

New Trends in Substance Abuse

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Indicators of Drug or Alcohol Abuse or Misuse:

Behavioral

- Abnormal behavior
- Exaggerated behavior
- Boisterous or argumentative
- Withdrawn
- Avoidance
- Changing emotions & erratic behavior

Physical

- Breath or body odor
- Lack of coordination
- Uncoordinated & unsteady gait
- Unnecessary use of arms or supports for balance
- Sweating and/or dry mouth
- Change in appearance

Speech

- Slurred or slow speech
- Nonsensical patterns
- Confusion
- Impaired driving ability

Performance

- Inability to concentrate
- Fatigue & lack of motivation
- Slowed reactions

The physiologic factors predisposing to addiction

Nearly every addictive drug targets the brain's reward system by flooding the circuit with the neurotransmitter, dopamine. Neurotransmitters are necessary to transfer impulses from one brain cell to another. The brain adapts to the overwhelming surges in dopamine by ultimately producing less dopamine and by reducing the number of dopamine receptors in the reward circuit. As a result, two important physiologic adaptations occur: (1) the addict's ability to enjoy the things that previously brought pleasure is impaired because of decreased dopamine, and (2) higher and higher doses of the abused drug are needed to achieve the same "high" that occurred when the drug was first used. This compels the addict to increase drug consumption to increase dopamine production leading to physiologic addiction with more and more intense cravings for the drug.

The effects of addiction on the brain

Nearly all substances of abuse affect the activity of neurotransmitters that play an important role in connecting one brain cell to another. Interruption of this process may result in:

- Delayed maturation and development of the immature brain (brain development continues to about age 25 years)
- Cognitive impairment with learning problems and limited or decreasing IQ
- Behavioral disorders, including aggression, impulsive behavior, and a variety of mental health problems

ALCOHOL ABUSE

Alcohol affects vision, judgment, reaction time, and memory. The effects of alcohol vary from person to person, some become quiet or depressed while others become aggressive and argumentative. Long-term users can develop tolerance. The physical signs of misuse may not be easily identified. Alcohol in the blood rapidly enters every organ and every cell. It directly affects the brain and is most toxic to the developing adolescent brain. The toxic metabolic byproduct of ethanol, acetaldehyde, can be found in the brain. Acetaldehyde damages brain cells, affecting the function of these cells and resulting in cell injury or cell death.

Alcohol intoxication is the primary contributor to motor vehicle accidents (the leading cause of adolescent death) and is associated

with suicide attempts, depression, anxiety, mood disorders, and ADHD. Alcohol use at an early age is a strong predictor of future alcohol-related problems. Early age use of alcohol is also associated with greater sexual risk taking, academic problems, other substance abuse, and delinquent behavior. Binge drinking is becoming more common among teens and college students. Binge drinking is particularly dangerous because of the risk of alcohol poisoning leading to suppressed gag reflex, depressed respiratory rate, and death.

Indicators for Alcohol:

- Difficulty in recalling instructions
 - Shortened attention span
 - Thick, slurred speech
 - Sluggish, sleepy
 - Slowed reactions
 - Uncoordinated & unsteady gait
 - Faulty judgment
 - Lack of coordination
 - Greatly impaired driving ability
- ❖ **(Hangover indicators)** headaches, nausea, dehydration, unclear thinking, unsettled digestion, aching muscles, slow moving, unmotivated

New trends in consuming alcohol

Alcohol-containing candy

A trick popular with teens is to soak Gummy Bears or Worms in alcohol. Vodka and Everclear have less alcohol odor than other alcohols and are favored. The Bears or Worms are placed in a dish and covered with alcohol. They absorb all the liquid. The candies are initially sticky and look the same as untreated candy. They are then eaten as ordinary candy - only with a buzz!

Tampon dipping and "butt-chugging"

A new craze at high school and college campus parties is "butt-chugging" which requires a device for giving an alcohol enema. The mucosal absorption of ethanol leads to rapid intoxication without producing a significant breath-odor of alcohol. "Tampon dipping" (tampons soaked in vodka) is another craze with similar results and are used by both men (rectal insertion) and women (vaginal insertion).

Vaporization

A new device, Alcohol Without Liquid (AWOL), is becoming popular. The device vaporizes alcohol so that it may be inhaled. The AWOL device consists of two components: an oxygen generator and a hand-held vaporizer. Tubes from the generator attach to the vaporizer. Alcohol (typically vodka) is poured into the vaporizer and mixes with oxygen producing an alcohol-mist. The mist is inhaled resulting in rapid absorption of alcohol from the lungs and immediate intoxication. Vaporization causes very high blood alcohol content much quicker than drinking alcohol does, thus making it more dangerous.

Teens may make their own AWOL device using a plastic bottle, plastic or rubber tubing and a hand held air pump. A hole is put in the lid of a 1-2 liter bottle. An inflation-pin typically used for inflating basketballs is inserted through the hole in the lid. About a cup of Vodka or some other type of alcohol is poured into the bottle. A tire pump is connected to the pin and air is pumped into the bottle until the bottle is firm. The pump is pulled, causing a pressure change in the bottle and the liquid is converted into vapors and is then inhaled through the hole in the lid. The user quickly becomes intoxicated.

Hand Sanitizers

Drinking hand sanitizers is popular. The gelling agents are "salted out" by adding a pinch of table salt to the bottle of hand sanitizer. The gelling agent precipitates out and the clear liquid is then decanted, and consumed. Once separated, the alcohol can be anywhere from 120-170 proof, thus getting one drunk rather fast. The ethanol in hand sanitizers may be adulterated (denatured) with chemicals, isopropyl alcohol, or methyl alcohol, all of which may pose significant medical hazards if ingested. The label on the hand sanitizer may not always indicate if these other types of alcohol have been added, or how much has been added.

Alcohol consumed with other drugs

In an attempt to get more “high” or to experience a longer lasting “high” users may mix alcohol with other substances. Combination use is most common among adolescents and college-age students.

Alcohol and caffeine

Abuse of the combination of alcohol and caffeine is dangerous and may be deadly. Commercially available energy drinks with 12% alcohol are sold in liquor stores and are showing up at teen parties. These drinks are sold in bright colored cans and marketed to underage drinkers. Brand names include Four Loko, Joose, Jilt, and Tilt. Alcohol may be mixed with high-caffeine energy drinks (i.e. Amp & Everclear, Yager & Redbull) to achieve the same effects. Caffeine masks the effects of alcohol and the user keeps drinking, often until he/she passes-out. Recently, a caffeine-containing inhaler (Aero Shots) has hit the market and is being used in combination with alcohol.

Alcohol and Adderall (ADDYS)

The combination of Adderall and alcohol is often described as a “safe” replacement to cocaine and alcohol but combining these may have deadly consequences. Many people are using this mixture as a party drug cocktail that allows them to extend their partying. People will snort or smoke the pills to get “high” quicker. Adderall acts as a stimulant to people who do not suffer from attention disorders and counteracts the depressive effects of alcohol. When Adderall and alcohol are combined, a number of things happen. Because Adderall masks the depressive feelings induced by alcohol, many users drink excessive amounts of alcohol resulting in physical harm. Prolonged use of this drug cocktail can lead to paranoia, anxiety, and severe depression. Physically, it can cause nausea, vomiting, weight loss, heart palpitations, and headaches. If used over a long period of time, users may experience convulsions, irregular heartbeats, fevers, malnutrition, tremors, and muscle twitching.

Alcohol Withdrawal

Withdrawal may occur in chronic users and in binge drinkers. Common symptoms are headache, nausea and vomiting, sweating and hypertension. In more severe cases, confusion, hallucinations, delirium tremors (DT’s), and seizures may occur. DT’s are particularly dangerous. The death rate is 5% in treated individuals and 35% if untreated.

Effects on the fetus, infant, and children: Fetal Alcohol Syndrome (FAS)

Fetal alcohol syndrome is a cluster of related problems and birth defects that result from a women’s use of alcohol during pregnancy. In the US, it is one of the leading causes of birth defects and the most common cause of preventable mental retardation. Each year 5,000 to 15,000 babies are born with this condition. Signs of FAS include:

- Distinctive facial feature
- Heart defects
- Deformities of joints, limbs and fingers
- Slow growth before and after birth, small head size
- Vision and hearing problems
- Mental retardation and delayed development,
- Hyperactivity, poor impulse control, short attention span

Because there is no known safe amount of alcohol to drink, women should not drink if they are pregnant or trying to get pregnant. Women who drink 4-5 alcoholic drinks/day greatly increase the risk of FAS. A woman who drinks only lightly or occasionally before she realizes she is pregnant might or might not harm the developing baby. There is no cure or specific treatment for FAS.

Hookah and E-cigarettes

Hookah originated in Persia and India many centuries ago and is known as narghile, argileh, shisha, hubble-bubble, and goza. Hookah is the water pipe used to smoke flavored tobacco (shisha), other “non-tobacco” herbal substances, and liquids such as E-drops, E-liquid, or E-juice.

