DARLENE ON DRUGS

Part 2: Narcotic Analgesics and Cannabinoids

Washington State Office of Public Defense

What are drugs?

Drugs are any substances that have a physiological effect when introduced into the body.

What happens when a person consumes drugs?

A. D. M.E.

Absorption, Distribution, Metabolism, Excretion-- the four key processes that a drug goes through within the body. It describes how it moves from the site of administration into the bloodstream, is distributed throughout the body's tissues, is broken down by the body's enzymes (metabolized), and ultimately eliminated from the body through excretion

What is a controlled substance?

Controlled substances are drugs that are regulated by law. They are classified into schedules from I to V, with Schedule I having the highest potential for abuse and therefore the most stringent regulations.

NARCOTIC ANALGESICS OPIOIDS

What are Narcotic Analgesics?

Narcotic analgesics are pain-relieving drugs that include opioids. While "narcotic" originally referred to substances affecting mood or behavior—often associated with illegal drug use—it is commonly used to describe opioids. "Analgesic" simply means a painkiller. Over-the-counter analgesics like ibuprofen and Tylenol are not opioids.

What is an Opioid?

Opioids are natural, semisynthetic, or synthetic substances that bind to opioid receptors in the brain, producing pain relief and euphoria. Common opioids include:

- **Prescription painkillers:** Hydrocodone (Vicodin), Oxycodone (Percocet, OxyContin), Morphine, Codeine, Methadone, Hydromorphone (Dilaudid), Buprenorphine (Suboxone)
- **Illicit opioids:** Heroin, Fentanyl

What are the typical effects of Narcotic Analgesics?

Effects of narcotic analgesics can include relaxation, drowsiness, euphoria, slow speech, respiratory depression and slow response times. With a few exceptions, one of the tell-tale signs of Narcotic Analgesic consumption is pinpoint pupils.

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How do opioids work?

Opioids are substances that interact with specific receptors in the brain and spinal cord, known as opioid receptors, which are part of the body's natural pain-relieving system. When opioids bind to these receptors, they block pain signals and can create feelings of euphoria.

While effective for pain relief, opioids also stimulate the release of dopamine, a neurotransmitter linked to pleasure. Over time, this can lead to tolerance, requiring larger doses for the same effect, and dependence, where the brain relies on the drug to feel normal. Chronic use can alter brain chemistry, making it difficult to function without the drug.

What is naloxone and how does it work?

Naloxone is a medication that quickly reverses the effects of an opioid overdose. It works by binding to the same opioid receptors in the brain that opioids like heroin or prescription painkillers target. However, naloxone acts as an antagonist, meaning it blocks or "reverses" the effects of opioids. When administered, naloxone displaces the opioids from the receptors, reversing symptoms such as slow breathing, loss of consciousness, and sedation, which can be life-threatening during an overdose.

Naloxone works rapidly, typically within minutes, and can be given as an injection or a nasal spray. Since its effects are temporary, it may be necessary to administer naloxone again if the symptoms of the opioid overdose return.

What is methadone and how does it work?

Methadone is a long-acting synthetic opioid primarily used to treat opioid addiction and manage pain. It can be administered in the form of a pill, liquid, or wafer. Methadone works by binding to the same opioid receptors in the brain that other opioids, such as heroin or fentanyl, target. This interaction alters the way an individual's brain and nervous system respond to pain, providing relief. Additionally, methadone is often prescribed to help people reduce cravings and alleviate withdrawal symptoms.

What is the half-life of heroin?

While each person metabolizes substances at different rates, the approximate half-life of heroin is 2 minutes. This means that, in most cases, heroin will not be detectable in a person’s blood or urine.

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What are the metabolites of heroin?

One of the metabolites of heroin is morphine. This means that if a person has consumed heroin, their toxicology report will likely only show a positive result for morphine because heroin has a very short half-life. Since morphine is also an opioid, toxicologists cannot definitively determine from the toxicology report alone whether a person ingested morphine directly or used heroin.

What are active vs. inactive metabolites?

An active metabolite is a compound generated during metabolism that can have therapeutic effects or potentially cause impairment. Many active metabolites can function as medications on their own. For instance, the metabolite of heroin is morphine, which is widely used as a pain reliever.

