

Topic 13: Street Drugs

- Human have always enjoyed mind altering substances
- Chemicals for religious purposes
 - Many religions use hallucinogens during ceremonies
 - At least at some point during their history
- Incense Acetate from frankincense
 - Mild hallucinogen makes people more susceptible to suggestion
- Cow poop releases methane as it decomposes
 - People will collect the gas in a plastic bag and breathe it in
- Drugs are illegal because they are dangerous
 - Health
 - Adverse effects
 - Personal life (strongly addictive that people have so self control when they should/shouldn't take the drug)
 - Employability
 - Destruction of relationships and families
 - Society
 - Health costs
 - Economic impacts to families
 - Economic impact to society
- Drugs are dangerous because they are Illegal
 - Fines
 - \$200 and up
 - Jail time
 - Up to life in prison
 - Criminal record (often the longest lasting effect)
 - Limits employment opportunities
 - Limits ability to travel
 - Secondary crime
 - Up to 75 % of property crime is drug related
 - Violent crime
- Buyer beware
 - Street drugs are not pure substances
 - They can contain anything
 - Impossible to know what is actually in them
- Solvents are often abused in young people (elementary school)
- Nitrous oxide in whipped cream
- Weed
 - Easy to grow
 - Buds are high in THC
 - Dry them and smoke them to consume the THC
 - Resin collected from buds
 - Hash
 - The reason it became illegal
 - In the 20/30 there was a crime wave in new Orleans

- The town leaders knew weed was a popular drug in the area of the city with the high crime rates, and thus they made an association between the two
 - At first they placed taxes on the weed
 - When you paid the taxes they gave you a stamp to say you were allowed to have it
 - But they never actually gave anyone the stamp
 - There was then a lot of propaganda to convince the public that weed is an awful drug
 - Very popular in the 60s
 - Hippy culture
 - THC
 - Is used medicinally
 - Treatment to improve appetite
 - Munchies
 - Treatment for multiple sclerosis
 - Helps with the muscle spasms
 - Comparable to tylenol to treat pain
 - There are anti nausea medications that are much more effective
 - Impairs memory
 - Slows down reaction times
 - The smoke is toxic
 - Carbon monoxide (heart attack)
 - Carcinogens (cancer)
 - Dose makes the poisons
 - People who smoke cigarettes are exposed to much more smoke than a casual weed smoker
 - Edibles
 - Dosage can become an issue with these, its easy to eat 5 cookies when you are only supposed to have one
 - Legalization
 - Fate of existing criminal records of possession are unclear
 - Someone with a record of distribution is less likely to be excused of their record
 - Similar legislation to alcohol
 - Test are available
 - However there is no good information about how much THC is needed in the blood for us to become intoxicated
 - Most research has been focused on toxicity and side effects
 - They are going to have to make up a number when the legislation comes out
 - Heavy use may lead to schizophrenia (multiple times a day)
 - THC triggers the release of dopamine in the brain
 - We know that schizophrenia is related to dopamine

- However the symptoms of schizophrenia often appears at the ages of 18
 - However this the age people often smoke at
 - It has been hypothesized that the THC alleviates their symptoms and when they stop smoking their symptoms are no longer alleviated
 - Marijuana also contains cannabidiol
 - In the 60s
 - 2% THC
 - Equal amounts of cannabidiol
 - 2015
 - 20% THC
 - Almost no cannabidiol
 - When you breed the plant to have high levels of THC the cannabidiol levels decrease
 - Cannabidiol has antipsychotic activity
 - Semi pure THC (shatter)
 - Extract the THC Using butane from the bud
 - Cannabinoid Hyperemesis Syndrome (CHS)
 - Abdominal pain, nausea, vomiting
 - Sufferers self treat with heat
 - Could be related to the higher contents of THC in marijuana products
 - Associated with heavy marijuana use
 - 'Fake' pot in herbal incense
 - Supposed to be a legal version of marijuana
 - Herbal incense has a similar compound to THC
 - People would take leaves that smell nice when you burn them and soak them in the herbal incense
 - JWH-018
 - Binds to the same receptor as THC
 - Was made to use in a lab however started showing up in the herbal incense
 - More potent than THC
- Cocaine
 - Used as a stimulant for centuries
 - Native communities in Peru chew coca leaves instead of drinking coffee
 - Cocaine in COke
 - Coca cola is the non alcoholic version of a medication that had coca leaves in it
 - Found in many medicinal product at the turn of the century
 - Dandruff
 - Topical anesthetic
 - US government made it illegal in 1914
 - People were becoming addicted and it altered their lifestyles and their ability to function properly