Smoking hookah (flavored tobacco) is not a safer alternative to cigarette smoking. Tobacco isn't less toxic when you put it in a water pipe, and it still contains nicotine. Flavored tobacco carries all the same health risks and cancer causing agents that cigarette smoking causes. Many studies suggest Hookah smoking may be more dangerous than cigarette smoking because of the amount of smoke inhaled. A typical hour hookah smoking session can involve 200 puffs, about 90,000 ml of smoke being inhaled, compared to about 20 puff or 500-600 ml of cigarette smoke inhaled. Hookah pipes used in hookah bars and cafes may not be cleaned properly, risking the spread of infectious diseases as well.

According to studies by the American Lung association, Hookah smokers may be at risk for some of the same diseases as cigarette smokers. These include:

- Oral cancer
- Lung cancer
- Stomach cancer
- Cancer of the esophagus
- Reduced lung function
- Decreased fertility

Carbon monoxide, a chemical in tobacco has long been linked to heart disease. There is an increased concern about health risks as the charcoal used to heat the hookah products releases large amounts of carbon monoxide, metals and cancer causing agents. Studies now show that tobacco-based shisha and "herbal" shisha show that smoke from both preparations contain carbon monoxide and other toxic agents known to increase the risks for smoking-related cancers, heart disease, and lung disease. (Shihadeh A, Food and Chemical Toxicology 2012;50(5):1494–8).

Secondhand smoke from hookahs poses a serious risk for nonsmokers; it contains smoke not only from the tobacco but also from the charcoal. Hookah smoke contains high levels of toxic compounds, including tar, carbon monoxide, heavy metals, and cancer-causing chemicals (carcinogens).

New forms of electronic smoking, hookah pens and E-cigarettes, are becoming very popular. These products are filled with liquids such as E-drops, E-liquid, or E-juice, battery powered to convert the liquid to a vapor that resembles cigarette smoke, which is then inhaled. These liquids contain nicotine, flavorings, and other chemicals. Many labels and ads for these products often claim that users can enjoy the same taste without the harmful effects of tobacco. This is not true, there are no studies showing that E-cigarettes or hookah pens are a safer alternatives to cigarettes. When the FDA analyzed samples of two popular brands, they found variable amounts of nicotine and traces of toxic chemicals and metals, including known cancer-causing substances (carcinogens). The World Health Organization (WHO) states that as of July 2013, they recommend that "consumers should be strongly advised not to use" electronic cigarettes until a reputable national regulatory body has found them safe and effective. Many states have banned the use and sale of E-cigarettes over the last few years.

Many of these products come from China and other countries. The US government does not regulate, test, or monitor any chemicals put in them. It is important to read the labels as some contain only water, others contain nicotine, some contain chemicals that mimic the effects of nicotine, and some contain propylene glycol (antifreeze family). Propylene glycol is used to create a thicker smoke, and thus mimics cigarette smoking.

E-cigarettes and hookah pens can also be used to smoke Marijuana concentrates, known as hash, wax, oil, shatter, and dabs.

Dextromethorphan –DXM (Robo-Tripping)

Uses of products containing DXM are those that adhere to the manufacturer's suggested guidelines for dosages. Users consuming DXM-containing cough syrups (such as Robitussin) for medical reasons typically ingest 10 to 20 mg every four to six hours or 30 mg every six to eight hours. On the other hand, a single dose for recreational users can range from 240 to 1500 mg. Heavier users have been known to ingest up to 3 or 4 bottles a day—an amount that can induce a multitude of negative side effects. According to the DEA, Internet sites inform young users to "drink the syrup expeditiously in order to absorb enough DXM from the drink prior to the impending incidence of vomiting which will occur as a result of the ingestion of the large volume of syrup required for intoxication." In addition to traditional syrup forms, there is also evidence that DXM is being sold over the Internet in powder,

capsule, and pill forms. These are snorted or ingested orally. Powders and pills have an effect similar to syrups without the need to consume large quantities of the substance in a small time period. Users can also find instructions on how to extract DXM from syrups and gel capsules on the Internet, thus enabling them to inject or orally consume this active ingredient.

Physical and Psychological Effects of DXM

DXM is a dissociative anesthetic that at high doses can create powerful psychedelic effects. It is sometimes compared to PCP and ketamine, which are also dissociative anesthetics. The effects caused by DXM use vary depending on the dose. Users often describe dose-dependent 'plateaus' that range from a mild stimulant effect with distorted visual perceptions to a sense of complete dissociation from one's body. Effects generally last for 6 hours, but will ultimately vary depending on the amount of DXM ingested and if it is used in combination with other drugs or chemicals. Other effects can include:

- Hot flashes
- Nausea and dizziness
- Lack of coordination
- Panic attack or seizures
- Disassociation from body
- Visual and auditory hallucinations
- Impaired judgment and mental performance
- Sweating
- Lethargy
- Hyperactivity
- Slurred speech
- Hypertension (increased blood pressure)
- Nystagmus (rapid eye movement)
- Vomiting
- Rashes, red blotchy skin
- Tachycardia (racing, pounding heart)
- Euphoria
- Paranoia
- Disorientation
- Tactile hallucinations
- Visual disturbances
- Feelings of floating
- Altered time perception

Tolerance, Dependence & Withdrawal

The level and likelihood of experiencing tolerance and dependence will ultimately depend on the dose and frequency of use. When it is abused regularly, DXM can actually cause some of the symptoms (i.e., insomnia and dysphoria) that it is designed to cure. In addition, high-dose chronic use of DXM can lead to the development of toxic psychosis - a mental condition characterized by a loss of contact with reality along with a confused state - as well as other physiological and behavioral problems. It is unknown, however, what effect infrequent use of low doses has upon the user, although anecdotal reports of prolonged use describe DXM as a drug with moderate physical dependence and tolerance. Most users that display symptoms of withdrawal will experience some form of anxiety, restlessness, insomnia, diarrhea, vomiting, severe weight loss, and upset stomach.

Dextromethorphan (Robitussin and other over the counter cough preparations) acts as a hallucinogen when taken in large doses. Dosing instructions are available online. Large doses also cause nausea and vomiting, loss of coordination, hot flashes, numbness, and a "horrible feeling" in users, yet repeated abuse is common. Effects may last for several hours. Robo-tripping has been implicated as a "gateway" to using other hallucinogenic drugs. Users may experience:

- Impaired judgment and mental functioning
- Loss of coordination
- Hot flashes
- Numbness
- Increase heart rate and blood pressure
- Nausea & vomiting

- Seizures
- Dissociative state
- Sensitive to light
- “Horrible Feeling”

If the cold medication contains Tylenol, or any other brand of acetaminophen, liver damage may occur.

“Molly”: The new Ecstasy

Ecstasy is known for inducing feelings of euphoria, closeness, and diminished anxiety and is frequently used at raves. As demand for ecstasy increased, so did the adulterants in each pill (caffeine, speed, ephedrine, ketamine, LSD, talcum powder and aspirin) and by 2000 ecstasy’s reputation had soured. Then sometime in the last decade, it returned to clubs as Molly, a pure powder or crystalline form of MDMA. Other designer drugs in the phenethylamine/cathinone family are being substituted or mixed with MDMA, sold as “Molly”, and causing overdose.

Molly is marketed as a gentler, more approachable drug than ecstasy and has found a following in the Now-Generation. Much as marijuana enthusiasts of an earlier generation sang the virtues of Mary Jane, Ecstasy enthusiasts believe that Molly is natural and harmless. The opposite is true.

The popularity of Molly is attributed largely to hip hop. Many rap songs released in the last year have references to Molly. In “Mercy,” Kanye West says “something ‘bout Mary she gone off that Molly.” In “All Gold Everything” Trinidad James raps “popped a Molly, I’m sweatin.” Lil Durk and Wiz Khalifa released a track called “Molly Girl.” Madonna recently referred to the drug at one of her concerts and received a standing ovation after saying “Molly.”

For most people, a “hit” of Molly lasts for 3 to 6 hours. Molly is a white crystalline powder similar to sugar. It can be ingested in a capsule or paper, dissolved in soda or liquid, smoked, snorted, or injected. Some people do “swirlies” where they rub the powder under their tongue and on their gums. It takes only about 15 minutes for MDMA to enter the bloodstream and reach the brain after ingestion. About 45 minutes later, the person experiences the “high.” People who use MDMA might feel very alert or “hyper” at first. Some lose a sense of time and experience other changes in perception, such as an enhanced sense of touch. Others experience negative effects right away. They may become anxious and agitated. Sweating or chills may occur, and people may feel faint or dizzy.

Molly can cause muscle tension, nausea, blurred vision, and increased heart rate and blood pressure. Forceful clenching of the teeth can occur and individuals at clubs often chew on pacifiers to relieve some of the tension. Even if a person takes only one pill, the side effects of Molly—including feelings of sadness, anxiety, depression, and memory difficulties—can last for several days to a week or longer in people who use MDMA regularly.

Molly also causes users to become dehydrated through vigorous activity in a hot environment (club). It interferes with the body’s ability to regulate its temperature resulting in dangerous overheating. This can lead to serious heart and kidney problems or, rarely, death. Molly can be extremely dangerous in high doses or when multiple small doses are taken within a short time period to maintain the high. High levels of the drug in the blood stream can increase the risk of seizures and affect the heart’s ability to maintain its normal rhythms.

