Street Drugs Overview and Effects on Pregnancy
Part 2

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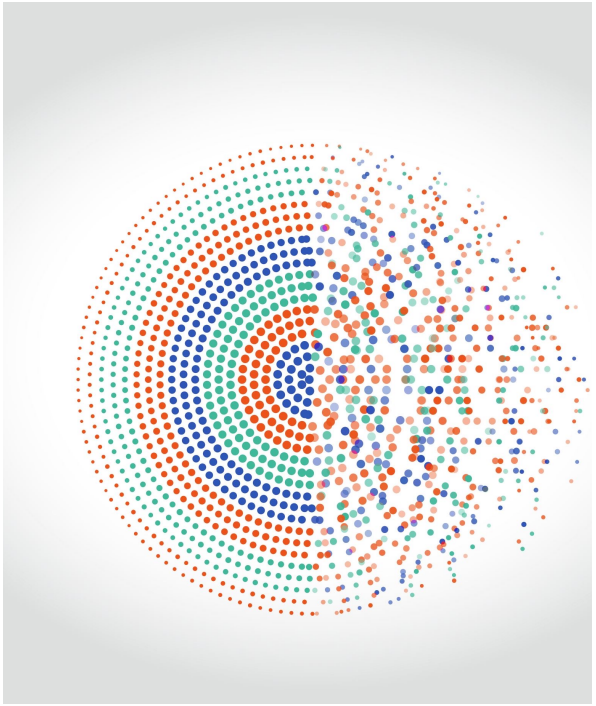


"Street Drugs"

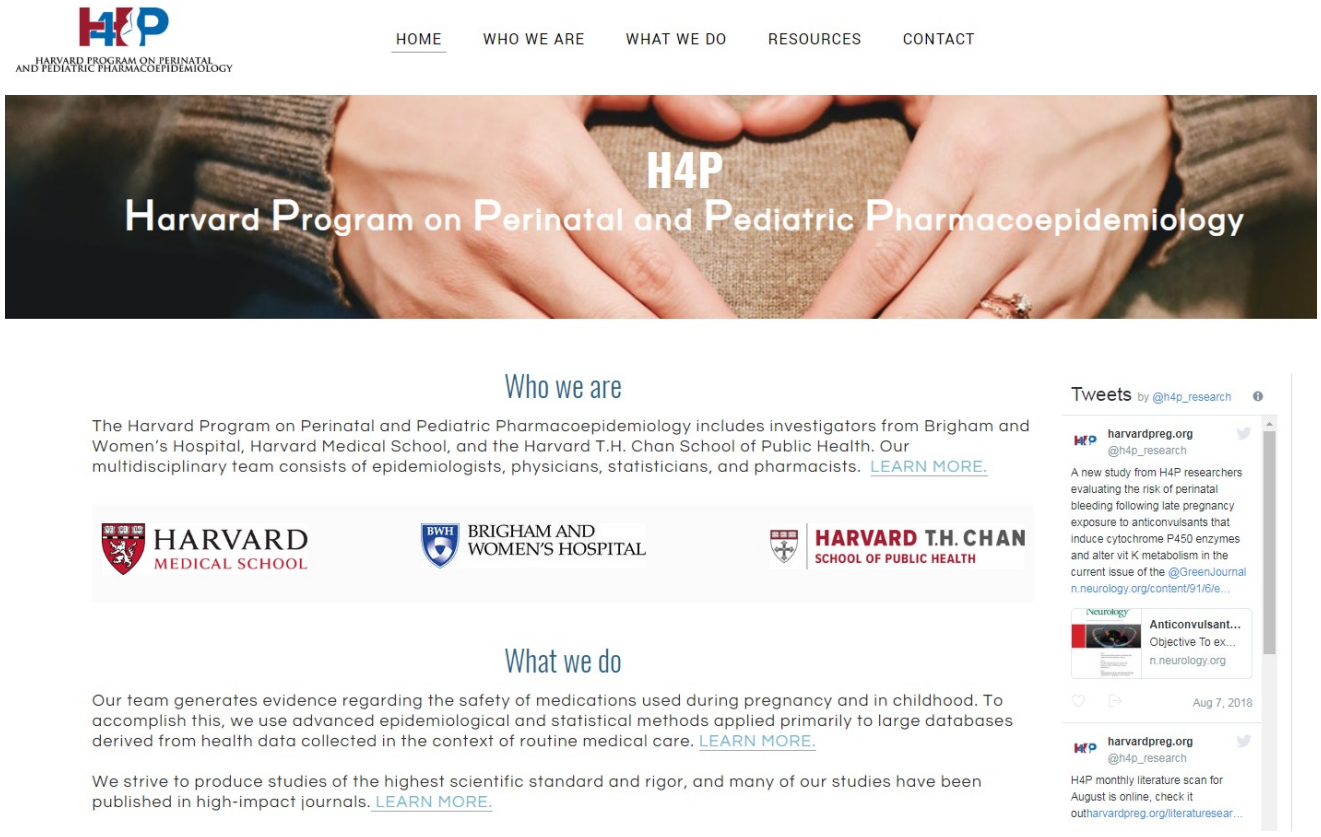
- Delta 8 THC
- Alcohol
- Amphetamines
- Bath Salts
- Black Mamba
- Benzodiazepines
- Caffeine Pills and Drinks
- Cannabis Leaf, Oil, Dabs
- Cocaine
- Counterfeit Drugs
- Date Rape Drugs: GHB and Rohypnol
- DXM
- Fentanyl
- Flakka
- Gas Station Drugs
- Heroin
- Imodium
- Inhalants
- Khat
- Kratom

"Street Drugs"

- Ketamine
- Krokodil
- LSD
- MDMA
- Mescaline
- Methadone
- Methamphetamine
- Methylphenidate
- Magic Mushrooms
- Opioids
- Peyote
- Pink
- Poppers
- Pseudoephedrine
- Salvia
- Synthetic Marijuana
- Tianeptine
- Tobacco/Nicotine
- Vaping and the Brain

Harvard Program on Perinatal and Pediatric Pharmacoepidemiology

www.harvardpreg.org



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Funding:
NIMH, NICHD, NIDA
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Research Activity:
>50 Publications
Book Chapters
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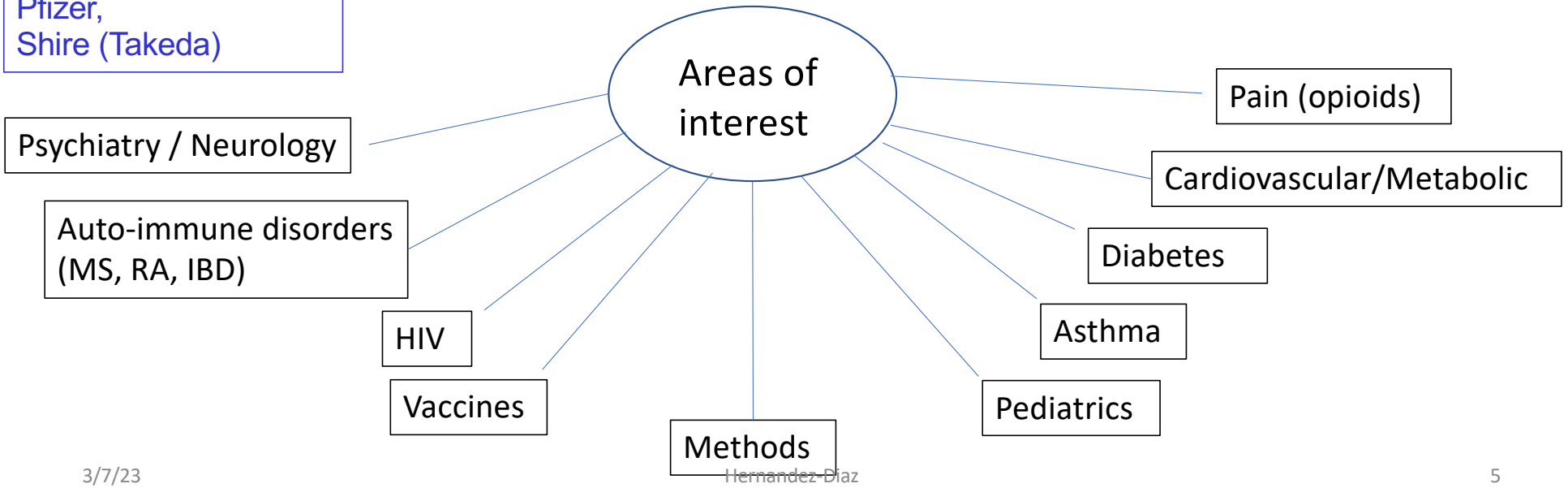

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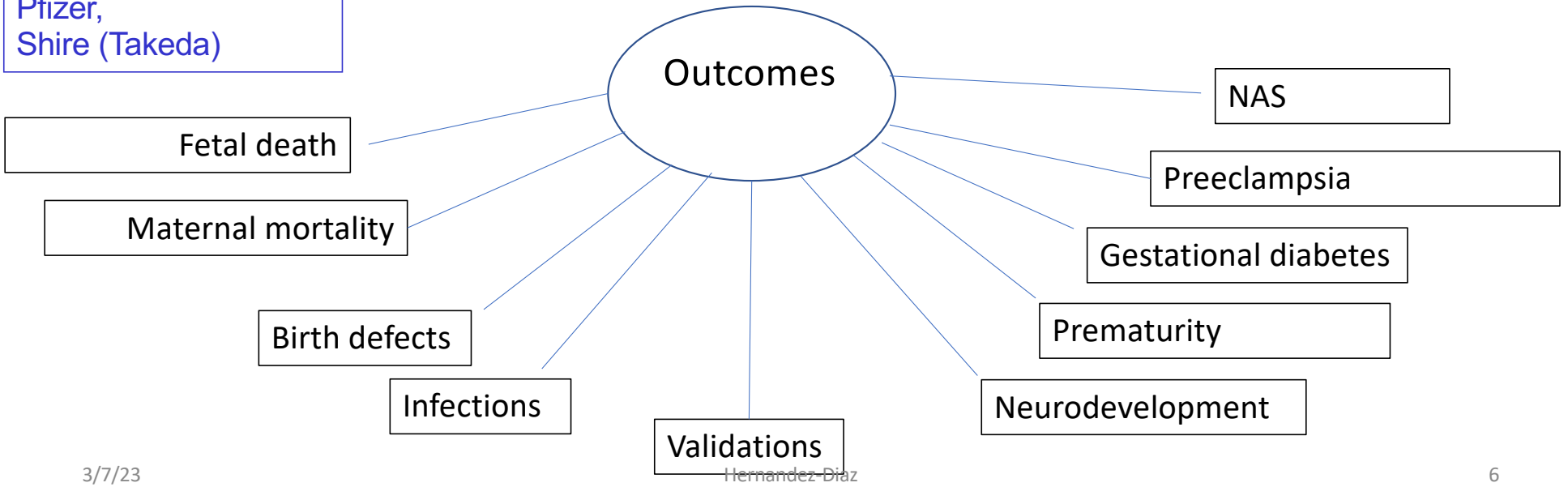

Cannabis

What is Cannabis (Marijuana)?

Cannabis is a plant that has three varieties:

- C. Sativa (hemp)
- Indica (grown in India – higher THC)
- Ruderalis (grown in Northern Europe and Asia – low potency)

There are over 80 known active ingredients in cannabis, known as cannabinoids

- Most common cannabinoid: delta-9-tetrahydrocannabinol (THC)

Cannabis Short-Term Effects

Positive

- Euphoria
- Relaxation and stress reduction
- Increased awareness of senses
  - Eating, drinking, and smelling are enhanced

Negative

- Nausea and dizziness
- Coughing, asthma, and difficulty breathing are associated with smoking cannabis
- Mild to severe anxiety
- Paranoia
- Confusion
- Headaches

Cannabis Long-Term Effects

- Mental health problems
- Chronic cough
- Reoccurring respiratory infections
- Memory loss/impairment

Cannabis Withdrawal Effects

Withdrawal occurs with abrupt discontinuation after heavy usage

Sleep disturbance

Restlessness

Nausea

Reduced appetite

Irritability

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Medical Cannabis

- Cannabis has many possible medical uses.
- Positive effects are claimed for ailments such as cancer and HIV.
- HIV can cause a loss of appetite known as the "wasting syndrome" which can lead to drastic weight loss and weakness.
- Chemotherapy used in the treatment of cancer causes nausea resulting in an inability to keep down food.
- Cannabis for these two illnesses is a result of its ability to increase a person's appetite as well as relieving nausea allowing a patient to regain weight.

Drug Testing for Cannabis

- Cannabis, the most commonly used illicit drug, can be detected for prolonged periods after regular use.
- The active principle of marijuana, tetrahydrocannabinol (or THC) has high lipid solubility.
- The THC that is stored in fatty tissue gradually reenters the bloodstream at very low levels, permitting metabolism and eventual excretion.
- THC is metabolized extensively in the liver.
- The window of detection is highly dependent on the quality of the marijuana, the individual's body fat content and metabolism, chronicity of use, the individual's state of hydration when the urine sample is collected, and the cutoff used by the laboratory.

