

#FSHP2018



Toxicology and Overdoses

By: Kathy Moorman

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Objectives

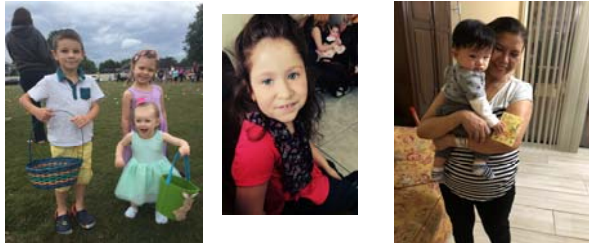
- Discuss common drugs in overdoses, both legal and illegal
- Recognize reversal agents
- Discuss administration techniques for reversal agents
- Discuss tentative treatments for overdoses

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Why do we do what we do



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Top 9 Causes of Overdoses

- Opioids
- Benzodiazepines
- Ethyl Alcohol
- Amphetamines
- Marijuana
- Antihistamines
- Acetaminophen
- Pesticides
- Anticonvulsants

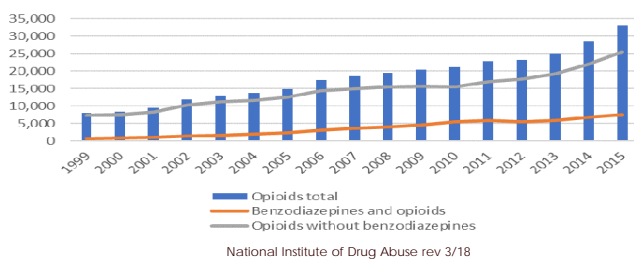


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Opioid Overdose Deaths Involving Benzodiazepines



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Facts

BLACK BOX WARNING

- More than 30% of opioid overdoses also involve benzodiazepines
- Every day over **115 Americans die of overdoses**
- Individuals who are prescribed both benzodiazepines and opioids are **10X more likely** to die of an overdose.
- Both opioids and benzodiazepines now have **black box** warnings issued by the FDA recommending they not be prescribed together.

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OPIOID Toxicity

- Opioids include: HYDROmorphine, MORphine, meperidine, fentanyl, oxycontin and others
- Symptoms of overdose include drowsiness, slow breathing, pinpoint pupils, cyanosis (blueish skin due to poor circulation), loss of consciousness, and death.
- Due to their addictive potential and easy accessibility opioid addiction is a growing problem.
- Antidote for an acute opioid overdose in the emergency room is **Narcan(naloxone)**, which is an opioid antagonist.

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What do you use to reverse opioids?

- Answer: **Naloxone**



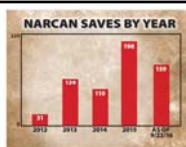
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Naloxone (Narcan®)

- Comes as a 2mg/2ml syringe or 1mg intranasal
- Can be administered IM, IV Push, IV, intranasal
- Benefits: It withdraws all narcotic effects for a limited period of time
- Deficits: If the patient is on opioids and in pain prior to the naloxone administration and they receive naloxone, the pain relief associated with the opioids is also reversed

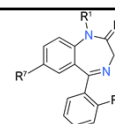


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Benzodiazepines



- **Oral benzodiazepine (BZD) overdoses**, The most common symptoms of **overdose** include central nervous system (CNS) depression, impaired balance, ataxia (lack of muscle control), and slurred speech

Treatment of overdose:

- Symptomatic and supportive care is the mainstay of treatment of **benzodiazepine overdose**.

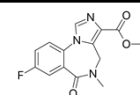
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What do you use to reverse benzos?

- **Flumazenil**



Flumazenil

- Inhibits the activity at the benzodiazepine receptor site
- Initial dose: 0.2 mg over 30 seconds; if the desired level of consciousness is not obtained 30 seconds after the dose, 0.3 mg can be given over 30 seconds
- Repeat doses: 0.5 mg over 30 seconds repeated at 1 minute intervals
- Maximum total cumulative dose: 3 mg
- Onset of action: 1-2 minutes
- Peak: 3 minutes

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→ 2016 marijuana use among full time college students and non-college peers ³

	1996	2006	2016
19- 22 year olds	4.0%	5.3%	7.8%
College	2.8%	4.3%	4.9%
Non-College	5.3%	6.7%	12.8%

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→ Other drug use in college age/ non- college students ³

- College students use more amphetamines
- College students binge drink more
- College students tend to smoke less
- Greek life membership associated with binge drinking (fraternities) and marijuana use (fraternities and sororities) use in later life ³

Journal of Adolescent Health March 2011 Volume 62, Issue 3, Supplement, Pages S35-S43

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→ Marijuana

- Cannabis has been used for both recreational and medicinal purposes for several centuries
- However, in most countries, it is categorized as a drug of abuse and its use is strictly prohibited
- In the United states the FDA schedules it as a C-1 drug
- Cannabinoids appear to affect the same reward systems as alcohol, cocaine, and opioids



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→ Treatment of Marijuana Overdose

- Although marijuana overdose symptoms are rare, it is impossible for people to overdose on the drug
- Treating marijuana intoxication is typically a waiting game
- **Activated charcoal** is used, if the drug has been eaten
- Sedatives, benzodiazepines, such as **diazepam (Valium)** or **lorazepam (Ativan)**, may be given
- Fluids through the vein (intravenous, or IV)
- Reassuring those who have panic reactions, as well as additional supportive care



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→ Anecdotal information (not recommended!!)

- There have been reports of marijuana over-use resulting in blood thinning effects.
- Chronic vomiting has been treated by **oral capsaicin**.



