

**Central nervous system depressants** are sedative or hypnotic medications commonly used to treat anxiety. The two main types of drugs in this group are benzodiazepines (such as Valium, Ativan, and Xanax), and barbiturates (including Amytal and Seconal). The benzodiazepines are the most widely used drug in this category, most commonly prescribed for tension, muscular strain, sleep problems, anxiety, panic attacks, and alcohol withdrawal. They differ widely in their mechanism of action, absorption rate, and metabolism, but all produce similar intoxication and withdrawal symptoms. Benzodiazepine sleeping pills have largely replaced barbiturates, which were used medically in the past for relieving tension and inducing relaxation and sleep.

All sedative or hypnotic drugs can produce physical and psychological dependence in several weeks. A complication specific to sedatives is cross-tolerance, which occurs when users develop tolerance for one sedative or become dependent on it and develop tolerance for others as well. Withdrawal from sedative or hypnotic drugs may range from mild discomfort to severe symptoms, depending on the degree of dependence. A major public health issue is whether or not persons using benzodiazepines have an increased risk of cognitive decline and dementia. Ongoing research is investigating this possible link.

**Antidepressants** are medications typically used to treat major depression, although occasionally they are used for other forms of depression that resist conventional therapy. There are several groups of antidepressant medications.
In 1993, the Food and Drug Administration (FDA) changed its policies to speed the approval process of new drugs. These changes were made for humanitarian reasons, in response to activists seeking rapid approval of experimental drugs that offered at least a ray of hope to AIDS patients who otherwise faced certain death. The “accelerated development/review” process was seen as a way to offer drugs that might be a significant improvement over existing treatments or that could benefit people with life-threatening illnesses for which no treatment currently exists.

Hundreds of new drugs have been approved since then. Of that number, a handful have been withdrawn after reports of deaths and severe side effects. Two examples are the prescription drugs Bextra and Lotronex. Bextra, a drug widely used for treating arthritis pain, was taken off the market after a large-scale study revealed a series of cardiovascular risks associated with it, including heart attack and stroke, and an increased risk for a potentially fatal skin reaction. Lotronex, a drug for treating irritable bowel syndrome, was pulled from the market after being linked to five deaths, the removal of one patient’s colon, and other bowel complications.

In response to these events and others, the Food and Drug Administration has launched a new drug safety initiative. It established the Drug Safety Oversight Board to oversee safety issues, consult with medical experts and consumer groups, and provide new information on medication risks and benefits to consumers and health care providers. The FDA has also developed new and improved communication channels to the general public on drug safety information.

New communication channels include the following:

- **The Drug Watch Web Page.** This page includes emerging information, for both previously and newly approved drugs, about possible serious side effects or other safety risks and how risks can be avoided. The agency will enhance access to this information and call for assistance in prioritizing and further evaluating potential adverse health concerns.
- **Healthcare Professional Information Sheets.** These information sheets for health care professionals contain the most important new information for safe use, including known and potential safety issues based on reports of adverse events, new information that may affect prescribing of the drug, and its approved indications and benefits.
- **Patient Information Sheets.** These are one-page information sheets for patients in a consumer-friendly format for all products on Drug Watch. Information includes new safety information as well as basic information about how to use the drug.


Approved for use in the United States. Prozac, Zoloft, and Paxil are well-known examples. Over the past decade, the use of antidepressant drugs in the United States has increased by 48 percent overall, and by 124 percent in children.14

**Generic Drugs**

Generic drugs, medications sold under a chemical name rather than under a brand name, have gained popularity in recent years. They contain the same active ingredients as brand-name drugs but are less expensive. If your doctor prescribes a drug, always ask whether a generic equivalent exists and whether it would be safe and effective for you to try. Not all drugs are available as generics.

Be aware, though, that there is some controversy about the effectiveness of generic drugs because substitutions sometimes are made in minor ingredients that can affect the way the drug is absorbed, potentially causing discomfort or even allergic reactions in some users. Always note any reactions you have to medications, and tell your doctor about them.

**Over-the-Counter Drugs**

Over-the-counter (OTC) drugs are nonprescription substances used in the course of self-diagnosis and self-medication. More than one-third of the time, people treat their routine health problems with OTC medications. In fact, American consumers spend billions of dollars yearly on OTC preparations for relief of everything from runny noses to ingrown toenails. There are 40,000 OTC drugs and more than 300,000 brand names for them.
This is not an ordinary party—it’s a pharming party, a get-together arranged so young adults can barter for their favorite prescription drugs. Pharming parties represent a growing trend among teenaged drug abusers and college students. According to a report by the National Center on Addiction and Substance Abuse (CASA) at Columbia University, the use of illegal substances such as cocaine, heroin, and other illegal drugs on college campuses had increased by 52 percent in 2005 over 1993 rates. (Marijuana use was not included in the study.) CASA findings during this time also show that the proportion of students abusing prescription drugs had significantly increased:

- 225 percent for sedatives such as Nembutal and Seconal
- 225 percent for opioids such as OxyContin and Vicodin
- 343 percent for opioids such as Percocet, Vicodin and OxyContin
- 93 percent for abuse of stimulants such as Ritalin and Adderall
- 450 percent for tranquilizers such as Xanax and Valium
- 300 percent for stimulants such as Ritalin and Adderall
- 300 percent for sedatives such as Nembutal and Seconal
- 450 percent for tranquillizers such as Xanax and Valium
- 300 percent for stimulants such as Ritalin and Adderall
- 450 percent for tranquillizers such as Xanax and Valium

Most OTC drugs are manufactured from a basic group of 1,000 chemicals. The many different products available to us are produced by combining as few as two and as many as ten substances.

**How Prescription Drugs Become Over-the-Counter Drugs**

The FDA regularly reviews prescription drugs to evaluate how suitable they would be as OTC products. For a drug to be switched from prescription to OTC status, it must meet the following criteria.

1. The drug has been marketed as a prescription medication for at least 3 years.
2. The use of the drug has been relatively high during the time it was available as a prescription drug.
3. Adverse drug reactions are not alarming, and the frequency of side effects has not increased during the time it was available to the public.

Since this policy has been in effect, the FDA has moved hundreds of drugs to OTC status. Some examples are:

- **Percocet, Vicodin and OxyContin**
- **Percodan, Vicozin, and others**
- **Ritalin and Adderall**
- **Xanax and Valium**
- **Nembutal and Seconal**
- **Percocet, Vicodin and OxyContin**
- **Percodan, Vicozin, and others**
- **Ritalin and Adderall**
- **Xanax and Valium**
- **Nembutal and Seconal**
ibuprofen, Claritin, and Prilosec. Many more prescription drugs are currently being considered for OTC status.

**Types of Over-the-Counter Drugs**

The FDA has categorized 26 types of OTC preparations. Those most commonly used are analgesics; cold, cough, allergy, and asthma relievers; stimulants; sleeping aids and relaxants; and dieting aids.

**Analgesics** More than 50 million Americans experience chronic pain. Is it any wonder that we spend more than $2 billion annually on analgesics (pain relievers), the largest sales category of OTC drugs in the United States? These pain relievers come in several forms. Aspirin, acetaminophen (Tylenol, Pamprin, Panadol), ibuprofen (Advil, Motrin, Nuprin), and ibuprofen-like drugs such as naproxen (Aleve) and ketoprofen (Orudis) are the most common.

Most pain relievers work at receptor sites by interrupting pain signals. Some are categorized as NSAIDs (non-steroidal anti-inflammatory drugs), also called prostaglandin inhibitors. Prostaglandins are chemicals released by the body in response to pain. Prostaglandin inhibitors restrain the release of prostaglandins and thus reduce the pain. Common NSAIDs include ibuprofen, naproxen, and aspirin.

Besides relieving pain, aspirin lowers fever by increasing the flow of blood to the skin surface, which causes sweating and cools the body. Aspirin long has been used to reduce inflammation and swelling associated with arthritis. It is widely accepted that a low dose of aspirin has anticoagulant effects (that is, it interferes with blood clotting) and can reduce the risk of heart attack and stroke.

Possible side effects for many NSAIDs include allergic reactions, ringing in the ears, stomach bleeding, and ulcers. Combining aspirin with alcohol can compound aspirin’s gastric irritant properties. As with all drugs, read the labels. Some analgesic labels caution against driving or operating heavy machinery when using the drug, and most warn that analgesics should not be taken with alcohol.

Research has also linked aspirin to a potentially fatal condition called Reye’s syndrome. Children, teenagers, and young adults (up to age 19) who are treated with aspirin while recovering from the flu or chickenpox are at risk for developing this syndrome. Aspirin substitutes are recommended for people in these age groups.

Acetaminophen is an aspirin substitute found in Tylenol and related medications. Like aspirin, acetaminophen is an effective analgesic and antipyretic (fever-reducing drug). However, it does not relieve inflamed or swollen joints. The side effects associated with acetaminophen generally are minimal, though overdose can cause liver damage. Both aspirin and acetaminophen are on the government’s lists of medications that are Generally Recognized as Safe (GRAS) and Generally Recognized as Effective (GRAE).

