Chapter Overview

The three major classes of downers (depressants), include opiates/opioids, sedative-hypnotics, and alcohol. The four minor classes are skeletal muscle relaxants, antihistamines, over-the-counter depressants, and look-alike depressants.

**OPIATES/OPIOIDS**

Desired effects include pain relief, sedation, anxiety control, muscle relaxation, suppression of inhibitions, and drowsiness. Undesired effects include depressed respiration, slowed heart rate, constipation, and slurred speech. When grossly misused the drugs’ effects can include unconsciousness, coma, and death. Opiates/opioids work by either inhibiting pain or stimulatory neurotransmitters or by mimicking the body’s natural sedating neurotransmitters.

A prescription drug epidemic of depressant drugs (opioid painkillers and benzodiazepine sedatives) that begin in the 2000s is responsible for an increase in diversion, overdoses, and addiction.

This chapter surveys the different types of opiates and opioids (e.g., heroin, codeine, morphine, methadone, buprenorphine, fentanyl, Vicodin® and OxyContin®), history, effects, side effects, and addictive qualities.

**SEDATIVE HYPNOTICS**

The sedative-hypnotics covered in this chapter include benzodiazepines, barbiturates, GHB, and z-hypnotics, their effects, side effects, drug interactions, synergism, addictive qualities, cross-dependence, and cross-tolerance. Alcohol is covered in Chapter 5.

**OTHER PROBLEMS WITH DEPRESSANTS**

Other problems with depressants include drug interactions, misuse, and diversion. The chapter also covers prescription drugs, over-the-counter medications and the pharmaceutical industry’s role in the depressant prescription drug epidemic and our prescription drug-dependent society.
GENERAL CLASSIFICATION

I. MAJOR DEPRESSANTS
   A. OPIATES/OPIOIDS
   B. SEDATIVE-HYPNOTICS
   C. ALCOHOL (see Chapter 5)

II. MINOR DEPRESSANTS
   A. SKELETAL MUSCLE RELAXANTS
   B. ANTIHISTAMINES
   C. OVER-THE-COUNTER DOWNERS
   D. LOOKALIKE DOWNERS

III. PRESCRIPTION DRUG EPIDEMIC

OPIOATES/OPIOIDS

IV. INTRODUCTION

V. CLASSIFICATION
   A. OPIUM, OPIATES, & OPIOIDS

VI. HISTORY OF USE (see Chapter 1)
   A. ORAL INGESTION
   B. SMOKING
   C. REFINEMENT OF MORPHINE, CODEINE, & HEROIN
   D. INJECTION USE
   E. PATENT MEDICINES
   F. SNORTING
   G. TWENTIETH CENTURY
   H. HEROIN - A WORLD VIEW
      1. Mexican Heroin & Mexican Cartel

VII. EFFECTS OF OPIOIDS
   A. PAIN & PLEASURE
      1. Opioids & Receptor Sites
      2. Pain
      3. Pleasure
   B. FROM PLEASURE TO PAIN
   C. COUGH SUPPRESSION & DIARRHEA CONTROL

VIII. SIDE EFFECTS OF OPIOIDS
   A. PHYSICAL SIDE EFFECTS
   B. TOLERANCE, TISSUE DEPENDENCE, & WITHDRAWAL
      1. Tolerance
      2. Tissue Dependence
      3. Withdrawal

IX. ADDITIONAL PROBLEMS WITH HEROIN & OTHER OPIOIDS
   A. NEONATAL EFFECTS
   B. OVERDOSE
   C. DIRTY & SHARED NEEDLES
      1. Hepatitis C & HIV
      2. Abscesses & Other Infections
   D. DILUTION & ADULTERATION
   E. COST
   F. POLYDRUG USE

X. FROM EXPERIMENTATION TO ADDICTION
   1. The Vietnam Experience
   2. The Iraqi/Afghani Experience
   3. The Russian Experience

XI. PAIN CONTROL & SPECIFIC OPIOIDS
   A. THERAPEUTIC PAIN CONTROL
   B. MORPHINE
   C. CODEINE
   D. HYDROCODONE (Vicodin®, Hycodan®, Tussend®, Norco®)
   E. OXYCODONE (OxyContin®, Percodan®)
   F. METHADONE (Dolophine®)
   G. BUPRENORPHINE (Buprenex®, Subutex®, Suboxone®)
   H. FENTANYL
   I. HYDROMORPHONE (Dilaudid®)
   J. MEPERIDINE (Demerol®, Pethidine®)
   K. PENTAZOCINE (Talwin NX®)
   L. PROPOXYPHENE (Darvon®, Darvocet®,
   M. LAAM® (l-alpha acetylmethadol)
   N. NALOXONE (Narcan®)
   P. CLONIDINE (Catapres®)
   Q. BUTORPHANOL (Stadol) & TRAMADOL (Ultram®)
R. ULTRARAPID OPIOID DETOXIFICATION
S. KRATOM

SEDATIVE-HYPNOTICS
XII. CLASSIFICATION
XIII. HISTORY
XIV. USE, MISUSE, ABUSE, & ADDICTION
XV. BENZODIAZEPINES
  A. MEDICAL USE OF BENZODIAZEPINES
  B. NONMEDICAL USE OF BENZODIAZEPINES
  C. NEUROCHEMISTRY & GABA
  D. TOLERANCE, TISSUE DEPENDENCE, & WITHDRAWAL
    1. Tolerance
    2. Tissue Dependence
    3. Withdrawal
    4. Overdose
  F. MEMORY IMPAIRMENT

XVI. BARBITURATES
  A. EFFECTS
  B. TOLERANCE, TISSUE DEPENDENCE & WITHDRAWAL

XVII. OTHER SEDATIVE-HYPNOTICS
  A. PREGABALIN (Lyrica®)
  B. RAMELTEON (Rozerem)
  C. ESZEPHONE (Lunesta®)
  D. ZALEPLON (Sonata®), ZOPLICLINE (Imovane®) & ZOLPIDEM
  (Ambien®)
  E. BUSPIRONE (BuSpar®)
  F. ETHCHLOVYNOL (Placidyl®)
  G. GHB (gamma hydroxybutyrate)
  H. GBL (gamma butyrolactone or 2[3H]-furanone dihydro) & BD (1,3 butanediol)
  I. METHAQUALONE (Quaalude®, Mandrax®)
  J. QUETIAPINE (Seroquel®)

OTHER PROBLEMS WITH DEPRESSANTS
XVIII. DRUG INTERACTIONS
  A. SYNERGISM
  B. CROSS-TOLERANCE & CROSS-DEPENDENCE

XIX. PRESCRIPTION DRUGS & THE PHARMACEUTICAL INDUSTRY
  A. RESEARCH/DEVELOPMENT & MARKETING
Chapter 4 - DOWNERS: OPIATES/OPIOIDS & SEDATIVE-HYPNOTICS

Extended Outline

GENERAL CLASSIFICATION (PP. 4.2–4.5)
The abuse of prescription painkillers such as hydrocodone and oxycodone, along with prescription sedative hypnotics are widespread. Downers (depressants) depress the overall functioning of the central nervous system to induce sedation, muscle relaxation, drowsiness, and if used to excess - coma. Some downers also induce a rush or high and often cause disinhibition of impulses and emotions.