Drug Testing for Cannabis

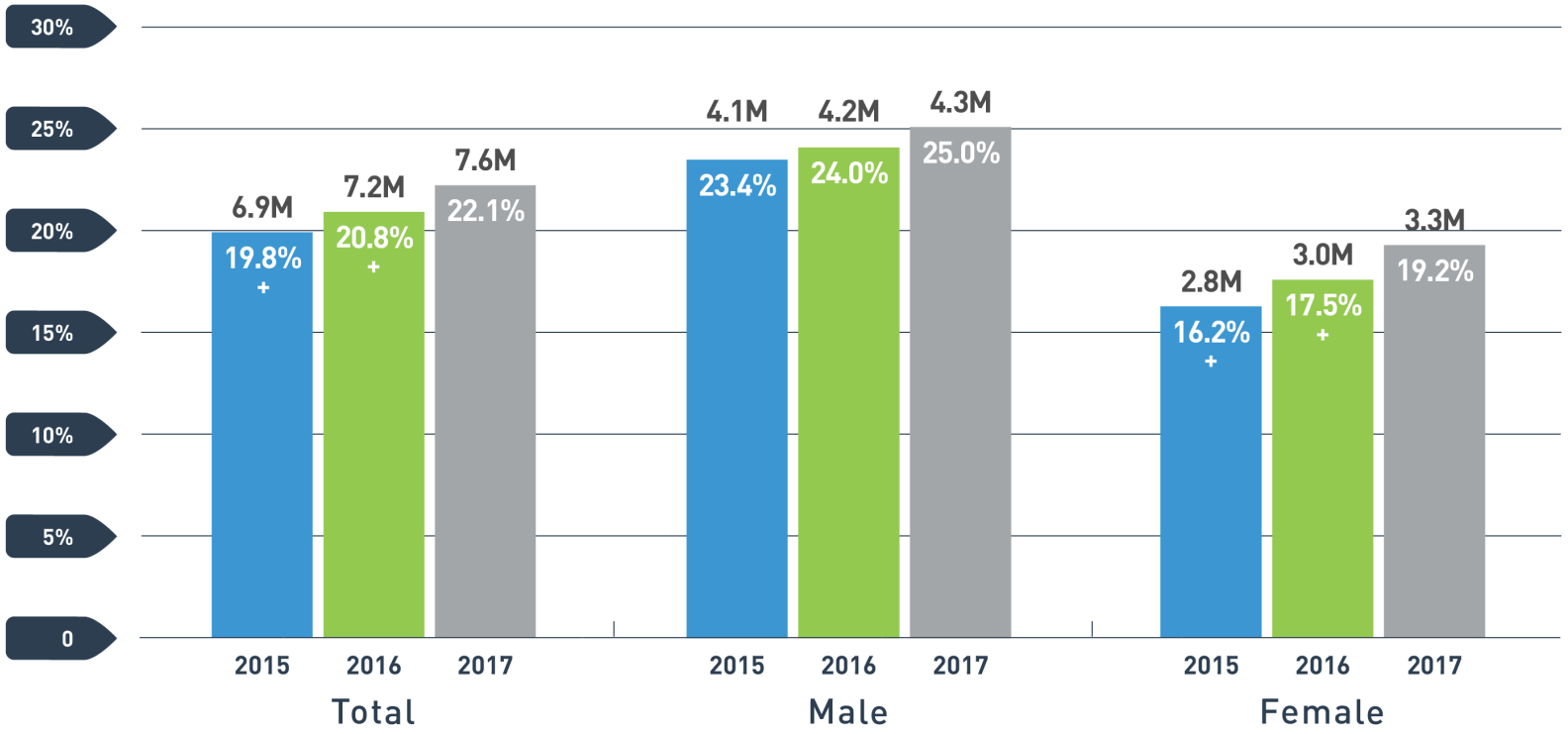
- Approximate window of detection times:
- Up to 3 days for single use
- Up to 4 days for moderate use
- Up to 10 days for heavy use
- 30–36 days for chronic, heavy use
- Marijuana is easily detected by immunoassay. Generally, laboratory tests for marijuana use are designed to detect THC-COOH (11-nor Δ9-tetrahydrocannabinol-9-carboxylic acid; commonly referenced as THC acid or THCA), the major inactive metabolite of THC.
- Laboratory tests are available with cutoff concentrations of 20 ng/mL, 50 ng/mL, or 100 ng/mL, although the majority of laboratories employ 50 ng/mL. The 20 ng/mL cutoff is commonly used clinically.
- The 100 ng/mL cutoff is rarely used due to its lack of sensitivity.

Drug Testing for Cannabis

- Confirmation by GC/MS tests should be performed if the positive screening test results have legal or other serious implications for the patient.
- Some legal food products are made from hemp seeds (e.g., hemp seed oil, flour, liquor, ale).
- These products do not appear to be psychoactive, but, after a person has ingested these food products, THC metabolites have been detected in urine specimens.
- However, usually the THC concentrations in the food products are too low to produce a positive urine drug test result (Bosy & Cole, 2000).
- Some proton-pump inhibitors have caused positive tests on immunoassay

Marijuana Use among Young Adults: Significant Increases in Women

PAST MONTH, 2015 - 2017, 18 - 25

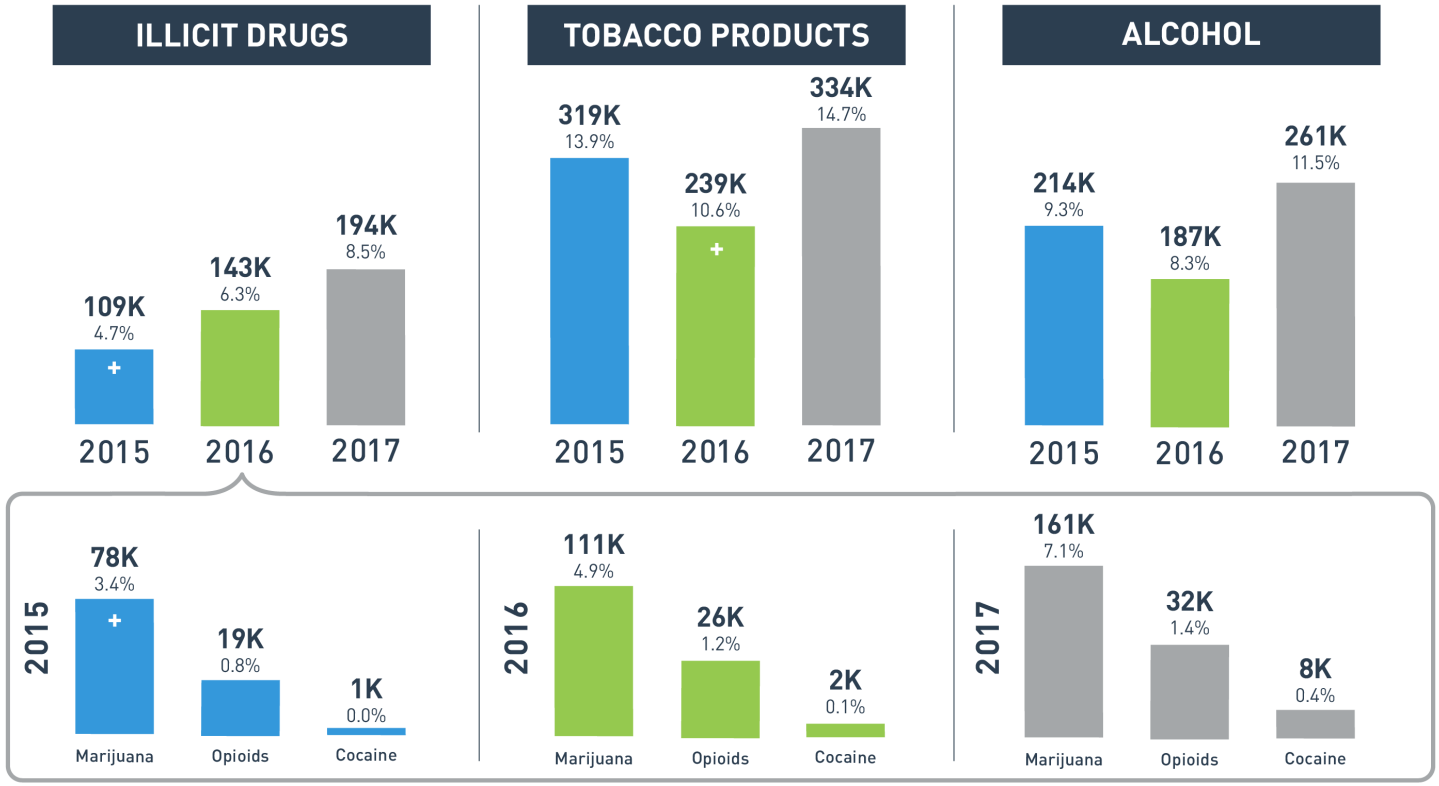


Special analysis of the 2017 NSDUH Report.

+ Difference between this estimate and the 2017 estimate is statistically significant at the .05 level.

Substance Use in Past Month Among Pregnant Women

PAST MONTH, 2015 - 2017, 15 - 44



Special analysis of the 2017 NSDUH Report.

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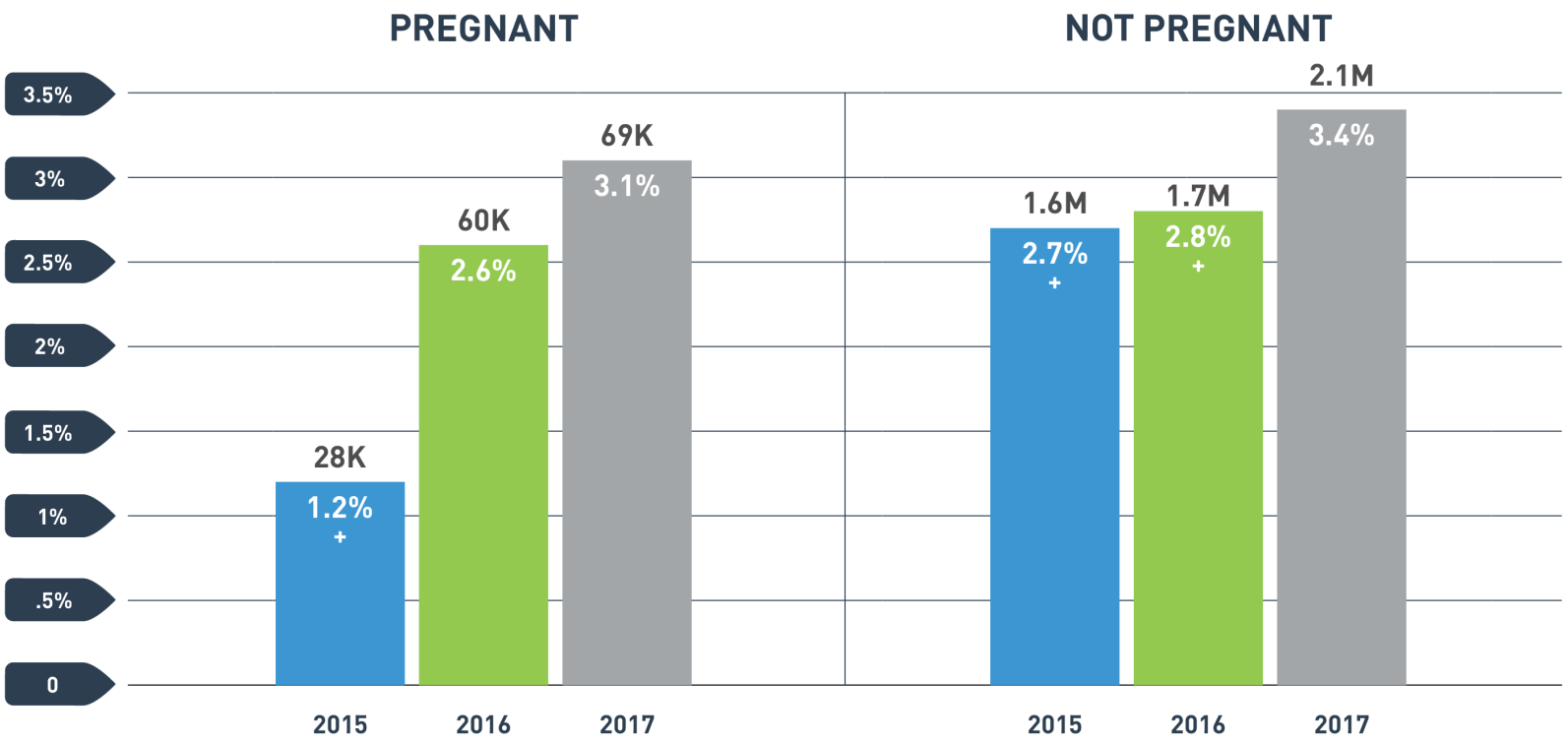
Daily or Almost Daily Marijuana Use among Women by Pregnancy Status

PAST YEAR, 2015 - 2017, 15 - 44



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Why is this Data Important?