**TABLE 7.1 Types of Over-the-Counter Cold, Cough, and Allergy Relievers**

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Expectorants</td>
<td>These drugs loosen phlegm, which allows the user to cough it up and clear congested respiratory passages.</td>
</tr>
<tr>
<td>Antitussives</td>
<td>These OTC drugs calm or curtail the cough reflex. They are most effective when the cough is dry (does not produce phlegm). Oral codeine, dextromethorphan, and diphenhydramine are the most common antitussives that are on both the GRAE and GRAS lists.</td>
</tr>
<tr>
<td>Antihistamines</td>
<td>These central nervous system depressants dry runny noses, clear postnasal drip, clear sinus congestion, and reduce tears.</td>
</tr>
<tr>
<td>Decongestants</td>
<td>These remedies reduce nasal stuffiness due to colds.</td>
</tr>
<tr>
<td>Anticholinergics</td>
<td>These substances often are added to cold preparations to reduce nasal secretions and tears. None of the preparations tested have been found to be GRAE or GRAS. Some cold compounds contain alcohol in concentrations that may exceed 40 percent.</td>
</tr>
</tbody>
</table>

**Cold, Cough, Allergy, and Asthma Relievers** Most cold, cough, allergy, and asthma relievers are designed to alleviate the discomfiting symptoms associated with maladies of the upper respiratory tract. The operative word in this category is reliever; unfortunately, no drugs exist to cure the actual diseases. The drugs available provide only temporary relief until the sufferer’s immune system prevails over the disease. Table 7.1 describes the basic types of OTC cold, cough, and allergy relievers.

**Sleeping Aids and Relaxants** A study by the World Health Organization, conducted in 15 health centers around the globe, found that 27 percent of patients reported difficulties with sleeping. Many people routinely treat their insomnia with OTC sleep aids (such as Nytol, Sleep-Eze, and

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**analgesics** Pain relievers.

**prostaglandin inhibitors** Drugs that inhibit the production and release of prostaglandins, hormone-like substances often associated with arthritis or menstrual pain. Also called non-steroidal anti-inflammatory drugs (NSAIDs).

**Generally Recognized as Safe (GRAS)** A list of drugs generally recognized as safe, which seldom cause side effects when used properly.

**Generally Recognized as Effective (GRAE)** A list of drugs generally recognized as effective, which work for their intended purpose when used properly.
Rules for Proper Use of Over-the-Counter Drugs

Despite a common belief that OTC products are safe and effective, indiscriminate use and abuse can occur with these drugs as with all others. For example, people who frequently drop medication into their eyes to “get the red out” or pop antacids after every meal are likely to become addicted. Many people also experience adverse side effects because they ignore the warnings on the labels or simply do not read them.

The FDA has developed a standard label that appears on most OTC products (Figure 7.2). It provides directions for use, warnings, and other useful information. (Diet supplements, which are regulated as food products, have their own label that includes a Supplement Facts panel.)

OTC medications are far more powerful than ever before, and the science behind them is stronger as well. Therefore, as with any type of medication, do your homework. Observe the following rules when taking nonprescription drugs.

1. Always know what you are taking. Identify the active ingredients in the product.
2. Know the effects, both desired and undesired, of each active ingredient.
3. Read the warnings and cautions.
4. Don’t use anything for more than 1 or 2 weeks.
5. Be particularly cautious if you are also taking prescription drugs because the drugs may interact.
6. If you have questions, ask your pharmacist.
7. If you don’t need it, don’t take it!

Drug Interactions

Sharing medications, using expired prescriptions, taking higher doses than recommended, or using medications as a substitute for dealing with personal problems may result in serious health consequences. Polydrug use, taking several medications (including vitamins) or illegal drugs simultaneously, also can lead to dangerous health problems associated with drug interactions. The most hazardous interactions are synergism, antagonism, inhibition, intolerance, and cross-tolerance. Hazardous interactions may also occur between drugs and foods and beverages. Talk with your doctor about possible interactions before taking any medicines.

Synergism, also known as potentiation, is an interaction of two or more drugs in which the effects of the individual drugs are multiplied beyond what normally would be expected if they were taken alone. You might think of synergism as $2 + 2 = 10$.

A synergistic reaction can be very dangerous. Prescription and OTC medications carry labels warning the user not to combine them with certain other drugs or with alcohol. You should always verify any possible drug interactions before
Antagonism, although usually less serious than synergism, can also produce unwanted and unpleasant effects. In an antagonistic reaction, drugs work at the same receptor site so that one blocks the action of the other. The blocking drug occupies the receptor site and prevents the other substance from attaching, thus altering its absorption and action.

With inhibition, the effects of one drug are eliminated or reduced by the presence of another drug at the receptor site. One common inhibitory reaction occurs between antacid tablets and aspirin. The antacid inhibits the absorption of aspirin and makes it less effective as a pain reliever. Other inhibitory reactions occur between alcohol and antibiotics and between antibiotics and contraceptive pills.

Intolerance occurs when drugs combine in the body to produce extremely uncomfortable reactions. The drug Antabuse, used to help alcoholics give up alcohol, works by producing this type of interaction. It binds liver enzymes (the chemicals the liver produces to break down alcohol), making it impossible for the body to metabolize alcohol. As a result, an Antabuse user who drinks alcohol experiences nausea, vomiting, and, occasionally, fever.

Cross-tolerance occurs when a person develops a physiological tolerance to one drug and shows a similar tolerance to selected other drugs as a result. Taking one drug may actually increase the body’s tolerance to another substance. For example, cross-tolerance can develop between alcohol and barbiturates, two depressant drugs.

**Definitions**

**Antagonism** A type of drug interaction in which two or more drugs work at the same receptor site, so that one blocks the action of the other.

**Inhibition** A type of drug interaction in which the effects of one drug are eliminated or reduced by the presence of another drug at the receptor site.

**Intolerance** A type of drug interaction in which two or more drugs produce extremely uncomfortable symptoms.

**Cross-tolerance** Development of a tolerance to one drug that reduces the effects of another, similar drug.
Illicit Drugs

Whereas some people become addicted to prescription drugs and painkillers, others use illicit drugs. The problem of illicit drug use touches us all. We may use illicit substances ourselves, watch someone we love struggle with drug abuse, or become the victim of a drug-related crime. At the very least, we are forced to pay increasing taxes for law enforcement and drug rehabilitation. When our co-workers use drugs, the effectiveness of our own work is diminished. If the car we drive was assembled by drug-using workers at the plant, we are in danger. A drug-using bus driver, train engineer, or pilot jeopardizes our safety.

The good news is that the use of illicit drugs has declined significantly in recent years in most segments of society. Use of most drugs increased from the early 1970s to the late 1970s, peaked between 1979 and 1986, and declined until 1992, from which point it has not changed. In 2003, an estimated 19.2 million Americans were illicit drug users, about three-quarters the 1979 peak level of 25 million users. Among youth, however, illicit drug use, notably of marijuana, has been rising in recent years.\(^1\)

Who Uses Illicit Drugs?

Many of us have stereotypes in our minds of who uses illicit drugs, but it is difficult to generalize. Illicit drug users span all age groups, ethnicities, occupations, and socioeconomic groups. No matter the group, illicit drug use has a devastating effect on users and their families in the United States and many other countries.

After more than a decade of declining use on American college campuses, illicit drugs have reappeared. In 2004, the number of college students nationwide who had tried any drug stood at almost 52 percent; over a third had smoked pot in the past year, and 20 percent had done so in the past month. Daily use of marijuana was at its highest point since 1989.\(^1\) Cocaine use is down sharply, but LSD use has more than doubled. These figures vary from school to school.