Researchers that study the brain think that Molly may affect the way that nerve cells communicate with each other by altering the effects of the serotonin. The serotonin system plays a direct role in controlling our mood, aggression, sexual activity, sleep, and sensitivity to pain. Memory loss is a problem among regular users of Molly.

Ecstasy

Ecstasy (3-4-methylenedioxy-N-methamphetamine or MDMA) is a psychedelic amphetamine with both hallucinogenic and stimulant properties created in the early 1900’s. Ecstasy is a chemical cousin to Meth – its Methamphetamine plus a hallucinogen so you will also see indicators similar to meth. It is unique in that it causes hallucinogens as well as feeling of exhilaration and excitement. Ecstasy is usually in tablet form; however, it can be in powder form. The tablets come in all colors and have various types of logos or images on them. The color and the logo have meaning as to what is in them and the intensity of the reaction. Many pills on the

street today do not have just MDMA in them; they have Cocaine, BZP, Heroin, LSD, Ketamine, and/or Methamphetamine in them as well. Users need to know the lingo or jargon that goes along with Ecstasy so they know what they are getting. Molly is pure MDMA and is in white crystalline form. It can be smoked, snorted, injected, put into Gatorade or any drink and sipped all day long, or put into capsules. Some kids will do “swirlies” where they lightly wet a finger, dip it in the substance, and smear it on their gums.

Ecstasy Indicators:

- Reduced inhibitions
- Sweating
- Elevated Vitals
- Happy and Friendly
- Continuous Speech
- Tremors
- Heightening of senses
- Nausea & vomiting
- Blurred Vision
- Confusion
- Paranoia
- Grinding Teeth (Bruxism)

Adverse effects

Side effects are common and include poor concentration, jaw clenching, lack of appetite and dry mouth/thirst. Hyperthermia (elevated body temperature up to 110 degrees) may occur along with dehydration. In the long term, the drug may cause insomnia, aches and pains, anxiety and paranoia, impaired long-term memory, depression and irritability, and chronic fatigue. These problems may continue even after stopping the drug. Long-term use can deplete serotonin (a neurotransmitter) and result in mood swings, sleep disorders, altered thought processes, sexual dysfunction, and loss of sensitivity to pain.

Effects on the fetus

There are a small number of reports of fetal problems, including clubfoot in females, possible increase in the rate of congenital heart disease, and major defects of the abdominal wall resulting in infants being born with their intestines outside the abdomen.

Marijuana

Marijuana Plants

Marijuana plants and the plant material that is smoked or ingested contain a variety of chemical substances. The known active ingredients are “cannabinoids,” and each plant contains about 100 different cannabinoids. There are over 600 other substances in the plant. However, the effects of only 6-8 of the plants cannabinoids are known. These cannabinoids are: delta-9 tetrahydrocannabinol (THC), its sister compound cannabinal (CBN), delta-9 tetrahydrocannabivarin (THCV), cannabigerol (CBG), cannabadiol (CBD), delta-9 tetrahydrocannabinolic acid (THCA) and cannabadiolic acid (CBDA).

THC is the main psychoactive component. CBN also has psychoactive properties but is about 50X less potent than THC. CBD and THCV are much less psychoactive and cause more sedation. There are 2 species of marijuana plants: *Cannabis sativa* (high in THC) and *Cannabis indica* (more CBD, less THC).

Amendment 64 – legalization in Colorado

In November 2012, Amendment 64 passed in Colorado allowing the sale and use of recreational marijuana in the state. Under this amendment anyone 21 years of age or older can:

- Possess, use, transport or purchase up to one ounce of marijuana
- Allows for the growing of no more than 6 plants, 2 of which can be mature at a time
- Transfer one ounce without payment to another individual 21 years of age or older
- Allows for the possession of 1 ounce of THC oil, or edibles

- Cannot use marijuana in any form and operate a vehicle
- However, the Amendment clearly states that marijuana cannot be used out in plain view, in areas open to the general public, or in a manner that endangers others.

Under Colorado's Medical Marijuana Law and Amendment 64, employers do not have to accommodate the use of Marijuana in the workplace, whether it is for medicinal use or otherwise. Many marijuana users have been fired after going to work under the influence, or testing positive after a random or employer required drug test. According to the Bell & Pollock Law Firm website, the following pertains to Amendment 64 regarding employment and driving:

- "The Amendment does not change the ability of employers to maintain their current employment policies, nor does it prevent them from creating whatever policies they see fit. If employers do not currently allow marijuana use by employees, they can continue to prohibit it."
- "The Amendment does not change existing law regarding driving under the influence of marijuana. It is currently illegal to drive while impaired by marijuana, and it remains illegal. Legislature maintains the ability to develop new driving-related policies as it sees fit."

Addiction to marijuana

Nearly every addictive drug, including marijuana, targets the brain's reward system by flooding the circuit with the neurotransmitter, dopamine. Neurotransmitters are necessary to transfer impulses from one brain cell to another. The brain adapts to the overwhelming surges in dopamine by ultimately producing less dopamine and by reducing the number of dopamine receptors in the reward circuit. As a result, two important physiologic adaptations occur: (1) the addict's ability to enjoy the things that previously brought pleasure is impaired because of decreased dopamine, and (2) higher and higher doses of the abused drug are needed to achieve the same "high" that occurred when the drug was first used. This compels the addict to increase drug consumption in order to increase dopamine production leading to physiologic addiction and intense cravings for the drug.

Marijuana and brain development

The human body produces trace amounts of cannabinoids that play an important part in the development and maturation of the brain. Human cannabinoids act at the cellular level by combining with receptors on the surface of the cell allowing the cell to communicate with other cells. This interaction between the cannabinoid, the receptor, and the cell is referred to as the human "endo-cannabinoid system." The trace amounts of human cannabinoids that are produced are immediately degraded and are only active for a very, very short time. The prolonged presence of cannabinoids in the blood, and therefore at the cellular level, resulting from exposure to marijuana, has deleterious effects on cell growth and communication between cells and may result in inflammation and delayed maturation, and injury or death of the cell. Cannabinoid-induced inflammation in the brain has been shown to cause brain-cell death. (*Cutano et al. J Clin Invest. 2013;123(7):2816-2831*). These effects occur and the in the fetus, infant, child and young adult and the resulting functional defects may persist for years or even a life time.

Exposure to cannabinoids present in marijuana affects nearly all other neurotransmitters through the action of prolonged activation of the cannabinoid receptors in brain cells. This results in delayed maturation and development of the immature brain (brain development continues to about age 25 years); cognitive impairment with learning problems and limited or decreasing IQ; and behavioral disorders, including aggression, impulsive behavior, and a variety of mental health problems

Recreational marijuana

Marijuana is used for its mildly tranquilizing, mood and perception altering effects. The psychoactive ingredient in marijuana is THC (delta-9-tetrahydrocannabinol). The marijuana on the streets today is unlike the marijuana in the 60's, 70's, 80's, 90's, or early 2000's - it is a potent addictive drug cultivated to maximize its psychoactive effect. The THC content of marijuana continues to increase. In the 60's - 80's the THC content ranged from 2-7%. Today it is around 23-28%. However, in some places the THC content may be of 50% or higher. Today's marijuana should not be looked at as "just marijuana."

Marijuana concentrate (hashish, THC oil, wax, shatter) has become very popular. THC is extracted from the plant buds by using butane or other chemicals. Oil can be mixed with butter, known as "budda" on the street, and is used to make marijuana edibles: cookies, cakes, brownies, pies, yogurt, ice cream, chocolates, etc.

Hashish may be a greenish brown solid substance, or a brownish tan waxy substance known as “wax”, “earwax” or “dabs” on the street. This wax is usually smoked in vaporizers, which may look like pens or inhalers. Vaporizers typically have a section that contains a liquid, sometimes flavored, that is used to reduce the odor or marijuana making smoking less detectable.

Marijuana joints can be laced with other drugs such as PCP, cocaine, ecstasy, methamphetamine, heroin, or embalming fluid. The street names of marijuana joints often describe what is laced in the joint, i.e.; “black ice” is marijuana laced with meth, “white rhino” is marijuana laced with cocaine, and wet sticks or “sherm” is marijuana laced with embalming fluid.

Indicators of marijuana use:

Relaxed inhibitions	Difficulty concentrating
Errors in judgment	Distorted perception of time
Distinct odor of marijuana	Impaired memory and attention
Lack of motor coordination	Flattening of emotions
Loss of eye convergence	Lack of motivation
Irritated mucous membranes	Dry mouth

Effects of using marijuana

Immediate effects: The physical effects of using marijuana include euphoria, rapid heart rate, increased blood pressure, and rapid respirations. Other physical changes include red eyes, dry mouth and increased appetite or “the munchies.” One of the main problems is slowed reaction. Because marijuana impairs judgment and motor coordination and slows reaction time, an intoxicated person has an increased chance of being involved in and being responsible for an accident.

