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DRUGS (Over-the-Counter, Prescription, Stimulants)

Unit Overview

In this unit you will study about over-the-counter drugs, prescription drugs, and stimulant drugs. You will learn how some of these drugs can be beneficial if used as directed and some can be very dangerous if abused. Good luck!

Information on Over-the-Counter Drugs

What are they?

Over-the-counter, (OTC) drugs are non-prescription drugs sold in convenience stores, grocery stores and health shops. They range from pain relievers, cough and cold remedies to sleeping aids, weight reducing aids, and vitamin supplements.

How are they taken?

Over-the-counter drugs are typically taken orally in the form of liquid or pill. They can also be applied to the skin in the form of ointments, lotions, or liquids.

The Scoop on Over-the-counter Drugs

- The chemicals or substances in some over-the-counter drugs have psychoactive effects which mean that they impair the central nervous system.
- About 50% of elderly people regularly use over-the-counter-drugs.

- There are more than 200,000 non-prescription drugs sold in stores.
- Over-the-counter drugs may impair the ability to safely drive a vehicle because they can cause drowsiness or excitability.
- As a precaution, do not combine OTC drugs with other drugs, because the combination can result in stronger side-effects, or possibly reduce the effectiveness of the drugs.
- When used correctly, over-the-counter drugs are generally safe.
- Large doses of over-the-counter drugs can be very toxic.
- Aspirin is one of most abused OTC drugs as evidenced by the number of emergency room visits from overdoses.

Toxicity Symptoms

- Hypersensitivity
- Dizziness
- Nausea
- Fatigue
- Mental Confusion

Long-term Effects of Toxicity

- Liver damage
- Gastrointestinal irritation

Prescription Drugs

Prescriptions Drugs and Pain Medications - what are they?

Definition: powerful drugs prescribed in writing by a doctor or dentist.

Prescription drugs make complex surgery possible, relieve pain for millions of people, and enable many individuals with chronic medical conditions to control their symptoms and lead productive lives. Most people who take prescription medications use them responsibly. However, the non-medical use of prescription drugs is a serious public health concern. Non-medical use of prescription drugs like opioids, central nervous system (CNS) depressants, and stimulants can lead to abuse and addiction, characterized by compulsive drug seeking and use. Addiction rarely occurs among people who use a pain reliever, CNS depressant, or stimulant as prescribed; however, inappropriate use of prescription drugs can lead to addiction in some cases. Patients, healthcare professionals, and pharmacists all have roles in preventing misuse and addiction. For example, if a doctor prescribes a pain medication, CNS depressant, or stimulant, the patient should follow the directions for use carefully, and also learn what effects the drug could have and potential interactions with other drugs by reading all information provided by the pharmacist. Physicians and other health care providers should

screen for any type of substance abuse during routine history-taking with questions about what prescriptions and over-the-counter medicines the patient is taking and why.

Commonly Abused Prescription Drugs
While many prescription drugs can be abused or misused, these three classes are most commonly abused:

1) **Opioids** - often prescribed to treat pain.

2) **CNS Depressants** - used to treat anxiety and sleep disorders.

3) **Stimulants** - prescribed to treat narcolepsy and attention deficit/hyperactivity disorder.

Opioids
Opioids are commonly prescribed because of their effective analgesic or pain relieving properties. Many studies have shown that properly managed medical use of opioid analgesic drugs is safe and rarely causes clinical addiction, which is defined as compulsive, often uncontrollable use. Taken exactly as prescribed, opioids can be used to manage pain effectively.

Among the drugs that fall within this class - sometimes referred to as narcotics - are morphine, codeine, and related drugs. Morphine is often used before or after surgery to alleviate severe pain. Codeine is used for milder pain. Other examples of opioids that can be prescribed to alleviate pain include oxycodone (OxyContin-an oral, controlled release form of the drug); propoxyphene (Darvon); hydrocodone (Vicodin); hydromorphone (Dilaudid); and meperidine (Demerol), which is used less often because of its side effects. In addition to their effective pain relieving properties, some of these drugs can be used to relieve severe diarrhea (Lomotil, for example**,** which is diphenoxylate) or severe coughs (codeine).