Marijuana and Pregnancy

May be associated with:

- Fetal growth restriction
- Stillbirth
- Preterm birth

May cause problems with neurological development:

- Hyperactivity
- Poor cognitive function *(Metz TD and Stickrath EH, 2015)*

Epidemiology

3-34% of pregnant women

Most women stop or cut back during pregnancy

- 46-78% quit
- Most that do not quit cut back

Most women relapse postpartum

Ryan, Pediatrics 2018

Cannabis Use in Pregnancy

Recent meta-analysis of 24 studies (Gunn et al., 2016)

Use associated with increased odds of

- **Anemia (OR 1.36)**
- **Low birth weight (OR 1.77)**
- **Need for intensive care treatment (OR 2.02)**

TABLE 1

Testing for marijuana in biological samples

Biological sample	Duration of positive result	Test limitations
Maternal urine	2–3 days in occasional users[63] Several weeks in chronic users[64]	Chronicity of use determines duration of positive result[63]
Maternal serum	2–3 days in occasional users[6] Several weeks in chronic users[6]	Chronicity of use determines duration of positive result[63] Invasive sample Shorter half-life than urine[6]
Maternal hair	Several weeks[65]	Less accurate for marijuana than other drugs[65] False positives from passive exposure[65] Not clinically used due to cost and inaccuracy
Meconium	Positive result indicates second- and third-trimester exposure[26,66,67]	Small amount of detectable THC in the samples[68] High false-positive rate (up to 43%)[15] Send out to reference laboratory Costly and impractical at many sites
Neonatal hair	Positive result indicates third-trimester exposure[66]	Costly and impractical at many sites Less sensitive than meconium[66]

THC, delta-9-tetrahydrocannibinol.

Metz. Marijuana in pregnancy. Am J Obstet Gynecol 2015.

The Known

- **Marijuana crosses the placenta**

Metz, AJOG 2015

Fetal Effects

- **Marijuana is not a teratogen**

Metz, AJOG 2015

Fetal Effects: Possible

Growth restriction

- Confounded by tobacco
- If there is an effect, likely small and unclear consequences

Stillbirth

- Most studies exclude due to history of stillbirth
- Increased risk of stillbirth (THC in umbilical cord)
- Possibly confounded by tobacco use

Metz, AJOG 2015

Fetal Effects: Possible

- Preterm Birth
  - Conflicting results
  - Confounders (history of PTB, iatrogenic)
  - Positive biologic screen seems more correlated
  - Unclear the effects (early versus late preterm)
- Metz, AJOG 2015

Concurrent Tobacco Use

- **Increased risk compared to tobacco alone**
- **Preterm birth (OR 2.6)**
- **Low birth weight (OR 2.8)**
- **Pre-eclampsia (OR 2.5)**

Chabarria, AJOG 2016

Cannabis and Pregnancy

- **Marijuana use during pregnancy is an increasingly common occurrence with little research to show how that use may impact the health of both the mother and the baby.**
- **As more states legalize marijuana for both medical and recreational purposes, there has been a notable increase in use.**
- **Despite most national medical organizations' recommendation to cease the use of marijuana use during pregnancy, there seems to be a shift in the general public's attitude about marijuana, causing many people to see it as "safe and natural".**
- **Many mothers report that marijuana is their alternative to prescription medications for conditions such as nausea and vomiting related to pregnancy, as well as anxiety and depression.**
- *Diehl,A., Marijuana Use During Pregnancy, Poster Session 2016*

Cannabis and Pregnancy

- **Many of the medical concerns of using marijuana while pregnant relate to the health of the baby.**
- **There is a great need to do more research on this topic because many of the current studies contradict one another. Some possible risks that continue to be studied include, decreased birth weights, increased NICU admissions, preterm births, stillbirths, low Apgar scores.**
- **Another concern is the association marijuana use has on the newborn cry. A higher-pitched cry is noted and is also seen in infants with fetal alcohol syndrome.**
- *Diehl,A., Marijuana Use During Pregnancy, Poster Session 2016*

Cannabis and Pregnancy

- **Of these possible risks there is still controversy about which are medically accurate concerns.**
- **Additionally, there are very few studies that look at the possible long-term effects in the child's development related of marijuana use during gestation.**
- **One study found a link between maternal marijuana use and increased risk of depression and anxiety in adolescence. Ultimately some of the most medically agreed upon risks include, low birth weights and low Apgar scores as well as a possible increase in NICU admissions.**
- **Even though the exact risks have not been definitively substantiated, nearly all health organizations recognize the risk of maternal use of marijuana in utero.**
- *Diehl,A., Marijuana Use During Pregnancy, Poster Session 2016*

Cannabis and Pregnancy

- **When looking at the maternal component of cannabis use during pregnancy, there seems to be fewer direct risks to the mother's health.**
- **It is important to understand why mothers are choosing to use in the first place. The major risk of maternal use is an increased risk of anemia during labor.**
- **Anemia during labor does have the potential to lead to other complications, however the studies have not shown this association.**
- **There are many reasons why a mother may choose to use marijuana during pregnancy, and this is important to understand when communicating with the mothers about cessation. Mothers report using marijuana medicinally for nausea and vomiting in pregnancy (NVP), anxiety, depression and stress.**
- *Diehl,A., Marijuana Use During Pregnancy, Poster Session 2016*

Cannabis and Pregnancy

- **Additionally, as marijuana becomes legalized there is also an increase in recreational use during pregnancy.**
- **Some studies have shown that mothers perceive marijuana to be "safer and more natural" than other prescription medications that can be given for things like NVP.**
- **There has also been an increase in media promotion of marijuana, with many dispensaries citing NVP as something cannabis works well to manage. 'Understanding the reasons behind why pregnant women are choosing to use marijuana is a vital**
- **component for health care professionals to consider.**
- **This will allow the health care provider to engage in a more effective and therapeutic conversation about cessation of use.**
- *Diehl,A., Marijuana Use During Pregnancy, Poster Session 2016*

Cocaine

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What Is Cocaine?

Cocaine is a central nervous system stimulant

Short-term effects:
- Stimulation, sexual arousal
- Decreased appetite
- Increased focus

Cocaine is made from the leaves of the coca plant which is grown in Bolivia, Peru, and Colombia

Colombia produces about 90 percent of the cocaine powder reaching the United States

Cocaine is found as a white powder or rock crystal

It can be smoked, snorted, or injected

Other names for cocaine include Blow, Coke, Nose Candy, and Snow

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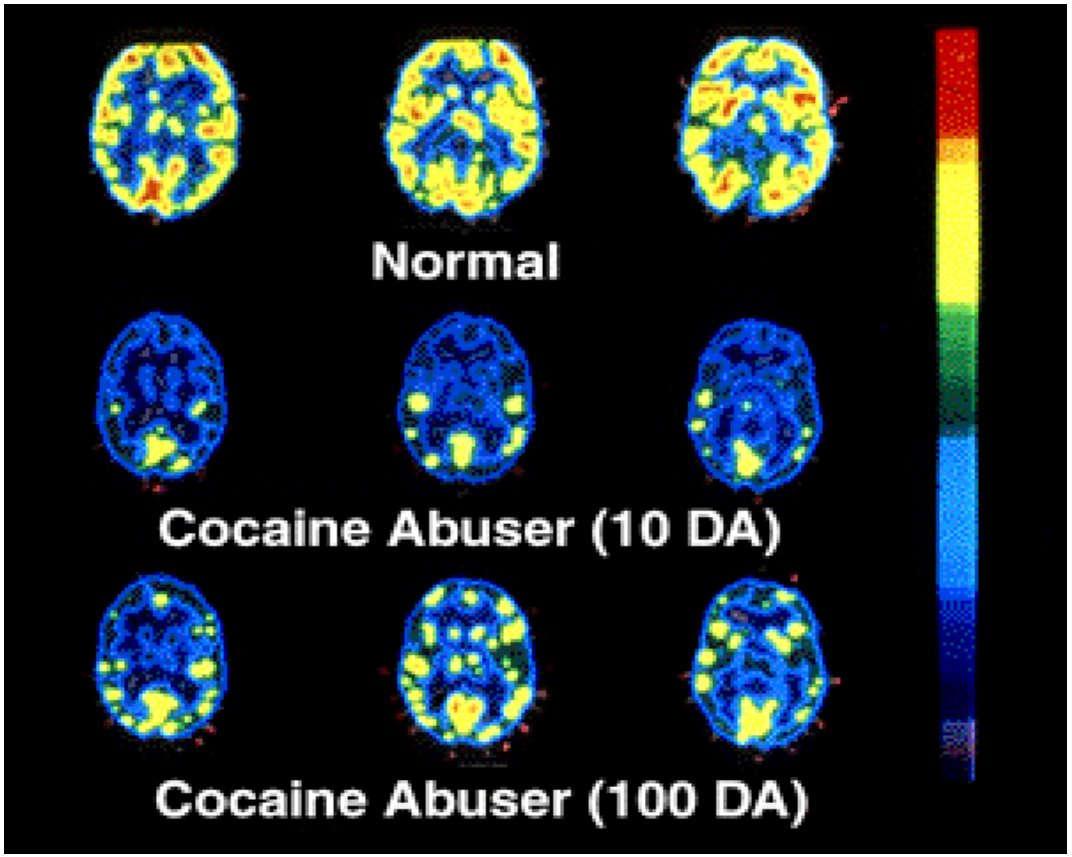
Cocaine Chronic Effects

- Tolerance & Addiction
- Tissue damage inside the nose from snorting cocaine
  - Caused by constricting blood vessels in the nasal cavities
- Lung damage from smoking
- Cardiovascular damage
- Increased miscarriage rate
- Increase in premature birth/birth defects

Long term effects of cocaine on the brain



Drug Testing for Cocaine

Urine drug tests for cocaine detect cocaine's major metabolite, benzoylecgonine.

The body quickly metabolizes cocaine to its major metabolite, benzoylecgonine, and neither is stored in the body.

Therefore, even with chronic use, the window of detection is 1–3 days, with the clinical test cutoff of 300ng/ml.

Urine immunoassay tests for cocaine are highly specific and detect use of powder (snorting or insufflation), parenteral use, oral ingestion, smoked, or use of crack cocaine.

Immunoassay tests are highly specific for the cocaine metabolite (benzoylecgonine) and do not cross-react with other substances.

Effects of Cocaine on the Pregnant Woman

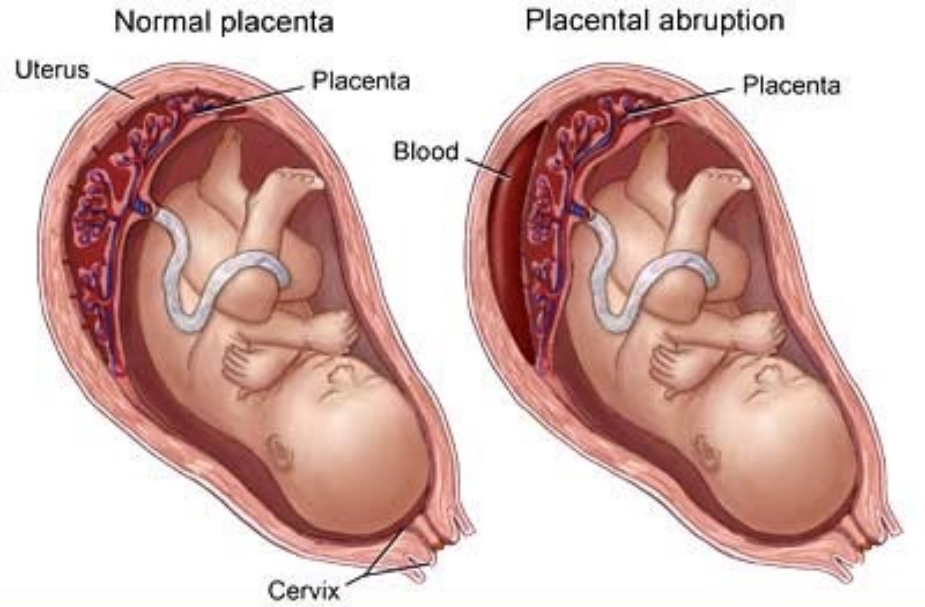
http://www.google.com/imgres?imgurl=http://www.onlinenewsreporters.com

The Effects of Cocaine on the Normal Physiology of Pregnancy

- **<u>Placental abruption:</u>**

  -Placental lining has separated from the mother's uterus , causing late pregnancy bleeding within uterus, which can ultimately result in maternal mortality.

  -Fetal membranes prematurely rupture, triggering pre-term labor.