An inactive metabolite is one that does not produce any therapeutic or impairing effects. A good example of this is Carboxy-THC, the metabolite of THC, which is considered inactive.

What is the half-life of oxycodone?

The approximate half-life of oxycodone is about 3 hours. It is metabolized into noroxycodone and oxymorphone. Notably, oxymorphone is also available as a medication on its own under the trade name Opana, making it an active metabolite of oxycodone. Additionally, you can consult your toxicologist about which drugs are included in a specific testing panel. For example, you might ask what drugs and metabolites are included in the opiate panel.

What is the half-life of Fentanyl?

The approximate half-life of fentanyl is between 3 and 7 hours. Its metabolites include norfentanyl, despropionylfentanyl, hydroxyfentanyl, and hydroxynorfoentanyl.

What is a major vs. minor metabolite?

A major metabolite is the compound that is the most abundant. A minor metabolite will be in a much smaller abundance.

For example, fentanyl's active, major metabolite is Norfentanyl and is the most abundant at 26 to 55% of the total dose. Minor metabolites (despropionylfentanyl, hydroxy fentanyl, and hydroxynorfoentanyl) can be detected at less than 1%. Most toxicology laboratories will only test for major metabolites.

Despropoionylfentanyl, a minor inactive metabolite of fentanyl, is also known as 4-ANPP. This is also encountered as an illicit fentanyl precursor.

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CANNABINOIDS

What is a Cannabinoid?

Cannabinoid refers to various naturally occurring, biologically active chemical compounds (such as cannabidiol or cannabinol) found in hemp or cannabis, including some (like THC) that possess psychoactive properties.

How many kinds of Cannabinoids are there?

Research has found that the cannabis plant produces between 80 and 100 cannabinoids and about 300 non-cannabinoid chemicals. The two main cannabinoids are delta-9-tetrahydrocannabinol (THC) and cannabidiol (CBD).

How many types of THC are there?

There are ten types of THC: Delta 9, Delta 10, Delta 11, THC-A, THC-O, THC-P, THC-V, THC-B, HH, and THC-O-Acetate. Delta 9 and Delta 8 are the most common.

What are the effects of Cannabinoids?

Cannabinoids can affect perception of time, space, and distance. They may also cause bloodshot eyes, dilated pupils, and body tremors, particularly fluttering eyelids.

What about green tongues?

Currently, scientific research has not established a direct link between marijuana use and a green coating on the tongue.

How do Cannabinoids work?

CBD, CBN, and THC function like a lock and key with specific receptors in the human body. These receptors are part of the endocannabinoid system, which plays a crucial role in regulating various physiological processes, including pain modulation, memory, appetite, anti-inflammatory effects, and other immune responses. The endocannabinoid system consists of two main types of receptors, CB1 and CB2, each serving distinct functions that contribute to human health and well-being.

What are K2 and Spice?

K2 and Spice are trade names for synthetic cannabinoids that are often sold as herbal incense or potpourri. The cannabinoid compounds found in K2 and Spice were developed by John W. Huffman in a laboratory to mimic the properties of Delta-9 THC for medical research purposes. As a part of his research, the scientific findings and formulas were published. It's important to note that Mr. Huffman has no direct connection to the creation of the actual products known as K2 and Spice.

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Are K2 or Spice a grown plant like Marijuana?

No, they are powders mixed with green leafy substances and sold as herbal incense or potpourri.

Are K2 and Spice illegal?