I. MAJOR DEPRESSANTS (P. 4.3)

A. OPIATES/OPIOIDS (p. 4.3)
These are refinements and synthetic versions of the active ingredients in the opium poppy, e.g., opium, morphine, codeine, hydrocodone (Vicodin®), oxycodone (OxyContin®), methadone, and heroin. They were developed for the treatment of acute pain, diarrhea, coughs, and a number of other illnesses.

B. SEDATIVE-HYPNOTICS (p. 4.3)
Sedative-hypnotics include a wide range of synthetic chemical substances developed to treat anxiety and insomnia. Barbiturates were the standard for years, but now benzodiazepines and most recently Z-hypnotics are the most widely prescribed and often abused.

C. ALCOHOL (p. 4.3)
Alcohol, the natural by-product of fermented plant sugars or starches, is the oldest psychoactive drug in the world. It is often used in combination with other downers, especially opioids and sedative hypnotics.

II. MINOR DEPRESSANTS (p. 4.3–4.4)

A. SKELETAL MUSCLE RELAXANTS (p. 4.3)
Centrally acting skeletal muscle relaxants are synthetic CNS depressants aimed at areas of the brain responsible for muscle coordination and activity. They are used to treat muscle spasms and pain. Recently, carisoprodol (Soma®) has been detected in the drug-screening urine tests of a number of addicts, often in combination with other drugs, particularly benzodiazepines. In San Francisco it is used as a recreational drug of abuse by young Asian Americans resulting in hundreds of overdoses and dozens of deaths. These are usually due to combining drugs, either another depressant such as alcohol or a stimulant to get a "speedball effect."


B. ANTIHISTAMINES (pp. 4.3–4.4)
Antihistamines, found in hundreds of prescription and OTC cold and allergy medicines (including Benadryl®, Actifed®, and Tylenol P.M. Extra®), are synthetic drugs that were first developed during the 1930s and 1940s to treat allergic reactions. Antihistamines are occasionally abused for their depressant effects.

C. OVER-THE-COUNTER DOWNERS (p. 4.3)
These include nonprescription depressants, such as Nytol®, Sleep-Eze®, and Sominex®.

D. LOOK-ALIKE DOWNERS (p. 4.4)
In the early 80s unscrupulous drug manufacturers sold products that looked like prescription downers. These companies took legally available antihistamines and packaged them in tablets that resembled Quaalude®, Valium®, Seconal®, etc. They are rarely available today, but are still advertised in a few magazine ads.

III. PRESCRIPTION DRUG EPIDEMIC (PP. 4.4–4.5)
Many prescription drug users are hospitalized or die of prescription drug overdose; celebrities are not immune, e.g., Michael Jackson, Heath Ledger, and Anna Nicole Smith.
Over 3 billion prescriptions are filled each year for legal drugs.
The consequences of misuse can be as deadly as any street drug.
Almost two-thirds of prescription drug abusers receive them from friends or relatives, 17% from physicians and 4.3% from street dealers. Other ways to obtain prescription drugs include diversion, forgery and theft.
Males 18 to 25 are most likely to abuse opioid analgesics. Others demographics prefer sedative-hypnotics such as the benzodiazepines or the newer Z-hypnotics like Ambien®.
Abuse of prescription drugs produces toxic effects, adverse drug reactions, and other negative physical and emotional consequences.

OPIATES/OPIOIDS (PP. 4.5-4.29)

IV. INTRODUCTION (PP. 4.5–4.6)
Opiates/opioids are one of the oldest and best-documented groups of drugs and are the principal drugs used to treat pain, diarrhea, and coughs. A debate continues over the use of opioids to control pain because they have a high addiction liability.
The discovery in the 1070s of the body’s own natural painkillers—endorphins and enkephalins—significantly changed our understanding of this class of drugs.

V. CLASSIFICATION (PP. 4.6–4.7)
A. OPIUM, OPIATES & OPIOIDS (p. 163)

Opioids are fully synthetic versions of opiates which come from opium, the milky fluid contained in unripe seedpod of the opium poppy plant (*Papaver somniferum*). There are more than 25 known alkaloids in opium, but the two most prevalent are morphine (10% to 20% of the milky fluid) and codeine (0.7% to 2.5%).

- Opiates include opium, morphine, codeine, and thebaine.
- The semisynthetic opiates include heroin, hydrocodone (*Vicodin*<sup>®</sup>), oxycodone (*OxyContin*<sup>®</sup>), and hydromorphone (*Dilaudid*<sup>®</sup>).
- Fully synthetic opiate-like drugs include meperidine (*Demerol*<sup>®</sup>), methadone, and propoxyphene (*Darvon*<sup>®</sup>).
- Synthetic opioid antagonists (naloxone and naltrexone) block the effects of opiates and opioids.

VI. HISTORY OF USE (PP. 4.7–4.12)

The first cultivation of opium poppies occurred in ancient Mesopotamia, Egypt, and Greece around 3400 B.C. and spread eastward to Asia. Ancient civilizations used it as a cure-all, a pleasure-inducing substance, and a poison.

Over the centuries, experimentation with different methods of use, development of new refinements of the drug, synthesis of molecules that act like the natural opiates, and time-release versions of the drugs have slowly increased the benefits of these substances as well as their potential for abuse.

A. ORAL INGESTION (p. 4.8)

Opium, from the Greek word *opòs*, meaning “juice” or “sap,” was originally chewed, eaten, or blended in various liquids and swallowed. The abuse potential of opium was relatively low due to its bitter taste, low concentration of active ingredients, and limited supply. When taken orally, it reaches the brain in 20–30 minutes.

In ancient writings opium is listed as an ingredient in more than 700 remedies. Other opiate medicines over the centuries included theriac, laudanum, and paregoric.

B. SMOKING (p. 4.8)

In the sixteenth century, the introduction of smoking opium in a pipe (from North America to Europe and by Portuguese traders to Asia) set the stage for the widespread nonmedical use. Vaporized opium reaches the brain in 7 to 10 seconds and produces a stronger sense of euphoria than oral ingesting.

China banned the practice in the 1700s but the British were unwilling to stop the opium trade which led to the Opium Wars. Britain and other Western countries prevailed, won trade concessions; and China ceded control of Hong Kong to Britain.
Opium smoking was introduced to the United States by some of the 70,000 Chinese workers who built the railroads. In the twentieth century, heroin smoking gained in popularity.

C. REFINEMENT OF MORPHINE, CODEINE & HEROIN (pp. 4.8–4.9)
• In 1805, morphine was isolated from opium. It is 10 times as strong.
• In 1832, codeine, the other major component of opium, was isolated.
• In 1874, heroin (diacetylmorphine) was refined from morphine. Heroin crosses the blood/brain barrier more rapidly than morphine. The rush (and the subsequent euphoria) comes on more quickly and is more addicting.

