Drugs, Health & Behavior
DRUGS, HEALTH & BEHAVIOR

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INTRODUCTION

Welcome to Drugs, Health & Behavior!

In this open textbook, you will find seven chapters.
1. What are Drugs? A Brief Introduction
2. How the Body Works in Relation to Drugs
3. Types of Drugs Commonly Misused
4. Prescriptions, Over The Counter Medications, and Supplements
5. Law, Regulation, and Social Policy
6. Use, Abuse, Addiction & Treatment
7. Prevention

Please note that in Pressbooks pages are called chapters. When you click on the “next chapter” arrow at the bottom right, you are just going to the next page.
CHAPTER 1
CHAPTER 1: WHAT ARE DRUGS?

Introduction

Mention the word drugs and most of us will think of opioids or marijuana. But when we consider where drugs come from or how they are made and what we can buy at the drug store (prescription drugs, over-the-counter medications, supplements), the categories become much broader. The goal of this chapter is to take a look at what substances are considered to be drugs and how they are classified. This will provide a good base of understanding to delve into how drugs impact the body, health and society.
Learning Objectives

By the end of this chapter you should be able to:

1. Explain how the body makes chemicals that are drugs
2. Describe how illicit drugs range from natural to synthetic which have increasingly stronger effects on the body
3. Identify the most commonly misused and abused drugs
4. Connect several illicit drugs to their schedules set by current law and regulations
5. Describe how drugs interact with each other and foods
6. Describe the vast amount of medications and supplements currently available in the world
1.1 TYPES OF DRUGS

The first reading for this chapter which is available in Canvas reviews four types of drugs: Endogenous, natural (both Crude Forms and Refined forms), semisynthetic, and synthetic. The websites below provide additional information on all kinds of medications and commonly misused drugs.

1. A great overview of drugs and medications is provided by drugabuse.com

2. A comprehensive list of Medical Information on prescription drugs, vitamins and over-the-counter medicines from WebMd.com

3. Commonly Abused Drug Charts provided by the National Institute on Drug Abuse.

To make the most of these resources you should be able to do the following after carefully reading the information they provide:

- Describe each type of drug in your own words.
- Explain the benefits and dangers associated with each type of drugs.
- List several examples of each type of drug.
1.2 BRIEF INTRODUCTIONS INTO THE MOST COMMONLY MISUSED AND ABUSED DRUGS

While we all experience altered states of consciousness in the form of sleep on a regular basis, some people use drugs and other substances that result in altered states of consciousness as well. This section will present information relating to the use of various psychoactive drugs and problems associated with such use. This will be followed by brief descriptions of the effects of some of the more well-known drugs commonly used today.

SUBSTANCE USE DISORDERS

The fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5) is used by clinicians to diagnose individuals suffering from various psychological disorders. Drug use disorders are addictive
disorders, and the criteria for specific substance (drug) use disorders are described in DSM-5. A person who has a substance use disorder often uses more of the substance than they originally intended to and continues to use that substance despite experiencing significant adverse consequences. In individuals diagnosed with a substance use disorder, there is a compulsive pattern of drug use that is often associated with both physical and psychological dependence.

Physical dependence involves changes in normal bodily functions—the user will experience withdrawal from the drug upon cessation of use. In contrast, a person who has psychological dependence has an emotional, rather than physical, need for the drug and may use the drug to relieve psychological distress. Tolerance is linked to physiological dependence, and it occurs when a person requires more and more drug to achieve effects previously experienced at lower doses. Tolerance can cause the user to increase the amount of drug used to a dangerous level—even to the point of overdose and death.

Drug withdrawal includes a variety of negative symptoms experienced when drug use is discontinued. These symptoms usually are opposite to the effects of the drug. For example, withdrawal from sedative drugs often produces unpleasant arousal and agitation. In addition to withdrawal, many individuals who are diagnosed with substance use disorders will also develop tolerance to these substances. Psychological dependence, or drug craving, is a recent addition to the diagnostic criteria for substance use disorder in DSM-5. This is an important factor because we can develop tolerance and experience withdrawal from any number of drugs that we do not
abuse. In other words, physical dependence in and of itself is of limited utility in determining whether or not someone has a substance use disorder.

**DRUG CATEGORIES**

The effects of all psychoactive drugs occur through their interactions with our endogenous neurotransmitter systems. Many of these drugs, and their relationships, are shown in [link]. As you have learned, drugs can act as agonists or antagonists of a given neurotransmitter system. An agonist facilitates the activity of a neurotransmitter system, and antagonists impede neurotransmitter activity.
This figure illustrates various drug categories and overlap among them. (credit: modification of work by Derrick Snider)

Long description: the four main drug categories are “antipsychotics,” “stimulants,” “depressants,” and “hallucinogens.” The circle titled “Antipsychotics” includes the drug names “Haldol,” “Risperdal,” and “Seroquel.” The circle titled “Stimulants” contains a
subcircle titled “Psychomotor stimulants” with the drug names “Amphetamines,” “Khat,” “Ritalin,” and “Cocaine.” The “Stimulants” circle contains another subcircle titled “Methylxanthines” with the drug names “Caffeine,” “Theophylline,” and “Theobromine.” The circle titled “Depressants” contains a subcircle titled “Sedative Hypnotics” with the drug names “Alcohol,” “Barbituates,” “Ether,” and “GHB”; within that circle is a subcircle titled “Minor tranquilizers” with the drug names “Ativan,” “Valium,” and “Xanax.” “Nicotine” falls in the overlap between the “Stimulants” and “Depressants” circles. The circle titled “Depressants” also contains a subcircle titled “Narcotic Analgesics” with the drug names “Opium,” “Codeine,” “Morphine,” “Heroin,” and “DXM.” “DXM” falls in the overlap between the “Depressants” circle and the “Dissociatives” subcircle of the “Hallucinogens” circle. The circle titled “Hallucinogens” contains a subcircle labeled “Dissociatives” including the drug names “Ketamine,” “PCP,” “Nitrous,” “Amanitas,” and “Salvinorum.” Within that subcircle, “Ketamine,” “PCP,” and “Nitrous” overlap with with the “depressants” circle. The circle titled “Hallucinogens” also contains a subcircle titled “Psychedelics” including the drug names “MDMA,” “Mescaline,” “LSD,” “Psilocybin,” “AMT,” “DMT,” and “Ibogaine.” Within that subcircle, “MDMA,” “Mescaline,” “LSD,” “Psilocybin,” and “AMT” fall within the overlap between the “Hallucinogens” and “Stimulants” circles. “Ibogaine” falls within the overlap between the “Psychedelics” and “Dissociatives” subcircles. Outside of all subcircles, “Marijuana” falls within the overlap between the “Stimulants,” “Depressants,” and “Hallucinogens” circles.
Alcohol and Other Depressants

Ethanol, which we commonly refer to as alcohol, is in a class of psychoactive drugs known as depressants (Figure_04_05_Drug_Types). A depressant is a drug that tends to suppress central nervous system activity. Other depressants include barbiturates and benzodiazepines. These drugs share in common their ability to serve as agonists of the gamma-Aminobutyric acid (GABA) neurotransmitter system. Because GABA has a quieting effect on the brain, GABA agonists also have a quieting effect; these types of drugs are often prescribed to treat both anxiety and insomnia.
The GABA-gated chloride (Cl⁻) channel is embedded in the cell membrane of certain neurons. The channel has multiple receptor sites where alcohol, barbiturates, and benzodiazepines bind to exert their effects. The binding of these molecules opens the chloride channel, allowing negatively-charged chloride ions (Cl⁻) into the neuron's cell body. Changing its charge in a negative direction pushes the neuron away from firing; thus, activating a GABA neuron has a quieting effect on the brain.

Acute alcohol administration results in a variety of changes to consciousness. At rather low doses, alcohol use is associated with feelings of euphoria. As the dose increases, people report feeling sedated. Generally, alcohol is associated with decreases in reaction time and visual acuity, lowered levels of alertness, and reduction in behavioral control. With excessive alcohol use, a person
might experience a complete loss of consciousness and/or difficulty remembering events that occurred during a period of intoxication (McKim & Hancock, 2013). In addition, if a pregnant woman consumes alcohol, her infant may be born with a cluster of birth defects and symptoms collectively called fetal alcohol spectrum disorder (FASD) or fetal alcohol syndrome (FAS).

With repeated use of many central nervous system depressants, such as alcohol, a person becomes physically dependent upon the substance and will exhibit signs of both tolerance and withdrawal. Psychological dependence on these drugs is also possible. Therefore, the abuse potential of central nervous system depressants is relatively high.

Drug withdrawal is usually an aversive experience, and it can be a life-threatening process in individuals who have a long history of very high doses of alcohol and/or barbiturates. This is of such concern that people who are trying to overcome addiction to these substances should only do so under medical supervision.

**Stimulants**

Stimulants are drugs that tend to increase overall levels of neural activity. Many of these drugs act as agonists of the dopamine neurotransmitter system. Dopamine activity is often associated with reward and craving; therefore, drugs that affect dopamine neurotransmission often have abuse liability. Drugs in this category include cocaine, amphetamines (including methamphetamine), cathinones (i.e., bath salts), MDMA (ecstasy), nicotine, and caffeine.

Cocaine can be taken in multiple ways. While many
users snort cocaine, intravenous injection and ingestion are also common. The freebase version of cocaine, known as crack, is a potent, smokable version of the drug. Like many other stimulants, cocaine agonizes the dopamine neurotransmitter system by blocking the reuptake of dopamine in the neuronal synapse.

**Dig Deeper: Crack Cocaine**

Crack ([link](#)) is often considered to be more addictive than cocaine itself because it is smokable and reaches the brain very quickly. Crack is often less expensive than other forms of cocaine; therefore, it tends to be a more accessible drug for individuals from impoverished segments of society. During the 1980s, many drug laws were rewritten to punish crack users more severely than cocaine users. This led to discriminatory sentencing with low-income, inner-city minority populations receiving the harshest punishments. The wisdom of these laws has recently been called into question, especially given research that suggests crack may not be more addictive than other forms of cocaine, as previously thought (Haasen & Krausz, 2001; Reinerman, 2007).
Amphetamines have a mechanism of action quite similar to cocaine in that they block the reuptake of dopamine in addition to stimulating its release ([link](#)). While amphetamines are often abused, they are also
commonly prescribed for children diagnosed with attention deficit hyperactivity disorder (ADHD). It may seem counterintuitive that stimulant medications are prescribed to treat a disorder that involves hyperactivity, but the therapeutic effect comes from increases in neurotransmitter activity within certain areas of the brain associated with impulse control.

As one of their mechanisms of action, cocaine and amphetamines block the reuptake of dopamine from the synapse into the presynaptic cell.

Long description: The presynaptic cell contains two cylinder-shaped channels, one on each side near where it faces the postsynaptic cell. The postsynaptic cell contains several receptors, side-by-side across the area that faces
the presynaptic cell. In the space between the two cells, there are both cocaine and dopamine molecules. One of the cocaine molecules attaches to one of the presynaptic cell’s channels. This cocaine molecule is labeled “bound cocaine.” An X-shape is shown over the top of the bound cocaine and the channel to indicate that the cocaine does not enter the presynaptic cell. A dopamine molecule is shown inside of the presynaptic cell’s other channel. Arrows connect this dopamine molecule to several others inside of the presynaptic cell. More arrows connect to more dopamine molecules, tracing their paths from the channel into the presynaptic cell, and out into the space between the presynaptic cell and the postsynaptic cell. Arrows extend from two of the dopamine molecules in this in-between space to the postsynaptic cell’s receptors. Only the dopamine molecules are shown binding to the postsynaptic cell’s receptors.

In recent years, methamphetamine (meth) use has become increasingly widespread. Methamphetamine is a type of amphetamine that can be made from ingredients that are readily available (e.g., medications containing pseudoephedrine, a compound found in many over-the-counter cold and flu remedies). Despite recent changes in laws designed to make obtaining pseudoephedrine more difficult, methamphetamine continues to be an easily accessible and relatively inexpensive drug option (Shukla, Crump, & Chrisco, 2012).

The cocaine, amphetamine, cathinone, and MDMA users seek a euphoric high, feelings of intense elation and pleasure, especially in those users who take the drug via
intravenous injection or smoking. Repeated use of these stimulants can have significant adverse consequences. Users can experience physical symptoms that include nausea, elevated blood pressure, and increased heart rate. In addition, these drugs can cause feelings of anxiety, hallucinations, and paranoia (Fiorentini et al., 2011). Normal brain functioning is altered after repeated use of these drugs. For example, repeated use can lead to overall depletion among the monoamine neurotransmitters (dopamine, norepinephrine, and serotonin). People may engage in the compulsive use of these stimulant substances in part to try to reestablish normal levels of these neurotransmitters (Jayanthi & Ramamoorthy, 2005; Rothman, Blough, & Baumann, 2007).

Caffeine is another stimulant drug. While it is probably the most commonly used drug in the world, the potency of this particular drug pales in comparison to the other stimulant drugs described in this section. Generally, people use caffeine to maintain increased levels of alertness and arousal. Caffeine is found in many common medicines (such as weight loss drugs), beverages, foods, and even cosmetics (Herman & Herman, 2013). While caffeine may have some indirect effects on dopamine neurotransmission, its primary mechanism of action involves antagonizing adenosine activity (Porkka-Heiskanen, 2011).

While caffeine is generally considered a relatively safe drug, high blood levels of caffeine can result in insomnia, agitation, muscle twitching, nausea, irregular heartbeat, and even death (Reissig, Strain, & Griffiths, 2009; Wolt, Ganetsky, & Babu, 2012). In 2012, Kromann and Nielson reported on a case study of a 40-year-old woman who
suffered significant ill effects from her use of caffeine. The woman used caffeine in the past to boost her mood and to provide energy, but over the course of several years, she increased her caffeine consumption to the point that she was consuming three liters of soda each day. Although she had been taking a prescription antidepressant, her symptoms of depression continued to worsen and she began to suffer physically, displaying significant warning signs of cardiovascular disease and diabetes. Upon admission to an outpatient clinic for the treatment of mood disorders, she met all of the diagnostic criteria for substance dependence and was advised to dramatically limit her caffeine intake. Once she was able to limit her use to less than 12 ounces of soda a day, both her mental and physical health gradually improved. Despite the prevalence of caffeine use and a large number of people who confess to suffering from caffeine addiction, this was the first published description of soda dependence appearing in scientific literature.

Nicotine is highly addictive, and the use of tobacco products is associated with increased risks of heart disease, stroke, and a variety of cancers. Nicotine exerts its effects through its interaction with acetylcholine receptors. Acetylcholine functions as a neurotransmitter in motor neurons. In the central nervous system, it plays a role in arousal and reward mechanisms. Nicotine is most commonly used in the form of tobacco products like cigarettes or chewing tobacco; therefore, there is a tremendous interest in developing effective smoking cessation techniques. To date, people have used a variety of nicotine replacement therapies in addition to various psychotherapeutic options in an attempt to discontinue
their use of tobacco products. In general, smoking cessation programs may be effective in the short term, but it is unclear whether these effects persist (Cropley, Theadom, Pravettoni, & Webb, 2008; Levitt, Shaw, Wong, & Kaczorowski, 2007; Smedslund, Fisher, Boles, & Lichtenstein, 2004).

Opioids

An opioid is one of a category of drugs that includes heroin, morphine, methadone, and codeine. Opioids have analgesic properties; that is, they decrease pain. Humans have an endogenous opioid neurotransmitter system—the body makes small quantities of opioid compounds that bind to opioid receptors reducing pain and producing euphoria. Thus, opioid drugs, which mimic this endogenous painkilling mechanism, have an extremely high potential for abuse. Natural opioids, called opiates, are derivatives of opium, which is a naturally occurring compound found in the poppy plant. There are now several synthetic versions of opiate drugs (correctly called opioids) that have very potent painkilling effects, and they are often abused. For example, the National Institutes of Drug Abuse has sponsored research that suggests the misuse and abuse of the prescription painkillers hydrocodone and oxycodone are significant public health concerns (Maxwell, 2006). In 2013, the U.S. Food and Drug Administration recommended tighter controls on their medical use.

Historically, heroin has been a major opioid drug of abuse ([link]). Heroin can be snorted, smoked, or injected intravenously. Like the stimulants described earlier, the
use of heroin is associated with an initial feeling of euphoria followed by periods of agitation. Because heroin is often administered via intravenous injection, users often bear needle track marks on their arms and, like all abusers of intravenous drugs, have an increased risk for contraction of both tuberculosis and HIV.

Aside from their utility as analgesic drugs, opioid-like compounds are often found in cough suppressants, anti-nausea, and anti-diarrhea medications. Given that withdrawal from a drug often involves an experience opposite to the effect of the drug, it should be no surprise that opioid withdrawal resembles a severe case of the flu. While opioid withdrawal can be extremely unpleasant, it is not life-threatening (Julien, 2005). Still, people experiencing opioid withdrawal may be given methadone to make the withdrawal from the drug less difficult. Methadone is a synthetic opioid that is less euphorogenic than heroin and similar drugs. Methadone clinics help people who previously struggled with opioid addiction manage withdrawal symptoms through the use of
methadone. Other drugs, including the opioid buprenorphine, have also been used to alleviate symptoms of opiate withdrawal.

Codeine is an opioid with relatively low potency. It is often prescribed for minor pain, and it is available over-the-counter in some other countries. Like all opioids, codeine does have abuse potential. In fact, abuse of prescription opioid medications is becoming a major concern worldwide (Aquin, Marques-Baptista, Bridgeman, & Merlin, 2009; Casati, Sedefov, & Pfeiffer-Gerschel, 2012).

**Hallucinogens**

A hallucinogen is one of a class of drugs that results in profound alterations in sensory and perceptual experiences ([link](#)). In some cases, users experience vivid visual hallucinations. It is also common for these types of drugs to cause hallucinations of body sensations (e.g., feeling as if you are a giant) and a skewed perception of the passage of time.
As a group, hallucinogens are incredibly varied in terms of the neurotransmitter systems they affect. Mescaline and LSD are serotonin agonists, and PCP (angel dust) and ketamine (an animal anesthetic) act as antagonists of the NMDA glutamate receptor. In general, these drugs are not thought to possess the same sort of abuse potential as other classes of drugs discussed in this section.

**Link to Learning**

To learn more about some of the most commonly abused prescription and street drugs, check out the [Commonly Abused Drugs Chart](#) and the [Commonly Abused Prescription Drugs Chart](#) from the National Institute on Drug Abuse.
Dig Deeper: Medical Marijuana

While the possession and use of marijuana is illegal in most states, it is now legal in Washington and Colorado to possess limited quantities of marijuana for recreational use ([link]). In contrast, medical marijuana use is now legal in nearly half of the United States and in the District of Columbia. Medical marijuana is marijuana that is prescribed by a doctor for the treatment of a health condition. For example, people who undergo chemotherapy will often be prescribed marijuana to stimulate their appetites and prevent excessive weight loss resulting from the side effects of chemotherapy treatment. Marijuana may also have some promise in the treatment of a variety of medical conditions (Mather, Rauwendaal, Moxham-Hall, & Wodak, 2013; Robson, 2014; Schicho & Storr, 2014).

Medical marijuana shops are becoming more and more common in the United States. (credit: Laurie Avocado)

While medical marijuana laws have been passed on a state-by-state basis, federal laws still classify this as an illicit substance, making conducting research on the potentially beneficial medicinal uses of marijuana problematic. There is quite a bit of controversy within the scientific community as to the extent to which marijuana might have medicinal benefits due to a lack of large-scale, controlled research (Bostwick, 2012). As a result, many scientists have urged the federal government to allow for
relaxation of current marijuana laws and classifications in order to facilitate a more widespread study of the drug’s effects (Aggarwal et al., 2009; Bostwick, 2012; Kogan & Mechoulam, 2007).

Until recently, the United States Department of Justice routinely arrested people involved and seized marijuana used in medicinal settings. In the latter part of 2013, however, the United States Department of Justice issued statements indicating that they would not continue to challenge state medical marijuana laws. This shift in policy may be in response to the scientific community’s recommendations and/or reflect changing public opinion regarding marijuana.

Summary

Substance use disorder is defined in DSM-5 as a compulsive pattern of drug use despite negative consequences. Both physical and psychological dependence are important parts of this disorder. Alcohol, barbiturates, and benzodiazepines are central nervous system depressants that affect GABA neurotransmission. Cocaine, amphetamine, cathinone, and MDMA are all central nervous stimulants that agonize dopamine neurotransmission, while nicotine and caffeine affect acetylcholine and adenosine, respectively. Opiate drugs serve as powerful analgesics through their effects on the endogenous opioid neurotransmitter system, and hallucinogenic drugs cause pronounced changes in sensory and perceptual experiences. The hallucinogens are variable with regards to the specific neurotransmitter systems they affect.
**Glossary**

- **codeine** opiate with relatively low potency often prescribed for minor pain
- **depressant** drug that tends to suppress central nervous system activity
- **euphoric high** feelings of intense elation and pleasure from drug use
- **hallucinogen** one of a class of drugs that results in profound alterations in sensory and perceptual experiences, often with vivid hallucinations
- **methadone** synthetic opioid that is less euphorogenic than heroin and similar drugs; used to manage withdrawal symptoms in opiate users
- **methadone clinic** uses methadone to treat withdrawal symptoms in opiate users
- **methamphetamine** type of amphetamine that can be made from pseudoephedrine, an over-the-counter drug; widely manufactured and abused
- **opiate/opioid** one of a category of drugs that has strong analgesic properties; opiates are produced from the resin of the opium poppy; includes heroin, morphine, methadone, and codeine
- **physical dependence** changes in normal bodily functions that cause a drug user to experience withdrawal symptoms upon cessation of use
- **psychological dependence** emotional, rather than a physical, need for a drug which may be used to relieve psychological distress
- **stimulant** drug that tends to increase overall levels of neural activity; includes caffeine, nicotine, amphetamines, and cocaine
- **tolerance** state of requiring increasing quantities of the drug to gain the desired effect
- **withdrawal** variety of negative symptoms experienced when drug use is discontinued

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1.3 DRUG SCHEDULES SET BY CURRENT LAW AND REGULATIONS

Definition of Controlled Substance Schedules Under the Controlled Substances Act

Drugs and other substances that are considered controlled substances under the Controlled Substances Act (CSA) are divided into five schedules. An updated and complete list of the schedules is published annually in Title 21 Code of Federal Regulations (C.F.R.) §§ 1308.11 through 1308.15. Substances are placed in their respective schedules based on whether they have a currently accepted medical use in treatment in the United States, their relative abuse potential, and the likelihood of causing dependence when abused.

Please take a look at the DEA website for explanation of the schedules and a list of 19 pages of controlled...
substances along with their schedule listing (CSA SCH): DEA, Drug Scheduling

Here is an updated link to the Diversion Control Division of the DEA with more detail on the drug schedules: Diversion Control Division, Controlled Substance Schedules

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://psu.pb.unizin.org/bbh143/?p=187#h5p-1
1.4 THE COMPREHENSIVE DRUG ABUSE PREVENTION AND CONTROL ACT OF 1970


27 TITLES II AND III OF THE COMPREHENSIVE DRUG ABUSE... Sec. 202 any comments submitted by the Secretary in response to a notice transmitted pursuant to this paragraph. (1) A temporary scheduling order issued under paragraph (1) shall be vacated upon the issuance of a permanent scheduling order under paragraph (6).
(5) An order issued under paragraph (1) is not subject to judicial review.

(6) The Attorney General may, by rule, issue a permanent order adding a drug or other substance to the definition of anabolic steroids if such drug or other substance satisfies the criteria for being considered an anabolic steroid under section 102(41). Such rulemaking may be commenced simultaneously with the issuance of the temporary order issued under paragraph (1).

(j)(1) With respect to a drug referred to in subsection (f), if the Secretary of Health and Human Services recommends that the Attorney General controls the drug in schedule II, III, IV, or V pursuant to subsections (a) and (b), the Attorney General shall, not later than 90 days after the date described in paragraph (2), issue an interim final rule controlling the drug in accordance with such subsections and section 202(b) using the procedures described in paragraph (3).

(2) The date described in this paragraph shall be the later of—

(A) the date on which the Attorney General receives the scientific and medical evaluation and the scheduling recommendation from the Secretary of Health and Human Services in accordance with subsection (b); or

(B) the date on which the Attorney General receives notification from the Secretary of Health and Human Services that the Secretary has approved an application under section 505(c), 512, or 571 of the Federal Food, Drug, and Cosmetic Act or section 351(a) of the Public Health Service Act, or indexed a drug under section 572 of the Federal Food, Drug,
and Cosmetic Act, with respect to the drug described in paragraph (1).

(3) A rule issued by the Attorney General under paragraph (1) shall become immediately effective as an interim final rule without requiring the Attorney General to demonstrate good cause therefor. The interim final rule shall give interested persons the opportunity to comment and to request a hearing. After the conclusion of such proceedings, the Attorney General shall issue a final rule in accordance with the scheduling criteria of subsections (b), (c), and (d) of this section and section 202(b).

SCHEDULES OF CONTROLLED SUBSTANCES

SEC. 202. ò21 U.S.C. 812: (a) There are established five schedules of controlled substances, to be known as schedules I, II, III, IV, and V. Such schedules shall initially consist of the substances listed in this section. The schedules established by this section shall be updated and republished on a semiannual basis during the two-year period beginning one year after the date of enactment of this title and shall be updated and republished on an annual basis thereafter.

Sec. 202 TITLES II AND III OF THE COMPREHENSIVE DRUG ABUSE... 28(b) Except where control is required by United States obligations under an international treaty, convention, or protocol, in effect on the effective date of this part, and except in the case of an immediate precursor, a drug or other substance may not be placed in any schedule unless the findings required for such schedule are made with respect to such
drug or other substance. The findings required for each of the schedules are as follows:

(1) **SCHEDULE I**
   (A) The drug or other substance has a high potential for abuse.
   (B) The drug or other substance has no currently accepted medical use in treatment in the United States.
   (C) There is a lack of accepted safety for use of the drug or other substance under medical supervision.

(2) **SCHEDULE II**
   (A) The drug or other substance has a high potential for abuse.
   (B) The drug or other substance has a currently accepted medical use in treatment in the United States or a currently accepted medical use with severe restrictions.
   (C) Abuse of the drug or other substances may lead to severe psychological or physical dependence.

(3) **SCHEDULE III**
   (A) The drug or other substance has a potential for abuse less than the drugs or other substances in schedules I and II.
   (B) The drug or other substance has a currently accepted medical use in treatment in the United States.
   (C) Abuse of the drug or other substance may lead to moderate or low physical dependence or high psychological dependence.

(4) **SCHEDULE IV**
   (A) The drug or other substance has a low potential for abuse relative to the drugs or other substances in schedule III.
   (B) The drug or other substance has a currently accepted medical use in treatment in the United States.
   (C) Abuse of the drug or other substance may lead to limited physical dependence or psychological dependence relative to the drugs or other substances in schedule III.

(5) **SCHEDULE V**
   (A) The drug or other substance has a low potential for abuse relative to the drugs or other substances in schedule IV.
(B) The drug or other substance has a currently accepted medical use in treatment in the United States.
(C) Abuse of the drug or other substance may lead to limited physical dependence or psychological dependence relative to the drugs or other substances in schedule IV.

(c) 23 Schedules I, II, III, IV, and V shall, unless and until amended pursuant to section 201, consist of the following drugs or

23 For current placement of substances in the schedules, see part 1308 of title 21, Code of Federal Regulations. Note that the schedules as they appear in section 202 may not show all controlled substances, and in some cases, a substance may actually be on a different schedule than shown in section 202. This is because the Attorney General has rulemaking authority under section 201(a) to add substances to the schedules, to transfer substances from one schedule to another, and to remove substances from the schedules.

29 TITLES II AND III OF THE COMPREHENSIVE DRUG ABUSE... Sec. 202 other substances, by whatever official name, common or usual name, chemical name, or brand name designated:

**SCHEDULE I**

(a) Unless specifically excepted or unless listed in another schedule, any of the following opiates, including their isomers, esters, ethers, salts, and salts of isomers, esters, and ethers, whenever the existence of such
isomers, esters, ethers, and salts is possible within the specific chemical designation:

(1) Acetylmethadol.
(2) Allylprodine.
(3) Alphacetylmethadol. 24
(4) Alphameprodine.
(5) Alphamethadol.
(6) Benzethidine.
(7) Betacetylmethadol.
(8) Betameprodine.
(9) Betamethadol.
(10) Betaprodine.
(11) Clonitazene.
(12) Dextromoramside.
(13) Dextrorphan.
(14) Diampromide.
(15) Diethylthiambutene.
(16) Dimenoxadol.
(17) Dimepheptanol.
(18) Dimethylthiambutene.
(19) Dioxaphetyl butyrate.
(20) Dipipanone.
(21) Ethylmethylthiambutene.
(22) Etonitazene.
(23) Etoxeridine.
(24) Furethidine.
(25) Hydroxypethidine.
(26) Ketobemidone.
(27) Levomoramide.
(28) Levophenacylmorphan.
(29) Morpheridine.
(30) Noracymethadol.
(31) Norlevorphanol.
(32) Normethadone.
(33) Norpipanone.
(34) Phenadoxone.
(35) Phenampromide.
(36) Phenomorphan.
(37) Phenoperidine.
(38) Piritramide.
(39) Proheptazine.
(40) Properidine.
(41) Racemoramide.
(42) Trimeperidine.

24 So in law. Probably should be “Alphacetylmethadol.”

Sec. 202 TITLES II AND III OF THE COMPREHENSIVE DRUG ABUSE...

30(b) Unless specifically excepted or unless listed in another schedule, any of the following opium derivatives, their salts, isomers, and salts of isomers whenever the existence of such salts, isomers, and salts of isomers is possible within the specific chemical designation:

(1) Acetorphine.
(2) Acetyldihydrocodeine.
(3) Benzylmorphine.
(4) Codeine methylbromide.
(5) Codeine-N-Oxide.
(6) Cyprenorphine.
(7) Desomorphine.
(8) Dihydromorphine.
(9) Etorphine.
(10) Heroin.
(11) Hydromorphinol.
(12) Methyldesorphine.
(13) Methylhydromorphine.
(14) Morphine methylbromide.
(15) Morphine methylsulfonate.
(16) Morphine-N-Oxide.
(17) Myrophine.
(18) Nicocodeine.
(19) Nicomorphine.
(20) Normorphine.
(21) Pholcodine.
(22) Thebacon.

(c) Unless specifically excepted or unless listed in another schedule, any material, compound, mixture, or preparation, which contains any quantity of the following hallucinogenic substances, or which contains any of their salts, isomers, and salts of isomers whenever the existence of such salts, isomers, and salts of isomers is possible within the specific chemical designation:

1. 3,4-methylenedioxy amphetamine.
2. 5-methoxy-3,4-methylenedioxy amphetamine.
3. 3,4,5-trimethoxy amphetamine.
5. Diethyltryptamine.
6. Dimethyltryptamine.
7. 4-methyl-2,5-dimethoxy amphetamine.
8. Ibogaine.
9. Lysergic acid diethylamide.
10. Marihuana.
11. Mescaline.
(13) N-ethyl-3-piperidyl benzilate.
(14) N-methyl-3-piperidyl benzilate.
(15) Psilocybin.
(16) Psilocyn.
(17) Tetrahydrocannabinols.
(18) 4-methylmethcathinone (Mephedrone).
(19) 3,4-methylendioxypyrovalerone (MDPV).
(20) 2-(2,5-Dimethoxy-4-ethylphenyl)ethanamine (2C–E).
(21) 2-(2,5-Dimethoxy-4-methylphenyl)ethanamine (2C–D).

31  TITLES II AND III OF THE COMPREHENSIVE DRUG ABUSE...  Sec. 202(22)
2-(4-Chloro-2,5-dimethoxyphenyl)ethanamine (2C–C).
(23) 2-(4-Iodo-2,5-dimethoxyphenyl)ethanamine (2C–I).
(26) 2-(2,5-Dimethoxyphenyl)ethanamine (2C–H).
(27) 2-(2,5-Dimethoxy-4-nitro-phenyl)ethanamine (2C–N).
(28) 2-(2,5-Dimethoxy-4-(n)-propylphenyl)ethanamine (2C–P).
(d)(1) Unless specifically exempted or unless listed in another schedule, any material, compound, mixture, or preparation which contains any quantity of cannabimimetic agents, or which contains their salts, isomers, and salts of isomers whenever the existence of such salts, isomers, and salts of isomers is possible within the specific chemical designation.

(2) In paragraph (1):

(A) The term “cannabimimetic agents” means any substance that is a cannabinoid receptor type 1 (CB1 receptor) agonist as demonstrated by binding studies and functional assays within any of the following structural classes:

(i) 2-(3-hydroxycyclohexyl)phenol with substitution at the 5-position of the phenolic ring by alkyl or alkenyl, whether or not substituted on the cyclohexyl ring to any extent.

(ii) 3-(1-naphthoyl) indole or 3-(1-naphthylmethane)indole by substitution at the nitrogen atom of the indole ring, whether or not further substituted on the indole ring to any extent, whether or not substituted on the naphthoyl or naphthyl ring to any extent.

(iii) 3-(1-naphthoyl)pyrrole by substitution at the nitrogen atom of the pyrrole ring, whether or not further substituted in the pyrrole ring to any extent, whether or not substituted on the naphthoyl ring to any extent.

(iv) 1-(1-naphthylmethylene)indene by substitution of the 3-position of the indene ring, whether or not further substituted in the indene ring to any extent, whether or not substituted on the naphthyl ring to any extent.

(v) 3-phenylacetylin dol e or 3-benzy lin dol e by
substitution at the nitrogen atom of the indole ring, whether or not further substituted in the indole ring to any extent, whether or not substituted on the phenyl ring to any extent.

(B) Such term includes—

(i) 5-(1,1-dimethylheptyl)-2-[(1R,3S)-3-hydroxycyclohexyl]ø¿-phenol (CP–47,497);

(ii) 5-(1,1-dimethyloctyl)-2-[(1R,3S)-3-hydroxycyclohexyl]-phenol (cannabicyclohexanol or CP–47,497 C8-homolog);

(iii) 1-pentyl-3-(1-naphthoyl)indole (JWH–018 and AM678);

(iv) 1-butyl-3-(1-naphthoyl)indole (JWH–073);

(v) 1-hexyl-3-(1-naphthoyl)indole (JWH–019);

Sec. 202 TITLES II AND III OF THE COMPREHENSIVE DRUG ABUSE... 32(vi)
1-[2-(4-morpholinyl)ethyl]-3-(1-naphthoyl)indole (JWH–200);

(vii) 1-pentyl-3-(2-methoxyphenylacetyl)indole (JWH– 250);

(viii) 1-pentyl-3-[1-(4-methoxynaphthoyl)]indole (JWH– 081);

(ix) 1-pentyl-3-(4-methyl-1-naphthoyl)indole (JWH– 122);

(x) 1-pentyl-3-(4-chloro-1-naphthoyl)indole (JWH–398);

(xi) 1-(5-fluoropentyl)-3-(1-naphthoyl)indole (AM2201);
(xii) 1-(5-fluoropentyl)-3-(2-iodobenzoyl)indole (AM694);
(xiii) 1-pentyl-3-[(4-methoxy)-benzoyl]indole (SR–19 and RCS–4);
(xiv) 1-cyclohexylethyl-3-(2-methoxyphenylacetyl)indole (SR–18 and RCS–8); and
(xv) 1-pentyl-3-(2-chlorophenylacetyl)indole (JWH–203).

SCHEDULE II

(a) Unless specifically excepted or unless listed in another schedule, any of the following substances whether produced directly or indirectly by extraction from substances of vegetable origin, or independently by means of chemical synthesis, or by a combination of extraction and chemical synthesis:

(1) Opium and opiate, and any salt, compound, derivative, or preparation of opium or opiate.

(2) Any salt, compound, derivative, or preparation thereof which is chemically equivalent or identical with any of the substances referred to in clause (1), except that these substances shall not include the isoquinoline alkaloids of opium.

(3) Opium poppy and poppy straw.

(4) coca 25 leaves, except coca leaves and extracts of coca leaves from which cocaine, ecgonine, and derivatives of ecgonine or their salts have been removed; cocaine, its salts, optical and geometric isomers, and salts of isomers; ecgonine, its derivatives, their salts, isomers, and salts of isomers; or any compound, mixture, or preparation which contains any quantity of any of the substances referred to in this paragraph.

(b) Unless specifically excepted or unless listed in
another schedule, any of the following opiates, including their isomers, esters, ethers, salts, and salts of isomers, esters, and ethers, whenever the existence of such isomers, esters, ethers, and salts is possible within the specific chemical designation:

1. Alphaprodine.
2. Anileridine.
4. Dihydrocodeine.
5. Diphenoxylate.
6. Fentanyl.
7. Isomethadone.
8. Levomethorphan.

25 So in law. Probably should be “Coca”.

33 Titles II and III of the Comprehensive Drug Abuse...(9) Levorphanol.

10. Metazocine.
11. Methadone.
12. Methadone-Intermediate, 4-cyano-2-dimethylamino- 4,4-diphenyl butane.

15. Pethidine-Intermediate-A, 4-cyano-1-methyl-4- phenylpiperidine.
(17) Pethidine-Intermediate-C, 1-methyl-4-phenylpiperidine-4-carboxylic acid.
(18) Phenazocine.
(19) Piminodine.
(20) Racemethorphan.
(21) Racemorphan.

(c) Unless specifically excepted or unless listed in another schedule, any injectable liquid which contains any quantity of methamphetamine, including its salts, isomers, and salts of isomers.

**SCHEDULE III**

(a) Unless specifically excepted or unless listed in another schedule, any material, compound, mixture, or preparation which contains any quantity of the following substances having a stimulant effect on the central nervous system:

1. Amphetamine, its salts, optical isomers, and salts of its optical isomers.
2. Phenmetrazine and its salts.
3. Any substance (except an injectable liquid) which contains any quantity of methamphetamine, including its salts, isomers, and salts of isomers.

(b) Unless specifically excepted or unless listed in another schedule, any material, compound, mixture, or preparation which contains any quantity of the following substances having a depressant effect on the central nervous system:

1. Any substance which contains any quantity of a derivative of barbituric acid, or any salt of a derivative of barbituric acid.
2. Chlorhexadol.
(3) Glutethimide.
(4) Lysergic acid.
(5) Lysergic acid amide.
(6) Methyprylon.
(7) Phencyclidine.
(8) Sulfondiethylmethane.
(9) Sulfonethylmethane.
(10) Sulfonmethane.

26 The substances referred to in schedule III(a) have been administratively moved to schedule II.

Sec. 202 TITLES II AND III OF THE COMPREHENSIVE DRUG ABUSE... 34(c) Nalorphine.

(d) Unless specifically excepted or unless listed in another schedule, any material, compound, mixture, or preparation containing limited quantities of any of the following narcotic drugs, or any salts thereof:

(1) Not more than 1.8 grams of codeine per 100 milliliters or not more than 90 milligrams per dosage unit, with an equal or greater quantity of an isoquinoline alkaloid of opium.

(2) Not more than 1.8 grams of codeine per 100 milliliters or not more than 90 milligrams per dosage unit, with one or more active, nonnarcotic ingredients in recognized therapeutic amounts.

(3) Not more than 300 milligrams of dihydrocodeinone per 100 milliliters or not more than 15 milligrams per dosage unit, with a fourfold or greater quantity of an isoquinoline alkaloid of opium.

(4) Not more than 300 milligrams of
dihydrocodeinone per 100 milliliters or not more than 15 milligrams per dosage unit, with one or more active, nonnarcotic ingredients in recognized therapeutic amounts.

(5) Not more than 1.8 grams of dihydrocodeine per 100 milliliters or not more than 90 milligrams per dosage unit, with one or more active, nonnarcotic ingredients in recognized therapeutic amounts.

(6) Not more than 300 milligrams of ethylmorphine per 100 milliliters or not more than 15 milligrams per dosage unit, with one or more active, nonnarcotic ingredients in recognized therapeutic amounts.

(7) Not more than 500 milligrams of opium per 100 milliliters or per 100 grams, or not more than 25 milligrams per dosage unit, with one or more active, nonnarcotic ingredients in recognized therapeutic amounts.

(8) Not more than 50 milligrams of morphine per 100 milliliters or per 100 grams with one or more active, nonnarcotic ingredients in recognized therapeutic amounts.

(e) Anabolic steroids.

**SCHEDULE IV**

(1) Barbital.
(2) Chloral betaine.
(3) Chloral hydrate.
(4) Ethchlorvynol.
(5) Ethinamate.
(6) Methohexital.
(7) Meprobamate.
(8) Methylphenobarbital.
(9) Paraldehyde.
(10) Petrichloral.
(11) Phenobarbital.

**SCHEDULE V**

Any compound, mixture, or preparation containing any of the following limited quantities of narcotic drugs, which shall include

35 **TITLES II AND III OF THE COMPREHENSIVE DRUG ABUSE…** Sec. 204

one or more nonnarcotic active medicinal ingredients in sufficient proportion to confer upon the compound, mixture, or preparation valuable medicinal qualities other than those possessed by the narcotic drug alone:

- (1) Not more than 200 milligrams of codeine per 100 milliliters or per 100
- (2) Not more than 100 milligrams of dihydrocodeine per 100 milliliters or per 100
- (3) Not more than 100 milligrams of ethylmorphine per 100 milliliters or per 100
- (4) Not more than 2.5 milligrams of diphenoxylate and not less than 25 micrograms of atropine sulfate per dosage
- (5) Not more than 100 milligrams of opium per 100 milliliters or per 100

**TREATMENT OF CONTROLLED SUBSTANCE ANALOGUES**

SEC. 203. ø21 U.S.C. 813¿ A controlled substance analog shall, to the extent intended for human consumption, be treated, for the purposes of any Federal law as a controlled substance in schedule I.

**REMOVAL OF EXEMPTION OF CERTAIN DRUGS**
SEC. 204. Ø21 U.S.C. 814¿ (a) REMOVAL OF EXEMPTION.—The
Attorney General shall by regulation remove from exemption under section 102(39)(A)(iv) a drug or group of drugs that the Attorney General finds is being diverted to obtain a listed chemical for use in the illicit production of a controlled substance.

- (b) FACTORS TO BE CONSIDERED.—In removing a drug or group of drugs from exemption under subsection (a), the Attorney General shall consider, with respect to a drug or group of drugs that is proposed to be removed from exemption—
  - (1) the scope, duration, and significance of the diversion;
  - (2) whether the drug or group of drugs is formulated in such a way that it cannot be easily used in the illicit production of a controlled substance; and
  - (3) whether the listed chemical can be readily recovered from the drug or group of

- (c) SPECIFICITY OF DESIGNATION.—The Attorney General shall limit the designation of a drug or a group of drugs removed from exemption under subsection (a) to the most particularly identifiable type of drug or group of drugs for which evidence of diversion exists unless there is evidence, based on the pattern of diversion and other relevant factors, that the
diversion will not be limited to that particular drug or group of

• (d) REINSTATEMENT OF EXEMPTION WITH RESPECT TO PARTICULAR DRUG PRODUCTS.—

• (1) REINSTATEMENT.—On application by a manufacturer of a particular drug product that has been removed from exemption under subsection (a), the Attorney General shall by regulation reinstate the exemption with respect to that particular drug product if the Attorney General determines that the particular drug product is manufactured and distributed in a manner that prevents
CHAPTER 2
CHAPTER 2: HOW THE BODY WORKS

Introduction

This chapter draws on concepts from the supplemental reading from Chapter Two of _Drugs, Behavior, and Modern Society_ textbook (Levinthal, 2014) and several short videos for this unit. The purpose of this chapter is to gain an understanding of how drugs work in the body. For this, we need to take a look at the brain, the nervous system, how drugs enter and exit the body, how drugs are metabolized, and how they affect physical and psychological reactions. You will also explore several websites and watch brief videos to deepen your understanding of these processes.
CHAPTER
OBJECTIVES

Learning Objectives
By the end of this chapter you should be able to:

1. Identify how drugs enter and exit the body
2. Explain drug interaction and tolerance
3. Distinguish between the sympathetic and parasympathetic nervous system
4. Match neurotransmitters with their primary action
5. Define craving, abuse, psychological and physical dependence
6. Give examples of the placebo effect
2.1 DRUG DELIVERY METHODS

Ranking Addiction Potential

Research has shown that the faster a drug reaches the brain, the more likely it is to be addicting. Different methods of delivery—smoking, injecting, or snorting—largely influence how quickly a drug reaches the brain. Delivery methods, genetics, and environment all influence the potential of a drug to cause addiction.
The fastest way drugs get to the brain

The Fastest Way to the Brain

The fastest way to get a drug to the brain is by smoking it. When a drug like tobacco smoke is taken into the lungs, nicotine (the addictive chemical in tobacco) seeps into lung blood where it can quickly travel to the brain. This fast delivery is one reason smoking cigarettes is so addicting.

Injecting a drug directly into a blood vessel is the second fastest way to get a drug to the brain, followed by snorting or sniffing it through the nose. A slow mode of delivery is ingestion, such as drinking alcohol. The effects of alcohol take many minutes rather than a few seconds to cause behavioral and biological changes in the brain.
Cocaine Delivery – Rapid delivery changes your brain

Rapid Delivery Changes Your Brain

Nobody likes to wait, so users often choose a delivery method that gets them higher faster. As addiction progresses, users often seek out the more immediate and more intense high. But speed doesn’t seem to be the only reason that rapid delivery is an important factor in addiction. Recent evidence suggests that the mode of delivery can actually influence which part of the brain is most affected by a drug. Rapid delivery, such as smoking, affects brain regions that facilitate addiction.

Slow Delivery: An Addiction Therapy?

Increased knowledge about drug delivery methods is leading to new addiction therapies. It turns out that delivering a drug slowly, by ingestion or through the skin, produces a weaker, longer-lasting effect. Slow delivery allows the drug to temporarily stabilize the brain and help reduce withdrawal symptoms over a longer period of
time. And slow delivery is less addicting! So it’s becoming an increasingly popular treatment approach.

![Nicotine Patch](image)

Nicotine Patch – a therapy which slows the delivery of nicotine to the brain

Reference
2.2
UNDERSTANDING
PARTS OF THE
BRAIN - VIDEOS
AND PICTURES

The Human Brain and Nervous System

In this section, you'll review the Nervous System (external site) and the videos embedded below.
Pay attention to:

◦ The diagram labeling the Neuron
◦ The diagram labeling the Nervous System
◦ The parts of the Brain

The Human Brain

This video from the National Institute on Drug Abuse (NIDA/NIH) covers the major structures and functions of the brain.