Opioids act by attaching to specific proteins called opioid receptors, which are found in the brain, spinal cord, and gastrointestinal tract. When these drugs attach to certain opioid receptors in the brain and spinal cord they can effectively block the transmission of pain messages to the brain. In addition to relieving pain, opioid drugs can affect regions of the brain that mediate what we perceive as pleasure, resulting in the initial euphoria that many opioids produce. They can also produce drowsiness, cause constipation, and, depending upon the amount of drug taken, depress breathing. Taking a large single dose could cause severe respiratory depression or be fatal.

Opioids may interact with other drugs and are only safe to use with other drugs under a physician's supervision. Typically, they should not be used with substances such as alcohol, antihistamines, barbiturates, or benzodiazepines. These drugs slow down breathing, and their combined effects could risk life-threatening respiratory depression.

Chronic use of opioids can result in tolerance to the drugs so that higher doses must be taken to obtain the same initial effects. Long-term use also can lead to physical dependence - the body adapts to the presence of the drug and withdrawal symptoms occur if use is reduced abruptly.

Symptoms of withdrawal

- Restlessness
- muscle and bone pain
- insomnia
- diarrhea
- vomiting
- cold flashes with goose bumps ("cold turkey")
- involuntary leg movements

Options for effectively treating addiction to prescription opioids are drawn from experience and research on treating heroin addiction.

Some examples follow

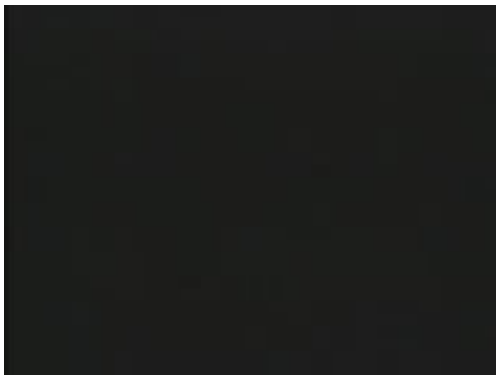
- Methadone, a synthetic opioid that blocks the effects of heroin and other opioids, eliminates withdrawal symptoms, and relieves drug craving. It has been used for over 30 years to successfully treat people addicted to opioids.
- LAAM (levo-alpha-acetyl-methadol), an alternative to methadone that blocks the effects of opioids for up to 72 hours. Naltrexone is a long acting opioid blocker often used with highly motivated individuals in treatment programs promoting complete abstinence, and also to prevent relapse.
- Buprenorphine, another synthetic opioid, will soon be available. Also, naloxone counteracts the effects of opioids and is used to treat overdoses.

Drug Groups: Stimulants

Have you eaten any chocolate or drunk any soda lately? If you have, there's a good chance you gave your body a dose of a stimulant called caffeine, which is also in coffee. Eating or drinking a large amount of caffeine can make you feel jittery, nervous, or energetic. That is because caffeine, like any stimulant changes the way your brain works. But caffeine is just a mild example of a stimulant. Many other stimulant drugs are much stronger, and some are illegal and very dangerous. Others require a doctor's prescription.

Examples of stronger stimulants include:

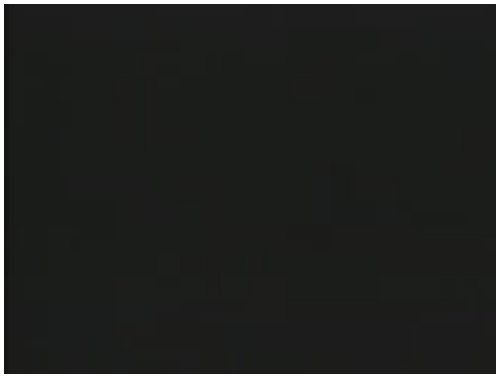
- Cocaine: Made from the leaf of the coca plant, this drug often comes in the form of a white powder that some people inhale through their nose.
- Crack: A form of cocaine that can be smoked.
- Amphetamines: Often called "speed," these pills are sometimes prescribed by doctors for medical problems.
- Methamphetamine: A powerful form of amphetamine that comes in clear crystals (called "ice") or powder (called "crack") that is smoked or injected.