D. INJECTION USE (p. 4.9)
The development of the hypodermic needle in 1853, enabled high doses of the drug to be injected directly into the bloodstream. It takes 15 to 30 seconds to affect the central nervous system. Injection under the skin or in a muscle delays effects by five to eight minutes. When injected intravenously an intense rush occurs making addiction more likely.

E. PATENT MEDICINES (pp. 4.9–4.10)
During the 1800s opiates were so popular that hundreds of tonics and medications containing the drug became available. Working-class adults used opium-laced mixtures to ease their aches and pains. Members of the upper class, especially women, were prescribed excessive amounts by their physicians, which often led to addiction (iatrogenic addiction). The use of opioids for pleasure also came into vogue as the number of opium parlors, doctors willing to prescribe for flimsily reasons, and new opiate mixtures increased.

F. SNORTING (p. 4.10)
It takes five to eight minutes for the drug to enter the nasal capillaries and reach the central nervous system and 10 to 15 minutes for peak effects to occur. More than half of all heroin addicts entering treatment began their use by insufflations (snorting). Opioid pills can be crushed and snorted.

G. TWENTIETH CENTURY (p. 4.10)
Casual nonmedical use of opiates was declared illegal at the beginning of the twentieth century by the United States through the Pure Food and Drug Act in 1906 and the Harrison Narcotics Act in 1914. The gradual proliferation of laws also increased the prison population even though opioid addiction was considered a medical problem in the early 1900s and was treated by physicians.

Legal restrictions limited supplies and made opium and heroin valuable commodities. Growing, processing, and distributing heroin became a
major source of revenue for criminal organizations worldwide. Diversion of legal prescription opiates/opioids, through theft, forged prescriptions, and easy Internet accessibility has created an expanding illegal market of prescription opioids. Currently, an estimated 4.7 million Americans use prescription opiates/opioids illicitly every month compared with 136,000 to 800,000 heroin abusers.

H. HEROIN: A WORLD VIEW (pp. 4.11–4.12)
There are 5 to 10 million regular heroin users worldwide. The United States consumes approximately 3% of the world’s heroin supply. Afghanistan grows over 90% of the world’s opium supply; most is used in Europe and Asia. Opium supports most of the Taliban counterinsurgency in Afghanistan.
The Golden Triangle (Myanmar, Thailand, and Laos) is the other significant grower of illicit opium. Most heroin in the United States comes from Mexico and Colombia. Since the 1940s, Mexico has been a major supplier. Drug wars are devastating Mexico and challenging the Mexican government’s efforts to wipe out the drug gangs.
Since the 1980s “tar” or “black tar” heroin from Mexico has taken over a large part of the western U.S. market.
In the early 1990s, a number of Colombian cocaine cartels diversified and started to grow and distribute opium/heroin (in addition to coca).

VII. EFFECTS OF OPIOIDS (PP. 4.12–4.15)
Medically, physicians most often prescribe opioids to:
• deaden pain,
• suppress cough,
• control diarrhea.
Nonmedically, users self-prescribe opioids to:
• drown out emotional pain,
• get a rush,
• induce euphoria, and
• prevent withdrawal symptoms.

A. PAIN & PLEASURE (pp. 4.12–4.14)

1. Opioids & Receptor Sites
Humans have many natural (endogenous) opioids, particularly endorphins, enkephalins, and dynorphins which produce effects similar to those from opioid drugs. They both affect pain and pleasure at receptor sites on the dendrites of adjoining nerve cells.

2. Pain
Pain is a warning signal that damage has occurred. The pain message is transmitted from nerve cell to nerve cell by a neurotransmitter called *substance P*. If the pain is too intense the body releases its own painkillers (endorphins and enkephalins) to block pain transmission. Natural opioid receptor sites for the body’s own endorphins and enkephalins help block pain. The main receptors are μ (mu), κ (kappa), δ (sigma), and nociceptin.

Opioid medications relieve unbearable pain because they act like the body’s endogenous (naturally occurring) painkillers (endorphins and enkephalins) and slot into the same receptor sites; causing more-intense reactions. Mental pain such as fear and anxiety is also subdued.

Even though all opioids relieve pain, small alterations in the molecular structure can produce dramatic differences in the strength, duration, and side effects.

### 3. Pleasure

The other major effect of opioids involves endorphins and dopamine and their effect on the reward/control pathway. The normal activation of this system produces a surge of pleasure that encourages repeating the action, such as eating or having sex. Dopamine released in this pathway helps the brain remember the details of the action so it can be repeated in the future.

Some people try opioids in search of a high or to relieve pain because the drugs activate the reward/control pathway. Of the various opioids, heroin has the strongest effect on the reward/control pathway.

Normally, natural endorphins and enkephalins activate the stop signal/switch when the need is filled (the body has had enough to eat, it is relaxed after sex, etc.). Powerful psychoactive drugs like heroin disrupt this cutoff or stop switch (fasciculus retroflexus and habenula), the individual continues the behavior or activity which serves to reinforce the desire to continue.

### B. FROM PLEASURE TO PAIN (4.14–4.15)

The same area of the brain that signals pleasure/reward also signals alleviation of pain. Drug abusers will keep using past the point of pain relief searching for a high or simply because they are unable to stop.

### C. COUGH SUPPRESSION & DIARRHEA CONTROL (p. 4.15)

Opioids suppress a cough by controlling the activation of the cough center in the brainstem that signals the body to cough when the respiratory tract is irritated.

Opioids control diarrhea because they affect areas in the brainstem that inhibit gastric secretions and depress the activity of intestinal muscles. Constipation can become a severe problem for surgical patients or for those with intractable pain who use opioids over a long period.

### VIII. SIDE EFFECTS OF OPIOIDS (PP. 4.15–4.17)
A. PHYSICAL SIDE EFFECTS (pp. 4.15–4.16)
Unwanted side effects include
- insensitivity to pain as a warning signal;
- lowered blood pressure, pulse, and respiration;
- confusion;
- droopy eyelids and nodding head
- slurred, slowed speech, and a raspy or hoarse voice;
- slowed gait and lack of coordination
- pinpoint pupils that do not react to light;
- dry, itchy skin
- lack of sexual desire, often to the point of indifference;
- hindered phlegm clearance;
- nausea
- delayed/erratic menstrual periods

B. TOLERANCE, TISSUE DEPENDENCE & WITHDRAWAL (pp. 4.16–4.17)
1. Tolerance
Tolerance occurs when the body tries to neutralize heroin by speeding up the metabolism, desensitizing nerve cells, excreting the drug more rapidly, or altering the brain and body chemistry to compensate for the effects of the drug.
There is almost no limit to the development of opioid tolerance. Tolerance develops at different rates for different body systems so a desire for stronger mental effects might be accompanied by excessive respiratory depression.

