

Substance Abuse

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Purpose

The purpose of this course is to inform the healthcare provider about substance abuse, including alcohol and the primary drugs that are currently associated with addiction.

Goals

Upon completion of this course, the nurse should be able to:

- Describe the short-term effects, long-term effects, withdrawal symptoms, and treatment of alcohol and 10 types of drugs of abuse.
- Describe the relationship between the intake of alcohol and blood alcohol content.

Substance Abuse

- List and describe 4 commonly-abused amphetamines.
- Describe 4 ways cocaine is used.
- Describe the difference between cocaine and crack cocaine.
- List and describe at least 6 of 9 types of hallucinogens.
- Discuss decriminalization of marijuana.
- Discuss the chemical makeup of MDMA.
- Discuss the use of methamphetamine, including the "high," "binge and crash," and "run."
- Describe the 4 stages of heroin withdrawal.
- Describe the potency of fentanyl.
- Describe at least 5 behavioral signs and 8 workplace signs of diversion.
- Describe at least 10 behavioral signs and 10 physical signs of impairment.
- List and describe 3 substance abuse helplines.

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Substance abuse is a pervasive problem with 22 million people in the United States abusing drugs and alcohol and many addicted. The changes that occur

in the brain exposed to drugs and alcohol make it difficult for the person to stop using.

While the initial choice to use is voluntary for most, subsequent use is often not because users are caught in a vicious cycle of craving drugs, using, and needing more. It is unclear why some people become more easily addicted than others, but most authorities believe it is some combination of genes and environmental influences.

Addiction cannot often be cured in the traditional sense, but it can be controlled and managed with ongoing treatment and support. Relapses, however, are common, especially in the early stages of recovery, and should not be considered failure.

One problem with treatment is that up to 95% of those with substance abuse problems do not recognize—or admit—that they have a problem even though the results of their abuse may be evident to others.

Substance abuse contributes to myriad social and public health problems:

- Teenage pregnancy
- STDs and HIV/AIDs.
- Domestic violence.
- Child abuse.
- Homelessness.
- Motor vehicle accidents.
- Crime (theft, homicide, assaults).
- Suicide.

Alcohol use has long been socially acceptable, but there is a dark side as well. In 2015 alone, 15.1 million adults in the United States had alcohol use disorder (AUD). AUD is defined by the NIH as a “chronic relapsing brain

disease characterized by an impaired ability to stop or control alcohol use despite adverse social, occupational, or health consequences.”

Alcohol is absorbed within 30 minutes into the bloodstream and the body metabolizes about 0.25 ounces of alcohol per hour, so drinking large amounts in a short period of time can cause the blood alcohol content (BAC) to spike quickly, putting the person at risk for alcohol poisoning, which is life-threatening. Legally, a blood alcohol content (BAC) of 0.08% or higher is considered drunk. The BAC continues to rise for about 40 minutes after the last drink.

Number of Drinks		BLOOD ALCOHOL CONTENT (BAC) Table for Male (M) / Female (F)							Driving Condition	
		Body Weight in Pounds								
		100	120	140	160	180	200	220	240	
0	M	.00	.00	.00	.00	.00	.00	.00	.00	Only Safe Driving Limit
	F	.00	.00	.00	.00	.00	.00	.00	.00	
1	M	.06	.05	.04	.04	.03	.03	.03	.02	Driving Skills Impaired
	F	.07	.06	.05	.04	.04	.03	.03	.03	
2	M	.12	.10	.09	.07	.07	.06	.05	.05	
	F	.13	.11	.09	.08	.07	.07	.06	.06	
3	M	.18	.15	.13	.11	.10	.09	.08	.07	Legally Intoxicated
	F	.20	.17	.14	.12	.11	.10	.09	.08	
4	M	.24	.20	.17	.15	.13	.12	.11	.10	
	F	.26	.22	.19	.17	.15	.13	.12	.11	
5	M	.30	.25	.21	.19	.17	.15	.14	.12	
	F	.33	.28	.24	.21	.18	.17	.15	.14	

Subtract .01% for each 40 minutes of drinking.
1 drink = 1.5 oz. 80 proof liquor, 12 oz. 5% beer, or 5 oz. 12% wine.
Fewer than 5 persons out of 100 will exceed these values.

People may suffer from alcohol abuse and/or alcohol dependence. With alcohol abuse, the person doesn't necessarily drink every day and is not dependent on alcohol; but, when the person does drink, it is to excess, such as engaging in binge drinking on the weekend but refraining from drinking during the workweek.