Crack and Cocaine, what are they?
Cocaine is a powerfully addictive drug of abuse. Once having tried cocaine, an individual cannot predict or control the extent to which he or she will continue to use the drug. The major routes of administration of cocaine are sniffing or snorting, injecting, and smoking (including free-base and crack cocaine). Snorting is the process of inhaling cocaine powder through the nose where it is absorbed into the bloodstream through the nasal tissues. Injecting is the act of using a needle to release the drug directly into the bloodstream. Smoking involves inhaling cocaine vapor or smoke into the lungs where absorption into the bloodstream is as rapid as by injection.

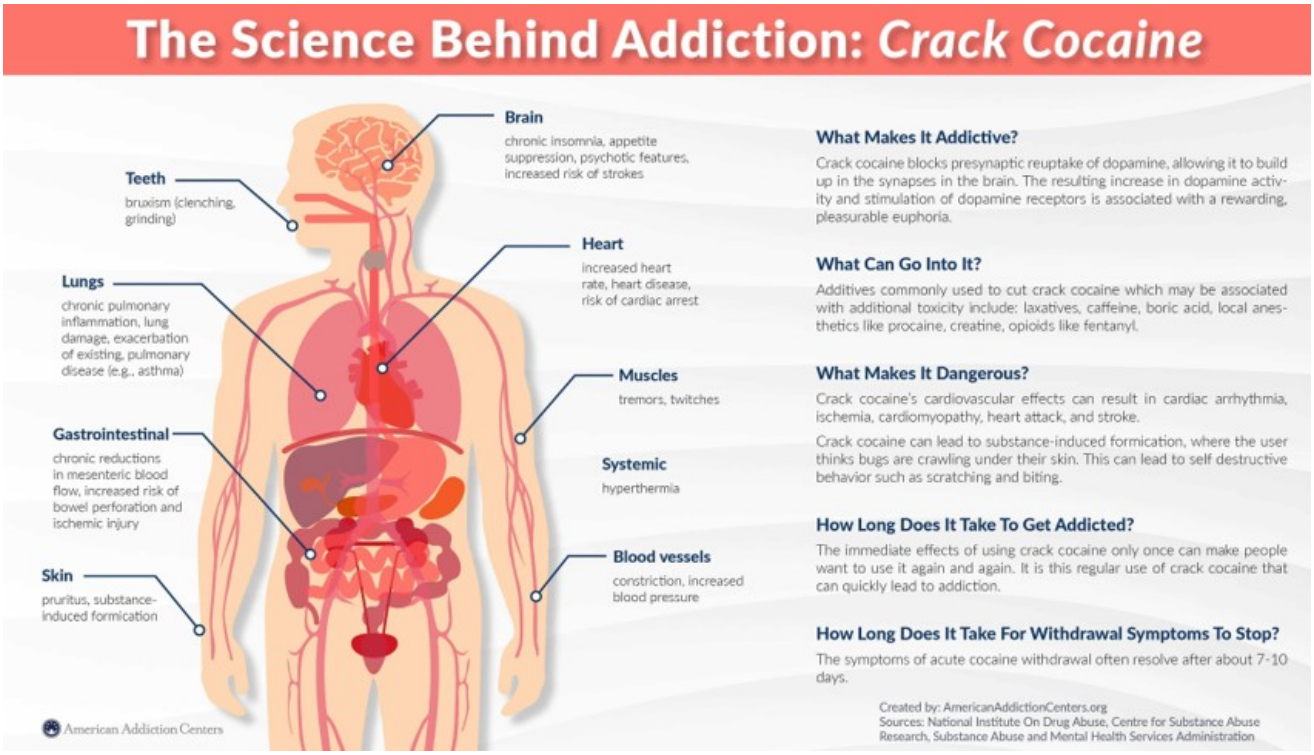
"Crack" is the street name given to cocaine that has been processed from cocaine hydrochloride to a free base for smoking. Rather than requiring the more volatile method of processing cocaine using ether, crack cocaine is processed with ammonia or sodium bicarbonate (baking soda) and water and heated to remove the hydrochloride, thus producing a form of cocaine that can be smoked. The term "crack" refers to the crackling sound heard when the mixture is smoked (heated), presumably from the sodium bicarbonate.