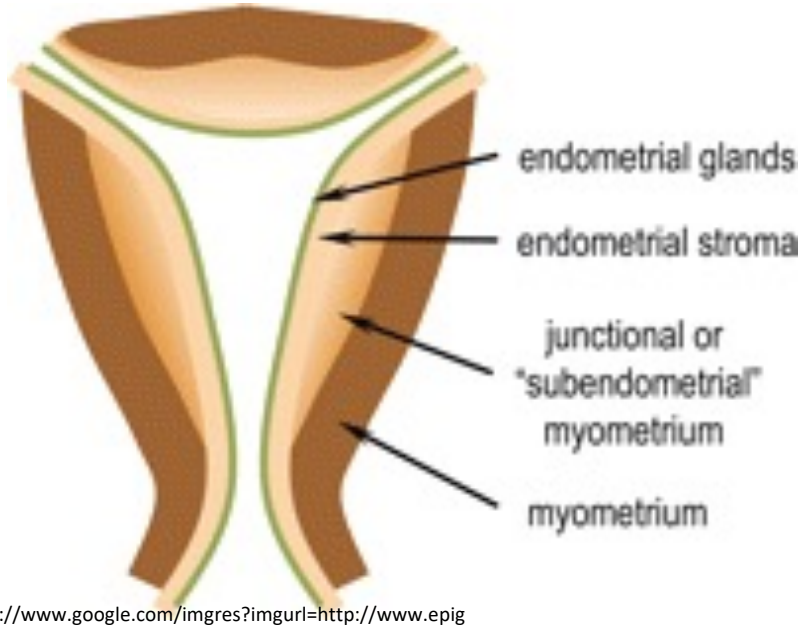


The Effects of Cocaine on the Normal Physiology of Pregnancy

- **<u>Pre-term labor, Pre-term delivery</u>**:

  -Cocaine use during pregnancy may cause the down-regulation of myometrial (middle layer of uterine wall) beta-adrenergic receptors

HOW?



http://www.google.com/imgres?imgurl=http://www.epigee.org

The Effects of Cocaine on the Normal Physiology of Pregnancy

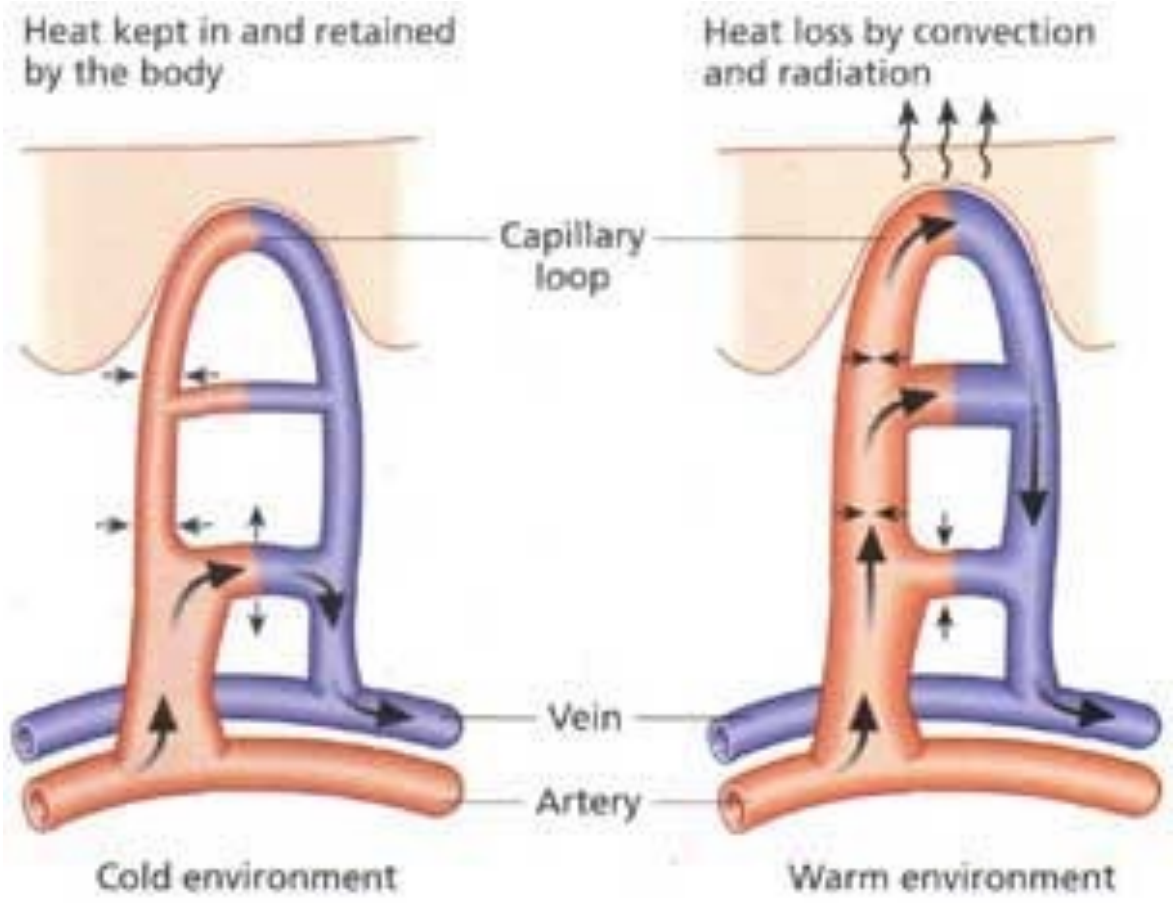
- **Normal pregnancy**: Vasodilation occurs due to increased levels of progesterone. This vasodilation may be counteracted by cocaine-induced vasoconstriction

- **Hyperthermia caused by vasoconstriction**
- An increase in [E]synaptic from cocaine use→vasoconstriction, resulting in the retention of heat→hyperthermia
- Cocaine-induced maternal hyperthermia→fetal prematurity, low birth weight, and fetal death.

  --May also alter the mother's mental status

Epinephrine Causes Vasoconstriction and Progesterone Causes Vasodilation

- http://www.google.com/imgres?imgurl=http://www.pgbeautygroomingscience.com/assets/images



How a drug affects a fetus depends on…

- The fetus's stage of development
  - Early in pregnancy (within 20 days after fertilization)
  - Between 3rd and 8th week after fertilization
  - After organ development
- The strength & dose of the drug

http://adoption.families.com/blog/considerations-in-adoption-prenatal-drug-and-alcohol-exposure

What are the risks with use of cocaine during pregnancy?

- Increased risk of miscarriage
- Preterm labor
- Premature & low-birth weight
  - 3 to 6 times more likely to be born at a low birth weight (less than 5.5 pounds)
- Smaller heads

More problems…

- Placental & urinal tracts problems
- Physical condition & overall responsiveness
- Sudden Infant Death Syndrome (SIDS)
- Dependence & withdrawal symptoms

http://www.thepanamadigest.com/2010/04/daddys-baby-grabs-1400-kilos-of-cocaine/

http://www.drugcouncil.tc/cocaine.html

What is the long-term outlook for babies who were exposed to cocaine before birth?

- Negative effects of cocaine exposure is permanent
  - Normal intelligence but subtle learning & behavioral problems
    - Lower IQ
    - Language delays & attention problems
  - Deficits in cognitive & emotional development

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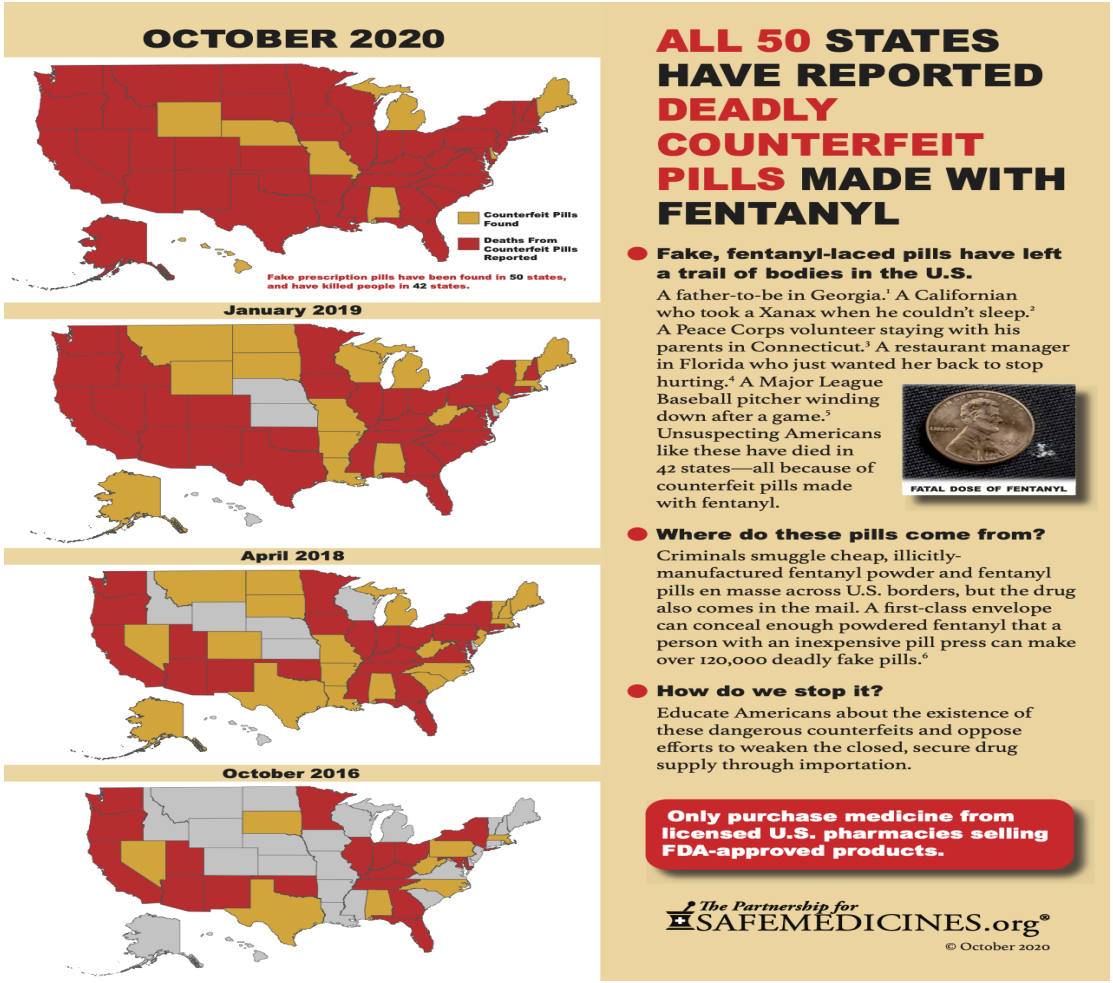
Counterfeit Drugs

Fentanyl in counterfeit pills in all 50 states



What Are Counterfeit Drugs?

- Counterfeit medicine is fake medicine and may be harmful to your health.
- However, incidence of counterfeit drugs in the U.S. is rare relative to the large number of prescription drugs used. FDA remains vigilant to protect the U.S. drug supply from counterfeits and other substandard drugs that often originate from outside our boarders.
- Since many counterfeits are made abroad and can arrive in the U.S. through the mail or are smuggled in, FDA works with U.S. Customs and Border Protection, and using a risk-based approach focuses on areas that present the most threat to our drug supply.

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Counterfeit Drugs = Fentanyl

- Counterfeit drugs are fake look alike medications
- They often originate from outside the US
- These drugs commonly contain fentanyl, which is highly potent and potentially deadly

← A lethal dose of fentanyl

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Counterfeit Drugs

- These drugs often lead to opioid overdose

Top: Authentic oxycodone 30mg

Bottom: Counterfeit oxycodone 30mg mixed with fentanyl

Counterfeit Opioid Medications

- *Authentic Adderall tablets (top) vs. counterfeit Adderall tablets containing methamphetamine (bottom).*

Counterfeit Opioid Medications

- *Authentic Xanax tablets (white) vs. counterfeit Xanax tablets containing fentanyl (yellow).*

Fentanyl and Carfentanil

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Fentanyl Citrate/Fentanyl HCL
Schedule II

What Is Fentanyl?

- Fentanyl is 80-100 times stronger than morphine
- It is a potent prescription synthetic opioid that is used for cancer pain management
- Fentanyl is typically used as a transdermal patch
- Street names for Fentanyl include Apace, China Girl, and Dance Fever
- Fentanyl is often added to heroin for increased potency, leading to many overdose deaths

What Is Carfentanil ?