The dangers of smoking marijuana are summarized as follows:

- Impaired perception
- Diminished short-term memory
- Loss of concentration and coordination
- Impaired judgment
- Increased risk of accidents
- Loss of motivation
- Diminished inhibitions
- Increased heart rate
- Anxiety, panic attacks, and paranoia
- Hallucinations
- Damage to the respiratory, reproductive, and immune systems
- Increased risk of cancer

Secondhand smoke: Exposure to marijuana, including exposure to second-hand marijuana smoke, during pregnancy has been shown to increase the risk of stillbirth (Varner M. Ob Gyn 2014;123(1);113-125). The study documented that blood THC levels even below the 3 ng/ml threshold of “intoxication” is detrimental to the unborn child. Blood levels of THC above 3.5ng/ml have been repeatedly documented in people exposed to second-hand marijuana smoke for at least 3 hours. (Rohrich J. J Anal Toxicol 2010;34(4):196-203)

Emotional health: According to the National Institute on Drug Abuse, the main effects of marijuana on mood include euphoria, calmness, anxiety, and/or paranoia. Other short-term psychological effects include a distorted sense of time, magical or “random” thinking, short-term memory loss, and depression. These psychological problems generally ease after a few hours but residual effects can last for days.

Seizures: In most users, THC is a pro-seizure drug inducing new onset of seizures. However, this is a very controversial issue and the results of scientific studies are mixed: some report that smoking marijuana may precipitate seizures while others report that marijuana suppresses seizures. There may not be a clear answer to this question because of the variability of the contents and concentration of psychoactive substances in marijuana and the psychological differences between people.

Red-eye and vision problems: The eye tissues contain cannabinoid receptors and exposure to cannabinoids induces corneal vasodilatation resulting in “red eye”. Cannabinoid exposure also has short-term and long-term effects on visual acuity and causes alterations in color discrimination and an increase in sensitivity to light. (Kiplinger et al. *Clin Pharm & Therapeutics* 1971;12:650-657). Long term-marijuana users, even after abstaining for as long as 10 years, tend to have an increase in sensitivity to light and a decrease in dark adaptation, color matching and visual acuity. (Dawson et al. *Invest Ophthalmol Vis Sci* 1977;16:689-699)

Stillbirths: Exposure to marijuana, including exposure to second-hand marijuana smoke, during pregnancy has been shown to increase the risk of stillbirth (*Varner M. Ob Gyn* 2014;123(1);113-125). The study documented that blood THC levels even below the 3 ng/ml threshold of “intoxication” is detrimental to the unborn child. Blood levels of THC above 3.5ng/ml have been repeatedly documented in people exposed to second-hand marijuana smoke for at least 3 hours. (Rohrich J. *J Anal Toxicol* 2010;34(4):196-203)

Long-term health consequences of using marijuana

Dental health: Using marijuana is associated with the development of periodontal dental disease. This effect occurs in people who smoke marijuana; ingest marijuana, and who only use the drug occasionally. The periodontal effects are related to the negative systemic effects of cannabis on the immune system. (Ashton CH. *Br J Psychiatry* 2001;178:101-106) High frequency users have more severe periodontal disease causing inflammation of the gums leading to loosening of the teeth from the gums and underlying bone resulting in early loss of teeth. (Thompson et al. *JAMA*, 2008;299(5):525-531) Cannabis use has also been linked to several other oral and dental problems including fiery-red gingivitis, gingival overgrowth, inflammation of the uvula and benign and cancerous oral tumors.

Cardiovascular events: There have been an increased number of reports of cardiovascular complications in young people. There are multiple case reports of atrial fibrillation in children and adults following exposure to cannabis (Singh et al. *Pediatrics* 2014;133(2):e443-446, Korantzopoulos et al, *Am J Card* 2014;113(6):1085-1086). In addition, cannabis use is associated with cardiovascular complications. A recent report from France, where reactions to substance abuse must be reported, revealed that from 2006-2010 1.8% of all cannabis-related sequella were cardiovascular, including acute coronary syndromes, peripheral arteriopathies (Buerger-like diseases {thromboangiitis obliterans}) and cerebral complications (Jouanjus et al, *J Am Heart Assoc.* 2014;3:e000638).

Emphysema and spontaneous pneumothorax: The known consequences of chronic marijuana smoking include chronic cough, sputum production, wheezing and high frequency of acute bronchitis (Taylor et al, *Addiction* 2000;95:1669-1677). Spontaneous pneumothorax has also been reported to be the presenting symptom of bullous emphysema in otherwise healthy asymptomatic young adults who chronically smoke marijuana but not tobacco. The bullae appear at the apex of the lung with no signs of emphysema of the entire lung. Chronic marijuana use should now be included in the differential diagnosis of pneumothorax (Beshay M et al, *European Journal of Cardio-Thoracic Surgery*, 2007; 32:834-838).

Hyperemesis syndrome: The cannabinoid hyperemesis syndrome may occur following frequent use of marijuana for several months or years. Essential clinical criteria for the diagnosis include 1) history of regular cannabis use, 2) severe nausea, 3) vomiting that recurs in a cyclic pattern over months and 4) resolution of symptoms after stopping cannabis use. Supporting features for the diagnosis include (1) compulsive hot baths with symptom relief, (2) colicky abdominal pain, and (3) no evidence of gall bladder or pancreatic inflammation. (Simonetto, DA et al. *Mayo Clinic Proceedings* 2012;87(2):114-9).

Risks to family, job, and safety as a result of using marijuana: Inadvertent exposure to THC either through exposure to second hand smoke, accidental ingestion of marijuana-edibles or contact with marijuana buds during the drying process may pose a significant health threat to innocent by-standers. As noted, exposure to second hand smoke results in increased blood levels of THC with all the consequences of inhaling or ingesting marijuana. There are numerous reports in the medical literature about accidental childhood THC poisoning resulting in hospitalization, including the necessity of ICU care. (Wang, GS. *JAMA Pediatr* 2013; 167(7):630-633 and Molly C. *Arch Pediatr.* 2012; 19(7):729-732). Family members and friends, especially children, who have a history of asthma, are prone to severe asthma attacks following exposure to marijuana smoke by either inhalation or contact with contaminated clothing. THC in marijuana buds is volatile (forms a gas) and exposure to buds during the drying process can result in increased blood levels of marijuana. (Ross SA. *J Nat Prod* 1996; 59(1):49-51)

Marijuana may be detected in the urine for up to 30 days after using marijuana and exposure to second-hand smoke may cause one to test positive. The more often someone smokes, the longer THC stays in one's system. The THC detected in urine for employment testing is for the metabolite of THC, known as THC-COOH and is non-active. There is an allowable amount of 15 -50 nanograms of THC metabolite, depending on who you work for (Federally regulated or private industry), before someone has failed the drug test. Employers have the right to perform random drug tests on employees. Positive tests may cause a person to be unemployable.

The National Highway Traffic Safety Administration (www.NHTSA.gov) has extensively studied the effects of marijuana on driving. Marijuana impairs driving for up to 3 hours after use and results in:

- Decreased car handling performance
- Increased reaction times
- Impaired time and distance estimation
- Motor in-coordination
- Decrease vigilance

Colorado allows up to 5 nanograms of **active** THC/ml of blood, at five or higher people can be charged with a DUID. Active THC shows the active derivative 11-hydroxy-THC. Colorado requires a blood test to test for *active THC* only; THC can stay active in the system for 2-20 hours depending on method of use, and how often smoked before getting into a vehicle. Active THC usually falls below the 5-nanogram limit within 24 hours. According to the National Highway Traffic Safety Administration, drugs other than alcohol (e.g., marijuana and cocaine) are involved in about 18 percent of motor vehicle driver deaths. A recent survey found that 6.8 percent of drivers, mostly under age 35, who were involved in accidents tested positive for THC; alcohol levels above the legal limit were found in 21 percent of such drivers.

Mental health disorders- chronic depression and schizophrenia: Short-term psychological effects include a distorted sense of time, magical or "random" thinking, short-term memory loss, and depression. These psychological problems generally ease after a few hours but residual effects can last for days. There is a significant and consistent relationship between marijuana use and the development of schizophrenia and chronic depression. The results of scientific studies showing an association between marijuana use and these mental disorders are alarming. A prevalence rate of persistent depression as high as 40% in chronic marijuana smokers has been reported (Brook JS. *Psychol Rep* 2011; 108(2):339-357). A 2004 article in the *British Journal of Psychiatry* reviewed 4 large studies, all of which showed a significant and consistent association between consumption of marijuana, mostly during teenage years or early 20s, and the later development of schizophrenia. The review concluded that marijuana is a "causal component" in the development of schizophrenia and other psychotic disorders. (Caspi et al., *Biol Psychiatry*, May 2005.) The mechanism of action is not clear but some studies implicate sudden depletion of dopamine or alterations in the dopamine receptor. (Strejilevich SA et al. *Med Hypotheses* 2012;78(1):107-112) In addition, a number of well-designed scientific studies have shown an association between chronic marijuana use and increased rates of chronic depression and schizophrenia in people with abnormalities of the *COMT* gene. Variations in the *COMT* gene are present in 1:4000 live births (Zammit et al. *Br J Psychiatry* 2011; 199(5):380-385).