Binge drinking is defined as blood alcohol concentrations typically reaching 0.08 g/dL after 4 or more drinks for women and 5 or more for men within 2 hours and occurring at least one day a month.

With alcohol dependence, the person is physically and/or psychologically dependent on alcohol and usually drinks on a daily basis, becoming inebriated and eventually experiencing blackouts. The person is unable to control the drinking and may suffer withdrawal if alcohol is withheld.

Street names include *juice, hooch, booze, giggle juice, suds, draft, hard stuff, joy juice, liquid courage, and KoolAid.*

Short-term effects include slurred speech, lack of coordination, memory impairment, bradypnea, vision impairment, and mood shifts. Symptoms

vary according to the number of drinks the person has had and the blood alcohol content (BAC).

Even a first time drinking to excess may have tragic consequences:

- **0.033 to 0.12%:** Improved mood and self-confidence, relaxation, flushing, short attention span, impaired judgement, and lack of fine motor coordination.
- **0.09 to 0.25%:** Sedation, memory loss, impaired comprehension, ataxia, blurred vision, delayed motor reactions.
- **0.25 to 0.40%:** Blackouts, staggering gait, loss of consciousness, respiratory depression, urinary incontinence, bradycardia, and vomiting with risk of aspiration.
- **0.35 to 0.80%:** Coma, severe respiratory and cardiovascular depression, lack of pupillary response, death.

Long-term effects include cardiovascular disease, cognitive impairment, liver disease (including fatty liver, cirrhosis, liver failure and liver cancer), respiratory infections, pancreatitis, neuropathy, and ulcers.

Withdrawal symptoms may vary in intensity but onset may occur within 2 hours and symptoms typically peak within 24 to 48 hours. Withdrawal symptoms generally progress over time:

- **6-12 hours:** Person is agitated and anxious. Other symptoms include shaking, headaches, nausea, and vomiting.
- **12-24 hours:** Person becomes increasingly disoriented and has hand tremors. Seizures may occur.
- **48 hours:** Person has hypertension, insomnia, fever, diaphoresis, tactile and auditory and visual hallucinations. May experience seizures and delirium tremens (the most severe reaction).
- **Months after stopping:** Person may experience insomnia, restlessness, and depression.

With delirium tremens ("DTs"), the person becomes extremely confused and agitated and may react violently to others, fever may be high, and the person may experience seizures, cardiac dysrhythmias, severe hypertension, and tactile hallucinations (itching, burning, numbness), auditory hallucinations, and/or visual hallucinations. Delirium tremens is a medical emergency and can be life-threatening.

Treatment for alcoholism includes:

- Detoxification: Should be done under medical supervision so that treatment may ease some of the symptoms.
- Alcohol counseling.
- Inpatient or outpatient rehabilitation.

Amphetamines

- Medications to help control drinking:
 - Disulfiram (Antabuse®) changes the way the body breaks down alcohol so the person who takes the drug and drinks becomes ill (nausea, vomiting, headaches, sweating). Taken daily as a pill.
 - Naltrexone removes the sense of pleasure associated with drinking and may reduce cravings. May be administered daily as a pill or monthly as an injection.
 - Acamprosate (Campral®) reduces withdrawal symptoms that may last for months after stopping. Requires the person to take 2 pills three times daily.
- 12-step programs, such as Alcoholics Anonymous®.

Amphetamines are central nervous system stimulants that include dextroamphetamine (commonly found in Dexedrine®) and amphetamine sulphate, which is sometimes manufactured as a drug of abuse (commonly referred to as "speed") but is also found in a number of prescription drugs. Dextroamphetamine has a stronger effect than amphetamine.

Amphetamines also include a number of drugs used to treat ADHD or narcolepsy: Adderall® (combination amphetamine sulphate/dextroamphetamine), Ritalin (methylphenidate), Vyvanse® (Lisdexamfetamine), Concerta® (time-released methylphenidate).

Amphetamines may be taken in the form of powder, tablets, crystals, and capsule and may be swallowed, smoked, snorted, or injected.

Street names include *ICE, speed, uppers, whip, goeey, upper, whizz, and dexie*.

Short-term effects include a feeling of euphoria, talkativeness, dilated pupils, dry mouth, tachycardia, teeth grinding, increased sex drive, and decreased appetite. Overdose may result in tachycardia, respiratory distress, chills, fever, no urine output, seizures, stroke, heart attack, and sometimes death.