2. Tissue Dependence
A strong opioid can temporarily and sometimes permanently alter brain chemistry. When chronic heroin use is stopped, the body has less ability to produce its own dopamine and therefore less ability to feel elated or normal. This depletion intensifies the desire to use the drug again because the body relies on it to stay normal.

3. Withdrawal
For powerful opioids there are three withdrawal phases: acute, post-acute, and protracted.
- Acute withdrawal occurs as the body tries to return to normal too quickly.
- Protracted withdrawal (extended withdrawal symptoms) lasts for months after abstinence has begun.
• Post–acute withdrawal syndrome (PAWS) is the persistence of subtle emotional and physical symptoms that can last for 3 to 6 months and in some cases up to 18 months.

Short-acting opioids (2 to 3 hours), like heroin and morphine result in more-acute withdrawal symptoms which begin 8 to 12 hours after cessation of chronic use, reach peak intensity within 48 hours, and then subside over a period of 5–7 days.

Long-acting opioids such as methadone activate withdrawal symptoms within 36 to 72 hours.

Withdrawal symptoms include, bone, joint, and muscular pain, insomnia, anxiety, sweating; runny nose; stomach cramps, vomiting, diarrhea, hyper reflexes, and muscle cramps, all accompanied by fever, chills, and goose flesh.

Severe withdrawal is rarely life threatening (except in infants) although the fear of withdrawal becomes an even greater trigger for continued use than does the desire to repeat the rush.

IX. ADDITIONAL PROBLEMS WITH HEROIN & OTHER OPIOIDS (PP. 4.18–4.29)

A. NEONATAL EFFECTS (p. 4.18)

Most opioids can cross the placental barrier between the fetus and the mother and deliver large doses of the drug to the developing infant. Babies born to addicted mothers are also addicted; withdrawal can be fatal.

The amount of prenatal care received by a pregnant opioid addict is crucial to the health of her fetus and neonate. Infants born addicted often have to be medically managed.

B. OVERDOSE (p. 4.18)

Of 1.3 million drug-related emergency department (ED) visits in 2008, about 200,000 involved heroin compared with 482,000 for cocaine, 91,000 for methamphetamine, and 657,000 involving alcohol. Approximately 367,000 cases involved prescription opioids.

Each year 5,000 to 6,000 people die from opioid overdoses alone or in combination with other depressants. Severe respiratory depression is the major cause of overdose deaths. An overdose can be counteracted by a shot of an opioid antagonist—naloxone (Narcan®)—to block and reverse the life-threatening effects.

C. DIRTY & SHARED NEEDLES (pp. 4.18–4.20)

Heroin users can unknowingly inject adulterants, infectious bacteria or virus, including those that cause hepatitis B or C, endocarditis, malaria, syphilis, flesh-eating bacteria, gangrene, and HIV.

1. Hepatitis C & HIV
From 50% to 90% of all needle-using heroin addicts carry hepatitis C. IV users carry infections that can be spread to their partners or co-users. More than half of IV drug users carry HIV, although the percentages vary radically from city to city. 70% of children infected with HIV had mothers who were IV drug users or had sexual contact with an IV drug user. Worldwide, 60 million people have been diagnosed with HIV and 25 million have died. By 2007, about 576,000 Americans had died from AIDS and a million carry the virus.

2. Abscesses & Other Infections
Septic abscesses and ulcerations caused by soft-tissue infections are common among IV drug users. Other signs of IV drug use are lesions or “tracks,” (scars on the skin) often caused by constant inflammation at the injection site and hyperpigmentation. One particularly gruesome infection is necrotizing fasciitis, an infection that destroys large areas fascia and subcutaneous tissue. Other infections include
- endocarditis, an infection of heart valves;
- cotton fever, caused by endotoxins (which thrive in cotton),

D. DILUTION & ADULTERATION (p. 4.20)
Street drugs vary radically in purity from 0% to 99% pure. If a user is expecting 3% heroin and gets 30%, the results could be fatal. One reason for the increased purity is the influx of large amounts of unadulterated Southeast Asian and South American heroin.

E. COST (p. 4.20)
The majority of heroin users (79%) are gainfully employed; however, many users must turn to illegal activities to pay for their habit. The cost of a heroin habit can range from $20 to $200 a day. 60% of the cost of supporting a habit is acquired through consensual crime, including prostitution and drug dealing.

F. POLYDRUG USE (pp. 4.20-4.21)
Multiple Drug Use. Heroin in the morning can lead to speed at night. Mixing cocaine or amphetamine with heroin is called a “speedball” and can enhance the euphoric and painkilling effects of both drugs. OxyContin® is often mixed with other drugs to simulate a heroin-like high. Users often use an opioid or alcohol to come down from meth or cocaine.

X. FROM EXPERIMENTATION TO ADDICTION (PP. 4.21-4.22)
It takes an average of one year of sporadic heroin use for someone to develop a daily habit. Over time, the pain of withdrawal often exceeds whatever pain the user might have been trying to avoid by taking the drug, so the motivation to continue use is reinforced. Treating addiction is a physiological as well as a psychological process. Physically the addict must be detoxified from the heroin or other opioid,
often with the use of medications. Cravings must be controlled to maintain abstinence. Psychologically the addict has to learn a new way of living.

1. The Vietnam Experience
During the Vietnam War (1965 to 1973) almost half the GIs experimented with opium or heroin; 20% became physically addicted and reported withdrawal symptoms. Only 5% of those who had become addicted in Vietnam relapsed within 10 months of their return to the United States (environmental influence).

2. The Iraqi/Afghan Experience
A 2007 survey found that 7.1% of veterans met the criteria for substance use disorders. The Department of Defense is allotting more money for mental health and drug treatment and protecting the careers of those who voluntarily seek help.

The Russian Experience
The number of Russian heroin addicts ballooned during and after their occupation of Afghanistan. Six times as many Russians died from heroin overdose as Americans.

XI. PAIN CONTROL & SPECIFIC OPIOIDS (4.22–4.29)

A. THERAPEUTIC PAIN CONTROL (pp. 4.22–4.23)
An estimated 50 million Americans have chronic pain. About half of those take a prescription drug and many are afraid of becoming dependent. Physician concerns include;

- fear that addiction might develop or a recovering addict will relapse;
- the possibility that the opioid will mask clues to a serious disease;
- the chance that the patient is faking symptoms.

These concerns keep some physicians from prescribing sufficient pain medication even when it is appropriate. Problems caused by OxyContin, hydrocodone, and methadone make adherence to medically sound prescribing practices challenging. Most of the problems with moderate-strength prescription opioids come from long-term use. By relying on the drug to relieve the pain, the patient becomes more sensitive to pain because the body produces fewer of its own painkillers and down-regulates its own opioid receptors.

Ongoing research is focusing on non-opioid pain medications. Lines of inquiry include glial cells and cannabinoid receptors.