- Similar to weed
 - Created a tax but then did not really allow people to pay the taxes
 - This way doctors can still use it
 - Stepan Chemical in New Jersey
 - Only company legally allowed to import coca leaves in the US
 - Extract the cocaine from the leave so they can then be sold to companies like Coca-Cola
 - Most is destroyed, some is kept for medical purposes
 - Cocaine is the inspiration more many topical anesthetics today
 - Cocaine is the number one smuggled substance worldwide
 - Consumptions
 - Snorting cocaine hydrochloride
 - Hydrochloride stabilizes the active ingredients
 - Very expensive you need a lot to get a good high
 - It is not absorbed very well
 - The effects
 - Very addictive
 - No tolerance
 - No physical withdrawal
 - Very strong psychological effect
 - As soon as you come down from the high you immediately want more
 - The most unsatisfying drug
 - Is experiments animals will pick the drug over sex and food
 - Crack Cocaine
 - Freebased cocaine
 - Stabilizer is removed from the compound
 - Can be done with baking soda in water and ether
 - After the stabilizer is removed it dries and crack, hence the name
 - Requires much lower doses
 - Cheaper
 - Smoked
 - Can be injected
 - Prevents the reuptake of dopamine
 - Side effects
 - Seizures
 - Psychiatric disturbances
 - Coke bugs
 - Stroke
 - Cardiac arrhythmia
 - Death
- Amphetamines
 - Used in World War II as a way to make ‘super soldiers’
 - Increased aggressiveness and endurance
 - First amphetamines abuse in military prison
 - At low doses nasal decongestant

- Stimulate your flight or fight response
 - Higher doses increases confidence and aggression
 - Stimulate your flight or fight response
 - And even higher dose creates a high/euphoria
 - Promotes the release of dopamine in the brain
 - Hyper Stimulates the body's reward system
 - Produce psychosis
 - Discovery
 - Benzedrine inhaler contained 250 mg
 - Had 10-12 doses separated in different reservoirs
 - Prisoners discovered they could open the inhaler and consume all the amphetamine at the same time
 - They also discovered it was soluble in water, so they would dissolve it in coke
 - Was used to treat depression
 - Developed a bad reputation in the 60s
 - Amphetamine users were shunned by other drug users because it stimulated aggression and violence
 - Made a come back in the 80s/90s
 - Similar compound Methamphetamine
 - Easy to get access to it
 - Pseudoephedrine is easily converted to meth
 - Pseudoephedrine was easy to order too
 - In the 80s it was estimated that half the pseudoephedrine being produced world wide was used to produce crystal meth
 - Dealers then started buying cold meds in bulk and convert it
 - Meth is a potent vasoconstrictor
 - Will cut off the blood supply
 - This is what causes users teeth to rot, and can eventually spread to the rest of the face
 - Happens to heavy user the blood supply is eventually cut off from your teeth and then your skin, which causes sores and infections
 - Dependence is very strong
- Opiates
 - Derived from poppy latex
 - Oldest documented drugs
 - Consumed in ancient China
 - If ingested in the proper way it can create a euphoric sensation
 - Hypodermic syringe was invented in 1856
 - A whole new way of consuming drug
 - It can now be injected directly into the bloodstream
 - Morphine
 - Injecting morphine became common after the civil war

- Because it was a new invention people weren't good at injecting the correct dosages and people quickly discovered that it can produce good effects
 - Heroin
 - Synthetic morphine
 - Was originally marketed as a non addictive version as morphine
 - Was sold as a cough suppressant
 - It is actually much more addictive
 - Enter the brain more efficiently
 - Became illegal in 1914
 - Taxation
 - Usually injected
 - You can see track mark that develop on people's skin from the injection of heroin
 - It is from the damage injecting the drug causes
 - The blood vessels become closed off and dies off
 - Codeine
 - Most common medicinal opiate
 - Largely synthetic
 - Semi synthetic
 - Manufactured from morphine
 - Does occur naturally but in very small amounts
 - Oxycodone (oxycontin)
 - First produced in 1939 as recycling a waste product of opium
 - Thebaine had no medical value
 - However thebaine can be converted to oxycodone
 - Wasn't a widely abused drug until the 90s
 - Hillbilly Heroin
 - Hard to convert in an underground lab
 - Most on the market is stolen
 - Depress central nervous system
 - Analgesia
 - Drowsiness
 - Apathy
 - Lethargy
 - Unconsciousness
 - Suppressed the nerves involved in breathing
 - This is usually the cause of death in users
 - Important painkillers
 - Modern surgery is possible due to these strong pain relievers
 - Used to make end of life care more comfortable
- Hallucinogens
 - Have been used since the dawn of time
 - Usually involve serotonin, which is found the primitive center of the brain, where the brainstem connects to the brain