Long-term effects include weight loss, disordered sleep, dry mouth, dental problems, anxiety, paranoia, depression, and increased risk of stroke. Some also develop "amphetamine psychosis" with paranoid delusions and hallucinations and aggressive or violent behavior.

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Some **withdrawal symptoms** may persist up to a month but usually decrease after a week. Coming down usually takes 2 to 4 days and results in disordered sleep and fatigue, headaches, muscle aches and twitchings, mood swings, irritability, depression, paranoia, confusion, and hallucinations.

Treatment includes inpatient detoxification, and both inpatient programs and outpatient programs although outpatient programs are best for highly-motivated users because of the risk of relapse. Treatment approaches may include contingency management, cognitive behavioral therapy, and the matrix model.

Cocaine is a stimulant drug derived from the coca plant, which is native to South America. It is most often sold as a white powder which can be snorted, smoked, or injected. Cocaine is often mixed with other substances, such as cornstarch, talcum powder, or flour as well as other drugs, such as amphetamine or fentanyl, increasing the risk of overdose and death. Cocaine is sometimes mixed with heroin and injected (speedballing).

Cocaine increases the level of dopamine in the brain and prevents it from being recycled so large amounts begin to build up, reinforcing the brain's reward system and the need to take greater and greater amounts of the drug and repeated doses. The effects of cocaine are almost immediate but the high is fleeting, 15 to 30 minutes for snorting and 5 to 10 minutes for injecting or smoking.

Street names include blow, bump, C, Charlie, coke, flake, snow, toot.

Short-term effects may include feelings of euphoria, mental alertness, hypersensitivity to sound, sight, and touch, irritability, paranoia, nausea, pupil dilation, vasoconstriction, hyperthermia, hypertension, tachycardia, dysrhythmias, tremors, and restlessness. Overdose may cause severe symptoms (heart attack, stroke) and even death, especially if the cocaine is mixed with alcohol or heroin.

Long-term effects may vary according to the preferred method of abuse:

- **Snorting:** Loss of smell, nosebleeds, runny nose, and dysphagia. The nasal passages may become inflamed and tissue erode. Perforation of the nasal passages may occur.
- **Smoking:** Asthma, cough, and respiratory distress, including pneumonia.
- **Orally:** Bowel decay associated with vasoconstriction.

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- **Injecting:** Collapsed veins, infections, risk of bloodborne diseases. Long-term effects may also include malnutrition and movement disorders, such as Parkinson's disease.

Withdrawal symptoms include depression, fatigue, increased appetite, nightmares, insomnia, and cognitive impairment.

Treatment options includes cognitive behavioral therapy, contingency management, 12-step programs (Narcotics Anonymous®), therapeutic communities, and inpatient or outpatient treatment programs. No medication is FDA-approved for treatment of cocaine addiction although various medications are being studied or tried.

Crack cocaine is usually purchased in a mineral-like off-white substance that is created by mixing baking soda or ammonia with powdered cocaine and then heating it until "rocks" form.

Users heat the rocks in glass pipes (or substitute aluminum cans, spoons, or aluminum foil) to vaporize the rocks and then inhale the vapors. Some liquify and inject the crack.

Crack is more addictive than plain cocaine, so people can become addicted with a first use. However, the high is short-lasting, so the user is constantly searching for more drug.

Additionally, tolerance occurs rapidly so users need more and more drugs to achieve the same effects. Most crack users were initially cocaine addicts, but crack is less expensive initially, although the increasing need for more drugs can result in costs thousands of dollars a week.

Street names include crack (because of the noise the rocks make when heated), candy, cookies, kryptonite, sleet, hard, or base.

Short-term effects include feelings of euphoria, hyperactivity, tension, pupil dilated, and confidence. The person may be very talkative and excitable. Crack increases the level of dopamine in the brain, but natural production of dopamine is inhibited. As soon as the high subsides, the user experiences intense cravings.

Hallucinogens

Because crack is potent, a fatal overdose can easily occur. Those who are overdosing may exhibit anxiety, aggression, tachycardia, chest pain, nausea, hallucination, seizures, and stroke. Those with kidney problems or hypertension are especially at risk for fatal complications.