B. MORPHINE (pp. 4.23–4.24)
Morphine remains the standard by which effective pain relief is measured. It is processed from opium into white crystal hypodermic tablets, capsules, suppositories, oral and injectable solutions. Three to six times more morphine must be taken orally to achieve the same effects as injecting.

C. CODEINE (p. 4.24)
Codeine is extracted directly from opium or refined from morphine. It is one-fifth as strong and is generally used to relieve moderate pain. It is also commonly used to control a severe cough (Robitussin A-C® and Cheracol®). Codeine was formerly the most widely prescribed and abused prescription opioid in the United States, today it is hydrocodone (Vicodin®).

D. HYDROCODONE (Vicodin®, Hycodan®, Tussend®, Norco®) (p. 4.24)
More than 120 million prescriptions were written for hydrocodone in 2006, the most of any prescription drug (4 times as many as codeine). In addition to pain relief, hydrocodone is also used in cough preparations, called antitussives. About 600 deaths are reported each year from hydrocodone overdose, more occur when it is used with other depressants.

E. OXYCODONE (Oxycontin®, Percodan®) (pp. 4.24–4.25)
This semisynthetic derivative of codeine is used for the relief of moderate-to-severe pain. Purdue Pharma introduced OxyContin® in 1995. Abusers chew, crush, and inject the drug or they crush and sniff the time-release formulation that holds the oxycodone. Once the time-release action is destroyed a higher blood level of oxycodone is achieved. Heroin and other opioid abusers describe the high as similar to heroin. Robberies and diversion of legitimate supplies are on the rise. Patients with legitimate prescriptions recognize a financial opportunity and sell their supplies. Heightened media coverage is responsible for the public’s increased knowledge of the drug.

F. METHADONE (Dolophone®) (pp. 4.25–4.26)
Methadone is a legal opioid used to treat heroin addiction through a program known as “methadone maintenance.” There are approximately 288,000 heroin addicts involved in methadone treatment in more than 1,132 methadone treatment programs nationwide. This long-acting synthetic opioid reduces drug craving and blocks withdrawal symptoms for 24 to 72 hours. Like heroin, methadone is addicting and must be monitored closely to prevent diversion into illegal channels. More frequent prescriptions of methadone as a pain reliever in recent years has increased the street supply of the drug and the number of inadvertent overdoses; 4,462 deaths in 2005. In 2009 Oregon reported more overdose deaths from methadone than heroin.
G. BUPRENORPHINE (Buprenex®, Subutex®, Suboxone®) (pp. 4.26–4.27)

Buprenorphine is a powerful opioid agonist at low doses and an opiate antagonist at high doses. In low doses it is approved as an analgesic alternative to morphine. At high doses, it blocks the opioid receptors. It has been approved as an alternative to methadone for detoxification, buprenorphine maintenance, and as a transition away from methadone maintenance. It can be prescribed and administered by an approved physician in addition to being available daily at specialized treatment clinics.

Two drugs, Subutex® and Suboxone®, were approved in 2002 for treatment of patients with opioid dependence. Buprenorphine doesn't mitigate all withdrawal symptoms so clients have slightly unrealistic expectations about the effectiveness of the drug.

H. FENTANYL (Sublimaze®) (p. 4.27)

Even in its milder therapeutic formulation, fentanyl, introduced in 1968, is the most powerful of the opioids—50 to 100 times as strong as morphine on a gram-for-gram basis. It is used intravenously during and after surgery for severe pain. The drug is diverted from normal channels in pill form, liquid suspension, or in a patch.

The street versions of fentanyl (alpha, 3-methyl) and meperidine (MPPP) are illegally manufactured and are often more potent than the drugs they are imitating. Sold as “China white,” these drugs attest to the growing sophistication of street chemists.

I. HYDROMORPHONE (Dilaudid®) (pp. 4.27–4.28)

Hydromorphone, a short-acting semisynthetic opioid, can be taken orally or injected. Hydromorphone is refined from morphine using a process that makes it 7 to 10 times more potent gram-for-gram than morphine. A 4 mg tablet of Dilaudid® costs $30 to $70 on the street.

J. MEPERIDINE (Demerol®, Pethidine®, Mepergan®) (p. 4.28)

A synthetic phenylpiperidine derivative, this short-acting opioid is one of the most widely used analgesics for moderate-to-severe pain. Though less potent by weight than morphine, it is the opioid most often abused by medical professionals.

K. PENTAZOCINE (Talwin NX®, Fortwin®, Talacen®) (p. 4.28)

Talwin NX®, prescribed for chronic or acute pain, comes in tablets, has a fraction of the potency of morphine, and acts as a weak opioid antagonist as well as an opioid agonist. In the past, this drug was frequently combined and injected with pyrabenzamine, an antihistamine drug (“Ts and blues”) for the heroin-like high.
L. PROPOXYPHENE (Darvon®, Darvocet®, Propacet®, Wygesic®) (p. 4.28)

Used for the relief of mild-to-moderate pain, this odorless white crystalline powder is often prescribed by dentists. More than 23 million prescriptions were written for propoxyphene in 2005. It was removed from the U.S. market in 2010 because it was found to cause heart problems.

M. LAAM® (Levomethadyl Acetate) (p. 4.28)

LAAM® is another long-acting opioid that was used for heroin replacement therapy. It prevented withdrawal symptoms and lasted 2 to 3 days. By the early 2000s, a number of cardiac arrhythmias were documented in patients treated with LAAM. In response, Roxanne Pharmaceuticals voluntarily ceased production of the medication in 2003, it is still referenced in current research.

N. NALOXONE (Narcan®, Nalone, Narcanti) & NALTREXONE (Revia®, Depade®, Vivitrol®, Trexan®) (p. 4.28-4.29)

Naloxone and naltrexone are opioid antagonists. They block the effects of heroin, hydrocodone, and other opioids as well as blocking endorphins and enkephalins.

Naloxone (Narcan®) is effective in treating heroin/opioid drug overdose. When a heroin overdose victim is injected with naloxone, the heroin’s effects are immediately halted and the person regains consciousness in a matter of seconds.

Naltrexone (Revia®) is used to prevent relapse and to help break the cycle of addiction to opioids. Taking naltrexone daily effectively blocks the effects of heroin and any other opioid. It is also used to reduce cravings for alcohol and cocaine. Naltrexone has proven effective in smoking-cessation programs, particularly among female smokers. Vivitrol® is the time-release version.

P. CLONIDINE (Catapres®) (p. 4.29)

This nonopioid, originally prescribed for the treatment of hypertension, is often used to diminish opioid withdrawal symptoms such as nausea, anxiety, and diarrhea. It can also alleviate opioid craving. Because it acts on norepinephrine receptors to control their overactivity (one of the main causes of severe opioid withdrawal symptoms), it can shorten withdrawal time from a month to a couple of weeks. When used in combination with naltrexone it shortens severe withdrawal symptoms to about five days in a process called rapid opioid detoxification.