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→ Alcohol



An overdose of alcohol occurs when a person has a blood alcohol content (BAC) sufficient to produce impairments that increase the risk of harm.

Florida prohibits driving any type of vehicle if your BAC is 0.08% or higher. This level is called "euphoria"



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→ Effects of Alcohol Poisoning

- include confusion; difficulty remaining conscious; vomiting; seizures; trouble with breathing; slow heart rate; clammy skin; dulled responses, such as no gag reflex (which prevents choking); and extremely low body temperature.



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→ Alcohol Overdose Treatments

- Medical personnel may administer **oxygen and intravenous (IV) fluids** to keep a person safe and hydrated
- The patient may also receive **vitamins and glucose (Banana Bag)** since an alcohol overdose can result in low blood sugar and chronic drinking leads to vitamin deficiencies.



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→ Alcohol Overdose Treatments

- In more serious cases of alcohol overdose, **the patient's stomach may be pumped** to remove alcohol that has not metabolized
- IV medication such as **diazepam or lorazepam** may also be administered to lower the risk of deadly withdrawal symptoms such as seizures or delirium

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→ Amphetamines



Any person who abuses amphetamines is in danger of an amphetamine overdose. Overdose can occur even in first-time users, depending on the amount of drug used in one sitting.

Symptoms can manifest as aggression, dangerously high blood pressure, rapid heartbeat, coma, or even death.

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→ Treatment of amphetamine toxicity

- A recent, comprehensive study for amphetamine overdose indicated that:
 - **beta blockers** were helpful in controlling accelerated heart rate and high blood pressure
 - **antipsychotic** medications and **benzodiazepines** were the best course of action to control agitation and psychosis after an amphetamine overdose



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→ Antihistamines

Antihistamines are commonly used to treat allergies.

Symptoms of **overdose** include tachycardia, blood pressure disturbances, dry mouth, ataxia, agitation, psychosis and, uncommonly, convulsions. Non-sedating **antihistamines** are less toxic in **overdose** but may cause tachycardia, drowsiness, gastrointestinal disturbances and headache.

Most common cause of overdose in children is giving them adult doses of antihistamines

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→ Antihistamine overdose

- Treatment of antihistamine overdose includes **activated charcoal** (when indicated) and general symptomatic and supportive care.
- Cardiovascular monitoring, including of the electrocardiogram, is appropriate
- Convulsions should be treated with a **benzodiazepine**



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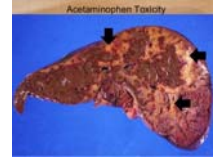
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→ Tylenol(acetaminophen)

Acetaminophen use is the **#1 cause of liver failure and need for liver transplants.**

The recommended maximum daily dose is 4,000 milligrams (mg) per day for adults. In severe cases, an **overdose** of acetaminophen can cause liver failure or death



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→ Treatment for acetaminophen toxicity

- The antidote to acetaminophen overdose is **N-acetylcysteine (NAC)**. It is most effective when given within 8 hours of ingesting acetaminophen. NAC can prevent liver failure if given early enough. It can be given orally or IV.

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→ Pesticides

Many insecticides can cause **poisoning** after being swallowed, inhaled, or absorbed through the skin

Symptoms may include eye tearing, coughing, heart problems, and breathing difficulties

Organophosphates include malathion, parathion, fenthion, dursban, diazinon, chlorpyrifos, and sarin. Carbamates include aldicarb, carbaryl, carbofuran, fenobucarb, and oxamyl



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→ Treatment for Pesticide Poisoning

- Treatment involves:
 - Removal of contaminated clothing
 - Washing of skin
 - Symptomatic and supportive care to assure support of breathing
 - An ECG to check heart function
 - Irrigate eyes with sodium chloride or lactated ringers

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→ Treatment for Pesticide Poisoning

- Atropine- is used to assure adequate oxygenation by drying up excessive lung secretions



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Treatment for Pesticide Poisoning

Pralidoxime- used to reverse muscle paralysis. Must be administered in the first 48 hours of exposure. Dose is 1-2 grams IV in 100 ml NS over 15 to 30 minutes, repeat in 1 hour and then every 3 to 8 hours until symptoms resolve.

Can be administered at the same time as **atropine**.



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Anticonvulsants

Anticonvulsant drugs include **phenytoin, carbamazepine, lamotrigine, topiramate, gabapentin and other agents**

Symptoms vary depending on which drug was ingested but may include lethargy, dizziness, **ataxia**, stupor, **nystagmus** (an uncontrollable or involuntary, repetitive, rhythmic movement of the eyes), seizure prolongation, nausea/vomiting, and hypokalemia



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Treatment for Anticonvulsant Poisoning

- Symptomatic and supportive care (ABC's)
- Prevent absorption- lavage activated charcoal
- Enhance elimination
~hemodialysis



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Antidepressants

Overuse of **tricyclic antidepressants (TCAs)** is a major cause of both non-fatal and fatal drug poisoning in the world.

TCA toxicity can be caused by either an acute ingestion or a chronic ingestion

Symptoms include, dry mouth and skin, urinary retention, decreased gastric motility, altered mental status, delirium, hallucinations, and seizures

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Antidepressant Toxicity Treatment

- Intubation if patient is **obtunded** (unable to arouse or awaken)
- Start **IV fluids**
- ECG of heart
 - If the QRS interval is greater than 10msec they will give sodium bicarbonate
- Benzodiazepines** to treat TCA assoc. convulsions
- Activated charcoal** may be administered in a hospital

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Questions?



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