Long-term effects include depression and paranoia. Crack-induced paranoia may lead to aggressive or violent attacks of others or suicide. Some users may experience tactile hallucinations (formication) that makes them believe that bugs ("coke bugs" or "crack bugs") are crawling under their skin, leading them to have long scratch marks on their skin, which may become infected. Sleep deprivation may occur because of inability to sleep. Users may develop heart, kidney, and liver damage and respiratory problems ("crack lung"), malnutrition, infertility, and seizures

Withdrawal symptoms tend to be more psychological than physical and can include depression, fatigue, psychosis, anxiety, irritability, and intense cravings.

Treatment options generally include inpatient treatment with intensive counseling and prevention of access to drugs.

Hallucinogens, including LSD, PCP, and ketamine, are a group of drugs that alter perceptions, thoughts, and feelings. Users experience hallucinations. Hallucinogens can be taken orally, brewed, snorted, injected, or inhaled, depending on the type of hallucinogens. Some hallucinogens interfere with serotonin and others with glutamate.

Effects usually begin within 20 to 90 minutes and last for 6 to 12 hours except for salvia, whose effects begin within a minute and last for less than 30 minutes. Some hallucinogens are addictive (such as PCP) and others not (such as LSD), but tolerance can develop, requiring higher doses.

Some hallucinogens are found in plants, such as mushrooms, and others manufactured. Hallucinogens include:

- **Ayahuyasca** (*hoasca, aya, yagé*) is from a plant found in the Amazon.
- **DMT** (*Dimitri*) can be derived from a plant found in the Amazon or manufactured.
- **D-lysergic acid diethylamide** (LSD) (*acid, blotter, dots, and yellow sunshine*) is derived from a fungus found on rye and other grains.
- **Peyote** (mescaline) (*buttons, cactus, and mesc*) derived from a cactus or manufactured.

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- **4-phosphoryloxy-N, N-dimethyltryptamine** (psilocybin) (*little smoke, magic mushrooms, purple passion, and shrooms*) derived from mushrooms.
- **Dextromethorphan** (DXM) (*robo*) is found in cough suppressants.
- **Ketamine** (*K, special K, and cat valium*) is an anesthetic, often obtained

from veterinary practices.

- **Phencyclidine** (PCP) (*angel dust, hog, love boat, and peace pill*) was originally developed as an anesthetic.
- **Salvia divinorum** (salvia) (*diviner's sage, Maria Pastora, Sally-D, and magic mint*).

Short-term effects in general include hallucinations, tachycardia, nausea, changes in perception of time, and intensification of sensory perceptions. Some users may react with hostile or violent behavior. Some hallucinogens cause the following: hallucinations, hypertension, hyperthermia, dry mouth, difficulty sleeping, lack of coordination, paranoia, psychosis, mixed senses (hearing colors), and a sense of detachment,

Long-term effects may include persistent hallucinations and psychosis, flashbacks (may persist for years). Ketamine may cause ulcerations of the bladder, renal disease, and cognitive impairment. PCP can result in memory loss, anxiety, depression, suicidal ideation, weight loss, seizures, coma, and death (accident or suicide).

Withdrawal symptoms are similar to short term effects and include flashbacks, muscle spasms, hallucinations, and psychoses.

Treatment usually includes inpatient or outpatient behavioral approaches but no medications are approved for treatment.

Inhalants include those substances that are inhaled through the mouth or nose. Inhalants are often accessed through common household products, making them a special risk for children and adolescents because of ease of access.

Inhalants include:

Marijuana



- **Solvents:** Paint thinners, pain removers, dry-cleaning fluid, gasoline, lighter fluid, correction fluids, felt-tip markers, glue, shoe polish and electronic contact cleaners.
- **Aerosols:** Spray paints, deodorant sprays, hairspray, computer cleaning sprays, vegetable oil sprays.
- **Gases:** Butane lighters, propane tanks, whipped cream aerosols (whippets), anesthetics (ether, chloroform, nitrous oxide).
- **Nitrites:** video head cleaner, room odorizer, leather cleaner, liquid aroma, and amyl nitrite. (Nitrites are often sold in small brown bottles).

Street names include *snappers*, *whippets*, and *laughing gas*. Amyl nitrite is often referred to as *popper*, *bold*, or *rush*.

Short-term effects include nausea, euphoria, confusion, lack of coordination, headaches, disinhibition, hallucinations and delusions. Sudden death ("sudden sniffing death") may occur from cardiac arrest, asphyxiation, suffocations, choking, and seizures. Nitrites, such as amyl nitrite or butyl nitrite, are often used to enhance sexual pleasure through vasodilation but may cause tachycardia, dizziness, headache, and excitement. Sudden sniffing death can occur within minutes of use of some chemicals. Suffocation may occur when using inhalants in a paper or plastic bag.