Q. BUTORPHANOL (Stadol®) & TRAMADOL (Ultram®) (p. 4.29)

These newer synthetic opioid analgesics were originally developed to be less abusable and addictive than older opioids. Butorphanol became just as abused as other opioids and is now a Schedule IV drug.
R. ULTRARAPID OPIOID DETOXIFICATION (p. 4.29)

In this medically supervised process naltrexone is given orally or intravenously to a patient who is either heavily sedated or under general anesthesia to avoid the pain of acute withdrawal symptoms precipitated by the opioid antagonist. There is much controversy about this process.

S. KRATOM (p. 4.29)

The kratom tree is native to Southeast Asia. Its leaves are used in low doses as a stimulant and in high doses for diarrhea control and as a sedative, a painkiller, a treatment for opiate addiction, and a recreational drug.

SEDATIVE-HYPNOTICS

Prescription drugs have been called the middle and upper classes’ abusable drugs of choice. America has gone through several periods of sedative-hypnotic abuse as each new drug or family of drugs was released. Reports exist of barbiturate abuse in the 1930s and 1940s, Miltown® abuse in the 1950s, benzodiazepine abuse in the 1970s through the present. Prescription drug abuse, particularly among younger users, is increasing.

XII. CLASSIFICATION (PP. 4.29–4.30, 4.31)

Americans spent $300 billion on prescription drugs in 2009, which amounts to 3.8 billion prescriptions at an average of $70 to $80 per prescription. More than 85 million of those prescriptions were for sedative-hypnotics (mostly benzodiazepines). Psychiatric medications have taken over a significant part of the sedative-hypnotics market share. Approximately 164 million prescriptions were written for psychiatric medications in 2008.

Almost all sedative-hypnotics are available in pill, capsule, or tablet form. The three main groups of sedative-hypnotics are benzodiazepines, barbiturates, and a number of nonbenzodiazepine, nonbarbiturate sedative-hypnotics, especially the Z-hypnotics.

The effects of sedative-hypnotics are similar to those of alcohol (e.g., lowered inhibitions, physical depression, sedation, and muscular relaxation). The basic difference between the two is their potency.

Sedatives are calming drugs, e.g., alprazolam (Xanax®). They are also called “minor tranquilizers.”

Hypnotics are sleep inducers, i.e., short-acting barbiturates and benzodiazepines such as Halcion® that work on the brainstem. They also depress most body functions, including breathing and muscular coordination. Some sedatives are used as hypnotics and some hypnotics are used as sedatives.

XIII. HISTORY (PP. 4.30, 4.32)

Calming and sleep-inducing drugs have been around for centuries. In ancient cultures, natural plant-derived substances or products of
fermentation were used. Since the mid 1800s all sedative-hypnotics have been developed in the laboratory.

At the beginning of the twentieth century, bromides, chloral hydrate, and paraldehyde were commonly used. Though chemically quite different, they all depress the central nervous system.

**Barbiturates** were developed at the end of the nineteenth century and slowly grew in popularity; they peaked in the 1930s and 1940s. Phenobarbital, secobarbital, and pentobarbital were among the hundreds of compounds synthesized from barbituric acid. The toxic potential of barbiturates instilled an apprehension about use.

**Meprobamate (Miltown®)** was developed in the late 1940s and 1950s. Known as “mother’s little helper,” this long-acting sedative replaced many long-acting barbiturates.

**Glutethimide (Doriden®)** was tested as a barbiturate substitute, but it had many of the same disadvantages.

**Benzodiazepines** were discovered in 1954 (Librium®) in a deliberate search for a safer class of sedative-hypnotics. Over the years more than 3,000 compounds were developed, but less than two dozen were marketed and released. Benzodiazepines still dominate the market for sedative-hypnotics.

**Other sedative-hypnotics** are being developed in an attempt to improve this class of drugs, e.g., Lunesta®, BuSpar®, Rozerem®, Lyrica®, and Ambien®.

**XIV. USE, MISUSE, ABUSE & ADDICTION (PP. 4.32–4.33)**

Half of all Americans use at least one prescription drug a day. When used properly, sedative-hypnotics can be beneficial therapeutic adjuncts for treatment of a variety of psychological and physical conditions. When misused they can cause undesirable side effects, dependence, abuse, addiction, and death. Sedative-hypnotic misuse or abuse can occur when patients overuse the drug or use them in combination with other psychoactive drugs.

**MENTS OF DRUG PROBLEMS IN U.S. EMERGENCY ROOMS, 2004 & 2008.**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Drug Mentions 2004</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>674,914</td>
<td>656,892</td>
</tr>
<tr>
<td>Narcotics (hydrocodone, OxyContin®)</td>
<td>264,759</td>
<td>593,956</td>
</tr>
<tr>
<td>Cocaine</td>
<td>475,425</td>
<td>482,188</td>
</tr>
<tr>
<td>Marijuana</td>
<td>281,619</td>
<td>374,475</td>
</tr>
<tr>
<td>Benzodiazepines (Xanax®, Klonopin®)</td>
<td>170,471</td>
<td>330,235</td>
</tr>
<tr>
<td>Heroin</td>
<td>214,432</td>
<td>200,666</td>
</tr>
<tr>
<td>Aspirin, acetaminophen, etc.</td>
<td>102,076</td>
<td>138,446</td>
</tr>
<tr>
<td>Methamphetamine, amphetamines</td>
<td>166,661</td>
<td>95,500</td>
</tr>
<tr>
<td>Barbiturates</td>
<td>12,919</td>
<td>10,808</td>
</tr>
</tbody>
</table>
More than one drug is found in many incoming patients

**XV. BENZODIAZEPINES (PP. 4.33–4.36)**

Benzodiazepines are the most widely used sedative-hypnotics in the United States. This class of drugs was developed in the 1950s as an alternative to barbiturates. Benzodiazepines are recommended for short-term use for specific conditions.

The most widely used benzodiazepines are alprazolam (Xanax®), lorazepam (Ativan®), clonazepam (Klonopin®), diazepam (Valium®), and temazepam (Restoril®).

**A. MEDICAL USE OF BENZODIAZEPINES (pp. 433-436)**

Medically, benzodiazepines are used to treat
- symptoms of anxiety and panic disorders;
- anxiety in surgical patients;
- sleep disorders;
- spasms and seizures;
- acute alcohol withdrawal symptoms.

**B. NONMEDICAL USE OF BENZODIAZEPINES (p. 4.34)**

Because the desirable emotional and physical effects of benzodiazepines are very similar to those of alcohol, people use them for the same reason they drink.

Benzodiazepines can be abused alone but they are most often abused in conjunction with other drugs. Methamphetamine and cocaine abusers take them to come down from excess stimulation. Most benzodiazepine abusers are over 30 years of age, White, well educated, and female.

**C. NEUROCHEMISTRY & GABA (p. 4.34)**

Benzodiazepines increase the effects of GABA (gamma amino butyric acid), the most important inhibitory neurotransmitter, so when a benzodiazepine increases the actions of GABA, it subsequently inhibits anxiety-producing thoughts and over stimulating neural messages. The metabolites of benzodiazepines can be as or more active than the original drug.