One or more interactive elements has been excluded from
The Nervous System

The following videos from CTE Skills and CrashCourse provide you with an introduction to the nervous system. In the first video from CTE Skills, please pay particular attention at minute marker 6:40 when it explains the concepts of the parasympathetic nervous system & the sympathetic nervous system.
2.3 DRUGS AND THE BRAIN

Introducing the Human brain

The human brain is the most complex organ in the body. This three-pound mass of gray and white matter sits at the center of all human activity—you need it to drive a car, to enjoy a meal, to breathe, to create an artistic masterpiece, and to enjoy everyday activities. In brief, the brain regulates your body’s basic functions; enables you to interpret and respond to everything you experience; and shapes your thoughts, emotions, and behavior.

The brain is made up of many parts that all work together as a team. Different parts of the brain are responsible for coordinating and performing specific functions. Drugs can alter important brain areas that are necessary for life-sustaining functions and can drive the compulsive drug abuse that marks addiction. Brain areas affected by drug abuse include:

- **The brain stem**, which controls basic functions critical to life, such as heart rate, breathing, and sleeping.
- **The cerebral cortex**, which is divided into areas that control specific functions. Different areas
process information from our senses, enabling us to see, feel, hear, and taste. The front part of the cortex, the frontal cortex or forebrain, is the thinking center of the brain; it powers our ability to think, plan, solve problems, and make decisions.

- **The limbic system**, which contains the brain’s reward circuit. It links together a number of brain structures that control and regulate our ability to feel pleasure. Feeling pleasure motivates us to repeat behaviors that are critical to our existence. The limbic system is activated by healthy, life-sustaining activities such as eating and socializing—but it is also activated by drugs of abuse. In addition, the limbic system is responsible for our perception of other emotions, both positive and negative, which explains the mood-altering properties of many drugs.

An interactive H5P element has been excluded from this version of the text. You can view it online here: [https://psu.pb.unizin.org/bbh143/?p=519#h5p-2](https://psu.pb.unizin.org/bbh143/?p=519#h5p-2)
How do the parts of the brain communicate?

The brain is a communications center consisting of billions of neurons, or nerve cells. Networks of neurons pass messages back and forth among different structures within the brain, the spinal cord, and nerves in the rest of the body (the peripheral nervous system). These nerve networks coordinate and regulate everything we feel, think, and do.

- **Neuron to Neuron** – Each nerve cell in the brain sends and receives messages in the form of electrical and chemical signals. Once a cell receives and processes a message, it sends it on to other neurons.
- **Neurotransmitters**—The Brain’s Chemical
Messengers – The messages are typically carried between neurons by chemicals called neurotransmitters.

- **Receptors:** The Brain’s Chemical Receivers—“The neurotransmitter attaches to a specialized site on the receiving neuron called a receptor. A neurotransmitter and its receptor operate like a “key and lock,” an exquisitely specific mechanism that ensures that each receptor will forward the appropriate message only after interacting with the right kind of neurotransmitter.

- **Transporters—The Brain’s Chemical Recyclers**—Located on the neuron that releases the neurotransmitter, transporters recycle these neurotransmitters (that is, bring them back into the neuron that released them), thereby shutting off the signal between neurons.

To send a message, a brain cell (neuron) releases a chemical (neurotransmitter) into the space (synapse) between it and the next cell. The neurotransmitter crosses the synapse and attaches to proteins (receptors) on the receiving brain cell. This causes changes in the receiving cell—the message Transmitter Receptor Neurotransmitter Receptor is delivered. Concept courtesy of B.K. Madras.
Most drugs of abuse target the brain’s reward system by flooding it with dopamine.

How do drugs work in the brain?

Drugs are chemicals that affect the brain by tapping into its communication system and interfering with the way neurons normally send, receive, and process information. Some drugs, such as marijuana and heroin, can activate neurons because their chemical structure mimics that of a natural neurotransmitter. This similarity in structure “fools” receptors and allows the drugs to attach onto and activate the neurons. Although these drugs mimic the brain’s own chemicals, they don’t activate neurons in the same way as a natural neurotransmitter, and they lead to abnormal messages being transmitted through the network. Other drugs, such as amphetamine or cocaine, can cause the neurons to release abnormally large amounts of natural neurotransmitters or prevent the normal recycling of these brain chemicals. This disruption produces a greatly amplified message, ultimately disrupting communication channels.

How do drugs work in the brain to produce pleasure?

Most drugs of abuse directly or indirectly target the brain’s reward system by flooding the circuit with dopamine. Dopamine is a neurotransmitter present in regions of the brain that regulate movement, emotion, motivation, and feelings of pleasure. When activated at normal levels, this system rewards our natural behaviors. Overstimulating the system with drugs, however,
produces euphoric effects, which strongly reinforce the behavior of drug use—teaching the user to repeat it.

How does stimulation of the brain’s pleasure circuit teach us to keep taking drugs?

Our brains are wired to ensure that we will repeat life-sustaining activities by associating those activities with pleasure or reward. Whenever this reward circuit is activated, the brain notes that something important is happening that needs to be remembered and teaches us to do it again and again without thinking about it. Because drugs of abuse stimulate the same circuit, we learn to abuse drugs in the same way.

Why are drugs more addictive than natural rewards?

When some drugs of abuse are taken, they can release 2 to 10 times the amount of dopamine that natural rewards such as eating and sex do. In some cases, this occurs almost immediately (as when drugs are smoked or injected), and the effects can last much longer than those produced by natural rewards. The resulting effects on the brain’s pleasure circuit dwarf those produced by naturally rewarding behaviors. The effect of such a powerful reward strongly motivates people to take drugs again and again. This is why scientists sometimes say that drug abuse is something we learn to do very, very well.
Long-term drug abuse impairs brain functioning.

What happens to your brain if you keep taking drugs?

For the brain, the difference between normal rewards and drug rewards can be described as the difference between someone whispering into your ear and someone shouting into a microphone. Just as we turn down the volume on a radio that is too loud, the brain adjusts to the overwhelming surges in dopamine (and other neurotransmitters) by producing less dopamine or by reducing the number of receptors that can receive signals. As a result, dopamine’s impact on the reward circuit of the brain of someone who abuses drugs can become abnormally low, and that person’s ability to experience any pleasure is reduced.

This is why a person who abuses drugs eventually feels flat, lifeless, and depressed, and is unable to enjoy things that were previously pleasurable. Now, the person needs to keep taking drugs again and again just to try and bring
his or her dopamine function back up to normal—which only makes the problem worse, like a vicious cycle. Also, the person will often need to take larger amounts of the drug to produce the familiar dopamine high—an effect known as tolerance.

**How does long-term drug taking affect brain circuits?**

We know that the same sort of mechanisms involved in the development of tolerance can eventually lead to profound changes in neurons and brain circuits, with the potential to severely compromise the long-term health of the brain. For example, glutamate is another neurotransmitter that influences the reward circuit and the ability to learn. When the optimal concentration of glutamate is altered by drug abuse, the brain attempts to compensate for this change, which can cause impairment in cognitive function. Similarly, long-term drug abuse can trigger adaptations inhabit or non-conscious memory systems. Conditioning is one example of this type of learning, in which cues in a person's daily routine or environment become associated with the drug experience and can trigger uncontrollable cravings whenever the person is exposed to these cues, even if the drug itself is not available. This learned “reflex” is extremely durable and can affect a person who once used drugs even after many years of abstinence.

**What other brain changes occur with drug abuse?**

Chronic exposure to drugs of abuse disrupts the way critical brain structures interact to control and inhibit
behaviors related to drug use. Just as continued abuse may lead to tolerance or the need for higher drug dosages to produce an effect, it may also lead to addiction, which can drive a user to seek out and take drugs compulsively. Drug addiction erodes a person’s self-control and ability to make sound decisions while producing intense impulses to take drugs.
2.4 IMPACTS OF DRUGS ON NEUROTRANSMISSION

- OVERVIEW

TABLE FROM NIDA

Review the information on How Drugs Affect the Brain & Central Nervous System (link below) that demonstrates how different drugs impact neurotransmitters American Addiction Centers, How Do Drugs and Alcohol Affect the Brain and Central Nervous System?

- dopamine
- serotonin – Overview from NIDA
- norepinephrine
- endogenous opioids (endorphin and enkephalin)
- acetylcholine
- endogenous cannabinoids (anandamide)
- glutamate
- gamma-aminobutyric acid (GABA)
2.5 THE PLACEBO EFFECT

The Power of The Placebo and the Therapeutic Encounter Effect

The placebo effect is a beneficial health outcome resulting from a person’s anticipation that an intervention—pill, procedure, or injection, for example—will help them. A clinician’s style of interacting with patients also may bring about a positive response that is independent of any specific treatment. – National Center for Complementary and Integrative Health, Placebo Effect

An interview from NPR’s Science Friday with Ira Flatow and Ted Kantchuck, MD.

Listen to this radio interview (click on the go button in the bar below) or watch the video with Ted Kantchuck below the radio interview.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://psu.pb.unizin.org/bbh143/?p=849#audio-849-1
NPR Science Friday, One Scholar’s Take On The Power of The Placebo

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://psu.pb.unizin.org/bbh143/?p=849#oembed-1
2.6 KEY TERMS
STUDY GUIDE

Key Terms – How Drugs Work in the Body and the Mind (Levinthal, 2015)

The material in this chapter and the supporting web pages and video are the core of this course. Once you understand the brain, nervous systems, neurotransmitters, and how drugs enter, exit and are metabolized you will have a solid foundation for understanding the rest of the course content. Some of you have had several physiology courses and may be very familiar with this material. If you are not familiar with the terms below, I recommend you download this study sheet, add more spaces to write in definitions and relevant information (or make flashcards) as you read the chapter and watch videos.

1. Acetylcholine
2. Biotransformation
3. Blood-brain barrier
4. Central nervous system (CNS)
5. Cerebral cortex
6. Cross-dependence
7. Cross-tolerance
8. Dopamine
9. Double-blind
10. Elimination half-life
11. Endocannabinoids
12. Endorphins
13. Gamma-aminobutyric acid (GABA)
14. Glutamate
15. Intramuscular
16. Intranasal
17. Intravenous
18. Metabolite
19. Neuron
20. Neurotransmitter
21. Norepinephrine
22. Nucleus accumbens
23. Parasympathetic branch of the autonomic nervous system
24. Peripheral nervous system
25. Placebo
26. Reuptake
27. Serotonin
28. Subcutaneous
29. Sublingual
30. Sympathetic branch of the autonomic nervous system
31. Synapse
CHAPTER 3
CHAPTER 3:
TYPES OF DRUGS

Introduction

This chapter provides an opportunity to learn about the historically abused drugs as well as new drugs and to examine how the industry and user preferences shape the experiences of users and abusers of various drugs.
Chapter 3

Objectives

By the end of this chapter you should be able to:

1. Categorize drugs and determine their origin
2. Give examples of each type of drug category
3. Explain the effects on the mind and body of each drug
4. Recognize overdose effects
5. Indicate the legal status of each drug
6. Explore nicotine and the change the tobacco industry had to make to keep up with trends in nicotine use
7. Indicate the trends in drug use that shaped the meth epidemic
8. Consider the pros and cons of performance-enhancing drugs
3.1

INTRODUCTION
TO DRUG
CLASSES

The Controlled Substances Act (CSA) regulates five classes of drugs:

1. Narcotics (e.g., fentanyl, heroin, methadone, morphine, opium, oxycodone)

2. Depressants (e.g., barbiturates, benzodiazepines, GHB, rohypnol, alcohol – not CSA regulated)

3. Stimulants (e.g., amphetamines, methamphetamines, cocaine, Khat, ephedrine, nicotine – not CSA regulated)

4. Hallucinogens (e.g., MDMA/ecstasy, LSD, ketamine, peyote, mescaline, psilocybin)
5. Anabolic steroids

Each class has distinguishing properties, and drugs within each class often produce similar effects. However, all controlled substances, regardless of class, share a number of common features. This introduction will familiarize you with these shared features and define the terms frequently associated with these drugs.

All controlled substances have abuse potential or are immediate precursors to substances with abuse potential. With the exception of anabolic steroids, controlled substances are abused to alter mood, thought, and feeling through their actions on the central nervous system (brain and spinal cord). Some of these drugs alleviate pain, anxiety, or depression. Some induce sleep and others energize.

Though some controlled substances are therapeutically useful, the “feel good” effects of these drugs contribute to their abuse. The extent to which a substance is reliably capable of producing intensely pleasurable feelings (euphoria) increases the likelihood of that substance being abused.

Drug Abuse

When controlled substances are used in a manner or amount inconsistent with the legitimate medical use, it is called drug abuse. The non-sanctioned use of substances controlled in Schedules I through V of the CSA is considered drug abuse. While legal pharmaceuticals placed under control in the CSA are prescribed and used by patients for medical treatment, the use of these same
pharmaceuticals outside the scope of sound medical practice is drug abuse.

Dependence

In addition to having abuse potential, most controlled substances are capable of producing dependence, either physical or psychological.

Physical Dependence

Physical dependence refers to the changes that have occurred in the body after repeated use of a drug that necessitates the continued administration of the drug to prevent a withdrawal syndrome. This withdrawal syndrome can range from mildly unpleasant to life-threatening and is dependent on a number of factors, such as:

- The drug being used
- The dose and route of administration
- Concurrent use of other drugs
- Frequency and duration of drug use
- The age, sex, health, and genetic makeup of the user

Psychological Dependence

Psychological dependence refers to the perceived “need” or “craving” for a drug. Individuals who are psychologically dependent on a particular substance often feel that they cannot function without the continued use of that substance.
While physical dependence disappears within days or weeks after drug use stops, psychological dependence can last much longer and is one of the primary reasons for relapse (initiation of drug use after a period of abstinence).

Contrary to common belief, physical dependence is not addiction. While individuals with a substance use disorder are usually physically dependent on the drug they are abusing, physical dependence can exist without addiction. For example, patients who take narcotics for chronic pain management or benzodiazepines to treat anxiety are likely to be physically dependent on that medication.

Addiction

Addiction is defined as compulsive drug-seeking behavior where acquiring and using a drug becomes the most important activity in the user’s life. This definition implies a loss of control regarding drug use, and the person with a substance use disorder will continue to use a drug despite serious medical and/or social consequences. In 2015, an estimated 27.1 million Americans aged 12 or older were current (past month) illicit drug users, meaning they had used an illicit drug during the month prior to the survey interview. This estimate represents 10.1 percent of the population aged 12 or older. Illicit drugs include marijuana, cocaine (including crack), heroin, hallucinogens, inhalants, methamphetamine, or prescription psychotherapeutics (including pain relievers, tranquilizers, stimulants, and sedatives) that were misused.
Drugs within a class are often compared with each other with terms like potency and efficacy. Potency refers to the amount of a drug that must be taken to produce a certain effect, while efficacy refers to whether or not a drug is capable of producing a given effect regardless of dose. Both the strength and the ability of a substance to produce certain effects play a role in whether that drug is selected by the drug user.

It is important to keep in mind that the effects produced by any drug can vary significantly and is largely dependent on the dose and route of administration. Concurrent use of other drugs can enhance or block an effect, and substance abusers often take more than one drug to boost the desired effects or counter unwanted side effects. The risks associated with drug abuse cannot be accurately predicted because each user has his/her own unique sensitivity to a drug. There are a number of theories that attempt to explain these differences, and it is clear that a genetic component may predispose an individual to certain toxicities or even addictive behavior.

Youth are especially vulnerable to drug abuse. According to the National Institute on Drug Abuse, young Americans engaged in extraordinary levels of illicit drug use in the last third of the twentieth century. Today, about 48 percent of young people have used an illicit drug by the time they leave high school and about 7 percent of eighth graders, 16 percent of tenth graders, and 24 percent of twelfth graders are current (within the past month) users. 2

Substance abuse in youth can result in tragic consequences with untold harm to themselves, their families, and others. The 2016 Surgeon General’s Report
on Alcohol, Drugs, and Health identified risk factors for youth which might lead them into substance abuse. These include being raised in a home where the parents or other relatives use drugs, living in neighborhoods and going to schools where drug use is common, and associating with peers who use substances. Nearly 70 percent of those who try an illicit drug before the age of 13 develop a substance use disorder in the next 7 years, compared with 27 percent of those who first try an illicit drug after the age of 17.

In the sections that follow, each of the five classes of drugs is reviewed and various drugs within each class are profiled.

Although marijuana is classified in the CSA as a hallucinogen, a separate section is dedicated to that topic. There are also a number of substances that are abused but not regulated under the CSA. Alcohol and tobacco, for example, are specifically exempt from control by the CSA. In addition, a whole group of substances called inhalants are commonly available and widely abused by children. Control of these substances under the CSA would not only impede legitimate commerce but also would likely have little effect on the abuse of these substances by youngsters. An energetic campaign aimed at educating both adults and youth about inhalants is more likely to prevent their abuse. To that end, a section is dedicated to providing information on inhalants.

1. Results from the 2015 National Survey on Drug Use and Health: Detailed Tables; U.S. Department of Health and Human Services, Substance Abuse and

3.2 NARCOTICS

What Are Narcotics?

Also known as “opioids,” the term “narcotic” comes from the Greek word for “stupor” and originally referred to a variety of substances that dulled the senses and relieved pain. Though some people still refer to all drugs as “narcotics,” today “narcotic” refers to opium, opium derivatives, and their semi-synthetic substitutes. A more current term for these drugs, with less uncertainty regarding its meaning, is “opioid.” Examples include the illicit drug heroin and pharmaceutical drugs like OxyContin, Vicodin, codeine, morphine, methadone, and fentanyl.

What is their origin?

The poppy Papaver somniferum is the source of all-natural opioids, whereas synthetic opioids are made entirely in a lab and include meperidine, fentanyl, and methadone. Semi-synthetic opioids are synthesized from naturally occurring opium products, such as morphine and codeine, and include heroin, oxycodone, hydrocodone, and hydromorphone. Teens can obtain narcotics from friends, family members, medicine
cabinets, pharmacies, nursing homes, hospitals, hospices, doctors, and the Internet.

What are common street names?

Street names for various narcotics/opioids include:

Smack, Horse, Mud, Brown Sugar, Junk, Black Tat, Big H, Paregoric, Dover’s Powder, MPTP (New Heroin), Hilbilly Heroin, Lean or Purple Drank, OC, Ox, Oxy, Oxycotton, Sippin Syrup.
What do they look like?

Narcotics/opioids come in various forms, including:
  Tablets, capsules, skin patches, powder, chunks in varying colors (from white to shades of brown and black), liquid form for oral use and injection, syrups, suppositories, and lollipops.

How are they abused?

Narcotics/opioids can be swallowed, smoked, sniffed, or injected.

What is their effect on the mind?

Besides their medical use, narcotics/opioids produce a general sense of well-being by reducing tension, anxiety, and aggression. These effects are helpful in a therapeutic setting but contribute to the drugs’ abuse. Narcotic/opioid use comes with a variety of unwanted effects, including drowsiness, inability to concentrate, and apathy.

What is their effect on the body?

Narcotics/opioids are prescribed by doctors to treat pain, suppress a cough, cure diarrhea, and put people to sleep. Effects depend heavily on the dose, how it’s taken, and previous exposure to the drug. Negative effects include: slowed physical activity, constriction of the pupils, flushing of the face and neck, constipation, nausea, vomiting, and slowed breathing.
  As the dose is increased, both the pain relief and the
harmful effects become more pronounced. Some of these preparations are so potent that a single dose can be lethal to an inexperienced user. However, except in cases of extreme intoxication, there is no loss of motor coordination or slurred speech.

Narcotics continue on the next page (chapter).

3.3 NARCOTICS CONTINUED

Psychological Dependence

Use can create psychological dependence. Long after the physical need for the drug has passed, the addict may continue to think and talk about using drugs and feel overwhelmed coping with daily activities. Relapse is common if there are no changes to the physical environment or the behavioral motivators that prompted the abuse in the first place.

Physical Dependence and Withdrawal

Physical dependence is a consequence of chronic opioid use, and withdrawal takes place when drug use is discontinued. The intensity and character of the physical symptoms experienced during withdrawal are directly related to the particular drug used, the total daily dose, the interval between doses, the duration of use, and the health and personality of the user. These symptoms usually appear shortly before the time of the next scheduled dose.

Early withdrawal symptoms often include watery eyes, runny nose, yawning, and sweating. As the withdrawal
worsens, symptoms can include: Restlessness, irritability, loss of appetite, nausea, tremors, drug craving, severe depression, vomiting, increased heart rate, and blood pressure, and chills alternating with flushing and excessive sweating.

However, without intervention, the withdrawal usually runs its course, and most physical symptoms disappear within days or weeks, depending on the particular drug.

What are their Overdose Effects?

Overdoses of narcotics are not uncommon and can be fatal. Physical signs of narcotics/opioid overdose include:

- constricted (pinpoint) pupils
- cold clammy skin, confusion
- convulsions
- extreme drowsiness
- slowed breathing

Which Drugs Cause Similar Effects?

With the exception of pain relief and cough suppression, most central nervous system depressants (like barbiturates, benzodiazepines, and alcohol) have similar effects, including slowed breathing, tolerance, and dependence. What is their legal status in the United States? Narcotics/opioids are controlled substances that vary from Schedule I to Schedule V, depending on their medical usefulness, abuse potential, safety, and drug dependence profile. Schedule I narcotics, like heroin, have no medical use in the U.S. and are illegal to distribute, purchase, or use outside of medical research.
Fentanyl
Heroin
Hydromorphone
Methadone
Morphine
Opium
Oxycodone

What is Fentanyl?

Fentanyl is a potent synthetic opioid drug approved by the Food and Drug Administration for use as an analgesic (pain relief) and anesthetic. It is approximately 100 times more potent than morphine and 50 times more potent than heroin as an analgesic.

What is its Origin?

Fentanyl was first developed in 1959 and introduced in the 1960s as an intravenous anesthetic. It is legally manufactured and distributed in the United States. Licit fentanyl pharmaceutical products are diverted via theft, fraudulent prescriptions, and illicit distribution by patients, physicians, and pharmacists.

From 2005 through 2007, both fatal overdoses associated with abuse of clandestinely produced fentanyl and law enforcement encounters increased markedly. According to the Centers for Disease Control and Prevention, there were 1,013 fatal overdoses recorded from April 2005 to March 2007. More recently, there has been a re-emergence of trafficking, distribution, and
abuse of illicitly produced fentanyl with an associated dramatic increase in overdose fatalities.

What are Common Street Names?

**Common street names include:**
Apache, China Girl, China Town, Dance Fever, Friend, Good-fellas, Great Bear, He-Man, Jackpot, King Ivory, Murder 8, and Tango & Cash.

What does it Look Like?

Fentanyl pharmaceutical products are currently available in the following dosage forms: oral transmucosal lozenges commonly referred to as fentanyl “lollipops” (Actiq), effervescent buccal tablets (Fentora), sublingual tablets (Abstral), sublingual sprays (Subsys), nasal sprays (Lazanda), transdermal patches (Duragesic), and injectable formulations.

Clandestinely produced fentanyl is encountered either as a powder or in counterfeit tablets and is sold alone or in combination with other drugs such as heroin or cocaine.

How is it Abused?

Fentanyl can be injected, snorted/sniffed, smoked, taken
orally by pill or tablet, and spiked onto blotter paper. Fentanyl patches are abused by removing its gel contents and then injecting or ingesting these contents. Patches have also been frozen, cut into pieces, and placed under the tongue or in the cheek cavity. Illicitly produced fentanyl is sold alone or in combination with heroin and other substances and has been identified in counterfeit pills, mimicking pharmaceutical drugs such as oxycodone. According to the National Forensic Laboratory Information System, reports on fentanyl (both pharmaceutical and clandestinely produced) increased from nearly 5,400 in 2014 to over 14,600 in 2015, as reported by federal, state, and local forensic laboratories in the United States.

What is the Effect on the Body?

Fentanyl, similar to other commonly used opioid analgesics (e.g., morphine), produces effects such as relaxation, euphoria, pain relief, sedation, confusion, drowsiness, dizziness, nausea, vomiting, urinary retention, pupillary constriction, and respiratory depression.

What are the Overdose Effects?

Overdose may result in stupor, changes in pupillary size, cold and clammy skin, cyanosis, coma, and respiratory failure leading to death. The presence of the triad of symptoms such as coma, pinpoint pupils, and respiratory depression are strongly suggestive of opioid poisoning.
Which Drugs Cause Similar Effects?

Drugs that cause similar effects include other opioids such as morphine, hydrocodone, oxycodone, hydromorphone, methadone, and heroin.

What is the Legal Status in the Federal Control Substances Act?

Fentanyl is a Schedule II narcotic under the United States Controlled Substances Act of 1970.

In the news

You may have heard of the recent news that prisons in Ohio and Pennsylvania were on lock-down for a few weeks because of fentanyl. Please read the associated press article: Heroin-fentanyl mix led to drug exposure concerns at an Ohio prison.

What is Heroin?

Heroin is a highly addictive drug and it is a rapidly acting opioid.
What is its Origin?

Heroin is processed from morphine, a naturally occurring substance extracted from the seed pod of certain varieties of poppy plants grown in Mexico, South America, Southwest Asia (Afghanistan and Pakistan), and Southeast Asia (Thailand, Laos, and Myanmar (Burma)).

Heroin comes in several forms, primarily white powder from Mexico and South America; and “black tar” and brown powder from Mexico.

What are Common Street Names?

Common Street Names for Heroin Include: Big H, Black Tar, Chiva, Hell Dust, Horse, Negra, Smack, and Thunder.

What Does it Look Like?

Heroin is typically sold as a white or brownish powder, or as the black sticky substance known on the streets as “black tar heroin.” Although purer heroin is becoming more common, most street heroin is “cut” with other
drugs or with substances such as sugar, starch, powdered milk, or quinine.

How is it Abused?

Heroin can be injected, smoked, or sniffed/snorted. High purity heroin is usually snorted or smoked.

What is its Effect on the Mind?

Because it enters the brain so rapidly, heroin is particularly addictive, both psychologically and physically. Heroin users report feeling a surge of euphoria or “rush,” followed by a twilight state of sleep and wakefulness. One of the most significant effects of heroin use is addiction. With regular heroin use, tolerance to the drug develops. Once this happens, the person must use more heroin to achieve the same intensity. As higher doses of the drug are used over time, physical dependence and addiction to the drug develop.

What is its effect on the body?

One of the most significant effects of heroin use is addiction. With regular heroin use, tolerance to the drug develops. Once this happens, the person must use more heroin to achieve the same intensity. As higher doses of the drug are used over time, physical dependence and addiction to the drug develop. Effects of heroin use include drowsiness, respiratory depression, constricted pupils, nausea, a warm flushing of the skin, dry mouth, and heavy extremities.
What are its Overdose Effects?

Because heroin users do not know the actual strength of the drug or its true contents, they are at a high risk of overdose or death. The effects of a heroin overdose are slow and shallow breathing, blue lips and fingernails, clammy skin, convulsions, coma, and possible death.

Which Drugs Cause similar Effects?

Other opioids such as OxyContin®, Vicodin®, codeine, morphine, methadone, and fentanyl can cause similar effects as heroin.

What is its legal status in the United States?

Heroin is a Schedule I substance under the Controlled Substances Act meaning that it has a high potential for abuse, no currently accepted medical use in treatment in the United States, and a lack of accepted safety for use under medical supervision.

Hydromorphone

What is Hydromorphone?

Hydromorphone belongs to a class of drugs called “opioids,” which includes morphine. It has an analgesic potency of two to eight times greater than that of morphine and has a rapid onset of action.

What is its Origin?

Hydromorphone is legally manufactured and distributed in the United States. However, users can obtain
hydromorphone from forged prescriptions, “doctor-shopping,” theft from pharmacies, and from friends and acquaintances.

**What are the Street Names?**

Common street names include: D, Dillies, Dust, Footballs, Juice, and Smack.

**What Does it Look Like?**

Hydromorphone comes in tablets, capsules, oral solutions, and injectable formulations.

**How is it Abused?**

Users may abuse hydromorphone tablets by ingesting them. Injectable solutions, as well as tablets that have been crushed and dissolved in a solution, may be injected as a substitute for heroin.

**What is its Effect on the Mind?**

When used as a drug of abuse, and not under a doctor’s supervision, hydromorphone is taken to produce feelings of euphoria, relaxation, sedation, and reduced anxiety. It may also cause mental clouding, changes in mood, nervousness, and restlessness. It works centrally (in the brain) to reduce pain and suppress a cough. Hydromorphone use is associated with both physiological and psychological dependence.
What is its Effect on the Body?

Hydromorphone may cause constipation, pupillary constriction, urinary retention, nausea, vomiting, respiratory depression, dizziness, impaired coordination, loss of appetite, rash, slow or rapid heartbeat, and changes in blood pressure.

What are its Overdose Effects?

Acute overdose of hydromorphone can produce: Severe respiratory depression, drowsiness progressing to stupor or coma, lack of skeletal muscle tone, cold and clammy skin, constricted pupils, and reduction in blood pressure and heart rate. Severe overdose may result in death due to respiratory depression.

Which Drugs cause Similar Effects?

Drugs that have similar effects include: Heroin, morphine, hydrocodone, fentanyl, and oxycodone.

What is its Legal status in the United States?

Hydromorphone is a Schedule II drug under the Controlled Substances Act with an accepted medical use as a pain reliever. Hydromorphone has a high potential for abuse and use may lead to severe psychological or physical dependence.
Methadone

What is Methadone?

Methadone is a synthetic (man-made) narcotic.

What is its Origin?

German scientists synthesized methadone during World War II because of a shortage of morphine. Methadone was introduced into the United States in 1947 as an analgesic (Dolophine).

What are Common Street Names?

Common street names include: Amidone, Chocolate Chip Cookies, Fizzies, Maria, Pastora, Salvia, Street Methadone, and Wafer.

What Does it Look Like?

Methadone is available as a tablet, oral solution, or injectable liquid. Tablets are available in 5 mg and 10 mg formulations. As of January 1, 2008, manufacturers of methadone hydrochloride tablets 40 mg (dispersible) have voluntarily agreed to restrict distribution of this formulation to only those facilities authorized for
detoxification and maintenance treatment of opioid addiction, and hospitals. Manufacturers will instruct their wholesale distributors to discontinue supplying this formulation to any facility not meeting the above criteria.

How is it Abused?

Methadone can be swallowed or injected.

What is its Effect on the Mind?

Abuse of methadone can lead to psychological dependence.

What is its Effect on the Body?

When an individual uses methadone, he/she may experience physical symptoms like sweating, itchy skin, or sleepiness. Individuals who abuse methadone risk becoming tolerant of and physically dependent on the drug. When use is stopped, individuals may experience withdrawal symptoms including: Anxiety, muscle tremors, nausea, diarrhea, vomiting, and abdominal cramps.

What are its Overdose Effects?

The effects of a methadone overdose are slow and shallow breathing, blue fingernails and lips, stomach spasms, clammy skin, convulsions, weak pulse, coma, and possible death.
Which Drugs cause Similar Effects?

Although chemically unlike morphine or heroin, methadone produces many of the same effects.

What is its Legal Status in the United States?

Methadone is a Schedule II drug under the Controlled Substances Act. While it may legally be used under a doctor’s supervision, its non-medical use is illegal.

Morphine

What is Morphine?

Morphine is a non-synthetic narcotic with a high potential for abuse and is derived from opium. It is used for the treatment of pain.

What is its Origin?

In the United States, a small percentage of the morphine obtained from opium is used directly for pharmaceutical products. The remaining morphine is processed into codeine and other derivatives.

What are Common Street Names?

Common street names include Dreamer, Emsel, First Line, God’s Drug, Hows, M.S., Mister Blue, Morf, Morpho, and Unkie.
What Does it Look Like?

Morphine is marketed under generic and brand name products, including: MS-Contin, Oramorph SR, MSIR, Roxanol, Kadian, and RMS.

How is it Abused?

Traditionally, morphine was almost exclusively used by injection, but the variety of pharmaceutical forms that it is marketed as today support its use by oral and other routes of administration.

Forms Include:

Oral solutions, immediate-and extended-release tablets and capsules, and injectable preparations. Those dependent on morphine prefer injection because the drug enters the bloodstream more quickly.

What is its Effect on the Mind?

Morphine’s effects include euphoria and relief of pain. Chronic use of morphine results in tolerance and physical and psychological dependence.

What is its Effect on the Body?

Morphine use results in relief from physical pain, a decrease in hunger, and inhibition of the cough reflex.

What are its Overdose Effects?

Overdose effects include cold and clammy skin,
lowered blood pressure, sleepiness, slowed breathing, slow pulse rate, coma, and possible death.

Which Drugs Cause Similar Effects?

Drugs causing similar effects as morphine include opium, codeine, heroin, methadone, hydrocodone, fentanyl, and oxycodone.

What is it’s Legal status in the United States?

Morphine is a Schedule II narcotic under the Controlled Substances Act.

What is Opium?

Opium is a highly addictive non-synthetic narcotic that is extracted from the poppy plant, Papaver somniferum. The opium poppy is the key source for many narcotics, including morphine, codeine, and heroin.

What is its Origin?

The poppy plant, Papaver somniferum, is the source of opium. It was grown in the Mediterranean region as early as 5000 B.C. and has since been cultivated in a number of countries throughout the world. The milky fluid that seeps from its incisions in the unripe seedpod of this poppy has been scraped by hand and air-dried to produce what is known as opium.

A more modern method of harvesting for pharmaceutical use is by the industrial poppy straw
process of extracting alkaloids from the mature dried plant (concentrate of a poppy straw). All opium and poppy straw used for pharmaceutical products are imported into the United States from legitimate sources in regulated countries.

What are Common Street Names?


What Does it Look Like?

Opium can be a liquid, solid, or powder, but most poppy straw concentrate is available commercially as a fine brownish powder.

How is it Abused?

Opium can be smoked, intravenously injected, or taken in pill form. Opium is also abused in combination with other drugs. For example, “Black” is a combination of marijuana, opium, and methamphetamine, and “Buddha” is potent marijuana spiked with opium.
What is its Effect on the Mind?

The intensity of opium’s euphoric effects on the brain depends on the dose and route of administration. It works quickly when smoked because the opiate chemicals pass into the lungs, where they are quickly absorbed and then sent to the brain. An opium “high” is very similar to a heroin “high”; users experience a euphoric rush, followed by relaxation and the relief of physical pain.

What is its Effect on the Body?

Opium inhibits muscle movement in the bowels leading to constipation. It also can dry out the mouth and mucous membranes in the nose. Opium use leads to physical and psychological dependence and can lead to overdose.

What are its Overdose Effects?

Overdose effects include slow breathing, seizures, dizziness, weakness, loss of consciousness, coma, and possible death.

Drugs that Cause Similar Effects Include:

Morphine, codeine, heroin, methadone, hydroquinone, fentanyl, and oxycodone.

What is its Legal Status in the United States?

Opium is a Schedule II drug under the Controlled Substances Act. Most opioids are Schedule II, III, IV, or V
drugs. Some drugs that are derived from opium, such as heroin, are Schedule I drugs.

**Oxycodone**

**What is Oxycodone?**

Oxycodone is a semi-synthetic narcotic analgesic and historically has been a popular drug of abuse among the narcotic abusing population.

**What is its Origin?**

Oxycodone is synthesized from thebaine, a constituent of the poppy plants.

**What are Common Street Names?**

Common street names include: Hillbilly Heroin, Kicker, OC, Ox, Roxy, Perc, and Oxy.

**What Does it Look Like?**

Oxycodone is marketed alone as OxyContin in 10, 20, 40 and 80 mg extended-release tablets and other immediate-release capsules like 5 mg OxyIR. It is also marketed in combination products with aspirin such as Percodan or acetaminophen such as Roxicet or Percocet. (Note: when acetaminophen is added to a drug, it often gets the suffix “cet.”)
How is it Abused?

Oxycodone is abused orally or intravenously. The tablets are crushed and sniffed or dissolved in water and injected. Others heat a tablet that has been placed on a piece of foil then inhale the vapors.

What is its Effect on the Mind?

Euphoria and feelings of relaxation are the most common effects of oxycodone on the brain, which explains its high potential for abuse.

What is its Effect on the Body?

Physiological effects of oxycodone include pain relief, sedation, respiratory depression, constipation, papillary constriction, and cough suppression. Extended or chronic use of oxycodone containing acetaminophen may cause severe liver damage.

What are its Overdose Effects?

Overdose effects include: Extreme drowsiness, muscle weakness, confusion, cold and clammy skin, pinpoint pupils, shallow breathing, slow heart rate, fainting, coma, and possible death.

Which Drugs cause Similar Effects?

Drugs that cause similar effects to Oxycodone include
opium, codeine, heroin, methadone, hydrocodone, fentanyl, and morphine.

What is its Legal Status in the United States?

Oxycodone products are in Schedule II of the Controlled Substances Act.


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**Additional Information to Explore**

- [NIDA information on opioids](#)
  - Film assignments on opioids are part of the chapter on addiction and prevention to spread out the films in the course.
  - However, if you are interested to learn more on your own, [Top Documentary Films has many films on drugs](#), especially opioids.
  - National Geographic also has a series of films called *Drugs, Inc: The Fix*
3.4

STIMULANTS

What are Stimulants?

Stimulants speed up the body’s systems. This class of drugs includes: Prescription drugs such as amphetamines [Adderall and dexedrine], Methylphenidate [Concerta and Ritalin], diet aids [such as Didrex, Bontril, Preludin, Fastin, Adipex P, ionomin, and Meridia] and illicitly produced drugs such as methamphetamine, cocaine, and methcathinone. The stimulant nicotine will be covered in the next section.

What is their Origin?

Stimulants are diverted from legitimate channels and clandestinely manufactured exclusively for the illicit market.
What are Common Street Names?

Common street names for stimulants include:

- Bennies, Black Beauties, Cat, Coke, Crank, Crystal, Flake, Ice, Pellets, R-Ball, Skippy, Snow, Speed, Uppers, and Vitamin R.

What do They Look Like?

Stimulants come in the form of pills, powder, rocks, and injectable liquids.

How are they Abused?

Stimulants can be pills or capsules that are swallowed. Smoking, snorting, or injecting stimulants produces a sudden sensation known as a “rush” or a “flash.” Abuse is often associated with a pattern of binge use — sporadically consuming large doses of stimulants over a short period of time. Heavy users may inject themselves every few hours, continuing until they have depleted their drug supply or reached a point of delirium, psychosis, and physical exhaustion. During heavy use, all other interests become secondary to recreating the initial euphoric rush.
What is Their Effect on the Mind?

When used as drugs of abuse and not under a doctor’s supervision, stimulants are frequently taken to:

- Produce a sense of exhilaration, enhance self-esteem, improve mental and physical performance, increase activity, reduce appetite, extend wakefulness for a prolonged period, and “get high”
- Chronic, high-dose use is frequently associated with agitation, hostility, panic, aggression, and suicidal or homicidal tendencies.
- Paranoia, sometimes accompanied by both auditory and visual hallucinations, may also occur.
- Tolerance, in which more and more drug is needed to produce the usual effects, can develop rapidly, and psychological dependence occurs. In fact, the strongest psychological dependence observed occurs with the more potent stimulants, such as amphetamine, methylphenidate, methamphetamine, cocaine, and methcathinone.

Abrupt cessation is commonly followed by depression, anxiety, drug craving, and extreme fatigue, known as a “crash”.

What is Their Effect on the Body?

Stimulants are sometimes referred to as uppers and reverse the effects of fatigue on both mental and physical
tasks. Therapeutic levels of stimulants can produce exhilaration, extended wakefulness, and loss of appetite. These effects are greatly intensified when large doses of stimulants are taken. Taking too large a dose at one time or taking large doses over an extended period of time may cause such physical side effects as dizziness, tremors, headache, flushed skin, chest pain with palpitations, excessive sweating, vomiting, and abdominal cramps.

What are Their Overdose Effects?

In overdose, unless there is medical intervention, high fever, convulsions, and cardiovascular collapse may precede death. Because accidental death is partially due to the effects of stimulants on the body’s cardiovascular and temperature-regulating systems, physical exertion increases the hazards of stimulant use.

Which Drugs cause Similar Effects?

Some hallucinogenic substances, such as ecstasy, have a stimulant component to their activity.

What is Their Legal Status in the United States?

A number of stimulants have no medical use in the United States but have a high potential for abuse. These stimulants are controlled in Schedule I. Some prescription stimulants are not controlled, and some stimulants like tobacco and caffeine don’t require a prescription — though society’s recognition of their adverse effects has resulted in a proliferation of caffeine-free products and efforts to discourage cigarette smoking.
Stimulant chemicals in over-the-counter products, such as ephedrine and pseudoephedrine, can be found in allergy and cold medicine. As required by *The Combat Methamphetamine Epidemic Act of 2005*, a retail outlet must store these products out of reach of customers, either behind the counter or in a locked cabinet. Regulated sellers are required to maintain a written or electronic form of a logbook to record sales of these products. In order to purchase these products, customers must now show a photo identification issued by a state or federal government. They are also required to write or enter into the logbook: their name, signature, address, date, and time of sale. In addition to the above, there are daily and monthly sales limits set for customers.

**Amphetamines**

**What are Amphetamines?**

Amphetamines are stimulants that speed up the body’s system. Many are legally prescribed and used to treat attention-deficit hyperactivity disorder (ADHD).

**What is Their Origin?**

Amphetamine was first marketed in the 1930s as Benzedrine in an over-the-counter inhaler to treat nasal congestion. By 1937 amphetamine was available by prescription in tablet form and was used in the treatment of the sleeping disorder narcolepsy and ADHD. Over the years, the use and abuse of clandestinely produced amphetamines have spread. Today, clandestine laboratory
production of amphetamines has mushroomed, and the abuse of the drug has increased dramatically.

What are Common Street Names?

Common street names include: Bennies, Black Beauties, Crank, Ice, Speed, and Uppers.

What do they Look Like?

Amphetamines can look like pills or powder. Common prescription amphetamines include methylphenidate (Ritalin or Ritalin SR), amphetamine and dextroamphetamine (Adderall), and dextroamphetamine (Dexedrine).

How are they Abused?

Amphetamines are generally taken orally or injected. However, the addition of “ice,” the slang name of crystallized methamphetamine hydrochloride, has promoted smoking as another mode of administration. Just as “crack” is smokable cocaine, “ice” is smokable methamphetamine.

What is their Effect on the Mind?

The effects of amphetamines and methamphetamine are similar to cocaine, but their onset is slower and their duration is longer. In contrast to cocaine, which is quickly removed from the brain and is almost completely metabolized, methamphetamine remains in the central nervous system longer, and a larger percentage of the
drug remains unchanged in the body, producing prolonged stimulant effects.

Chronic abuse produces a psychosis that resembles schizophrenia and is characterized by paranoia, picking at the skin, preoccupation with one’s own thoughts, and auditory and visual hallucinations. Violent and erratic behavior is frequently seen among chronic users of amphetamines and methamphetamine.

What is their Effect on the Body?

Physical effects of amphetamine use include increased blood pressure and pulse rates, insomnia, loss of appetite, and physical exhaustion.

What are their Overdose Effects?

Overdose effects include agitation, increased body temperature, hallucinations, convulsions, and possible death.

Which Drugs Cause Similar Effects?

Drugs that cause similar effects include dexmethylphenidate, phentermine, benzphetamine, phendimetrazine, cocaine, crack, methamphetamine, and khat.

What is their Legal Status in the United States?

Amphetamines are Schedule II stimulants, which means that they have a high potential for abuse and a currently accepted medical use (in FDA-approved products).
Pharmaceutical products are available only through a prescription that cannot be refilled.

Cocaine

What is Cocaine?

Cocaine is an intense, euphoria-producing stimulant drug with strong addictive potential.

What is its Origin?

Cocaine is derived from coca leaves grown in Bolivia, Peru, and Colombia. The cocaine manufacturing process takes place in remote jungle labs where the raw product undergoes a series of chemical transformations. Colombia produces about 90 percent of the cocaine powder reaching the United States. Most of the cocaine entering the United States comes through Mexico.

What are Common Street Names?

Common street names include: Coca, Coke, Crack, Flake, Snow, and Soda Cot.

What does it Look Like?

Cocaine is usually distributed as a white, crystalline powder. Cocaine is often diluted (“cut”) with a variety of substances, the most common of which are sugars and local anesthetics. It is “cut” to stretch the amount of the product and increase profits for dealers. In contrast,
cocaine base (crack) looks like small, irregularly shaped chunks (or “rocks”) of a whitish solid.

How is it Abused?

Powdered cocaine can be snorted or injected into the veins after dissolving in water. Cocaine base (crack) is smoked, either alone or on marijuana or tobacco. Cocaine is also used in combination with an opiate, like heroin, a practice known as “speedballing.” Although injecting into veins or muscles, snorting, and smoking are the common ways of using cocaine, all mucous membranes readily absorb cocaine. Cocaine users typically binge on the drug until they are exhausted or run out of cocaine.

What is its Effect on the Mind?

The intensity of cocaine’s euphoric effects depends on how quickly the drug reaches the brain, which depends on the dose and method of abuse. Following smoking or intravenous injection, cocaine reaches the brain in seconds, with a rapid buildup in levels. This results in a rapid-onset, intense euphoric effect known as a “rush”.

By contrast, the euphoria caused by snorting cocaine is less intense and does not happen as quickly due to the
slower build-up of the drug in the brain. Other effects include increased alertness and excitation, as well as restlessness, irritability, and anxiety.

Tolerance to cocaine’s effects develops rapidly, causing users to take higher and higher doses. Taking high doses of cocaine or prolonged use, such as binging, usually causes paranoia. The crash that follows euphoria is characterized by mental and physical exhaustion, sleep, and depression lasting several days. Following the crash, users experience a craving to use cocaine again.

What is its Effect on the Body?

Physiological effects of cocaine include increased blood pressure and heart rate, dilated pupils, insomnia, and loss of appetite. The widespread abuse of highly pure street cocaine has led to many severe adverse health consequences such as cardiac arrhythmias, ischemic heart conditions, sudden cardiac arrest, convulsions, strokes, and death. In some users, the long-term use of inhaled cocaine has led to a unique respiratory syndrome, and chronic snorting of cocaine has led to the erosion of the upper nasal cavity.

Which Drugs cause Similar Effects?

Other stimulants, such as methamphetamine, cause effects similar to cocaine that vary mainly in degree.
What is its Legal status in the United States?