Long-term effects include renal and hepatic damage, damage to bone marrow, delayed behavioral development (children), cognitive impairment (from lack of sufficient oxygen to the brain), and altered metabolism.

Withdrawal symptoms include nausea, vomiting, mood alterations, and insomnia.

Treatment options are unclear. There are no FDA-approved drugs and the effectiveness of behavioral therapies is not clear although cognitive behavioral therapy and motivational incentives are often utilized.

Use of marijuana (cannabis) has been decriminalized in 33 states and the District of Columbia, and 10 states have legalized recreational use. Additionally, 46 states now allow use of medical marijuana with a prescription. Despite this, use of marijuana remains illegal according to federal law, which does not differentiate between medical and recreational use.

Marijuana is still labeled as a Schedule I drug, which means it is highly addictive and has no medical benefit—despite evidence to the contrary. However, this does not mean that marijuana is simply benign.

Marijuana is a mixture of the dried flowers of the plant *Cannabis sativa*. Marijuana may be smoked in hand-rolled cigarettes (“joints”) or in water pipes (bongs) or blunts (rolled in cigar wraps). It may also be consumed in foods (brownies, for example), brewed and drank, or vaporized and inhaled. The primary chemical responsible for the effects of the drug is *delta-9-tetrahydrocannabinol* (THC). Users of marijuana take the drug to get “high” or to relax. The drug often causes pleasant sense of euphoria.

If marijuana is smoked, the effects are almost immediate and persist for 1 to 3 hours but reactions are delayed for 30 to 60 minutes if consumed in food or drinks because the chemicals pass through the digestive system. Thus, people may ingest more marijuana to get high because the effects are delayed. The effects of marijuana ingested in food or drink may persist for many hours.

Street names include *weed, herb, grass, bud, ganja, Mary Jane, and pot.*

Short-term effects include short-term memory impairment, distorted perceptions, and impaired performance. Occasionally, someone who has taken a large dose of marijuana may experience acute psychosis (hallucinations, delusions) but the reaction is temporary. Some users experience anxiety, fear, and panic instead of euphoria. Marijuana increases the heart rate by 20 to 50 beats per minutes, increasing the risk of a heart attack in some individuals. Blood vessels in the eyes dilate, causing a bloodshot appearance. Some experience orthostatic hypotension.

Long-term effects include marijuana use disorders, such as problematic use, which can lead to symptoms addiction in some cases, especially if users began using the drug before age 18. Addiction implies that the user cannot stop using the drug and it has begun to interfere with aspects of the person’s life. The effects on the brain and cognitive abilities are still not clear as study results vary.

One study of 4000 young adults found deficits in verbal memory but no effect on other cognitive abilities. Smoking marijuana exposes the lungs to smoke and chemicals that are irritating to the tissue but whether smoking marijuana poses the same risk as tobacco regarding lung cancer remains unproven.

MD



Some studies have shown a link between marijuana use during adolescence and nonseminomatous testicular germ cell tumor (an aggressive testicular cancer). Some long-term users have developed cannabinoid hyperemesis syndrome with recurrent nausea, vomiting, and dehydration. The condition generally recedes if the person stops using marijuana.

Using marijuana during pregnancy increases the risks of miscarriage and stillbirth and may negatively impact the fetus' developing brain, so women who want to get pregnant or are pregnant, or are breastfeeding should avoid marijuana use.

Withdrawal typically only affects those who have developed some dependency on the drug because of frequent use. They may report irritability, restlessness, sleep disruption, decreased appetite, and some cravings for up to two weeks.

Treatment for habitual use (usually daily for more than 10 years with repeated attempts at stopping) may include cognitive behavioral therapy, contingency management, and motivational enhancement therapy. Because sleep disorders are common, some patients have been treated with zolpidem (Ambien®).

MDMA (3,4-methylenedioxymethamphetamine) is a synthetic stimulant that has effects similar to psychedelic drug as it's chemically similar to both stimulants and hallucinogens. MDMA is a pale crystalline powder that is usually pressed into pills although some may snort the drug or take it in liquid form. MDMA was originally primarily a "club" and "rave" drug but has since expanded to a broader group. MDMA is often taken along with alcohol or marijuana.