Patterns of drug use vary only slightly by age. For example, a nationwide study of college campuses reported that approximately 33.3 percent of students had tried marijuana during the previous year (Table 7.2), and that percentage is nearly the same as the percentage of all Americans under the age of 45 who used marijuana during that time: 33.7 percent. Approximately 5.7 percent of college students surveyed reported using cocaine in the past year, whereas 8.5 percent of all Americans under age 45 said they had used cocaine during the previous year.\(^2\)

Most antidrug programs have not been effective because they have focused on only one aspect of drug abuse, rather than examining all factors that contribute to the problem. The pressures to take drugs are often tremendous, and the reasons for using them are complex. People who develop drug problems generally begin with the belief that they can control their drug use. Initially, they often view taking drugs as a fun and manageable pastime. Peer influence is a strong motivator, espes-

### Table 7.2

**Annual Prevalence of Use for Various Types of Drugs, 2005: Full-Time College Students versus Respondents 1–4 Years beyond High School**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Full-Time College (%)</th>
<th>Others (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any illicit drug</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any illicit drug other than marijuana</td>
<td>36.6</td>
<td>39.6</td>
</tr>
<tr>
<td>Marijuana</td>
<td>18.5</td>
<td>23.4</td>
</tr>
<tr>
<td>Inhaleants</td>
<td>33.3</td>
<td>34.6</td>
</tr>
<tr>
<td>Hallucinogens</td>
<td>1.8</td>
<td>1.8</td>
</tr>
<tr>
<td>LSD</td>
<td>5.0</td>
<td>7.3</td>
</tr>
<tr>
<td>Cocaine</td>
<td>0.7</td>
<td>2.1</td>
</tr>
<tr>
<td>Crack</td>
<td>5.7</td>
<td>9.0</td>
</tr>
<tr>
<td>MDMA (Ecstasy)</td>
<td>0.8</td>
<td>2.9</td>
</tr>
<tr>
<td>Heroin</td>
<td>0.3</td>
<td>1.1</td>
</tr>
<tr>
<td>Other narcotics</td>
<td>8.4</td>
<td>12.7</td>
</tr>
<tr>
<td>OxyContin</td>
<td>2.1</td>
<td>6.2</td>
</tr>
<tr>
<td>Vicodin</td>
<td>9.6</td>
<td>14.0</td>
</tr>
<tr>
<td>Amphetamines, adjusted</td>
<td>6.7</td>
<td>7.2</td>
</tr>
<tr>
<td>Ritalin</td>
<td>4.2</td>
<td>4.3</td>
</tr>
<tr>
<td>Methamphetamine</td>
<td>1.7</td>
<td>4.9</td>
</tr>
<tr>
<td>Ice</td>
<td>1.4</td>
<td>3.1</td>
</tr>
<tr>
<td>Sedatives (barbiturates)</td>
<td>3.9</td>
<td>6.9</td>
</tr>
<tr>
<td>Tranquilizers</td>
<td>6.4</td>
<td>9.3</td>
</tr>
<tr>
<td>Rohypnol</td>
<td>0.1</td>
<td>0.6</td>
</tr>
<tr>
<td>GHB</td>
<td>0.4</td>
<td>0.6</td>
</tr>
<tr>
<td>Ketamine</td>
<td>0.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Alcohol</td>
<td>83.0</td>
<td>76.9</td>
</tr>
<tr>
<td>Cigarettes</td>
<td>36.0</td>
<td>45.2</td>
</tr>
<tr>
<td><strong>Approximate weighted N</strong></td>
<td>1,360</td>
<td>850</td>
</tr>
</tbody>
</table>


### What do you THINK?

What factors do you believe influence illicit drug use in the United States? ■ What is the attitude toward drug use on your campus? ■ Are some substances considered more acceptable than others? ■ Is drug use considered more acceptable at certain times or occasions?
Controlled Substances

Drugs are classified into five schedules (categories) based on their potential for abuse, their medical uses, and accepted standards of safe use (Table 7.3). Schedule I drugs, those with the highest potential for abuse, are considered to have no valid medical uses. Although Schedule II, III, IV, and V drugs have known and accepted medical applications, many of them present serious threats to health when abused or misused. Penalties for illegal use are tied to the drugs’ schedule level.

Hundreds of illegal drugs exist. For general purposes, they can be divided into seven representative categories: stimulants, depressants, hallucinogens/psychedelics, designer drugs, inhalants, and steroids.

Stimulants

Cocaine  A white crystalline powder derived from the leaves of the South American coca shrub (not related to cocoa plants), cocaine (“coke”) has been described as one of the most powerful naturally occurring stimulants.

Methods of Cocaine Use  Cocaine can be taken in several ways. The powdered form of the drug is “snorted” through the nose. When cocaine is snorted, it can damage mucous membranes in the nose and cause sinusitis. It can destroy the user’s sense of smell, and occasionally it even eats a hole through the septum.

Smoking (known as freebasing) and intravenous injections are even more dangerous means of taking cocaine. Freebasing has become more popular than injecting in recent years because people fear contracting diseases such as AIDS and hepatitis by sharing contaminated needles. But freebasing involves other dangers. Because the volatile mix it requires are very explosive, some people have been killed or seriously burned. Smoking cocaine can also cause lung and liver damage.

Many cocaine users still occasionally “shoot up,” a method that introduces large amounts into the body rapidly. Within seconds, a sense of euphoria sets in. This intense high lasts for 15 to 20 minutes, and then the user heads into a “crash.” To prevent the unpleasant effects of the crash, users must shoot up frequently, which can severely damage veins. Injecting users place themselves at risk not only for AIDS and hepatitis, but also for skin infections, inflamed arteries, and infection of the lining of the heart.

Physical Effects of Cocaine  The effects of cocaine are felt rapidly. Snorted cocaine enters the bloodstream through the lungs in less than 1 minute and reaches the brain in less than 3 minutes. When cocaine binds at its receptor sites in the central nervous system, it produces intense pleasure. The euphoria quickly abates, however, and the desire to regain the pleasurable feelings makes the user want more cocaine (Figure 7.3).

Cocaine is both an anesthetic and a central nervous system stimulant. In tiny doses, it can slow heart rate. In larger doses, the physical effects are dramatic: increased heart rate and blood pressure, loss of appetite that can lead to dramatic weight loss, convulsions, muscle twitching, irregular heartbeat, and even eventual death due to overdose. Other effects of cocaine include temporary relief of depression, decreased fatigue, talkativeness, increased alertness, and heightened self-confidence. However, as the dose increases, users become irritable and apprehensive, and their behavior may turn paranoid or violent.

Types of Cocaine  Freebase is a form of cocaine that is more powerful and costly than powder or crack (see next section) and is taken by smoking. Street cocaine (cocaine hydrochloride) is converted to pure base by using ether to remove the hydrochloride salt and many of the “cutting agents” used to dilute the drug. This volatile chemical mixture is very dangerous and can cause severe burns. (The use of ether, which is flammable, adds to the danger.) The end product, freebase, is smoked through a water pipe.

Freebase cocaine reaches the brain within seconds and produces a quick, intense high that disappears quickly, leaving an intense craving for more. Freebasers typically increase the amount and frequency of the dose, often become severely addicted, and experience serious health problems.

**FIGURE 7.3 Ups and Downs of a Typical Dose of Cocaine**

Source: From Charles F. Levinthal, Drugs, Behavior and Modern Society, 5th ed. Published by Allyn & Bacon, Boston, MA. Copyright © 2007 by Pearson Education. Reprinted by permission of the publisher.

Cocaine is a powerful stimulant drug made from the leaves of the South American coca shrub.

Freebase  The most powerful distillate of cocaine.
Side effects of freebasing cocaine include weight loss, increased heart rate and blood pressure, depression, paranoia, and hallucinations. Freebase is an extremely dangerous drug and is responsible for a large number of cocaine-related hospital emergency-room visits and deaths.

The street name **crack** is given to freebase cocaine processed from cocaine hydrochloride by using ammonia or sodium bicarbonate (baking soda), water, and heat to remove the hydrochloride. The mixture (90 percent pure cocaine) is then dried. The soapy-looking substance that results can be broken into “rocks” and smoked. These rocks are approximately five times as strong as cocaine. Crack gets its name from the popping noises it makes when burned. A recent study found that 2 percent of college students reported using crack during their lives.\(^{21}\)

Because crack is such a pure drug, it takes much less time to achieve the desired high. One puff of a pebble-sized rock produces an intense high that lasts for approximately 20 minutes. The user can usually get three or four hits off a rock before it is used up. Crack is typically sold in small vials, folding papers, or heavy tinfoil containing two or three rocks.

A crack user can become addicted quickly. Addiction is accelerated by the speed at which crack is absorbed through the lungs (it hits the brain within seconds) and by the intensity of the high.

**Cocaine-Affected Babies** Because cocaine rapidly crosses the placenta (as virtually all drugs do), the fetus is vulnerable when a pregnant woman uses cocaine. It is estimated that 2.4 to 3.5 percent of pregnant women between the ages of 12 and 34 abuse cocaine. It is difficult to gauge how many newborns have been exposed to cocaine because pregnant users are reluctant to discuss their drug habit with health care providers for fear of prosecution. The most threatening problem during pregnancy is the increased risk of a miscarriage.

Although cocaine abuse has declined from its peak in the 1980s, it continues to be a commonly abused illicit drug today.
Fetuses exposed to cocaine in the womb are more likely to have a small head, premature delivery, reduced birth weight, increased irritability, and subtle learning and cognitive deficits. Research suggests that a significant number of these children develop problems with learning and language skills that require remedial attention. It is critical to identify these children early so they can receive immediate intervention. For both financial and humane reasons, prenatal care and education programs for mothers at risk should be considered a priority for state and local government.