Cocaine is a Schedule II drug under the Controlled Substances Act, meaning it has a high potential for abuse and has an accepted medical use for treatment in the United States.

Hydrochloride solution (4 percent and 10 percent) is used primarily as a topical local anesthetic for the upper respiratory tract. It also is used to reduce bleeding of the mucous membranes in the mouth, throat, and nasal cavities. However, better products have been developed for these purposes, and cocaine is rarely used medically in the United States.

Khat

What is Khat?

Khat is a flowering evergreen shrub that is abused for its stimulant-like effect. Khat has two active ingredients, cathine, and cathinone.

What is its Origin?

Khat is native to East Africa and the Arabian Peninsula, where the use of it is an established cultural tradition for many social situations.
What does it Look Like?

Khat is a flowering evergreen shrub. Khat that is sold and abused is usually just the leaves, twigs, and shoots of the Khat shrub.

How is it Abused?

Khat is typically chewed like tobacco, then retained in the cheek and chewed intermittently to release the active drug, which produces a stimulant-like effect. Dried Khat leaves can be made into a tea or a chewable paste, and Khat can also be smoked and even sprinkled on food.

What is its Effect on the Mind?

Khat can induce manic behavior with grandiose delusions, paranoia, nightmares, hallucinations, and hyperactivity. Chronic Khat abuse can result in violence and suicidal depression.

What is its Effect on the Body?

Khat causes an immediate increase in blood pressure and heart rate. Khat can also cause a brown staining of the teeth, insomnia, and gastric disorders. Chronic abuse of Khat can cause physical exhaustion. The dose needed to constitute an overdose is not known, however, it has been historically associated with those who are long-term
chewers of the leaves. Symptoms of toxicity include delusions, loss of appetite, difficulty with breathing, and increases in both blood pressure and heart rate. Additionally, there are reports of liver damage (chemical hepatitis) and cardiac complications; specifically myocardial infarctions. This mostly occurs among long-term chewers of khat or those who have chewed too large a dose.

Which Drugs cause Similar Effects?

Khat’s effects are similar to other stimulants, such as cocaine, amphetamine, and methamphetamine.

What is its Legal Status in the United States?

The chemicals found in khat are controlled under the Controlled Substances Act. Cathine is a Schedule IV stimulant, and cathinone is a Schedule I stimulant under the Controlled Substances Act, meaning that it has a high potential for abuse, no currently accepted medical use in treatment in the United States, and a lack of accepted safety for use under medical supervision.

Methamphetamine

What is Methamphetamine?

Methamphetamine (meth) is a stimulant. The FDA-approved brand-name medication is Desoxyn.
What is its Origin?

Mexican drug trafficking organizations have become the primary manufacturers and distributors of methamphetamine to cities throughout the United States, including in Hawaii. Domestic clandestine laboratory operators also produce and distribute meth but usually on a smaller scale. The methods used depend on the availability of precursor chemicals.

Currently, this domestic clandestinely produced meth is mainly made with diverted products that contain pseudoephedrine. Mexican methamphetamine is made with different precursor chemicals. The Combat Methamphetamine Epidemic Act of 2005 requires retailers of non-prescription products containing pseudoephedrine, ephedrine, or phenylpropanolamine to place these products behind the counter or in a locked cabinet. Consumers must show identification and sign a logbook for each purchase.

What are Common Street Names?

Common street names include Batu, Bikers Coffee, Black Beauties, Chalk, Chicken Feed, Crank, Crystal, Glass, Go-Fast, Hiropon, Ice, Meth, Methlies Quick, Poor Man’s Cocaine, Shabu, Shards, Speed, Stove Top, Tina, Trash, Tweak, Uppers, Ventana, Vidrio, Yaba, and Yellow Bam.

What does it Look Like?

Regular meth is a pill or powder. Crystal meth resembles glass fragments or shiny blue-white “rocks” of various sizes.
How is it Abused?

Meth is swallowed, snorted, injected, or smoked. To intensify the effects, users may take higher doses of the drug, take it more frequently, or change their method of intake.

What is its effect on the mind?

Meth is a highly addictive drug with a potent central nervous system (CNS) stimulant properties.

Those who smoke or inject it report a brief, intense sensation, or rush. Oral ingestion or snorting produces a long-lasting high instead of a rush, which reportedly can continue for as long as half a day. Both the rush and the high are believed to result from the release of very high levels of the neurotransmitter dopamine into areas of the brain that regulate feelings of pleasure. Long-term meth use results in many damaging effects, including addiction.

Chronic meth users can exhibit violent behavior, anxiety, confusion, insomnia, and psychotic features including paranoia, aggression, visual and auditory hallucinations, mood disturbances, and delusions such as the sensation of insects creeping on or under the skin. Such paranoia can result in homicidal or suicidal
thoughts. Researchers have reported that as much as 50 percent of the dopamine-producing cells in the brain can be damaged after prolonged exposure to relatively low levels of meth. Researchers also have found that serotonin-containing nerve cells may be damaged even more extensively.

What is its Effect on the Body?

Taking even small amounts of meth can result in increased wakefulness, increased physical activity, decreased appetite, rapid breathing and heart rate, irregular heartbeat, increased blood pressure, and hyperthermia (overheating). High doses can elevate body temperature to dangerous, sometimes lethal, levels, and cause convulsions and even cardiovascular collapse and death. Meth use may also cause extreme anorexia, memory loss, and severe dental problems.

What are its Overdose Effects?

High doses may result in death from stroke, heart attack, or multiple organ problems caused by overheating.
Which Drugs cause Similar Effects?

Cocaine and potent stimulant pharmaceuticals, such as amphetamines and methylphenidate, produce similar effects.

What is its Legal status in the United States?

Methamphetamine is a Schedule II stimulant under the Controlled Substances Act, which means that it has a high potential for abuse and a currently accepted medical use (in FDA-approved products). It is available only through a prescription that cannot be refilled. Today there is only one legal meth product, Desoxyn. It is currently marketed in 5-milligram tablets and has very limited use in the treatment of obesity and attention deficit hyperactivity disorder (ADHD).


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*Frontline – The Meth Epidemic*

Watch this 53-minute film and explore the accompanying website. While the meth epidemic has been taken over by the opioid epidemic, this film makes it clear how drug epidemics spread as well as ebb and flow.

For additional information, see National Institute on Drug Abuse (NIDA), Methamphetamine.
3.5 NICOTINE

What is Tobacco?

Tobacco is a plant grown for its leaves, which are dried and fermented before being put in tobacco products. Tobacco contains nicotine, an ingredient that can lead to addiction, which is why so many people who use tobacco find it difficult to quit. There are also many other potentially harmful chemicals found in tobacco or created by burning it.

How Do People use Tobacco?

People can smoke, chew, or sniff tobacco. Smoked tobacco products include cigarettes, cigars, bidis, and kreteks. Some people also smoke loose tobacco in a pipe or hookah (water pipe). Chewed tobacco products include chewing tobacco, snuff, dip, and snus; snuff can also be sniffed.
How Does Tobacco Affect the Brain?

The nicotine in any tobacco product readily absorbs into the blood when a person uses it. Upon entering the blood, nicotine immediately stimulates the adrenal glands to release the hormone epinephrine (adrenaline). Epinephrine stimulates the central nervous system and increases blood pressure, breathing, and heart rate. As with drugs such as cocaine and heroin, nicotine activates the brain’s reward circuits and also increases levels of the chemical messenger dopamine, which reinforces rewarding behaviors. Studies suggest that other chemicals in tobacco smoke, such as acetaldehyde, may enhance nicotine’s effects on the brain.

What are the Other Health Effects of Tobacco Use?

Although nicotine is addictive, most of the severe health effects of tobacco use come from other chemicals. Tobacco smoking can lead to lung cancer, chronic bronchitis, and emphysema. It increases the risk of heart disease, which can lead to stroke or heart attack. Smoking has also been linked to other cancers, leukemia, cataracts, and pneumonia. All of these risks apply to use of any smoked product, including hookah tobacco. Smokeless tobacco increases the risk of cancer, especially mouth cancers.

Electronic Cigarettes

Electronic cigarettes, also known as e-cigarettes or e-vaporizers, are battery-operated devices that deliver nicotine with flavorings.
and other chemicals to the lungs in vapor instead of smoke. E-cigarette companies often advertise them as safer than traditional cigarettes because they don’t burn tobacco. But researchers actually know little about the health risks of using these devices. Read more about e-cigarettes in our Electronic Cigarettes (e-Cigarettes) DrugFacts.

Pregnant women who smoke cigarettes run an increased risk of miscarriage, stillborn or premature infants, or infants with low birth weight. Smoking while pregnant may also be associated with learning and behavioral problems in exposed children.

People who stand or sit near others who smoke are exposed to secondhand smoke, either coming from the burning end of the tobacco product or exhaled by the person who is smoking. Secondhand smoke exposure can also lead to lung cancer and heart disease. It can cause health problems in both adults and children, such as coughing, phlegm, reduced lung function, pneumonia, and bronchitis. Children exposed to secondhand smoke are at an increased risk of ear infections, severe asthma, lung infections, and death from sudden infant death syndrome.

How Does Tobacco Use Lead to Addiction?

For many who use tobacco, long-term brain changes brought on by continued nicotine exposure result in addiction. When a person tries to quit, he or she may have withdrawal symptoms, including:

- irritability
- problems paying attention
• trouble sleeping
• increased appetite
• powerful cravings for tobacco

How Can People Get Treatment for Nicotine Addiction?

Both behavioral treatments and medications can help people quit smoking, but the combination of medication with counseling is more effective than either alone.

The U.S. Department of Health and Human Services has established a national toll-free quitline, 1-800-QUIT-NOW, to serve as an access point for anyone seeking information and help in quitting smoking.

Government Regulation of Tobacco Products

On May 5, 2016, the FDA announced that nationwide tobacco regulations now extend to all tobacco products, including:

• e-cigarettes and their liquid solutions
• cigars
• hookah tobacco
• pipe tobacco

This ruling includes restricting the sale of these products to minors. For more information, see the FDA’s webpage, The Facts on the FDA’s New Tobacco Rule.

Behavioral Treatments

Behavioral treatments use a variety of methods to help people quit smoking, ranging from self-help materials to counseling. These treatments teach people to recognize high-risk situations and develop strategies to deal with
them. For example, people who hang out with others who smoke are more likely to smoke and less likely to quit.

Nicotine Replacement Therapies

Nicotine replacement therapies (NRTs) were the first medications the U.S. Food and Drug Administration (FDA) approved for use in smoking cessation therapy. Current FDA-approved NRT products include chewing gum, transdermal patch, nasal sprays, inhalers, and lozenges. NRTs deliver a controlled dose of nicotine to relieve withdrawal symptoms while the person tries to quit.

Other Medications

Bupropion (Zyban®) and varenicline (Chantix®) are two FDA-approved non-nicotine medications that have helped people quit smoking. They target nicotine receptors in the brain, easing withdrawal symptoms and blocking the effects of nicotine if people start smoking again.

Can a person overdose on nicotine?

Nicotine is poisonous and, though uncommon, an overdose is possible. An overdose occurs when the person uses too much of a drug and has a toxic reaction that results in serious, harmful symptoms or death. Nicotine poisoning usually occurs in young children who accidentally chew on nicotine gum or patches used to quit smoking or swallow e-cigarette liquid. Symptoms include difficulty breathing, vomiting, fainting, headache,
weakness, and increased or decreased heart rate. Anyone concerned that a child or adult might be experiencing a nicotine overdose should seek immediate medical help.

Key Takeaways

- Tobacco is a plant grown for its leaves, which are dried and fermented before being put in tobacco products. Tobacco contains nicotine, the ingredient that can lead to addiction.
- People can smoke, chew, or sniff tobacco.
- Nicotine acts in the brain by stimulating the adrenal glands to release the hormone epinephrine (adrenaline) and by increasing levels of the chemical messenger dopamine.
- Tobacco smoking can lead to lung cancer, chronic bronchitis, and emphysema. It increases the risk of heart disease, which can lead to stroke or heart attack. Smoking has also been linked to other cancers, leukemia, cataracts, and pneumonia. Smokeless tobacco increases the risk of cancer, especially mouth cancers.
- Secondhand smoke can lead to lung cancer and heart disease as well as other health effects in adults and children.
- For many who use tobacco, long-term brain changes brought on by continued nicotine exposure result in addiction.
- Both behavioral treatments and medication can help people quit smoking, but the combination of medication with counseling is more effective than either alone.
- Nicotine overdose is possible, though it usually occurs in young children who accidentally chew on nicotine gum or patches or swallow e-cigarette liquid.
- Anyone concerned that a child or adult might be experiencing a nicotine overdose should seek immediate medical help.
Learn More

For more information about tobacco products and nicotine, visit our Tobacco/Nicotine webpage.

For more information about how to quit smoking, visit smokefree.gov.


Films for Course Assignment

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://psu.pb.unizin.org/bbh143/?p=949#oembed-1

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://psu.pb.unizin.org/bbh143/?p=949#oembed-2
3.6 DEPRESSANTS

What Are Depressants?

Depressants will put you to sleep, relieve anxiety and muscle spasms, and prevent seizures. Barbiturates are older drugs and include butalbital (Fiorina), phenobarbital, Pentothal, Seconal, and Nembutal. A person can rapidly develop a dependence on and tolerance to barbiturates, meaning a person needs more and more of them to feel and function normally. This makes them unsafe, increasing the likelihood of coma or death.

Benzodiazepines were developed to replace barbiturates, though they still share many of the undesirable side effects including tolerance and dependence. Some examples are Valium, Xanax, Halcion, Ativan, Klonopin, and Restoril. Rohypnol is a benzodiazepine that is not manufactured or legally marketed in the United States, but it is used illegally.

Lunesta, Ambien, and Sonata are sedative-hypnotic medications approved for the short-term treatment of insomnia that shares many of the properties of benzodiazepines. Other CNS depressants include
meprobamate, methaqualone (Quaalude), and the illicit drug GHB. Alcohol will be covered in the next section.

What is their Origin?

Generally, legitimate pharmaceutical products are diverted to the illicit market. Teens can obtain depressants from the family medicine cabinet, friends, family members, the Internet, doctors, and hospitals.

What are Common Street Names?

Common street names for depressants include: Barbs, Benzos, Downers, Georgia Home Boy, GHB, Grievous Bodily Harm, Liquid X, Nerve Pills, Phennies, R2, Reds, Roofies, Rophies, Tranks, and Yellows.

What do They Look Like?

Depressants come in the form of pills, syrups, and injectable liquids.

How are they Abused?

Individuals abuse depressants to experience euphoria. Depressants are also used with other drugs to add to the
other drugs’ high or to deal with their side effects. Users take higher doses than people taking the drugs under a doctor’s supervision for therapeutic purposes. Depressants like GHB and Rohypnol are also misused to facilitate sexual assault.

What is their Effect on the Mind?

Depressants used therapeutically do what they are prescribed to induce sleep, relieve anxiety and muscle spasms, and prevent seizures. They also cause amnesia, leaving no memory of events that occur while under the influence, reduce reaction time, impair mental functioning and judgment, and cause confusion. Long-term use of depressants produces psychological dependence and tolerance.

What is their Effect on the Body?

Some depressants can relax the muscles. Unwanted physical effects include slurred speech, loss of motor coordination, weakness, headache, lightheadedness, blurred vision, dizziness, nausea, vomiting, low blood pressure, and slowed breathing.

Prolonged use of depressants can lead to physical dependence even at doses recommended for medical treatment. Unlike barbiturates, large doses of benzodiazepines are rarely fatal unless combined with other drugs or alcohol. But unlike the withdrawal syndrome seen with most other drugs of abuse, withdrawal from depressants can be life-threatening.
What is their Legal Status in the United States?

Most depressants are controlled substances that range from Schedule I to Schedule IV under the Controlled Substances Act, depending on their risk for abuse and whether they currently have an accepted medical use. Many of the depressants have FDA-approved medical uses. Rohypnol and Quaaludes are not manufactured or legally marketed in the United States.

Barbiturates

What are Barbiturates?

Barbiturates are depressants that produce a wide spectrum of central nervous system depression from mild sedation to coma. They also have been used as sedatives, hypnotics, anesthetics, and anticonvulsants. Barbiturates are classified as: Ultrashort, Short, Intermediate, Long-acting
What is their origin?

Barbiturates were first introduced for medical use in the 1900s, and today about 12 substances are in medical use.

What are Common Street Names?

Common street names include:
- Barbs, Block Busters, Christmas Trees, Goof Balls, Pinks, Red Devils, Reds & Blues, and Yellow Jackets

What do They Look Like?

Barbiturates come in a variety of multicolored pills and tablets. Users prefer the short-acting and intermediate barbiturates such as Amytal and Seconal.

How are they Abused?

Barbiturates are abused by swallowing a pill or injecting a liquid form. Barbiturates are generally abused to reduce anxiety, decrease inhibitions, and treat unwanted effects of illicit drugs. Barbiturates can be extremely dangerous because overdoses can occur easily and lead to death.

What is their Effect on the Mind?

Barbiturates cause mild euphoria, lack of inhibition, relief of anxiety, and sleepiness. Higher doses cause impairment of memory, judgment, and coordination; irritability; and paranoid and suicidal ideation. Tolerance develops quickly and larger doses are then needed to
produce the same effect, increasing the danger of an overdose.

What is their Effect on the Body?

Barbiturates slow down the central nervous system and cause sleepiness.

What are their Overdose Effects?

Effects of overdose include shallow respiration, clammy skin, dilated pupils, weak and rapid pulse, coma, and possible death.

Which Drugs cause Similar Effects?

Drugs with similar effects include: Alcohol, benzodiazepines like Valium and Xanax, tranquilizers, sleeping pills, Rohypnol, and GHB.

What is their Legal Status in the United States?

Barbiturates are Schedule II, III, and IV depressants under the Controlled Substances Act.

Benzodiazepines

What are Benzodiazepines?

Benzodiazepines are depressants that produce sedation and hypnosis, relieve anxiety and muscle spasms, and reduce seizures.
What is their Origin?

Benzodiazepines are only legally available through prescription. Many users maintain their drug supply by getting prescriptions from several doctors, forging prescriptions, or buying them illicitly. Alprazolam and diazepam are the two most frequently encountered benzodiazepines on the illicit market.

What are Common Street Names?

Common street names include Benzos and Downers.

What do They Look Like?

The most common benzodiazepines are the prescription drugs Valium, Xanax, Halcion, Ativan, and Klonopin. Tolerance can develop, although at variable rates and to different degrees.

Shorter-acting benzodiazepines used to manage insomnia include estazolam (ProSom), flurazepam (Dalmane), temazepam (Restoril), and triazolam (Halcion). Midazolam (Versed), a short-acting benzodiazepine, is utilized for sedation, anxiety, and amnesia in critical care settings and prior to anesthesia. It is available in the United States as an injectable preparation and as a syrup (primarily for pediatric patients).

Benzodiazepines with a longer duration of action are utilized to treat insomnia in patients with daytime anxiety. These benzodiazepines include alprazolam (Xanax), chlordiazepoxide (Librium), clorazepate (Tranxene), diazepam (Valium), halazepam (Paxipam),
lorazepam (Ativan), oxazepam (Serax), prazepam (Centrax), and quazepam (Doral). Clonazepam (Klonopin), diazepam, and clorazepate are also used as anticonvulsants.

How are they Abused?

Abuse is frequently associated with adolescents and young adults who take the drug orally or crush it up and snort it to get high. Abuse is particularly high among heroin and cocaine users.

What is their Effect on the Mind?

Benzodiazepines are associated with amnesia, hostility, irritability, and vivid or disturbing dreams.

What is their Effect on the Body?

Benzodiazepines slow down the central nervous system and may cause sleepiness.

What are their Overdose Effects?

Effects of overdose include shallow respiration, clammy skin, dilated pupils, weak and rapid pulse, coma, and possible death.

Which Drugs cause Similar Effects?

Drugs that cause similar effects include: Alcohol, barbiturates, sleeping pills, and GHB.
What is their Legal Status in the United States?

Benzodiazepines are controlled in Schedule IV of the Controlled Substances Act.

**GHB**

What is GHB?

Gamma-Hydroxybutyric acid (GHB) is another name for the generic drug sodium oxybate. Xyrem (which is sodium oxybate) is the trade name of the Food and Drug Administration (FDA)-approved prescription medication. Analogues that are often substituted for GHB include GBL (gamma-butyrolactone) and 1,4 BD (also called just “BD”), which is 1,4-butanediol. These analogues are available legally as industrial solvents used to produce polyurethane, pesticides, elastic fibers, pharmaceuticals, coatings on metal or plastic, and other products. They are also sold illicitly as supplements for bodybuilding, fat loss, reversal of baldness, improved eyesight, and to combat aging, depression, drug addiction, and insomnia.

GBL and BD are sold as “fish tank cleaner,” “ink stain remover,” “ink cartridge cleaner,” and “nail enamel remover” for approximately $100 per bottle — much more expensive than comparable products. Attempts to identify the abuse of GHB analogues are hampered by the fact that routine toxicological screens do not detect the presence of these analogues.
What Does it Look Like?

See the photo above of GHB vials.

What is its Origin?

GHB is produced illegally in both domestic and foreign clandestine laboratories. The major source of GHB on the street is through clandestine synthesis by local operators. At bars or “rave” parties, GHB is typically sold in liquid form by the capful or “swig” for $5 to $25 per cap. Xyrem has the potential for diversion and abuse like any other pharmaceutical containing a controlled substance. GHB has been encountered in nearly every region of the country.

What are Common Street Names?

Common street names include: Easy Lay, G, Georgia Home Boy, GHB, Goop, Grievous Bodily Harm, Liquid Ecstasy, Liquid X, and Scoop.

GHB is usually sold as a liquid or as a white powder that is dissolved in a liquid, such as water, juice, or alcohol. GHB dissolved in liquid has been packaged in small vials or small water bottles. In liquid form, GHB is clear and colorless and slightly salty in taste.

How is it Abused?

GHB and its analogues are abused for their euphoric and calming effects and because some people believe they build muscles and cause weight loss. GHB and its analogues are also misused for their ability to increase
libido, suggestibility, passivity, and to cause amnesia (no memory of events while under the influence of the substance) — traits that make users vulnerable to sexual assault and other criminal acts.

GHB abuse became popular among teens and young adults at dance clubs and “raves” in the 1990s and gained notoriety as a date rape drug. GHB is taken alone or in combination with other drugs, such as alcohol (primarily), other depressants, stimulants, hallucinogens, and marijuana.

The average dose ranges from 1 to 5 grams (depending on the purity of the compound, this can be 1-2 teaspoons mixed in a beverage). However, the concentrations of these “home-brews” have varied so much that users are usually unaware of the actual dose they are drinking.

What is its Effect on the Mind?

GHB occurs naturally in the central nervous system in very small amounts. Use of GHB produces Central Nervous System (CNS) depressant effects including euphoria, drowsiness, decreased anxiety, confusion, and memory impairment. GHB can also produce both visual hallucinations and — paradoxically — excited and aggressive behavior. GHB greatly increases the CNS depressant effects of alcohol and other depressants.

What is its Effect on the Body?

GHB takes effect in 15 to 30 minutes, and the effects last 3 to 6 hours. Low doses of GHB produce nausea. At high doses, GHB overdose can result in unconsciousness,
seizures, slowed heart rate, greatly slowed breathing, lower body temperature, vomiting, nausea, coma, and death. Regular use of GHB can lead to addiction and withdrawal that includes insomnia, anxiety, tremors, increased heart rate and blood pressure, and occasional psychotic thoughts. Currently, there is no antidote available for GHB intoxication. GHB analogues are known to produce side effects such as topical irritation to the skin and eyes, nausea, vomiting, incontinence, loss of consciousness, seizures, liver damage, kidney failure, respiratory depression, and death.

What are its Overdose Effects?

GHB overdose can cause death.

Which Drugs cause Similar Effects?

GHB analogues are often abused in place of GHB. Both GBL and BD metabolize to GHB when taken and produce effects similar to GHB. CNS depressants such as barbiturates and methaqualone also produce effects similar to GHB.

What is its legal status in the United States?

GHB is a Schedule I controlled substance, meaning that it has a high potential for abuse, no currently accepted medical use in treatment in the United States, and a lack
of accepted safety for use under medical supervision. FDA-approved GHB products are Schedule III substances under the Controlled Substances Act. In addition, GBL is a List I chemical.

It was placed on Schedule I of the Controlled Substances Act in March 2000. However, when sold as FDA-approved GHB products (such as Xyrem), it is considered Schedule III, one of several drugs that are listed in multiple schedules.

Rohypnol

What is Rohypnol?

Rohypnol is a trade name for flunitrazepam, a central nervous system (CNS) depressant that belongs to a class of drugs known as benzodiazepines. Flunitrazepam is also marketed as generic preparations and other trade name products outside of the United States. Like other benzodiazepines, Rohypnol produces sedative-hypnotic, anti-anxiety, and muscle relaxant effects. This drug has never been approved for medical use in the United States by the Food and Drug Administration. Outside the United States, Rohypnol is commonly prescribed to treat insomnia. Rohypnol is also referred to as a “date rape” drug.

What is its Origin?

Rohypnol is smuggled into the United States from other countries, such as Mexico.
What are common street names?

Common street names include:


What Does it Look Like?

Prior to 1997, Rohypnol was manufactured as a white tablet (0.5-2 milligrams per tablet), and when mixed in drinks, was colorless, tasteless, and odorless. In 1997, the manufacturer responded to concerns about the drug’s role in sexual assaults by reformulating the drug. Rohypnol is now manufactured as an oblong olive green tablet with a speckled blue core that when dissolved in light-colored drinks will dye the liquid blue. However, generic versions of the drug may not contain the blue dye.

How is it Abused?

The tablet can be swallowed whole, crushed and snorted, or dissolved in liquid. Adolescents may abuse Rohypnol to produce a euphoric effect often described as a “high.” While high, they experience reduced inhibitions and impaired judgment. Rohypnol is also used in combination with alcohol to produce an exaggerated intoxication. In addition, abuse of Rohypnol may be associated with multiple-substance abuse. For example, cocaine users may use benzodiazepines such as Rohypnol.
to relieve the side effects (e.g., irritability and agitation) associated with cocaine binges.

Rohypnol is also misused to physically and psychologically incapacitate victims targeted for sexual assault. The drug is usually placed in the alcoholic drink of an unsuspecting victim to incapacitate them and prevent resistance to sexual assault. The drug leaves the victim unaware of what has happened to them.


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Date rape drugs are illegal and are sometimes used to assist a sexual assault. Sexual assault is any type of sexual activity that a person does not agree to. Date rape drugs often have no color, smell, or taste, so you can’t tell if you are being drugged. The drugs can make you weak and confused — or even cause you to pass out — so that you cannot consent to sex. Both men and women can be drugged with date rape drugs. – womenshealth.gov

See this website for more important information on protecting oneself and others from date rape drugs: [website on date rape drugs from womenshealth.gov](https://psu.pb.unizin.org/bbh143/?p=352#oembed-1).
3.7 ALCOHOL

ALCOHOL FACTS AND STATISTICS

Alcohol Use in the United States:

- **Prevalence of Drinking**: According to the 2015 National Survey on Drug Use and Health (NSDUH), 86.4 percent of people ages 18 or older reported that they drank alcohol at some point in their lifetime; 70.1 percent reported that they drank in the past year; 56.0 percent reported that they drank in the past month.¹

- **Prevalence of Binge Drinking and Heavy Alcohol Use**: In 2015, 26.9 percent of people ages 18 or older reported that they engaged in binge drinking in the past month; 7.0 percent reported that they engaged in heavy alcohol use in the past month.² (See “Definitions” box for definitions of binge drinking and heavy alcohol use.)
Alcohol Use Disorder (AUD) in the United States:

- **Adults (ages 18+):** According to the 2015 NSDUH, 15.1 million adults ages 18 and older\(^3\) (6.2 percent of this age group\(^4\)) had AUD. This includes 9.8 million men\(^3\) (8.4 percent of men in this age group\(^4\)) and 5.3 million women\(^3\) (4.2 percent of women in this age group\(^4\)).
  - About 6.7 percent of adults who had AUD in the past year received treatment. This includes 7.4 percent of males and 5.4 percent of females with AUD in this age group.\(^5\)

- **Youth (ages 12–17):** According to the 2015 NSDUH, an estimated 623,000 adolescents ages 12–17\(^6\) (2.5 percent of this age group\(^7\)) had AUD. This number includes 298,000 males\(^6\) (2.3 percent of males in this age group\(^7\)) and 325,000 females\(^6\) (2.7 percent of females in this age group\(^7\)).
  - About 5.2 percent of youth who had AUD in the past year received treatment. This includes 5.1 percent of males and 5.3 percent of females with AUD in this age group.\(^5\)

**Alcohol-Related Deaths:**

- An estimated 88,000\(^8\) people (approximately 62,000 men and 26,000 women\(^8\)) die from alcohol-related causes annually, making alcohol the third leading preventable cause of death in the United States. The first is tobacco, and the
second is poor diet and physical inactivity.\textsuperscript{9}  
- In 2014, alcohol-impaired driving fatalities accounted for 9,967 deaths (31 percent of overall driving fatalities).\textsuperscript{10}

**Economic Burden:**

- In 2010, alcohol misuse cost the United States $249.0 billion.\textsuperscript{11}  
- Three-quarters of the total cost of alcohol misuse are related to binge drinking.\textsuperscript{11}

**Global Burden:**

- In 2012, 3.3 million deaths, or 5.9 percent of all global deaths (7.6 percent for men and 4.1 percent for women), were attributable to alcohol consumption.\textsuperscript{12}  
- In 2014, the World Health Organization reported that alcohol contributed to more than 200 diseases and injury-related health conditions, most notably DSM–IV alcohol dependence (see sidebar), liver cirrhosis, cancers, and injuries.\textsuperscript{13} In 2012, 5.1 percent of the burden of disease and injury worldwide (139 million disability-adjusted life-years) was attributable to alcohol consumption.\textsuperscript{12}  
- Globally, alcohol misuse was the fifth leading risk factor for premature death and disability in 2010. Among people between the ages of 15 and 49, it is the first.\textsuperscript{14} In the age group 20–39 years, approximately 25 percent of the total deaths are alcohol-attributable.\textsuperscript{15}
Family Consequences:

- More than 10 percent of U.S. children live with a parent with alcohol problems, according to a 2012 study.\textsuperscript{16}

Underage Drinking:

- **Prevalence of Underage Alcohol Use:**
  - **Prevalence of Drinking:** According to the 2015 NSDUH, 33.1 percent of 15-year-olds report that they have had at least 1 drink in their lives.\textsuperscript{17} About 7.7 million people ages 12–20\textsuperscript{18} (20.3 percent of this age group\textsuperscript{19}) reported drinking alcohol in the past month (19.8 percent of males and 20.8 percent of females\textsuperscript{19}).
  - **Prevalence of Binge Drinking:** According to the 2015 NSDUH, approximately 5.1 million people\textsuperscript{18}(about 13.4 percent\textsuperscript{19}) ages 12–20 (13.4 percent of males and 13.3 percent of females\textsuperscript{19}) reported binge drinking in the past month.
  - **Prevalence of Heavy Alcohol Use:** According to the 2015 NSDUH, approximately 1.3 million people\textsuperscript{18}(about 3.3 percent\textsuperscript{19}) ages 12–20 (3.6 percent of males and 3.0 percent of females\textsuperscript{19}) reported heavy alcohol use in the past month.
- **Consequences of Underage Alcohol Use:**
  - Research indicates that alcohol use
during the teenage years could interfere with normal adolescent brain development and increase the risk of developing AUD. In addition, underage drinking contributes to a range of acute consequences, including injuries, sexual assaults, and even deaths—including those from car crashes.20

Alcohol and College Students:

- **Prevalence of Alcohol Use:**
  - **Prevalence of Drinking:** According to the 2015 NSDUH, 58.0 percent of full-time college students ages 18–22 drank alcohol in the past month compared with 48.2 percent of other persons of the same age.21
  - **Prevalence of Binge Drinking:** According to the 2015 NSDUH, 37.9 percent of college students ages 18–22 reported binge drinking in the past month compared with 32.6 percent of other persons of the same age.21
  - **Prevalence of Heavy Alcohol Use:** According to the 2015 NSDUH, 12.5 percent of college students ages 18–22 reported heavy alcohol use in the past month compared with 8.5 percent of other persons of the same age.21

- **Consequences—Researchers estimate that each year:**
• 1,825 college students between the ages of 18 and 24 die from alcohol-related unintentional injuries, including motor-vehicle crashes.\textsuperscript{22}

• 696,000 students between the ages of 18 and 24 are assaulted by another student who has been drinking.\textsuperscript{23}

• 97,000 students between the ages of 18 and 24 report experiencing alcohol-related sexual assault or date rape.\textsuperscript{23}

• Roughly 20 percent of college students meet the criteria for AUD.\textsuperscript{24}

• About 1 in 4 college students report academic consequences from drinking, including missing class, falling behind in class, doing poorly on exams or papers, and receiving lower grades overall.\textsuperscript{25}

Alcohol and Pregnancy:

• The prevalence of Fetal Alcohol Syndrome (FAS) in the United States was estimated by the Institute of Medicine in 1996 to be between 0.5 and 3.0 cases per 1,000.\textsuperscript{26}

• More recent reports from specific U.S. sites report the prevalence of FAS to be 2 to 7 cases per 1,000, and the prevalence of Fetal Alcohol Spectrum Disorders (FASD) to be as high as 20 to 50 cases per 1,000.\textsuperscript{27,28}
Alcohol and the Human Body:

- In 2015, of the 78,529 liver disease deaths among individuals ages 12 and older, 47.0 percent involved alcohol. Among males, 49,695 liver disease deaths occurred and 49.5 percent involved alcohol. Among females, 28,834 liver disease deaths occurred and 43.5 percent involved alcohol.29

- Among all cirrhosis deaths in 2013, 47.9 percent were alcohol-related. The proportion of alcohol-related cirrhosis was highest (76.5 percent) among deaths of persons ages 25–34, followed by deaths of persons ages 35–44, at 70.0 percent.30

- In 2009, alcohol-related liver disease was the primary cause of almost 1 in 3 liver transplants in the United States.31

- Drinking alcohol increases the risk of cancers of the mouth, esophagus, pharynx, larynx, liver, and breast.32

Definitions

**Alcohol Use Disorder (AUD):** AUD is a chronic relapsing brain disease characterized by an impaired ability to stop or control alcohol use despite adverse social, occupational, or health consequences. AUD can range from mild to severe, and recovery is possible regardless of severity. The fourth edition of the *Diagnostic and Statistical Manual* (DSM-IV), published by the American Psychiatric Association, described two distinct disorders—alcohol abuse and alcohol dependence—with specific criteria for each. The fifth edition, DSM-5, integrates the two DSM-IV disorders,
alcohol abuse, and alcohol dependence, into a single disorder called alcohol use disorder, or AUD, with mild, moderate, and severe subclassifications.

**Binge Drinking:**

- NIAAA defines binge drinking as a pattern of drinking that brings blood alcohol concentration (BAC) levels to 0.08 g/dL. This typically occurs after 4 drinks for women and 5 drinks for men—in about 2 hours.\(^{33}\)
- The Substance Abuse and Mental Health Services Administration (SAMHSA), which conducts the annual National Survey on Drug Use and Health (NSDUH), defines binge drinking as 5 or more alcoholic drinks for males or 4 or more alcoholic drinks for females on the same occasion (i.e., at the same time or within a couple of hours of each other) on at least 1 day in the past month.\(^{34}\)

**Heavy Alcohol Use:** SAMHSA defines heavy alcohol use as binge drinking on 5 or more days in the past month.

**Moderate alcohol consumption:** According to the “Dietary Guidelines for Americans 2015-2020,” U.S. Department of Health and Human Services and U.S. Department of Agriculture, moderate drinking is up to 1 drink per day for women and up to 2 drinks per day for men.

**NIAAA’s Definition of Drinking at Low Risk for Developing AUD:** For women, low-risk drinking is defined as no more than 3 drinks on any single day and no more than 7 drinks per week. For men, it is defined as no more than 4 drinks on any single day and no more than 14 drinks per week. NIAAA research shows that only about 2 in 100 people who drink within these limits have AUD.

**Alcohol-Impaired-Driving Fatality:** A fatality in a crash involving a driver or motorcycle rider (operator) with a BAC of 0.08 g/dL or greater.

**Disability-Adjusted Life-Years (DALYs):** A measure of years of life lost or lived in less than full health.

**Underage Drinking:** Alcohol use by anyone under the age of 21. In the United States, the legal drinking age is 21.
WHAT IS A STANDARD DRINK?

Many people are surprised to learn what counts as a drink. The amount of liquid in your glass, can, or bottle does not necessarily match up to how much alcohol is actually in your drink. Different types of beer, wine, or malt liquor can have very different amounts of alcohol content. For example, many light beers have almost as much alcohol as regular beer – about 85% as much. Here’s another way to put it:

- Regular beer: 5% alcohol content
- Some light beers: 4.2% alcohol content

That’s why it’s important to know how much alcohol your drink contains. In the United States, one “standard” drink contains roughly 14 grams of pure alcohol, which is found in:

- 12 ounces of regular beer, which is usually about 5% alcohol
- 5 ounces of wine, which is typically about 12% alcohol
- 1.5 ounces of distilled spirits, which is about 40% alcohol

How do you know how much alcohol is in your drink?

Even though they come in different sizes, the drinks below are examples of one standard drink:
The same amount of alcohol is contained in 12 fluid ounces of regular beer, 8 to 9 fluid ounces of malt liquor, 5 fluid ounces of table wine, or a 1.5 fluid ounce shot of 80-proof spirits (“hard liquor” such as whiskey, gin, etc.) The percent of ‘pure’ alcohol varies by the beverage.

Each beverage portrayed above represents one standard drink of “pure” alcohol, defined in the United States as 0.6 fl oz or 14 grams. The percent of pure alcohol, expressed here as alcohol by volume (alc/vol), varies within and across beverage types. Although the standard drink amounts are helpful for following health guidelines, they may not reflect customary serving sizes.

Visit the following websites for information on alcohol

- Rethinking Drinking
- Link to alcohol fact sheets from drugabuse.gov
- WebMD slideshow on How Alcohol Affects Your Body
3.8

HALLUCINOGENS

Hallucinogens are found in plants and fungi or are synthetically produced and are among the oldest known group of drugs used for their ability to alter human perception and mood.

WHAT IS THEIR ORIGIN?

Hallucinogens can be synthetically produced in illicit laboratories or are found in plants.
What are common street names?

Common street names include: Acid, Blotter, Blotter Acid, Cubes, Doses, Fry, Mind Candy, Mushrooms, Shrooms, Special K, STP, X, and XTC.

What do they look like?

Hallucinogens come in a variety of forms. MDMA or ecstasy tablets are sold in many colors with a variety of logos to attract youth. LSD is sold in the form of impregnated paper (blotter acid), typically imprinted with colorful graphic designs.

How are they abused?

The most commonly abused hallucinogens among junior and senior high school students are hallucinogenic mushrooms, LSD, and MDMA (ecstasy). Hallucinogens are typically taken orally or can be smoked.

What is their effect on the mind?

Sensory effects include perceptual distortions that vary with dose, setting, and mood. Psychic effects include distortions of thought associated with time and space.
Time may appear to stand still, and forms and colors seem to change and take on new significance. Weeks or even months after some hallucinogens have been taken, the user may experience flashbacks — fragmentary recurrences of certain aspects of the drug experience in the absence of actually taking the drug. The occurrence of a flashback is unpredictable, but is more likely to occur during times of stress and seems to occur more frequently in younger individuals. With time, these episodes diminish and become less intense.

What is their effect on the body?

Physiological effects include elevated heart rate, increased blood pressure, and dilated pupils.

What are their overdose effects?

Deaths exclusively from an acute overdose of LSD, magic mushrooms, and mescaline are extremely rare. Deaths generally occur due to suicide, accidents, and dangerous behavior, or due to the person inadvertently eating poisonous plant material. A severe overdose of PCP and ketamine can result in respiratory depression, coma, convulsions, seizures, and death due to respiratory arrest.

What is their legal status in the United States? Many hallucinogens are Schedule I under the Controlled
Substances Act, meaning that they have a high potential for abuse, no currently accepted medical use in treatment in the United States, and a lack of accepted safety for use under medical supervision.

Ecstasy/MDMA

WHAT IS ECSTASY/MDMA?

MDMA acts as both a stimulant and psychedelic, producing an energizing effect, distortions in time and perception, and enhanced enjoyment of tactile experiences. Adolescents and young adults use it to reduce inhibitions and to promote euphoria, feelings of closeness, empathy, and sexuality. Although MDMA is known among users as ecstasy, researchers have determined that many ecstasy tablets contain not only MDMA but also a number of other drugs or drug combinations that can be harmful, such as methamphetamine, ketamine, cocaine, the over-the-counter cough suppressant dextromethorphan (DXM), the diet drug ephedrine, and caffeine.

In addition, other drugs similar to MDMA, such as MDA or PMA, are often sold as ecstasy, which can lead to overdose and death when the user takes additional doses to obtain the desired effect.

WHAT IS ITS ORIGIN?

MDMA is a synthetic chemical made in labs. Seized MDMA in the U.S. is primarily manufactured in and
smuggled across our borders from, clandestine laboratories in Canada and, to a lesser extent, the Netherlands. A small number of MDMA clandestine laboratories have also been identified operating in the United States.

**What are common street names?**

Common street names include: Adam, Beans, Clarity, Disco Biscuit, E, Ecstasy, Eve, Go, Hug Drug, Lover’s Speed, MDMA, Peace, STP, X, and XTC.

**What does it look like?**

MDMA is mainly distributed in tablet form. MDMA tablets are sold with logos, creating brand names for users to seek out. The colorful pills are often hidden among colorful candies. MDMA is also distributed in capsules, powder, and liquid forms.

**How is it abused?**

MDMA use mainly involves swallowing tablets (50-150 mg), which are sometimes crushed and snorted, occasionally smoked but rarely injected. MDMA is also available as a powder. MDMA users usually take MDMA by “stacking” (taking three or more tablets at once) or by “piggy-backing” (taking a series of tablets over a short period of time). One trend among young adults is “candy flipping,” which is the co-abuse of MDMA and LSD. MDMA is considered a “party drug.” As with many other drugs of abuse, MDMA is rarely used alone. It is
common for users to mix MDMA with other substances, such as alcohol and marijuana.

What is its effect on the mind?

MDMA mainly affects brain cells that use the chemical serotonin to communicate with each other. Serotonin helps to regulate mood, aggression, sexual activity, sleep, and sensitivity to pain. Clinical studies suggest that MDMA may increase the risk of long-term, perhaps permanent, problems with memory and learning. MDMA causes changes in perception, including euphoria and increased sensitivity to touch, energy, sensual and sexual arousal, need to be touched, and need for stimulation.

Some unwanted psychological effects include: Confusion, anxiety, depression, paranoia, sleep problems, and drug craving. All these effects usually occur within 30 to 45 minutes of swallowing the drug and usually last 4 to 6 hours, but they may occur or last weeks after ingestion.

What is its effect on the body?

Users of MDMA experience many of the same effects and face many of the same risks as users of other stimulants such as cocaine and amphetamines. These include increased motor activity, alertness, heart rate, and blood pressure.
What are its overdose effects?

In high doses, MDMA can interfere with the body’s ability to regulate temperature. On occasions, this can lead to a sharp increase in body temperature (hyperthermia), resulting in liver, kidney, and cardiovascular system failure, and death. Because MDMA can interfere with its own metabolism (that is, its breakdown within the body), potentially harmful levels can be reached by repeated drug use within short intervals.

Which drugs cause similar effects?

MDMA produces both amphetamine-like stimulation and mild mescaline-like hallucinations.

What is its legal status in the United States?

MDMA is a Schedule I drug under the Controlled Substances Act, meaning it has a high potential for abuse, no currently accepted medical use in treatment in the United States, and a lack of accepted safety for use under medical supervision.
Some unwanted physical effects include:

 Muscle tension, tremors, involuntary teeth clenching, muscle cramps, nausea, faintness, chills, sweating, and blurred vision.

 High doses of MDMA can interfere with the ability to regulate body temperature, resulting in a sharp increase in body temperature (hyperthermia), leading to liver, kidney, and cardiovascular failure. Severe dehydration can result from the combination of the drug’s effects and the crowded and hot conditions in which the drug is often taken. Studies suggest the chronic use of MDMA can produce damage to the serotonin system. It is ironic that a drug that is taken to increase pleasure may cause damage that reduces a person’s ability to feel pleasure.

Ketamine

WHAT IS KETAMINE?

Ketamine is a dissociative anesthetic that has some hallucinogenic effects. It distorts perceptions of sight and sound and makes the user feel disconnected and not in control. It is an injectable, short-acting anesthetic for use in humans and animals. It is referred to as a “dissociative
anesthetic” because it makes patients feel detached from their pain and environment.

Ketamine can induce a state of sedation (feeling calm and relaxed), immobility, relief from pain, and amnesia (no memory of events while under the influence of the drug).

It is abused for its ability to produce dissociative sensations and hallucinations. Ketamine has also been used to facilitate sexual assault.

WHAT IS ITS ORIGIN?

Ketamine is produced commercially in a number of countries, including the United States. Most of the ketamine illegally distributed in the United States is diverted or stolen from legitimate sources, particularly veterinary clinics, or smuggled into the United States from Mexico. Distribution of ketamine typically occurs among friends and acquaintances, most often at raves, nightclubs, and at private parties; street sales of ketamine are rare.

How is it abused?

Ketamine, along with the other “club drugs,” has become popular among teens and young adults at dance clubs and “raves.” Ketamine is manufactured commercially as a powder or liquid. Powdered ketamine is also formed from pharmaceutical ketamine by evaporating the liquid using hot plates, warming trays, or microwave ovens, a process that results in the formation of crystals, which are then ground into powder.
What are common street names?

Common street names include: Cat Tranquilizer, Cat Valium, Jet K, Kit Kat, Purple, Special K, Special La Coke, Super Acid, Super K, and Vitamin K.

What does it look like?

Ketamine comes in a clear liquid and a white or off-white powder. Powdered ketamine (100 milligrams to 200 milligrams) typically is packaged in small glass vials, small plastic bags, and capsules as well as paper, glassine, or aluminum foil folds. Powdered ketamine is cut into lines known as bumps and snorted, or it is smoked, typically in marijuana or tobacco cigarettes. Liquid ketamine is injected or mixed into drinks. Ketamine is found by itself or often in combination with MDMA, amphetamine, methamphetamine, or cocaine.