Specific benzodiazepines have been developed to treat specific conditions. For example: Xanax® for symptoms of generalized anxiety disorder, panic disorder, and depression; or triazolam (Halcion®) for short-term (7 to 10 days) treatment of insomnia;
D. TOLERANCE, TISSUE DEPENDENCE & WITHDRAWAL (pp. 4.34–4.36)

1. Tolerance
Tolerance to benzodiazepines develops as the liver becomes more efficient in processing the drug. A younger person can tolerate higher doses of benzodiazepines than someone older.

2. Tissue Dependence
Physical addiction to a benzodiazepine can develop if a patient takes 10 to 20 times the normal dose daily over a couple of months, or takes a normal dose for a year or more.

3. Withdrawal
Withdrawal symptoms can be severe with symptoms lasting 7 to 20 days for short-acting benzodiazepines and up to 28 days for those long-acting. It takes several months to taper off of the drug.
Symptoms can include recurrence or magnification of the symptoms that were being treated, headaches, tremors, muscle twitches, nausea and vomiting, anxiety, restlessness, yawning, tachycardia, cramping, hypertension, sleep disturbances, and life-threatening convulsions.
Symptoms can come and go in cycles separated by 2 to 10 days; can be bizarre, sometimes life threatening, and are complicated by the cyclical nature of benzodiazepine withdrawal.

4. Overdose
Benzos have a high margin of safety but the margin is significantly diminished when benzodiazepines are taken in combination with alcohol, other benzodiazepines, phenothiazines, MAO inhibitors, barbiturates, opioids, or other antidepressants.

E. MEMORY IMPAIRMENT (p. 4.36)
Benzodiazepines disrupt the transfer of information from short- to long-term memory. The amnesic effect of benzodiazepines is medically known as either retrograde or anterograde amnesia. Sexual predators sometimes count on this effect so their victims will forget they were sexually assaulted. Rohypnol® was associated with date rape until 1996 when the FDA banned all imports of the drug even for personal use.

XVI. BARBITURATES (PP. 4.36–4.37)
Barbituric acid was first synthesized in 1863. In 1903, the molecule was modified to create barbital (Veronal®). Phenobarbital was synthesized in 1913, and since then approximately 50 of the 2,000 barbiturates created have been marketed. Since the peak of their use in the 1940s and 1950s and their abuse in the 1950s, 1960s, and 1970s, their licit and illicit use has declined dramatically.
A. EFFECTS (pp. 4.36–4.37)

- Long-acting barbiturates (e.g., Phenobarbital) last 12 to 24 hours and are used mostly as daytime sedatives or to control seizures.
- Intermediate-acting barbiturates (e.g., butabarbital), are used as longer-acting sedatives and last 6 to 12 hours.
- Short-acting compounds, (e.g., butalbital and, in the past-Seconal®) last 3 to 6 hours and are used to induce sleep.
- Very short-acting barbiturates (Pentothal®) are used for anesthesia.

Barbiturates affect GABA, therefore acting as a brake on inhibitions, anxiety, and restlessness. Because they can induce a feeling of disinhibitory euphoria, barbiturates have an initial stimulatory effect. Their effects are very similar to those of alcohol.

B. TOLERANCE, TISSUE DEPENDENCE & WITHDRAWAL (p. 4.37)

Dispositional tolerance results from the physiologic conversion of liver cells to more-efficient cells that metabolize or destroy barbiturates more quickly. Pharmacodynamic tolerance causes affected nerve cells and tissues to become less sensitive. Tissue dependence to barbiturates occurs after 8 to 10 times the normal dose is taken daily for 30 days or more.

Within 6 to 8 hours after stopping heavy use of short-acting barbiturates, users will begin to experience anxiety, agitation, loss of appetite, nausea, vomiting, increased heart rate, excessive sweating, abdominal cramps, and tremulousness. Convulsions can occur 12 hours to a week after the last dose.

XVII. OTHER SEDATIVE-HYPNOTICS (PP. 4.37–4.39)

A. PREGABALIN (Lyrica®) (p. 4.37)

Pregabalin is FDA approved to treat nerve pain from shingles or diabetes as well as to help treat seizures. In 2007 the FDA was considering approving Lyrica® for the treatment of anxiety and sleep or mood disorders. It can cause dizziness, drowsiness, lethargy, and memory problems. Euphoria has also been associated with its use and there is a mild potential for abuse and dependence.

B. RAMELTEON (Rozerem®) (p. 4.37)

This medication is a new approach to treating insomnia. Ramelteon directly activates the brain’s melatonin receptors. It is recommended for short-term treatment of sleep problems. Abuse and dependence have not been associated with its use; however, ramelteon taken with alcohol has additive toxic effects.

C. ESZOPICLONE (Lunesta®) (p. 4.37)

This drug is a hypnotic agent prescribed for insomnia, it affects GABA. When used longer than a few weeks at a high dose, it can cause
dependence. There is a cumulative effect when it is taken with other sedatives or opioids.

D. ZALEPLON (Sonata®), ZOPICLONE (Imovane®) & ZOLPIDEM (Ambien®) (pp. 4.37–4.38)

Zaleplon (Sonata®), zopiclone (Imovane®), and zolpidem (Ambien®) are known as the Z-hypnotics because they have similar actions and their chemical names all began with the letter Z. Eszopiclone (Lunesta®) is also considered a Z-hypnotic. The Z-hypnotics are short acting and work by activating the benzodiazepine receptor to enhance the effect of GABA in the brain. Excess use can cause nausea, diarrhea, headaches, dizziness, and drowsiness the following day. The Z-hypnotics can cause memory, performance, and learning impairment, they have a high therapeutic index and rarely cause overdose deaths except when taken in combination with other depressants.

E. BUSPIRONE (BuSpar®) (p. 4.38)

This sedative-hypnotic medication is most often used as an anxiolytic or anti-anxiety medication but is also used in combination with SSRI antidepressant medications to treat depression. It does not produce abuse, addiction, or withdrawal symptoms. Because most people (and especially addicts) expect a high or buzz from a sleeping pill or an anti-anxiety medication, it has a low-use rate.

F. ETHCHLORVYNOL (Placidyl®) & CHLORAL HYDRATE (Noctec®, Somnos®, Aquachloral®) (pp. 4.38–4.39)

Ethchlorvynol and chloral hydrate are used to induce sleep, and both have a long history of toxic overdoses and patterns of addictive use.

G. GHB (Gamma Hydroxybutyrate) (p. 4.38)

GHB is a strong, rapidly acting CNS depressant that was used as a sleep inducer in the 1960s and 1970s. It is thought to increase the body’s levels of human growth hormone (HGH). It also induces effects similar to alcohol (sedation and disinhibition), ecstasy (empathy and sensory enhancement), and heroin intoxication (euphoria), making it a popular club drug. By the 1990s, the FDA took GHB off the market because of health risks. A dose of GHB costs $5 to $10 on the street and the effects last three to six hours. Because GHB causes a mild euphoria and lowers inhibitions, it has been used by sexual predators to lower the defenses of their victims.