There is great risk whether cocaine is ingested by inhalation (snorting), injection, or smoking. It appears that compulsive cocaine use may develop even more rapidly if the substance is smoked rather than snorted. Smoking allows extremely high doses of cocaine to reach the brain very quickly and brings an intense and immediate high. The injecting drug user is at risk for transmitting or acquiring HIV infection/AIDS if needles or other injection equipment are shared.



Health Hazards
Cocaine is a strong central nervous system stimulant that interferes with the reabsorption process of dopamine, a chemical messenger associated with pleasure and movement. Dopamine is released as part of the brain's reward system and is involved in the high that characterizes cocaine consumption.

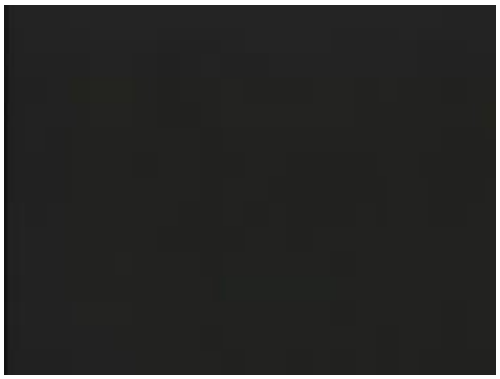
Physical effects of cocaine use include constricted peripheral blood vessels, dilated pupils, and increased temperature, heart rate, and blood pressure. The duration of cocaine's immediate euphoric effects, which include hyper-stimulation, reduced fatigue, and mental clarity, depends on the route of administration. The faster the absorption, the more intense the high. On the other hand, the faster the absorption, the shorter the duration of action. The high from snorting may last 15 to 30 minutes, while that from smoking may last 5 to 10 minutes. Increased use can reduce the period of stimulation. Some users of cocaine report feelings of restlessness, irritability, and anxiety. An appreciable tolerance to the high may be developed, and many addicts report that they seek but fail to achieve as much pleasure as they did from their first exposure. Scientific evidence suggests that the powerful neuropsychologic reinforcing property of cocaine is responsible for an individual's continued use, despite harmful physical and social consequences. In rare instances, sudden death can occur on the first use of cocaine or unexpectedly thereafter. However, there is no way to determine who is prone to sudden death.



High doses of cocaine and/or prolonged use can trigger paranoia. Smoking crack cocaine can produce a particularly aggressive paranoid behavior in users. When addicted individuals stop using cocaine, they often become depressed. This also may lead to further cocaine use to alleviate depression. Prolonged cocaine snorting can result in ulceration of the mucous membrane of the nose and can damage the nasal septum enough to cause it to collapse. Cocaine-related deaths are often a result of cardiac arrest or seizures followed by respiratory arrest.

Added Danger: Cocaethylene

When people mix cocaine and alcohol consumption, they are compounding the danger each drug poses and unknowingly forming a complex chemical experiment within their bodies. NIDA-funded researchers have found that the human liver combines cocaine and alcohol and manufactures a third substance, cocaethylene, which intensifies cocaine's euphoric effects, while possibly increasing the risk of sudden death.



Methamphetamine, what is it?

Methamphetamine is an addictive stimulant drug that strongly activates certain systems in the brain. Methamphetamine is closely related chemically to amphetamine, but the central nervous system effects of Methamphetamine are greater. Both drugs have some medical uses, primarily in the treatment of obesity, but their therapeutic use is limited.

Methamphetamine is made in illegal laboratories and has a high potential for abuse and dependence. Street Methamphetamine is referred to by many names, such as "speed," "meth," and "chalk." Methamphetamine hydrochloride, clear chunky crystals resembling ice, which can be inhaled by smoking, is referred to as "ice," "crystal," and "glass."