What is its effect on the mind?

Ketamine produces hallucinations. It distorts perceptions of sight and sound and makes the user feel disconnected and not in control. A “Special K” trip is touted as better than that of LSD or PCP because its hallucinatory effects are relatively short in duration, lasting approximately 30 to 60 minutes as opposed to several hours.

Slang for experiences related to Ketamine or effects of ketamine include:

- “K-land” (refers to a mellow & colorful experience)
• “K-hole” (refers to the out-of-body, near-death experience)

• “Baby food” (users sink into blissful, infantile inertia)

• “God” (users are convinced that they have met their maker)

The onset of effects is rapid and often occurs within a few minutes of taking the drug, though taking it orally results in a slightly slower onset of effects. Flashbacks have been reported several weeks after ketamine is used. Ketamine may also cause agitation, depression, cognitive difficulties, unconsciousness, and amnesia.

What is its effect on the body?

A couple of minutes after taking the drug, the user may experience an increase in heart rate and blood pressure that gradually decreases over the next 10 to 20 minutes. Ketamine can make users unresponsive to stimuli. When in this state, users experience:

• Involuntarily rapid eye movement, dilated pupils, salivation, tear secretions, and stiffening of the muscles.
• This drug can also cause nausea.

What are its overdose effects?

An overdose can cause unconsciousness and dangerously slowed breathing.
Which drugs cause similar effects?

Other hallucinogenic drugs such as LSD, PCP, and mescaline can cause hallucinations. There are also several drugs such as GHB, Rohypnol, and other depressants that are misused for their amnesiac or sedative properties to facilitate sexual assault.

What is its legal status in the United States?

Since the 1970s, ketamine has been marketed in the United States as an injectable, short-acting anesthetic for use in humans and animals. In 1999, ketamine including its salts, isomers, and salts of isomers, became a Schedule III non-narcotic substance under the Controlled Substances Act. It has a currently accepted medical use but some potential for abuse, which may lead to moderate or low physical dependence or high psychological dependence.

LSD

WHAT IS LSD?

LSD is a potent hallucinogen that has a high potential for abuse and currently has no accepted medical use in treatment in the United States.
WHAT IS ITS ORIGIN?

LSD is produced in clandestine laboratories in the United States.

What are common street names?

Common names for LSD include: Acid, Blotter Acid, Dots, Mellow Yellow, and Window Pane.

What does it look like?

LSD is sold on the street in tablets, capsules, and occasionally in liquid form. It is an odorless and colorless substance with a slightly bitter taste. LSD is often added to absorbent paper, such as blotter paper, and divided into small decorated squares, with each square representing one dose.

What is its effect on the body?

The physical effects include dilated pupils, higher body temperature, increased heart rate and blood pressure, sweating, loss of appetite, sleeplessness, dry mouth, and tremors.

How is it abused?

LSD is abused orally.

What is its effect on the mind?

During the first hour after ingestion, users may experience visual changes with extreme changes in mood.
While hallucinating, the user may suffer impaired depth and time perception accompanied by a distorted perception of the shape and size of objects, movements, colors, sound, touch, and the user's own body image. The ability to make sound judgments and see common dangers is impaired, making the user susceptible to personal injury. It is possible for users to suffer acute anxiety and depression after an LSD “trip” and flashbacks have been reported days, and even months, after taking the last dose.

The physical effects include dilated pupils, higher body temperature, increased heart rate and blood pressure, sweating, loss of appetite, sleeplessness, dry mouth, and tremor.

What are its overdose effects?

 Longer, more intense “trip” episodes, psychosis, and possible death.

Which drugs cause similar effects?

LSD’s effects are similar to other hallucinogens, such as PCP, mescaline, and peyote.

What is its legal status in the United States?

LSD is a Schedule I substance under the Controlled Substances Act. Schedule I substances have a high potential for abuse, no currently accepted medical use in treatment in the United States, and a lack of accepted safety for use under medical supervision.
Peyote & Mescaline

WHAT ARE PEYOTE AND MESCALINE?

Peyote is a small, spineless cactus. The active ingredient in peyote is the hallucinogen mescaline.

WHAT IS ITS ORIGIN?

From the earliest recorded time, peyote has been used by natives in northern Mexico and the southwestern United States as a part of their religious rites. Mescaline can be extracted from peyote or produced synthetically.

What is its effect on the body?

Following the consumption of peyote and mescaline, users may experience:

- Intense nausea, vomiting, dilation of the pupils, increased heart rate, increased blood pressure, a rise in body temperature that causes heavy perspiration, headaches, muscle weakness, and impaired motor coordination

Which drugs cause similar effects?

Other hallucinogens like LSD, psilocybin (mushrooms), and PCP.

What are common street names?

Common street names include: Buttons, Cactus, Mesc, and Peyote.
What does it look like?

The top of the peyote cactus is referred to as the “crown” and consists of disc-shaped buttons that are cut off.

How is it abused?

The fresh or dried buttons are chewed or soaked in water to produce an intoxicating liquid. Peyote buttons may also be ground into a powder that can be placed inside gelatin capsules to be swallowed, or smoked with a leafy material such as cannabis or tobacco.

What is its effect on the mind?

Abuse of peyote and mescaline will cause varying degrees of illusions, hallucinations, altered perception of space and time, and altered body image. Users may also experience euphoria, which is sometimes followed by feelings of anxiety.

What is its legal status in the United States?

Peyote and mescaline are Schedule I substances under the Controlled Substances Act, meaning that they have a high potential for abuse, no currently accepted medical use in treatment in the United States, and a lack of accepted safety for use under medical supervision.
Psilocybin is a chemical obtained from certain types of fresh or dried mushrooms.

WHAT IS ITS ORIGIN?

Psilocybin mushrooms are found in Mexico, Central America, and the United States.
What are common street names?

Common street names include: Magic Mushrooms, Mushrooms, and Shrooms.

What does it look like?

Mushrooms containing psilocybin are available fresh or dried and have long, slender stems topped by caps with dark gills on the underside. Fresh mushrooms have white or whitish-gray stems; the caps are dark brown around the edges and light brown or white in the center. Dried mushrooms are usually rusty brown with isolated areas of off-white.

How is it abused?

Psilocybin mushrooms are ingested orally. They may also be brewed as a tea or added to other foods to mask their bitter flavor.

What is its effect on the body?

The physical effects include nausea, vomiting, muscle weakness, and lack of coordination.

What is its effect on the mind?

The psychological consequences of psilocybin use include hallucinations and an inability to discern fantasy from reality. Panic reactions and psychosis also may occur, particularly if a user ingests a large dose.
What are its overdose effects?

Effects of overdose include longer, more intense “trip” episodes, psychosis, and possible death. Abuse of psilocybin mushrooms could also lead to poisoning if one of the many varieties of poisonous mushrooms is incorrectly identified as a psilocybin mushroom.

Which drugs cause similar effects?

Psilocybin effects are similar to other hallucinogens, such as mescaline and peyote.

What is its legal status in the United States?

Psilocybin is a Schedule I substance under the Controlled Substances Act, meaning that it has a high potential for abuse, no currently accepted medical use in treatment in the United States, and a lack of accepted safety for use under medical supervision.


Additional information: [National Institute on Drug Abuse, Commonly Used Drugs Charts](https://www.drugabuse.gov/sites/default/files/commonly-used-drugs-charts.pdf)
3.9 MARIJUANA / CANNABIS

WHAT IS MARIJUANA?

Marijuana is a mind-altering (psychoactive) drug, produced by the Cannabis sativa plant. Marijuana contains over 480 constituents. THC (delta-9-tetrahydrocannabinol) is believed to be the main ingredient that produces the psychoactive effect.

WHAT IS ITS ORIGIN?

Marijuana is grown in the United States, Canada, Mexico, South America, the Caribbean, and Asia. It can be cultivated in both outdoor and indoor settings.

What are common street names?

Common street names include: Aunt Mary, BC Bud, Blunts, Boom, Chronic, Dope, Gangster, Ganja, Grass, Hash, Herb, Hydro, Indo, Joint, Kif, Mary Jane, Mota, Pot, Reefer, Sinsemilla, Skunk, Smoke, Weed, and Yerba.

What does it look like?

Marijuana is a dry, shredded green/brown mix of flowers,
Marijuana Plant

stems, seeds, and leaves from the Cannabis sativa plant. The mixture typically is green, brown, or gray in color and may resemble tobacco.

How is it abused?

Marijuana is usually smoked as a cigarette (called a joint) or in a pipe or bong. It is also smoked in blunts, which are cigars that have been emptied of tobacco and refilled with marijuana, sometimes in combination with another drug. Marijuana is also mixed with foods or brewed as a tea.

What is its effect on the mind?

When marijuana is smoked, the THC passes from the lungs and into the bloodstream, which carries the chemical to the organs throughout the body, including the brain. In the brain, the THC connects to specific sites called cannabinoid receptors on nerve cells and influences the activity of those cells. Many of these receptors are found in the parts of the brain that influence pleasure, memory, thought, concentration, sensory and time perception, and coordinated movement.

The short-term effects of marijuana include:

Problems with memory and learning, distorted
perception, difficulty in thinking and problem-solving, and loss of coordination.

The effect of marijuana on perception and coordination are responsible for serious impairments in learning, associative processes, and psychomotor behavior (driving abilities). Long-term, regular use can lead to physical dependence and withdrawal following discontinuation, as well as psychic addiction or dependence. Clinical studies show that the physiological, psychological, and behavioral effects of marijuana vary among individuals and present a list of common responses to cannabinoids, as described in the scientific literature:

- Dizziness, nausea, tachycardia, facial flushing, dry mouth, and tremor initially
- Merriment, happiness, and even exhilaration at high doses
- Disinhibition, relaxation, increased sociability, and talkativeness
- Enhanced sensory perception, giving rise to increased appreciation of music, art, and touch
- Heightened imagination leading to a subjective sense of increased creativity
- Time distortions
- Illusions, delusions, and hallucinations are rare except at high doses
- Impaired judgment, reduced coordination, and ataxia, which can impede driving ability or lead to an increase in risktaking behavior
- Emotional lability, the incongruity of affect, dysphoria, disorganized thinking, inability to converse logically,
agitation, paranoia, confusion, restlessness, anxiety, drowsiness, and panic attacks may occur, especially in inexperienced users or in those who have taken a large dose.

• Increased appetite and short-term memory impairment are common

What is its effect on the body?

Short-term physical effects from marijuana use may include sedation, bloodshot eyes, increased heart rate, coughing from lung irritation, increased appetite, and decreased blood pressure. Marijuana smokers experience serious health problems such as bronchitis, emphysema, and bronchial asthma. Extended use may cause suppression of the immune system. Withdrawal from chronic use of high doses of marijuana causes physical signs including a headache, shakiness, sweating, and stomach pains and nausea. Withdrawal symptoms also include behavioral signs such as restlessness, irritability, sleep difficulties, and decreased appetite.

What are its overdose effects?

No deaths from overdose of marijuana have been reported.

Which drugs cause similar effects?

Hashish and hashish oil are drugs made from the cannabis plant that is like marijuana, only stronger. Hashish (hash) consists of the THC-rich resinous material of the cannabis plant, which is collected, dried, and then
compressed into a variety of forms, such as balls, cakes, or cookie-like sheets. Pieces are then broken off, placed in pipes or mixed with tobacco and placed in pipes or cigarettes, and smoked. The main sources of hashish are the Middle East, North Africa, Pakistan, and Afghanistan. Hashish Oil (hash oil, liquid hash, cannabis oil) is produced by extracting the cannabinoids from the plant material with a solvent. The color and odor of the extract will vary, depending on the solvent used. A drop or two of this liquid on a cigarette is equal to a single marijuana joint. Like marijuana, hashish and hashish oil are both Schedule I drugs.

What is its legal status in the United States?

Marijuana is a Schedule I substance under the Controlled Substances Act, meaning that it has a high potential for abuse, no currently accepted medical use in treatment in the United States, and a lack of accepted safety for use under medical supervision. Although some states within the United States have allowed the use of marijuana for medicinal purpose, it is the U.S. Food and Drug Administration that has the federal authority to approve drugs for medicinal use in the U.S. To date, the FDA has not approved a marketing application for any marijuana product for any clinical indication. Consistent therewith, the FDA and DEA have concluded that marijuana has no federally approved medical use for treatment in the U.S. and thus it remains as a Schedule I controlled substance under federal law. Marinol, a synthetic version of THC, the active ingredient found in the marijuana plant, can be
prescribed for the control of nausea and vomiting caused by chemotherapeutic agents used in the treatment of cancer and to stimulate appetite in AIDS patients. Marinol is a Schedule III substance under the Controlled Substances Act.

Marijuana Concentrates Also Known As: THC Extractions

WHAT ARE MARIJUANA CONCENTRATES?

A marijuana concentrate is a highly potent THC concentrated mass that is most similar in appearance to either honey or butter, which is why it is referred to or known on the street as “honey oil” or “budder”.

WHAT IS ITS ORIGIN?

Marijuana concentrates contain extraordinarily high THC levels that could range from 40 to 80 percent. This form of marijuana can be up to four times stronger in THC content than high grade or top-shelf marijuana, which normally measures around 20 percent THC levels. Many methods are utilized to convert or “manufacture” marijuana into marijuana concentrates. One method is the butane extraction process. This process is particularly dangerous because it uses highly flammable butane to extract the THC from the cannabis plant. Given the extremely volatile nature of butane, this process has resulted in violent explosions. THC extraction labs are being reported nationwide, particularly in the western states and in states where local and state marijuana laws are more relaxed.
What are common street names?

Common street names include: 710 (the word “OIL” flipped and spelled backwards), wax, ear wax, honey oil, budder, butane hash oil, butane honey oil (BHO), shatter, dabs (dabbing), black glass, and errl.

What does it look like?

Marijuana concentrates are similar in appearance to honey or butter and are either brown or gold in color.

How is it abused?

One form of abuse occurs orally by infusing marijuana concentrates in various food or drink products; however, smoking remains the most popular form of ingestion by use of water or oil pipes. A disturbing aspect of this emerging threat is the ingestion of concentrates via electronic cigarettes (also known as e-cigarettes) or vaporizers. Many users of marijuana concentrates prefer the e-cigarette/vaporizer because it's smokeless, odorless,
and easy to hide or conceal. The user takes a small amount of marijuana concentrate, referred to as a “dab,” then heats the substance using the e-cigarette/vaporizer producing vapors that ensure an instant “high” effect upon the user. Using an e-cigarette/vaporizer to ingest marijuana concentrates is commonly referred to as “dabbing” or “vaping”.

What are the Effects of Using Marijuana Concentrates?

Being a highly concentrated form of marijuana, the effects upon the user may be more psychologically and physically intense than plant marijuana use. To date, long-term effects of marijuana concentrate use are not yet fully known; but, the effects of plant marijuana use are known. These effects include paranoia, anxiety, panic attacks, and hallucinations. Additionally, the use of plant marijuana increases one’s heart rate and blood pressure. Plant marijuana users may also experience withdrawal and addiction problems.

Source: Drugs of abuse: A DEA resource guide (DEA, 2017)

Additional information: National Institute on Drug Abuse (NIDA), Cannabis (Marijuana).

Assignment films and discussion boards are part of the policy chapter. Recently, I watched the marijuana episode the one Netflix series “Explained” which I found interesting and useful. Here is some information on this episode: Vox, The world’s weed market is rapidly changing. Most people have no idea what they’re buying.
3.10 STEROIDS

WHAT ARE STEROIDS?

Anabolic steroids are synthetically produced variants of the naturally occurring male hormone testosterone that are abused in an attempt to promote muscle growth, enhance athletic or other physical performance, and improve physical appearance. Testosterone, nandrolone, stanozolol, methandienone, and boldenone are some of the most frequently abused anabolic steroids.

WHAT IS THEIR ORIGIN?

Most illicit steroids are smuggled into the U.S. from abroad. Steroids are also illegally diverted from legitimate sources (theft or inappropriate prescribing). The Internet is the most widely used means of buying and selling anabolic steroids. Steroids are also bought and sold at gyms, bodybuilding competitions, and schools from teammates, coaches, and trainers.

What are common street names?

Common street names include: Arnolds, Juice, Pumpers, Roids, Stackers, and Weight Gainers.
What do they look like?

Steroids are available in tablets and capsules, sublingual-tablets, liquid drops, gels, creams, transdermal patches, subdermal implant pellets, and water-based and oil-based injectable solutions. The appearance of these products varies depending on the type and manufacturer.
How are they abused?

Steroids are ingested orally, injected intramuscularly, or applied to the skin. The doses abused are often 10 to 100 times higher than the approved therapeutic and medical treatment dosages. Users typically take two or more anabolic steroids at the same time in a cyclic manner, believing that this will improve their effectiveness and minimize the adverse effects.

What is their effect on the mind?

Case studies and scientific research indicate that high doses of anabolic steroids may cause mood and behavioral effects. In some individuals, steroid use can cause dramatic mood swings, increased feelings of hostility, impaired judgment, and increased levels of aggression (often referred to as “roid rage”). When users stop taking steroids, they may experience depression that may be severe enough to lead one to commit suicide. Anabolic steroid use may also cause psychological dependence and addiction.

What is their effect on the body?

A wide range of adverse effects is associated with the
use or abuse of anabolic steroids. These effects depend on several factors including age, sex, the anabolic steroid used, amount used, and duration of use. In adolescents, anabolic steroid use can stunt the ultimate height that an individual achieves. In boys, steroid use can cause early sexual development, acne, and stunted growth. In adolescent girls and women, anabolic steroid use can induce permanent physical changes, such as deepening of the voice, increased facial and body hair growth, menstrual irregularities, male pattern baldness, and lengthening of the clitoris. In men, anabolic steroid use can cause shrinkage of the testicles, reduced sperm count, enlargement of the male breast tissue, sterility, and an increased risk of prostate cancer.

In both men and women, anabolic steroid use can cause high cholesterol levels, which may increase the risk of coronary artery disease, strokes, and heart attacks. Anabolic steroid use can also cause acne and fluid retention. Oral preparations of anabolic steroids, in particular, can damage the liver. Users who inject steroids run the risk of contracting various infections due to non-sterile injection techniques, sharing of contaminated needles, and the use of steroid preparations manufactured in non-sterile environments. All these factors put users at risk for contracting viral infections such as HIV/AIDS or hepatitis B or C, and bacterial infections at the site of injection. Users may also develop endocarditis, a bacterial infection that causes a potentially fatal inflammation of the heart lining.
What are their overdose effects?

Anabolic steroids are not associated with overdoses. The adverse effects a user would experience develop from the use of steroids over time.

Which drugs cause similar effects?

There are several substances that produce effects similar to those of anabolic steroids. These include human growth hormone (HGH), clenbuterol, gonadotropins, and erythropoietin.

What is their legal status in the United States?

Anabolic steroids are Schedule III substances under the Controlled Substances Act. Only a small number of anabolic steroids are approved for either human or veterinary use. Steroids may be prescribed by a licensed physician for the treatment of testosterone deficiency, delayed puberty, low red blood cell count, breast cancer, and tissue wasting resulting from AIDS.

Source: Drugs of abuse: A DEA resource guide (DEA, 2017)

Film for Assignment:
3.11 INHALANTS

WHAT ARE INHALANTS?

Inhalants are invisible, volatile substances found in common household products that produce chemical vapors that are inhaled to induce psychoactive or mind-altering effects.

WHAT IS THEIR ORIGIN?

There are more than 1,000 products that are very dangerous when inhaled — things like typewriter correction fluid, air conditioning refrigerant, felt tip markers, spray paint, air freshener, butane, and even cooking spray. See products abused as inhalants at National TASC, 10 Most Common Household Products Used as Inhalants (National Inhalant Prevention Coalition).

What are common street names?

Common street names include: Gluey, Huff, Rush, and Whippets.
What do they look like?

Common household products such as glue, lighter fluid, cleaning fluids, and paint all produce chemical vapors that can be inhaled.

How are they abused?

Although other abused substances can be inhaled, the term “inhalants” is used to describe a variety of substances whose main common characteristic is that they are rarely, if ever, taken by any route other than inhalation.

Inhalants are breathed in through the nose or the mouth in a variety of ways, such as:

- “Sniffing” or “snorting”
- “Bagging” — sniffing or inhaling fumes from substances sprayed or deposited inside a plastic or paper bag
- “Huffing” from an inhalant-soaked rag stuffed in the mouth or inhaling from balloons filled with nitrous oxide

Inhalants are often among the first drugs that young children use. About 1 in 5 kids report having used inhalants by the eighth grade. Inhalants are also one of the few substances abused more by younger children than by older ones.
What is their effect on the mind?

Inhalant abuse can cause damage to the parts of the brain that control thinking, moving, seeing, and hearing. Cognitive abnormalities can range from mild impairment to severe dementia.

What is their effect on the body?

Inhaled chemicals are rapidly absorbed through the lungs into the bloodstream and quickly distributed to the brain and other organs. Nearly all inhalants produce effects similar to anesthetics, which slow down the body’s function. Depending on the degree of abuse, the user can experience slight stimulation, feeling of less inhibition, or loss of consciousness. Within minutes of inhalation, the user experiences intoxication along with other effects similar to those produced by alcohol.

These effects may include slurred speech, an inability to coordinate movements, euphoria, and dizziness. After heavy use of inhalants, users may feel drowsy for several hours and experience a lingering headache.

Additional symptoms exhibited by long-term inhalant users include:
• Weight loss, muscle weakness, disorientation, inattentiveness, lack of coordination, irritability,
depression, and damage to the nervous system and other organs.

Some of the damaging effects on the body may be at least partially reversible when inhalant abuse is stopped; however, many of the effects of prolonged abuse are irreversible.

Prolonged sniffing of the highly concentrated chemicals in solvents or aerosol sprays can induce irregular and rapid heart rhythms and lead to heart failure and death within minutes.

There is a common link between inhalant use and problems in school — failing grades, chronic absences, and general apathy.

Other signs include:

- Paint or stains on body or clothing; spots or sores around the mouth; red or runny eyes or nose; chemical breath odor; drunk, dazed, or dizzy appearance; nausea; loss of appetite; anxiety; excitability; and irritability.
What are their overdose effects?

Because intoxication lasts only a few minutes, users try to prolong the high by continuing to inhale repeatedly over the course of several hours, which is a very dangerous practice. With successive inhalations, users may suffer the loss of consciousness and/or death.

“Sudden sniffing death” can result from a single session of inhalant use by an otherwise healthy young person. Sudden sniffing death is particularly associated with the abuse of butane, propane, and chemicals in aerosols.

Inhalant abuse can also cause death by asphyxiation from repeated inhalations, which lead to high concentrations of inhaled fumes displacing the available oxygen in the lungs, suffocation by blocking air from entering the lungs when inhaling fumes from a plastic bag placed over the head, and choking from swallowing vomit after inhaling substances.

Which drugs cause similar effects?

Most inhalants produce a rapid high that is similar to the effects of alcohol intoxication.

What is their legal status in the United States?

The common household products that are misused as inhalants are legally available for their intended and legitimate uses. Many state legislatures have attempted to deter youth who buy legal products to get high by placing a restriction on the sale of these products to minors. Even though some substances are not currently controlled by the Controlled Substances Act, they pose risks to
individuals who abuse them.


Additional information [National Institute on Drug Abuse (NIDA), Inhalants](https://psu.pb.unizin.org/bbh143/?p=360#oembed-1)
3.12 DRUGS OF CONCERN

Even though some substances are not currently controlled by the Controlled Substances Act, they pose risks to individuals who abuse them. The following section describes these drugs of concern and their associated risks.

WHAT IS DXM?

DXM is a cough suppressor found in more than 120 over-the-counter (OTC) cold medications, either alone or in combination with other drugs such as analgesics (e.g., acetaminophen), antihistamines (e.g., chlorpheniramine), decongestants (e.g., pseudoephedrine), and/or expectorants (e.g., guaifenesin). The typical adult dose for cough is 15 or 30 mg taken three to four times daily. The cough-suppressing effects of DXM persist for 5 to 6 hours after ingestion. When taken as directed, side effects are rarely observed.

WHAT IS ITS ORIGIN?

DXM users can obtain the drug at almost any pharmacy
or supermarket, seeking out the products with the highest concentration of the drug from among all the OTC cough and cold remedies that contain it. DXM products and powder can also be purchased on the Internet.

**What are common street names?**

Common street names include: CCC, Dex, DXM, Poor Man’s PCP, Robo, Rojo, Skittles, Triple C, and Velvet.

**What does it look like?**

DXM can come in the form of cough syrup, tablets, capsules, or powder.

**How is it abused?**

DXM is abused in high doses to experience euphoria and visual and auditory hallucinations. Users take various amounts depending on their body weight and the effect they are attempting to achieve. Some users ingest 250 to 1,500 milligrams in a single dosage, far more than the recommended therapeutic dosages described above.

Illicit use of DXM is referred to on the street as “Robotripping”, “skittling”, or “dexing”. The first two terms are derived from the products that are most commonly abused, Robitussin and Coricidin HBP. DXM abuse has traditionally involved drinking large volumes of the OTC liquid cough preparations. More recently, however, abuse of tablet and gel capsule preparations has increased.

These newer, high-dose DXM products have particular appeal for users. They are much easier to consume,
eliminate the need to drink large volumes of unpleasant-tasting syrup, and are easily portable and concealed, allowing an abuser to continue to abuse DXM throughout the day, whether at school or work.

DXM powder, sold over the Internet, is also a source of DXM for abuse. (The powdered form of DXM poses additional risks to the user due to the uncertainty of composition and dose.) DXM is also distributed in illicitly manufactured tablets containing only DXM or mixed with other drugs such as pseudoephedrine and/or methamphetamine. DXM is abused by individuals of all ages, but its abuse by teenagers and young adults is of particular concern. This abuse is fueled by DXM’s OTC availability and extensive “how-to” abuse information on various websites.

What is its effect on the mind?

Some of the many psychoactive effects associated with high-dose DXM include: Confusion, inappropriate laughter, agitation, paranoia, and hallucinations. Other sensory changes, including the feeling of floating and changes in hearing and touch. Long-term abuse of DXM is associated with severe psychological dependence. Abusers of DXM describe the following four dose-dependent “plateaus”:
<table>
<thead>
<tr>
<th>PLATEAU</th>
<th>DOSE (MG)</th>
<th>BEHAVIORAL EFFECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>100 - 200</td>
<td>Mild stimulation</td>
</tr>
<tr>
<td>2nd</td>
<td>200 - 400</td>
<td>Euphoria and hallucinations</td>
</tr>
<tr>
<td>3rd</td>
<td>300-600</td>
<td>Distorted visual perceptions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Loss of motor coordination</td>
</tr>
<tr>
<td>4th</td>
<td>500 - 1500</td>
<td>Out-of-body sensations</td>
</tr>
</tbody>
</table>

**What is its effect on the body?**

DXM intoxication involves:
Over-excitability, lethargy, loss of coordination, slurred speech, sweating, hypertension, and involuntary spasmodic movement of the eyeballs. The use of high doses of DXM in combination with alcohol or other drugs is particularly dangerous, and deaths have been reported. Approximately 5-10 percent of Caucasians are poor DXM metabolizers and at increased risk for overdoses and deaths. DXM taken with antidepressants can be life-threatening. OTC products that contain DXM often contain other ingredients such as acetaminophen, chlorpheniramine, and guaifenesin that have their own effects, such as liver damage, rapid heart rate, lack of coordination, vomiting, seizures, and coma. To circumvent the many side effects associated with these other ingredients, a simple chemical extraction procedure has been developed and published on the Internet that removes most of these other ingredients in cough syrup.

**What are its overdose effects?**

DXM overdose can be treated in an emergency room
setting and generally does not result in severe medical consequences or death. Most DXM-related deaths are caused by ingesting the drug in combination with other drugs. DXM-related deaths also occur from impairment of the senses, which can lead to accidents. In 2003, a 14-year-old boy in Colorado who abused DXM died when he was hit by two cars as he attempted to cross a highway. State law enforcement investigators suspect that the drug affected the boy’s depth perception and caused him to misjudge the distance and speed of the oncoming vehicles.

Which drugs cause similar effects?

Depending on the dose, DXM can have effects similar to marijuana or ecstasy. In high doses, its out-of-body effects are similar to those of ketamine or PCP.

What is its legal status in the United States?

DXM is a legally marketed cough suppressant that is neither a controlled substance nor a regulated chemical under the Controlled Substances Act.

Kratom

WHAT IS KRATOM?

Kratom is a tropical tree native to Southeast Asia. Consumption of its leaves produces both stimulant effects (in low doses) and sedative effects (in high doses), and can lead to psychotic symptoms, and psychological and physiological dependence. The psychoactive
ingredient is found in the leaves of the kratom tree. These leaves are subsequently crushed and then smoked, brewed with tea, or placed into gel capsules. Kratom has a long history of use in Southeast Asia, where it is commonly known as thang, kakuam, thom, ketum, and biak. In the U.S., the abuse of kratom has increased markedly in recent years.

How is it abused?

Mostly abused by oral ingestion in the form of a tablet, capsule, or extract. Kratom leaves may also be dried or powdered and ingested as a tea, or the kratom leaf may be chewed.

What are the effects?

At low doses, kratom produces stimulant effects with users reporting increased alertness, physical energy, and talkativeness. At high doses, users experience sedative effects. Kratom consumption can lead to addiction.
Several cases of psychosis resulting from the use of kratom have been reported, where individuals addicted to kratom exhibited psychotic symptoms, including hallucinations, delusion, and confusion.

What does it do to your body?

Kratom’s effects on the body include nausea, itching, sweating, dry mouth, constipation, increased urination, tachycardia, vomiting, drowsiness, and loss of appetite. Users of kratom have also experienced anorexia, weight loss, insomnia, hepatotoxicity, seizure, and hallucinations.

What is its legal status?

Kratom is not controlled under the Federal Controlled Substances Act; however, there may be some state regulations or prohibitions against the possession and use of kratom. The FDA has not
approved Kratom for any medical use. In addition, DEA has listed kratom as a Drug and Chemical of Concern.

WHAT IS SALVIA DIVINORUM?

Salvia divinorum is a perennial herb in the mint family that is abused for its hallucinogenic effects.

WHAT IS ITS ORIGIN?

Salvia is native to certain areas of the Sierra Mazaleca region of Oaxaca, Mexico. It is one of several plants that are used by Mazatec Indians for ritual divination. Salvia divinorum plants can be grown successfully outside of this region. They can be grown indoors and outdoors, especially in humid semitropical climates.

What are common street names?

Common street names include:

- Maria Pastora, Sally-D, and Salvia.

What does it look like?

The plant has spade-shaped variegated green leaves that look similar to mint. The plants themselves grow to more than three feet high, have large green leaves, hollow square stems, and white flowers with purple calyces.

How is it abused?

Salvia can be chewed, smoked, or vaporized.
What is its effect on the mind?

Psychic effects include perceptions of bright lights, vivid colors, shapes, and body movement, as well as body or object distortions. Salvia divinorum may also cause fear and panic, uncontrollable laughter, a sense of overlapping realities, and hallucinations. Salvinorin A is believed to be the ingredient responsible for the psychoactive effects of Salvia divinorum.

What is its effect on the body?

Adverse physical effects may include:

- Loss of coordination, dizziness, and slurred speech

Which drugs cause similar effects?

When Salvia divinorum is chewed or smoked, the hallucinogenic effects elicited are similar to those induced by other Scheduled hallucinogenic substances.

What is its legal status in the United States?

Neither Salvia divinorum nor its active constituent Salvinorin A has an approved medical use in the United States. Salvia is not controlled under the Controlled Substances Act. Salvia divinorum is, however, controlled by a number of states. Since Salvia is not controlled by
the CSA, some online botanical companies and drug promotional sites have advertised Salvia as a legal alternative to other plant hallucinogens like mescaline.

Recently, the abuse of clandestinely synthesized drugs has re-emerged as a major worldwide problem. These drugs are illicitly produced with the intent of developing substances that differ slightly from controlled substances in their chemical structure while retaining their pharmacological effects. These substances are commonly known as designer drugs and fall under several drug categories. The following section describes these drugs of concern and their associated risks.

Bath Salts or Designer Cathinones

(Synthetic Stimulants)
WHAT ARE “BATH SALTS”?

Synthetic stimulants often referred to as “bath salts” are from the synthetic cathinone class of drugs. Synthetic cathinones are central nervous stimulants and are designed to mimic effects similar to those produced by cocaine, methamphetamine, and MDMA (ecstasy). These substances are often marketed as “bath salts,” “research chemicals,” “plant food,” “glass cleaner,” and labeled “not for human consumption,” in
order to circumvent the application of the Controlled Substance Analogue Enforcement Act. Marketing in this manner attempts to hide the true reason for the products’ existence—the distribution of a psychoactive/stimulant substance for abuse.

WHAT IS THEIR ORIGIN?

Synthetic cathinones are manufactured in East Asia and have been distributed at wholesale levels throughout Europe, North America, Australia, and other parts of the world.

What are common street names?

What does it look like?

Websites have listed products containing these synthetic stimulants as “plant food” or “bath salts,” however, the powdered form is also compressed in gelatin capsules. The synthetic stimulants are sold in smoke shops, head shops, convenience stores, adult bookstores, gas stations, and on Internet sites and often labeled “not for human consumption.”

How are they abused?

“Bath salts” are usually ingested by sniffing/snorting. They can also be taken orally, smoked, or put into a solution and injected into veins.

What is their effect on the mind?

These synthetic substances are abused for their desired effects, such as euphoria and alertness. Other effects that have been reported from the use of these drugs include psychological effects such as confusion, acute psychosis, agitation, combativeness, aggressive, violent, and self-destructive behavior.
What is their effect on the body?

Adverse or toxic effects associated with the abuse of cathinones, including synthetic cathinones, include rapid heartbeat; hypertension; hyperthermia; prolonged dilation of the pupil of the eye; breakdown of muscle fibers that leads to release of muscle fiber contents into the bloodstream; teeth grinding; sweating; headaches; palpitations; seizures; as well as paranoia, hallucinations, and delusions.

What are their overdose effects?

In addition to the effects above, reports of death from individuals abusing drugs in this class indicate the seriousness of the risk users are taking when ingesting these products.

Which drugs cause similar effects?

They cause effects similar to those of other stimulants such as methamphetamine, MDMA, and cocaine.

What is their legal status in the United States?

In July 2012, the U.S. Government passed Pub.L. 112-144, the Synthetic Drug Abuse Prevention Act (SDAPA), that classified a number of synthetic substances under Schedule I of the Controlled Substances Act. SDAPA placed these substances in the most restrictive category of controlled substances. Cannabimimetic agents, including 15 synthetic cannabinoid compounds identified by name, two synthetic cathinone compounds (mephedrone and
MDPV), and nine synthetic hallucinogens known as the 2C family, are now restricted by this law. In addition, methylone was permanently controlled by DEA through the administrative process, and another 10 synthetic cathinones became subject to temporary control. Other synthetic cathinones may be subject to prosecution under the Controlled Substance Analogue Enforcement Act which allows these dangerous substances to be treated as Schedule I controlled substances if certain criteria can be met.

**K2 / Spice**

**WHAT IS K2?**

K2 and Spice are just two of the many trade names or brands for synthetic designer drugs that are intended to mimic THC, the main active ingredient of marijuana. These designer synthetic drugs are from the synthetic cannabinoid class of drugs that are often marketed and sold under the guise of “herbal incense” or “potpourri”.

Synthetic cannabinoids are not organic but are chemical compounds created in a laboratory. Since 2009, law enforcement has encountered numerous different synthetic cannabinoids that are being sold as “legal” alternatives to marijuana. These products are being abused for their psychoactive properties and are packaged without information as to their health and safety risks.

Synthetic cannabinoids are sold as “herbal incense” and “potpourri” under names like K2 and Spice, as well as
many other names, at small convenience stores, head shops, gas stations, and via the Internet from both domestic and international sources. These products are labeled “not for human consumption” in an attempt to shield the manufacturers, distributors, and retail sellers from criminal prosecution. This type of marketing is nothing more than a means to make dangerous, psychoactive substances widely available to the public.

WHAT IS ITS ORIGIN?

The vast majority of synthetic cannabinoids are manufactured in Asia without manufacturing requirements or quality control standards. The bulk products are smuggled into the United States typically as misbranded imports and have no legitimate medical or industrial use.

What are common street names?

There are numerous and various street names of synthetic cannabinoids as drug manufacturers try to appeal and entice youth and young adults by labeling these products with exotic and extravagant names. Some of the many street names of synthetic marijuana are: “Spice,” “K2,” Blaze, RedX Dawn, Paradise, Demon, Black Magic, Spike, Mr. Nice Guy, Ninja, Zohai, Dream, Genie, Sense, Smoke, Skunk, Serenity, Yucatan, Fire, and Crazy Clown.
What does it look like?

These chemical compounds are generally found in bulk powder form and then dissolved in solvents, such as acetone, before being applied to dry plant material to make the “herbal incense” products. After local distributors apply the drug to the dry plant material, they package it for retail distribution, again without pharmaceutical-grade chemical purity standards, as these have no accepted medical use, and ignoring any control mechanisms to prevent contamination or to ensure a consistent, uniform concentration of the powerful and dangerous drug in each package.

How is it abused?

Spraying or mixing the synthetic cannabinoids on plant material provides a vehicle for the most common route of administration – smoking (using a pipe, a water pipe, or rolling the drug-laced plant material in cigarette papers). In addition to the cannabinoids laced on plant material and sold as potpourri and incense, liquid cannabinoids have been designed to be vaporized through both disposable and reusable electronic cigarettes.

What are its overdose effects?

Overdose deaths have been attributed to the abuse of synthetic cannabinoids, including death by a heart attack. Acute kidney injury requiring hospitalization and dialysis in several patients reportedly having smoked synthetic cannabinoids has also been reported by the Centers for Disease Control and Prevention.
Which drugs cause similar effects?

THC, the main psychoactive constituent of marijuana.

What is its effect on the mind?

Acute psychotic episodes, dependence, and withdrawal are associated with the use of these synthetic cannabinoids. Some individuals have suffered from intense hallucinations. Other effects include severe agitation, disorganized thoughts, paranoid delusions, and violence after smoking products laced with these substances.

What is its effect on the body?

State public health and poison centers have issued warnings in response to adverse health effects associated with abuse of herbal incense products containing these synthetic cannabinoids. These adverse effects included tachycardia (elevated heart rate), elevated blood pressure, unconsciousness, tremors, seizures, vomiting, hallucinations, agitation, anxiety, pallor, numbness, and tingling. This is in addition to the numerous public health and poison centers which have similarly issued warnings regarding the abuse of these synthetic cannabinoids.

What is its legal status in the United States?

These substances have no accepted medical use in the United States and have been reported to produce adverse health effects. Currently, 26 substances are specifically
listed as Schedule I substances under the Controlled Substances Act either through legislation or regulatory action. In addition, there are many other synthetic cannabinoids that meet the definition for “cannabimimetic agent” under the Controlled Substances Act and thus are Schedule I substances.

There are many synthetic cannabinoid substances that are being sold as “incense,” “potpourri,” and other products that are not controlled substances. However, synthetic cannabinoids may be subject to prosecution under the Controlled Substance Analogue Enforcement Act which allows non-controlled drugs to be treated as Schedule I controlled substances if certain criteria can be met. The DEA has successfully investigated and prosecuted individuals trafficking and selling these dangerous substances using the Controlled Substance Analogue Enforcement Act.

**Synthetic Opioids**

**WHAT IS THEIR ORIGIN?**

Synthetic opioids are believed to be synthesized abroad and then imported into the United States.

**What do they look like?**

Clandestinely produced synthetic opioids have been encountered in powder form and were identified on bottle caps and spoons, detected within glassine bags, on digital scales, and on sifters which demonstrates the abuse of these substances as replacements for heroin or
other opioids. These drugs are also encountered as tablets, mimicking pharmaceutical opioid products. Clandestinely produced synthetic opioids are encountered as a single substance in combination with other opioids (fentanyl, heroin, U-47700) or other substances.

How are they abused?

Abuse of clandestinely produced synthetic opioids parallels that of heroin and prescription opioid analgesics. Many of these illicitly produced synthetic opioids are more potent than morphine and heroin and thus have the potential to result in a fatal overdose.

WHAT ARE SYNTHETIC OPIOIDS?

Synthetic opioids are substances that are synthesized in a laboratory and that act on the same targets in the brain as natural opioids (e.g., morphine and codeine) to produce analgesic (pain relief) effects. In contrast, natural opioids are naturally occurring substances extracted from the seed pod of certain varieties of poppy plants. Some synthetic opioids, such as fentanyl and methadone, have been approved for medical use.

Clandestinely produced synthetic opioids structurally related to the Schedule II opioid analgesic fentanyl were trafficked and abused on the West Coast in the late 1970s and 1980s. In the 1980s, DEA controlled several of these illicitly produced synthetic opioids such as alpha-methylfentanyl, 3-methylthiofentanyl, acetyl-alpha-methylfentanyl, beta-hydroxy-3-methylfentanyl,
alpha-methylthiofentanyl, thiofentanyl, beta-hydroxyfentanyl, para-fluorofentanyl, and 3-methylfentanyl.

As of 2013, there has been a re-emergence in the trafficking and abuse of various clandestinely produced synthetic opioids, including several substances related to fentanyl. Some common illicitly produced synthetic opioids that are currently encountered by law enforcement include, but are not limited to, acetylfentanyl, butyrylfentanyl, betahydroxythiofentanyl, furanyl fentanyl, 4-fluoroisobutyrylfentanyl, acrylfentanyl, and U-47700. Clandestinely produced counterfeit oxycodone tablets that contain fentanyl. Opioid powder U-47700.

What are their effects?

Some effects of clandestinely produced synthetic opioids, similar to other commonly used opioid analgesics (e.g., morphine), may include relaxation, euphoria, pain relief, sedation, confusion, drowsiness, dizziness, nausea, vomiting, urinary retention, pupillary constriction, and respiratory depression.

What are their overdose effects?

Overdose effects of clandestinely produced synthetic opioids are similar to other opioid analgesics. These effects may include stupor, changes in pupillary size, cold and clammy skin, cyanosis, coma, and respiratory failure leading to death. The presence of the triad of
symptoms such as coma, pinpoint pupils, and respiratory depression are strongly suggestive of opioid poisoning.

Which drugs cause similar effects?

Some drugs that cause similar effects include other opioids such as morphine, hydrocodone, oxycodone, hydromorphone, methadone, and heroin.

What is their legal status in the United States?

Several synthetic opioids are currently controlled under the Controlled Substances Act. Recently, the DEA temporarily placed U-47700 and several other substances that are structurally related to fentanyl, such as acetyl fentanyl, butyryl fentanyl, beta-hydroxythiofentanyl, and furanyl fentanyl, in Schedule I of the Controlled Substances Act. Other synthetic opioid substances may be subject to prosecution under the Controlled Substance Analogue Enforcement Act which allows non-controlled substances to be treated as Schedule I substances if certain criteria are met. The DEA has successfully investigated and prosecuted individuals trafficking and selling these dangerous substances using the Controlled Substances Analogue Enforcement Act.

CHAPTER 4:
PREScriptions, 
OVER THE 
COUNTER (OTC), 
SUPPLEMENTS 
(MedicationS 
AND 
SUPPLEMENTS)

Introduction

In this chapter, we explore a variety of medications and supplements to help us understand their impact on physical and mental well-being. We will review what type of medications are used for psychological disorders, which over-the-counter medicines may be appropriate for health concerns, and which supplements people are using for health and well-being. In addition, we will examine the drug development process and the phases of
clinical trials to learn how medications and supplements are tested and approved for human consumption.
CHAPTER OBJECTIVES

Learning Objectives

By the end of this chapter you should be able to:

1. Classify commonly used medications for psychological well-being.
2. Explain the process and stages of the drug approval process.
3. Recognize the possible side effects of psychoactive medications.
4. Distinguish over-the-counter medications from prescriptions.
5. List over-the-counter medications which tend to be abused.
6. Assess the benefits and side effects of OTC painkillers.
7. Define types of dietary supplements.
8. Appraise supplements effectiveness, safety concerns and interactions with medications.
9. Select vitamins, minerals, herbs, and plants useful for personal health and well-being.
Mental Health Medications

Overview

Medications can play a role in treating several mental disorders and conditions. Treatment may also include psychotherapy (also called “talk therapy”) and brain stimulation therapies (less common). In some cases, psychotherapy alone may be the best treatment option. Choosing the right treatment plan should be based on a person’s individual needs and medical situation and under a mental health professional’s care.
The National Institute of Mental Health (NIMH), a federal research agency, does not provide medical advice or referrals. Resources that may help you find treatment services in your area are listed on our Help for Mental Illnesses web page.

NIMH also does not endorse or recommend any particular drug, herb, or supplement. Results from NIMH-supported clinical research trials (What are Clinical Research Trials?) that examine the effectiveness of treatments, including medications, are reported in the medical literature. This health topic webpage is intended to provide basic information about mental health medications. It is not a complete source for all medications available and should not be used as a guide for making medical decisions.

Information about medications changes frequently. Check the U.S. Food and Drug Administration (FDA) website for the latest warnings, patient medication guides, or newly approved medications. Brand names are not referenced on this page, but you can search by brand name on MedlinePlus Drugs, Herbs and Supplements Drugs website. The MedlinePlus website also provides additional information about each medication, including side effects and FDA warnings.

Understanding Your Medications

If you are prescribed a medication, be sure that you:

- Tell the doctor about all medications and vitamin supplements you are already taking.
- Remind your doctor about any allergies and any
problems you have had with medicines.
• Understand how to take the medicine before you start using it and take your medicine as instructed.
• Don’t take medicines prescribed for another person or give yours to someone else.
• Call your doctor right away if you have any problems with your medicine or if you are worried that it might be doing more harm than good. Your doctor may be able to adjust the dose or change your prescription to a different one that may work better for you.
• Report serious side effects to the FDA MedWatch Adverse Event Reporting program online at [U.S. Food & Drug (FDA), MedWatch: The FDA Safety Information and Adverse Event Reporting Program] or by phone [1-800-332-1088]. You or your doctor may send a report.

Antidepressants

What are antidepressants?

Antidepressants are medications commonly used to treat depression. Antidepressants are also used for other health conditions, such as anxiety, pain, and insomnia. Although antidepressants are not FDA-approved specifically to treat ADHD, antidepressants are sometimes used to treat ADHD in adults.