Cocaine Addiction and Society  Cocaine addicts often suffer both physiological damage and serious disruption in lifestyle, including loss of employment and self-esteem. It is estimated that the annual cost of cocaine addiction in the United States exceeds $3.8 billion. However, there is no way to measure the cost in wasted lives. In 2005, 33.7 million Americans aged 12 and over reported lifetime use of cocaine, and 7.9 million reported using crack. About 5.5 million reported annual use of cocaine, and 1.4 million reported using crack. An estimated 2.4 million Americans reported current use of cocaine, 682,000 of whom reported using crack. There were an estimated 872,000 new users of cocaine in 2005 (approximately 2,400 per day), and most were aged 18 or older, although the average age of first use was approximately 20 years.

Cocaine has been called unpredictable by drug experts, deadly by coroners, dangerous by former users, and disastrous by the media. Yet to date, there has been no successful weapon to combat its use in the United States. Apparently, the risks do not override users’ desire to experience its effects.

Because cocaine is illegal, a complex underground network has developed to manufacture and sell the drug. Buyers may not always get the product they think they are purchasing. Cocaine marketed for snorting may be only 60 percent pure. Usually, it is mixed, or “cut,” with other white, powdery substances such as mannitol or sugar, though occasionally it is cut with arsenic or other cocaine-like powders that may themselves be highly dangerous.

Amphetamines  The amphetamines include a large and varied group of synthetic agents that stimulate the central nervous system. Small doses of amphetamines improve alertness, lessen fatigue, and generally elevate mood. With repeated use, however, physical and psychological dependence develops. Sleep patterns are affected (insomnia); heart rate, breathing rate, and blood pressure increase; and restlessness, anxiety, appetite suppression, and vision problems are common (Figure 7.4). High doses over long time periods can produce hallucinations, delusions, and disorganized behavior.

Certain types of amphetamines are used for medicinal purposes. Drugs such as Ritalin and Adderall are used to treat children with attention deficit hyperactivity disorder. However, in recent years these drugs have taken the place of caffeine on college campuses, and many students misuse them to stay awake for all-night cramming sessions. In fact, Ritalin is on the Drug Enforcement Agency’s top ten list of most often stolen prescription drugs. There is a false perception that these drugs improve academic performance. According to a recent national survey, over 4 percent of college students had used Ritalin in the past year.

Methamphetamine  An increasingly common form of amphetamine, methamphetamine (commonly called simply “meth”) is a potent, long-acting, addictive drug that strongly
ARE YOU CONTROLLED BY DRUGS?

How do you know whether you are chemically dependent? A dependent person can’t stop using drugs. This abuse hurts the user and everyone around him or her. Take the following assessment; the more often you check yes, the more likely you have a problem.

1. Do you use drugs to handle stress or escape from life’s problems?  
2. Have you unsuccessfully tried to cut down on or quit using your drug?  
3. Have you ever been in trouble with the law or been arrested because of your drug use?  
4. Do you think a party or social gathering isn’t fun unless drugs are available?  
5. Do you avoid people or places that do not support your usage?  
6. Do you neglect your responsibilities because you’d rather use your drug?  
7. Have your friends, family, or employer expressed concern about your drug use?  
8. Do you do things under the influence of drugs that you would not normally do?  
9. Have you seriously thought that you might have a chemical dependency problem?

ARE YOU CONTROLLED BY A DRUG USER?

Is your life controlled by a chemical abuser? Your love and care (codependence) may actually be enabling the person to continue the abuse, hurting you and others. Try this assessment; the more often you check yes, the more likely there’s a problem.

1. Do you often have to lie or cover up for the chemical abuser?  
2. Do you spend time counseling the person about the problem?  
3. Have you taken on additional financial or family responsibilities?  
4. Do you feel that you have to control the chemical abuser’s behavior?  
5. At the office, have you done work or attended meetings for the abuser?  
6. Do you often put your own needs and desires after the user’s?  
7. Do you spend time each day worrying about your situation?  
8. Do you analyze your behavior to find clues to how it might affect the chemical abuser?  
9. Do you feel powerless and at your wit’s end about the abuser’s problem?


activates the brain’s reward center by producing a sense of euphoria. Meth can cause brain damage that impairs motor skills and cognitive functions, leads to psychosis, and increases risk for heart attack and stroke.

Methods of Methamphetamine Use Methamphetamine can be snorted, smoked, injected, or orally ingested. Depending on the method of use, the drug will affect the user in different ways. Users often experience tolerance immediately, making meth a highly addictive drug from the very first time it is used. When snorted, the effects can be felt in 3 to 5 minutes; if orally ingested, the user will experience effects within 15 to 20 minutes. The pleasurable effects of meth are typically an intense rush lasting only a few minutes when snorted; in contrast, smoking the drug can produce a high lasting over 8 hours.
MAKE it happen!

**ASSESSMENT:** The Assess Yourself activity describes signs of being controlled by drugs or by a drug user. Depending on your results, you may need to change certain behaviors that may be detrimental to your health.

**MAKING A CHANGE:** To change your behavior, you need to develop a plan. Follow these steps below and complete your Behavior Change Contract to take action.

1. Evaluate your behavior, and identify patterns and specific things you are doing. What can you change now? What can you change in the near future?
2. Select one pattern of behavior that you want to change.
3. Fill out the Behavior Change Contract found at the front of your book. It should include your long-term goals for change, your short-term goals, the rewards you’ll give yourself for reaching these goals, potential obstacles along the way, and strategies for overcoming these obstacles. For each goal, list the small steps and specific actions that you will take.
4. Chart your progress in a journal. At the end of a week, consider how successful you were in following your plan. What helped you be successful? What made change more difficult? What will you do differently next week?
5. Revise your plan as needed. Are the short-term goals attainable? Are the rewards satisfying?

**EXAMPLE:** Tranh was surprised to find he had several yes answers to the self-assessment section about being controlled by a drug user. He realized that his girlfriend Kim’s drug use was hurting their relationship and negatively affecting him. Kim smoked marijuana almost every day and took club drugs at least twice a month. Tranh often had to lie to Kim’s employer if she was too incapacitated to go to work. Recently, she had been in a car accident after smoking pot for several hours, which damaged Tranh’s car and increased his insurance rate. And whenever she went out for an evening, he worried that she was taking Ecstasy and would find herself in a compromising situation.

These worries, financial consequences, and pressure to lie all made Tranh resolve to take steps to make a change in his responses to Kim’s behavior. His first step was to plan what he wanted to say to Kim about her drug use and how it affected both of them. He also started investigating drug counseling resources at school and in the community, both for Kim and for himself to help him cope with the issues raised by Kim’s drug use. Finally, he began talking to Kim’s friends, who, it turned out, also were concerned about her behavior. They worked together to develop strategies to help Kim and provide alternatives to her drug use; Tranh also felt less alone and more supported as soon as he started reaching out to his peers.

**Physical Effects of Methamphetamine** As shown in Figure 7.4, smaller doses of methamphetamine increase physical activity and alertness and decrease appetite. However, the drug’s effects quickly wear off, and the user seeks more. Long-term use of meth can cause severe dependence, psychosis, paranoia, aggression, weight loss, and stroke. Abusers often do not sleep or eat for days, as they continually inject up to 1 gram of the drug every 2 to 3 hours. A high state of irritability and agitation has been associated with violent behavior among some users.

Abuse of methamphetamine is an increasingly serious problem, especially in more rural areas of the United States, Hawaii, and the West Coast. In 2005, 4.5 percent of high school seniors reported using methamphetamine in their lifetime. Rates among adults are difficult to determine, but it is believed that over 12 million Americans have tried meth. A possible contributing factor to the increasing rate of methamphetamine use that it is relatively easy to make. Methamphetamine is produced by “cookers” using
recipes that often include common over-the-counter ingredients such as ephedrine and pseudoephedrine, which are found in cold and allergy medications. Many states have taken action by moving all cold and allergy medications behind the pharmacist’s counter, so high-volume buyers can be carefully monitored. Additionally, laws have strengthened the penalties associated with manufacturing methamphetamine.

Ice is a potent form of methamphetamine that is imported primarily from Asia, particularly from South Korea and Taiwan. It is purer and more crystalline than the version manufactured in many large U.S. cities, and is odorless when smoked. Ice is usually smoked, like crack cocaine, and its effects can last for more than 12 hours.

Like other methamphetamines, the “down” side of this drug is devastating. Prolonged use can cause fatal lung and kidney damage as well as long-lasting psychological damage. In some instances, major psychological dysfunction can persist as long as 2½ years after last use.

Marijuana

Although archaeological evidence documents the use of marijuana (“grass,” “weed,” “pot”) as far back as 6,000 years, the drug did not become popular in the United States until the 1960s. Today marijuana is the most commonly used illicit drug in the United States. Nearly one of every three Americans over the age of 12 has tried marijuana at least once. Some 12 million Americans have used it; more than 1 million cannot control their use of it. Its use is also on the rise on college campuses, following the trend of increased use set by the general population.26 However, students do not use marijuana as much as is sometimes perceived (see Did You Know?).