Learning problems and school performance/job performance: Early initiation and continued use of marijuana affects memory, attention and ability to think clearly, making it difficult to concentrate, learn new things, and make sound decisions (Dougherty DM et al, *Psychopharmacology* 2013;226(2):307-319). As a result, school performance is impaired, increasing number of absences and increasing the risk of dropping out of school. In Washington State, the Healthy Youth Survey results for 2012 found that high school students who used marijuana were more likely to get lower grades in school (Cs, Ds, or Fs) compared to those that do not use. While it is difficult to distinguish whether this is due to learning difficulties, lack of motivation, or because marijuana users mix with peers who may be involved in a range of risk taking behaviors, using marijuana at an early age is independently associated with learning problems. (Crean RD et al. *J Addict Med.* 2011;5(1):1-8).

Loss of IQ: Recent reports show that fewer teens and young adults believe that cannabis is harmful to health. Concomitantly they are beginning to use cannabis at a younger age and more frequently (daily cannabis). In view of this change in behavior a long-term epidemiological study was performed using data collected on over 1000 participants over a 38 year period. The results revealed that users had more cognitive problems and a decline in IQ over the study period (average 8 points). The problems were more severe in users who started marijuana during adolescence and in more persistent users. (Meier M. *Proc Natl Acad Sci USA* 2012;109(40):E2657-2664). Other studies have confirmed that teens who are chronic marijuana users have reduced problem solving skills and exhibit "cognitive inflexibility." (Egerton A et al. *Neuropsychopharmacology* 2005;30(10):1895-18905).

Memory loss and changes in brain structure: Persistence use of cannabis in adolescents is associated with defects in both acute and long term memory. Researchers have suggested that these defects are related to changes in synaptic function within the cortico-basalganglio-thalamic circuits that play an important role in memory. This circuitry includes the striatum, globus pallidus and thalamus (S-GP-T). These areas contain a dense population of CB1 receptors. A recent controlled study of patients with poor memory function, who were part of a larger cross-sectional neurobiological study of schizophrenia, and who persistently smoked marijuana underwent MRI brain surface mapping. This unique study compared findings in 4 groups of patients with poor memory function documented by neuropsychological testing: the groups included 2 populations, one with schizophrenia and one without schizophrenia. The groups were subsequently divided into 2 subsets, those who were addicted to smoking marijuana (but did not use marijuana for the preceding 6 months), and those who never used marijuana. It is known that patients with schizophrenia exhibit structural changes in the S-GP-T. These same changes were present in study patients who did not have schizophrenia but chronically smoked marijuana and were most severe in schizophrenic patients who smoked marijuana (Smith MJ et al., Schizophrenia Bulletin 2014;40:287-299).

Withdrawal: THC is a fat-soluble drug and therefore stays in the body fat much longer than other drugs. Withdrawal symptoms include anxiety, tremor, aches and pains, sleep problems and craving of the drug. Restlessness, irritability, and insomnia can occur in heavy users.

Effects of prenatal exposure to marijuana on infants and children

Acute effects: Exposure to marijuana, including exposure to second-hand marijuana smoke, during pregnancy has been shown to increase the risk of stillbirth 2-fold. (Varner M. Ob Gyn 2014;123(1):113-125). The study documented that blood THC levels even below the 3 ng/ml threshold of "intoxication" are detrimental to the unborn child. Blood levels of THC above 3.5ng/ml have been repeatedly documented in people exposed to second-hand marijuana smoke for at least 3 hours. (Rohrich J. J Anal Toxicol 2010; 34(4):196-203).

Long-term effects of prenatal exposure on infants and children: Prenatal exposure to marijuana has been associated with numerous problems in the infant. Infants may have a "high pitched cry" of the type potentially associated with developmental delay. Some research suggests that infants may also have a T-cell immune defect. The developing fetal endocannabinoid system is vulnerable to maternal marijuana. A recent scientific study links fetal exposure to an increased risk for aggressive behavior and attention problems as early as 18 months of age. (Marroun EL. Drug Alcohol Depend 2011; 118(2-3):470-474). The relationship between prenatal marijuana exposure and long-term school achievement has also been examined. As a group prenatally exposed children performed below non-exposed peers on standard intelligence tests at age 6 years, showed attention problems and depression at age 10 years and performed poorly on standardized tests to measure reading, spelling, and mathematics reasoning at age 14 years. (Goldschmidt L. Neurotoxicol Teratol 2012; 34(1):161-167)

Natal Exposure/Breast Feeding: Current evidence indicates that cannabis use during breastfeeding adversely affects the infants' neurodevelopment and impacts neuropsychiatric, behavioral, and executive functioning. The effects on learning and behavior may influence future adult productivity and outcome. Women using cannabis during lactation should be advised about what is known and encouraged to stop using. (Jaques et al, J. Perinatol 2014, doi 10.1038/jp.2013.180)

Accidental intoxication in infants and children: Infants and children may be accidentally exposed to THC through exposure to second hand smoke, volatilization of THC during drying of the marijuana plant (buds) or ingestion of marijuana edibles. In February 2013, the National Institute on Drug Abuse published statistics confirming an increase in marijuana use among teens which is now at a 5 year high. More worrisome is the report by Wang and colleagues in July 2013. Medical toxicologist George Wang and his colleagues at the Rocky Mountain Poison and Drug Center in Denver published a study about pediatric marijuana poisonings. "We are seeing increases in exposure to marijuana in young pediatric patients, and they have more severe symptoms than we typically associate with marijuana," Wang said "We hadn't seen these exposures before the big boom of the medical marijuana industry." At children's hospital there were a total of 1378 patients younger than 12 years evaluated for unintentional ingestions during the retrospective study group from January 2005 to the end of 2011. Of those cases, there were 0 of 790 cases due to ingestion of marijuana prior to the law's change and 14 of 588 cases after the law changed on Sept. 30, 2009. (Wang et al, JAMA Pediatrics. 2013;167(7):630-633).

Abuse of Prescription Opiates (Pain Killers)

Identifying Narcotic Abuse: Signs of Abuse

- The warning signs of addiction to prescription drugs include the following:
- Using more than the recommended amount of the medication
- Using prescription pills prescribed for others
- Complaining of vague symptoms to get more medication
- Lack of interest in treatment options other than medications
- Mood swings
- Seeing several doctors and/or pharmacies to get more pills

Opioids are commonly prescribed for pain-relief and include morphine, tramadol, opium, codeine, hydrocodone, methadone, hydromorphone, oxycodone, and codeine. Prescription pain-killers within this class include morphine, codeine, hydromorphone (Dilaudid), tramadol (Ultram), oxycodone (OxyContin, Percodan, Percocet) and hydrocodone (Vicodin). Opiates also act as depressants. The popular prescribed painkillers are addictive and abusers may exhibit any of the following:

Signs of Addiction

Constricted pupils	Drowsiness & excessive yawning
Lack of energy/motivation	Become more isolated or alone
Skin cool to touch	Itching of face, arms, and body
Ptosis - "on the nod"	Lack of coordination
Slurred, slowed raspy speech	Inability to concentrate
Slow/shallow breathing	Depression, apathy, & withdrawal
Slowed reaction time	Sweating
Impaired mental function and alertness	Dry mouth
Flushing of neck and face	Drooping eyelids

Women are 2-3 times more likely to be prescribed these drugs and are about 2 times more likely to become addicted. Seniors take more of these drugs than the rest of the population, increasing their odds of becoming addicted. However, recent national studies show that the sharpest increase in users of prescription drugs for non-medical purposes is the 12 to 25 year age group. Those who abuse opioids may intensify their experience by taking the drug in ways other than those prescribed. For example, OxyContin is an oral medication but may be snorted or injected, thereby increasing their risk for serious medical complications, including overdose.

Opiate pain relief

Opioids act by attaching to opioid-receptors that are found in the brain, spinal cord, gastrointestinal tract, and other organs in the body. When these drugs attach to their receptors, they block the perception of pain (and cause brain injury, see below). In addition to relieving pain, opioids produce drowsiness, mental confusion, nausea, and constipation. Some people experience a euphoric response to opioid medications, since these drugs also affect the brain regions involved in reward.

Short Term Effects

Short-term administration of prescription drugs produce euphoria, sedation and a feeling of tranquility. Repeated administration rapidly produces tolerance (increasing the dose, reducing intervals between doses or both) and intense physical dependence. Overdose causes respiratory depression. Continued use of opiates makes the body rely on the presence of the drug to maintain rewarding feelings and other normal behaviors. The person is no longer able to feel the benefits of natural rewards (food, water, sex) and cannot function normally without the drug present.

Long Term Effects

Opiates are considered extremely addictive and this addiction affects the structure and function of the brain, especially motivation and emotions. The ways in which the nerve cells communicate are changed because of damage to neurotransmitters and to the shapes of brain cells. The damage alters the way people behave.

Drug interaction poses another risk. If the physician or pharmacist is not aware of everything that a person is taking they may prescribe a medication that will interact with the illicit drug and result in serious side effects. Vitamins and herbal remedies fall into

this category. The combination of alcohol and prescription drugs can affect the central nervous system, leading to respiratory distress or failure, or even death.