H. GBL (Gamma Butyrolactone or 2[3H]-Furanone Dihydro) & BD (1,3 Butanediol) (p. 4.39)

Increased legal scrutiny of GHB has resulted in the abuse of GBL and BD. GBL and BD are prodrugs (they are metabolized to GHB in the
body). These elixirs are sold under the trade names Blue Nitro® and Insom-X®.

I. METHAQUALONE (Quaalude®, Mandrax®) (p. 4.39)
Methaqualone was developed in India in 1955 as a safe barbiturate substitute. The disinhibitory effect is similar to that caused by alcohol and can last 60 to 90 minutes; the sedating effects last 6 to 10 hours. In 1984 it was classified as a Schedule I drug. This change led to a tremendous increase in the illicit production of Quaalude®. There is no guarantee that street versions of Quaalude® contain actual methaqualone.

J. QUETIAPINE (Seroquel®) (4.39)
Quetiapine was approved to treat schizophrenia and bipolar disorders. It has benzodiazepine-like effects; abuse has increased in recent years.

OTHER PROBLEMS WITH DEPRESSANTS

XVIII. DRUG INTERACTIONS (PP. 4.39–4.40)
Pharmacologic research has found that more than 150 prescription and OTC medications interact negatively with alcohol. This is a particular problem in those over 65.

A. SYNERGISM (pp. 4.39–4.40)
When more than one depressant drug is used, the polydrug combination can cause a much greater reaction than simply the sum of the effects. Exaggerated respiratory depression presents the most serious danger, often caused by the use of alcohol and another depressant. Approximately 19,000 deaths per year are due to this effect, and 275,000 people are treated in ERs because of adverse reactions to nonmedical use of multiple drugs.

B. CROSS-TOLERANCE & CROSS-DEPENDENCE (p. 4.40)
Cross-tolerance is the development of tolerance to other drugs due to the continued exposure and development of tolerance to the initial drug. Cross-dependence occurs when an individual becomes addicted or develops tissue dependent on one drug, resulting in biochemical and cellular changes that support an addiction to another drug.

XIX. PRESCRIPTION DRUGS & THE PHARMACEUTICAL INDUSTRY (PP. 4.40–4.41)
In 2009, Americans spent about $300 billion on prescription medications. Legal psychoactive drugs, including psychiatric medications, account for approximately 10% to 12% of prescriptions written in the United States. There has been a significant increase in prescription medications for children.
From the industry perspective, the high cost of prescription drugs is justified. The cost of developing a new medication is enormous and patents are good for only 17 years. The industry is trying to limit the purchase of drugs online causing consumers to claim that they are being denied access to cheaper versions of the drugs they need.

Advertising dollars aimed at consumers for pharmaceuticals has gone from $2 million in 1980 to $1.85 billion in 1999, to $4.43 billion in 2008, while overall promotion budgets are four to five times that amount.

Of the 1,035 new drugs approved by the FDA between 1989 and 2000, more than half showed "no significant clinical improvement" over older and/or cheaper drugs.

When free enterprise is at odds with unprofitable public policy, heavy political contributions, inaction and delaying tactics are often the result, usually to the detriment of the general public.
Chapter 4 - DOWNERS: OPIATES/OPIOIDS & SEDATIVE-HYPNOTICS

Classroom or Small Group Discussion Topics

1. Discuss the similarity between pleasure and relief from pain. Will a person strive harder to gain pleasure or relieve pain?

2. Discuss the subjective nature of pain. Note that people have different pain thresholds or levels of tolerance for pain and therefore require different amounts of a painkiller for the same injury.

3. Compare the use of legally prescribed drugs for the treatment of opiate addiction (a.) heroin( b.) methadone (c.) Suboxone/Subutex . What are the pros and cons of each of these drugs from the perspective of (a.) crime prevention, (b.) ethics, and (c.) effective recovery.

4. How does growing and selling opium in Afghanistan affect the war efforts? Have we looked the other way rather than prosecute those involved in the drug war for fear of interfering with attempts to defeat the insurgency?

5. Compare Valium® addiction to heroin addiction, physically, mentally, financially, and criminally. Which of these drugs have a higher risk of death during withdrawal particularly if a patient is not medically monitored (a.) heroin (b.) Valium®.

6. Discuss which drugs are likely to be prescribed or recommended for a person presenting with one of the complaints listed below.
   a. “I can't sleep at night.”
   b. “Since my partner died, I always feel low.”
   c. “These headaches are killing me.”
   d. “I have debilitating anxiety attacks in social situations.”

   • What is the most likely prescription or suggested therapy for a woman with the presenting complaints? For a man?

   • What are the potential benefits and drawback?

   • What non-drug therapies could be substituted?

7. How has advertising prescription medications changed the doctor patient relationship in the United States.
Chapter 4 - DOWNERS: OPIATES/OPIOIDS & SEDATIVE-HYPNOTICS

Critical Thinking & Class Exercises

1. Have the students create a human interactive model that illustrates how neurotransmitters move from one nerve cell across the synapse to a secondary terminal when pain is transmitted (Substance P). Then integrate students into positions on the secondary terminal to show how opioids block the transmission of pain signals.

2. Ask the students to compare the descriptions of several regularly prescribed sedatives (Xanax®, Valium®, etc.) in the Physicians’ Desk Reference with advertisements for those drugs in professional medical journals.
   • How are the ads designed to encourage physicians to prescribe the drugs?
   • How are patients portrayed in the ads?
   • What characteristics of the drugs are not emphasized in the ads?

3. Have the class discuss what social factors may affect the medical prescribing patterns of benzodiazepines (e.g., Valium®, Xanax®)

   Are benzodiazepines prescribed equally for men and women?
   Is there a disparity?

4. Have students discuss how various cultures have developed in relation to the types of depressant drugs licit or illicit drugs they have available, e.g. opium in China, heroin in Afghanistan, whiskey and valium in the United States, vodka in Russia.

5. Invite a pharmacist or emergency room physician to visit your class and share his or her experiences dealing with people who abuse prescription drugs trying by “doctor shopping” or feigning an illness or injury in order to obtain a prescription or access to a controlled substance. Note this may also include over-the-counter drugs with ephedrine (e.g. Sudaphed®).

Applied Learning - Case Study

Break the students into small groups (2 to 4 students) and have each group of students review Case Study # 9 which focuses on a person with a heroin problem. Ask the students to identify the following:

- What evidence indicates that the subject used heroin habitually, abusively, and/or addictively?
- What drives the person to continue using heroin? What was their initial draw, what is their desired effect from heroin?
- What side effects or undesired effects did they experience from the drug?
- What role did heredity and the person’s environment play in the subject’s heroin problem?