Physical Effects of Marijuana

Marijuana is derived from either the Cannabis sativa or Cannabis indica (hemp) plants. Current American-grown marijuana is a turbocharged version of the hippie weed of the late 1960s. Tetrahydrocannabinol (THC) is the psychoactive substance in marijuana and the key to determining how powerful a high it will produce. Today, most marijuana contains 5 percent THC; more potent forms of the drug can contain up to 27 percent THC but average 12 percent.27

Hashish, a potent cannabis preparation derived mainly from the thick, sticky resin of the plant, contains high concentrations of THC. Hash oil, a tarlike liquid produced by percolating a solvent such as ether through dried marijuana to extract the THC, may contain up to 300 mg of THC in a dose, or an average of 10 percent.28

Most of the time, marijuana is rolled into cigarettes (joints) or smoked in a pipe or water pipe (bong). Effects are generally felt within 10 to 30 minutes and usually wear off within 3 hours.

The most noticeable effect of THC is dilation of the blood vessels of the eyes, which produces the characteristic

DID you KNOW?

A recent study shows college students think their peers smoke marijuana four times as much as they actually do.


ice A potent, inexpensive form of methamphetamine that has long-lasting effects.
marijuana Chopped leaves and flowers of the Cannabis indica or Cannabis sativa plants (hemp); a psychoactive stimulant that intensifies reactions to environmental stimuli.
tetrahydrocannabinol (THC) The chemical name for the active ingredient in marijuana.
hashish The sticky resin of the cannabis plant; it is high in THC.
bloodshot eyes. Smokers of the drug also exhibit coughing, dry mouth and throat (“cotton mouth”), increased thirst and appetite, lowered blood pressure, and mild muscular weakness, primarily exhibited in drooping eyelids. Users can also experience severe anxiety, panic, paranoia, and psychosis.

Users of marijuana may have intensified reactions to various stimuli; colors, sounds, and the speed at which things move may seem altered. High doses of hashish may produce vivid visual hallucinations.

**Effects of Chronic Marijuana Use** Because marijuana is illegal in most parts of the United States and has been widely used only since the 1960s, long-term studies of its effects have been difficult to conduct. Also, studies conducted in the 1960s involved marijuana with THC levels constituting only a fraction of today’s plant levels, so their results may not apply to the stronger forms available today.

Most current information about chronic marijuana use comes from countries such as Jamaica and Costa Rica, where the drug is not illegal. These studies of long-term users (for 10 or more years) indicate that marijuana causes lung damage comparable to that caused by tobacco smoking. Indeed, smoking a single joint may be as bad for the lungs as smoking three tobacco cigarettes. Inhaling marijuana transfers carbon monoxide to the bloodstream. Because the blood has a greater affinity for carbon monoxide than it does for oxygen, this action diminishes the oxygen-carrying capacity of the blood. The heart must work harder to pump the vital element to oxygen-starved tissues. Furthermore, the cannabis tar contains higher levels of carcinogens than does tobacco smoke. Smoking marijuana results in three times as much tar inhalation and retention in the respiratory tract than tobacco use.

Other risks associated with marijuana include suppression of the immune system, blood pressure changes, and impaired memory function. Recent studies suggest that pregnant women who smoke marijuana are at a higher risk for stillbirth or miscarriage and for delivering low-birth weight babies and babies with abnormalities of the nervous system. Babies born to marijuana smokers are five times more likely to have features similar to those exhibited by children with fetal alcohol syndrome.

Debates concerning the effects of marijuana on the reproductive system have yet to be resolved. Studies conducted in the mid-1970s suggested that marijuana inhibited testosterone (and thus sperm) production in men and caused chromosomal breakage in both ova and sperm. Subsequent research in these areas is inconclusive. The question of whether the high-level THC plants currently available will increase the risks associated with this drug is, as yet, unanswered.29

**Marijuana and Medicine** Although recognized as a dangerous drug by the U.S. government, marijuana has several medical purposes. It helps control such side effects as the severe nausea and vomiting produced by chemotherapy, the chemical treatment for cancer. It improves appetite and forestalls the loss of lean muscle mass associated with AIDS-wasting syndrome. Marijuana reduces the muscle pain and spasticity caused by diseases such as multiple sclerosis. It also temporarily relieves the eye pressure of glaucoma, although it is unclear whether it is more effective than legal glaucoma drugs.30 Marijuana’s legal status for medicinal purposes continues to be hotly debated.

**Marijuana and Driving** Marijuana use presents clear hazards for drivers of motor vehicles as well as others on the road. The drug substantially reduces a driver’s ability to react and make quick decisions. In a study by the National Highway Traffic Safety Administration, a moderate dose of marijuana alone was shown to impair driving performance; however, the effects of even a low dose of marijuana combined with alcohol were markedly greater than for either drug alone. Studies show that approximately 6 to 11 percent of fatal accident victims test positive for THC.31 In many of these cases, alcohol is detected as well. Perceptual and other performance deficits resulting from marijuana use may persist for some time after the high subsides. Users who attempt to drive, fly, or operate heavy machinery often fail to recognize their impairment.

**what do you THINK?**

Why do you think that marijuana is the most popular illicit drug on college campuses? How widespread is marijuana use at your school?

**Opiates**

**Opiates** cause drowsiness, relieve pain, and induce euphoria. Also called narcotics, they are derived from the parent drug opium, a dark, resinous substance made from the milky juice of the opium poppy seed pod. Opiates include morphine, codeine, heroin, and black tar heroin.

The word narcotic comes from the Greek word for “stupor” and generally is used to describe sleep-inducing substances. Until the early twentieth century, many patent medicines contained opiates and were advertised as cures for everything from menstrual cramps to teething pains. More powerful than opium, morphine (named after Morpheus,
the Greek god of sleep) was widely used as a painkiller during the Civil War. **Codeine**, a less powerful analgesic (pain reliever) derived from morphine, also became popular.

As opiates became more common, physicians noted that patients tended to become dependent on them. Growing concern about addiction led to government controls of narcotic use. The Harrison Act of 1914 prohibited the production, dispensation, and sale of opiate products unless prescribed by a physician. Subsequent legislation required physicians prescribing opiates to keep careful records. Physicians are still subject to audits of their prescriptions.

Some opiates are still used today for medical purposes. Morphine is sometimes prescribed for severe pain, and codeine is found in prescription cough syrups and other painkillers. Several prescription drugs, including Percodan, Vicodin, and Dilaudid, contain synthetic opiates. Although all opiate use is strictly regulated, illicit use of OxyContin, another powerful opiate, has increased dramatically in recent years.

### Physical Effects of Opiates

Opiates are powerful depressants of the central nervous system. In addition to relieving pain, these drugs lower heart rate, respiration, and blood pressure. Side effects include weakness, dizziness, nausea, vomiting, euphoria, decreased sex drive, visual disturbances, and lack of coordination. Of all the opiates, heroin has the greatest notoriety as an addictive drug. The following section discusses the progression of heroin addiction; addiction to any opiate follows a similar path.

#### Heroin Addiction

Heroin is a white powder derived from morphine. **Black tar heroin** is a sticky, dark brown, foul-smelling form of heroin that is relatively pure and inexpensive. Once considered a cure for morphine dependence, heroin was later discovered to be even more addictive and potent than morphine. Today, heroin has no medical use.

An estimated 3.7 million people have used heroin at one time in their lives. The highest number of users are young adults aged 26 or older. **32** Heroin can be snorted, injected, or smoked. Injection remains the most common route of administration; however, the contemporary version of heroin is so potent that users can get high by snorting or smoking the drug. This has attracted a more affluent group of users who may not want to inject, for reasons such as the increased risk of contracting diseases such as HIV.

Heroin is a depressant that produces drowsiness and a dreamy, mentally slow feeling. It can cause drastic mood swings, with euphoric highs followed by depressive lows. Heroin slows respiration and urinary output and constricts the pupils of the eyes. Symptoms of tolerance and withdrawal can appear within 3 weeks of first use.

The most common route of administration for heroin addicts is “mainlining”—intravenous injection of powdered heroin mixed in a solution. Many users describe the “rush” they feel when injecting themselves as intensely pleasurable, whereas others report unpredictable and unpleasant side effects. The temporary nature of the rush contributes to the drug’s high potential for addiction—many addicts shoot up four or five times a day. Mainlining can cause veins to scar and eventually collapse. Once a vein has collapsed, it can no longer be used to introduce heroin into the bloodstream. Addicts become expert at locating new veins to use: in the feet, the legs, the temples, under the tongue, or in the groin.

The physiology of the human body could be said to encourage opiate addiction. Opiate-like substances called **endorphins** are manufactured in the body and have multiple receptor sites, particularly in the central nervous system. When endorphins attach at these points, they create feelings of painless well-being. Medical researchers refer to them as “the body’s own opiates.” When endorphin levels are high, people feel euphoric. The same euphoria occurs when opiates or related chemicals are active at the endorphin receptor sites.