Carfentanil is a tranquilizing agent used for elephants and other large mammals

It is not meant for use in humans due to its dangerously high potency

Carfentanil is 10,000 times more potent than morphine and 100 times more potent than fentanyl

Fatal overdoses have occurred from counterfeit pills that contain carfentanil

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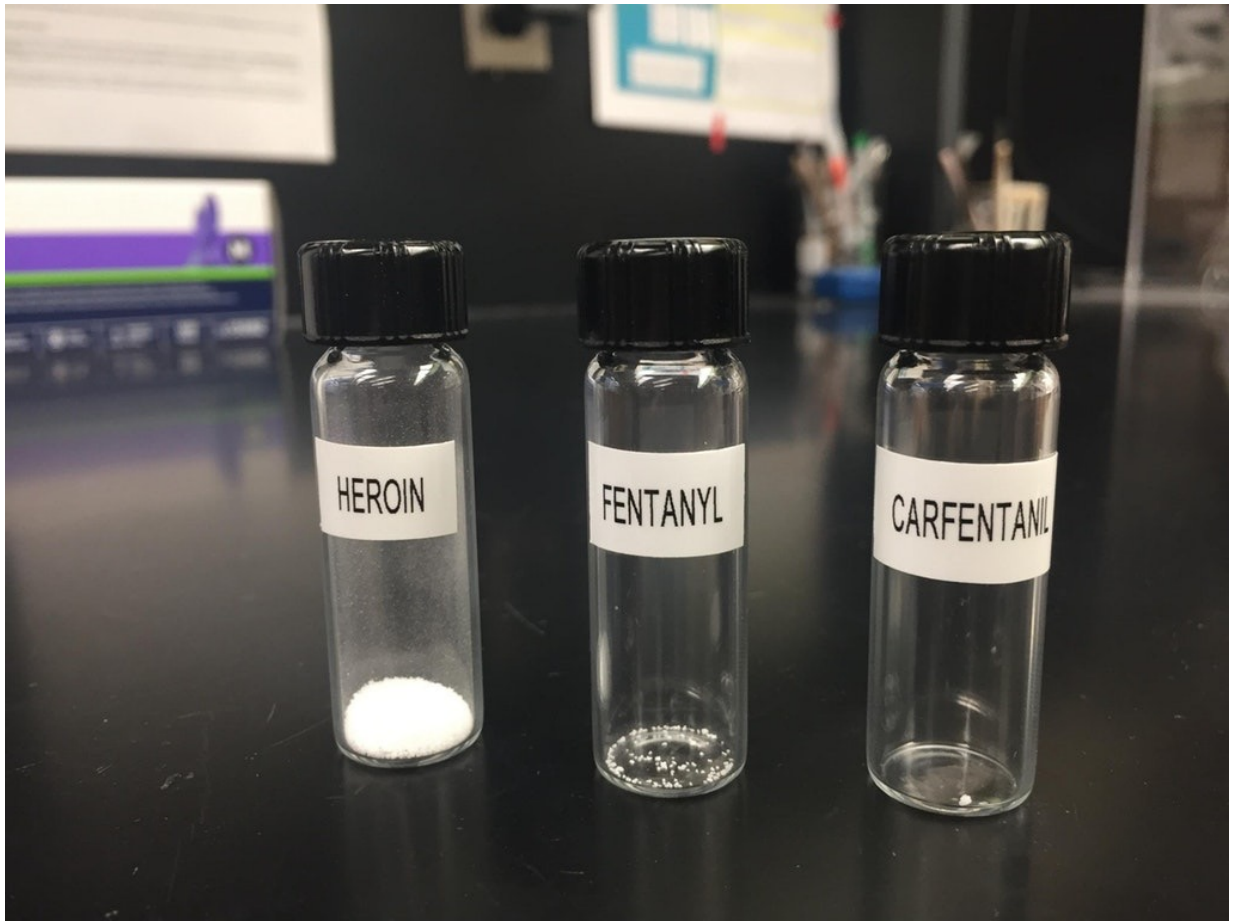
Lethal Doses of Heroin, Fentanyl, and Carfentanil



Fentanyl Related Substances

- **3-methylfentanyl**
- **3-methylthiofentanyl**
- **4-methoxy-butyryl fentanyl**
- **Acetyl norfentanyl**
- **Acetyl-alpha-methylfentanyl**
- **Acetylfentanyl**
- **Acryl-alpha-methylfentanyl**
- **Acrylfentanyl**
- **Alfentanil**
- **Alpha-methylfentanyl**
- **Alpha-methylthiofentanyl**
- **Benzodioxole fentanyl**
- **Benzoylbenzyl fentanyl**
- **Benzylfentanyl**
- **Beta-hydroxy-3-methylfentanyl**
- **Beta-hydroxyfentanyl**
- **Beta-hydroxythiofentanyl**
- **Butanoyl 4-fluoro fentanyl**
- **Butyryl fentanyl**
- **Carfentanil**
- **Crotonyl fentanyl**
- **Cyclopentyl fentanyl**
- **Cyclopropyl fentanyl**
- **Fluorobutyryl fentanyl**
- **Fluorofentanyl**
- **Fluoroisobutyryl fentanyl**
- **Furanyl fentanyl**
- **Isobutyryl fentanyl**
- **Lofentanil**
- **Methoxyacetyl fentanyl**
- **N-isobutanoyl 4-fluoro fentanyl**
- **Ortho-fluorofentanyl**
- **P-fluorobutyryl fentanyl**
- **P-fluorofentanyl**
- **P-fluoroisobutyryl fentanyl**
- **Phenyl fentanyl**
- **Remifentanil**
- **Sufentanil**
- **Tetrahydrofuran fentanyl**
- **Thenylfentanyl**
- **Thiofentanyl**
- **Thiofuranyl fentanyl**

Drug Testing for Fentanyl

Fentanyl	Actiq, Duragesic, Fentora, Lazanda, Sublimaze, Subsys, Ionsys	Plasma Detection 3–12 hrs	Urine Detection 1–3 days
Norfentanyl	Fentanyl metabolite		

Window Detection and Half Life of Fentanyl

- The mean elimination half-life is(1-3):
- -IV: 2 to 4 hours
- -Iontophoretic transdermal system (Ionsys) terminal half-life: 16 hours
- -Transdermal patch: 17 hours (13-22 hours, half-life is influenced by absorption rate)
- -Transmucosal:
- -Lozenge: 7 hours
- -Buccal tablet
- -100 to 200 mcg: 3 to 4 hours
- -400 to 800 mcg: 11 to 12 hours

Drug Testing for Fentanyl(False Negatives)

- Unless bundled *(Ask your lab!)*, opiate immunoassays will miss fentanyl, meperidine, methadone, pentazocine (Talwin), oxycodone and often hydrocodone
- Morphine: GCMS may miss it unless glucuronide hydrolyzed. Can pick up with a specific test such as a specific qualitative EIA kit such as MSOPIATE. *(Ask your lab!)*
- Opioids that are "opioid" neg: hydrocodone (unless high dose), hydromorphone, oxycodone, oxymorphone, fentanyl, methadone, buprenorphine, Demerol, tramadol (=most items rx'd)
- Illnesses that cause lactic acidosis can cause false negatives
- Patients taking opioids can be tested specifically for heroin use by looking for one of its specific metabolites): 6-monoacetyl morphine (6-MAM) duration 2-4 hours (certainly < 8) only on GCMS; positive as morphine and/or codeine for 2-3 days

Drug Testing for Fentanyl

- SAMHSA TIP 63 (pages 2-14 to 2-16) offers more information about testing and interpretations along with treatment implications.
- In humans, the drug appears to be metabolized primarily by oxidative N-dealkylation to norfentanyl and other inactive metabolites that do not contribute materially to the observed activity of the drug.
- Within 72 hours of intravenous (IV) administration, approximately 75% of the dose is excreted in urine, mostly as metabolites with less than 10% representing unchanged drug.

Fentanyl and Pregnancy

- US FDA pregnancy category: C
- Maternal use of fentanyl may cause withdrawal symptoms and respiratory depression in the newborn infant.
- Every pregnancy starts out with a 3-5% chance of having a birth defect.
- This is called the background risk.
- Based on the studies reviewed, **exposure to fentanyl is not expected to increase the chance for birth defects above the background risk**.

Fentanyl and Pregnancy

- Fentanyl will usually show up on a urine test between **24-72 hours** after last use.
- Hair tests can detect the drug for up to 3 months, and blood tests can detect it between 5 and 48 hours after use depending on the dose.

Fentanyl and Pregnancy

- **Published data concerning the use of fentanyl during pregnancy consist of a small number of case reports.**
- **No congenital malformations were observed in the four reported infants exposed during the first trimester and the available data do not currently raise concerns about other adverse pregnancy outcomes or altered neurodevelopment in the child.**
- **However, data are too limited to permit an evidence-based assessment of these risks.**
- **Use of any opioid during pregnancy, particularly around the time of delivery, confers a risk of neonatal respiratory depression.**
- **Prolonged use of opioids throughout pregnancy may also result in neonatal withdrawal.**

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DMT (Dimethyltryptamine)

What Is DMT (Dimethyltryptamine)?

- DMT is a powerful hallucinogenic chemical
- It is derived from an Amazonian plant and seen as a white powder that can be vaporized or smoked in a pipe

Effects include:

- Increased heart rate
- Agitation
- Vivid hallucinations
- Body/spatial distortions
- Intensified feelings and sensory experiences
- Changed perception of time

Quotes from people on DMT

"I felt what God was like. It was something that was smaller than anything. It's not made of anything—it is everything around the thing that it is and everything inside of it at the same time and it kind of moves about in a way that's not on the grid."

"After the second puff there were like Slinkys everywhere. Colorful Slinkys that were not necessarily attacking me, but coming towards my face. And all the colors that were in the room, that I imagined were in the room, were coming at me as well. It was beautiful."

Drug Testing for DMT

- DMT shares psychedelic and hallucinogenic activity with lysergic acid diethylamide (LSD) and mescaline in terms of intensity and characteristics.
- Common routes of DMT administration are oral, insufflation, intravenous (IV) and smoking.
- The time course of DMT administered via inhalation of vaporized freebase or IV injection of a water-soluble salt is brief.
- The onset is rapid, with full effects noted within 2 min of administration and subjective effects fully resolving within 20–30 min.

Drug Testing for DMT

- **DMT DETECTION IN Blood, Hair, Saliva, Urine, AND CEREBROSPINAL FLUID**
- DMT is not usually tested for in standard drug screenings, though some tests are able to detect it.
- It is also rapidly excreted from the body and, depending on the type of test used and on the way it was taken, it may not be detectable after as little as a few hours.
- How Long Does DMT Stay in Your System?
- Blood: One to two hours
- Urine: Up to 24 hours
- Saliva: Between four and 12 hours
- Hair: Up to 90 days

DMT : The Drug

- DMT is a Schedule I controlled substance in the United States, which means it's illegal to make, buy, possess, or distribute it. Some cities have recently decriminalized it, but it's still illegal under state and federal law.
- DMT is the main active ingredient ayahuasca.
- . . . lacking any evidence about safety and/or risk, the con- sumption of ayahuasca should be avoided by pregnant women until safety evidence exists.
- A study suggests that AYA is developmentally toxic and that its daily use by pregnant women may pose risks for the conceptus.

DMT and Pregnancy

Dextromethorphan(DXM)

Dextromethorphan(DXM)

Dextromethorphan, often referred to as DXM, is a medication most often used as a **cough suppressant** in over-the-counter cold and cough medicines. It is sold in syrup, tablet, spray, and lozenge forms. It is in the morphinan class of medications with sedative, dissociative, and stimulant properties (at lower doses).

Illicit use at high doses (over 1500 mg/day), of DXM is referred to on the street as **“Robo-tripping” or "skittling**." These terms are derived from the most commonly abused products, Robitussin and Coricidin.

Street Names: DXM, CCC, Triple C, Skittles, Robo, Poor Man’s PCP

Dextromethorphan(DXM)

- DXM abusers report a heightened sense of perceptual awareness, altered time perception, and visual hallucinations.
- Intoxication involves hyper excitability, lethargy, ataxia, slurred speech, sweating, hypertension, and/or nystagmus.
- Abuse of combination DXM products also results in health complications from the other active ingredient(s), which include increased blood pressure from pseudoephedrine, potential delayed liver damage from acetaminophen, and central nervous system toxicity, cardiovascular toxicity and anticholinergic toxicity from antihistamines.

Dextromethorphan(DXM)

- Abusers report the following effects occurring in each plateau:
- **First Plateau**: Mild inebriation.
- **Second Plateau**: An effect similar to alcohol intoxication and, occasionally, mild hallucinations. The abuser's speech can become slurred, and short-term memory may be temporarily impaired.
- **Third Plateau**: An altered state of consciousness. The abuser's senses, particularly vision, can become impaired.
- **Fourth Plateau**: Mind and body dissociation or an "out-of-body" experience. The abuser can lose some or all contact with his or her senses. The effects at this plateau are comparable to the effects caused by ketamine or PCP (phencyclidine).

What is **DXM**? **Dextromethorphan** is a psychoactive drug found in common over the counter cough medicines.

SOURCE: NIDA. (2001). *NIDA Research Report Series: Hallucinogens and Dissociative Drugs*.

Dextromethorphan (DXM)

- Dextromethorphan's slang names include "Robo;" people refer to using DXM as "robo-tripping."
- At high doses, may produce dissociative hallucinations (distance from reality, visual effects with eyes open and closed; perceptual changes, drug liking, mystical-type experiences similar to use of psilocybin.
- Can also produce tachycardia, hypertension, agitation, ataxia, and psychosis at high doses.
- Users of DXM engage in "dose dependent" behaviors in which they try to gauge the amount of the drug they take to produce the desired effects, which they call "plateaus". Plateau is the mildest effect and the 5th plateau will guarantee a trip to the hospital.

SOURCES: Reissig et al. (2012). *Psychopharmacology, 223*(1), 1-15; http://dxm.darkridge.com/text/beginners.htm.

Dextromethorphan(DXM) Treatments

The therapeutic approach to management of DXM intoxication focuses on symptom resolution.