The most popular types of antidepressants are called
selective serotonin reuptake inhibitors (SSRIs). Explore the information on these SSRI examples:

- **Fluoxetine** (ex. Prozac)
- **Citalopram** (ex. Celexa)
- **Sertraline** (ex. Zoloft)
- **Paroxetine** (ex. Paxil)
- **Escitalopram** (ex. Lexapro)

Other types of antidepressants are serotonin and norepinephrine reuptake inhibitors (SNRIs). SNRIs are similar to SSRIs and include **venlafaxine** (ex. Effexor) and **duloxetine** (ex. Cymbalta).

Another antidepressant that is commonly used is bupropion. **Bupropion** is a third type of antidepressant which works differently than either SSRIs or SNRIs. Bupropion is also used to treat seasonal affective disorder and to help people stop smoking.

SSRIs, SNRIs, and bupropion are popular because they do not cause as many side effects as older classes of antidepressants, and seem to help a broader group of depressive and anxiety disorders. Older antidepressant medications include tricyclics, tetracyclics, and monoamine oxidase inhibitors (MAOIs). For some people, tricyclics, tetracyclics, or MAOIs may be the best medications.

**How do people respond to antidepressants?**

According to a research review by the [Agency for Healthcare Research and Quality](https://www.ahrq.gov), all antidepressant medications work about as well as each other to improve symptoms of depression and to keep depression
symptoms from coming back. For reasons not yet well understood, some people respond better to some antidepressant medications than to others.

Therefore, it is important to know that some people may not feel better with the first medicine they try and may need to try several medicines to find the one that works for them. Others may find that a medicine helped for a while, but their symptoms came back. It is important to carefully follow your doctor’s directions for taking your medicine at an adequate dose and over an extended period of time (often 4 to 6 weeks) for it to work.

Once a person begins taking antidepressants, it is important to not stop taking them without the help of a doctor. Sometimes people taking antidepressants to feel better and stop taking the medication too soon, and the depression may return. When it is time to stop the medication, the doctor will help the person slowly and safely decrease the dose. It’s important to give the body time to adjust to the change. People don’t get addicted (or “hooked”) on these medications, but stopping them abruptly may also cause withdrawal symptoms.

What are the possible side effects of antidepressants?

Some antidepressants may cause more side effects than others. You may need to try several different antidepressant medications before finding the one that improves your symptoms and that causes side effects that you can manage.

The most common side effects listed by the FDA include:
- Nausea and vomiting
- Weight gain
- Diarrhea
- Sleepiness
- Sexual problems

Call your doctor right away if you have any of the following symptoms, especially if they are new, worsening, or worry you (U.S. Food and Drug Administration, 2011):

- Thoughts about suicide or dying
- Attempts to commit suicide
- New or worsening depression
- New or worsening anxiety
- Feeling very agitated or restless
- Panic attacks
- Trouble sleeping (insomnia)
- New or worsening irritability
- Acting aggressively, being angry, or violent
- Acting on dangerous impulses
- An extreme increase in activity and talking (mania)
- Other unusual changes in behavior or mood

Combining the newer SSRI or SNRI antidepressants with one of the commonly-used “triptan” medications used to treat migraine headaches could cause a life-threatening illness called “serotonin syndrome.” A person with serotonin syndrome may be agitated, have hallucinations (see or hear things that are not real), have a high temperature, or have unusual blood pressure changes. Serotonin syndrome is usually associated with the older
antidepressants called MAOIs, but it can happen with the newer antidepressants as well if they are mixed with the wrong medications. For more information, please see the FDA Medication Guide on Antidepressant Medicines.

Antidepressants may cause other side effects that were not included in this list. To report any serious adverse effects associated with the use of antidepressant medicines, please contact the FDA MedWatch program using the contact information at the bottom of this page. For more information about the risks and side effects for each medication, please see Drugs@FDA.

**Anti-Anxiety Medications**

*What are anti-anxiety medications?*

Anti-anxiety medications help reduce the symptoms of anxiety, such as panic attacks, or extreme fear and worry. The most common anti-anxiety medications are called benzodiazepines. Benzodiazepines can treat generalized anxiety disorder. In the case of panic disorder or social phobia (social anxiety disorder), benzodiazepines are usually second-line treatments, behind SSRIs or other antidepressants.

Benzodiazepines used to treat anxiety disorders include:

- Clonazepam
- Alprazolam
- Lorazepam

Short half-life (or short-acting) benzodiazepines (such as Lorazepam) and beta-blockers are used to treat the short-
term symptoms of anxiety. Beta-blockers help manage physical symptoms of anxiety, such as trembling, rapid heartbeat, and sweating that people with phobias (an overwhelming and unreasonable fear of an object or situation, such as public speaking) experience in difficult situations. Taking these medications for a short period of time can help the person keep physical symptoms under control and can be used “as needed” to reduce acute anxiety. **Buspirone** (which is unrelated to the benzodiazepines) is sometimes used for the long-term treatment of chronic anxiety. In contrast to the benzodiazepines, buspirone must be taken every day for a few weeks to reach its full effect. It is not useful on an “as-needed” basis.

**How do people respond to anti-anxiety medications?**

Anti-anxiety medications such as benzodiazepines are effective in relieving anxiety and take effect more quickly than the antidepressant medications (or buspirone) often prescribed for anxiety. However, people can build up a tolerance to benzodiazepines if they are taken over a long period of time and may need higher and higher doses to get the same effect. Some people may even become dependent on them. To avoid these problems, doctors usually prescribe benzodiazepines for short periods, a practice that is especially helpful for older adults (read the NIMH article: *Despite Risks, Benzodiazepine Use Highest in Older People*), people who have substance abuse problems and people who become dependent on medication easily. If people suddenly stop taking benzodiazepines, they may
have withdrawal symptoms or their anxiety may return. Therefore, benzodiazepines should be tapered off slowly.

**What are the possible side effects of anti-anxiety medications?**

Like other medications, anti-anxiety medications may cause side effects. Some of these side effects and risks are serious. The most common side effects of benzodiazepines are drowsiness and dizziness. Other possible side effects include:

- Nausea
- Blurred vision
- Headache
- Confusion
- Tiredness
- Nightmares

Tell your doctor if any of these symptoms are severe or do not go away:

- Drowsiness
- Dizziness
- Unsteadiness
- Problems with coordination
- Difficulty thinking or remembering
- Increased saliva
- Muscle or joint pain
- Frequent urination
- Blurred vision
- Changes in sex drive or ability (The American Society of Health-System Pharmacists, Inc, 2010)
If you experience any of the symptoms below, call your doctor immediately:

- Rash
- Hives
- Swelling of the eyes, face, lips, tongue, or throat
- Difficulty breathing or swallowing
- Hoarseness
- Seizures
- Yellowing of the skin or eyes
- Depression
- Difficulty speaking
- Yellowing of the skin or eyes
- Thoughts of suicide or harming yourself
- Difficulty breathing

Common side effects of beta-blockers include:

- Fatigue
- Cold hands
- Dizziness or light-headedness
- Weakness

Beta-blockers generally are not recommended for people with asthma or diabetes because they may worsen symptoms related to both.

Possible side effects from buspirone include:

- Dizziness
- Headaches
- Nausea
- Nervousness
- Lightheadedness
Excitement
Trouble sleeping

Anti-anxiety medications may cause other side effects that are not included in the lists above. To report any serious adverse effects associated with the use of these medicines, please contact the FDA MedWatch program using the contact information at the bottom of this page. For more information about the risks and side effects for each medication, please see Drugs@FDA.

Stimulants

What are Stimulants?

As the name suggests, stimulants increase alertness, attention, and energy, as well as elevate blood pressure, heart rate, and respiration (National Institute on Drug Abuse, 2014). Stimulant medications are often prescribed to treat children, adolescents, or adults diagnosed with ADHD.

Stimulants used to treat ADHD include:

- Methylphenidate
- Amphetamine
- Dextroamphetamine
- Lisdexamfetamine Dimesylate

Note: In 2002, the FDA approved the non-stimulant medication atomoxetine for use as a treatment for ADHD. Two other non-stimulant antihypertensive medications, clonidine and guanfacine, are also approved for the treatment of ADHD in children and adolescents.
One of these non-stimulant medications is often tried first in a young person with ADHD, and if the response is insufficient, then a stimulant is prescribed.

Stimulants are also prescribed to treat other health conditions, including narcolepsy, and occasionally depression (especially in older or chronically medically ill people and in those who have not responded to other treatments).

How do people respond to stimulants?

Prescription stimulants have a calming and “focusing” effect on individuals with ADHD. Stimulant medications are safe when given under a doctor’s supervision. Some children taking them may feel slightly different or “funny”.

Some parents worry that stimulant medications may lead to drug abuse or dependence, but there is little evidence of this when they are used properly as prescribed. Additionally, research shows that teens with ADHD who took stimulant medications were less likely to abuse drugs than those who did not take stimulant medications.

What are the possible side effects of stimulants?

Stimulants may cause side effects. Most side effects are minor and disappear when dosage levels are lowered. The most common side effects include:

- Difficulty falling asleep or staying asleep
- Loss of appetite
- Stomach pain
• Headache

Less common side effects include:

• Motor tics or verbal tics (sudden, repetitive movements or sounds)
• Personality changes, such as appearing “flat” or without emotion

Call your doctor right away if you have any of these symptoms, especially if they are new, become worse, or worry you.

Stimulants may cause other side effects that are not included in the list above. To report any serious adverse effects associated with the use of stimulants, please contact the FDA MedWatch program using the contact information at the bottom of this page. For more information about the risks and side effects for each medication, please see Drugs@FDA.

Antipsychotics

What are antipsychotics?

Antipsychotic medicines are primarily used to manage psychosis. The word “psychosis” is used to describe conditions that affect the mind, and in which there has been some loss of contact with reality, often including delusions (false, fixed beliefs) or hallucinations (hearing or seeing things that are not really there). It can be a symptom of a physical condition such as drug abuse or a mental disorder such as schizophrenia, bipolar disorder,
or very severe depression (also known as “psychotic depression”).

Antipsychotic medications are often used in combination with other medications to treat delirium, dementia, and mental health conditions, including:

- Attention-Deficit Hyperactivity Disorder (ADHD)
- Severe Depression
- Eating Disorders
- Post-traumatic Stress Disorder (PTSD)
- Obsessive-Compulsive Disorder (OCD)
- Generalized Anxiety Disorder

Antipsychotic medicines do not cure these conditions. They are used to help relieve symptoms and improve quality of life.

Older or first-generation antipsychotic medications are also called conventional “typical” antipsychotics or “neuroleptics”. Some of the common typical antipsychotics include:

- Chlorpromazine
- Haloperidol
- Perphenazine
- Fluphenazine

Newer or second-generation medications are also called “atypical” antipsychotics. Some of the common atypical antipsychotics include:

- Risperidone
- Olanzapine
According to a 2013 research review by the Agency for Healthcare Research and Quality, typical and atypical antipsychotics both work to treat symptoms of schizophrenia and the manic phase of bipolar disorder. Several atypical antipsychotics have a “broader spectrum” of action than the older medications and are used for treating bipolar depression or depression that has not responded to an antidepressant medication alone.

To find additional antipsychotics and other medications used to manage psychoses and current warnings and advisories, please visit the FDA website.

How do people respond to antipsychotics?

Certain symptoms, such as feeling agitated and having hallucinations, usually go away within days of starting an antipsychotic medication. Symptoms like delusions usually go away within a few weeks, but the full effects of the medication may not be seen for up to six weeks. Every patient responds differently, so it may take several trials of different antipsychotic medications to find the one that works best.

Some people may have a relapse—meaning their symptoms come back or get worse. Usually, relapses happen when people stop taking their medication, or when they only take it sometimes. Some people stop
taking the medication because they feel better or they may feel that they don't need it anymore, but no one should stop taking an antipsychotic medication without talking to his or her doctor. When a doctor says it is okay to stop taking a medication, it should be gradually tapered off— never stopped suddenly. Many people must stay on an antipsychotic continuously for months or years in order to stay well; treatment should be personalized for each individual.

What are the possible side effects of antipsychotics?

Antipsychotics have many side effects (or adverse events) and risks. The FDA lists the following side effects of antipsychotic medicines:

- Drowsiness
- Dizziness
- Restlessness
- Weight gain (the risk is higher with some atypical antipsychotic medicines)
- Dry mouth
- Constipation
- Nausea
- Vomiting
- Blurred vision
- Low blood pressure
- Uncontrollable movements, such as tics and tremors (the risk is higher with typical antipsychotic medicines)
- Seizures
- A low number of white blood cells, which fight
A person taking an atypical antipsychotic medication should have his or her weight, glucose levels, and lipid levels monitored regularly by a doctor.

Typical antipsychotic medications can also cause additional side effects related to physical movements, such as:

- Rigidity
- Persistent muscle spasms
- Tremors
- Restlessness

Long-term use of typical antipsychotic medications may lead to a condition called tardive dyskinesia (TD). TD causes muscle movements, commonly around the mouth, that a person can’t control. TD can range from mild to severe, and in some people, the problem cannot be cured. Sometimes people with TD recover partially or fully after they stop taking typical antipsychotic medication. People who think that they might have TD should check with their doctor before stopping their medication. TD rarely occurs while taking atypical antipsychotics.

Antipsychotics may cause other side effects that are not included in this list above. To report any serious adverse effects associated with the use of these medicines, please contact the [FDA MedWatch program](https://www.fda.gov/medwatch). For more information about the risks and side effects for antipsychotic medications, please visit [Drugs@FDA](https://www.drugsatfda.gov).
Mood Stabilizers

What are mood stabilizers?

Mood stabilizers are used primarily to treat bipolar disorder, mood swings associated with other mental disorders, and in some cases, to augment the effect of other medications used to treat depression. Lithium, which is an effective mood stabilizer, is approved for the treatment of mania and the maintenance treatment of a bipolar disorder. A number of cohort studies describe anti-suicide benefits of lithium for individuals on long-term maintenance. Mood stabilizers work by decreasing abnormal activity in the brain and are also sometimes used to treat:

- Depression (usually along with an antidepressant)
- Schizoaffective Disorder
- Disorders of impulse control
- Certain mental illnesses in children

Anticonvulsant medications are also used as mood stabilizers. They were originally developed to treat seizures, but they were found to help control unstable moods as well. One anticonvulsant commonly used as a mood stabilizer is valproic acid (also called divalproex sodium). For some people, especially those with “mixed” symptoms of mania and depression or those with a rapid-cycling bipolar disorder, valproic acid may work better than lithium. Other anticonvulsants used as mood stabilizers include:
Carbamazepine
Lamotrigine
Oxcarbazepine

What are the possible side effects of mood stabilizers?

Mood stabilizers can cause several side effects, and some of them may become serious, especially at excessively high blood levels. These side effects include:

- Itching, rash
- Excessive thirst
- Frequent urination
- Tremor (shakiness) of the hands
- Nausea and vomiting
- Slurred speech
- Fast, slow, irregular, or pounding heartbeat
- Blackouts
- Changes in vision
- Seizures
- Hallucinations (seeing things or hearing voices that do not exist)
- Loss of coordination
- Swelling of the eyes, face, lips, tongue, throat, hands, feet, ankles, or lower legs

If a person with bipolar disorder is being treated with lithium, he or she should visit the doctor regularly to check the lithium levels in his or her blood and make sure the kidneys and the thyroid are working normally.

Lithium is eliminated from the body through the kidney, so the dose may need to be lowered in older people with reduced kidney function. Also, loss of water
from the body, such as through sweating or diarrhea, can cause the lithium level to rise, requiring a temporary lowering of the daily dose. Although kidney functions are checked periodically during lithium treatment, actual damage of the kidney is uncommon in people whose blood levels of lithium have stayed within the therapeutic range.

Mood stabilizers may cause other side effects that are not included in this list. To report any serious adverse effects associated with the use of these medicines, please contact the FDA MedWatch program using the contact information at the bottom of this page. For more information about the risks and side effects for each individual medication, please see Drugs@FDA.

For more information on the side effects of Carbamazepine, Lamotrigine, and Oxcarbazepine, please visit MedlinePlus Drugs, Herbs and Supplements.

Some possible side effects linked anticonvulsants (such as valproic acid) include:

- Drowsiness
- Dizziness
- Headache
- Diarrhea
- Constipation
- Changes in appetite
- Weight changes
- Back pain
- Agitation
- Mood swings
- Abnormal thinking
- Uncontrollable shaking of a part of the body
• Loss of coordination
• Uncontrollable movements of the eyes
• Blurred or double vision
• Ringing in the ears
• Hair loss

These medications may also:

• Cause damage to the liver or pancreas, so people taking it should see their doctors regularly
• Increase testosterone (a male hormone) levels in teenage girls and lead to a condition called polycystic ovarian syndrome (a disease that can affect fertility and make the menstrual cycle become irregular)

Medications for common adult health problems, such as diabetes, high blood pressure, anxiety, and depression may interact badly with anticonvulsants. In this case, a doctor can offer other medication options.

For more information about the risks and side effects for each medication, please see Drugs@FDA.

Special Groups: Children, Older Adults, Pregnant Women

All types of people take psychiatric medications, but some groups have special needs, including:

• Children and adolescents
• Older adults
• Women who are pregnant or who may become pregnant
Children and Adolescents

Many medications used to treat children and adolescents with mental illness are safe and effective. However, some medications have not been studied or approved for use with children or adolescents.

Still, a doctor can give a young person an FDA-approved medication on an “off-label” basis. This means that the doctor prescribes the medication to help the patient even though the medicine is not approved for the specific mental disorder that is being treated or for use by patients under a certain age. Remember:

- It is important to watch children and adolescents who take these medications on an “off-label” basis.
- Children may have different reactions and side effects than adults.
- Some medications have current FDA warnings about potentially dangerous side effects for younger patients.

In addition to medications, other treatments for children and adolescents should be considered, either to be tried first, with medication added later if necessary, or to be provided along with medication. Psychotherapy, family therapy, educational courses, and behavior management techniques can help everyone involved cope with disorders that affect a child’s mental health. Read more about child and adolescent mental health research.
Older Adults

People over 65 have to be careful when taking medications, especially when they’re taking many different drugs. Older adults have a higher risk of experiencing bad drug interactions, missing doses or overdosing.

Older adults also tend to be more sensitive to medications. Even healthy older people react to medications differently than younger people because older people’s bodies process and eliminate medications more slowly. Therefore, lower or less frequent doses may be needed for older adults. Before starting a medication, older people and their family members should talk carefully with a physician about whether a medication can affect alertness, memory, or coordination, and how to help ensure that prescribed medications do not increase the risk of falls.

Sometimes memory problems affect older people who take medications for mental disorders. An older adult may forget his or her regular dose and take too much or not enough. A good way to keep track of medicine is to use a seven-day pillbox, which can be bought at any pharmacy. At the beginning of each week, older adults and their caregivers fill the box so that it is easy to remember what medicine to take. Many pharmacies also have pillboxes with sections for medications that must be taken more than once a day.

For more information and practical tips to help older people take their medicines safely, please see the National Institute on Aging’s Safe Use of Medicines booklet and Taking Medicines on NIHSeniorHealth.gov.
Women who are pregnant or who may become pregnant

The research on the use of psychiatric medications during pregnancy is limited. The risks are different depending on which medication is taken, and at what point during the pregnancy the medication is taken. Decisions on treatments for all conditions during pregnancy should be based on each woman’s needs and circumstances, and based on a careful weighing of the likely benefits and risks of all available options, including psychotherapy (or “watchful waiting” during part or all of the pregnancy), medication, or a combination of the two. While no medication is considered perfectly safe for all women at all stages of pregnancy, this must be balanced for each woman against the fact that untreated serious mental disorders themselves can pose a risk to a pregnant woman and her developing fetus. Medications should be selected based on available scientific research, and they should be taken at the lowest possible dose. Pregnant women should have a medical professional who will watch them closely throughout their pregnancy and after delivery.

Most women should avoid certain medications during pregnancy. For example:

- Mood stabilizers are known to cause birth defects. Benzodiazepines and lithium have been shown to cause “floppy baby syndrome,” in which a baby is drowsy and limp, and cannot breathe or feed well. Benzodiazepines may cause birth defects or other infant problems, especially if taken during the first trimester.
• According to research, taking antipsychotic medications during pregnancy can lead to birth defects, especially if they are taken during the first trimester and in combination with other drugs, but the risks vary widely and depend on the type of antipsychotic taken. The conventional antipsychotic haloperidol has been studied more than others and has been found not to cause birth defects. Research on the newer atypical antipsychotics is ongoing.

Antidepressants, especially SSRIs, are considered to be safe during pregnancy. However, antidepressant medications do cross the placental barrier and may reach the fetus. Birth defects or other problems are possible, but they are very rare. The effects of antidepressants on childhood development remain under study.

Studies have also found that fetuses exposed to SSRIs during the third trimester may be born with “withdrawal” symptoms such as breathing problems, jitteriness, irritability, trouble feeding, or hypoglycemia (low blood sugar). Most studies have found that these symptoms in babies are generally mild and short-lived, and no deaths have been reported. Risks from the use of antidepressants need to be balanced with the risks of stopping medication; if a mother is too depressed to care for herself and her child, both may be at risk for problems.

In 2004, the FDA issued a warning against the use of certain antidepressants in the late third trimester. The warning said that doctors may want to gradually taper pregnant women off antidepressants in the third trimester so that the baby is not affected. After a woman
delivers, she should consult with her doctor to decide whether to return to a full dose during the period when she is most vulnerable to postpartum depression.

After the baby is born, women and their doctors should watch for postpartum depression, especially if a mother stopped taking her medication during pregnancy. In addition, women who nurse while taking psychiatric medications should know that a small amount of the medication passes into the breast milk. However, the medication may or may not affect the baby depending on the medication and when it is taken. Women taking psychiatric medications and who intend to breastfeed should discuss the potential risks and benefits with their doctors.

Contact FDA MedWatch

About the FDA

The FDA is responsible for protecting the public health by ensuring the safety, efficacy, and security of drugs (medications), biological products, medical devices, our nation’s food supply, cosmetics, and products that emit radiation.

FDA is also responsible for advancing public health by helping to speed innovations that make medicines more effective, safer, and more affordable and by helping the public get accurate science-based information they need to use medicines and foods to maintain and improve their health.
Reporting Serious Problems to the FDA

Visit FDA’s MedWatch to voluntarily report a serious adverse effect, product quality problem, product use error or product failure that you suspect is associated with the use of an FDA-regulated drug, biologic, medical device, dietary supplement or cosmetic. You can also report suspected counterfeit medical products to the FDA through MedWatch. You can also use the contact information provided below: 1-800-332-1088; 1-800-FDA-0178 Fax; Report a Serious Problem: MedWatch Online Regular Mail: Use postage-paid FDA Form 3500 Mail to: MedWatch, 5600 Fishers Lane, Rockville, MD 20857

Required for class assignment: Podcast to listen to for assignment (click on Listen Now): To The Best Of Your Knowledge, A Pill That Saves Your Life But Destroys Your Body

Optional: Additional reading for those of you who want to learn more: Reducing Disorder Biologically: Drug and Brain Therapy
4.2

PRESCRIPTION DRUGS: THE DRUG APPROVAL PROCESS

Reading

Review the information on The Drug Development Process (an external site) that covers how drugs are developed in a five-step process:

- Step 1: Discovery and Development
- Step 2: Preclinical Research
- Step 3: Clinical Research
- Step 4: FDA Drug Review
- Step 5: FDA Post-Market Drug Safety Monitoring

Next review Dr. Ashutosh Tiwari’s slide deck on Clinical Trial Phases (an external site). Take a close look at slide
#8 which offers an overview of the drug approval process with Phases and timelines.

And finally, read the following NPR article “FDA Green-Lights Marijuana-Based Pharmaceutical Drug” NPR, FDA Green Lights Marijuana-Based Pharmaceutical Drug (an external site).

Listening

Please listen to the following Podcast:

- [What A New CBD Drug Approval Might Mean For Medical Marijuana](an external site)

Optional Listening: check out the Freakonomics podcast’s coverage on Drug Trials

- [Bad Medicine, Part 1: (Drug) Trials and Tribulations](an external site)
- [Bad Medicine, Part 2: (Drug) Trials and Tribulations](an external site)

Watching

Please watch the following video to learn more about complications with clinical trials:

- [The Shadow of Thalidomide](an external site)
4.3
OVER-THE-COUNTER DRUGS

Prescription Drugs and Over-the-Counter (OTC) Drugs: Questions and Answers

What is the difference between prescription drugs and OTC drugs?

A drug is a substance intended for use in the diagnosis, cure, mitigation, treatment, or prevention of disease. Here are the main differences between OTC drugs and prescription drugs.

Prescription drugs are:

- Prescribed by a doctor
- Bought at a pharmacy
- Prescribed for and intended to be used by one person
- Regulated by the FDA through the New Drug Application (NDA) process. This is the formal step a drug sponsor takes to ask that the FDA consider approving a new drug for marketing in the United States. An NDA includes all animal...
and human data and analyses of the data, as well as information about how the drug behaves in the body and how it is manufactured. For more information on the NDA process, please see “The FDA’s Drug Review Process: Ensuring Drugs Are Safe and Effective”.

OTC drugs are:

- Drugs that do NOT require a doctor's prescription
- Bought off-the-shelf in stores
- Regulated by FDA through OTC Drug monographs. OTC drug monographs are a kind of “recipe book” covering acceptable ingredients, doses, formulations, and labeling. Monographs will continually be updated adding additional ingredients and labeling as needed. Products conforming to a monograph may be marketed without further FDA clearance, while those that do not, must undergo separate review and approval through the “New Drug Approval System”.

Over-the-Counter Medicines

Start by reviewing the National Institute on Drug Abuse’s fact sheet on Over-the-Counter Medications.

Important tips for using over-the-counter medicines:
Always follow the printed directions and warnings. Talk to your healthcare provider before starting a new medicine.

Know what you are taking. Look at the list of ingredients and choose products that have fewer items listed.

All medicines become less effective over time and should be replaced. Check the expiration date before using any product.

Store medicines in a cool, dry area. Keep all medicines out of the reach of children.

Women who are pregnant or breastfeeding should talk to their provider before taking any new medicine.

Medicines affect children and older adults differently. People in these age groups should take special care when taking over-the-counter medicines.

Check with your provider before taking an over-the-counter medicine if:

- Your symptoms are very bad.
- You are not sure what is wrong with you.
- You have a long-term medical problem or you are taking prescription medicines.

ACHES, PAINS, AND HEADACHES

Over-the-counter pain medicines can help with a headache, arthritis pain, sprains, and other minor joint and muscle problems.

- Acetaminophen — Try this medicine first for your pain. DO NOT take more than 3 grams (3,000 mg) on any one day. Large amounts can
harm your liver. Remember that 3 grams are about the same as 6 extra-strength pills or 9 regular pills.

- Nonsteroidal anti-inflammatory drugs (NSAIDs) — You can buy some NSAIDs, such as ibuprofen and naproxen, without a prescription.

Both of these medicines can have serious side effects if you take them in high doses or for a long time. **Tell your provider if you are taking these medicines many times a week. You may need to be checked for side effects.**

**FEVER**

Acetaminophen (Tylenol) and ibuprofen (Advil, Motrin) help reduce fever in children and adults.

- Take acetaminophen every 4 to 6 hours.
- Take ibuprofen every 6 to 8 hours. DO NOT use ibuprofen in children younger than 6 months.
- Know how much you or your child weighs before giving these medicines.

Aspirin works very well for treating fever in adults. DO NOT give aspirin to a child unless your child’s provider tells you it is OK.

**COLD, SORE THROAT, COUGH**

Cold medicines can treat symptoms to make you feel better, but they do not shorten a cold. Taking zinc supplements within 24 hours of the start of a cold may reduce the symptoms and duration of a cold.
NOTE: Talk to your provider before giving your child any type of over-the-counter cold medicine, even if it is labeled for children.

Cough medicines:

- Guaifenesin — Helps break up mucus. Drink lots of fluids if you take this medicine.
- Menthol throat lozenges — Soothe “tickle” in the throat (Halls, Robitussin, and Vicks).
- Liquid cough medicines with dextromethorphan — Suppress the urge to cough (Benylin, Delsym, Robitussin DM, Simply Cough, Vicks 44, and store brands).

Decongestants:

- Decongestants help clear a runny nose and relieve postnasal drip.
- Decongestant nasal sprays may work more quickly, but they can have a rebound effect if you use them for more than 3 to 5 days. Your symptoms may get worse if you keep using these sprays.
- Check with your provider before taking decongestants if you have high blood pressure or prostate problems.
- Oral decongestants: Pseudoephedrine (Contac Non-Drowsy, Sudafed, and store brands); phenylephrine (Sudafed PE and store brands).
- Decongestant nasal sprays: Oxymetazoline (Afrin, Neo-Synephrine Nighttime, Sinex Spray); phenylephrine (Neo-Synephrine, Sinex...
Capsules).

*Sore throat* medicines:

- Sprays to numb pain — Dyclonine (Cepacol); phenol (Chloraseptic)
- Painkillers — Acetaminophen (Tylenol), ibuprofen (Advil, Motrin), naproxen (Aleve)
- Hard candies that coat throat — Sucking on candy or throat lozenges can be soothing. Be careful in young children because of the choking risk

**ALLERGIES**

Antihistamine pills and liquids work well for treating *allergy symptoms*.

- Antihistamines that may cause sleepiness — Diphenhydramine (Benadryl); chlorpheniramine (Chlor-Trimeton); brompheniramine (Dimetapp), or clemastine (Tavist)
- Antihistamines that cause little or no sleepiness — Loratadine (Alavert, Claritin, Dimetapp ND); fexofenadine (Allegra); cetirizine (Zyrtec)

Talk to your provider before giving medicines that cause sleepiness in a child, because they can affect learning. They can also affect alertness in adults.

You can also try:

- Eye drops — Soothe or moisten the eyes
• Preventive nasal spray — Cromolyn sodium (Nasalcrom), fluticasone (Flonase)

STOMACH UPSET

Medicines for diarrhea:

• Antidiarrhea medicines such as loperamide (Imodium) — These medicines slow down the action of the intestine and reduce the number of bowel movements. Talk to your provider before taking them because they can worsen diarrhea caused by infection.
• Medicines that contain bismuth — May be taken for mild diarrhea (Kaopectate, Pepto-Bismol)
• Rehydration fluids — May be used for moderate and severe diarrhea (Analytes or Pedialyte)

Medicines for nausea and vomiting:

• Liquids and pills for stomach upset — May help with mild nausea and vomiting (Emetrol; Pepto-Bismol)
• Rehydration fluids — May be used to replace fluids from vomiting (Enfalyte or Pedialyte)
• Medicines for motion sickness — Dimenhydrinate (Dramamine); meclizine (Bonine, Antivert, Postafen, and Sea Legs)

SKIN RASHES AND ITCHING

• Antihistamines taken by mouth — May help with itching or if you have allergies
• Hydrocortisone cream — May help with mild rashes (Cortaid, Cortizone 10)
• Antifungal creams and ointments — May help with diaper rashes and rashes caused by yeast (nystatin, miconazole, clotrimazole, and ketoconazole)

Explore the OTC pain relievers

FDA, A Guide to Safe Use of Pain Medicine
The University of Tennessee Medical Center, Know The Difference Between Your Pain Relievers
Consumer Reports, Best and Safest Strategies for Pain Relief
Mental Floss, The Difference Between Tylenol, Aspirin, Advil, and Aleve
familydoctor.org, Pain Relievers: Understanding Your OTC Options
lifehacker, What’s the Difference Between Pain Relievers? Should I Buy Generic?

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://psu.pb.unizin.org/bbh143/?p=612#oembed-1
4.4
SUPPLEMENTS AND FOODS FOR HEALTH AND WELL-BEING

Dietary Supplements

What is a dietary supplement?

As defined by Congress in the Dietary Supplement Health and Education Act, which became law in 1994, a dietary supplement is a product (other than tobacco) that

- is intended to supplement the diet;
- contains one or more dietary ingredients (including vitamins; minerals; herbs or other botanicals; amino acids; and other substances) or their constituents;
- is intended to be taken by mouth as a pill, capsule, tablet, or liquid; and
is labeled on the front panel as being a dietary supplement.

What is a new dietary ingredient?

A new dietary ingredient is a dietary ingredient that was not sold in the United States in a dietary supplement before October 15, 1994. The U.S. Food and Drug Administration (FDA) requires specific safety information from a manufacturer intending to market a dietary supplement containing a new dietary ingredient. This information is not required for older dietary supplement ingredients.

Are dietary supplements different from foods and drugs?

Although dietary supplements are regulated by the FDA as foods, they are regulated differently from other foods and from drugs. Whether a product is classified as a dietary supplement, conventional food, or drug is based on its intended use. Most often, classification as a dietary supplement is determined by the information that the manufacturer provides on the product label or in accompanying literature, although many foods and dietary supplement product labels do not include this information.

What claims can manufacturers make for dietary supplements and drugs?

The types of claims that can be made on the labels of dietary supplements and drugs differ. Drug manufacturers may claim that their product will
diagnose, cure, mitigate, treat, or prevent a disease. Such claims may not legally be made for dietary supplements.

The label of a dietary supplement or food product may contain one of three types of claims: a health claim, nutrient content claim, or structure/function claim. Health claims describe a relationship between a food, food component, or dietary supplement ingredient, and reducing the risk of a disease or health-related condition. Nutrient content claims describe the relative amount of a nutrient or dietary substance in a product. A structure/function claim is a statement describing how a product may affect the organs or systems of the body and it can not mention any specific disease. Structure/function claims do not require FDA approval but the manufacturer must provide FDA with the text of the claim within 30 days of putting the product on the market. Product labels containing such claims must also include a disclaimer that reads, “This statement has not been evaluated by the FDA. This product is not intended to diagnose, treat, cure, or prevent any disease.”

How does FDA regulate dietary supplements?

In addition to regulating label claims, FDA regulates dietary supplements in other ways. Supplement ingredients sold in the United States before October 15, 1994, are not required to be reviewed by FDA for their safety before they are marketed because they are presumed to be safe based on their history of use by humans. For a new dietary ingredient (one not sold as a dietary supplement before 1994) the manufacturer must notify FDA of its intent to market a dietary supplement
containing the new dietary ingredient and provide information on how it determined that reasonable evidence exists for safe human use of the product. FDA can either refuse to allow new ingredients into or remove existing ingredients from the marketplace for safety reasons.

Unlike drug products, there are no provisions in the law for FDA to “approve” dietary supplements for safety or effectiveness before they reach the consumer. Once a dietary supplement is marketed, FDA has to prove that the product is not safe in order to restrict its use or remove it from the market. In contrast, before being allowed to market a drug product, manufacturers must obtain FDA approval by providing convincing evidence that it is both safe and effective.

The label of a dietary supplement product is required to be truthful and not misleading. If the label does not meet this requirement, FDA may remove the product from the marketplace or take other appropriate actions.

What information is required on a dietary supplement label?

FDA requires that certain information appears on the dietary supplement label:

**General information**

- Name of product (including the word “supplement” or a statement that the product is a supplement)
- Net quantity of contents
- Name and place of business of manufacturer, packer, or distributor
• Directions for use

Supplement Facts panel

• Serving size, list of dietary ingredients, amount per serving size (by weight), percent of Daily Value (%DV), if established
• If the dietary ingredient is a botanical, the scientific name of the plant or the common or usual name standardized in the reference *Herbs of Commerce* (1992 edition) and the name of the plant part used
• If the dietary ingredient is a proprietary blend (i.e., a blend exclusive to the manufacturer), the total weight of the blend and the components of the blend in order of predominance by weight

Other ingredients

• Nondietary ingredients such as fillers, artificial colors, sweeteners, flavors, or binders; listed by weight in descending order of predominance and by common name or proprietary blend

The label of the supplement may contain a cautionary statement but the lack of a cautionary statement does not mean that no adverse effects are associated with the product.

Does a label indicate the quality of a dietary supplement product?

It is difficult to determine the quality of a dietary supplement product from its label. The degree of quality
control depends on the manufacturer, the supplier, and others in the production process.

In 2007, the FDA issued Good Manufacturing Practices (GMPs) for dietary supplements, a set of requirements and expectations by which dietary supplements must be manufactured, prepared, and stored to ensure quality. Manufacturers are now expected to guarantee the identity, purity, strength, and composition of their dietary supplements. For example, the GMPs aim to prevent the inclusion of the wrong ingredients, the addition of too much or too little of a dietary ingredient, the possibility of contamination (by pesticides, heavy metals such as lead, bacteria, etc.), and the improper packaging and labeling of a product.

Are dietary supplements standardized?

Standardization is a process that manufacturers may use to ensure batch-to-batch consistency of their products. In some cases, standardization involves identifying specific chemicals (known as markers) that can be used to manufacture a consistent product. The standardization process can also provide a measure of quality control.

Dietary supplements are not required to be standardized in the United States. In fact, no legal or regulatory definition exists in the United States for standardization as it applies to dietary supplements. Because of this, the term “standardization” may mean many different things. Some manufacturers use the term standardization incorrectly to refer to uniform manufacturing practices; following a recipe is not sufficient for a product to be called standardized.
Therefore, the presence of the word “standardized” on a supplement label does not necessarily indicate product quality.

What methods are used to evaluate the health benefits and safety of a dietary supplement?

Dietary supplements are not required by federal law to be tested for safety and effectiveness before they are marketed, so the amount of scientific evidence available for various supplement ingredients varies widely. Some ingredients in dietary supplements have been carefully evaluated. For example, scientists know that calcium and vitamin D are important for keeping bones strong and reducing bone loss. Other supplements, such as many herbal products, need more study to determine their value.

Scientists can use several approaches to evaluate dietary supplements for their potential health benefits and risks. They may investigate the history of use, conduct laboratory studies using cell or tissue cultures, and experiment with animals. Studies on people (e.g., individual case reports, observational studies, and clinical trials) provide the most direct evidence of a dietary supplement’s effects on health and patterns of use.

Botanical Dietary Supplements

What is a botanical?

A botanical is a plant or plant part valued for its medicinal or therapeutic properties, flavor, and/or
scent. Herbs are a subset of botanicals. Products made from botanicals that are used to maintain or improve health may be called herbal products, botanical products, or phytomedicines.

In naming botanicals, botanists use a Latin name made up of the genus and species of the plant. Under this system, the botanical black cohosh is known as Actaea racemosa L., where “L” stands for Linnaeus, who first described the type of plant specimen. In the Office of Dietary Supplements (ODS) fact sheets, we do not include such initials because they do not appear on most products used by consumers.

Can botanicals be dietary supplements?

To be classified as a dietary supplement, a botanical must meet the definition given below. Many botanical preparations meet the definition.

As defined by Congress in the Dietary Supplement Health and Education Act, which became law in 1994, a dietary supplement is a product (other than tobacco) that

- is intended to supplement the diet;
- contains one or more dietary ingredients (including vitamins; minerals; herbs or other botanicals; amino acids; and other substances) or their constituents;
- is intended to be taken by mouth as a pill, capsule, tablet, or liquid; and
- is labeled on the front panel as being a dietary supplement.
How are botanicals commonly sold and prepared?

Botanicals are sold in many forms: as fresh or dried products; liquid or solid extracts; tablets, capsules, powders; tea bags; and other forms. For example, fresh ginger root is often found in the produce section of food stores; the dried ginger root is sold packaged in tea bags, capsules, or tablets; and liquid preparations made from the ginger root are also sold. A particular group of chemicals or a single chemical may be isolated from a botanical and sold as a dietary supplement, usually in tablet or capsule form. An example is phytoestrogens from soy products.

Common preparations include teas, decoctions, tinctures, and extracts:

- A tea, also known as an infusion, is made by adding boiling water to fresh or dried botanicals and steeping them. The tea may be drunk either hot or cold.
- Some roots, bark, and berries require more forceful treatment to extract their desired ingredients. They are simmered in boiling water for longer periods than teas, making a decoction, which also may be drunk hot or cold.
- A tincture is made by soaking a botanical in a solution of alcohol and water. Tinctures are sold as liquids and are used for concentrating and preserving a botanical. They are made in different strengths that are expressed as botanical-to-extract ratios (i.e., ratios of the weight of the dried botanical to the volume or
weight of the finished product).

- An extract is made by soaking the botanicals in a liquid that removes specific types of chemicals. The liquid can be used as-is or evaporated to make a dry extract for use in capsules or tablets.

Are botanical dietary supplements standardized?

Standardization is a process that manufacturers may use to ensure batch-to-batch consistency of their products. In some cases, standardization involves identifying specific chemicals (also known as markers) that can be used to manufacture a consistent product. The standardization process can also provide a measure of quality control.

Dietary supplements are not required to be standardized in the United States. In fact, no legal or regulatory definition exists for standardization in the United States as it applies to botanical dietary supplements. Because of this, the term “standardization” may mean many different things. Some manufacturers use the term standardization incorrectly to refer to uniform manufacturing practices; following a recipe is not sufficient for a product to be called standardized. Therefore, the presence of the word “standardized” on a supplement label does not necessarily indicate product quality.

Ideally, the chemical markers chosen for standardization would also be the constituents that are responsible for a botanical’s effect in the body. In this way, each lot of the product would have a consistent health effect. However, the components responsible for the effects of most botanicals have not been identified
or clearly defined. For example, the sennosides in the botanical senna are known to be responsible for the laxative effect of the plant, but many compounds may be responsible for valerian’s relaxing effect.

Are botanical dietary supplements safe?

Many people believe that products labeled “natural” are safe and good for them. This is not necessarily true because the safety of a botanical depends on many things, such as its chemical makeup, how it works in the body, how it is prepared, and the dose used.

The action of botanicals ranges from mild to powerful (potent). A botanical with mild action may have subtle effects. Chamomile and peppermint, both mild botanicals, are usually taken as teas to aid digestion and are generally considered safe for self-administration. Some mild botanicals may have to be taken for weeks or months before their full effects are achieved. For example, Valerian may be effective as a sleep aid after 14 days of use but it is rarely effective after just one dose. In contrast, a powerful botanical produces a fast result. Kava, as one example, is reported to have an immediate and powerful action affecting anxiety and muscle relaxation.

The dose and form of a botanical preparation also play important roles in its safety. Teas, tinctures, and extracts have different strengths. The same amount of a botanical may be contained in a cup of tea, a few teaspoons of tincture, or an even smaller quantity of an extract. Also, different preparations vary in the relative amounts and concentrations of chemical removed from the whole botanical. For example, peppermint tea is generally
considered safe to drink but peppermint oil is much more concentrated and can be toxic if used incorrectly. It is important to follow the manufacturer’s suggested directions for using a botanical and not exceed the recommended dose without the advice of a healthcare provider.

Does a label indicate the quality of a botanical dietary supplement product?

It is difficult to determine the quality of a botanical dietary supplement product from its label. The degree of quality control depends on the manufacturer, the supplier, and others in the production process.

In 2007, the FDA issued Good Manufacturing Practices (GMPs) for dietary supplements, a set of requirements and expectations by which dietary supplements must be manufactured, prepared, and stored to ensure quality. Manufacturers are now expected to guarantee the identity, purity, strength, and composition of their dietary supplements. For example, the GMPs aim to prevent the inclusion of the wrong ingredients, the addition of too much or too little of a dietary ingredient, the possibility of contamination (by pesticides, heavy metals such as lead, bacteria, etc.), and the improper packaging and labeling of a product.

What methods are used to evaluate the health benefits and safety of a botanical dietary supplement?

Like other dietary supplements, botanicals are not required by federal law to be tested for safety and effectiveness before they are marketed, so the amount
of scientific evidence available for various botanical ingredients varies widely. Some botanicals have been evaluated in scientific studies. For example, research shows that St. John’s wort may be useful for short-term treatment of mild to moderate depression. Other botanical dietary supplements need more study to determine their value.

Scientists can use several approaches to evaluate botanical dietary supplements for their potential health benefits and risks. They may investigate the history of use, conduct laboratory studies using cell or tissue cultures, and experiment with animals. Studies on people (e.g., individual case reports, observational studies, and clinical trials) provide the most direct evidence of a botanical supplement’s effects on health and patterns of use.

To learn more about a specific dietary supplement try the Dietary Supplements Fact Sheet catalog.

Vitamin C Exploration

MedlinePlus, Vitamin C
healthline, 7 Impressive Ways Vitamin C Benefits Your Body
Mayo Clinic, Vitamin C
emedicinehealth, High-Dose Vitamin C Benefits and Side Effects
orthomolecular.org, The Gift of Vitamin C
Websites on the origins on plant based medicine and a source a collection of articles on “Green Medicine.”

<table>
<thead>
<tr>
<th>Plant Parts Used for Medicinal Purposes (USDA Forest Service)</th>
<th>United States Department of Agriculture, Plant Parts Used for Medicinal Purposes</th>
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<tr>
<td>Active Plant Ingredients Used for Medicinal Purposes (USDA Forest Service)</td>
<td>United States Department of Agriculture, Active Plant Ingredients Used for Medicinal Purposes</td>
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<td>GreenMedinfo, Research Dashboard</td>
<td>This is a collection of articles for those who are into natural health ideas</td>
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The following information comes from a U.S. Food and Drug Administration Consumer Update published on November 28, 2018.

People often combine foods. For example, chocolate and peanut butter might be considered a tasty combination. But eating chocolate and taking certain drugs might carry risks. In fact, eating chocolate and taking monoamine oxidase (MAO) inhibitors, such as Nardil (phenelzine) or Parnate (tranycypromine), could be dangerous.

MAO inhibitors treat depression. Someone who eats an excessive amount of chocolate after taking an MAO inhibitor may experience a sharp rise in blood pressure.

Other foods that should be avoided when taking MAO inhibitors: aged cheese, sausage, bologna, pepperoni, and salami. These foods can also cause elevated blood pressure when taken with these medications.
There are three main types of drug interactions from the Food and Drug Administration webpage: U.S. Food & Drug Administration (FDA), Drug Interactions: What You Should Know

- Drugs with food and beverages
- Drugs with dietary supplements
- Drugs with other drugs

“Consumers should learn about the warnings for their medications and talk with their health care professionals about how to lower the risk of interactions,” says Shiew-Mei Huang, Ph.D., deputy director of the Office of Clinical Pharmacology in FDA’s Center for Drug Evaluation and Research (CDER).

Drugs with Food and Beverages

Consequences of drug interactions with food and beverages may include delayed, decreased, or enhanced absorption of a medication. Food can affect the bioavailability (the degree and rate at which a drug is absorbed into someone’s system), metabolism, and excretion of certain medications.

Examples of drug interactions with food and beverages ...