#### Treatment for Opiate Addiction

Programs to help heroin addicts and people addicted to other opiates kick the habit have not been very successful. Some addicts resume drug use even after years of drug-free living because the craving for the injection rush is very strong. It takes a great deal of discipline to seek alternative nondrug highs.

Heroin addicts experience a distinct pattern of withdrawal. Symptoms of withdrawal include intense desire for the drug, sleep disturbance, dilated pupils, loss of appetite, irritability, goose bumps, and muscle tremors. The most difficult time in the withdrawal process occurs 24 to 72 hours following last use. All of the preceding symptoms continue, along with nausea, abdominal cramps, restlessness, insomnia, vomiting, diarrhea, extreme anxiety, hot and cold flashes, elevated blood pressure, and rapid heartbeat and respiration. Once the peak of withdrawal has passed, all these symptoms begin to subside. Still, the recovering addict has many hurdles to jump.

**Methadone maintenance** is one treatment available for people addicted to heroin or other opiates. Methadone is a synthetic narcotic that blocks the effects of opiate withdrawal. It is chemically similar enough to the opiates to control the tremors, chills, vomiting, diarrhea, and severe abdominal pains of withdrawal. Methadone dosage is
decreased over a period of time until the addict is weaned off the drug.

Methadone maintenance is controversial because of the drug’s own potential for addiction. Critics contend that the program merely substitutes one addiction for another. Proponents argue that people on methadone maintenance are less likely to engage in criminal activities to support their habits than heroin addicts are. For this reason, many methadone maintenance programs are financed by state or federal government and are available free of charge or at reduced cost.

A number of new drug therapies for opiate dependence are emerging. Naltrexone (Trexan), an opiate antagonist, has been approved as a treatment. While on naltrexone, recovering addicts do not have the compulsion to use heroin, and if they do use it, they don’t get high, so there is no point in using the drug. More recently, researchers have reported promising results with Temgesic (buprenorphine) a mild, nonaddicting synthetic opiate, which, like heroin and methadone, bonds to certain receptors in the brain, blocks pain messages, and persuades the brain that its cravings for heroin have been satisfied. Addicts report that while they are taking buprenorphine, they do not crave heroin anymore.

**Hallucinogens (Psychedelics)**

**Hallucinogens** are substances that are capable of creating auditory or visual hallucinations. These drugs are also known as **psychedelics**, a term adapted from the Greek phrase meaning “mind-manifesting.” Hallucinogens alter a user’s feelings, perceptions, and thoughts. The major receptor sites for most of these drugs are located in the brain region that is responsible for interpreting outside stimuli before these signals travel to other parts of the brain. This area, the **reticular formation**, lies in the brainstem at the upper end of the spinal cord (Figure 7.5). When a hallucinogen is present at a reticular formation site, messages become scrambled, and the user may see wavy walls instead of straight ones or may “smell” colors and “hear” tastes. This mixing of sensory messages is known as **synesthesia**. Users may also become less inhibited or recall events long buried in the subconscious mind.

The most widely recognized hallucinogens are LSD, mescaline, psilocybin, and PCP. All are illegal and carry severe penalties for manufacture, possession, transportation, or sale.

**LSD** Of all the psychedelics, **lysergic acid diethylamide (LSD)** is the most notorious. First synthesized in the late 1930s by Swiss chemist Albert Hoffman, LSD resulted from experiments to derive medically useful drugs from the ergot fungus found on rye and other cereal grains. Because LSD seemed capable of unlocking the secrets of the mind, psychiatrists initially felt it could be beneficial to patients unable to remember suppressed traumas. From 1950 through 1968, the drug was used for such purposes. Media attention focused on LSD in the 1960s. Young people used the drug to “turn on” and “tune out” the world that gave them the war in Vietnam, race riots, and political assassinations. In 1970, federal authorities, under intense pressure from the public, placed LSD on the list of controlled substances (Schedule I). LSD’s popularity peaked in 1972 then tapered off, primarily because of users’ inability to control dosages accurately.

Because of the recent wave of nostalgia for the 1960s, this dangerous psychedelic drug, known on the street as “acid,” has been making a comeback. Over 11 million Americans, most of them under age 35, have tried LSD at least once. LSD especially attracts younger users. A national survey of college students showed that 1.2 percent had used the drug in the past year.33
A hallucinogenic drug derived from the peyote cactus.

**peyote** A cactus with small “buttons” that, when ingested, produce hallucinogenic effects.

**psilocybin** The active chemical found in psilocybe mushrooms; it produces hallucinations.

**phencyclidine (PCP)** A hallucinogen, commonly called “angel dust,” that causes hallucinations, delusions, and delirium.

**Mescaline** Mescaline is one of hundreds of chemicals derived from the peyote cactus, a small cactus that grows in the southwestern United States and parts of Latin America. Natives of these regions have long used dried peyote “buttons” for religious purposes. In fact, members of the Native American Church (a religion practiced by thousands of North American native tribes) have been granted special legal permission to use the drug during religious ceremonies in some states.

Users typically swallow 10 to 12 buttons. They taste bitter and generally induce immediate nausea or vomiting. Long-time users claim that the nausea becomes less noticeable with frequent use. Those who are able to keep the drug down begin to feel the effects within 30 to 90 minutes, when mescaline reaches maximum concentration in the brain. (It may persist for up to 9 or 10 hours.) Mescaline is both a powerful hallucinogen and a central nervous system stimulant.

Products sold on the street as mescaline are likely to be synthetic chemical relatives of the true drug. Street names of these products include DOM, STP, TMA, and MMDA. Any of these can be toxic in small quantities.

**Psilocybin** Psilocybin and psilocin are the active chemicals in a group of mushrooms sometimes called “magic mushrooms.” Psilocybe mushrooms, which grow throughout the world, can be cultivated from spores or harvested wild. Because many mushrooms resemble the psilocybe variety, people who harvest wild mushrooms for any purpose should be certain of what they are doing. Mushroom varieties can be easily misidentified, and mistakes can be fatal. Psilocybin is similar to LSD in its physical effects, which generally wear off in 4 to 6 hours.

**PCP** Phencyclidine, or PCP, is a synthetic substance that became a black-market drug in the early 1970s. PCP was originally developed as a dissociative anesthetic, which means that patients receiving this drug could keep their eyes open and apparently remain conscious but feel no pain during a medical procedure. Afterward, patients would experience amnesia for the time the drug was in their system. Such a drug had obvious advantages as an anesthetic, but its unpredictability and drastic effects (postoperative delirium, confusion, and agitation) made doctors abandon it, and it was withdrawn from the legal market.

On the illegal market, PCP is a white, crystalline powder that users often sprinkle onto marijuana cigarettes. It is dangerous and unpredictable regardless of the method of administration. Common street names for PCP are “angel dust” for the crystalline powdered form and “peace pill” and “horse tranquilizer” for the tablet form.
The effects of PCP depend on the dose. A dose as small as 5 mg will produce effects similar to those of strong central nervous system depressants—slurred speech, impaired coordination, reduced sensitivity to pain, and reduced heart and respiratory rate. Doses between 5 and 10 mg cause fever, salivation, nausea, vomiting, and total loss of sensitivity to pain. Doses greater than 10 mg result in a drastic drop in blood pressure, coma, muscular rigidity, violent outbursts, and possible convulsions and death.

Psychologically, PCP may produce either euphoria or dysphoria. It also is known to produce hallucinations as well as delusions and overall delirium. Some users experience a prolonged state of “nothingness.” The long-term effects of PCP use are unknown.

## Designer Drugs (Club Drugs)

**Designer drugs** are synthetic drugs that produce effects similar to existing illegal drugs. They are manufactured in chemical laboratories and homes and are sold illegally. These drugs are easy to produce from available raw materials. The drugs themselves were once technically legal because the law had to specify the exact chemical structure of an illicit substance. However, a law is now in place that bans all chemical cousins of illegal drugs.

Collectively known as **club drugs**, these dangerous substances include Ecstasy, gamma-hydroxybutyrate (GHB), ketamine (Special K), and Rohypnol. Although users may think them harmless, research has shown that club drugs can produce a range of unwanted effects, including hallucinations, paranoia, amnesia, and, in some cases, death. Some club drugs work on the same brain mechanisms as alcohol and can dangerously boost the effects of both substances. Because the drugs are odorless and tasteless, people can easily slip them into drinks. Some of them have been associated with sexual assault and for that reason are referred to as “date rape drugs” (see the Spotlight on Your Health box in Chapter 4, as well as the discussion of drugs and sex on page 146 of Chapter 5).

**Ecstasy** (methylene dioxymethamphetamine, or MDMA) use has been reported by almost one of every four students at some universities. Ecstasy creates feelings of openness and warmth, combined with the mind-expanding characteristics of hallucinogens. Effects begin within 30 minutes and can last for 4 to 6 hours. Young people may use Ecstasy initially to improve mood or get energized so they can keep dancing; it also increases heart rate and blood pressure and may raise body temperature to the point of kidney and/or cardiovascular failure. Chronic use appears to damage the brain’s ability to think and to regulate emotion, memory, sleep, and pain. Combined with alcohol, Ecstasy can be extremely dangerous and sometimes fatal. Recent studies suggest that Ecstasy may cause long-lasting neurotoxic effects by damaging brain cells that produce serotonin.