Users experience increased energy and distortions of time, heightened sensory perceptions, increased sexual drive, and sense of happiness. MDMA alters the activity of serotonin, dopamine, and norepinephrine. MDMA pills may also contain other drugs, such as ketamine, cocaine, caffeine, or methamphetamine, so the reactions to the drug may be unpredictable. While some users believe that MDMA is relatively benign, effects can be disastrous.

As with many other drugs, users may develop tolerance and require higher doses to achieve the same feelings, and this can lead to overdose. The effects of MDMA usually persist for 3 to 6 hours.



Street names include *ecstasy* and *molly*.

Short-term effects include impaired judgement, confusion, depression, insomnia, anxiety, paranoia, muscle tension, chills, involuntary clenching of teeth, blurred vision, and nausea.

Signs of overdose include hyperthermia, hypertension, panic attacks, seizures, and loss of consciousness. Some users may develop serotonin syndrome, a potentially lethal condition in which excessive amounts of serotonin are produced in the brain. Symptoms include agitation, nausea, vomiting, diarrhea, tachycardia, hyperthermia, sweating, loss of coordination, hyperactive reflexes, tremors, and seizures.

Long-term effects include cognitive impairment, depression, anxiety, memory loss, kidney failure, psychosis, cardiovascular collapse, hemorrhage, seizures, death,

Withdrawal effects include severe depression, poor concentration, severe fatigue, and loss of appetite.

Treatment options includes supervised detoxification and inpatient or outpatient treatment. Those with multiple addictions almost always require inpatient treatment because of the risk of relapse if unsupervised. Some users benefit from cognitive behavioral therapy.

Methamphetamine, commonly referred to as "meth" is a stimulant (similar to amphetamine), which makes the user feel exhilarated and euphoric. The sense of euphoria is similar to that attained with cocaine. The half-life of methamphetamine is about 12 hours so it stays in the system for a long period of time, one of the reasons that it is so damaging to the body and brain of the user.

Meth is sold in the form of bitter tasting powder, pill or crystals, which can be taken by swallowing, snorting, inhaling, smoking, or injecting. Meth stimulates production of dopamine and norepinephrine in the brain, but the "high" lasts for a relatively short time (although longer than with cocaine), so users often take repeated doses in a cycle of "binge and crash."

Methamphetamines

This "run" can persist for days with the users taking no food and getting no sleep until they collapse.

Opioid: Heroin



One reason for the popularity of meth is that it is less expensive than cocaine and is easy to make, so production can occur locally. However, the drug may be cut with various substances, such as caffeine, talc and toxic substances.

Street names for methamphetamine include *chalk, crank, crystal, ice, tina, glass, meth,* and *speed*.

Short-term effects include insomnia and restlessness, tachypnea, tachycardia, dysrhythmias, hypertension, increased body temperature, and lack of appetite. Some may experience homicidal or suicidal ideation. Methamphetamine increases the risk of cardiac problems and stroke, even with a first use.

Some users may develop methamphetamine psychosis with paranoia, aggressive behavior, hallucinations, mood disturbances, and delusions (such as the idea that bugs are crawling under the skin). Psychotic symptoms may recede with abstinence and treatment but can recur spontaneously months or years later. Toxic effects of the drug increase if taken with alcohol or other drugs, such as cocaine or opiates.

Long-term effects include dental problems ("meth mouth"), severe weight loss, cognitive impairment, generalized itching and skin sores, anxiety, confusion, insomnia, violent behavior, paranoia, and hallucination. Because meth is neurotoxic, it can damage dopamine and serotonin neurons in the brain, resulting in functional changes in the brain that may be irreversible. Prolonged use may damage up to 50% of the cells in the brain that produce dopamine. This may result in the development of Parkinson's disease later in life.

Withdrawal symptoms usually begins within 24 hours of stopping the drug and generally persist for 7 to 10 days, so much support is necessary to prevent the person from relapsing. Symptoms of withdrawal include drug cravings, difficulty concentrating, psychoses, insomnia, nightmares and vivid dreams, hunger, slow movement, irritability, depression, and anxiety.

Treatment options include cognitive behavioral therapy, family education, counseling, and motivational strategies. No drugs are recommended for treatment of methamphetamine addiction.



Heroin is made from morphine, obtained from the seed pod of opium poppies. Heroin is highly addictive, and tolerance occurs fairly soon so that users need increasingly higher or more frequent doses to reach the same high. Heroin rapidly affects the brain, binding to receptors associated with pain, pleasure, heartbeat, sleep, and respirations. Heroin may come in white or brown powder form or in a black substance referred to as black tar heroin. Users may sniff, snort, smoke or inject heroin. *Speedballing* is mixing heroin with crack cocaine.