Heroin Abuse

Heroin is an opioid drug synthesized from morphine. Heroin may be a white or brown powder or a black sticky substance known as "Black Tar Heroin." The drug can be smoked or vaporized and inhaled, snorted, sniffed (dissolved in nasal spray), or injected. When it enters the brain, it is converted back to morphine and binds to opioid brain receptors, especially those in the pain-perception and reward areas of the brain and in the brain-stem which controls wakefulness, blood pressure and breathing.

Moderate doses of heroin cause euphoria, a warm "rush" sensation, constricted pupils, and nausea. Higher doses result in restlessness, constipation, droopy eyelids (on the nod), shallow and slow breathing, depressed cough reflex, sweatiness, lethargy, slow heart rate, and sedation. Overdose results in respiratory failure and death. The drug is highly addictive and withdrawal symptoms (cold turkey) may begin within 6 to 24 hours of discontinuation of the drug. However, the time frame can fluctuate with the degree of tolerance as well as the amount of the last dose.

Withdrawal symptoms may include sweating, malaise, anxiety, depression, priapism, extra sensitivity of the genitals in females, general feeling of heaviness, cramp-like pains in the limbs, excessive yawning or sneezing, tears, runny nose, sleep difficulties (insomnia), cold sweats, chills, severe muscle and bone pain, nausea and vomiting, diarrhea, cramps, and fever.

Heroin abuse is associated with a number of serious health problems including fatal overdose, spontaneous abortion, and serious infectious diseases (HIV, Hepatitis C, sexually transmitted diseases). Pregnant women who are abusing heroin put the fetus at extreme risk. These problems are discussed in the section on the abuse of prescription-pain-killers.

What Are The Warning Signs Of Heroin Use?

- Lack of personal hygiene
- Tendency toward recklessness
- Withdrawal from family and friends
- Items of value being "lost or stolen"
- Burnt foil being present in car, room, or in personal effects
- Mood swings, intense rage, lying, and manipulation
- Sudden drop in grades and excessive ditching at school
- Finding evidence of prescription drugs
- Scratching hands and arms
- Strong craving for sweets, morning, noon, and night.
- Possession of drug paraphernalia (needles, burnt spoons, cotton balls, pens, cut-off water bottles, foil)
- Foil & toilet paper rolls are commonly used to smoke heroin

What Are The Physical Signs Of Heroin Use?

- Runny nose and constant sniffing
- Needle marks on arms and/or legs, between toes, in groin area
- Soars on nostrils and top of lips from smoking heroin
- Constant "hacking" cough from smoking heroin off of tin foil
- Loss of appetite and dramatic weight loss
- Nodding off during day and inability to sleep at night
- Dark circles under eyes and constant sleepy or groggy expression

Heroin use during pregnancy and the effect on the fetus, newborn and child

Heroin abuse during pregnancy and its associated environmental factors have been associated with poor fetal growth, premature delivery, premature rupture of membranes, still birth and low birth weight (an important risk factor for developmental delay). Blood tests at birth have shown the infant's blood levels to be 50% - 100% of the mother's drug level. Using heroin also raises the baby's risk of

contracting the HIV virus. Babies born to mothers using heroin while they are pregnant inherit their addiction and upon birth must go through withdrawal and treatment of withdrawal.

Low birth weight Babies born to addicted mothers have been shown to have many difficulties later in life, including:

- Language, visuo-motor, and other learning disabilities
- Behavior problems
- Children are more likely to be rejected by peers
- Performance in school may suffer and the children may need special education courses
- Behavioral problems with hyperactivity and short attention span
- The need for foster care placement

Treatment of opiate overdose of prescription drugs and heroin

Opioid-related disorders that require medical management include opioid intoxication, opioid overdose, opioid withdrawal, and treatment of acute pain in people already on maintenance therapy. Short-term and long-term treatment includes a combination of opioid agonist therapy (substituting one drug for another) and psychotherapy.

Deaths from abuse and overdose of these substances are becoming more and more common, especially among women and adolescents. Excessive doses, whether taken by mouth or injection, result in respiratory depression and asphyxiation. In this situation, rapid emergency treatment is imperative. Because overdose usually occurs in the presence of other people and because medical care is often not sought or sought too late, at-home naloxone programs have been piloted and have been found to save lives. Naloxone prescription programs enable users to have kits on hand to administer intranasal naloxone to reverse the effects of narcotics.

For most addicts long-term treatment begins with detoxification, the controlled and medically supervised withdrawal from the drug. No single approach to detoxification is guaranteed to be best for all addicts. Medications used to detoxify the addict include methadone and buprenorphine or buprenorphine combined with naloxone (Suboxon®). Suboxone is often favored since abuse of this medication will cause withdrawal symptoms that addicts are trying to avoid. Maintenance medications used along with counseling include methadone, buprenorphine, or Suboxone or extended release naltrexone injections. Most addicts will resume taking the drug unless treatment includes long-term psychotherapy.

Opioid withdrawal in the adolescent

Withdrawal symptoms may occur even after short-term use. The symptoms are notoriously challenging and mild symptoms may mimic the flu. The process can be brutally painful and difficult to manage. Depending on the quantity, type, frequency, and duration of opioid use, the physical withdrawal symptoms may last for as little as 48-72 hours (for short-acting opioids such as hydromorphone and oxycodone) and as long as 30-60 days for long-acting opioids such as buprenorphine and methadone.

Symptoms of withdrawal from opiates include, but are not limited to:

Physical Symptoms	Behavioral Symptoms
Tremors	Dysphoria
Cramps	Malaise
Muscle and bone pain	Cravings
Chills	Anxiety/Panic attacks
Perspiration (sweating)	Paranoia
Priapism	Insomnia
Tachycardia (rapid heartbeat)	Depression
Itch	Flu-like symptoms

Pre-birth exposure to opiates and effects on the newborn

About 4%-10% of women admit taking opiates while pregnant, resulting in more than 500,000 newborns annually exposed to these drugs. The number of babies born with drug withdrawal symptoms tripled from 2000 to 2009 and hospital charges for their care increased from \$190 million to \$720 million. Fluctuations in an expectant mother's daily opiate use, because of voluntary abstinence or lack of access to the drug, may affect the fetus. Abrupt changes can precipitate the Fetal Abstinence Syndrome and increase the risk of premature delivery, low birth weight, and stillbirth.

Exposure to opiates decreases birth weight, birth length, and head circumference, but has not been associated with congenital malformations. Other associated problems include abnormally high muscle tone (stiffness and rigidity), inconsolability, irritability, sneezing, stuffiness, excessive sucking, poor sucking ability, Sudden Infant Death Syndrome (SIDS) and high-pitched cry. The high-pitched cry may signify a brain abnormality.

About 30% of exposed newborns are born prematurely and have a high mortality rate, either as a result of drug exposure, mother not taking care of herself or a combination of both. Babies may be born addicted to opiates (neonatal abstinence syndrome) and require treatment within the first few weeks of life. Methadone may be prescribed to pregnant women to facilitate withdrawal from opiate addiction and safe guard the newborn infant. Unfortunately, chronic use of methadone also results in neonatal addition and withdrawal problems. Methadone withdrawal may be more severe than withdrawal from heroin or narcotic pain-killers. Buprenorphine may be used to prevent the infant's withdrawal. Although withdrawal from buprenorphine may occur, the symptoms are very mild.

Naloxone (an opiate blocker) is given immediately after birth to any infant born to a mother who is known to be using opium, heroin, methadone, or hydrocodone. However, the mother's drug history may not be known until the infant develops symptoms after birth. Symptoms may start as early as 1 day or as late as 7 days after birth. Symptoms include tremors, irritability, sleep problems, seizures, yawning, stuffy nose, sneezing, unstable temperature, poor feeding, vomiting, and diarrhea.

Treatment includes keeping the infant swaddled and in a quiet, dark room, but most babies need medications. Morphine elixir and phenobarbital are the most commonly used drugs. Treatment may be required for 1-2 weeks or longer.

Mothers who are taking opiates should not breast-feed their infant.

Pre-birth exposure and the long-term consequences for older children

Children whose mothers used opiates during pregnancy have on-going neuro-developmental problems including short attention span, hyperactivity, sleep disturbances and mild memory and perceptual difficulties. Some studies have found evidence of delayed general cognitive function at 3 years of age with lower verbal ability, impaired reading skills, and impaired arithmetic skills. Opiate-exposed children are more likely to have ADHD or other disruptive behavior diagnoses at 10 years of age and 65% of opiate-exposed school age children repeat one or more grades or need special educational services. It is difficult to differentiate the impact of a poor postnatal environment and prenatal opiate exposure on children's long-term outcome and studies of prenatal opiate exposure and infants' early cognitive development yield mixed results. However, there is solid evidence linking exposure to behavioral problems, including ADHD and other disruptive behaviors. Long-term effects on growth have not been documented. (Pediatrics, Feb 2013)

Cocaine

Cocaine is a powerfully addictive drug. Once having tried cocaine, an individual may have difficulty controlling the extent to which he or she will continue to use the drug. Cocaine produces intense euphoria and alertness, makes users feel more energetic, and reduces hunger. Cocaine's effects appear almost immediately after a single dose and disappear within a few minutes or hours. Psychological effects include feelings of well-being and a grandiose sense of power and ability mixed with anxiety and restlessness. Some users find that the drug helps them to perform simple physical and intellectual tasks more quickly, while others experience the opposite effect. As the drug wears off these temporary sensations of mastery are replaced by intense depression. The abuser will then "crash", becoming lethargic and typically sleeping for several days.