**Alcohol:** If you are taking any sort of medication, it’s recommended that you avoid alcohol, which can increase or decrease the effectiveness of many drugs.

**Grapefruit juice:** Grapefruit and grapefruit juice is often mentioned as a product that can interact negatively with drugs, but the actual number of drugs the juice can
interact with is less well-known. Grapefruit juice shouldn't be taken with certain blood pressure-lowering drugs or cyclosporine for the prevention of organ transplant rejection. That’s because grapefruit juice can cause higher levels of those medicines in your body, making it more likely that you will have side effects from the medicine. The juice can also interact to cause higher blood levels of the anti-anxiety medicine Buspar (buspirone); the anti-malaria drugs Quinerva or Quinite (quinine); and Halcion (triazolam), a medication used to treat insomnia. To learn more, read Grapefruit Juice and Some Drugs Don’t Mix linked on the FDA webpage: U.S. Food & Drug Administration (FDA), Grapefruit Juice and Some Drugs Don’t Mix.

**Licorice:** This would appear to be a fairly harmless snack food. However, for someone taking Lanoxin (digoxin), some forms of licorice may increase the risk for Lanoxin toxicity. Lanoxin is used to treat congestive heart failure and abnormal heart rhythms. Licorice may also reduce the effects of blood pressure drugs or diuretic (urine-producing) drugs, including Hydrodiuril (hydrochlorothiazide) and Aldactone (spironolactone).

**Chocolate:** MAO inhibitors are just one category of drugs that shouldn't be consumed with excessive amounts of chocolate. The caffeine in chocolate can also interact with stimulant drugs such as Ritalin (methylphenidate), increasing their effect, or by decreasing the effect of sedative-hypnotics such as Ambien (zolpidem).
Drugs with Dietary Supplements

Research has shown that 50 percent or more of American adults use dietary supplements on a regular basis, according to congressional testimony by the Office of Dietary Supplements in the National Institutes of Health. The law defines dietary supplements in part as products taken by mouth that contain a “dietary ingredient.” Dietary ingredients include vitamins, minerals, amino acids, and herbs or botanicals, as well as other substances that can be used to supplement the diet.

Examples of drug interactions with dietary supplements ...

St. John's Wort (Hypericum perforatum): This herb is considered an inducer of liver enzymes, which means it can reduce the concentration of medications in the blood. St. John’s Wort can reduce the blood level of medications such as Lanoxin, the cholesterol-lowering drugs Mevacor and Altocor (lovastatin), and the erectile dysfunction drug Viagra (sildenafil).

**Vitamin E:** Taking vitamin E with a blood-thinning medication such as Coumadin can increase anti-clotting activity and may cause an increased risk of bleeding.

**Ginseng:** This herb can interfere with the bleeding effects of Coumadin. In addition, ginseng can enhance the bleeding effects of heparin, aspirin, and nonsteroidal anti-inflammatory drugs such as ibuprofen, naproxen, and ketoprofen. Combining ginseng with MAO inhibitors such as Nardil or Parnate may cause a headache, trouble sleeping, nervousness, and hyperactivity.
Ginkgo Biloba: High doses of the herb Ginkgo biloba could decrease the effectiveness of anticonvulsant therapy in patients taking the following medications to control seizures: Tegretol, Equetro or Carbatrol (carbamazepine), and Depakote (valproic acid).

Drugs with Other Drugs

Two out of every three patients who visit a doctor leave with at least one prescription for medication, according to a 2007 report on medication safety issued by the Institute for Safe Medication Practices. Close to 40 percent of the U.S. population receive prescriptions for four or more medications. And the rate of adverse drug reactions increases dramatically after a patient is on four or more medications.

Drug-drug interactions have led to adverse events and withdrawals of drugs from the market, according to an article on drug interactions co-authored by Shiew-Mei Huang, Ph.D., deputy director of FDA’s Office of Clinical Pharmacology. The paper was published in the June 2008 issue of the Journal of Clinical Pharmacology.

However, market withdrawal of a drug is a fairly drastic measure. More often, FDA will issue an alert warning the public and health care providers about risks as the result of drug interactions.

Examples of drug interactions with other drugs ...

Cordarone (amiodarone): FDA issued an alert in August 2008, warning patients about taking Cordarone to correct abnormal rhythms of the heart and the
cholesterol-lowering drug Zocor (Simvastatin). Patients taking Zocor in doses higher than 20 mg while also taking Cordarone to run the risk of developing a rare condition of muscle injury called rhabdomyolysis, which can lead to kidney failure or death. “Cordarone also can inhibit or reduce the effect of the blood thinner Coumadin (warfarin),” said Huang. “So if you’re using Cordarone, you may need to reduce the amount of Coumadin you’re taking”.

**Lanoxin (digoxin):** “Lanoxin has a narrow therapeutic range. So other drugs, such as Norvir (ritonavir), can elevate the level of Lanoxin,” says Huang. “And an increased level of Lanoxin can cause irregular heart rhythms.” Norvir is a protease inhibitor used to treat HIV, the virus that causes AIDS.

**Antihistamines:** Over-the-counter (OTC) antihistamines are drugs that temporarily relieve a runny nose, or reduce sneezing, itching of the nose or throat, and itchy watery eyes. If you are taking sedatives, tranquilizers, or a prescription drug for high blood pressure or depression, you should check with a doctor or pharmacist before you start using antihistamines. Some antihistamines can increase the depressant effects (such as sleepiness) of a sedative or tranquilizer. The sedating effect of some antihistamines combined with a sedating antidepressant could strongly affect your concentration level. Operating a car or any other machinery could be particularly dangerous if your ability to focus is impaired. Antihistamines taken in conjunction with blood pressure medication may cause a person’s blood pressure to increase and may also speed up the heart rate.
Tips to Avoid Problems

There are lots of things you can do to take prescription or over-the-counter (OTC) medications in a safe and responsible manner.

- Always read drug labels carefully.
- Learn about the warnings for all the drugs you take.
- Keep medications in their original containers so that you can easily identify them.
- Ask your doctor what you need to avoid when you are prescribed with a new medication. Ask about food, beverages, dietary supplements, and other drugs.
- Check with your doctor or pharmacist before taking an OTC drug if you are taking any prescription medications.
- Use one pharmacy for all of your drug needs.
- Keep all of your health care professionals informed about everything that you take.
- Keep a record of all prescription drugs, OTC drugs, and dietary supplements (including herbs) that you take. Try to keep this list with you at all times, but especially when you go on any medical appointment. The Food and Drug Administration (FDA) has a Web site where you can get more information and download a sample medicine record: U.S. Food & Drug Administration (FDA), My Medicine Record.
Explore the links on drug interactions below.

Key terms: interaction, idiosyncratic reactions, adverse drug reaction, toxicity

Licorice—find out information about interactions that occur with this commonly used herb from WebMD.
CHAPTER 5: LAW, REGULATION, AND SOCIAL POLICY

Introduction

Chances are that you know someone who has been in trouble related to drug use, whether it is in your family, neighborhood, work or school. It could be someone who lost a driver’s license, lost a job, or went to jail. As a society, we try to protect people from self-harm and harming others. We also want to have safe medication, protect children, and make it easier for people to get help for drug-related problems. All these efforts require laws, regulations and social policy. We decide when something is a crime and when we should send offenders to jail or prison. The use of valuable drugs become illegal to curbs spreading abuse, while other drugs are reevaluated and made more readily available. We create tobacco-free environments, require drug tests for jobs, and make it possible for people to get help for problem drug use and
addiction. In this chapter, we will examine laws and policies and explore some of the debates around incarceration and legalizing drugs.
CHAPTER
OBJECTIVES

Learning Objectives

By the end of this chapter you should be able to:

1. Review the history of drug policy
2. Distinguish between misdemeanors and felony charges and their implications
3. Illustrate how the three strikes out policy and drug courts affect the size of the prison population
4. Interpret Penn State and Pennsylvania alcohol and drug violation policies
5. Explain drug testing for work and privacy protection for seeking help
6. Explain the main arguments for and against decriminalization and legalization of drugs
7. Identify risks and benefits of medical and recreational marijuana
8. Recognize that policies have side effects and often need to be revised
5.2 OPIOID CRISIS

Introduction

Begin by watching the Warning: This Drug May Kill You video that follows the perspectives of four families affected by the opioid crisis.

Then learn more about the everyday implications of the Opioid Crisis by reading the following:

- Legal Requirements for the Sale and Purchase of Drug Products
- Opioid-Makers Cut Back On Marketing Payments To Doctors
5.3
MILESTONES
OF DRUG
REGULATION IN
THE UNITED STATES

1820

Eleven physicians meet in Washington, D.C., to establish the U.S. Pharmacopeia, the first compendium of standard drugs for the United States.

1848

Drug Importation Act passed by Congress requires U.S. Customs Service inspection to stop entry of adulterated drugs from overseas.

1883

Dr. Harvey W. Wiley becomes chief chemist, expanding
the Bureau of Chemistry’s food adulteration studies. Campaigning for a federal law, Dr. Wiley is called the “Crusading Chemist” and “Father of the Pure Food and Drugs Act.” He retired from government service in 1912 and died in 1930.

1904

The Biologics Control Act is passed to ensure purity and safety of serums, vaccines, and similar products used to prevent or treat diseases in humans.

1905

Samuel Hopkins Adams’ ten-part expose of the patent medicine industry, “The Great American Fraud,” begins in Collier’s.

The American Medical Association, through its Council on Pharmacy and Chemistry, initiates a voluntary program of drug approval that would last until 1955. To earn the right to advertise in AMA and related journals, companies submitted evidence, for review by the Council and outside experts, to support their therapeutic claims for drugs.

1906

The original Food and Drugs Act is passed by Congress on June 30 and signed by President Theodore Roosevelt. It prohibits interstate commerce in misbranded and adulterated foods, drinks, and drugs.
1911

U.S. v. Johnson, the Supreme Court rules that the 1906 Food and Drugs Act does not prohibit false therapeutic claims but only false and misleading statements about the ingredients or identity of a drug.

1912

Congress enacts the Sherley Amendment to overcome the ruling in U.S. v. Johnson. It prohibits labeling medicines with false therapeutic claims intended to defraud the purchaser, a standard difficult to prove.

1914

The Harrison Narcotic Act requires prescriptions for products exceeding the allowable limit of narcotics and mandates increased record-keeping for physicians and pharmacists who dispense narcotics.

1930

The name of the Food, Drug, and Insecticide Administration is shortened to the Food and Drug Administration (FDA) under an agricultural appropriations act.

1933

FDA recommends a complete revision of the obsolete
1906 Food and Drugs Act. The first bill is introduced into the Senate, launching a five-year legislative battle. FDA assembles a graphic display of shortcomings in pharmaceutical and other regulation under the 1906 act. Dubbed by one reporter as the Chamber of Horrors, the display is exhibited nationwide to help draw support for a new law.

1937

Elixir Sulfanilamide, containing the poisonous solvent diethylene glycol, kills 107 persons, many of whom are children, dramatizing the need to establish drug safety before marketing and to enact the pending food and drug law.

1938

The Federal Food, Drug, and Cosmetic (FDC) Act of 1938 is passed by Congress, containing new provisions:

- Extending control to cosmetics and therapeutic devices.
- Requiring new drugs to be shown safe before marketing, starting a new system of drug regulation.
- Eliminating the Sherley Amendment requirement to prove intent to defraud in drug misbranding cases.
- Providing that safe tolerances be set for unavoidable poisonous substances.
- Authorizing standards of identity, quality, and
fill-of-container for foods.
• Authorizing factory inspections.
• Adding the remedy of court injunctions to the previous penalties of seizures and prosecutions.

FDA says that sulfanilamide and selected other dangerous drugs must be administered under the direction of a qualified expert, thus launching the requirement for prescription-only (non-narcotic) drugs.

Under the Wheeler-Lea Act, the Federal Trade Commission is charged with overseeing advertising associated with products otherwise regulated by FDA, with the exception of prescription drugs.

1941

Insulin Amendment requires FDA to test and certify purity and potency of this life-saving drug for diabetes.

Nearly 300 deaths and injuries result from the distribution of sulfathiazole tablets tainted with the sedative, phenobarbital. The incident prompts FDA to revise manufacturing and quality controls drastically, the beginning of what would later be called good manufacturing practices (GMPs).

1945

Penicillin Amendment requires FDA testing and certification of safety and effectiveness of all penicillin products. Later amendments would extend this requirement to all antibiotics. In 1983 such control would be found no longer needed and abolished.
1948

Supreme Court rules in U. S. v. Sullivan that FDA’s jurisdiction extends to the retail distribution, thereby permitting FDA to interdict in pharmacies illegal sales of drugs—the most problematical being barbiturates and amphetamines.

1950

In Alberty Food Products Co. v. the U.S., a court of appeals rules that the directions for use on a drug label must include the purpose for which the drug is offered. Therefore, a worthless remedy cannot escape the law by not stating the condition it is supposed to treat.

1951

Durham-Humphrey Amendment defines the kinds of drugs that cannot be used safely without medical supervision and restricts their sale to prescription by a licensed practitioner.

1952

In U.S. v. Cardiff, the Supreme Court rules that the factory inspection provision of the 1938 FDC Act is too vague to be enforced as criminal law.

A nationwide investigation by FDA reveals that chloramphenicol, a broad-spectrum antibiotic, has caused nearly 180 cases of often fatal blood diseases. Two years later FDA would engage the American Society of
Hospital Pharmacists, the American Association of Medical Record Librarians, and later the American Medical Association in a voluntary program of drug reaction reporting.

1953

Factory Inspection Amendment clarifies previous law and requires FDA to give manufacturers written reports of conditions observed during inspections and analyses of factory samples.

1955

FDA denies a new drug application for a cancer drug, Hepasyn, on the grounds that it was not proven safe because it was not proven effective, an important consideration for a serious disease in which other useful therapies existed. In 1961 the agency was challenged in a hearing over the same issue involving an anti-infective drug, Altafur, which was decided in FDA’s favor.

1962

Thalidomide, a new sleeping pill, is found to have caused birth defects in thousands of babies born in Western Europe. News reports on the role of Dr. Frances Kelsey, FDA medical officer, in keeping the drug off the U.S. market, arouse public support for stronger drug regulation.

Kefauver-Harris Drug Amendments For the first time,
drug manufacturers are required to prove to FDA the effectiveness of their products before marketing them.

1963

Advisory Committee on Investigational Drugs meets the first meeting of a committee to advise FDA on product approval and policy on an ongoing basis.

1965

Drug Abuse Control Amendments are enacted to deal with problems caused by the abuse of depressants, stimulants, and hallucinogens.

1966

FDA contracts with the National Academy of Sciences/National Research Council to evaluate the effectiveness of 4,000 drugs approved on the basis of safety alone between 1938 and 1962.

Fair Packaging and Labeling Act requires all consumer products in interstate commerce to be honestly and informatively labeled, with FDA enforcing provisions on foods, drugs, cosmetics, and medical devices.

1968

FDA forms the Drug Efficacy Study Implementation (DESI) to implement recommendations of the National Academy of Sciences investigation of the effectiveness of drugs first marketed between 1938 and 1962.
1970

In Upjohn v. Finch, the Court of Appeals upholds enforcement of the 1962 drug effectiveness amendments by ruling that commercial success alone does not constitute substantial evidence of drug safety and efficacy.

FDA requires the first patient package insert oral contraceptives must contain information for the patient about specific risks and benefits.

The Comprehensive Drug Abuse Prevention and Control Act replaces previous laws and categorizes drugs based on abuse and addiction potential compared to their therapeutic value.

1972

Over-the-Counter Drug Review began to enhance the safety, effectiveness and appropriate labeling of drugs sold without a prescription.

1973

The U. S. Supreme Court upholds the 1962 drug effectiveness law and endorses FDA action to control entire classes of products by regulations rather than to rely only on time-consuming litigation.

1976

Vitamins and Minerals Amendments (“Proxmire Amendments”) stop FDA from establishing standards
limiting the potency of vitamins and minerals in food supplements or regulating them as drugs based solely on potency.

1977

Introduction of the Bioresearch Monitoring Program as an agency-wide initiative ensures the quality and integrity of data submitted to FDA and provides for the protection of human subjects in clinical trials by focusing on preclinical studies on animals, clinical investigations, and the work of institutional review boards.

1981

FDA and the Department of Health and Human Services revise regulations for human subject protections, based on the 1979 Belmont Report, which had been issued by the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. The revised rules provide for wider representation on institutional review boards and they detail elements of what constitutes informed consent, among other provisions.

1982

Tamper-resistant Packaging Regulations issued by FDA to prevent poisonings such as deaths from cyanide placed in Tylenol capsules. The Federal Anti-Tampering Act passed in 1983 makes it a crime to tamper with packaged consumer products.
1983

Orphan Drug Act passed, enabling FDA to promote research and marketing of drugs needed for treating rare diseases.

The first televised advertisement for a prescription drug appears in June, purportedly for price comparison with a competitor’s product, but it includes information about therapeutic indication and the relative value of the advertised drug—without summarized information about side effects. The same year, FDA initiates a voluntary moratorium on direct-to-consumer advertising of prescription drugs to study the issue among consumers, health professionals, and industry. FDA withdrew the moratorium in 1985.

1984

Drug Price Competition and Patent Term Restoration Act (Hatch-Waxman Act) expedites the availability of less costly generic drugs by permitting FDA to approve applications to market generic versions of brand-name drugs without repeating the research done to prove them safe and effective. At the same time, the brand-name companies can apply for up to five years additional patent protection for the new medicines they developed to make up for time lost while their products were going through FDA’s approval process.

1987

Investigational drug regulations revised to expand access
to experimental drugs for patients with serious diseases with no alternative therapies.

1988

Food and Drug Administration Act of 1988 officially establishes FDA as an agency of the Department of Health and Human Services with a Commissioner of Food and Drugs appointed by the President with the advice and consent of the Senate, and broadly spells out the responsibilities of the Secretary and the Commissioner for research, enforcement, education, and information.

The Prescription Drug Marketing Act bans the diversion of prescription drugs from legitimate commercial channels. Congress finds that the resale of such drugs leads to the distribution of mislabeled, adulterated, sub potent, and counterfeit drugs to the public. The new law requires drug wholesalers to be licensed by the states; restricts reimportation from other countries; and bans sale, trade or purchase of drug samples, and traffic or counterfeiting of redeemable drug coupons.

1989

The FDA issued guidelines asking manufacturers to determine whether a drug is likely to have significant use in elderly people and to include elderly patients in clinical studies if applicable.
1991

Regulations published to Accelerate the Review of Drugs for life-threatening diseases.

The policy for the protection of human subjects in research, promulgated in 1981 by FDA and the Department of Health and Human Services, is adopted by more than a dozen federal entities involved in human subject research and becomes known as the Common Rule. This rule issues requirements for researchers who obtain and document informed consent secures special protection for children, women, and prisoners and elaborates on required procedures for institutional review boards and ensures that research institutions comply with the regulations.

1992

Generic Drug Enforcement Act imposes debarment and other penalties for illegal acts involving abbreviated drug applications.

The U.S. FDA with Japan and Europe establish the International Conference on Harmonization (ICH). The ICH works to reduce the burden of regulation by harmonizing regulatory requirements in the three regions.

Prescription Drug User Fee Act (PDUFA) requires drug and biologics manufacturers to pay fees for product applications and supplements, and other services. The act also requires FDA to use these funds to hire more reviewers to assess applications.
1993

A consolidation of several adverse reaction reporting systems is launched as MedWatch, designed for voluntary reporting of problems associated with medical products to be filed with FDA by health professionals. Revising a policy from 1977 that excluded women of childbearing potential from early drug studies, FDA issues guidelines calling for improved assessments of medication responses as a function of gender. Companies are encouraged to include patients of both sexes in their investigations of drugs and to analyze any gender-specific phenomena.

1994

Uruguay Round Agreements Act extends the patent terms of U.S. drugs from 17 to 20 years.

1995

FDA declares cigarettes to be “drug delivery devices.” Restrictions are proposed on marketing and sales to reduce smoking by young people.

1997

Food and Drug Administration Modernization Act (FDAMA) reauthorizes the Prescription Drug User Fee Act of 1992 and mandates the most wide-ranging reforms in agency practices since 1938. Provisions include measures to accelerate the review of devices, regulate
advertising of unapproved uses of approved drugs and devices, and regulate health claims for foods.

1998

The Adverse Event Reporting System (AERS) is a computerized information database designed to support the FDA's post-marketing safety surveillance program for approved drug and therapeutic biologic products. The ultimate goal of AERS is to improve public health by providing the best available tools for storing and analyzing safety reports.

The Demographic Rule requires that a marketing application analyze data on safety and effectiveness by age, gender, and race.

The Pediatric Rule requires manufacturers of selected new and existing drug and biological products to conduct studies to assess their safety and efficacy in children.

The FDA approves the use of thalidomide for the treatment of Hansen’s Disease, commonly known as leprosy. In tandem with the approval, FDA invokes an oversight program designed to help ensure a zero-tolerance policy for thalidomide exposure during pregnancy.

1999

ClinicalTrials.gov is founded to provide the public with updated information on enrollment in federally and privately supported clinical research, thereby expanding patient access to studies of promising therapies.

FDA publishes guidance for electronic submissions
that provide for the receipt and archiving of a new drug application entirely in electronic format without an accompanying paper archival copy.

A final rule mandates that all over-the-counter drug labels must contain data in a standardized format. These drug facts are designed to provide the patient with easy-to-find information, analogous to the nutrition facts label for foods.

FDA publishes “Managing the Risks from Medical Product Use: Creating a Risk Management Framework.” The report describes current and recommended premarket and postmarket risk assessment procedures and the need for better risk communications.

A Final Guidance for prescription drug broadcast advertising is published to ensure consumers get a balanced view of the benefits and risks of a product.

2000

Federal agencies are required to issue guidelines to maximize the quality, objectivity, utility, and integrity of the information they generate, and to provide a mechanism whereby those affected can secure correction of information that does not meet these guidelines, under the Data Quality Act.

The U. S. Supreme Court, upholding an earlier decision in Food and Drug Administration v. Brown & Williamson Tobacco Corp. et al., rules 5-4 that FDA does not have authority to regulate tobacco as a drug. Within weeks of this ruling, FDA revokes its final rule, issued in 1996, that restricted the sale and distribution of cigarettes and smokeless tobacco products to children and adolescents,
and that determined that cigarettes and smokeless tobacco products are combination products consisting of a drug (nicotine) and device components intended to deliver nicotine to the body.

2002

The Best Pharmaceuticals for Children Act improves the safety and efficacy of patented and off-patent medicines for children. It continues the exclusivity provisions for pediatric drugs as mandated under the Food and Drug Administration Modernization Act of 1997, in which market exclusivity of a drug is extended by six months, and in exchange, the manufacturer carries out studies of the effects of drugs when taken by children. The provisions both clarify aspects of the exclusivity period and amend procedures for generic drug approval in cases when pediatric guidelines are added to the labeling.

In the wake of the events of September 11, 2001, the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 is designed to improve the country’s ability to prevent and respond to public health emergencies. Provisions include a requirement that FDA issue regulations to enhance controls over imported and domestically produced commodities it regulates.

An effort to enhance and update the regulation of manufacturing processes and end-product quality of animal and human drugs and biological medicines is announced, the current good manufacturing practice (cGMP) initiative. The goals of the initiative are to focus on the greatest risks to public health in manufacturing procedures, to ensure that process and product quality
standards do not impede innovation, and to apply a consistent approach to these issues across FDA.

Prescription Drug User Fee Act of 1992 (PDUFA III) receives its third five-year extension. The reauthorization requires pilots for risk management, a good review of manufacturing practices and a continuous marketing application. PDUFA III continues goals for meetings with industry and to shorten review time.

FDA publishes a guidance for industry that provides advice on establishing registries that monitor the outcomes of pregnancies in women exposed to a specific drug.

2003

The Medicare Prescription Drug Improvement and Modernization Act requires, among other elements, that a study be made of how current and emerging technologies can be utilized to make essential information about prescription drugs available to the blind and visually impaired.

FDA is given clear authority under the Pediatric Research Equity Act to require that sponsors conduct clinical research into pediatric applications for new drugs and biological products.

2004

Project BioShield Act of 2004 authorizes FDA to expedite its review procedures to enable rapid distribution of treatments as countermeasures to chemical, biological,
and nuclear agents that may be used in a terrorist attack against the U.S., among other provisions.

A ban on over-the-counter steroid precursors increased penalties for making, selling, or possessing illegal steroids precursors, and funds for preventive education to children are features of the Anabolic Steroid Control Act of 2004.

FDA publishes “Innovation or Stagnation? — Challenge and Opportunity on the Critical Path to New Medical Products.” It examines the critical path needed to bring therapeutic products to fruition, and how FDA can collaborate to make medical breakthroughs available to those in need as quickly as possible.

Based on results from controlled clinical studies indicating that Cox-2 selective agents may be connected to an elevated risk of heart attack and stroke, FDA issues a public health advisory urging health professionals to limit the use of these drugs.

FDA regulation calls for over-the-counter medicines commonly used in hospitals and all prescription medicines to have a barcode. The barcode rule aims to protect patients from preventable medication errors.

2005

Formation of the Drug Safety Board is announced, consisting of FDA staff and representatives from the National Institutes of Health and the Veterans Administration. The Board will advise the Director, Center for Drug Evaluation and Research, FDA, on drug
safety issues and work with the agency in communicating safety information to health professionals and patients.

Three final guidances were published to fulfill FDA’s commitment to the risk management performance goals that are part of the 2002 reauthorization of PDUFA.

- Premarketing Risk Assessment
- Development and Use of Risk Minimization Action Plans
- Good Pharmacovigilance Practices and Pharmacoepidemiologic Assessment

2006

FDA approves the final rule, Requirements on Content and Format of Labeling for Human Prescription Drug and Biological Products. New content and format requirements make it easier for healthcare professionals to access, read, and use in FDA-approved labeling.
5.4 FEDERAL DRUG PENALTIES
Review the information on Federal Drug penalties by reading the following:

- **Mandatory Minimum Penalties for Drug Offenses in the Federal Criminal Justice System** (Section Three)
- **Federal Trafficking Penalties**
- **Drug Courts**

Then watch this video on **Mass Incarceration in the US** from the Vlogbrothers.

One or more interactive elements has been excluded from this version of the text. You can view them online here: [https://psu.pb.unizin.org/bbh143/?p=647#oembed-1](https://psu.pb.unizin.org/bbh143/?p=647#oembed-1)

HBO Documentaries: **The Sentence**
Film is available on HBO and Amazon Prime Video.
5.5 DRUG POLICIES: PENN STATE AND PENNSYLVANIA

PENN STATE UNIVERSITY POLICIES GOVERNING ALCOHOL & OTHER DRUGS

Penn State’s Alcohol and Drug Policy

Federal law requires Penn State to notify all faculty, staff, and students of certain information pertaining to the unlawful possession, use, or distribution of illicit drugs and alcohol on its property or as part of its activities. The information included in this report complies with the notification requirements of the Drug-Free Schools and Communities Act and its implementing regulations.

The University prohibits the unlawful possession, use, manufacture, or distribution of alcohol or controlled substances by students, faculty, staff, and guests in buildings, facilities, grounds, or property controlled by the University or used as part of University activities. For students, this includes prohibiting the possession and
consumption of any beverage containing alcohol in a residence hall room except by individuals who are 21 years or older at campuses where alcoholic beverages are permitted. This also includes prohibiting the presence of students under the age of 21 in residence hall rooms where alcohol is present. In addition, the smoking of any material is prohibited in all facilities of Penn State University at all locations.

Areas Open to the Public

The Pennsylvania State University prohibits the possession and use of alcoholic beverages in areas open to the public, including areas of buildings open to the public. However, the use of alcoholic beverages, subject to the laws of the Commonwealth, may be permitted at University-sponsored activities in areas designated by, and with the prior approval of, the University Risk Manager at the University Park campus; the Senior Vice President for Health Affairs and Dean of the College of Medicine, Penn State Milton S. Hershey Medical Center; or at other non-University Park locations, the Chancellor or appropriate campus/center executive officer responsible for the area requested.

Private or Closed Areas

The possession and use of alcoholic beverages are prohibited in conference rooms, offices, office reception rooms, closed buildings, and areas of buildings not open to the public or from which the public has been excluded, except: the use of alcoholic beverages, subject to the laws
of the Commonwealth, may be permitted in specific private or closed areas designated by, and with the prior approval of, the appropriate person responsible for the area of request.

Education and Research Areas

The Pennsylvania State University specifically prohibits the use, possession, and dispensing of alcoholic beverages in classrooms, lecture halls, laboratories, libraries, research areas, or within buildings, arenas or areas where athletic events, lectures, or concerts are held, during such events or activities. Permission will not be granted to use or possess alcoholic beverages in a facility that is being used for one of the above functions. (Please consult Policy AD18, Possession, Use and Distribution of Alcoholic Beverages, for more information)

Policies Specific to Faculty and Staff

As a condition of University employment, every employee shall abide by the terms of this policy. Any employee who violates this policy is subject to Penn State sanctions, including dismissal, as well as criminal sanctions provided by federal, state, or local law. An employee may be required to participate in a drug abuse or drug rehabilitation program. An employee must notify his or her supervisor of any criminal drug conviction for a violation occurring in the University workplace no later than five (5) days after such conviction. Please consult Policy AD33, A Drug-Free Workplace for more
Policies Specific to Penn State Students

Any student who violates this policy is subject to disciplinary action including sanctions as outlined in the Student Code of Conduct in addition to any penalties resulting from violating local, state, and/or federal law. Disciplinary sanctions may include: Students who are found responsible for violations may be subject to sanctions ranging from Disciplinary Warning or Disciplinary Probation to Suspension or Expulsion from the University. Students residing in University housing may also lose the privilege of living on campus for violating University rules and regulations or conditions of the housing contract. In most cases, the Office of Student Conduct will also assign developmental and educational interventions designed to promote greater awareness and improved decision making for students and to further deter future misconduct.

Residence Life Alcohol Policy

Alcohol and Illegal Substances

Alcohol Policy

The possession of use of alcoholic beverages is prohibited on all Penn State Mont Alto facilities and grounds.

It is a violation of state law and University policy for a student under 21 years of age to attempt to purchase,
consume, possess, or transport alcoholic beverages. It is unlawful to sell, furnish, and give alcoholic beverages or to permit alcoholic beverages to be sold, furnished or given to any minor.

Residents will be held responsible for activities that occur in their rooms and will be referred to the Office of Residence Life, the Office of Student Conduct, and/or University Police if guests are violating the on-campus alcohol policies listed above.

Failure to comply with the direction or to present identification to University Officials acting in the performance of their duties is a violation of the Student Code of Conduct and will result in a referral to the Office of Residence Life or the Office of Student Conduct.

It is against the Student Code of Conduct to supply false information, such as name, age, etc. to University Officials who are acting in the performance of their duties.

Illegal Substances (Drugs)

It is a violation of state law and University policy to illegally possess, use, distribute, manufacture, sell, or be under the influence of other drugs. Students who violate this policy will be referred to the Office of Residence Life, the Office of Student Conduct, and/or University Police and Public Safety.

It is against residence hall policy for a student to be in a residential area (room, common area, common building, building entryway, or quad area immediately adjacent to the residence halls) and in the presence of an illegal substance. Students who are in the presence of an illegal
substance in these areas will be referred to the Office of Residence Life, the Office of Student Conduct and/or University Police and Public Safety.

Pennsylvania Alcohol-Related Offenses

Pennsylvania’s Medical Amnesty Law

If an individual who is under 21, in good faith, calls and believes they are the first to call 911, police, ambulance or campus security, gives their name and stays with the person to prevent that person’s death or serious injury, the caller is immune from prosecution for consumption or possession of alcohol.

Penn State’s Responsible Action Protocol

Penn State has a Responsible Action Protocol whereby students who seek medical assistance for peers suffering from alcohol poisoning or related problems may not be charged through the campus student conduct system for their own alcohol violations. Under the protocol, students who act responsibly by notifying the appropriate authorities (e.g., calling 911, alerting a resident assistant, contacting the police) typically will not face University disciplinary action for their own alcohol violations, unless they are responsible for other violations (e.g., vandalism, assault) as well. However, these students will be required to attend BASICS or similar program; the fee will be waived.
Underage Drinking

It is illegal for anyone under 21 years of age to attempt to purchase, consume, possess, or knowingly and intentionally transport any liquor, malt, or brewed beverage. It is also illegal to lie about age to obtain alcohol and to carry a false identification card.

Underage Drinking

<table>
<thead>
<tr>
<th>Penalty</th>
<th>1st Offense</th>
<th>2nd Offense</th>
<th>Subsequent Offense</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine</td>
<td>$0 - $500</td>
<td>$0 - $1000</td>
<td>$0 - $1000</td>
</tr>
<tr>
<td>Jail</td>
<td>0 - 90 days</td>
<td>0 - 1 year</td>
<td>0 - 1 year</td>
</tr>
<tr>
<td>License Suspension</td>
<td>at least 90 days</td>
<td>at least 1 year</td>
<td>at least 2 years</td>
</tr>
</tbody>
</table>

By law, the local police department and University Police are required to notify parents or guardians of all underage-drinking violations.

Penn State University has a zero-tolerance policy associated with students consuming beverage alcohol under the age of 21. Not only is this against the Pennsylvania law, but it is also a violation of the Student Code of Conduct.

Carrying False I.D.

It is illegal for anyone under 21 to possess an identification card falsely identifying that person by name, age, date of birth, or photograph as being 21 or older to attempt to obtain liquor, malt, or brewed
beverage by using the identification card of another or by using an identification card that has not been lawfully issued to or in the name of the person who possesses the card.

**Carrying False I.D.**

<table>
<thead>
<tr>
<th>Penalty</th>
<th>1st Offense</th>
<th>2nd Offense</th>
<th>Subsequent Offense</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine</td>
<td>$0-$300</td>
<td>$0-$500</td>
<td>$0-$500</td>
</tr>
<tr>
<td>Jail</td>
<td>0-90 days</td>
<td>0-1 year</td>
<td>0-1 year</td>
</tr>
<tr>
<td>License suspension</td>
<td>at least 90 days</td>
<td>at least 1 year</td>
<td>at least 2 years</td>
</tr>
</tbody>
</table>

**Public Drunkenness**

It is illegal to appear in any public place manifestly under the influence of alcohol to the degree that you may endanger yourself or other persons or property, or annoy others in your vicinity.

Public drunkenness is a crime when a person appears in any public place manifestly under the influence of alcohol or a controlled substance to the degree that he may endanger himself or other persons or property, or annoy persons in his vicinity.

Public drunkenness also leads to other behaviors and important health concerns. Often, public drunkenness contributes to many criminal mischiefs and disorderly conducts on campus. People must be responsible for their own actions and know their limits and tolerance levels before consuming alcohol.
Public Drunkeness

<table>
<thead>
<tr>
<th>Penalty</th>
<th>1st Offense</th>
<th>2nd Offense</th>
<th>Subsequent Offense</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine</td>
<td>$0-$500</td>
<td>$0-$1000</td>
<td>$0-$1000</td>
</tr>
<tr>
<td>Jail</td>
<td>0-90 days</td>
<td>0-90 days</td>
<td>0-90 days</td>
</tr>
</tbody>
</table>

Driving Under the Influence (DUI) Law

In Pennsylvania, the illegal level for DUI is .08 percent Blood Alcohol Content (BAC) and .02 percent BAC for minors. The law emphasizes treatment and a three-tier penalty system based on BAC and prior offenses: (1) general impairment (.08-.099 percent), (2) high rate of alcohol (.10-.159 percent), and (3) highest rate of alcohol (.16 percent and above).

Also, drivers with any amount of a Schedule I, II, or III controlled substance not medically prescribed (or their metabolites) may not drive, operate or be in actual physical control of a vehicle.

It is illegal for anyone under 21 years of age to drive a vehicle with a blood alcohol content of .02 percent or higher. A first-time offense individual, under certain circumstances, may qualify for an Accelerated Rehabilitative Disposition (ARD) program.
## Driving Under the Influence (DUI) Law

<table>
<thead>
<tr>
<th>Penalty</th>
<th>1st Offense</th>
<th>2nd Offense</th>
<th>Subsequent Offense</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine</td>
<td>$0-$5000</td>
<td>$750-$5000</td>
<td>$1500-$5000</td>
</tr>
<tr>
<td>Jail</td>
<td>2 days to 6 months</td>
<td>30 days to 6 months</td>
<td>90 days to 5 years</td>
</tr>
<tr>
<td>License suspension</td>
<td>1 year</td>
<td>1 year</td>
<td>18 months</td>
</tr>
<tr>
<td>Other</td>
<td>Alcohol</td>
<td>1 year Ignition license</td>
<td>1 year Ignition license</td>
</tr>
<tr>
<td></td>
<td>Highway Safety School</td>
<td>Alcohol Highway Safety School</td>
<td>Court Reporting Network file</td>
</tr>
<tr>
<td></td>
<td>Court Reporting</td>
<td>Court Reporting</td>
<td>Network file</td>
</tr>
<tr>
<td></td>
<td>Network file</td>
<td>Network file</td>
<td></td>
</tr>
</tbody>
</table>

### Refusing a Chemical Test

Any person who drives a motor vehicle automatically gives consent to one or more chemical test (e.g. breath, blood, or urine). This implied consent means that you don’t have the right to an attorney before testing. If a person refuses to submit to a chemical test: (1) the test will not be done; (2) the person may be charged with DUI. For more information about all alcohol-related offenses and resources in Pennsylvania, see [Pennsylvania Liquor Control Board](https://www.lcb.state.pa.us).

### Open Container Law

In Pennsylvania, there is no state law to prohibit open
containers of alcohol in public. However, many local governments have enacted such ordinances. For more information about all alcohol-related offenses in Pennsylvania, see Pennsylvania Liquor Control Board.

Related Drug Offenses

Possession of Marijuana

A person is unlawful when unknowingly, knowingly, or intentionally possesses marijuana (Hashish), a Schedule I substance, and is not authorized by law to possess such substance, as outlined under the Controlled Substances, Drugs, Device, and Cosmetic Act of 1972.

Persons engaged in such activity will most likely be faced with criminal charges and charged with a violation of the Student Code of Conduct.

Charges for marijuana possession

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Charge</th>
<th>Jail Time</th>
<th>Fine</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 grams or less</td>
<td>Misdemeanor</td>
<td>30 days</td>
<td>$0-$500</td>
</tr>
<tr>
<td>Over 30 grams</td>
<td>Misdemeanor</td>
<td>1 year</td>
<td>$0-$5000</td>
</tr>
</tbody>
</table>

Pennsylvania's Medical Marijuana Act

Pennsylvania’s Medical Marijuana Act went into effect on May 17, 2016. However, marijuana in any form remains a prohibited controlled substance under federal law, and therefore the possession, cultivation, and use by individuals remain illegal under federal law. The
Pennsylvania Medical Marijuana Act conflicts with federal criminal laws governing controlled substances, as well as federal laws requiring institutions receiving federal funds, by grant or contract, to maintain drug-free campuses and workplaces. Penn State receives federal funding that would be in jeopardy if those federal laws did not take precedence over state law. Therefore, the use and/or possession by individuals of marijuana in any form and for any purpose continues to violate applicable University policies, and any student or employee who violates such policies will be subject to disciplinary sanctions.

Possession of Other Drugs

In Pennsylvania, the penalties for being convicted of possession of a controlled substance such as heroin, cocaine, methamphetamines, prescriptions, ecstasy, and LSD vary by type of substance and quantity of the substance possessed. Charges also vary by first, second and subsequent offenses. Charges may include jail time, fines, drug counseling, and suspension of driver’s license.

Possession of Drug Paraphernalia

A person is unlawful when he possesses, with the intent to use, drug paraphernalia that is used for packaging, manufacturing, injecting, ingesting, inhaling, or otherwise introducing into the human body a controlled substance in violation of the Controlled Substances, Drugs, Device, and Cosmetic Act of 1972.
Synthetic Marijuana

Effective March 1, 2011, the U.S. Drug Enforcement Agency classified synthetic marijuana as an illegal substance. It is also known as Spice, K2, Demon, Wicked, Black Magic, Voodoo Spice, and Ninja Aroma Plus. Individuals found responsible for manufacturing, possessing, importing/exporting, or distributing these substances will face criminal and civil penalties. Penn State students engaging in these activities will also be held responsible under the University’s illegal substances policy. It is also against University policy to use synthetic marijuana.

**Controlled Substances Act (CSA)** — The CSA places all substances that are regulated under existing federal law into one of five schedules. The place is based on the substance’s medical use, the potential for abuse, and safety or dependence ability. Below is a description of the five schedules and examples of drugs in each schedule. The list is not comprehensive.

The Five Schedules of the Controlled Substances Act (CSA)
<table>
<thead>
<tr>
<th>Schedule</th>
<th>Characteristics</th>
<th>Examples</th>
</tr>
</thead>
</table>
| Schedule 1 | - high potential for abuse  
- no currently accepted medical use in the US  
- lack of accepted safety for use under medical supervision | - Heroin  
- Gamma Hydroxybutyric Acid (GHB)  
- LSD  
- Marijuana  
- MDMA (Ecstasy)  
- Mescaline (peyote)  
- Psilocybin/Psilocyn (mushrooms)  
- Tetrahydrocannabinol (THC)  
- Adderall®  
- Amphetamine  
- Cocaine  
- Fentanyl  
- Hydrocodone  
- Methadone  
- Methamphetamine  
- Morphine  
- Oxycodone  
- Phencyclidine (PCP)  
- Ritalin® |
| Schedule 2 | - high potential for abuse  
- currently accepted for medical use or with severe restrictions in the US  
- abuse may lead to severe psychological or physical dependence | - Anabolic Steroids  
- Codeine compounds  
- Some barbiturates  
- Ketamine |
| Schedule 3 | - less potential for abuse than drugs in Schedules I and II  
- currently accepted for medical use in the US  
- abuse may lead to moderate or low physical dependence or high psychological dependence |  |
<table>
<thead>
<tr>
<th>Schedule</th>
<th>Characteristics</th>
<th>Examples</th>
</tr>
</thead>
</table>
| Schedule 4 | • low potential for abuse compared to drugs in Schedule III  
  • currently accepted medical use in the US  
  • abuse may lead to limited physical dependence or psychological dependence | • Ativan®  
  • Rohypnol® (not manufactured or legally marketed in the US)  
  • Valium®  
  • Xanax® |
| Schedule 5 | • low potential for abuse compared to drugs in Schedule IV  
  • currently accepted medical use in the US  
  • abuse may lead to limited physical dependence or psychological dependence | • Cough medicines with codeine |

Federal Tracking Penalties for Marijuana
<table>
<thead>
<tr>
<th>Drug</th>
<th>Quantity</th>
<th>1st Offense</th>
<th>2nd Offense (Footnote)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marijuana (Schedule I)</td>
<td>1,000 kg or more mixture; or 1,000 or more plants</td>
<td>• Not less than 10 yrs, not more than life • If death or serious injury, not less than 20 yrs, not more than life • Fine not more than $10 million if an individual, $50 million if other than an individual</td>
<td>• Not less than 20 yrs, not more than life • If death or serious injury, mandatory life • Fine not more than $20 million if an individual, $75 million if other than an individual</td>
</tr>
<tr>
<td>Marijuana (Schedule I)</td>
<td>100 kg to 999 kg mixture; or 100 to 999 plants</td>
<td>• Not less than 5 yrs, not more than 40 yrs • If death or serious injury, not less than 20 yrs, not more than life • Fine not more than $5 million if an individual, $25 million if other than an individual</td>
<td>• Not less than 10 years, not more than life • If death or serious injury, mandatory life • Fine not more than $8 million if an individual, $50 million if other than an individual</td>
</tr>
<tr>
<td>Marijuana (Schedule I)</td>
<td>More than 10 kgs of hashish; 50 to 99 kg mixture More than 1 kg of hashish oil; 50 to 99 plants</td>
<td>• Not more than 20 yrs • If death or serious injury, not less than 20 yrs, not more than life • Fine $1 million if an individual, $5 million if other than an individual</td>
<td>• Not more than 30 years • If death or serious injury, mandatory life • Fine $2 million if an individual, $10 million if other than individual</td>
</tr>
<tr>
<td>Drug (Schedule I)</td>
<td>Quantity</td>
<td>1st Offense</td>
<td>2nd Offense (Footnote)</td>
</tr>
<tr>
<td>------------------</td>
<td>----------</td>
<td>-------------</td>
<td>-----------------------</td>
</tr>
</tbody>
</table>
| Marijuana        | 1 to 49 plants; less than 50 kg | • Not more than 5 years  
                               • Fine not more than $250,000, $1 million other than individual | • Not more than 10 years  
                               • Fine $500,000 if an individual, $2 million if other than individual |
| Hashish          | 10 kg or less | • Not more than 5 years  
                               • Fine not more than $250,000, $1 million other than individual | • Not more than 10 years  
                               • Fine $500,000 if an individual, $2 million if other than individual |
| Hashish          | 1 kg or less | • Not more than 5 years  
                               • Fine not more than $250,000, $1 million other than individual | • Not more than 10 years  
                               • Fine $500,000 if an individual, $2 million if other than individual |

Footnote: The minimum sentence for a violation after two or more prior convictions for a felony drug offense has become final is a mandatory term of life imprisonment without release and a fine up to $8 million if an individual and $20 million if other than an individual.


The following tables list Federal Tracking Penalties for various drugs in different amounts.

The penalties for the first table are as follows:
First Offense: Not less than 5 yrs, and not more than 40 yrs. If death or serious injury, not less than 20 or
more than life. Fine of not more than $5 million if an individual, $25 million if not an individual.

Second Offense: Not less than 10 yrs, and not more than life. If death or serious injury, life imprisonment. Fine of not more than $8 million if an individual, $50 million if not an individual.

Federal Tracking Penalties

<table>
<thead>
<tr>
<th>Drug Schedule</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cocaine (Schedule II)</td>
<td>500–4999 gms mixture</td>
</tr>
<tr>
<td>Cocaine Base (Schedule II)</td>
<td>28–279 gms mixture</td>
</tr>
<tr>
<td>Fentanyl (Schedule II)</td>
<td>40–399 gms mixture</td>
</tr>
<tr>
<td>Fentanyl Analogue (Schedule II)</td>
<td>10–99 gms mixture</td>
</tr>
<tr>
<td>Heroin (Schedule I)</td>
<td>100–999 gms mixture</td>
</tr>
<tr>
<td>LSD (Schedule I)</td>
<td>1–9 gms mixture</td>
</tr>
<tr>
<td>Methamphetamine (Schedule II)</td>
<td>5–49 gms pure or 50–499 gms mixture</td>
</tr>
<tr>
<td>PCP (Schedule II)</td>
<td>10–99 gms pure or 100–999 gms mixture</td>
</tr>
</tbody>
</table>

The penalties for the next table are as follows:

First Offense: Not less than 10 yrs, and not more than life. If death or serious injury, not less than 20 or more than life. Fine of not more than $10 million if an individual, $50 million if not an individual.
Second Offense: Not less than 20 yrs, and not more than life. If death or serious injury, life imprisonment. Fine of not more than $20 million if an individual, $75 million if not an individual.