Previously reported psychopharmacologic treatments include short-acting benzodiazepines or low-dose antipsychotics (haloperidol, risperidone, and quetiapine).

Drug Testing for DXM

- DXM abuse levels are difficult to determine. Commonly used drug toxicology screens and field tests do not accurately detect the presence of DXM.
- Therefore, more thorough laboratory testing must be performed. DEA recommends the gas chromatography/mass spectrometer (GC/MS) test, as other laboratory tests may produce false positives.
- Standard drug tests may not be able to identify DXM, although it has been shown to test similarly to Phencyclidine (PCP) causing a false positive for that drug.
- Dextromethorphan is typically detectable in urine for 1-2 days after use.
- The detection period may vary based on a variety of factors including weight, metabolism, and how much a person took. Positive results for this test will provide numerical results for the level detected. A Blood Dextromethorphan Drug Test is also available.

DXM and Pregnancy

- FDA pregnancy category C
- Dextromethorphan (DXM) is an over-the-counter cough suppressant.
- If you are wondering if you can take dextromethorphan while pregnant, **it is considered relatively safe**.
- Recent research has indicated that pregnant women do not have to worry about taking dextromethorphan during their pregnancy.
- Dextromethorphan exposure in the first trimester has been studied, and no increased risk of malformations was detected.

DXM and Pregnancy

- Dextromethorphan can be sold as a single medication treatment and it is also available in multi-symptom cold, cough, and flu medications.
- During pregnancy and while breastfeeding, when possible, it is best to avoid combination medications that contain multiple ingredients.
- Instead, choose single medications that treat the symptoms you currently have.
- Miscarriage can occur in any pregnancy. In one study there was no increase in miscarriage.
- This study looked at the pregnancies of 128 persons who took dextromethorphan in the first trimester.

DXM and Pregnancy

- Every pregnancy starts out with a 3-5% chance of having a birth defect.
- This is called the background risk.
- Most studies do not suggest that the use of dextromethorphan increases this chance of birth defects.
- One study found no differences in infant birthweight or the chance of stillbirth.
- This study looked at the infants of 184 persons who took dextromethorphan anytime during pregnancy.

FLAKKA

- **Chemical Name: Alpha pyrrolidinopentiophenone (α-PVP)**
  - **Has no legitimate medical use**
  - **Chemically similar to amphetamines, cocaine, MDMA**
- **A synthetic cathinone (stimulant)**

www.google.com/flakka

Kaizaki, Tanaka, Numazawa. New recreational drug 1-phenyl-2-(1-pyrrolidinyl)-1-pentanone (alpha-PVP) activates central nervous system via dopaminergic neuron. The Journal of Toxicological Sciences. Vol. 39, No.1, 1-6, 2014.

Flakka

What Is Flakka?

- Flakka (alpha-PVP) is a dangerous drug that is similar to the street drug commonly known as bath salts
- Flakka is typically a white or pink crystal
- Street Names for flakka include Gravel, Bath Salts, Meow Meow, .Molly, and 5 Dollar Insanity
- The drug may be eaten, snorted, injected, or vaporized in e-cigarettes
- The bulk of flakka seems to come from China and is either sold over the Internet or through gas stations or other dealers. A dose can go for $3 to $5, which makes it a cheap alternative to cocaine.

Flakka Effects

- Flakka contains a chemical that is a close cousin to MDPV, a key ingredient in “bath salts.”
- These chemicals bind and thwart molecules on the surface of neurons that normally keep the levels of mood-regulating neurotransmitters, dopamine and serotonin, in check.
- The result is to “flood the brain” with these chemicals.
- Cocaine and methamphetamine have similar modes of action in the brain, but the chemicals in flakka have longer-lasting effects.
- Not only does the drug sit on neurons, it could also destroy them.
- And because flakka, like bath salts, hang around in the brain for longer than cocaine, the extent of the destruction could be greater.

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Drug Testing for Flakka

- Alpha-PVP is a highly addictive central nervous system stimulant. It can be as potent as crystal meth, bath salts or cocaine. "Flakka" increases levels of dopamine, creates alert/euphoric feelings often with side effects of aggression, delirium and hallucinations. Psychotic reactions have been documented: anxiety, paranoia and delusional behavior.
- While routine drug testing won't detect "Flakka", the chemical compound alpha-PVP can be detected with Redwood Designer Stimulant Drug Test. The urine specimen must be wrapped in foil due to light sensitivity.
- Other laboratories have specific testing for Flakka.

Flakka and Pregnancy

- **Risk of premature rupture of membranes, placental abruption, placenta previa, decreased infant and infant head circumference (with *other* stimulant abuse)-little data/studies in particular on α-PVP**
- **Hypertension risk puts the fetus at risk, should be avoided in pregnancy**

- Prosser JM, Nelson LS. The toxicology of bath salts: A review of synthetic cathinones. *J Med Toxicol*. 2012;8(1):33–42
- Winstock AR, Mitcheson L. New recreational drugs and the primary care approach to patients who use them. *BMJ.* 2012;344:e288.

Gas Station Drugs: Phenibut, Tianeptine, Loperamide (Imodium), Delta 8 THC

What Are Gas Station Drugs?

The term “Gas Station Drugs” originally came from the DEA when describing locations where drug paraphernalia could be marketed through the internet, convenience stores or gas stations.

Bath Salts, Spice, and synthetic cannabinoid products were being sold over the counter to adolescents and young adults.

These drugs are often labeled as:

“Not for human consumption”

“Potpourri”

Gas Station Drugs: Phenibut, Tianeptine, Loperamide (Imodium), Delta 8 THC

- Phenibut is a considered a “smart drug”, meaning that it enhances memory
- Tianeptine is an antidepressant and a pain reliever
- Imodium is an anti-diarrheal with opioid properties
- Delta 8 THC is a psychoactive substance found in the Cannabis sativa plant

- Adverse Effects of these drugs include:
  - Phenibut: poisoning that could lead to death
  - Tianeptine: opioid withdrawal
  - Loperamide: sedation that can lead to accidents
  - Delta 8 THC: increased lethargy and loss of coordination

Drug Testing for Gas Station Drugs

- Phenibut has a half-life of 5.3 hours (12). It does not show up on the standard urine drug screen.
- Drug testing for tianeptine **is not routinely available**, but specialty-testing laboratories might have the capacity.
- Kratom is not detectable on many standard drug tests, such as a 5-panel drug test, but some kratom alkaloids can be identified on specific drug tests that involve urine or blood.
- There is also a drug test that tests explicitly for Kratom. It is known as a 10-panel drug test. When using a 10-panel drug test, the substance can be detected for up to 7 days after use, but many variables can influence how long the drug can be detected in a person system.

Phenibut and Pregnancy

Phenibut is problematic because it's not currently categorized in the U.S.

There isn't enough research or information available to determine that phenibut is safe, or to know what potential risks are.

Since it's not a regulated substance in the U.S. and there aren't standard dosage guidelines, this makes the unknowns associated with phenibut even greater.

It is not advised that pregnant or nursing women use phenibut.

Phenibut and Pregnancy

There is something important to note with phenibut. Since phenibut can cause physical dependence and severe withdrawal symptoms, a pregnant woman should speak with her healthcare provider before discontinuing her use.

Withdrawal during pregnancy can cause adverse effects for a woman and her unborn child including an increased risk of miscarriage.

A doctor may be able to help a pregnant woman safely stop using phenibut and reduce the risk of complications.

Tianeptine and Pregnancy

- **Pregnancy**: Tianeptine is possibly unsafe when taken by mouth during pregnancy. It can cause the infant to be born addicted to tianeptine.

  Breast-feeding: There isn't enough reliable information about the safety of tianeptine when breast-feeding. But other drugs that are similar to tianeptine are known to enter the breastmilk. Stay on the safe side and avoid use.

Delta 8 THC and Pregnancy

- THC has a very long half-life.
- Urine will stay positive for 60 days.
- A mom in drug treatment must “pump and dump” for at least 60 days after chronic cannabis use before being allowed to breastfeed her baby.
- THC can be detected in a baby's urine for **2-5 weeks after exposure.**
- **Universal testing involves screening for neonatal drug exposure following each delivery**.
- This approach is beneficial in that it prevents the use of biased testing protocols and may help to identify cases of neonatal drug exposure that would otherwise go untreated.

Delta 8 THC and Pregnancy

- Stillbirth and Miscarriage
- Preterm Labor and Preterm Birth
- Fetal Growth Restriction and Small for Gestational Age
- Neonatal Effects
- Neurocognitive effects
- Cardiovascular effects

Delta 8 THC and Breastfeeding

- **THC, is 99% protein bound and highly lipid soluble and has a low molecular weight; it is transferred into human breast milk and stored in lipid-filled tissues such as the fetal brain.**
- **Long-term maternal use has been shown to lead to fetal accumulation.**
- **Thus, if a mother smokes 1 to 2 marijuana cigarettes a day, a nursing infant may ingest approximately 0.01 to 0.1 mg of THC daily.**
- **In humans, it was reported that the THC concentration in maternal breast milk was 8.4 times higher than in plasma.**
- **Nursing mothers are discouraged from using marijuana.**
- ***Thompson, R., DeJong, K., & Lo, J. (2019). Marijuana Use in Pregnancy: A Review. Obstetrical & gynecological survey, 74(7), 415–428. https://doi.org/10.1097/OGX.0000000000000685***

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Date Rape Drugs: GHB (gamma-hydroxy butyrate) & Rohypnol

101

What Is GHB?

- GHB is known as a “Date Rape Drug”
- It is a prescription medication or illicitly sold
- As a prescription medication, GHB is used to treat daytime sleepiness in narcolepsy
- It is seen as a clear liquid or white powder
  - The powder is typically dissolved in liquid

GHB Effects

Short-term

- Euphoria
- Decreased anxiety
- Confusion
- Drowsiness
- Increased sex drive
- Memory impairment
- Decreased judgment

Long-term

- Addiction
- Withdrawal
- Insomnia
- Anxiety
- Tremors
- Occasional psychotic thoughts
- Overdose or coma leading to death

Drug Testing for GHB

- Determination of gamma-hydroxybutyric acid (GHB), also known as liquid Ecstasy, in human samples is challenging.
- Due to the small size of GHB, immunological testing is very difficult and limited immunoassays are available for screening.
- GHB detection in urine relies on specific chromatographic methods such as gas chromatography-mass spectrometry (GC-MS) or liquid chromatography-tandem mass spectrometry (LC-MS/MS).
- Redwood Toxicology Laboratory's test utilizes LC-MS/MS for the direct analysis of GHB from urine; other labs offer similar testing.

GHB and Pregnancy

- **GHB should be avoided during pregnancy as it is linked to higher rates of miscarriage and other birth complications**.
- Sedative medications can also cause the baby to be drowsy, have respiratory difficulties and low muscle tone.
- **Pregnancy and breast-feeding**: GHB is **UNSAFE**. Don't use GHB if you are pregnant or breast-feeding. It's been linked with life-threatening side effects.

What Is Rohypnol?

Rohypnol contains the controlled ingredient flunitrazepam hydrochloride.

"Roofies," as they are known on the street, are sold inexpensively in Mexico.

They are smuggled into the United States where they have recently become a problem among American teens.

The problem is rapidly spreading from the American southwest to other parts of the United States.

Rohypnol Adverse Effects

- Adverse effects associated with the use of flunitrazepam include
  - Decreased blood pressure
  - Memory impairment
  - Drowsiness
  - Visual disturbances
  - Dizziness
  - Confusion
  - Gastrointestinal disturbances
  - Urinary retention
  - Can induce excitability or aggressive behavior in some users

Drug Testing for Rohypnol

- Testing for Rohypnol is available with a urine test or hair test.
- This is typically accomplished with a date rape panel drug test which includes GHB, ketamine, and various benzodiazepines, including Rohypnol.
- Date rape drug testing can indicate the presence of substances even in conjunction with alcohol.
- For a urine test, the urine must be collected within five days of drug exposure.
- For the hair test, the hair should be collected within 30 days of the drug exposure. Turnaround time for getting results back on a date rape panel drug test is about 10 business days.
- US Laboratories and other labs offer similar testing

Rohypnol and Pregnancy

- A pregnant woman who takes Rohypnol **increases the risk of her child being born with hypotonia which can affect the child's early muscle development**.
- Benzodiazepines can produce withdrawal symptoms in new-born babies.
- Withdrawal symptoms can include breathing problems, poor body temperature control, poor muscle tone, and difficult sucking. The babies can appear floppy or limp and this poor muscle tone can last for a number of months, although the babies do eventually recover.
- If benzodiazepines have been used consistently throughout the pregnancy, withdrawal symptoms can last for one week or more (although they can take some days to appear).
- Australian Drug Foundation, Alcohol, Other Drugs and pregnancy: **http://www.adf.org.au/adp/**

Heroin

What Is Heroin?