Health Hazards

Methamphetamine releases high levels of the neurotransmitter dopamine, which stimulates brain cells, enhancing mood and body movement. It also appears to have a neurotoxic effect, damaging brain cells that contain dopamine and serotonin, another neurotransmitter. Over time, methamphetamine appears to cause reduced levels of dopamine, which can result in symptoms like those of Parkinson's disease, a severe movement disorder.

Methamphetamine is taken orally or intranasally (snorting the powder), by intravenous injection, and by smoking. Immediately after smoking or intravenous injection, the methamphetamine user experiences an intense sensation, called a "rush" or "flash," that lasts only a few minutes and is described as extremely pleasurable. Oral or intranasal use

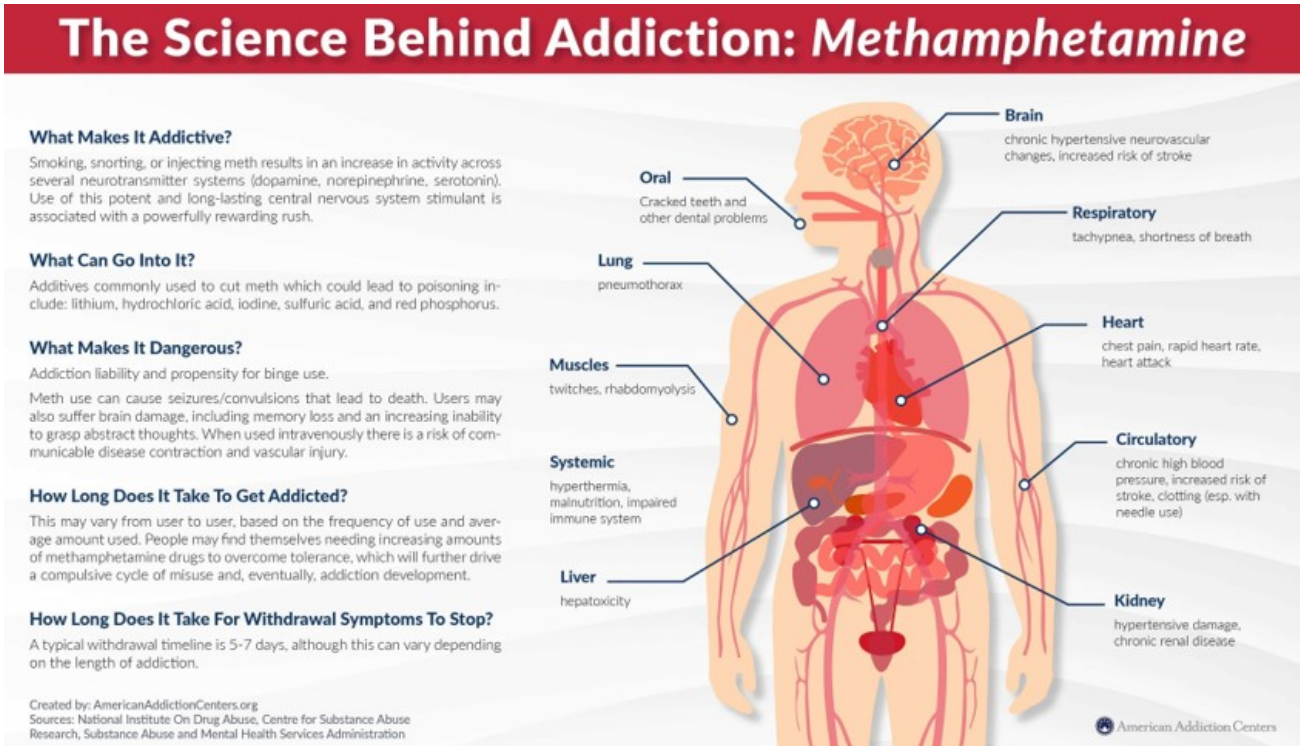
produces euphoria - a high, but not a rush. Users may become addicted quickly, and use it with increasing frequency and in increasing doses.