2 or More Prior Offenses: Life imprisonment. Fine of not more than $20 million if an individual, $75 million if not an individual.

Federal Tracking Penalties for Larger Quantities

<table>
<thead>
<tr>
<th>Drug Schedule</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cocaine (Schedule II)</td>
<td>5 kgs or more mixture</td>
</tr>
<tr>
<td>Cocaine Base (Schedule II)</td>
<td>280 gms or more mixture</td>
</tr>
<tr>
<td>Fentanyl (Schedule II)</td>
<td>400 gms or more mixture</td>
</tr>
<tr>
<td>Fentanyl Analogue (Schedule II)</td>
<td>100 gms or more mixture</td>
</tr>
<tr>
<td>Heroin (Schedule I)</td>
<td>1 kg or more mixture</td>
</tr>
<tr>
<td>LSD (Schedule I)</td>
<td>10 gms or more mixture</td>
</tr>
<tr>
<td>Methamphetamine (Schedule II)</td>
<td>50 gms or more pure or 500 gms or more mixture</td>
</tr>
<tr>
<td>PCP (Schedule II)</td>
<td>100 gm or more pure or 1kg or more mixture</td>
</tr>
</tbody>
</table>

The following table lists other drugs and their penalties.
Federal Tracking Penalties for Other Drugs
<table>
<thead>
<tr>
<th>Drug Schedule</th>
<th>Quantity</th>
<th>Penalties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Schedule I &amp; II drugs (and any drug product containing Gamma Hydroxybutyric Acid) Flunitrazepam (Schedule IV)</td>
<td>Any amount to 1 gm</td>
<td>First Offense: Not more than 20 yrs. If death or serious injury, not less than 20 years, or more than life. Fine $1 million if an individual, $5 million if not an individual. Second Offense: Not more than 30 yrs. If death or serious injury, life imprisonment. $2 million if an individual, $10 million if not an individual.</td>
</tr>
<tr>
<td>Other Schedule III drugs</td>
<td>Any amount</td>
<td>First Offense: Not more than 10 yrs. If death or serious injury, not more than 15 yrs. Fine not more than $500,000 if an individual, $2.5 million if not an individual. Second Offense: Not more than 20 yrs. If death or serious injury, not more than 30 yrs. Fine not more than $1 million if an individual, $5 million if not an individual.</td>
</tr>
<tr>
<td>All other Schedule IV drugs</td>
<td>Any amount</td>
<td>First Offense: Not more than 5 years. Fine not more than $250,000 if an individual, $1 million if not an individual. Second Offense: Not more than 10 yrs. Fine not more than $500,000 if an individual, $2 million if not an individual.</td>
</tr>
<tr>
<td>Drug Schedule</td>
<td>Quantity</td>
<td>Penalties</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------------------------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Flunitrazepam (Schedule IV)</td>
<td>Other than 1 gm or more</td>
<td>First Offense: Not more than 5 years. Fine not more than $250,000 if an individual, $1 million if not an individual. Second Offense: Not more than 10 yrs. Fine not more than $500,000 if an individual, $2 million if not an individual.</td>
</tr>
<tr>
<td>All Schedule V drugs</td>
<td>Any amount</td>
<td>First Offense: Not more than 1 yr. Fine not more than $100,000 if an individual, $250,000 if not an individual. Second Offense: Not more than 4 yrs. Fine not more than $200,000 if an individual, $500,000 if not an individual.</td>
</tr>
</tbody>
</table>

5.6
CONFIDENTIALITY
OF ALCOHOL
AND DRUG
ABUSE PATIENT
RECORDS

42 CFR Part 2 Confidentiality of Substance Use Disorder Patient Records

Learn about 42 CFR Part 2, a federal law governing confidentiality for people seeking treatment for substance use disorders from federally assisted programs. Federal privacy laws and regulations exist to protect patients’ personal health information. These policies guide healthcare professionals, health IT vendors, and insurance companies to maintain information security and patient confidentiality.

If you or a family member seeks treatment for a substance use disorder, or you are a professional who works with this population, it is important to understand a federal statute called Confidentiality of Alcohol and Drug Abuse Patient Records.

The federal statute governs confidentiality for people seeking treatment for substance use disorders from federally assisted programs.

This law generally requires a federally assisted substance use program to have a patient’s consent before releasing information to others. It encourages people to seek treatment and reassures patient privacy.

Proposed Revisions and the Notice of Proposed Rulemaking (NPRM)

The U.S. healthcare system has changed significantly since 42 CFR Part 2 was last substantially updated in 1987. Over the last 25 years, changes to health care include:

- New models of integrated care for supporting patient care
- An electronic infrastructure for managing and exchanging patient data
- The expansion of prescription drug monitoring programs
- A new focus on measuring performance in healthcare systems

In February 2016, the Department of Health and Human Services (HHS) published proposed revisions to 42 CFR Part 2. The proposed rule, Confidentiality of Substance Use Disorder Patient Records, was published in the Federal Register on Feb. 9, 2016. HHS recognized the need to update these regulations and used this proposal to suggest changes. Public comments were collected until
April 11, 2016, and are available on the Regulations.gov Web site.

SAMHSA hosted a webinar to give an overview of the proposed rule (NPRM):

Video: Proposed Rule Updating the Substance Abuse Confidentiality Regulations (42 CFR Part 2) (19 minutes) (link is external)
Webinar slides – 2016 (PDF | 1.5 MB)

Final Rule

SAMHSA issued a final rule to update and modernize the Confidentiality of Alcohol and Drug Abuse Patient Records (now the Confidentiality of Substance Use Disorder Patient Records) regulations and facilitate information exchange within new health care models while addressing the legitimate privacy concerns of patients seeking treatment for a substance use disorder. These modifications also help clarify the regulations and reduce unnecessary burden. On March 21, 2017, the final 42 CFR part 2 rule went into effect.

SAMHSA concurrently issued a supplemental notice of proposed rulemaking (SNPRM) that proposes additional clarifications to the part 2 regulations as amended by the final rule. Questions were raised by commenters on the proposed rule that highlighted varying interpretations of the 1987 rule’s restrictions on lawful holders and their contractors and subcontractors’ use and disclosure of part 2-covered data for purposes of carrying out payment, health care operations, and other health care-related activities. Public comments were collected on the SNPRM until February 17, 2017.

SAMHSA hosted and recorded a webinar (73 minutes)
that gives a broad overview of the Final Rule and the SNPRM available for viewing.

On January 3, 2018, SAMHSA issued a final rule based on the SNPRM.

Listening Sessions

In 2014, SAMHSA hosted a public listening session discussing concerns around 42 CFR Part 2 with stakeholders. Comments received during the listening session are posted on the SAMHSA Web site.

In January 2018, as required by Section 11002 of the 21st Century Cures Act, SAMHSA will hold a public meeting to seek input on how Part 2 impacts patient care, health outcomes, and patient privacy.

- Transcript of 2018 Listening Session (PDF | 945 KB)
- SAMHSA 2018 Listening Session Introductory PowerPoint Slides (PDF | 1 MB)
- SAMHSA Listening Session Audio Recording (Youtube) Part 1 (link is external); Part 2 (link is external); Part 3 (link is external)
- SAMHSA Listening Session Comments Summary (PDF | 745 KB)

Other Resources

SAMHSA has worked closely with the Office of the National Coordinator for Health Information Technology (ONC) to develop guidance documents for behavioral health providers on applying 42 CFR Part 2:

- FAQs by SAMHSA & ONC: Applying the Substance Abuse Confidentiality Regulations to Health Information
Exchange (HIE) – 2010 (PDF | 381 KB)
Applying the Substance Abuse Confidentiality Regulations 42 CFR Part 2 – 2011 (PDF | 57 KB)
Disclosure of Substance Use Disorder Patient Records: Does Part 2 Apply to Me?
This fact sheet explains a 42 CFR Part 2 Program and how healthcare providers can determine how Part 2 applies to them.
Disclosure of Substance Use Disorder Patient Records: How Do I Exchange Part 2 Data?
This fact sheet describes how 42 CFR Part 2 applies to the electronic exchange of healthcare records with a Part 2 Program.
SAMHSA is in the process of providing updated guidance to reflect changes made in the 2017 and 2018 rules.

In addition to federal regulations, many states have established regulations to protect health information. In these states, the state- or federal-level regulation that is most stringent is the one that applies. For more information on laws and regulations specific to behavioral health, access SAMHSA’s Laws, Regulations, and Guidelines topic.
5.7 DRUG SCREENING AND DECRIMINALIZATION

In this section, you will explore information about Drug Screening for Employment:

- What You Should Know About Pre-Employment Drug Screening

And the decriminalization, medicalization, and taxation of drugs:

- Portugal decriminalized drugs 14 years ago – and now hardly anyone dies from overdosing
- In Portugal, Drug Use Is Treated As A Medical Issue, Not A Crime
- Hidden Brain: How Cigarette Taxes Affect Food Buying
- How LSD Makes Your Brain One With The Universe
CHAPTER 6
CHAPTER 6:
USE, ABUSE, ADDICTION & TREATMENT

Introduction

You have probably thought about why some people can have healthy relationships with drugs and function well in life, while others get addicted and manage to ruin their lives and the lives of those around them. For some people, drinking a glass of beer or wine is part of winding down at the end of the day or enjoying a nice meal, for others it turns into binge drinking with predictable destructive behaviors and endless excuses. In this chapter, we will examine some of the factors that can lead to addiction, how addiction impacts health and well-being, and what people are trying to do to help.
CHAPTER 6
OBJECTIVES

Learning Objectives

By the end of this chapter you should be able to:

1. Distinguish between drug use, drug abuse, and addiction
2. Determine what factors increase the risk for addiction
3. Recognize the impact of addiction on health
4. Give examples of different treatment methods for addiction
5. Identify different community efforts to help people with addictions
6.1 DRUGS, BRAINS, AND BEHAVIOR: THE SCIENCE OF ADDICTION

DRUG MISUSE AND ADDICTION

Being with a short video: The director of the Center for Disease Control (CDC), Dr. Robert Redfield, talked about addiction October 30th starting at minute 2:00 in this 4-minute interview of CBS This Morning. [CBS News, CDC director says they’re “poised” to do more gun research if Congress funds it](https://www.cbsnews.com/)

What is drug addiction?

Addiction is defined as a chronic, relapsing disorder characterized by compulsive drug seeking and use despite
adverse consequences.† It is considered a brain disorder because it involves functional changes to brain circuits involved in reward, stress, and self-control, and those changes may last a long time after a person has stopped taking drugs.\textsuperscript{11}

Addiction is a lot like other diseases, such as heart disease. Both disrupt the normal, healthy functioning of an organ in the body, both have serious harmful effects, and both are, in many cases, preventable and treatable. If left untreated, they can last a lifetime and may lead to death.

Brain scans that show changes in the brain after 1 and 4 months of cocaine use vs. in someone who has never used cocaine.


Modified with permission from Volkow et al. 1993.

Note: These fMRI images compare the brain of an individual with a history of cocaine use disorder (middle and right) to the brain of an individual without a history of cocaine use (left). The person who has had a cocaine use disorder has lower levels of the D2 dopamine receptor (depicted in red) in the striatum one month (middle) and four months (right) after stopping cocaine use compared to the non-user. The level of dopamine receptors in the brain of the cocaine user is higher at the 4-month mark (right), but have not returned to the levels observed in the non-user (left).
The term addiction as used in this booklet is equivalent to a severe substance use disorder as defined by the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5, 2013).

Why do people take drugs?

In general, people take drugs for a few reasons:

- **To feel good.** Drugs can produce intense feelings of pleasure. This initial euphoria is followed by other effects, which differ with the type of drug used. For example, with stimulants such as cocaine, the high is followed by feelings of power, self-confidence, and increased energy. In contrast, the euphoria caused by opioids such as heroin is followed by feelings of relaxation and satisfaction.

- **To feel better.** Some people who suffer from social anxiety, stress, and depression start using drugs to try to feel less anxious. Stress can play a major role in starting and continuing drug use as well as relapse (return to drug use) in patients recovering from addiction.

- **To do better.** Some people feel pressure to improve their focus in school or at work or their abilities in sports. This can play a role in trying or continuing to use drugs, such as prescription stimulants or cocaine.

- **Curiosity and social pressure.** In this respect, teens are particularly at risk because peer pressure can be very strong. Teens are more
likely than adults to act in risky or daring ways to impress their friends and show their independence from parents and social rules.

If taking drugs makes people feel good or better, what’s the problem?

When they first use a drug, people may perceive what seem to be positive effects. They also may believe they can control their use. But drugs can quickly take over a person’s life. Over time, if drug use continues, other pleasurable activities become less pleasurable, and the person has to take the drug just to feel “normal.” They have a hard time controlling their need to take drugs even though it causes many problems for themselves and their loved ones. Some people may start to feel the need to take more of a drug or take it more often, even in the early stages of their drug use. These are the telltale signs of an addiction.

Even relatively moderate drug use poses dangers. Consider how a social drinker can become intoxicated, get behind the wheel of a car, and quickly turn a pleasurable activity into a tragedy that affects many lives. Occasional drug use, such as misusing an opioid to get high, can have similarly disastrous effects, including overdose, and dangerously impaired driving.

Do people freely choose to keep using drugs?

The initial decision to take drugs is typically voluntary. But with continued use, a person’s ability to exert self-control can become seriously impaired; this impairment
in self-control is the hallmark of addiction. Brain imaging studies of people with addiction show physical changes in areas of the brain that are critical to judgment, decision-making, learning and memory, and behavior control.12 These changes help explain the compulsive nature of addiction.

Why do some people become addicted to drugs, while others do not?

No single factor determines whether a person will become addicted to drugs. As with other diseases and disorders, the likelihood of developing an addiction differs from person to person, and no single factor determines whether a person will become addicted to drugs. In general, the more risk factors a person has, the greater the chance that taking drugs will lead to drug use and addiction. Protective factors, on the other hand, reduce a person’s risk. Risk and protective factors may be either environmental or biological.

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Protective Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggressive behavior in childhood13,14</td>
<td>Good self-control15</td>
</tr>
<tr>
<td>Lack of parental supervision14,16</td>
<td>Parental monitoring and support16-18</td>
</tr>
<tr>
<td>Poor social skills13,17,18</td>
<td>Positive relationships17,19</td>
</tr>
<tr>
<td>Drug experimentation14,20,21</td>
<td>Good grades17,22</td>
</tr>
<tr>
<td>Availability of drugs at school21,23</td>
<td>School anti-drug policies17</td>
</tr>
<tr>
<td>Community poverty24,25</td>
<td>Neighborhood resources26</td>
</tr>
</tbody>
</table>
What biological factors increase the risk of addiction?

Biological factors that can affect a person’s risk of addiction include their genes, stage of development, and even gender or ethnicity. Scientists estimate that genes, including the effects environmental factors have on a person’s gene expression, called epigenetics, account for between 40 and 60 percent of a person’s risk of addiction.\textsuperscript{27} Also, teens and people with mental disorders are at greater risk of drug use and addiction than others.\textsuperscript{28}

What environmental factors increase the risk of addiction?

Children’s earliest interactions within the family are crucial to their healthy development and risk for drug use. Environmental factors are those related to the family, school, and neighborhood. Factors that can increase a person’s risk include the following:

- **Home and Family.** The home environment, especially during childhood, is a very important factor. Parents or older family members who use drugs or misuse alcohol, or who break the law, can increase children’s risk of future drug problems.\textsuperscript{29}

- **Peer and School.** Friends and other peers can
have an increasingly strong influence during the teen years. Teens who use drugs can sway even those without risk factors to try drugs for the first time. Struggling in school or having poor social skills can put a child at further risk for using or becoming addicted to drugs.  

What other factors increase the risk of addiction?

• **Early Use.** Although taking drugs at any age can lead to addiction, research shows that the earlier a person begins to use drugs, the more likely he or she is to develop serious problems. This may be due to the harmful effect that drugs can have on the developing brain. It also may result from a mix of early social and biological risk factors, including the lack of a stable home or family, exposure to physical or sexual abuse, genes, or mental illness. Still, the fact remains that early use is a strong indicator of problems ahead, including addiction.

• **How the drug is taken.** Smoking a drug or injecting it into a vein increases its addictive potential. Both smoked and injected drugs enter the brain within seconds, producing a powerful rush of pleasure. However, this intense high can fade within a few minutes. Scientists believe this starkly felt contrast drives some people to repeated drug taking in an attempt to recapture the fleeting pleasurable state.

Addiction is a developmental disease— it typically begins
in childhood or adolescence.

Brain scans showing the healthy development of the brain from ages 5 to 20. The images are from the side and top views, with a focus on the prefrontal cortex.

Images of Brain Development in health Children and Teens (Ages 5-20)

As the brain matures, experiences prune excess neural connections while strengthening those that are used more often. Many scientists think that this process contributes to the steady reduction in gray matter volume seen during adolescence (depicted as the yellow to blue transition in the figure). As environmental forces help determine which connections will wither and which will thrive, the brain circuits that emerge to become more efficient. However, this is a process that can cut both ways because not all tasks are desirable. The environment is like an artist who creates a sculpture by chipping away excess marble; and just like bad artists can produce bad art, environments with negative factors (like drugs, malnutrition, bullying, or sleep deprivation) can lead to efficient but potentially harmful circuits that conspire against a person’s well-being.

The brain continues to develop into adulthood and undergoes dramatic changes during adolescence.

One of the brain areas still maturing during adolescence is the prefrontal cortex—the part of the brain that allows
people to assess situations, make sound decisions and keep emotions and desires under control. The fact that this critical part of a teen’s brain is still a work in progress puts them at increased risk for making poor decisions, such as trying drugs or continuing to take them. Introducing drugs during this period of development may cause brain changes that have profound and long-lasting consequences.

Below you will find a 7-minute film describing the pathology of addiction according to the theories presented in Dr. Ronald Ruden’s book “The Craving Brain”. (This has already been included earlier, but it also seems to fit well to this chapter.)

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://psu.pb.unizin.org/bbh143/?p=220#oembed-1

What are the other health consequences of drug addiction?

People with addiction often have one or more associated health issues, which could include lung or heart disease, stroke, cancer, or mental health conditions. Imaging scans, chest X-rays, and blood tests can show the damaging effects of long-term drug use throughout the body. For example, it is now well-known that tobacco smoke can cause many cancers, methamphetamine can cause severe dental problems, known as “meth mouth,” and that opioids can lead to overdose and death. In addition, some drugs, such as inhalants, may damage or destroy nerve cells, either in the brain or the peripheral nervous system (the nervous system outside the brain and spinal cord).

Drug use can also increase the risk of contracting infections. Human immunodeficiency virus (HIV) and hepatitis C (a serious liver disease) infection can occur from sharing injection equipment and from impaired judgment leading to unsafe sexual activity. Infection of the heart and its valves (endocarditis) and skin infection (cellulitis) can occur after exposure to bacteria by injection drug use. Addiction and HIV/AIDS are intertwined epidemics.

Does drug use cause mental disorders, or vice versa?

Drug use and mental illness often co-exist. In some cases,
mental disorders such as anxiety, depression, or schizophrenia may come before addiction; in other cases, drug use may trigger or worsen those mental health conditions, particularly in people with specific vulnerabilities.43,44

Some people with disorders like anxiety or depression may use drugs in an attempt to alleviate psychiatric symptoms, which may exacerbate their mental disorder in the long run, as well as increase the risk of developing an addiction.43,44 Treatment for all conditions should happen concurrently.

How can addiction harm other people?

<table>
<thead>
<tr>
<th>The Impact of Addiction Can Be Far-Reaching</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Cardiovascular disease</td>
</tr>
<tr>
<td>• Stroke</td>
</tr>
<tr>
<td>• Cancer</td>
</tr>
<tr>
<td>• HIV/AIDS</td>
</tr>
<tr>
<td>• Hepatitis B and C</td>
</tr>
<tr>
<td>• Lung disease</td>
</tr>
<tr>
<td>• Mental disorders</td>
</tr>
</tbody>
</table>

Beyond the harmful consequences for the person with the addiction, drug use can cause serious health problems for others. Some of the more severe consequences of addiction are:

An image of a put out cigarette.
An image of a car that has been in an accident.

• Negative effects of drug use while pregnant or
breastfeeding: A mother’s substance or medication use during pregnancy can cause her baby to go into withdrawal after it’s born, which is called neonatal abstinence syndrome (NAS). Symptoms will differ depending on the substance used but may include tremors, problems with sleeping and feeding, and even seizures. Some drug-exposed children will have developmental problems with behavior, attention, and thinking. Ongoing research is exploring if these effects on the brain and behavior extend into the teen years, causing continued developmental problems. In addition, some substances can make their way into a mother’s breast milk. Scientists are still learning about the long-term effects on a child who is exposed to drugs through breastfeeding.

• **Negative effects of secondhand smoke:** Secondhand tobacco smoke exposes bystanders to at least 250 chemicals that are known to be harmful, particularly to children. Involuntary exposure to secondhand smoke increases the risks of heart disease and lung cancer in people who have never smoked. Additionally, the known health risks of secondhand exposure to tobacco smoke raise questions about whether secondhand exposure to marijuana smoke poses similar risks. At this point, little research on this question has been conducted. However, a study found that some nonsmoking participants exposed for an hour to high-THC marijuana in an unventilated room
reported mild effects of the drug, and another study showed positive urine tests in the hours directly following exposure.\textsuperscript{47,48} If you inhale secondhand marijuana smoke, it’s unlikely you would fail a drug test, but it is possible.

- **Increased spread of infectious diseases:** Injection of drugs accounts for 1 in 10 of cases of HIV. Injection drug use is also a major factor in the spread of hepatitis C,\textsuperscript{49} and can be the cause of endocarditis and cellulitis. Injection drug use is not the only way that drug use contributes to the spread of infectious diseases. Drugs that are misused can cause intoxication, which hinders judgment and increases the chance of risky sexual behaviors.

- **Increased risk of motor vehicle accidents:** Use of illicit drugs or misuse of prescription drugs can make driving a car unsafe—just like driving after drinking alcohol. Drugged driving puts the driver, passengers, and others who share the road at risk. In 2016, almost 12 million people ages 16 or older reported driving under the influence of illicit drugs, including marijuana.\textsuperscript{50} After alcohol, marijuana is the drug most often linked to impaired driving. Research studies have shown negative effects of marijuana on drivers, including an increase in lane weaving, poor reaction time, and altered attention to the road.

Source: [National Institute on Drug Abuse (NIH), What are the other health consequences of drug addiction?](https://www.drugabuse.gov/dхотельствомрептилий)
Check out these websites and their numerous resources to learn more about addiction to opioids and the efforts to combat the problem and treat addictions:

- National Institute on Drug Abuse (NIDA), Drug Overdose Death Rates
- U.S. Department of Health and Human Services (HHS), National Opioids Crisis: Help and Resources
- Centers for Disease Control and Prevention (CDC), Drug Overdose
6.2 WHY DO ADULTS MISUSE PRESCRIPTION DRUGS?

WHY DO ADULTS MISUSE PRESCRIPTION DRUGS?
Rachel N. Lipari, Ph.D., Matthew Williams, Ph.D., and Struther L. Van Horn, M.A.

INTRODUCTION

Prescription drug misuse is second only to marijuana use as the nation’s most commonly used illicit drug.\textsuperscript{1,2} Although prescription drug misuse is common in the United States, the majority of people (87.2 percent) who take prescription pain relievers do not misuse them.\textsuperscript{2} Understanding the prevalence of and reasons for prescription drug misuse has major public health implications. Policymakers can use this type of information to help inform their assessments of substance use prevention and treatment needs in their communities.

The 2015 National Survey on Drug Use and Health (NSDUH) collects information on the reasons people misuse prescription psychotherapeutic drugs. NSDUH is an annual survey of the U.S. civilian, noninstitutionalized population.
aged 12 years or older and is the primary source for statistical information on illicit drug use, alcohol use, substance use disorders, and mental health issues for this population. One of NSDUH’s strengths is its large sample size, which allows for examinations of prescription drug misuse and the reason for that misuse.

This issue of The CBHSQ Report presents 2015 NSDUH estimates of past year misuse of prescription drugs among adults aged 18 or older and the primary reason for misusing these drugs among adults who misused them. As defined in NSDUH, misuse of prescription drugs includes use in any way that a doctor did not direct the respondent to use them, including (1) use without a prescription of the respondent’s own; (2) use in greater amounts, more often, or longer than the respondent was told to take them; or (3) use in any other way a doctor did not direct the respondent to use them. Misuse does not include the use of over-the-counter drugs or the legitimate use of prescription drugs. NSDUH respondents were asked to provide information about their use and misuse of four categories of prescription drugs: pain relievers, tranquilizers, stimulants, and sedatives. The specific prescription drugs asked about on NSDUH are identified as controlled substances by the Drug Enforcement Administration based on:

1. a substance’s potential for abuse
2. the current state of scientific knowledge regarding a drug
3. risks to public health
4. the potential for physiological or psychological dependence.3

NSDUH respondents who reported misuse of any of the four categories of prescription drugs at least once in the past year were asked to indicate their reasons for their most recent misuse of the prescription drug. Respondents who identified more than one reason for their most recent prescription drug misuse were asked to indicate the main
reason for misuse. The reasons for misusing prescription drugs are listed in Table S1. Findings in this report are based on 2015 NSDUH data from approximately 51,200 adults aged 18 or older.

**PRESCRIPTION PAIN RELIEVERS**

NSDUH respondents provided information on their use and misuse of prescription pain relievers including opioids such as hydrocodone (e.g., Vicodin®), oxycodone (e.g., OxyContin®, Percocet®), and morphine. Approximately 91.8 million adults aged 18 or older were past year users of prescription pain relievers in 2015, representing more than one-third (37.8 percent) of the adult population. Approximately 11.5 million adults misused prescription pain relievers at least once in the past year, representing 4.7 percent of all adults or 12.5 percent of adults who used pain relievers in the past year (Figure 1).

The 11.5 million adults who misused prescription pain relievers at least once in the past year were asked to identify the reason for their most recent pain reliever misuse. Respondents were asked to choose from the following list the reason they most recently misused a prescription pain reliever:

- to relieve physical pain,
- to relax or relieve tension,
- to experiment or see what the drug is like,
- to feel good or get high,
- to help with sleep,
- to help with feelings or emotions,
- to increase or decrease the effects of other drugs,
- because the respondent is “hooked” or has to have the drug, or
- for some other reason

Among adults in 2015 who misused prescription pain
relievers at least once in the past year, the most commonly identified reason for their last misuse of a pain reliever was to relieve physical pain (63.4 percent), in keeping with the reason pain relievers are prescribed (Figure 2). Even if the reason for misuse was to relieve physical pain and that was the purpose for which the prescription drug was prescribed, it is still considered misuse to use a prescription drug without a prescription of one’s own or to use it at a higher dosage or more often than prescribed. Other commonly identified reasons for the most recent misuse among adults who misused pain relievers at least once in the past year were to feel good or get high (11.7 percent) and to relax or relieve tension (10.9 percent). Less common reasons among past year misusers of pain relievers included to help with sleep (4.5 percent), to help with feelings or emotions (3.2 percent), because they were “hooked” or had to have the drug (2.5 percent), to experiment or see what the drug was like (2.0 percent), and to increase or decrease the effects of other drugs (0.9 percent). In addition, 1.1 percent of past year misusers of pain relievers misused them for some other reason.

**Figure 1. Past year misuse of prescription pain relievers among adults aged 18 or older: 2015**

Source: SAMHSA, Center for Behavioral Health Statistics
and Quality, National Survey on Drug Use and Health (NSDUH), 2015.

**Figure 2. Main reasons for the last episode of prescription pain reliever misuse among past year misusers aged 18 or older: 2015**

- Relieve physical pain: 63.4 percent
- Feel good or get high: 11.7 percent
- Relax or relieve tension: 10.9 percent
- Help with sleep: 4.5 percent
- Help with feelings or emotions: 3.2 percent
- “Hooked” and have to have it: 2.5 percent
- Experiment or see what it is like: 2.0 percent
- Increase or decrease effects of other drugs: 0.9 percent
- Other: 1.1 percent

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2015.

**PRESCRIPTION TRANQUILIZERS**
NSDUH asks respondents to provide information about prescription tranquilizers, which are substances often prescribed for anxiety or muscle spasm relief. The prescription tranquilizers category includes benzodiazepine drugs such as alprazolam (e.g., Xanax®), muscle relaxants such as Soma®, and others. In 2015, about 38.2 million adults aged 18 or older were past year users of prescription tranquilizers, representing 15.8 percent of the adult population. Approximately 5.7 million adults misused prescription tranquilizers at least once in the past year, representing 2.3 percent of all adults or 14.8 percent of adults who used tranquilizers in the past year (Figure 3).

When adults were asked to provide information on the reasons for misuse during the most recent time in the past year that they misused prescription tranquilizers, they were provided a list of reasons similar to the list for pain reliever misuse, but the list did not include the option “to relieve physical pain” (Table S1). Among adults who misused prescription tranquilizers at least once in the past year, the most common reasons for the last misuse were to relax or relieve tension (46.2 percent) and to help with sleep (21.2 percent); these are common reasons for prescribing tranquilizers (Figure 4). Even if the reason for misuse was a reason for which tranquilizers are prescribed, it is still considered misuse to use them without a prescription, to use them more often than prescribed, or to use them at higher dosages than prescribed. Eleven percent of adults who misused prescription tranquilizers at least once in the past year indicated that the main reason for their last misuse was to feel good or get high, and 10.9 percent indicated that their main reason was to help with feelings or emotions. Less common reasons for misuse included experimenting to see what the drug was like (5.4 percent), increasing or decreasing the effects of other drugs (1.6 percent), and because of being “hooked” or needing to have the drug (0.4 percent). Among adults who misused tranquilizers at least
once in the past year, an estimated 3.4 percent misused them for some other reason.

**Figure 3. Past year misuse of prescription tranquilizers among adults aged 18 or older: 2015**

- No past year misuse: 85.2%
- Past year misuse: 14.8%

38.2 million past year tranquilizer users

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2015.

**Figure 4. Main reasons for last episode of prescription tranquilizer misuse among past year misusers aged 18 or older: 2015**

- Relax or relieve tension: 46.2 percent
- Help with sleep: 21.2 percent
- Feel good or get high: 11.0 percent
- Help with feelings or emotions: 10.9 percent
- Experiment or see what it is like: 5.4 percent
- Increase or decrease effects of other drugs: 1.6 percent
- “Hooked” and have to have it: 0.4 percent
- Other: 3.4 percent
NSDUH respondents provided information on their use and misuse of prescription stimulants, such as amphetamines (e.g., Adderall®) and methylphenidate (e.g., Ritalin®). Prescription stimulants are often prescribed to treat attention-deficit/hyperactivity disorder (ADHD), to reduce or control weight, or to promote wakefulness because of sleepiness associated with conditions such as narcolepsy or sleep apnea. Approximately 15.4 million adults were past year users of prescription stimulants in 2015, representing 6.3 percent of adults. In 2015, about 4.8 million adults misused prescription stimulants at least once in the past year, representing 2.0 percent of all adults or 30.9 percent of adults who used stimulants in the past year (Figure 5).

NSDUH respondents who misused prescription stimulants were asked to choose from the following list the reason they most recently misused a prescription stimulant: (1) to help lose weight, (2) to help concentrate, (3) to help be alert or stay awake, (4) to help study, (5) to experiment or see what the drug is like, (6) to feel good or get high, (7) to
increase or decrease the effects of other drugs, (8) because the respondent is “hooked” or has to have the drug, or (9) for some other reason. In 2015, the most commonly identified reasons for stimulant misuse among adults who misused stimulants at least once in the past year were to help be alert or stay awake (28.4 percent), to help concentrate (26.2 percent), and to help study (22.4 percent) (Figure 6). Unlike pain relievers, tranquilizers, and sedatives, the intended purpose of prescribing stimulants is not always apparent from the name of the category. Many people may be prescribed stimulants to help manage their ADHD symptoms. However, using prescription stimulants without a prescription, using them more often than prescribed, or using them at higher dosages than prescribed still constitutes misuse and can have adverse or unintended consequences. Less commonly identified reasons for the last misuse of prescription stimulants among past year misusers were to experiment or see what the drug was like (5.2 percent), to help lose weight (4.3 percent), to increase or decrease the effects of other drugs (1.5 percent), and because of being “hooked” or needing to have the drug (0.1 percent). Among adults who misused stimulants at least once in the past year, an estimated 2.1 percent misused them for some other reason.

Figure 5. Past year misuse of prescription stimulants among adults aged 18 or older: 2015
Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2015.

**Figure 6. Main reasons for last episode of prescription stimulant misuse among past year misusers aged 18 or older: 2015**

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2015.

**PRESCRIPTION SEDATIVES**

NSDUH asks respondents to provide information on their use and misuse of prescription sedatives, which are psychotherapeutics often prescribed to relieve sleep disorders such as insomnia. Zolpidem (e.g., Ambien®) is an example of a prescription sedative. Approximately 18.0 million adults were past year users of prescription sedatives in 2015, representing 7.4 percent of adults. In 2015, about 1.4 million adults misused prescription sedatives at least once in the past year, representing 0.6 percent of all adults or 7.8 percent of adults who used sedatives in the past year (Figure 7).

When adults were asked to provide information on the
reasons for misuse during the most recent time in the past year that they misused prescription sedatives, they were provided a list of reasons identical to those who used for tranquilizers. Among adults who misused prescription sedatives in the past year, the most common reason for the last misuse was to help with sleep (73.2 percent), which is the reason sedatives are prescribed (Figure 8). Even if adults took sedatives to help them sleep, this use is still considered misuse if the adult took them without a prescription, more often than prescribed, or at higher dosages than prescribed. Other reasons for the last misuse among adults who misused sedatives in the past year were to relax or relieve tension (12.0 percent) and to feel good or get high (5.1 percent). Less common reasons for sedative misuse included help with feelings or emotions (3.9 percent), to experiment or see what the drug was like (3.0 percent), and to increase or decrease the effects of other drugs (1.3 percent). The percentage of adults who misused prescription sedatives at least once in the past year because they were “hooked” is not presented due to low precision. In addition, among adults who misused sedatives at least once in the past year, an estimated 1.6 percent misused them for some other reason.

Figure 7. Past year misuse of prescription sedatives among adults aged 18 or older: 2015

Source: SAMHSA, Center for Behavioral Health Statistics
Figure 8. Main reasons for last episode of prescription sedative misuse among past year misusers aged 18 or older:

- Help with sleep: 73.2 percent
- Relax or relieve tension: 12.0 percent
- Feel good or get high: 5.1 percent
- Help with feelings or emotions: 3.9 percent
- Experiment or see what it is like: 3.0 percent
- Increase or decrease effects of other drugs: 1.3 percent
- Other: 1.6 percent

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2015.

DISCUSSION

Research has shown that there is a common misperception in the United States that prescription drug misuse is without risk because prescription drugs are regulated
pharmaceuticals with legal, medical uses. The DEA has deemed the substances assessed in NSDUH as having abuse potential. This study highlights that most people who misuse prescription drugs are doing so for the very reason that the substances are typically prescribed, and comparatively few were misusing the prescription drug because they were trying to get high. However, the misuse of many of these prescription drugs, such as prescription opioids, even for the purpose they have been prescribed for, has documented risks, such as dependence, overdose, and death. Previous research on prescription drug misuse has shown that the two most commonly reported sources of the prescription pain relievers that were misused were (1) obtaining the drugs from a friend or relative and (2) receiving the drugs through prescriptions or health care providers. This suggests that physicians and other medical practitioners may consider talking with their patients or clients about the potential health consequences of misusing their prescriptions, not sharing their prescription medications, preventing others from accessing their medications, and disposing of remaining dosage units. As more years of NSDUH data are collected, it will be possible to conduct additional analyses to inform prescription drug misuse prevention efforts, such as misuse among adolescents or the relationship between reasons for misuse and the source of the drug. This type of additional research may give policymakers information they could use to improve treatment and prevention efforts.

The Substance Abuse and Mental Health Services Administration provides information on what communities can do to help prevent overdoses and deaths related to prescription drug misuse (see: SAMHSA Opioid Overdose Toolkit). For a comprehensive report on NSDUH prescription drug misuse data, see Substance Abuse and Mental Health Services Administration (SAMHSA), 2021 National Survey of Drug Use and Health (NSDUH) Releases.
ENDNOTES


3. Several of the pain relievers and stimulants in NSDUH are in Schedule II, indicating that these substances have currently accepted medical uses but also a high potential for abuse that can lead to severe psychological or physiological dependence. Some of the stimulants in NSDUH that are prescribed for weight loss are in Schedule III, and several of the tranquilizers and sedatives in NSDUH are in Schedule IV. For more information on the prescription drugs assessed in NSDUH, see Appendix A of Hughes, A., Williams, M. R., Lipari, R. N., Bose, J., Copello, E. A. P., & Kroutil, L. A. (2016, September). *Prescription drug use and misuse in the United States: Results from the 2015 National Survey on Drug Use and Health*. NSDUH Data Review. Retrieved from Substance Abuse and Mental Health Services Administration (SAMHSA), Data


**SUGGESTED CITATION**


**SUPPORTING TABLE**
Table S1. Main reasons for prescription drug misuse

Main reasons for prescription drug misuse in the last episode of misuse among individuals aged 18 or older who misused prescription drugs in the past year: 2015
<table>
<thead>
<tr>
<th>Main reason for misuse</th>
<th>Pain reliever</th>
<th>Tranquilizer</th>
<th>Stimulant</th>
<th>Sedative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relieve physical pain</td>
<td>63.4 (1.26)</td>
<td>Footnote 1</td>
<td>Footnote 1</td>
<td>Footnote 1</td>
</tr>
<tr>
<td>Relax or relieve tension</td>
<td>10.9 (0.82)</td>
<td>46.2 (1.84)</td>
<td>Footnote 1</td>
<td>12.0 (2.47)</td>
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<tr>
<td>Help with sleep</td>
<td>4.5 (0.54)</td>
<td>21.2 (1.54)</td>
<td>Footnote 1</td>
<td>73.2 (3.42)</td>
</tr>
<tr>
<td>Help with feelings or emotions</td>
<td>3.2 (0.40)</td>
<td>10.9 (1.21)</td>
<td>Footnote 1</td>
<td>3.9 (1.44)</td>
</tr>
<tr>
<td>Experiment or see what it is like</td>
<td>2.0 (0.25)</td>
<td>5.4 (0.77)</td>
<td>5.2 (0.76)</td>
<td>3.0 (0.84)</td>
</tr>
<tr>
<td>Feel good or get high</td>
<td>11.7 (0.75)</td>
<td>11.0 (1.03)</td>
<td>98 (0.95)</td>
<td>5.1 (1.71)</td>
</tr>
<tr>
<td>Increase or decrease effects of other drugs</td>
<td>0.9 (0.24)</td>
<td>1.6 (0.38)</td>
<td>1.5 (0.40)</td>
<td>1.3 (0.77)</td>
</tr>
<tr>
<td>Because the respondent is &quot;hooked&quot; or has to have it</td>
<td>2.5 (0.32)</td>
<td>0.4 (0.16)</td>
<td>0.1 (0.07)</td>
<td>Footnote 2</td>
</tr>
<tr>
<td>Help lose weight</td>
<td>Footnote 1</td>
<td>Footnote 1</td>
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### SUMMARY

**Background:** Prescription drug misuse is second only to marijuana use as the nation’s most common type of illicit drug use. As a result, understanding the prevalence of and reasons for prescription drug misuse has major public health implications. Policymakers can use this type of information to help inform their assessments of substance use prevention and treatment needs in their communities.
Method: This report uses data from the 2015 National Survey on Drug Use and Health to provide up-to-date information on estimates of past year misuse of prescription drugs and reasons for the most recent prescription drugs misuse for adults aged 18 or older.

Results: About 91.8 million adults aged 18 or older were past year users of prescription pain relievers in 2015, representing more than one-third (37.8 percent) of the adult population. About 11.5 million adults misused prescription pain relievers at least once in the past year, and the most commonly reported reason for their last misuse of a pain reliever was to relieve physical pain (63.4 percent). About 5.7 million adults misused prescription tranquilizers at least once in the past year. The most common reasons for misuse the last time were to relax or relieve tension (46.2 percent) and to help with sleep (21.2 percent). About 4.8 million adults misused prescription stimulants at least once in the past year. The most commonly reported main reasons for the misuse of stimulants among adults who misused stimulants in the past year were to help be alert or stay awake (28.4 percent), to help concentrate (26.2 percent), and to help study (22.4 percent). About 1.4 million adults misused prescription sedatives at least once in the past year; the most common reason for the last misuse was to help with sleep (73.2 percent).

Conclusion: This study highlights that most people who misuse prescription drugs are doing so for the very reason that the substance is typically prescribed, and comparatively few were misusing the prescription drug because they were trying to get high. However, the misuse of many of these prescription drugs, such as prescription opioids, has documented risks, such as dependence, overdoses, and death.

Keywords: National Survey on Drug Use and Health, NSDUH, prescription pain relievers, prescription drugs,
prescription sedatives, prescription stimulants, prescription tranquilizers.

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Read the “Commonly Abused Drugs and Withdrawal Symptoms” by the National Institute on Drug Abuse: nida_commonlyabused_withdrawalsymptoms_10062017-508-1

Drug overdose deaths in Pennsylvania: County Health Rankings & Roadmaps, Pennsylvania
6.3 TREATMENT AND RECOVERY

Before reading the material below watch this video. Nora Volkow, head of NIDA (National Institute on Drug Abuse) in 2012 on “60 Minutes.” Click on link for watch 13 minute interview: Nora Volkow speaks on why bad habits are hard to break.

CAN ADDICTION BE TREATED SUCCESSFULLY?

Yes, addiction is a treatable disorder. Research on the science of addiction and the treatment of substance use disorders has led to the development of research-based methods that help people to stop using drugs and resume productive lives, also known as being in recovery.
Can addiction be cured?

Like other chronic diseases such as heart disease or asthma, treatment for drug addiction usually isn’t a cure. But addiction can be managed successfully. Treatment enables people to counteract addiction’s disruptive effects on their brain and behavior and regain control of their lives.

Brain scans comparing the brain of someone who stopped using month after 1 and 14 months of abstinence vs the brain of a healthy person.

These images showing the density of dopamine transporters in the brain illustrate the brain’s remarkable ability to recover, at least in part, after a long abstinence from drugs—in this case, methamphetamine.51


Does relapse to drug use mean treatment has failed?

No. The chronic nature of addiction means that for some people relapse, or a return to drug use after an attempt to stop, can be part of the process, but newer treatments are designed to help with relapse prevention. Relapse rates for drug use are similar to rates for other chronic medical illnesses. If people stop following their medical treatment plan, they are likely to relapse.

Treatment of chronic diseases involves changing deeply rooted behaviors, and relapse doesn’t mean
treatment has failed. When a person is recovering from an addiction relapse, it indicates that the person needs to speak with their doctor to resume treatment, modify it, or try another treatment.52

This graph shows that relapse rates for substance use disorders is 40-60%, relapse rates for hypertension are 50-70%, and relapse rates for asthma are 50-70%.


Relapse rates for people treated for substance use disorders are compared with those for people treated for high blood pressure and asthma. Relapse is common and similar across these illnesses. Therefore, substance use disorders should be treated like any other chronic illness. Relapse serves as a sign for resumed, modified, or new treatment.

While relapse is a normal part of recovery, for some drugs, it can be very dangerous—even deadly. If a person uses as much of the drug as they did before quitting, they can easily overdose because their bodies are no longer adapted to their previous level of drug exposure. An overdose happens when the person uses enough of a drug to produce uncomfortable feelings, life-threatening symptoms, or death.

What are the principles of effective treatment?

Research shows that when treating addictions to opioids (prescription pain relievers or drugs like heroin or fentanyl), medication should be the first line of treatment, usually combined with some form of behavioral therapy
or counseling. Medications are also available to help treat addiction to alcohol and nicotine.

Additionally, medications are used to help people detoxify from drugs, although detoxification is not the same as treatment and is not sufficient to help a person recover. Detoxification alone without subsequent treatment generally leads to resumption of drug use.

For people with addictions to drugs like stimulants or cannabis, no medications are currently available to assist in treatment, so treatment consists of behavioral therapies. Treatment should be tailored to address each patient’s drug use patterns and drug-related medical, mental, and social problems. Discoveries in science lead to breakthroughs in drug use treatment.

What medications and devices help treat drug addiction?

Different types of medications may be useful at different stages of treatment to help a patient stop abusing drugs, stay in treatment, and avoid relapse.

- **Treating withdrawal.** When patients first stop using drugs, they can experience various physical and emotional symptoms, including restlessness or sleeplessness, as well as depression, anxiety, and other mental health conditions. Certain treatment medications and devices reduce these symptoms, which makes it easier to stop the drug use.

- **Staying in treatment.** Some treatment medications and mobile applications are used to
help the brain adapt gradually to the absence of the drug. These treatments act slowly to help prevent drug cravings and have a calming effect on body systems. They can help patients focus on counseling and other psychotherapies related to their drug treatment.

• **Preventing relapse.** Science has taught us that stress cues linked to the drug use (such as people, places, things, and moods), and contact with drugs are the most common triggers for relapse. Scientists have been developing therapies to interfere with these triggers to help patients stay in recovery.

Common medications used to treat drug addiction and withdrawal:

• **Opioid**
  - Methadone
  - Buprenorphine
  - Extended-release naltrexone
  - Lofexidine

• **Nicotine**
  - Nicotine replacement therapies (available as a patch, inhaler, or gum)
  - Bupropion
  - Varenicline

• **Alcohol**
  - Naltrexone
  - Disulfiram
  - Acamprosate
How do behavioral therapies treat drug addiction?

Behavioral therapies help people in drug addiction treatment modify their attitudes and behaviors related to drug use. As a result, patients are able to handle stressful situations and various triggers that might cause another relapse. Behavioral therapies can also enhance the effectiveness of medications and help people remain in treatment longer.