The duration of cocaine's immediate euphoric effects depends upon the route of administration. The faster the rate of absorption, the more intense the high, but the duration of action is shorter. Smoking crack is very addictive and has a very intense high, but the high only lasts 5 to 10 minutes.

The short-term effects of cocaine include:

Physiologic (Functional) Changes

Changes in Appearance

Increased energy	Cold sweats
Decreased appetite	Convulsions
Increased alertness	Swelling and bleeding of gums
Increased heart rate	Restlessness and anxiety
Increased blood pressure	Damaged nasal cavities
Constricted blood vessels	Vomiting
Elevated temperature	Malnutrition and weight loss
Feelings of strength & power	Dilated pupils
Euphoria	
Excitement	

The long-term effects of cocaine include irritability, mood disturbances, restlessness, paranoia, and auditory hallucinations. Tolerance to cocaine may develop and addicts report that they do not experience as much pleasure with repeated doses as they did from their first dose. Users can become “sensitized” to the drug and develop seizures after taking their usual dose of cocaine. “Sensitization” may explain why some deaths occur after apparently low doses of cocaine.

Cocaine indicators:

- Dry mouth
- Runny nose/ nosebleeds
- Dilated pupils
- Excited and talkative
- Increased alertness and self-esteem
- Increased physical activity
- Difficulty in concentrating
- Visual impairment
- Mood swings
- Compulsive behaviors (repeated hand washing, teeth grinding)
- Restless and aggressive behavior
- Agitation and combativeness
- Paranoia and hallucinations

Medical complications of cocaine use

There are enormous medical complications associated with cocaine use. The risk of heart attack is increased by a factor of 24 during the 60 minutes after the use of cocaine, unrelated to the amount ingested. Up to 25% of patients seen in Emergency Rooms for evaluation of chest pain have detectable amounts of cocaine in the urine. Heart attack is a known complication.

Different routes of cocaine administration can produce different adverse effects. Regularly snorting cocaine can lead to loss of sense of smell, nosebleeds, problems with swallowing, hoarseness, and an overall irritation of the nasal septum. Ingested cocaine

can cause severe bowel gangrene due to reduced blood flow to the intestine. Persons who inject cocaine have puncture marks and "tracks" most commonly in their forearms and are at high risk of infection.

There is a potentially dangerous interaction between cocaine and alcohol. Taken in combination the two drugs produce a sense of increased and prolonged euphoria. However, they are converted in the body to cocaethylene. Cocaethylene has a longer duration of action and is more toxic than either drug alone and in some people may cause severe heart and liver problems.

Withdrawal

There are no visible symptoms associated with cocaine withdrawal. Users do not experience vomiting or shaking, but will have intense cravings for the drug, irritability and delayed depression. About half the cocaine addicts have an underlying mental health disorder, e.g. ADD or depression, and the symptoms of these disorders are worse with withdrawal.

Effects on the fetus

Cocaine has devastating effects on the fetus. The exposed fetus does not grow appropriately, is born prematurely, and is likely to have problems related to blockage of blood vessels: stroke, intestinal perforation or blockage or limb abnormalities. Addicted mothers are at risk of rupturing their uterus at the time of delivery. Older children typically have behavioral problems, poor alertness, poor orientation, irritability, and symptoms of ADHD with prominent oppositional-defiant behavior.

Methamphetamine

Methamphetamine addiction is gripping the Nation. There are at least 1.5 million addicted users in the US. The "Monitoring the Future" survey of student drug use reports 4.5 % of high school seniors had used meth in their lifetimes, 4.1% of 10th graders, and 3.1% of 8th graders.

Methamphetamine is a very strong central nervous system stimulant that affects dopamine release in the brain. Its use fires up the central nervous system, constricts blood vessels, dilates the pupils and increases body temperature, heart rate and blood pressure. The user is put in a state of constant fight or flight. Dealing with someone high on meth is very dangerous. One hit of meth can keep the user high for 12 to 24 hours.

Methamphetamines may be smoked, snorted, injected or ingested. An intense rush (flash) appears immediately after smoking or injecting the drug. The flash is extremely pleasurable but lasts only a few minutes. Snorting or ingesting the drug results in euphoria without a flash, starting 3-5 minutes after taking the drug and lasting 15-20 minutes.

Indicators of methamphetamine use

Dry Mouth	Exaggerated reflexes and tremors
Dilated pupils	Increased alertness and self-esteem
Profuse sweating	Hyper-excitability, restlessness
Excited and talkative	Panic and anxiety
Rapid respiration	Agitation and combativeness
Loss of appetite	Paranoia, hallucinations and depression
Inability to sleep	

Drug Effects

The short-term effects of the drug are increased wakefulness and increased physical activity, decreased appetite, increased libido, rapid heart rate, increased blood pressure and hyperthermia (elevated body temperature). Death may occur as a result of hyperthermia, convulsions or cardiac arrest. Long-term effects are psychosis, paranoia, hallucinations, repetitive motor activity, loss of memory, aggressive or violent behavior, severe dental problems and weight loss. Methamphetamine has become highly associated with risky sexual behavior, increasing the risk for contracting hepatitis B or C and HIV.

Complications

The major complication of meth addiction is the devastating effect the drug has on the addict and his/her friends/family. Rarely does the addict return to being the person he/she was before exposure to meth. Meth has been associated with 2 major cardiovascular problems: heart attack and aortic dissection (tearing).

Withdrawal

The symptoms of methamphetamine withdrawal are primarily fatigue, depression and increased appetite. Symptoms may last for days with occasional use and weeks or months with chronic use. The severity is dependent on the length of time and the amount of methamphetamine used. Withdrawal symptoms may also include anxiety, irritability, headaches, agitation, excessive sleeping, vivid or lucid dreams, and suicidal ideations.

Effects on Infants and children

Methamphetamines damage the fetus resulting in permanent brain abnormalities with subsequent delay in language skills and aggressive behavior. The newborn is often born premature and small for gestational age. At the time of birth there may be placental abruption and the mother is at risk of rupturing her uterus. Infants exposed to prenatal meth also have poor suck, smaller head size, shorter length and more often require intensive care. Prenatal exposure leads to future self-control problems in early school-age children, including poor attention, poor self-regulation skills, and poor problem solving skills; all due to changes in the frontal cortex of the brain. Long-term medical research studies regarding growth are ongoing, however poor growth through 3 years of age has been documented. Laboratory studies have shown that meth impairs mineral uptake in the developing cartilage thus affecting growth. Poor growth may also be associated with the effects meth has on the mother including hypertension and placental abnormalities. Meth-mothers more often have psychiatric/emotional problems and these infants/children are more likely to be abused or neglected.

Drug Testing

Detection in urine:

Drugs have certain "detection windows" meaning the amount of time after ingestion that evidence of their use can be detected by a drug test. Alcohol is absorbed and eliminated more quickly than other drugs; therefore, many employers have post-accident testing procedures that require testing for alcohol to occur within two hours of the incident. Other drugs are eliminated from the body at different rates and thus detectable for different periods of time, often long after the drug's effect has worn off. The following are estimates of the length of time that certain drugs are detectable:

- Alcohol – 2-12 hours
- Amphetamines/Methamphetamine – 2-3 days
- Adderall / Ritalin – 2-5 days
- Bath salts – 4-7 days
- Barbiturates – 2-10 days
- Benzodiazepines – 1-6 weeks
- Cocaine – 2-10 days
 - Benzoylcegonine - 2-4 days
 - Heavy use - up to 10 days
- Codeine – 2-4 days
- Ecstasy (MDMA) – 2-3 days
- Heroin - 1-3 days
- Morphine – 2-3 days
- LSD – 8 hours
- Marijuana
 - 1 time only – 5-8 days
 - 2-4 times month - 11-18 days
 - 2-4 times week – 23-35 days

- 5-6 times week – 33-48 days
 - Daily use – 49-90 days
- Methadone – 2-3 days
 Phencyclidine (PCP) – 1 week
 Prescription Opiates – 3-5 days
 Suboxone – 2-7 days
 Synthetic Pot (K2 / Spice) – 4-7 days

**OxyContin and other prescription opiates will not show up in a regular urine tox! You need to request the urine be quantified or request a five panel opiate test.*

Ways to cheat/beat drug tests

When something is at stake, people will find a way to cheat the system and drug testing is no different. It is important to know what your drug-testing agency provides. Do they watch someone urinate? Do they allow people to bring their urine to a designated location? Do they test the temperature or the urine? What drugs are in the panel they are using? What type of testing are they doing: blood, urine, oral swab, hair sample, saliva test? What are the parameters of the different tests? (Know oral swabs can be blown up by washing your mouth out with hydrogen peroxide before they swab. Hair sampling is a 90-day window of exposure; it does not tell you if the person is currently under the influence). Do they test for human antigens? Knowing all the parameters of the drug-testing agency can lessen the possibility of someone cheating the test.