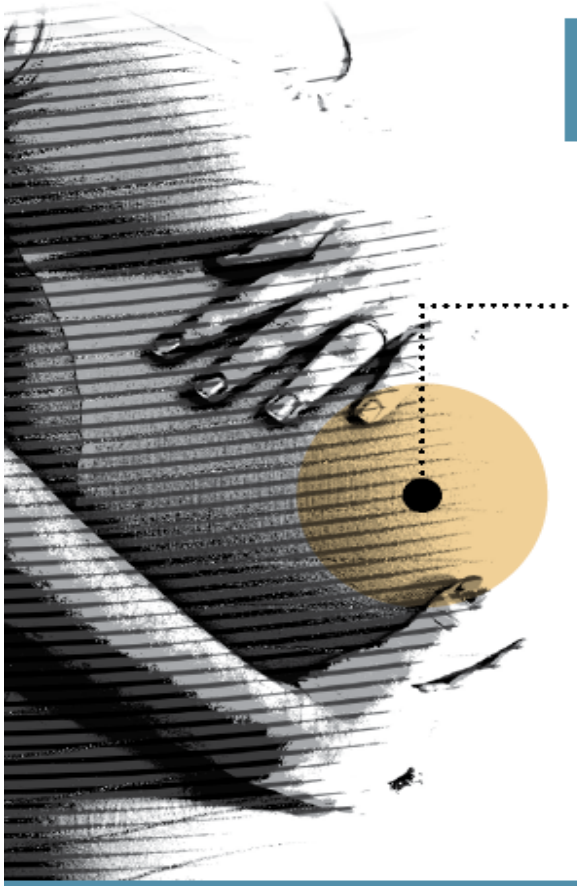
- Heroin is the street name for Diacetylmorphine
- It is a highly addictive, rapid opioid
- Heroin is found as a white or brown powder or as a black sticky substance called ”black tar”
- This drug can be injected, smoked, or sniffed/snorted
- Common street names for heroin include Big H, Black Tar, Chiva, Hell Dust, Horse, Negra, Smack, and Thunder

Heroin Short-Term Effects

- Euphoria
- Warm flushing of skin
- Pain relief
- Drowsiness
- Nausea
- Constricted pupils

Drug Testing for Heroin

- The drug tests approved by the Food and Drug Administration (FDA) for heroin are those for the **blood, saliva, urine, and hair follicle**.
- Newer, more advanced tests can detect traces of heroin in the system for a longer period of time since the last dose.
- The standard five-panel urine test will only detect the first metabolite—morphine—which may be problematic for employers because morphine is also a metabolite of a number of other legal and illegal drugs.
- Because of this, a positive result for morphine will not necessarily allow an employer to confirm heroin use.
- Federally mandated screening and confirmation cut-off levels for opiates were recently increased from 300 ng/mL to 2,000 ng/mL.
- While this increase makes it less likely that specimens will produce false positives due to things like poppy seed ingestion, it also makes it more likely that some heroin use will not be significant enough to clear the higher cut-off level, thus producing a false-negative result for heroin.



ARE OPIOID PAIN MEDICATIONS SAFE FOR WOMEN WHO ARE PREGNANT OR PLANNING TO BECOME PREGNANT?

Possible risks to your pregnancy include[1,2]:

- **Neonatal Opioid Withdrawal Syndrome (NOWS):** withdrawal symptoms (irritability, seizures, vomiting, diarrhea, fever, and poor feeding) in newborns[3]
- **Neural tube defects:** serious problems in the development (or formation) of the fetus' brain or spine
- **Congenital heart defects:** problems affecting how the fetus' heart develops or how it works
- **Gastroschisis:** birth defect of developing baby's abdomen (belly) or where the intestines stick outside of the body through a hole beside the belly button
- **Stillbirth:** the loss of a pregnancy after 20 or more weeks
- **Preterm delivery:** a birth before 37 weeks

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

LEARN MORE | www.cdc.gov/drugoverdose/prescribing/guideline.html

The Opioid Crisis in Pregnant and Postpartum Women

- Opioid use in pregnant women more than doubled between 1998 and 2011
- In 2016, the number of women of childbearing age (15–44 years) who reported past-month use of opioids (including heroin or pain reliever misuse)
  - 1,090,000 in 2016
  - 1.49% increase from 2015
- **Primary prevention**: Use non-pharmacologic therapies and non-opioid medications

Heroin and Pregnancy

Pregnant heroin users: younger than non using pregnant patients

unmarried or separated from spouses

disproportionately large number are members of minority ethnic groups

Severe effects and death may occur in both mothers and unborn babies.

Health effects resulting from Heroin withdrawals:

Diarrhea

Restlessness

Vomiting

Muscle or bone pain

Insomnia

Cold flashes

Complications

Significant medical and obstetrical complications resulting in acute and chronic abnormalities in neonates:

Pregnancy	Maternal	Fetal
Poor Fetal Growth	Malnutrition	Retardation
Premature rupture of membranes(water breaks too soon)	STDs	Fetal death
Premature birth	Hepatitis or HIV	Intrauterine growth restriction
Stillbirth	Preeclampsia	Prematurity
Breech birth	Third-Trimester Bleeding	Withdrawal Symptoms
Placenta: can separate too soon, or not have enough blood		

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1272838/

http://www.ireta.org/sbirt/pdf/Heroin_in_Pregnancy.pdf

Neonatal Abstinence Syndrome (NAS)

Provide education regarding neonatal abstinence syndrome (NAS) and newborn care

- Infants born to women who used opioids during pregnancy should be monitored by a pediatric care provider for neonatal abstinence syndrome (NAS), a drug withdrawal syndrome that opioid-exposed neonates may experience shortly after birth.
    - Engage patients early on in care and inform them to seek a pediatrician around their third trimester
    - Ensure awareness of the signs and symptoms of NAS
- Include interventions to decrease NAS severity (eg, maternal-infant bonding and breastfeeding, smoking cessation)
- Educate patient that baby may cry inconsolably, have seizures and experience GI issues as well
- Symptoms can appear 3 hours to 12 days after birth
- Babies stay minimum of 5 days at CHS hospitals

Some Information Adapted from ACOG District II Presentation
Opioid Use Disorder Bundle, 2018

NAS: Signs to Watch For

- Increased muscle tone “tightness”
- Poor eating or vomiting. Often, babies look like they want to eat, but they are not able to suck and swallow at the same time. Instead, they may take in a lot of air and become frantic, not able to eat. This can cause them to lose weight and have trouble putting weight back on

Source: Catholic Health Women Care NAS Pamphlet

**Use a modified NAS scoring system (eg, Finnegan’s, NWIS)*

Some Information Adapted from ACOG District II Presentation
Opioid Use Disorder Bundle, 2018

NAS: Signs to Watch For

- High pitched or long periods of crying or fussiness. Often, a lot of loud high pitched crying occurs and it may be difficult to quiet your baby. Long periods of being unsettled can cause your baby to use up a lot of calories and lose weight
- Trouble sleeping. Without enough sleep, they tire out and are not able to eat properly

Source: Catholic Health Women Care NAS Pamphlet

**Use a modified NAS scoring system (eg, Finnegan's, NWIS)*

Some Information Adapted from ACOG District II Presentation
Opioid Use Disorder Bundle, 2018

NAS: Signs to Watch For

- Tremors or shaking. Your baby may not be able to control his/her movements or self-console
- Diarrhea. This will cause your baby to lose weight and also puts skin in jeopardy of breakdown due to frequent stools
- Fever or sweating. Babies cannot control their temperature well, and sweating uses up a lot of calories

Source: Catholic Health Women Care NAS Pamphlet

**Use a modified NAS scoring system (eg, Finnegan's, NWIS)*

Some Information Adapted from ACOG District II Presentation
Opioid Use Disorder Bundle, 2018

NAS: Signs to Watch For

- Frequent yawning or sneezing
- Difficulty breathing because of a stuffy nose, fast breathing, or forgetting to breathe
- Breakdown of skin on face or knees because of rubbing on the linen. This can also happen if baby is unable to self-console
- Possible seizures

Source: Catholic Health Women Care NAS Pamphlet

**Use a modified NAS scoring system (eg, Finnegan's, NWIS)*

Some Information Adapted from ACOG District II Presentation
Opioid Use Disorder Bundle, 2018

Treatment Options for NAS

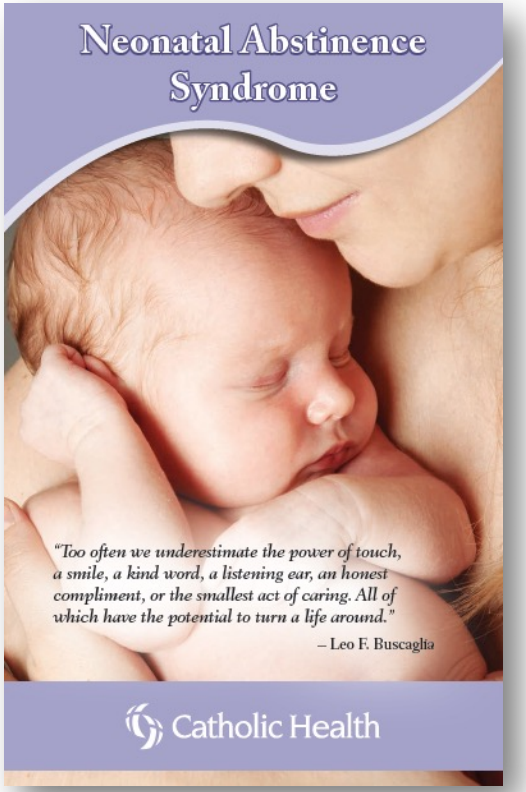
- Swaddling
- Cuddling
- Movement but with minimal sound and light
- Pharmacological interventions including morphine
- Bonding time with mom and/or dad

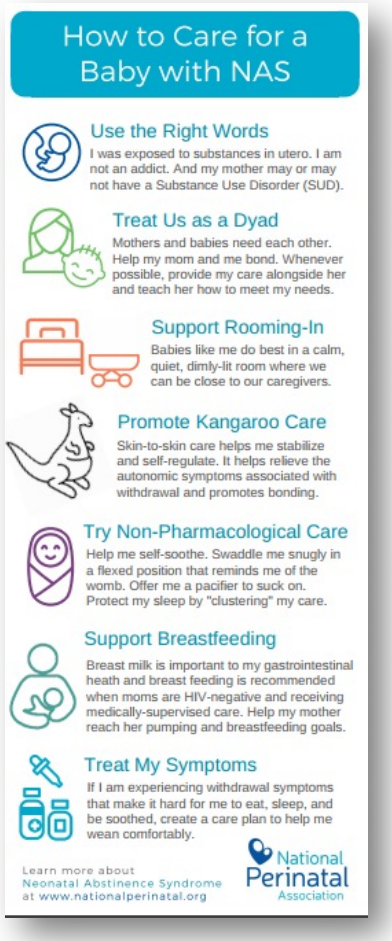
Source: Catholic Health Women Care NAS Pamphlet

**Use a modified NAS scoring system (eg, Finnegan's, NWIS)*

Some Information Adapted from ACOG District II Presentation
Opioid Use Disorder Bundle, 2018

Resources





Sources: Catholic Health
National Perinatal Association

Imodium(Loperamide)

Imodium(Loperamide)

- Loperamide is FDA-approved to help control symptoms of diarrhea, including Travelers' Diarrhea.
- The maximum approved daily dose for adults is 8 mg per day for OTC use and 16 mg per day for prescription use.
- It is sold under the OTC brand name Imodium A-D, as store brands, and as generics.
- Loperamide acts on opioid receptors in the gut to slow the movement in the intestines and decrease the number of bowel movements.
- It is safe at approved doses, but when much higher than recommended doses are taken, it can lead to serious problems, including severe heart rhythm problems and death.

Imodium(Loperamide)

- The U.S. Food and Drug Administration (FDA) is warning that taking higher than recommended doses of the common over-the-counter (OTC) and prescription diarrhea medicine loperamide (Imodium), including through abuse or misuse of the product, can cause serious heart problems that can lead to death.
- The risk of these serious heart problems, including abnormal heart rhythms, may also be increased when high doses of loperamide are taken with several kinds of medicines that interact with loperamide.
- The majority of reported serious heart problems occurred in individuals who were intentionally misusing and abusing high doses of loperamide in attempts to self-treat opioid withdrawal symptoms or to achieve a feeling of euphoria.

- Loperamide abuse may go undetected in emergency departments, experts warn, because routine drug screens **cannot detect it**.
- For loperamide to show up on a drug screen period, it would have to be specifically tested for.
- Even when loperamide is taken in high doses, it would not cause a false positive reading for opiates on a drug test.