**Rohypnol** is a potent tranquilizer similar in nature to Valium, but many times stronger. The drug produces a sedative effect, amnesia, muscle relaxation, and slowed psychomotor responses. The most publicized “date rape” drug, Rohypnol has gained notoriety as a problem on college campuses. The drug has been added to punch and other drinks at parties, where it is reportedly given to women in hopes of lowering their inhibitions and facilitating potential sexual conquests. The manufacturer changed the formula to give the drug a bright blue color that would make it easy to detect in most drinks, so would-be perpetrators are turning to blue tropical drinks and punches to disguise the drug.

**GHB (gamma-hydroxybutyrate)** is a central nervous system depressant known to have euphoric, sedative, and anabolic (body-building) effects. It was originally sold over the counter to body builders as an aid to reduce fat and build muscle. Concerns about GHB led the FDA to ban over-the-counter sales in 1992, and GHB is now a Schedule I controlled substance. GHB is an odorless, tasteless fluid that can be made easily at home or in a chemistry lab. Like Rohypnol, GHB has been slipped into drinks without being detected, resulting in loss of memory, unconsciousness, amnesia, and even death. Other dangerous side effects include nausea, vomiting, seizures, memory loss, hallucinations, coma, and respiratory distress.
An anesthetic used primarily in veterinary clinics. It is called Special K on the street, where it is most often diverted in liquid form from veterinary offices or medical suppliers. Dealers dry the liquid (usually by cooking it) and grind the residue into powder. Special K causes hallucinations as it inhibits the relay of sensory input; the brain fills the resulting void with visions, dreams, memories, and sensory distortions. The effects of Special K are less severe than those of Ecstasy, so it has grown in popularity among young people who have to go to work or school after a night of partying.

Inhalants

Inhalants are chemicals that produce vapors that, when inhaled, can cause hallucinations and create intoxicating and euphoric effects. Not commonly recognized as drugs, inhalants are legal to purchase and universally available but dangerous when used incorrectly. They generally appeal to young people who can’t afford or obtain illicit substances. Some products often misused as inhalants include rubber cement, model glue, paint thinner, lighter fluid, varnish, wax, spot removers, and gasoline. Most of these substances are sniffed or “huffed” by users in search of a quick, cheap high.

Because they are inhaled, the volatile chemicals in these products reach the bloodstream within seconds. An inhaled substance is not diluted or buffered by stomach acids or other body fluids and thus is more potent than it would be if swallowed. This characteristic, along with the fact that dosages are extremely difficult to control because every person has unique lung and breathing capacities, makes inhalants particularly dangerous.

The effects of inhalants usually last fewer than 15 minutes and resemble those of central nervous system depressants. Combining inhalants with alcohol produces a synergistic effect and can cause severe liver damage that can be fatal. Users may experience dizziness, disorientation, impaired coordination, reduced judgment, and slowed reaction times. An overdose of fumes from inhalants can cause unconsciousness. If the user’s oxygen intake is reduced during the inhaling process, death can result within 5 minutes. Whether a user is a first-time or chronic user, sudden sniffing death (SSD) syndrome can be a fatal consequence. This syndrome can occur if a user inhales deeply and then participates in physical activity or is startled.

**Amyl Nitrite** Sometimes called “poppers” or “rush,” amyl nitrite is packaged in small, cloth-covered glass capsules that can be crushed to release the active chemical. The drug is often prescribed to alleviate chest pain in heart disease patients because it dilates small blood vessels and reduces blood pressure. Dilation of blood vessels in the genital area is thought to enhance sensations or perceptions of orgasm. It also produces fainting, dizziness, warmth, and skin flushing.

**Nitrous Oxide** Nitrous oxide is sometimes used as an adjunct to dental anesthesia or minor surgical anesthesia. It is also a propellant chemical in aerosol products such as whipped toppings. Users who inhale nitrous oxide experience a state of euphoria, floating sensations, and illusions. Effects also include pain relief and a silly feeling demonstrated by laughing and giggling (hence its nickname, “laughing gas”). Regulating dosages of this drug can be difficult. Sustained inhalation can lead to unconsciousness, coma, and death.

**Anabolic Steroids**

Public awareness of anabolic steroids recently has been heightened by media stories about their use by amateur and professional athletes, especially in major league baseball. Anabolic steroids are artificial forms of the male hormone testosterone that promote muscle growth and strength. These ergogenic drugs are used primarily by people who believe the drugs will increase their strength, power, bulk (weight), speed, and athletic performance.

Most steroids are obtained through the black market. It was once estimated that approximately 17 to 20 percent of college athletes used them. Now that stricter drug-testing policies have been instituted by the National Collegiate Athletic Association (NCAA), reported use of anabolic steroids among intercollegiate athletes has dropped to 1.1 percent. However, a recent survey among high school students found a significant increase in the use of anabolic steroids since 1991. Few data exist on the extent of steroid abuse by adults. It has been estimated that hundreds of thousands of people aged 18 and older abuse anabolic steroids at least once a year. Among both adolescents and adults, steroid abuse is higher among men than women. However, steroid abuse is growing most rapidly among young women.36

Steroids are available in two forms: injectable solutions and pills. Anabolic steroids produce a state of euphoria, diminished fatigue, and increased bulk and power in both sexes. These qualities give steroids an addictive quality. When users stop, they can experience psychological withdrawal and...
In March 2005, Mark McGwire and other major league baseball players were subpoenaed to testify before Congress on the use of steroids in the sport. McGwire has admitted to the use of andro, a hormonal supplement, in the past.

Sometimes severe depression, in some cases leading to suicide attempts. If untreated, depression associated with steroid withdrawal has been known to last for a year or more after steroid use stops.

Men and women who use steroids experience a variety of adverse effects. These drugs cause mood swings (aggression and violence), sometimes known as “roid rage”; acne; liver tumors; elevated cholesterol levels; hypertension; kidney disease; and immune system disturbances. There is also a danger of transmitting AIDS and hepatitis (a serious liver disease) through shared needles. In women, large doses of anabolic steroids may trigger the development of masculine attributes such as lowered voice, increased facial and body hair, and male-pattern baldness; they may also result in an enlarged clitoris, smaller breasts, and changes in or absence of menstruation. When taken by healthy men, anabolic steroids shut down the body’s production of testosterone, causing men’s breasts to grow and testicles to atrophy.

To combat the growing problem of steroid use, the U.S. Congress passed the Anabolic Steroids Control Act (ASCA) of 1990. This law makes it a crime to possess, prescribe, or distribute anabolic steroids for any use other than the treatment of specific diseases. Anabolic steroids are now classified as a Schedule III drug. Penalties for their illegal use include up to 5 years’ imprisonment and a $250,000 fine for the first offense and up to 10 years’ imprisonment and a $500,000 fine for subsequent offenses.

A new and alarming trend is the use of other drugs to achieve the effects of steroids. The two most common steroid alternatives are gamma-hydroxybutyrate (GHB) and clenbuterol. GHB (also discussed earlier) is a deadly, illegal drug that is a primary ingredient in many “performance-enhancing” formulas. GHB does not produce a high. It does, however, cause headaches, nausea, vomiting, diarrhea, seizures, and other central nervous system disorders, and possibly death. Clenbuterol is used in some countries for veterinary treatments but is not approved for any use—in animals or humans—in the United States.

New attention was drawn to the issue of steroids and related substances when former St. Louis Cardinals slugger Mark McGwire admitted to using a supplement containing androstenedione (andro), an adrenal hormone that is produced naturally in both men and women. Andro raises levels of testosterone, which helps build lean muscle mass and promotes quicker recovery after injury. McGwire had done nothing illegal, because the supplement could be purchased over the counter (with sales estimated at $800 million a year), and its use was legal in baseball at that time. However, the supplement had been banned by the NFL, NCAA, and International Olympic Committee. A recent study found that when men take 100 milligrams of andro three times daily, it increases estrogen levels by up to 80 percent, enlarges the prostate gland, and increases heart disease risk by 10 to 15 percent. Major league baseball banned its use in 2004.

Visits to the locker rooms of many sports teams would disclose large containers of other alleged muscle-building supplements, such as creatine. Although they are legal, questions remain whether enough research has been done concerning the safety of these supplements. Some experts worry that they may bring consequences similar to those of steroids, such as liver damage and heart problems.

Try it NOW!