Heroin addiction has reached epidemic proportions in the last few years (increasing 400% between 2010 and 2017) because it's inexpensive and readily available. In 2017 alone, 15,482 died from heroin overdose. Users are especially at risk because most also take other drugs, which potentiates the effects of heroin. One factor in heroin abuse is prescription opioid abuse, but only about 4% of those who abuse prescription drugs progress to heroin.



CDC

Street names include *big H*, *horse*, *hell dust*, and *smack*.

Short-term effects include feeling a “rush,” but less pleasant effects include dry mouth, flushing, feeling of heaviness in the arms and legs, nausea, abdominal cramping, vomiting, dilated pupils, severe generalized itching, clouded mental functioning, and a state of alternating between consciousness and semiconsciousness, referred to as “on the nod.” An overdose can stop respirations, resulting in cerebral hypoxia with coma, brain damage, or death—even with a first use.

Long-term effects include insomnia, sclerosed veins, damaged nasal tissue (from those who snort the drug), endocarditis, abscesses, constipation, liver disease, kidney disease, respiratory complications, including pneumonia, depression, antisocial personality disorder, menstrual irregularis, and sexual dysfunction (males). Additionally, the additives in heroin (sugar, starch,

powdered milk) may cause long-term damage to vessels. Users are at increased risk of developing hepatitis and HIV.

Withdrawal symptoms can occur within a few hours (usually 6 to 12) of stopping the drug and can be severe with restlessness, severe bone and muscle pain, insomnia, diarrhea, nausea and vomiting, cold flashes and goose bumps ("cold turkey"), uncontrollable leg movements (the reason it is referred to as "kicking the habit"), and severe cravings.

Withdrawal occurs in stages:

- **Days 1-2:** Symptoms begin, usually with muscle aching, and progress within 48 hours to include anxiety, panic attacks, insomnia, shaking, and diarrhea.
- **Days 3-5:** Symptoms are at maximum intensity with nausea, vomiting, cramping, sweating, chills, and abdominal cramping.
- **Days 6-7:** Acute phase is waning and the user may feel more normal but exhausted.
- **Post-acute withdrawal symptoms (PAWS):** May persist for 18 to 24 months and can include insomnia, difficulty concentrating, anxiety, depression, panic attacks, hypersensitivity, irritability, memory loss, and mood swings.

Treatment includes naloxone (Evzio® or Narcan®) for overdose. Naloxone can be taken through injection or nasal spray and works immediately to block the effects of heroin although multiple doses may be needed in some cases. In some states, Naloxone can be dispensed from pharmacies without a prescription in an effort to curb the high numbers of deaths from overdose.

Users often benefit from inpatient detoxification followed by inpatient or outpatient recovery programs. However, those in outpatient programs are more likely to relapse than those in supervised inpatient programs. One study of relapse showed that 91% of users experienced a relapse with 59% within one week of discharge from a program, so relapse appears to be one step on the way to recovery.

Treatment to help users kick the habit include a variety of behavioral interventions, including cognitive behavioral therapy and contingency management. Lofexidine may be administered to help relieve the symptoms of withdrawal, but ongoing therapy is almost always needed. Both methadone and buprenorphine bind to the same opioid receptors as heroin but do so more weakly so that cravings and withdrawal symptoms are reduced. They are often used to taper users off of heroin.

Diversion of opioids and impairment of the healthcare provider



effective but the user must be fully detoxified of heroin before the drug is initiated, making it ineffective for active users.

Naltrexone, another option, also binds to the receptors and is as

Opioids include heroin as well as prescription analgesics, such as fentanyl, morphine, oxycodone (OxyContin®), hydrocodone (Vicodin®), and codeine. Fentanyl, especially, has become a serious problem.

In 2016, half of opioid-related deaths were caused by synthetic opioids, primarily fentanyl.

Fentanyl can be swallowed, smoked, or injected and is often mixed with heroin. Fentanyl is 50 to 100 times more potent than morphine, so it greatly increases the risk of overdose. While the short-term effects are similar to heroin, fentanyl can quickly lead to respiratory arrest.

Fentanyl patches, which contain the narcotic in a gel form, pose special problems because the drug is absorbed through the skin so children who are inadvertently contact the gel are at risk of overdose that can be life-threatening.