Drug Testing for Imodium

Loperamide and Pregnancy

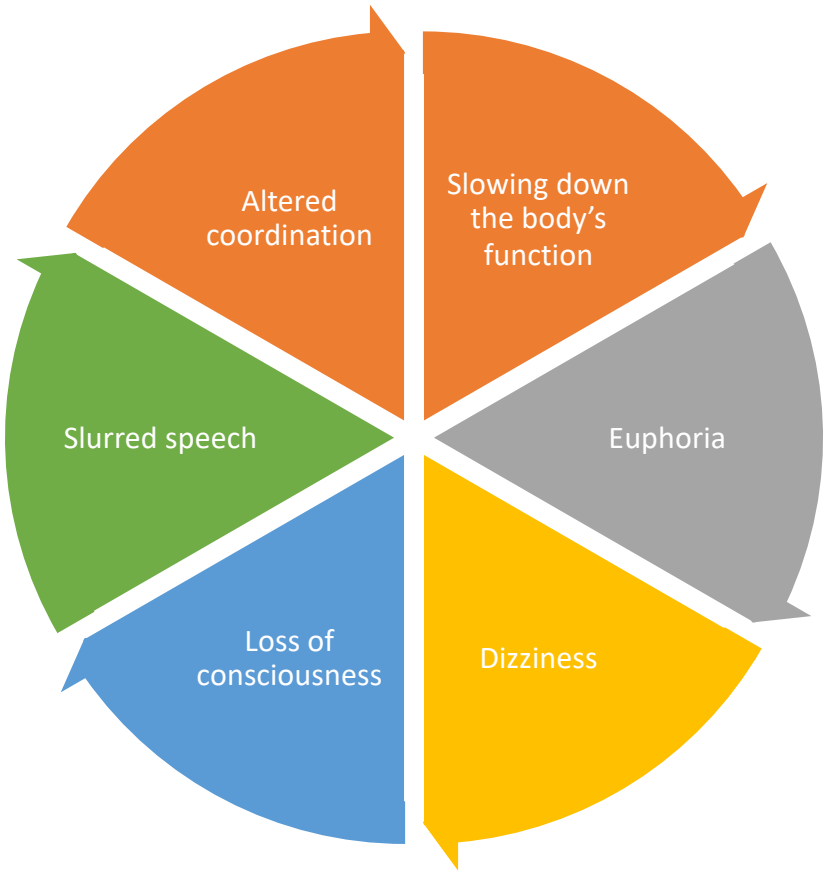
- FDA pregnancy risk classification by trimester (1st/2nd/3rd): C/C/C
- US FDA pregnancy category C: Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.
- **Loperamide Breastfeeding Warnings**
- Use is not recommended.
  Excreted into human milk: Yes
- *Product Information. Loperamide Hydrochloride (loperamide)." Teva Pharmaceuticals USA, North Wales, PA.*

Inhalants

What Are Inhalants?

- Inhalants are invisible, volatile substances found in common household products that produce chemical vapors that are inhaled to induce psychoactive or mind-altering effects
- These are often the first drugs that young children use
- 1/5 kids use inhalants by 8th grade
- Inhalants are invisible, volatile substances found in > 1,000 common household products
- They are inhaled to induce euphoric effects due to anoxia (lack of oxygen) in the brain!!!

Inhalant Short-Term Effects



Dangers of Inhalants

- Sudden sniffing death
  - Sudden sniffing death is particularly associated with the abuse of butane, propane, and chemicals in aerosols.
- Inhalant abuse can also cause death by asphyxiation from repeated inhalations, which lead to high concentrations of inhaled fumes displacing the available oxygen in the lungs, suffocation by blocking air from entering the lungs when inhaling fumes from a plastic bag placed over the head, and choking from swallowing vomit after inhaling substances.

Drug Testing for Inhalants

- Inhalants are **not detected** by routine urine drug screenings, so detection relies on the clinical diagnosis of knowledgeable medical professionals.
- Clinical testing can show abnormal laboratory results, such as elevated liver enzymes. Blood and other tissues can be tested by gas chromatography technique.
- Detection relies on the clinical judgment of medical personnel who also administer screening questions as part of conducting a thorough history and physical examination.

Drug Testing for Inhalants

- Some of the laboratory tests which are commonly being done for a patient presenting with acute inhalant intoxication or suspected inhalant use includes a complete blood count, determination of electrolyte, phosphorous, and calcium levels, an acid-base assessment, hepatic and renal profiles, and cardiac/muscle enzyme analysis.
- Specific urine drug testing is sometimes useful as part of the treatment-compliance plan when benzene, toluene, or a similar agent has been chronically abused, because major urinary metabolites (phenol and hippuric acid, respectively) are detectable when there has been a high level of use.
- Detection and monitoring of these compounds often include analysis for the parent compound and its metabolites.
- Laboratory has a very important role in the substance abuse testing program.

Inhalants and Pregnancy

Women who are occupationally exposed to solvents have more menstrual disorders, and preeclampsia and spontaneous abortions are more common in pregnant women who abuse inhalants.

Teratogenic effects secondary to maternal exposure to inhalants may lead to 'fetal solvent syndrome' with associated congenital neurological defects including microcephaly and cognitive impairments.

Signs of neonatal withdrawal include high-pitched cry, and disturbed sleep and feeding.

*L Baydala; Canadian Paediatric Society, First Nations, Inuit and Métis Health Committee Paediatr Child Health 2010;15(7):*443-8

Ketamine

Dr. Merrill Norton Pharm.D.,D.Ph.,CMAC

What Is Ketamine?

- Ketamine is a dissociative anesthetic that has some hallucinogenic effects.
- It distorts perceptions of sight and sound and makes the user feel disconnected and not in control.
- It is an injectable, short-acting anesthetic for use in humans and animals. It is referred to as a “dissociative anesthetic” because it makes patients feel detached from their pain and environment.
- Ketamine can induce a state of sedation (feeling calm and relaxed), immobility, relief from pain, and amnesia (no memory of events while under the influence of the drug).
- It is abused for its ability to produce dissociative sensations and hallucinations. Ketamine has also been used to facilitate sexual assault.

Ketamine Psychedelic effects

- K-land: mellow, colorful experience
- K-hole: out of body, near death
- Baby food: blissful, infantile state
- God: users meet their maker

Drug Testing for Ketamine

- While ketamine clears the system of people who take it within one to three days, it can show up on drug tests for longer, depending on whether or not metabolites are left behind. A standard drug screening panel won't detect ketamine, but specialized tests can.
- It's possible to detect ketamine in the following ways:
- **Urine test**: Up to 14 days after someone uses the drug. There has even been some research showing it can appear in a urine test for more than 30 days after someone uses it.
- **Hair tests**: These can show ketamine use for months after someone's last dose.
- **Blood test**: Usually, this type of test only shows ketamine for up to 24 hours after someone last used it.
- Half life is 45 minutes

Ketamine and Pregnancy

- It is not recommended for use during obstetrics, pregnancy, or breastfeeding as it is unknown if this medication passes into breast milk.
- Pregnant women has posed a concern about the neurotoxicity of ketamine to the immature brains of developing fetuses and children.
- Disturbance in brain development during these critical periods is likely to trigger long-term brain dysfunctions and ultimately lead to neurobehavioral impairment.
- Front. Neurosci., 22 February 2019 | https://doi.org/10.3389/fnins.2019.00138


Khat

What Is Khat?

Pronounced “cot”

It is a stimulant drug derived from a shrub (*Catha edulis*) native to East Africa and southern Arabia

Use is considered illegal because one of its chemical constituents, cathinone, is a Schedule I drug

Khat found in the U.S. often comes in by mail from Africa

SOURCE: NIDA. (2011). *NIDA DrugFacts: Khat*.

Khat Effects

- Manic behavior/ violence
- Paranoia
- Nightmares
- Hallucinations
- Increased blood pressure/ heart rate
- Brown staining of the teeth
- Insomnia
- Physical exhaustion
- Liver damage – hepatitis
- Heart complications – heart attack

Drug Testing for Khat

A gas chromatographic-mass spectrometric procedure for detection of cathinone (Khat) and methcathinone (CAT) in urine are developed

Khat samples in which any level of cathinone is found by chemical analysis are treated as Schedule I plant material. Khat samples in which only cathine is detectable by chemical analysis are treated as Schedule IV plant material.

Khat and Pregnancy

- There is an association between pregnant women, khat chewing and preterm birth, but evidence of association with Prelabor Rupture Of Membranes is sparse.
- study found a significant association between khat chewing in pregnancy and PROM. Efforts to reduce PROM need to consider prevention of khat chewing in pregnancy.
- A specific strategy need to protect pregnant women from khat chewing.
- *Tesfaye Assebe Yadeta et al. Khat chewing in pregnant women associated with prelabor rupture of membranes, evidence from eastern Ethiopia. Pan African Medical Journal. 2020;36:1. [**doi**: 10.11604/pamj.2020.36.1.22528]*

Khat and Pregnancy

- Reported and suggested adverse effects of khat in humans:
- Obstetric effects: low birth weight, stillbirths, impaired lactation;

Metabolic and endocrine effects	hyperthermia, perspiration, hyperglycemia
Ocular effects	blurred vision, mydriasis
Central nervous system	dizziness, impaired cognitive functioning, fine tremor, insomnia, headaches
Psychiatric effects	lethargy, irritability, anorexia, psychotic reactions, depressive reactions, hypnagogic hallucinations


Kratom

What Is Kratom?

Kratom is a tropical tree native to Southeast Asia.

Consumption of its leaves produces both stimulant effects (in low doses) and sedative effects (in high doses), and can lead to psychotic symptoms, and psychological and physiological dependence.

Kratom leaves contain two major psychoactive ingredients (mitragynine and 7-hydroxymitragynine).

These leaves are crushed and then smoked, brewed with tea, or placed into gel capsules.

Kratom has a long history of use in Southeast Asia, where it is commonly known as thang, kakuam, thom, ketum, and biak.

In the U.S., the abuse of kratom has increased markedly in recent years.

Kratom

Long-term effects of Kratom use include:

- Addiction and dependence
- Hepatotoxicity
- Seizure
- Anorexia and weight loss

There is no treatment specific for kratom addiction available.

There has been one case of Neonatal Abstinence Syndrome (NAS) in an infant whose mother was a kratom user and who responded to opioid treatment.

Drug Testing for Kratom

- Initial presumptive testing by immunoassay (IA) at a testing threshold of 5.0 ng/mL; presumptive positives confirmed by definitive liquid chromatography/tandem mass spectrometry (LC/MS-MS) at a testing threshold of 1.0 ng/mL. (Labcorp)
- Kratom isn't detectable on the standard 5-panel drug test, but it does show up in blood or urine tests.
- Additionally, there is a specific kratom drug test known as the kratom 10-panel test that clinicians can administer as well.
- In other words, yes, kratom does show up on some drug tests, but not as frequently as other, more dangerous drugs.

Kratom and Pregnancy

Typically babies who withdraw after exposure to maternal kratom use during pregnancy exhibit clinical signs associated with opiate withdrawal, including jitteriness, sneezing, excessive crying and variable appetite.

The babies were treated with morphine and then gradually weaned off until their signs and symptoms subsided.

They were monitored for an additional 48 hours for any signs of withdrawal before being discharged home.

Kratom and Pregnancy

Based on the available reports and evidence, typically babies who withdraw after exposure to maternal kratom use during pregnancy exhibit clinical signs associated with opiate withdrawal, including **jitteriness, sneezing, excessive crying and variable appetite**.

Although there are no formal studies of kratom transmission through breastmilk, The American Kratom Association (https://www.americankatom.org/science) **recommends against use among pregnant or breastfeeding women**. However, alleviation of withdrawal symptoms has been reported with breastfeeding.


Krokodil

What Is Krokodil?

Krokodil is known as “the zombie drug”

It is a synthetic opioid-like substance that is 10 times more potent than morphine

Krokodil is a designer drug from Russia that is made by boiling codeine with a diluting agent such as paint thinner, gasoline, or iodine

This process produces a murky yellow liquid that can be injected into the veins

Krokodil Effects

Short-term

- The effects are similar to heroin
- Sedation
- Pain relief
- Slowed breathing

Long-term

- Damaged blood vessels and tissue around injection site
  - → Leads to greenish, scaly skin
  - → Develops into gangrene and possibly amputation
- Open, slow-healing skin ulcers
- Blood poisoning
- Rotting gums and tooth loss
- Memory loss
- Speech impairment

Drug Testing for Krokodil

- Because of the high degree of contamination with different toxic chemicals, which vary among users, scientific analysis of the chemical composition is not available.
- Desomorphine can be detected in blood samples within a couple of hours and **in urine samples within 2-3 days after** Krokodil administration.
- Current commercially available drug screening tests cannot detect this drug.
- Routine screening tests done at hospitals will test for opiates, but cannot identify desomorphine.
- This will limit opportunities for physicians to confirm the drug usage in patients with clinical findings compatible with usage of this drug.
- Recent data suggest that novel sol-gel titania film-coated needles for solid-phase dynamic extraction gas chromatography/mass spectrometry analysis will be a promising technique for **desomorphine and desocodeine** analysis in urine.

Krokodil [Desomorphine] (dihydrodesoxymorphine) and Pregnancy

- The drug is made from codeine mixed with household chemicals like paint thinner and gasoline, Sack says. It's injected and can reportedly cause a high "ten times more powerful than **morphine**.
- Infections
- Blood poisoning
- Meningitis
- neurologic, liver, and kidney impairments
- Haskin, A., Kim, N., & Aguh, C. (2016). A new drug with a nasty bite: A case of krokodil-induced skin necrosis in an intravenous drug user. *JAAD case reports*, *2*(2), 174–176. https://doi.org/10.1016/j.jdcr.2016.02.007

Thank You For Your Time

Any Questions?