Here are some of the most common ways people try to cheat drug tests:

1. The whizzinator – a pouch with straps and a small hose that clamps off. People will put someone else’s urine in the pouch, strap it to their thigh, and wear it for 2-3 hours before the test. This gets the urine in the pouch to the same body temperature of the person. Then if no one watches them fill the cup, they can loosen the clamp, make dribbling sounds, and then re-clamp it off.
2. Elmer’s glue bottle – similar idea to the whizzinator above. The can leave the twist lid on, or take it off and attach small tubing to the top and clamp the tubing off. They put someone else’s urine in and strap it to their leg for 2-3 hours before the test. They can then squeeze the urine out, or open the clamp and release the urine.
3. Males will put someone else’s urine in small glass vials and roll it up under their scrotum. Sometimes they will tape it to get to body temperature; sometimes they do it right before they get to the collection site. If they are not watched or checked, the urine can easily be substituted for their urine.
4. Females will fill balloons with someone else’s, and insert them up their vagina for a couple hours. This gets the urine to match their body temperature, and they can pop the balloon releasing the urine.
5. Females take small thin prescription drug vials, put a hole in the lid, and cover it with duct tape. They fill the vial with someone else’s urine and insert it up their vagina. It gets to temperature, they pull off the tape, and the urine dribbles out.
6. Detox drinks – these drinks are sold at vitamin stores (GNC, Vitamin Shoppe, etc.), online, in smoke shops, and in marijuana dispensaries. Majority of the time they do not work, and some drug testing agencies can test for the flushing agents. The testing agencies will list the flushing agents and state the sample is “dilute” which is considered a positive test.
7. Powdered and synthetic urine – these products are sold in smoke shops, marijuana dispensaries, and online. Some synthetic urine products come with their own small heating pad to put the bottle in. It heats the liquid to body temperature. If the drug testing agency tests for human antigens this will easily pop up as non-human, and some agencies will list the urine is synthetic.
8. Cranberry and Niacin pills – this seems to be working. People take high doses of cranberry pills and niacin alternating every 3 hours. Both can legally be purchased anywhere vitamins are sold (pharmacies, vitamin stores, grocery stores, drug stores, and health food stores).

Drug Paraphernalia

Most people consider drug paraphernalia to be pipes, bongs and syringes, but it can be many things. It can be ordinary items used to disguise or hide the drug or things used to consume the drug. Aluminum foil, small ziplock baggies, pill bottles, spoons, film canisters, cigarette packs, hide-a-cans, makeup kits, gum wrappers, mint tins, liquid breath mint containers, or small glass vials are

types of paraphernalia. Parents need to be aware that these kinds of things are either used to conceal the drug or a way of using the drug. Paraphernalia means drug user.

The following is paraphernalia associated with the use of specific drugs:

Ecstasy:

- pacifiers, lollipops, mouth guards for grinding of the teeth
- glow sticks, surgical masks and mentholated rubs to over stimulate the senses
- water bottles used to bring in alcohol or liquid drugs like GHB, LS

Cocaine:

- glass pipes for smoking crack
- small mirrors and razorblades, rolled dollar bills or cut straws for snorting
- spoons and lighters, syringes, turnicate, cotton pieces

Heroin:

- kits containing – spoons, bottle caps, lighters, syringes, turnicate, cotton pieces, small baggies
- balloons, baggies, burnt aluminum foil, burnt spoons, bottle caps
- scales, razor blades with powder residue, cut straws, needles

Marijuana:

- rolling papers, small baggies, stash cans, film canisters, tins and roach clips
- deodorizers, incents, potpourri to disguise or mask the odor of marijuana
- pipes –metal, colored blown glass, ceramic large bong
- brown dryer sheets – kids' stuff them in an empty TP roll and exhale smoke into it

Methamphetamine:

- small plastic baggies
- small cosmetics bags (to keep paraphernalia in)
- pocket knives
- Q-tips
- Cut straws
- Pocket torches
- Glass pipes
- Razor blades
- Mirrors

Inhalants:

- tubes of modeling glue or super glue
- empty spray cans, small CO2 cartridges
- plastic & paper bags, balloons, tops cut off of liter bottles
- bottle or cans with pens or tubing punctured in the sides

Things used to cover up the use of drugs:

- mouthwashes, breathe sprays, mints
- eye drops to conceal bloodshot eyes
- breathe mint droppers and eye drop containers to conceal LSD and GHB
- wearing sunglasses at inappropriate times

Behaviors

People's behaviors and personalities change when things are happening in their lives, if someone is going through a divorce or breakup, a child is ill, a family member passes away, they lose their job, etc. Supervisors and employers need to be able to determine if it is a personal issue, a bad day, or possible substance abuse. The same goes for your children. Is your kid just having a bad day at school, or fighting with a friend, or is something else going on? When you notice behavioral changes in your child, you want to be able to identify if it is adolescent stress or typical growing pains or is it something else like drug use. When you are trying to figure out what your child has been up to it is important to use and trust your senses.

What do you see? Look at the person. Are their eyes red and having problems focusing? They may have been drinking. Are their pupils dilated or constricted? Are they agitated? Are they breathing normal? Is there a strange burn on their mouth or fingers? That could signify smoking something through a metal or glass pipe, or they are huffing Dust Off. Have they developed nosebleeds? This can be indicative of cocaine use. Are they wearing long sleeves even in the middle of summer? This is a way to hide track marks from intravenous drug use.

What do you smell? Marijuana, cigarettes, Inhalants (chemical odor), and alcohol all have tell tale odors. Whether you notice the odor on the breath or clothes, it is a reason to be alarmed; for teens, simply being around others who drink or smoke makes it more likely your child will try it. Do not be afraid to follow your nose. Excessive "pleasant" smells, like breathe mints, heavy perfumes, laundered clothing (for a child who never does their own wash) can be telltale signs of them trying to cover up or mask odors. If you have teenagers, make sure you look in, and smell, their car – the smell of stale beer and marijuana can linger in the upholstery.

What do you hear? Listen to the clues the person is giving you by the things being said, the things they laugh at or the fact they may not be saying anything at all. Silence can speak volumes about something going on in the person's life. By listening, over time you will be able to identify which behaviors are the results of bad days, mood swings or something more serious. Are they slurring their words? Are they speaking low and raspy or high pitched and fast? Are they able to follow the conversation? Are they taking a long time to answer? By using all your senses along with your gut instinct, you will be able to determine certain behavior as typical or indicative of drug use.

Other signs that may indicate drug use:

- Stories do not add up and social circles change
- Schoolwork goes downhill
- Increased lying and stealing

Resources:

Urban Dictionary is an app for smart phones, tablets and computers and is useful for defining drug related words and street terms. After entering a term or word, if the word is part of the drug-jargon, the meaning will pop up within the top 3 responses and give all details about the word or terminology. <http://www.urbandictionary.com/>

EcstasyData.org is an independent laboratory pill testing program run by Erowid Center, and co-sponsored by Dancesafe and Isomer Design. Launched in July 2001, its purpose is to collect, review, manage, and publish laboratory pill testing results from a variety of organizations. <https://www.ecstasydata.org/>

Feel free to contact Katie Wells, Manager of Adolescent Substance Use Disorder Programs for the Division of Behavioral Health, Substance Use Disorders Section, at (303) 866-7501 or by email katie.wells@state.co.us. Website for treatment: www.linkingcare.org

Phoenix Multisport fosters a supportive, physically active community for individuals who are recovering from alcohol and substance abuse and those who choose to live a sober life. Through pursuits such as climbing, hiking, running, strength training, yoga,

road/mountain biking, socials and other activities, we seek to help our members develop and maintain the emotional strength they need to stay sober. **Scott Strode, Director** <http://www.phoenixmultisport.org/> Multiple Locations:

- Denver - 2233 Champa, Denver, CO, 80205 #720-440- 9175
- Colorado Springs - 218 W Colorado Ave, Suite 102 Colorado Springs, CO, 80903 #719-434-3387
- Boulder 4735 East Walnut, Suite C Boulder, CO, 80301 # 303-440-0547

Rocky Mountain Counseling and Wellness Center provides a number of affordable services including Individual, Couples, Family Counseling, Group Therapy, Life Coaching, and more. Heidi Trescott worked at a psychiatric hospital for children. Heidi.truscott@gmail.com 720-663-7459 www.rmwcw.com

National Registry of Evidence-Based Programs and Practices - a searchable online registry of more than 160 interventions supporting mental health promotion, substance abuse prevention, and mental health and substance abuse treatment <http://nrepp.samhsa.gov/>

National Institute on Drug Abuse, the Science of Drug Abuse and Addiction. This site contains research about substance abuse and addiction. <http://www.drugabuse.gov/>

Substance Abuse and Mental Health Services Administration, Helpful site for both Substance Abuse and Mental Health www.samhsa.gov

Dr. Christian Thurstone is one of fewer than three dozen physicians in the United States who are board certified in general, child and adolescent and addictions psychiatry. He is medical director of one of Colorado's largest youth substance-abuse-treatment clinics and an associate professor of psychiatry at the University of Colorado Denver, where he conducts research on youth substance use and addiction. <http://drthurstone.com/>