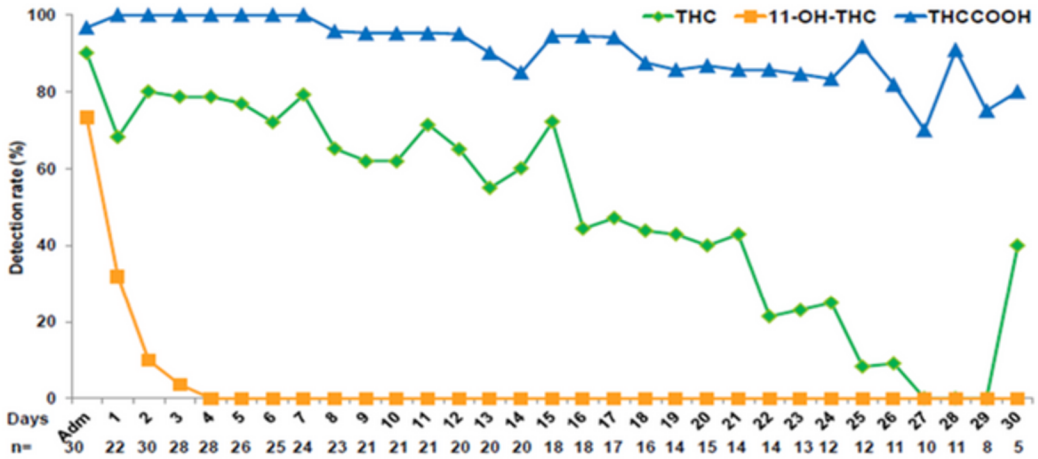
While it does depend on what specific substance you encounter, generally, yes. The Synthetic Drug Abuse Prevention Act is part of the FDA Safety and Innovation Act of 2012, signed into law by President Obama. The law permanently places 26 types of synthetic cannabinoids and cathinones into Schedule I of the Controlled Substances Act (CSA). They are likewise illegal under the RCWs.

What is the half-life of Delta-9 THC?

The half-life of Delta-9 THC is approximately 1 to 3 hours. The major metabolites of THC are Carboxy-THC and 11-Hydroxy-THC (sometimes written as 11-OH-THC). With the half-life, THC is a unique one. Some literature states the half-life is 50-100 hours. Another says 20-57 hours. What makes it unique is it is dependent on how it is absorbed. If smoked, the concentration in the blood can drop significantly within 1-3 hours.

Why do some clients continue to have positive drug tests even after they have stopped consuming Delta-9 THC?

Research indicates that THC can remain in the system of a chronic user for an extended period. The chart below displays test results for chronic users. If your client has similar urine test results while in an ongoing treatment program, dehydration may be a factor. When someone is dehydrated, their urine becomes more concentrated, leading to higher detected levels of THC and other substances. Some laboratories adjust for this by measuring the urine's specific gravity to account for dehydration, but not all do, which can make interpreting results more challenging.



Bergamaschi et al., *Clin Chem* 2013

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What is the difference between a drug screen and a confirmatory test?

A drug screen is a preliminary test that indicates the presence of a drug, while a confirmatory test examines the drug in greater detail to verify its identity and concentration.

What about therapeutic dosage? Is there consensus on what they are for a particular drug?

A therapeutic dose refers to the amount of a substance that is expected to be present in a person's system when taking a prescribed drug at the recommended dosage. It's important to note that there may not be a single, universally accepted amount for the therapeutic dose of a specific drug. When interviewing a toxicologist about the therapeutic dosage of a particular drug, be sure to ask which studies or papers they are referencing, and whether there are other studies that suggest different dosages.

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A TOXICOLOGIST CAN NOT EQUATE LEVEL OF IMPAIRMENT WITH THE CONCENTRATION OF A SUBSTANCE.

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Common papers that toxicologists consult regarding therapeutic levels and half-lives include:

Charles L Winek's-
Drug & chemical blood level data 2001

Martin Schulz's-
Therapeutic and toxic blood concentrations of more the 1100 drugs and other xenobiotics

Both articles are available in the OPD Training Resource Library found here:
https://bit.ly/DoDResources

	Therapeutic Range	Toxic Range	Half Life
Fentanyl			
WINEK	0.01-0.10 mg/L	No data	
SCHULZ	0.0003-0.3 mg/L	fatal: 0.003-0.02	1-3.5 hours
			17 hours if transdermal
Morphine			
WINEK	0.1 mg/L	fatal: 0.05-4.0 mg/L	
SCHULZ	0.01-0.1 mg/L	>0.1mg/L	1-4 hours
Methadone			
WINEK	0.075-1.10 mg/L	0.2-2.0 mg/L	
SCHULZ	0.1-0.6 mg/L	>0.6 mg/L	24-48 hours
Oxycodone			
WINEK	0.01-0.10 mg/L	0.2-5.0 mg/L	
SCHULZ	0.005-0.1 mg/L	>0.2mg/L	2-5 hours