- **Cognitive-behavioral therapy** seeks to help patients recognize, avoid, and cope with the situations in which they’re most likely to use drugs.
- **Contingency management** uses positive reinforcement such as providing rewards or privileges for remaining drugfree, for attending and participating in counseling sessions, or for taking treatment medications as prescribed.
- **Motivational enhancement therapy** uses strategies to make the most of people’s readiness to change their behavior and enter treatment.
- **Family therapy** helps people (especially young people) with drug use problems, as well as their families, address influences on drug use patterns and improve overall family functioning.
- **Twelve-step facilitation (TSF)** is an individual therapy typically delivered in 12 weekly session to prepare people to become engaged in 12-step mutual support programs. 12-step programs, like Alcoholic Anonymous, are not medical treatments, but provide social and
complementary support to those treatments. TSF follows the 12-step themes of acceptance, surrender, and active involvement in recovery.

Treatment must address the whole person.

How do the best treatment programs help patients recover from addiction?

Stopping drug use is just one part of a long and complex recovery process. When people enter treatment, addiction has often caused serious consequences in their lives, possibly disrupting their health and how they function in their family lives, at work, and in the community.

Because addiction can affect so many aspects of a person’s life, treatment should address the needs of the whole person to be successful. Counselors may select from a menu of services that meet the specific medical, mental, social, occupational, family, and legal needs of their patients to help in their recovery.

For more information on drug treatment, see Principles of Drug Addiction Treatment: A Research-Based Guide, and Principles of Adolescent Substance Use Disorder Treatment: A Research-Based Guide.

To end this unit watch the film “Drugs, Inc. Heroin (2010)."
6.4 Addiction Treatments and Therapies

Addiction Treatments Past and Present

In the past, society viewed drug addiction as a moral flaw. Popular “treatments” involved imprisonment, sentencing to asylums, and church-guided prayer. Not surprisingly, these methods were generally ineffective. Today we understand that addiction is a brain disease characterized by fundamental and long-lasting changes in the brain. Modern treatments are based on scientific research. Treatment is tailored to the individual and typically involves a combination of drug and behavioral therapy. Today’s methods are very effective, with 40-70% of patients remaining drug-free.

There are many options that have been successful in treating drug addiction, including:

- behavioral counseling
- medication
- medical devices and applications used to treat...
withdrawal symptoms or deliver skills training
  • evaluation and treatment for co-occurring mental health issues such as depression and anxiety
  • long-term follow-up to prevent relapse

A range of care with a tailored treatment program and follow-up options can be crucial to success. Treatment should include both medical and mental health services as needed. Follow-up care may include community- or family-based recovery support systems.

This video provides a brief overview of the treatments covered in this chapter:

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://psu.pb.unizin.org/bbh143/?p=298#oembed-1

How are medications and devices used in drug addiction treatment?

Medications and devices can be used to manage withdrawal symptoms, prevent relapse, and treat co-occurring conditions.

Withdrawal. Medications and devices can help suppress withdrawal symptoms during detoxification. Detoxification is not in itself “treatment,” but only the first step in the process. Patients who do not receive any further treatment after detoxification usually resume their drug use. One study of treatment facilities found that medications were used in almost 80 percent of
detoxifications (SAMHSA, 2014). In November 2017, the Food and Drug Administration (FDA) granted a new indication to an electronic stimulation device, NSS-2 Bridge, for use in helping reduce opioid withdrawal symptoms. This device is placed behind the ear and sends electrical pulses to stimulate certain brain nerves.

**Relapse prevention.** Patients can use medications to help re-establish normal brain function and decrease cravings. Medications are available for the treatment of opioid (heroin, prescription pain relievers), tobacco (nicotine), and alcohol addiction. Scientists are developing other medications to treat stimulant (cocaine, methamphetamine) and cannabis (marijuana) addiction. People who use more than one drug, which is very common, need treatment for all of the substances they use.

- **Opioids:** Methadone (Dolophine®, Methadose®), buprenorphine (Suboxone®, Subutex®, Probuphine®, Sublocade™), and naltrexone (Vivitrol®) are used to treat opioid addiction. Acting on the same targets in the brain as heroin and morphine, methadone and buprenorphine suppress withdrawal symptoms and relieve cravings. Naltrexone blocks the effects of opioids at their receptor sites in the brain and should be used only in patients who have already been detoxified. All medications help patients reduce drug seeking and related criminal behavior and help them become more open to behavioral treatments. A NIDA study found that once treatment is initiated, both a
buprenorphine/naloxone combination and an extended-release naltrexone formulation are similarly effective in treating opioid addiction. Because full detoxification is necessary for treatment with naloxone, initiating treatment among active users was difficult, but once detoxification was complete, both medications had similar effectiveness.

• **Tobacco:** Nicotine replacement therapies have several forms, including the patch, spray, gum, and lozenges. These products are available over the counter. The U.S. Food and Drug Administration (FDA) has approved two prescription medications for nicotine addiction: bupropion (Zyban®) and varenicline (Chantix®). They work differently in the brain, but both help prevent relapse in people trying to quit. The medications are more effective when combined with behavioral treatments, such as group and individual therapy as well as telephone quitlines.

• **Alcohol:** Three medications have been FDA-approved for treating alcohol addiction and a fourth, topiramate, has shown promise in clinical trials (large-scale studies with people). The three approved medications are as follows:
  - **Naltrexone** blocks opioid receptors that are involved in the rewarding effects of drinking and in the craving for alcohol. It reduces relapse to heavy drinking and is highly effective in some patients. Genetic differences may affect how well the drug works in certain
patients.

- **Acamprosate (Campral®)** may reduce symptoms of long-lasting withdrawal, such as insomnia, anxiety, restlessness, and dysphoria (generally feeling unwell or unhappy). It may be more effective in patients with severe addiction.

- **Disulfiram (Antabuse®)** interferes with the breakdown of alcohol. Acetaldehyde builds up in the body, leading to unpleasant reactions that include flushing (warmth and redness in the face), nausea, and irregular heartbeat if the patient drinks alcohol. Compliance (taking the drug as prescribed) can be a problem, but it may help patients who are highly motivated to quit drinking.

- **Co-occurring conditions:** Other medications are available to treat possible mental health conditions, such as depression or anxiety, that may be contributing to the person’s addiction.

### The Controversy of Maintenance and Medication

When we use medication or maintenance to treat drug addiction are we just replacing one drug with another? Does the addict simply become addicted to a legal drug? No. With pharmaceutical substance-abuse treatment, the user can begin to function normally again and stop the cravings. Using drugs to treat cravings and prevent relapse buys crucial time for behavioral and cognitive therapies to begin working.
Maintenance programs are controversial because the treatments are drugs that often have potent, intoxicating effects, and because patients often require continuous treatment, sometimes over many years. The classic example of a maintenance-based drug treatment is methadone, taken once a day to suppress heroin withdrawal.

One patient’s story: NIDA clinical trials bring a new life to a woman struggling with opioid addiction – the study hoped to determine if clonidine used with buprenorphine could help reduce stress-induced relapse in heroin users.

How are behavioral therapies used to treat drug addiction?

Behavioral therapies help patients:

- modify their attitudes and behaviors related to drug use
- increase healthy life skills
- persist with other forms of treatment, such as medication

Patients can receive treatment in many different settings with various approaches.

Outpatient behavioral treatment includes a wide variety of programs for patients who visit a behavioral health counselor on a regular schedule. Most of the programs involve individual or group drug counseling, or both. These programs typically offer forms of behavioral therapy such as:
• cognitive-behavioral therapy, which helps patients recognize, avoid, and cope with the situations in which they are most likely to use drugs (*See information below)
• multidimensional family therapy—developed for adolescents with drug abuse problems as well as their families—which addresses a range of influences on their drug abuse patterns and is designed to improve overall family functioning
• motivational interviewing, which makes the most of people’s readiness to change their behavior and enter treatment
• motivational incentives (contingency management), which uses positive reinforcement to encourage abstinence from drugs

Treatment is sometimes intensive at first, where patients attend multiple outpatient sessions each week. After completing intensive treatment, patients transition to regular outpatient treatment, which meets less often and for fewer hours per week to help sustain their recovery. In September 2017, the FDA permitted marketing of the first mobile application, reSET®, to help treat substance use disorders. This application is intended to be used with outpatient treatment to treat alcohol, cocaine, marijuana, and stimulant substance use disorders. See the New York Times article with pictures of the app: The New York Times, Take This App and Call Me in the Morning

Inpatient or residential treatment can also be very effective, especially for those with more severe problems
(including co-occurring disorders). Licensed residential treatment facilities offer 24-hour structured and intensive care, including safe housing and medical attention. Residential treatment facilities may use a variety of therapeutic approaches, and they are generally aimed at helping the patient live a drug-free, crime-free lifestyle after treatment. Examples of residential treatment settings include:

- **Therapeutic communities**, which are highly structured programs in which patients remain at a residence, typically for 6 to 12 months. The entire community, including treatment staff and those in recovery, act as key agents of change, influencing the patient’s attitudes, understanding, and behaviors associated with drug use. Read more about therapeutic communities in the Therapeutic Communities Research Report at National Institute on Drug Abuse (NIDA), Therapeutic Communities Research Report: What Are Therapeutic Communities?

- **Shorter-term residential treatment**, which typically focuses on detoxification as well as providing initial intensive counseling and preparation for treatment in a community-based setting.

- **Recovery housing**, which provides supervised, short-term housing for patients, often following other types of inpatient or residential treatment. Recovery housing can help people make the transition to an independent life—for example, helping them learn how to manage finances or
seek employment, as well as connecting them to support services in the community.

*Behavioral and Cognitive Therapy*

Counseling, support groups, and other forms of therapy are crucial to preventing relapse. In order to stay off drugs, addicts must learn new ways of thinking and behaving. Cognitive and behavior therapy can include such things as learning to:

- Talk openly about personal experiences
- Manage problems without turning to drugs
- Identify and correct problem behavior
- Identify and correct harmful patterns of thinking
- Recognize drug cravings
- Identify and manage high-risk situations
- Establish motivation to change
- Improve personal relationships
- Develop refusal skills
- Manage time more efficiently

**Principles of Effective Treatment**

Based on scientific research since the mid-1970s, the following key principles should form the basis of any effective treatment program:

- Addiction is a complex but treatable disease that
affects brain function and behavior.

- No single treatment is right for everyone.
- People need to have quick access to treatment.
- Effective treatment addresses all of the patient’s needs, not just his or her drug use.
- Staying in treatment long enough is critical.
- Counseling and other behavioral therapies are the most commonly used forms of treatment.
- Medications are often an important part of treatment, especially when combined with behavioral therapies.
- Treatment plans must be reviewed often and modified to fit the patient’s changing needs.
- Treatment should address other possible mental disorders.
- Medically assisted detoxification is only the first stage of treatment.
- Treatment doesn’t need to be voluntary to be effective.
- Drug use during treatment must be monitored continuously.
- Treatment programs should test patients for HIV/AIDS, hepatitis B and C, tuberculosis, and other infectious diseases as well as teach them about steps they can take to reduce their risk of these illnesses.

Is treatment different for criminal justice populations?

Scientific research since the mid-1970s shows that drug abuse treatment can help many drug-using offenders change their attitudes, beliefs, and behaviors towards drug abuse; avoid relapse; and successfully remove themselves from a life of substance abuse and crime. Many of the principles of treating drug addiction are similar for people within the criminal justice system as for those in the general population. However, many
offenders don’t have access to the types of services they need. Treatment that is of poor quality or is not well suited to the needs of offenders may not be effective at reducing drug use and criminal behavior.

In addition to the general principles of treatment, some considerations specific to offenders include the following:

- Treatment should include the development of specific cognitive skills to help the offender adjust attitudes and beliefs that lead to drug abuse and crime, such as feeling entitled to have things one’s own way or not understanding the consequences of one’s behavior. This includes skills related to thinking, understanding, learning, and remembering.

- Treatment planning should include tailored services within the correctional facility as well as transition to community-based treatment after release.

- Ongoing coordination between treatment providers and courts or parole and probation officers is important in addressing the complex needs of offenders re-entering society.
Drug addiction can be treated, but it’s not simple. Addiction treatment must help the person do the following:

- stop using drugs
- stay drug-free
- be productive in the family, at work, and in society

Successful treatment has several steps:

- detoxification
- behavioral counseling
- medication (for opioid, tobacco, or alcohol addiction)
- evaluation and treatment for co-occurring mental health issues such as depression and anxiety
- long-term follow-up to prevent relapse

Medications and devices can be used to manage withdrawal symptoms, prevent relapse, and treat co-occurring conditions.

Behavioral therapies help patients:

- modify their attitudes and behaviors related to drug use
- increase healthy life skills
- persist with other forms of treatment, such as medication

People within the criminal justice system may need additional treatment services to treat drug use disorders effectively. However, many offenders don’t have access to the types
of services they need.

Learn more:

- Research Report on Medications to Treat Opioid Addiction
- Research Report on Therapeutic Communities
- Naloxone – a medication designed to rapidly reverse an opioid overdose

Step-by-Step Guides

- What to do if you have a problem with drugs:
  - For Teens and Young Adults
  - For Adults

- What to do if someone you know has a problem with drugs:
  - Your Teen or Young Adult
  - Your Adult Friend or Loved One

- What to do if you or a loved one has a problem with drugs: En español

Source: National Institute on Drug Abuse; National Institutes of Health; U.S. Department of Health and Human Services. National Institute on Drug Abuse (NIDA), Treatment
CHAPTER 7
CHAPTER 7: PREVENTION AND TREATMENT OF ADDICTION

Introduction

In this chapter, we will explore the efforts made to prevent abuse and addiction beginning with an acknowledgment that drugs have been part of the human experience since the prehistoric times. Yet today, we have a new lethality due to the growing number of drugs, the accessibility of drugs, and the huge global drug trade business all which have led to waves of drug abuse epidemics resulting in the heart-breaking cost to individuals, families, and society. Schools, communities, and organizations have designed and implemented many types of prevention programs some of which have worked better than others.
CHAPTER 7
OBJECTIVES

Learning Objective
By the end of this chapter you should be able to:

1. Discuss the presence of drugs in ancient times.
2. Summarize the use of drugs in the United States during the nineteenth century.
3. List any three specific measures that may help deal with the drug problem.
4. Describe the importance of prevention during adolescence.
5. Distinguish components of prevention of behavioral health problems and disorders.
6. Evaluate current types of prevention and harm reduction programs.
7. Identify new initiatives and unexpected side effects of prevention programs.
7.1 DRUG USE IN HISTORY

Learning Objectives

1. Discuss the presence of drugs in ancient times.
2. Summarize the use of drugs in the United States during the nineteenth century.

Shakespeare once wrote that “what’s past is prologue”. This familiar phrase means that what happened in the past provides a context for, and can help to understand and predict, the future. To the extent that the past is prologue, the history of drug use provides a sobering lesson: Drug use has been common since ancient times and has been common in almost every society. As a recent book on drug policy states, “People have used chemicals to alter their state of mind since before there were written records” (Kleiman, Caulkins, & Hawken, 2011, p. xviii). If the past is indeed prologued, then it is no surprise that drug use remains common in contemporary nations despite considerable efforts to reduce it. One manifestation of the long history of drug use is that humans have used mind-altering plants since prehistoric times. “Early humans discovered that eating some plants
gave a feeling of relaxation, happiness, drowsiness, or peace,” one scholar writes. “Some gave a feeling of increased energy, alertness, and stamina. And some caused strange sensations, terrifying visions, or a profoundly different awareness” (Gahlinger, 2004, p. 5).

Examples of drug use thousands of years ago abound (Escohotado, 2010; Faupel, Horowitz, & Weaver, 2010; Goodman, Sherratt, & Lovejoy, 2007). Mead, an alcoholic drink made from fermented honey, was first used about 8000 BCE, and beer and berry wines were first used about 6000 BCE. The ancient Sumerians used opium starting about 5000 BCE. Ancient Egypt used alcohol in 3500 BCE, while ancient China used cannabis (the source of marijuana) around 3000 BCE. Ancient people in what is now Switzerland ate poppy seeds (the source of opium) in 2500 BCE. Coca leaves (the source of cocaine) have been chewed for thousands of years. Folk medicines made from plants and herbs have also been used since ancient times. People in ancient Palestine drank wine in 350 BCE. Ancient Greeks drank poppy juice in 300 BCE. In about the same period, South American tribes used a hallucinogen called cohoba, made from mimosa beans. The Chinese and other Asians were using opium regularly by 1000 CE. Native Americans used tobacco before being discovered by Columbus in 1492. The use of various drugs has also been common in the many societies that anthropologists have studied (Durant & Thakker, 2003; Page & Singer, 2010).

Sociologist Erich Goode (2008, p. 176) summarizes the history of drug use as follows: “Humans have been ingesting drugs for thousands of years. And throughout recorded time, significant numbers of nearly every
society on earth have used one or more drugs to achieve certain desired physical or mental states. Drug use comes close to being a universal, both worldwide and throughout history."

DRUG USE IN US HISTORY

This history of drug use includes the United States, where the past is again prologue. During the colonial era, tobacco was a major crop in Virginia and other colonies thanks to slave labor. After being processed, it was commonly used by colonists and also exported to Europe in great quantities (Gately, 2001). From the earliest colonial days, alcohol was another drug used in great quantities, as “Americans were drinkers right from the start” (Genzlinger, 2011, p. C1). The Mayflower, the celebrated ship that brought the first Puritans to what eventually became the United States, was filled with barrels of beer. In colonial New England, rum manufacturing was a major industry, and rum drinking was common. During the early 1770s, New England had more than 140 rum distilleries, and rum consumption in the colonies averaged 7.5 million gallons annually. This massive drinking has led one author to call rum “the real spirit of 1776” (Williams, 2006). Rum was also a major
export to Europe and elsewhere. In addition to rum, colonists routinely drank beer and hard cider.

During the nineteenth century, Americans began to use drugs other than alcohol in great quantities. One popular drug was coffee. Before the Civil War, Americans who drank coffee had to buy green (unroasted) coffee beans in bulk and roast their own coffee. Then in 1865, John Arbuckle, a Pittsburgh grocer, began selling roasted coffee inside a new invention—the paper bag. His bagged coffee was an instant hit across the nation, other coffee manufacturers followed suit, and coffee use by Americans greatly increased.

Alcohol also remained a very popular drug, and use of this drug during the 1800s was probably greater than during colonial America. Two reasons help account for this trend (Faupel et al., 2010). One reason was the western frontier. As the nation moved west, many of the explorers and settlers who led the way were men who were unmarried or, if married, men who had left their families behind. To put it mildly, they drank a lot, fought a lot, and gambled a lot. A second reason was that many Irish immigrants came to the United States during a great wave of immigration that began in the mid-nineteenth century. Although it might sound like a stereotype, the Irish drank a lot of alcohol back in their homeland, and they continued to do so once they reached the United States. Regardless of who was drinking, heavy alcohol use contributed greatly to poverty, to physical assaults and homicides, and to domestic violence and other family problems.

Three other popular drugs in this era were opium, cocaine, and marijuana. Use of these drugs was so
common that nineteenth-century America has been called a “dope fiend’s paradise” (Brecher, 1973). A brief discussion of these drugs’ histories will underscore the widespread use of drugs in the American past and also racial issues that arose when laws were passed to ban these drugs (Musto, 1999).

OPiUM

During the decades before and after the Civil War, the use of opium was extremely common (Goode, 2012). Beyond making people feel good, opium is an effective painkiller and cough suppressant. Accordingly, it was a staple in many patent medicines, elixirs and tonics, sold back then in apothecaries, general stores, and other venues. Large numbers of people from all social backgrounds used these opium-laced medicines for problems such as depression, headaches, menstrual cramps, and toothaches. It is not much of an exaggeration to say that the United States was a nation of opium users during this period; an estimated 500,000 Americans were addicted to opium by the end of the century. As anthropologist Robert B. Edgerton (1976, pp. 57–58) summarizes the situation, “The use of opium was widespread in all segments of American society. Children were calmed with opium derivatives, women used many popular patent medicines which were liberally
larded with opiates, and ‘opium dens’ were probably present in all cities and most towns as well.”

Attendance at opium dens (the equivalent of today’s bar or tavern, with opium the drug of choice rather than alcohol) was a popular activity for the Chinese immigrants who began coming to the United States during the 1850s to help build the nation’s railroads and perform other jobs. White workers feared their growing numbers as a threat to their jobs and racial prejudice against the Chinese increased. Politicians, labor unions, and other parties began to focus on the Chinese habit of smoking opium at opium dens and warned that the Chinese were kidnapping little white children, taking them to the opium dens, and turning them into “opium fiends.” This campaign had two effects: it increased prejudice against the Chinese, and it increased public concern about opium. This rising concern led San Francisco in 1875 to become the first locality to ban opium dens. Other California cities did the same, and the state itself banned opium dens in 1881. Three decades later, the federal government banned the manufacture, sale, and use of opium (except for use with a physician’s prescription) when it passed the Harrison Narcotics Act in 1914.
COCAINE

Cocaine was another drug that was very popular in the nineteenth century, beginning in the 1880s, thanks in part to enthusiastic claims by Sigmund Freud and American physicians that cocaine could help relieve asthma, depression, hay fever, sexual impotence, toothache pain, and a host of other problems. Like opium, cocaine was a popular ingredient in the many patent medicines that people bought at various stores, and the US Army Surgeon-General advocated its medical use. It was a major ingredient in a new beverage introduced in 1886, Coca-Cola, which became an instant hit because people naturally felt so good when they drank Coke! During the next two decades, however, concern grew about cocaine’s effects. Some of this concern was fueled by the absurd belief that African Americans who used cocaine became extra strong, dangerous, and even invulnerable to bullets. Cocaine was heavily taxed by the 1914 Harrison Narcotics Act and later banned.

MARIJUANA

A third legal drug during the late nineteenth century was marijuana. It joined opium and cocaine in being a common ingredient in patent medicines, and it was a
popular drug for problems like migraine headaches, menstrual cramps, and toothache pain. After the Mexican Revolution of 1910, Mexicans moved to the United States in increased numbers and brought with them their habit of marijuana use. Whites feared that Mexicans would take their jobs, and, similar to what happened with opium and Chinese immigrants during the 1870s, began to charge that Mexicans who used marijuana would become violent and more likely to rape and murder innocent white victims. This racially prejudiced claim increased concern about marijuana and helped lead to the federal Marijuana Tax Act of 1937 that banned its use.

This brief history shows that drug use has been part of the American culture ever since the nation began. If past is prologue, it should come as no surprise that drugs remain part of the American culture today, and it should also come as no surprise that efforts to reduce or eliminate drug use often meet with much resistance and little success. As the United States continues to try to deal with drug use, these basic facts must not be forgotten.

Key Takeaways

- Drug use has been common since ancient times.
- Alcohol was widely drunk in colonial America. During the latter nineteenth century, opium, marijuana, and cocaine were legal drugs that were also widely used.
- Racial prejudice played an important role in decisions during the late nineteenth century and early twentieth century to ban opium, marijuana, and cocaine

References


Page, B., & Singer, M. (2010). *Comprehending drug use:*
Ethnographic Research at the social margins. New Brunswick, NJ: Rutgers University Press.


Source: saylordotorg.github.io, 7.1 Drug Use in History
7.2 ADDRESSING THE DRUG PROBLEM AND REDUCING DRUG USE

Learning Objectives

1. Explain the problems associated with arresting hundreds of thousands of people for drug possession.
2. List any three specific measures that may help deal with the drug problem.

When it comes to finding solutions for social problems, drug abuse, and addiction present a major challenge for our society. People have enthusiastically used drugs since prehistoric times and show no signs of reducing their drug use. Many and perhaps most scholars think the legal war on drugs has had little, if any, impact on drug use
(Walker, 2011), and many scholars recognize that this war brought with it the many disadvantages cited in the previous section. As Kleiman et al. (2011, p. xvi) observes, “Our current drug policies allow avoidable harm by their ineffectiveness and create needless suffering by their excesses.”

A growing number of people in the political world agree. In 2011, the Global Commission on Drug Policy issued a major report on the world’s anti-drug efforts. The commission comprised nineteen members, including a former United Nations secretary-general, a former US secretary of state, a former chair of the US Federal Reserve, and former presidents or prime ministers of Brazil, Colombia, Greece, Mexico, and Switzerland. The commission’s report called for a drastic rethinking of current drug policy: “The global war on drugs has failed, with devastating consequences for individuals and societies around the world…Fundamental reforms in national and global drug control policies are urgently needed” (Global Commission on Drug Policy, 2011, p. 3). Decriminalization and even legalization of illegal drugs should be seriously considered, the report concluded.

Given this backdrop, many drug experts question whether our current drug policies make sense. They add that the best approach our society could take would be to expand the prevention, treatment, and harm reduction approaches discussed earlier; because drugs will always be with us, our society should do what it can to minimize the many harms that drugs cause. Thus drug education prevention and drug treatment programs should be
expanded, sterile needles should be made available for drug addicts who inject their drugs, and drug courts should be used for a greater number of drug offenders.

Beyond these approaches, some experts say marijuana use should be decriminalized and that decriminalization of other drugs should be seriously considered. If marijuana were not only decriminalized but also legalized and taxed, it is estimated that this new tax revenue would amount to $8.7 billion annually and that about $8.7 billion annually would also be saved in reduced law enforcement costs, for a total of more than $17 billion in new funds that could be used for drug prevention, drug treatment, and other needs (Kristof, 2010). Many Americans agree with these experts: In a 2011 Gallup poll, 50 percent of the public favored legalizing marijuana, while 46 percent opposed legalizing it (Graves, 2011). Marijuana legalization receives 50 percent support in a new poll. Huffington Post. Retrieved from Huffington Post, Support For Marijuana Legalization Reaches All-Time High: Gallup Poll.

More generally, these experts say, it makes little sense to arrest more than 1.3 million people each year for drug possession and to put many of them in jail or prison. We do not arrest and imprison alcoholics and cigarette smokers; instead we try to offer them various kinds of help, and we should do the same for people who are addicted to other kinds of drugs. If arrest and imprisonment must continue, these measures should be reserved for sellers of large quantities of illegal drugs, not for the people who use the drugs or for those who sell only small quantities. When low-level drug dealers are imprisoned, they are simply replaced on the street by
new dealers. Providing low-level dealers with alternative sentencing would reduce the number of imprisoned dealers over time by several hundred thousand annually without making illegal drugs more available.

In addition to all these measures, several other steps might well reduce certain kinds of drug use or at least reduce the harm that both drugs and our current drug policies cause (Kleiman et al., 2011). These steps include the following:

1. **Providing legally prescribed heroin and/or substitute opiates, including methadone, for heroin addicts.** This provision has proven effective in several other nations.

2. **Encouraging primary care physicians and other health-care providers to screen more carefully for substance abuse.**

3. **Basing drug sentencing less on the quantity of illegal drugs sold and more on the level of violence in which some drug sellers engage.**

4. **Abandoning DARE.** According to Kleiman et al. (2011, p. 201), “the continued dominance in school-based drug education of DARE—a program that has never been shown to actually reduce drug use—is a scandal.” They instead recommend school-based programs that help children develop self-control and prosocial behavior, as these programs have also been shown to reduce children’s subsequent drug use.

5. **Following the psychological principle of operant conditioning by providing drug addicts small cash payments for clean drug tests, as these rewards have been shown to be**
6. **Fully reintegrating former drug dealers and recovering drug addicts into society.** They should have full access to public housing, educational loans, and other benefits, and they should be allowed to vote in states that now do not let them vote.

7. **Raising alcohol taxes.** According to Kleiman et al. (2011), tripling the alcohol tax would especially reduce drinking by heavy drinkers and by minors, and it would reduce the number of homicides by 1,000 annually and the number of motor vehicle accidents by 2,000 annually. The new tax money could also help fund alcohol treatment and prevention programs. “In the entire field of drug-abuse control,” Kleiman et al. (2011, p. 204) write, “there is no bargain as attractive as a higher alcohol tax.”

8. **Prohibiting alcohol sales to anyone who has engaged in drunk driving or who has committed violence under the influence of alcohol.** For this ban to work, everyone who wants to buy alcohol would have to show an ID, and those prohibited from buying alcohol would have that indicated on their ID. This ban would certainly be unpopular among the many drinkers who drink responsibly, but it would reduce the great harm that alcohol causes.

9. **Allowing marijuana users to grow their own cannabis or to buy it from small growers.** This would reduce the sales of cannabis, and thus its profits, from the organized crime groups and
the Mexican cartels that now provide much of the marijuana used in the United States.

10. **Raising the cigarette tax.** Some states already have high cigarette taxes, but several states have low cigarette taxes. Raising the taxes in the low-tax states would reduce cigarette smoking in these states. The new tax revenue could be used to fund treatment programs that help reduce smoking.

A short video on Harm Reduction strategies

https://youtube.com/watch?v=tMF9Cfn_SRk

**Key Takeaways**

- Critics of the war on drugs say that people who use illegal drugs should be treated, not arrested, just as people who use alcohol and tobacco are treated, if they seek treatment, rather than arrested.
- Specific measures that could help address the drug problem include providing legally prescribed heroin or substitute opiates for heroin addicts and raising the alcohol tax.

**References**


Source: saylordotorg.github.io, 7.6 Addressing the Drug Problem and Reducing Drug Use
7.3 PREVENTION OF SUBSTANCE ABUSE AND MENTAL ILLNESS BY SAMHSA

Overview

Promoting mental health and preventing mental and/or substance use disorders are fundamental to SAMHSA’s (Substance Abuse and Mental Health Services Administration) mission to reduce the impact of behavioral health conditions in America’s communities.

Mental and substance use disorders can have a powerful effect on the health of individuals, their families, and their communities. In 2014, an estimated 9.8 million adults aged 18 and older in the United States had a serious mental illness, and 1.7 million of which were aged 18 to 25. Also 15.7 million adults (aged 18 or older) and
2.8 million youth (aged 12 to 17) had a major depressive episode during the past year. In 2014, an estimated 22.5 million Americans aged 12 and older self-reported needing treatment for alcohol or illicit drug use, and 11.8 million adults self-reported needing mental health treatment or counseling in the past year. These disorders are among the top conditions that cause disability and carry a high burden of disease in the United States, resulting in significant costs to families, employers, and publicly funded health systems. By 2020, mental and substance use disorders will surpass all physical diseases as a major cause of disability worldwide. In addition, drug and alcohol use can lead to other chronic diseases such as diabetes and heart disease. Addressing the impact of substance use alone is estimated to cost Americans more than $600 billion each year.

Preventing mental and/or substance use disorders and related problems in children, adolescents, and young adults is critical to Americans’ behavioral and physical health. Behaviors and symptoms that signal the development of a behavioral disorder often manifest two to four years before a disorder is present. In addition, people with a mental health issue are more likely to use alcohol or drugs than those not affected by a mental illness. Results from the 2014 NSDUH report (PDF | 3.4 MB) showed that of those adults with any mental illness, 18.2% had a substance use disorder, while those adults with no mental illness only had a 6.3% rate of substance use disorder in the past year. If communities and families can intervene early, behavioral health disorders might be prevented, or symptoms can be mitigated.

Data have shown that early intervention following the
first episode of a serious mental illness can make an impact. Coordinated, specialized services offered during or shortly after the first episode of psychosis are effective for improving clinical and functional outcomes.

In addition, the Institute of Medicine and National Research Council’s Preventing Mental, Emotional, and Behavioral Disorders Among Young People report – 2009(link is external) notes that cost-benefit ratios for early treatment and prevention programs for addictions and mental illness programs range from 1:2 to 1:10. This means a $1 investment yields $2 to $10 savings in health costs, criminal and juvenile justice costs, educational costs, and lost productivity.

Continuum of Care

The Behavioral Health Continuum Model

Long description: The top half of a circle is shown and is sectioned into 8 slices like a pie. The left most section at 9 o’clock is labeled Promotion. The next 3 sections are labeled Universal, Selective and Indicated and are all
under the title Prevention. The next 2 sections are labeled Case Identification and Standard Treatment for Known Disorders. Both of these are under the title Treatment. The last 2 sections have long labels: 1 Compliance with long term treatment and in parentheses Goal: Reduction in Relapse and Recurrence 2 Aftercare including rehabilitation; these last 2 sections are under the title Recovery.

A comprehensive approach to behavioral health also means seeing prevention as part of an overall continuum of care. The Behavioral Health Continuum of Care Model recognizes multiple opportunities for addressing behavioral health problems and disorders. Based on the Mental Health Intervention Spectrum, first introduced in a 1994 Institute of Medicine report, the model includes the following components:

- **Promotion**—These strategies are designed to create environments and conditions that support behavioral health and the ability of individuals to withstand challenges. Promotion strategies also reinforce the entire continuum of behavioral health services.
- **Prevention**—Delivered prior to the onset of a disorder, these interventions are intended to prevent or reduce the risk of developing a behavioral health problem, such as underage alcohol use, prescription drug misuse and abuse, and illicit drug use.
- **Treatment**—These services are for people diagnosed with substance use or other
behavioral health disorder.

- **Recovery**—These services support individuals’ abilities to live productive lives in the community and can often help with abstinence.

### Risk and Protective Factors

People have biological and psychological characteristics that can make them vulnerable or resilient to potential behavioral health problems. Individual-level protective factors might include a positive self-image, self-control, or social competence.

In addition, people do not live in isolation, they are part of families, communities, and society. A variety of risk and protective factors exist within each of these environmental contexts. Learn more from the SAMHSA Center for the Application of Prevention Technologies’ [Key Features of Risk and Protective Factors](https://www.samhsa.gov) webpage and from the [Risk and Protective Factors and Initiation of Substance Use: Results from the 2014 National Survey on Drug Use and Health](https://www.samhsa.gov). Review the chapter on [Risk Factors and Protective Factors](https://www.nida.nih.gov) in the National Institute on Drug Abuse’s report, *Preventing Drug Use among Children and Adolescents*.

### Evidence-Based Practices

Experts attest that an optimal mix of prevention interventions is required to address substance use issues in communities because they are among the most difficult social problems to prevent or reduce. SAMHSA’s
program grantees should consider comprehensive solutions that fit the particular needs of their communities and population, within a cultural context and take into consideration unique local circumstances, including community readiness. Some interventions may be evidence-based, while others may document their effectiveness based on other sources of information and empirical data.

Early intervention also is critical to treating mental illness before it can cause tragic results like serious impairment, unemployment, homelessness, poverty, and suicide. The Community Mental Health Services Block Grant (MHBG) directs states to set aside 5% of their MHBG allocation, which is administered by SAMHSA, to support evidence-based programs that address the needs of individuals with early serious mental illness, including psychotic disorders. The Guidance for Revision of the FY2014-2015 MHBG Behavioral Health Assessment and Plan (PDF | 92 KB) provides additional information.

Review SAMHSA’s criteria for defining a prevention program or early intervention as evidence-based. Also, search SAMHSA’s Evidence-Based Practices Resource Center to find evidence-based programs related to prevention and early intervention for all behavioral health issues.

Prevention Strategies

Many prevention approaches, such as selective prevention strategies, focus on helping individuals develop the knowledge, attitudes, and skills they need to make good choices or change harmful behaviors. Many
of these strategies can be classroom-based. Learn more from the SAMHSA Center for the Application of Prevention Technologies’ comprehensive review of classroom-based programs.

Universal prevention approaches include the use of environmental prevention strategies, which are tailored to local community characteristics and address the root causes of risky behaviors by creating environments that make it easier to act in healthy ways. The successful execution of these strategies often involves lawmakers, local officials, and community leaders, as well as the acceptance and active involvement of members from various sectors of the community (such as business, faith, schools, and health). For example, the use of this type of strategy may offer fewer places for young people to purchase alcohol, so consuming alcohol becomes less convenient; therefore, less is consumed.

Environmental change strategies have specific advantages over strategies that focus exclusively on the
individual. Because they target a much broader audience, they have the potential to produce widespread changes in behavior at the population level. Further, when implemented effectively, they can create shifts in both individual attitudes and community norms that can have long-term, substantial effects. Strategies that target the environment include:

- Communication and education
- Enforcement

Visit the SAMHSA Center for the Application of Prevention Technologies’ Evaluating Environmental Change Strategies webpage for more prevention information and resources.

SAMHSA is a leader in the promotion of prevention and early intervention, most notably through its Strategic Prevention Framework (SPF) and participation in the President’s Now Is The Time initiative.

Learn about SAMHSA’s many preventions and early intervention programs, initiatives, and partnerships:

- SAMHSA’s Efforts Related to Prevention and Early Intervention
- SAMHSA’s Prevention Efforts for Specific Populations
- Grants Related to the Prevention of Substance Abuse and Mental Illness
- Publications and Resources on the Prevention of Substance Abuse and Mental Illness
Cultural Awareness and Competency

Improving cultural and linguistic competence is an important strategy for addressing persistent behavioral health disparities experienced by diverse communities, including the lesbian, gay, bisexual, and transgender population and racial and ethnic minority groups. These diverse populations tend to have less access to prevention services and poorer behavioral health outcomes.

Cultural and linguistic competence includes, but is not limited to, the ability of an individual or organization to interact effectively with people of different cultures. To produce positive change, prevention practitioners must understand the cultural and linguistic context of the community, and they must have the willingness and skills to work within this context.

For diverse populations to benefit from prevention and early intervention programs, SAMHSA ensures that culture and language be considered at every step when developing and then implementing these programs. For more information and resources, visit the Strategic Prevention Framework’s Cultural Competence webpage. In addition, the SAMHSA Center for the Application of Prevention Technologies lists the elements of a culturally competent prevention system. With regard to the development of a culturally diverse workforce, the Now Is The Time: Minority Fellowship Program – Youth expands on the existing Minority Fellowship program to support master’s level-trained behavioral health providers in the fields of psychology, social work, professional counseling, marriage and family therapy, and nursing. In addition, SAMHSA supports the Now Is The Time: Minority
Fellowship Program – Addiction Counselors, which supports students pursuing master’s level degrees in addiction/substance abuse counseling as well as the Minority Fellowship Program whose purpose is to reduce health disparities and improve healthcare outcomes of racially and ethnically diverse populations by increasing the number of culturally competent behavioral health professionals available to underserved populations in the public and private nonprofit sectors.

Community Coalitions

Community coalitions are increasingly used as a vehicle to foster improvements in community health. A coalition is traditionally defined as “a group of individuals representing diverse organizations, factions or constituencies who agree to work together to achieve a common goal.” Community coalitions differ from other types of coalitions in that they include professional and grassroots members committed to working together to influence long-term health and welfare practices in their community. Additionally, given their ability to leverage existing resources in the community and convene diverse organizations, community coalitions connote a type of collaboration that is considered to be sustainable over time.

The federal government has increasingly used community coalitions as a programmatic approach to address emerging community health issues. Community coalitions are composed of diverse organizations that form an alliance in order to pursue a common goal. The activities of community coalitions include outreach,
education, prevention, service delivery, capacity building, empowerment, community action, and systems change. The presumption is that successful community coalitions are able to identify new resources to continue their activities and sustain their impact in the community over time. Given the large investment in community coalitions, researchers are beginning to systematically explore the factors that affect the sustainability of community coalitions once their initial funding ends.

Example: Our local community coalition in Franklin County, PA! Check out their Facebook page.

Healthy Communities Partnerships & Communities That Care (CTC)
Facebook, hcpfranklinpa
Chambersburg Cares

The Office of National Drug Control Policy (ONDCP) and the SAMHSA Center for Substance Abuse Prevention (CSAP) support Drug-Free Communities (DFC) Support Program grants, which were created by the Drug-Free Communities Act of 1997 (Public Law 105-20). The DFC Support Program has two goals:

- Establish and strengthen collaboration among communities, public and private non-profit agencies, as well as federal, state, local, and tribal governments to support the efforts of community coalitions working to prevent and reduce substance use among youth.
- Reduce substance use among youth and, over time, reduce substance abuse among adults by addressing the factors in a community that increase the risk of substance abuse and promoting the factors that minimize the risk of substance abuse.

Long-term analyses suggest a consistent record of positive accomplishment for substance use outcomes in communities with a DFC grantee from 2002 to 2012. The prevalence of past 30-day use of alcohol, tobacco, and marijuana declined significantly among both middle school and high school students. The prevalence of past 30-day alcohol use dropped the most in absolute percentage point terms, declining by 2.8 percentage points among middle school students and declining by 3.8 percentage points among high school students. The prevalence of past 30-day tobacco use declined by 1.9 percentage points among middle school students, and by 3.2 percentage points among high school students from DFC grantees’ first report to their most recent report. Though significant, the declines in the prevalence of past 30-day marijuana use were less pronounced, declining by 1.3 percentage points among middle school students and by 0.7 percentage points among high school students. Learn more from the Drug Free Communities Support Program 2012 National Evaluation Report.

SAMHSA has demonstrated that behavioral health is essential to health, prevention works, treatment is effective, and people recover from mental and/or substance use disorders.

Last Updated: 05/29/2018
7.4 THE IMPORTANCE OF PREVENTION

“Preventing Drug Misuse and Addiction: The Best Strategy”

Why is adolescence a critical time for preventing drug addiction?

As noted previously, the early use of drugs increases a person’s chances of becoming addicted. Remember, drugs change the brain—and this can lead to addiction and other serious problems. So, preventing early use of drugs or alcohol may go a long way in reducing these risks.

Risk of drug use increases greatly during times of transition. For an adult, a divorce or loss of a job may increase the risk of drug use. For a teenager, risky times include moving, family divorce, or changing schools. When children advance from elementary through middle school, they face new and challenging social, family, and academic situations. Often during this period, children are exposed to substances such as cigarettes and alcohol for the first time. When they enter
high school, teens may encounter greater availability of drugs, drug use by older teens, and social activities where drugs are used.

A certain amount of risk-taking is a normal part of adolescent development. The desire to try new things and become more independent is healthy, but it may also increase teens’ tendencies to experiment with drugs. The parts of the brain that control judgment and decision-making do not fully develop until people are in their early or mid-20s; this limits a teen’s ability to accurately assess the risks of drug experimentation and makes young people more vulnerable to peer pressure.\textsuperscript{36}

Because the brain is still developing, using drugs at this age has more potential to disrupt brain function in areas critical to motivation, memory, learning, judgment, and behavior control.\textsuperscript{12} So, it's not surprising that teens who use alcohol and other drugs often have family and social problems, poor academic performance, health-related problems (including mental health conditions), and involvement with the juvenile justice system.

Can research-based programs prevent drug addiction in youth?

\textbf{Yes.} Scientists have developed a broad range of programs that positively alter the balance between risk and protective factors for drug use in families, schools, and communities. Studies have shown that research-based programs, such as described in NIDA’s \textit{Principles of Substance Abuse Prevention for Early Childhood: A Research-Based Guide}.\textsuperscript{37}
National drug use surveys indicate some children are using drugs by age 12 or 13. Prevention is the best strategy.

Childhood: A Research-Based Guide and Preventing Drug Use among Children and Adolescents: A Research-Based Guide for Parents, Educators, and Community Leaders, can significantly reduce early use of tobacco, alcohol, and other drugs. Also, while many social and cultural factors affect drug use trends, when young people perceive drug use as harmful, they often reduce their level of use.

How do research-based prevention programs work?

These prevention programs work to boost protective factors and eliminate or reduce risk factors for drug use. The programs are designed for various ages and can be used in individual or group settings, such as the school and home. There are three types of programs:

- **Universal programs** address risk and protective factors common to all children in a given setting, such as a school or community.
- **Selective programs** are for groups of children and teens who have specific factors that put them at increased risk of drug use.
- **Indicated programs** are designed for youth who have already started using drugs.
Young Brains Under Study

Using cutting-edge imaging technology, scientists from the NIDA’s Adolescent Brain Cognitive Development (ABCD) Study will look at how childhood experiences, including the use of any drugs, interact with each other and with a child’s changing biology to affect brain development and social, behavioral, academic, health, and other outcomes. As the only study of its kind, the ABCD study will yield critical insights into the foundational aspects of adolescence that shape a person’s future.

These are graphics of brain scans showing the changes that happen in the brain when a child is successful at achieving a reward. Areas of the brain that are most active are highlighted in red and yellow.

These brain images show the reward-related circuitry in the cortical and subcortical regions of the brain that tend to be more active when a child is successful at achieving a reward. While all of the images show the regions of the brain that are active to reward, the regions in yellow and red are the most active.

Courtesy of the ABCD Study. Adapted from Casey et al., 2018. ScienceDirect, The Adolescent Brain Cognitive Development (ABCD) study: Imaging acquisition across 21 sites

Economics of Prevention

Benefit-per-dollar cost ratios for evidence-based interventions range from small returns per dollar invested to more than $65 every dollar invested.39

Follow the resource links here to read more.
Resource: collegedrinking: Changing The Culture
7.5 CURRENT PREVENTION PROGRAMS, NEW INITIATIVES, AND FOOD FOR THOUGHT

1. In this chapter we examine a variety of prevention efforts, beginning with a film whose purpose it is to prevent drug use. Did you see this one in high school? Do you think it is effective in deterring drug use? Take a look.

“Chasing the Dragon” from the FBI

2. Finding a more effective message, staying up-to-date,
and dealing with the unexpected consequences are part of the continuous efforts of drug abuse prevention and education. Here are three examples.

Sometimes prevention efforts are not as effective as intended, yet some prove to be effective. Listen to this 6-minute report for examples.

“How Anti-Drug Campaigns Like ‘This Is Your Brain On Drugs’ Have And Haven’t Worked” wbur, How Anti-Drug Campaigns Like ‘This Is Your Brain On Drugs’ Have And Haven’t Worked

Changing policies require updated prevention messages. Listen to this 4-minute podcast report for the effort to change tactics from “fear to facts.”

“With The Rise Of Legal Weed, Drug Education Moves From ‘Don’t’ to ‘Delay’” npr, With The Rise Of Legal Weed, Drug Education Moves From ‘Don’t’ to ‘Delay’

Listen to this 3-minute podcast report on unintended consequences of raising taxes on cigarettes to reduce smoking.


3. Providing resources for parents and educators, as well as involving teenagers, is a key component of prevention.
Explore current DEA prevention programs and the video competition to create prevention messages for and by teens

Operation Prevention [Operation Prevention, About the Program](#) and the 1-minute video competition 2018 finalists [Operation Prevention, 2018 Competition Archives](#)

Resources for Parents, Educators, and Caregivers: [Get Smart About Drugs: Homepage](#)

Resources for children and teens: [Just Think Twice: Homepage](#)
This is where you can add appendices or other back matter.