Animal research going back more than 20 years shows that high doses of methamphetamine damage neuron cell-endings. Dopamine- and serotonin-containing neurons do not die after methamphetamine use, but their nerve endings ("terminals") are cut back and re-growth appears to be limited.

The central nervous system (CNS) actions that result from taking even small amounts of methamphetamine include increased wakefulness, increased physical activity, decreased appetite, increased respiration, hyperthermia, and euphoria. Other CNS effects include irritability, insomnia, confusion, tremors, convulsions, anxiety, paranoia, and aggressiveness. Hyperthermia and convulsions can result in death.

Methamphetamine causes increased heart rate and blood pressure and can cause irreversible damage to blood vessels in the brain, producing strokes. Other effects of methamphetamine include respiratory problems, irregular heartbeat, and extreme anorexia. Its use can result in cardiovascular collapse and death.

A study in Seattle confirmed that methamphetamine use was widespread among the city's homosexual and bisexual populations. Of these groups, members using methamphetamine reported they practice sexual and needle-use behaviors that place them at risk of contracting and transmitting HIV and AIDS.



Heroin, what is it?

Heroin is an addictive drug, and its use is a serious problem in America. Recent studies suggest a shift from injecting heroin to snorting or smoking because of increased purity and the misconception that these forms are safer.

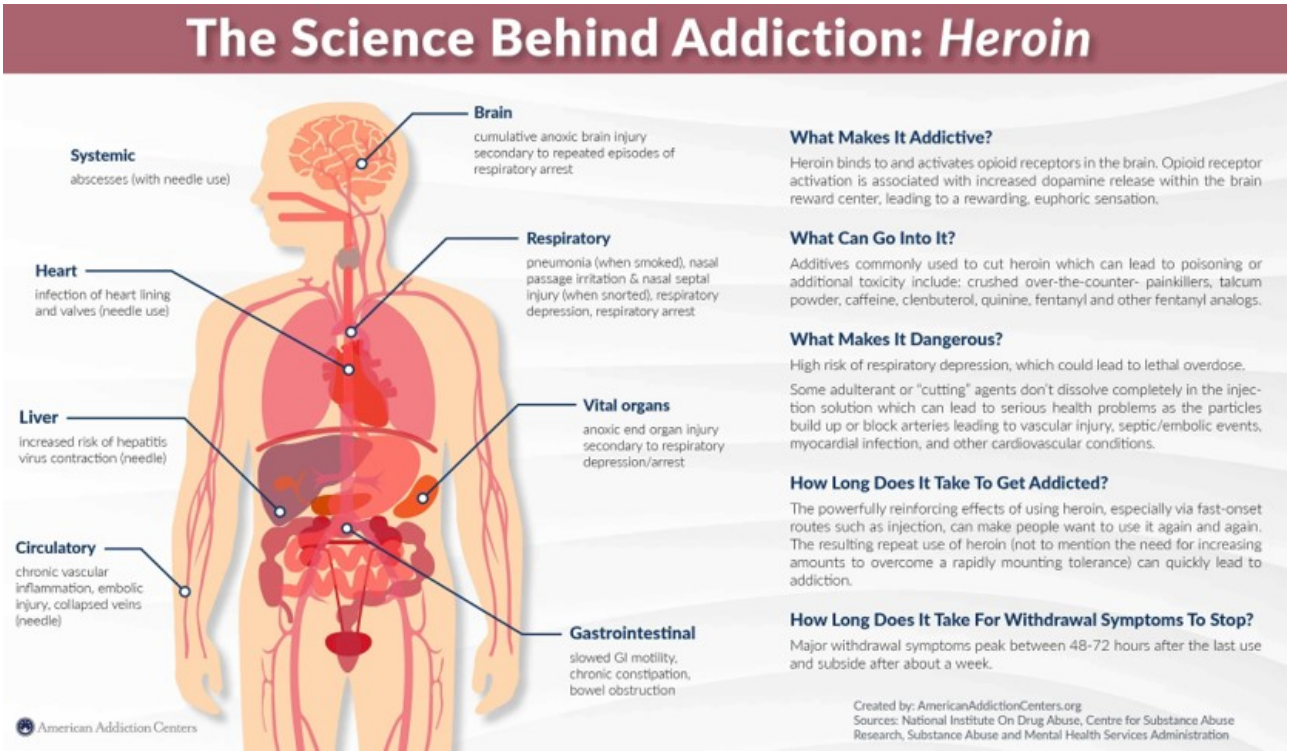
Heroin is processed from morphine, a naturally occurring substance extracted from the seedpod of the Asian poppy plant. Heroin usually appears as a white or brown powder. Street names for heroin include "smack," "H," "skag," and "junk." Other names may refer to types of heroin produced in a specific geographical area, such as "Mexican black tar."

