***New Trends in Substance Abuse***

***Parent handout 2017***

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**Indicators of Drug or Alcohol Abuse or Misuse:**

**Behavioral Physical**

* Abnormal behavior - Breath or body odor
* Exaggerated behavior - Lack of coordination
* Boisterous or argumentative - Uncoordinated & unsteady gait
* Withdrawn - Unnecessary use of arms or supports for balance
* Avoidance - Sweating and/or dry mouth
* Changing emotions & erratic behavior - Change in appearance

**Speech Performance**

* Slurred or slow speech - Inability to concentrate
* Nonsensical patterns - Fatigue & lack of motivation - Confusion - Slowed reactions - Impaired driving ability

# *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

# *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 Edrops, 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 cancercausing 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 Ecigarettes 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. Hazards of smoking large amounts of propylene glycol are not known. Propylene glycol is considered safe to consume in small quantities by the Food and Drug Administration (FDA), but little to no data on it when in vapor form in the lungs.

There are over 7,000 e-cigarette flavors currently marketed, and hundreds of brands. A new study released in December or 2015 by the Harvard School of Public Health found some concerning chemicals in these e-drops.Their objective was to determine if the flavoring chemical diacetyl, and two other high-priority flavoring chemicals 2,3-pentanedione, and acetoin, are present in a convenience sample of flavored e-cigarettes. What they found was more than 75% of flavored electronic cigarettes and refill liquids tested by researchers contained Diacetyl. Diacetyl is a flavoring chemical linked to cases of severe respiratory disease. The chemical gained notoriety in the early 2000’s when inhalation exposure of the flavoring chemical diacetyl was found to be associated with a disease that became known as “Popcorn Lung.” Two other potentially harmful related compounds were also found in many of the tested flavors, which included varieties with potential appeal to young people such as Cotton Candy, Fruit Squirts, and Cupcake.

E-cigarettes and hookah pens can also be used to smoke Marijuana concentrates, (known as hash, wax, oil, shatter, and dabs), “bath salts” and other drugs. In March of 2016, the FDA announced they are banning these for everyone under the age of 18. They will be controlled like cigarettes. ***Teens get charged with possession of paraphernalia which can show up on their background if colleges or businesses check it. If the also get suspended, that will appear as well.***

JUUL vapes and JUUL pods are extremely popular with teens. They have a sleek design that allows them to vape during classes, because they can be hidden within a closed fist. The pods are traded and sold on school property. The pods are sold filled with a proprietary blend that contains nicotine. ***The nicotine in each pod is equivalent to 1 pack of cigarettes. These are illegal on school property!***

**Dextromethorphan –DXM (Robo-Tripping*)***

Users 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, and pill forms. These powders can be snorted, smoked or injected. Five recent deaths have been reported from abusing the powder. 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. People are concentrating down the liquid resulting in a gooey substance that they smoke on aluminum foil, or put into capsules, then the user acts like they are on PCP. 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:

Impaired judgment and mental functioning Paranoia

Loss of coordination Panic or anxiety attack

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| --- | --- |
| Visual and auditory hallucinations | Sweating |
| Lethargy | Hyperactivity |
| Nystagmus (rapid eye movement) | Rashes, red blotchy skin |
| Tachycardia (racing, pounding heart) | Euphoria |
| Slurred speech | Confusion |
| Hot flashes – leading to hyperthermia | Numbness in fingers and toes |
| Increase heart rate and blood pressure | Nausea & vomiting |
| Seizures | Tactile hallucinations |
| Dissociative state | Altered perception of time |
| Visual disturbances | Feelings of floating |
| Sensitive to light | “Horrible Feeling” |

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

# 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 cannabinol (CBN), delta-9 tetrahydrocannabivarin (THCV), cannabigerol (CBG), cannabadiol (CBD), delta- 9 tetrahydrocannabinolic acid (THCA) and cannabadolic 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 C*annabis indica* (more CBD, less THC).

## *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, honey oil, THC oil, wax, dabs, shatter, BHO) has become very popular. THC is extracted from the plant buds by using butane or other chemicals. These products are extremely potent and can be 75-99% THC. The extract may be a brownish tan liquid. It can be thickened into a gooey substance which is a brownish tan or yellowish 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. Butane extraction is volatile and has caused vapes to blow up if the butane is left in the product. There is a new “wax” on the street that is translucent (it looks like a blob of super glue) and is 98% THC. The edibles contain the potent THC oil. THC oil can be mixed with butter, known as “buddah” on the street, and is used to make marijuana edibles: cookies, cakes, brownies, pies, yogurt, ice cream, chocolates, etc.

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. Adderall pills ( ADHD pills known as Addy’s on the street) is being crushed and sprinkled onto joints and then smoked. Street name is “god mode” or “madderall.” When smoked users get extremely agitated and aggressive or paranoid with anxiety issues.

*Indicators of marijuana use:*

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| --- | --- |
| Relaxed inhibitions | Difficulty concentrating |
| Errors in judgment | Distorted perception of time |
| Distinct odor of marijuana | Impaired memory and attention |
| Lack of motor coordination | Rapid heart rate and high blood pressure |
| Loss of eye convergence | Lack of motivation |
| Irritated mucous membranes | Dry mouth |

*Indicators of Edibles consumed by young kids:*

* Lack of coordination, unsteady gait
* Dizziness
* Increased blood pressure and pulse rate
* Dry mouth
* Confusion, lack of focus
* Sleepy, lethargic, lack of activity
* Slowed breathing



### 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
* Agitation and aggressive behavior
* 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