Additionally, users sometimes smoke the patches to release residual drug or to increase the effects. This can release a large dose (3-days worth) of the active ingredient all at once, leading to overdose. Some users melt the narcotic gel and inject it, also leading to overdose. Other users boil the patches and drink the water or chew the patches. All of these methods are extremely dangerous.

Street names for fentanyl includes *Apache, China girl, China white, dance fever, friend, Goodfella, jackpot, murder 8, TNT, and Tango and Cash.*

Short term effects, long-term effects, withdrawal, and treatment (naloxone) is similar to heroin.

Healthcare providers have access to narcotics and are at risk of becoming addicted, often through diversion of drugs. Common methods of diversion include:

- Using waste narcotics for personal use.
- Failing to dose the patient properly and stealing part of the dose.
- Removing excessive amounts of PRN medications for personal use.
- Tampering with patients' drugs, such as replacing injection with saline and oral tablets with NSAID.

Behavioral signs of diversion	Workplace signs
<ul style="list-style-type: none"> • Administers more narcotic drugs than other nurses. • Volunteers to administer drugs to others' patients. • Comes to work early, stays late, volunteers for overtime. • Takes frequent bathroom breaks. • Reports wasting excessive amounts of drugs. • Carries drugs, syringes in pockets. • Increasing personal/professional isolation. 	<ul style="list-style-type: none"> • Narcotics records do not reconcile. • Patients do not appear to have relief from pain medication. • Drug choice and/or dosage is inappropriate for patient's level of pain. • Medications missing. • Medication tampering (broken vials). • Improper storage of injection supplies. • Excessive time spent near drug supply. • Frequent administration of PRN medications. • Failure to document waste. • Fentanyl patches show tampering or disappear.

The behavioral and physical signs of impairment exhibited by healthcare providers mirrors those of other addicts.

Behavioral signs of impairment	Physical signs
<ul style="list-style-type: none"> • Personality changes, mood swings. • Underperforms and makes excuses. • Frequent absences and late arrivals. • Shows resentment of authority. • Wears long sleeves even when temperature is high. • Appears visibly intoxicated, high. • Reeks of alcohol or marijuana. • Fails to keep appointments or meet deadlines. • Makes increasing numbers of errors. 	<ul style="list-style-type: none"> • Chronic rhinorrhea. • Track marks. • Bloodshot eyes. • Poor hygiene. • Weight loss or weight gain. • Slurred or unclear speech. • Hand tremors, muscle fasciculations. • Excessive drowsiness. • Rapid speech. • Sallow skin color.

Conclusion

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| <ul style="list-style-type: none">• Takes longer to carry out tasks.• Has increasing difficulty getting along with family and coworkers.• Refuses drug testing.• Has intense bursts of energy.• Has increasing absences and vague health complaints. | <ul style="list-style-type: none">• Frequent diarrhea.• Dilated or constricted pupils.• Frequent nosebleeds.• Insomnia.• Confusion, memory loss.• Tremors. |
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Many state and local programs and helplines are available, some tied to specific rehabilitation programs, but some national helplines are also available:

- **SAMHSA's National Helpline: 1-800-662-HELP (4357)**
This helpline is intended for patients and/or families of those with mental health problems or substance abuse disorders and provides information and referral. Includes the Center for Substance Abuse Treatment (CSAT), which supports treatment services through block grants.
- **National Drug Helpline: 1-888-633-3239**
This helpline provides information about treatment and recovery for those with drug or alcohol addiction.
- **Partnership for a Drug Free America: 855-DRUG-FREE (378-4373)**
This helpline provides general information about drug abuse for patients and families but does not provide referrals for treatment.
- **National Drug Early Warning System** monitors drug trends in the United States and posts information on its website at <https://ndews.umd.edu/>

Other resources that are widely available include 12-step programs:

- **Alcoholics Anonymous®**
- **Narcotics Anonymous®**

Drug abuse and alcohol abuse have taken a serious toll on American society and led to thousands and thousands of deaths. Approximately 88,000 Americans die each year from alcohol abuse, and over 70,000 Americans died from drug abuse in 2017 alone.

References

People who manufacture and/or distribute illegal drugs are constantly bringing new substances on the market to feed the demand for drugs and to addict a new generation.

Healthcare providers must be knowledgeable about addiction and vigilant in looking for the signs of drug and alcohol abuse in patients and other healthcare providers and should directly intervene.

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