Take steps against drug misuse. Drug misuse can eventually lead to addiction and hurt your chances of achieving lifelong goals. On a piece of paper, identify one long-term goal you would like to achieve, such as becoming a lawyer. Be sure your goal is specific. Next, write down three steps you need to take to reach this goal (e.g., an internship with the district attorney, getting into the law school of your choice, passing the bar exam). Finally, think about drug misuse, its consequences, and how these factors will make your goal difficult to achieve or prevent you from reaching it at all.

Illegal Drug Use in the United States

Stories of people who have tried illegal drugs, enjoyed them, and suffered no consequences may tempt you to try them yourself. You may tell yourself it’s “just this once,” convincing yourself that one-time use is harmless. Given the dangers surrounding these substances, however, you should think
twice. The risks associated with drug use extend beyond the personal. The decision to try any illicit substance encourages illicit drug manufacture and transport, thus contributing to the national problem. The financial burden of illegal drug use on the U.S. economy is staggering, with an estimated economic cost of around $180.9 billion per year.\textsuperscript{37} This estimate includes costs associated with substance abuse treatment and prevention, health care, reduced job productivity and lost earnings, and social consequences such as crime and social welfare.

In addition, roughly half of all expenditures to combat crime are related to illegal drugs. The burden of these costs is absorbed primarily by the government (46 percent), followed by people who abuse drugs and members of their households (44 percent). One study found that Americans spend $64 billion on illicit drugs annually. These numbers break down as follows: $35 billion on cocaine, $10 billion each on marijuana and heroin, and $5 billion on methamphetamines. This is eight times what the federal government spends on research on HIV/AIDS, cancer, and heart disease put together.\textsuperscript{38}

**Solutions to the Problem**

Americans are alarmed by the increasing use of illegal drugs. Respondents in public opinion polls feel that the most important strategy for fighting drug abuse is educating young people. They also endorse strategies such as stricter border surveillance to reduce drug trafficking, longer prison sentences for drug dealers, increased government spending on prevention, enforcing antidrug laws, and greater cooperation among government agencies, private groups, and individuals providing treatment assistance. All of these approaches will probably help up to a point, but they do not offer a total solution to the problem. Drug abuse has been a part of human behavior for thousands of years, and it is not likely to disappear in the near future. For this reason, it is necessary to educate ourselves and to develop the self-discipline necessary to avoid dangerous drug dependence.

For many years, the most popular antidrug strategies were total prohibition and “scare tactics.” Both approaches proved ineffective. Prohibition of alcohol during the 1920s created more problems than it solved, as did prohibition of opiates in 1914. Outlawing other illicit drugs has neither eliminated them nor curtailed their traffic across U.S. borders.

In general, researchers in the field of drug education agree that a multimodal approach is best. Students should be taught the difference between drug use and abuse. Factual information that is free of scare tactics must be presented; lecturing and moralizing do not work. Emphasis should be placed on things that are important to young people. Telling adolescent boys that girls will find them disgusting if their breath stinks of cigarettes or pot will get their attention. Likewise, lecturing on the negative effects of drug use is a much less effective deterrent than teaching young people how to negotiate the social scene. One program intended to educate students, Drug Abuse Resistance Education (commonly called DARE), has been largely ineffective. Education efforts need to focus on achieving better outcomes for preventing drug use.

We must also study at-risk groups so we can better understand the circumstances that make them susceptible to drug use. Time, money, and effort by educators, parents, and policymakers are needed to ensure that today’s youth receive the love and security essential for building productive and meaningful lives and rejecting drug abuse.

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**Taking charge**

**Summary**

- Addiction is the continued involvement with a substance or activity despite ongoing negative consequences. Some behaviors, such as compulsive gambling and shopping, are addictive because they are mood-altering. Codependents are “addicted to the addict.”
- The six categories of drugs are prescription drugs, over-the-counter (OTC) drugs, recreational drugs, herbal preparations, illicit drugs, and commercial preparations. Administration routes include oral ingestion, injection (intravenous, intramuscular, and subcutaneous), inhalation, and inunction.
- Prescription drugs are administered under medical supervision. There are dozens of categories, including antibiotics, sedatives, tranquillizers, and antidepressants. Generic drugs often can be substituted for more expensive brand-name products.
- OTC drug categories include analgesics; cold, cough, allergy, and asthma relievers; stimulants; sleeping aids and relaxants; and dieting aids. Exercise personal responsibility by reading directions for OTC drugs and asking your pharmacist or doctor whether any special precautions are advised when taking these substances.
People from all walks of life use illicit drugs, although college students report higher usage rates than do the general population. Drug use declined from the mid-1980s to the early 1990s but has remained steady since then. However, among young people, use of drugs has been rising in recent years.

Chapter Review

1. An individual who knowingly tries to protect an addict from natural consequences of his or her destructive behaviors is
   a. enabling.  
   b. coddling.  
   c. practicing intervention.  
   d. controlling.

2. Chemical dependence relapse refers to
   a. a person who is experiencing a blackout memory loss.  
   b. a gap in one’s drinking or drugging patterns.  
   c. a full return to addictive behavior.  
   d. the failure to change one’s behavior.

3. Taking excessive drugs on a continual basis, even when it is not necessary to, describes
   a. drug misuse.  
   b. drug addiction.  
   c. drug tolerance.  
   d. drug abuse.

4. Cross-tolerance occurs when
   a. drugs work at the same receptor site so that one blocks the action of the other.  
   b. the effects of one drug are eliminated or reduced by the presence of another drug at the receptor site.  
   c. a person develops a physiological tolerance to one drug and shows a similar tolerance to selected other drugs as a result.  
   d. two or more drugs interact and the effects of the individual drugs are multiplied beyond what normally would be expected if they were taken alone.

5. Rebecca takes a number of medications for various conditions, including Prinivil (an antihypertensive drug), insulin (a diabetic medication), and Claritin (an antihistamine). This is an example of
   a. synergism.  
   b. illegal drug use.  
   c. polydrug use.  
   d. antagonism.

6. Prozac, Zoloft, and Paxil are among the most frequently prescribed
   a. antibiotics.  
   b. sedatives.  
   c. antidepressants.  
   d. tranquilizers.

7. Drugs that are marketed by their chemical names rather than a brand name are called
   a. generic drugs.  
   b. OTC drugs.  
   c. recreational drugs.  
   d. commercial drugs.

8. Which of the following is classified as a stimulant drug?
   a. amphetamines  
   b. alcohol  
   c. marijuana  
   d. LSD

9. Freebasing is
   a. mixing cocaine with heroin.  
   b. inhaling heroin fumes.  
   c. injecting a drug into the veins.  
   d. smoking the fumes of cocaine.

10. The psychoactive drug mescaline is found in what plant?
   a. mushrooms  
   b. peyote cactus  
   c. marijuana  
   d. belladonna

Answers to these questions can be found on page A-1.
Questions for Discussion and Reflection

1. What is the current theory that explains how drugs work in the body? Explain how this theory works.
2. Explain the terms synergism, antagonism, and inhibition.
3. Why do you think many people today feel that marijuana use is not dangerous? What are the arguments in favor of legalizing marijuana? What are the arguments against legalization? How common is the use of marijuana on your campus?
4. What could you do to help a friend who is fighting a substance abuse problem? What resources on your campus could help you?
5. What types of programs do you think would be effective in preventing drug abuse among high school and college students? How would programs for high school students differ from those for college students?
6. Discuss how addiction affects family and friends. What role do family and friends play in helping the addict get help and maintain recovery?

Accessing Your Health on the Internet

The following websites explore further topics and issues related to personal health. For links to the websites below, visit the Companion Website for Health: The Basics, Eighth Edition at www.aw-bc.com/donatelle.

2. U.S. Food and Drug Administration (FDA). The federal agency responsible for approving prescription and over-the-counter drugs, with information on product approvals, recalls, and more. www.fda.gov
3. Join Together. An excellent site for the most current information related to substance abuse. Also includes information on gun violence and provides advice on organizing and taking political action. www.jointogether.org
5. Substance Abuse and Mental Health Services Administration (SAMHSA). Outstanding resource for information about national surveys, ongoing research, and national drug interventions. www.samhsa.gov

Further Reading

Addresses current addiction controversies from an international perspective, with authors from the United States and Norway. Topics include whether addicts have a choice in their behavior and current addiction theories.

Discusses how drugs affect the brain, how each drug causes addiction, and how addictive drugs impact society. The author explains what we know about drug addiction, how we know what we know, and what we can and cannot do about the drug problem.

This essential guide answers every conceivable question about prescription and nonprescription drugs and contains information about dosages, side effects, precautions, interactions, and more. More than 5,000 brand-name and 800 generic drugs are profiled in an easy-to-use format.

A scholarly analysis of substance abuse among American women. This lucidly written book provides a perceptive and compassionate discussion of the factors that contribute to abuse of a wide spectrum of substances and of the associated social and health consequences for women.

Outlines proper uses, possible dangers, and effective ingredients of nonprescription medications.

This book examines drugs and behavior from the behavioral, pharmacological, historical, social, legal, and clinical perspectives.

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**e-themes from The New York Times**


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