Health Hazards

Heroin abuse is associated with serious health conditions, including fatal overdose, spontaneous abortion, collapsed veins, and, particularly in users who inject the drug, infectious diseases, including HIV/AIDS and hepatitis. The short-term effects of heroin abuse appear soon after a single dose and disappear in a few hours. After an injection of heroin, the user reports feeling a surge of euphoria ("rush") accompanied by a warm flushing of the skin, a dry mouth, and heavy extremities. Following this initial euphoria, the user goes "on the nod," an alternately wakeful and drowsy state. Mental functioning becomes clouded due to the depression of the central nervous system. Long-term effects of heroin appear after repeated use for some period of time. Chronic users may develop collapsed veins, infection of the heart lining and valves, abscesses, cellulitis, and liver disease. Pulmonary complications, including various types of pneumonia, may result from the poor health condition of the abuser, as well as from heroin's depressing effects on respiration.

In addition to the effects of the drug itself, street heroin may have additives that do not readily dissolve and result in clogging the blood vessels that lead to the lungs, liver, kidneys, or brain. This can cause infection or even death of small patches of cells in vital organs.

The Drug Abuse Warning Network* lists heroin/morphine among the three most frequently mentioned drugs reported in drug-related death cases in 2001. Nationwide, heroin emergency department mentions **were** statistically unchanged from 2001 to 2002, but have increased 35 percent since 1995.



Tolerance, Addiction, and Withdrawal
With regular heroin use, tolerance develops. This means the abuser must use more heroin to achieve the same intensity of effect. As higher doses are used over time, physical dependence and addiction develop. With physical dependence, the body has adapted to the presence of the drug and withdrawal symptoms may occur if use is reduced or stopped.

Withdrawal, which in regular abusers may occur as early as a few hours after the last administration, produces drug craving, restlessness, muscle and bone pain, insomnia, diarrhea and vomiting, cold flashes with goose bumps ("cold turkey"), kicking movements ("kicking the habit"), and other symptoms. Major withdrawal symptoms peak between 48 and 72 hours after the last dose and subside after about a week. Sudden withdrawal by heavily dependent users who are in poor health is occasionally fatal, although heroin withdrawal is considered less dangerous than alcohol or barbiturate withdrawal.

Ephedra, what is it?

Ephedra is used as a stimulant and for mild respiratory disorders, including asthma and bronchitis. In Asian medicine, it is used for fever, swelling, and bone pain. Ephedrine, the principle alkaloid, a popular ingredient in many "herbal" weight loss and body building formulas, decongestants, "legal high" alternatives, and ephedrine-based pep pills.

Ephedra's value for respiratory problems derives from the calming effect it has on spasms in the bronchial walls. At the same time, ephedra stimulates the nervous system, and boosts the rate and strength of heart contractions. It also tends to discourage the growth of bacteria.

Ephedra has many potential side effects including sleeplessness, restlessness, irritability, headache, nausea, vomiting, urinary disorders, and rapid heartbeat. Higher doses can stimulate a sharp rise in blood pressure and disrupt heart rhythm. Chronic use can lead to tolerance and dependence, requiring ever larger doses to obtain earlier effects. Due to these dangers, ephedra should only be used for short periods of time. Ephedra has also recently been linked to many deaths of athletes.