- Magic Mushrooms
 - Contain psilocybin
 - Resembles serotonin
- Cane toads
 - Bufotenine
 - The toad secretes a poison to protect itself,
 - The poison contains the bufotenine
 - People will often have one of these toads as a pet and when they want to get high they will make the toad secrete its poison and then lick it off the toad
- Ergot in Rye bread
 - Had a large impact on the witch trials
 - Ergotamine is converted to lysergic acid which can then be converted into other things, like LSD
- LSD
 - Albert Hoffman, was trying to create drugs to treat mental health, accidentally consumed some and got high
 - He then took more and got really high ‘Bicycle Day’
 - Used by the CIA at McGill university in 1950s
 - Investigated the use of LSD
 - People volunteered to be subjects of a psychology study at McGill and unknowingly signed up for this experiment
 - Hallucinations
 - have religious significance
 - Leaves you believing that there is a connection between you and the spiritual world
 - Timothy Leary at Harvard
 - ‘Tune in turn on and drop out’
 - Often give you a sensation/belief that you can fly
- Atropine
 - Comes from the Deadly Nightshade, plant
 - It is a poison but given in specific doses it is a drug
 - Makes your pupils dilate, which is considered an attractive quality, women used to take small amounts to achieve this effect
 - Used in surgery
 - To manipulate the digestive system
- Hyoscine (aka Scopolamine)
 - Truth serum
 - People would tell you things they wouldn't normally
 - However not necessarily the truth
 - Associated with witchcraft
 - Used in flying potions
 - Atropine and hyoscine are not water soluble

- To administer this they would put the drug into fat/greasy material and then rub it into the gums and they would be absorbed through the mucus membranes
 - Or put it on a stick and then masturbate with it to get high (witch broomstick)
- Designer Drugs
 - Original narcotic laws were very specific
 - You had to ingest exactly the substance listed in the laws in order to be prosecuted
 - Designer Drugs: acted the same way as the restricted substance, however their chemical structure were different and therefore legal
 - The first of these were found in medical literature
 - Drugs that had never reached the market place or were not restricted
 - Chemist were the ones that started this movement, because they had the knowledge and tools to produce the new compounds
 - Fentanyl
 - Inspired the original designer drugs
 - Methylfentanyl
 - Much more potent than heroin
 - Had been designed to operate on the heroin system
 - 200g of heroin worth \$1 million
 - 200g of methylfentanyl \$1 billion
 - Addicts often died from overdose because they were just told its was specialized heroin and took their usual dose, of a drug that is 100x more potent then the drugs they usually take
 - Because the dose is extremely small it is hard to accurately measure the drugs
 - In the drug industry they dilute the drug into a filler (this is what makes up our pills)
 - You have to be able to get the drug to distribute evenly within your batch so that all pills have the same amount of the active ingredient
 - This way each pill has the same amount of active ingredient in each pill
 - By improperly mixing the designer drugs it makes them very dangerous because one pill may have no effect while another may be deadly
 - Designer drugs have been created off the original designer drugs
 - W-18 was discovered in Edmonton in a lab for experiments
 - It showed up in street drugs and was 100x more potent than fentanyl
 - Overdose
 - When people do not know that they are taking fentanyl instead of the drugs they thought they bought they will likely overdose
 - Designer drugs are usually easier and cheaper to produce
- Ecstasy

- Gordon Alles also discovered amphetamines, ecstasy is similarly structured to amphetamines
- Mood elevation effect
- People more likely to express their emotions
- MDMA was tested by the military as an interrogation tool in the 60s
- In the 80s it began to be used recreationally in raves and stuff
- Effects:
 - Good
 - Euphoria
 - Empathy
 - Reduced inhibitions
 - Auditory hallucinations
 - Sexuality
 - Bad
 - Hyperthermia
 - Liver, kidney, heart failure
 - Death
 - Loss of appetite
 - Dehydration
 - Depression
 - Lack of Judgment
- Usually made synthetically in underground labs because it is not used medically
- Usually not very pure
 - There is mercury
 - Methylenedioxyamphetamine, Paramethoxyamphetamine
 - Neurotoxic
 - Ketamine
 - Veterinary anesthetic (effects similar to PCP)
 - GHB
 - “Date-Rape” drug
 - Methamphetamine
- Many tablets found in the street today do not contain MDMA
 - Commonly substituted amphetamines because MDMA is not an addictive substance
- Used to take advantage (‘predatory drugs’/date rape drugs)
- Tests Kits
 - Based on law enforcement to test drugs
 - Similar to pH tests
 - To identify a substance correctly you need to perform more than one test
 - Substances with similar structures produce similar colours
 - Test is only as good as the source it is coming from
- Khat
 - Contains cathinone
 - Stimulant and hallucinogen
 - Chew the leaves

- Releases dopamine
- Dose you take controls the effects
 - Small amount
 - Dopamine release
 - mild hallucinations
 - High doses
 - Increase aggression
 - Similar to methamphetamines
- Synthetic version were tested as appetite suppressants
 - Extremely dangerous side effects
 - Extreme dehydration
 - Massive weight loss
 - Highly addictive
 - Hallucinations
 - Psychosis
 - Paranoia
 - Extreme violence
 - Were then sold as designer versions
 - Large crystal salt looking product
 - Were sold as 'bath salts'
 - New versions are constantly being produced
- Demerol
 - Synthetic painkiller
 - Michael Jackson
 - MPPP designer legal version
 - Cause extreme versions of parkinson's disease in users
 - If you positioned them a certain way they would not move from this position
 - This is due to sloppy chemistry
 - A byproduct of the reaction was hydrochloric acid
 - Too much acid was being build up in the mixture which actually converted the MPPP to a different substance, MPTP
 - This selectively destroys the tissue that connects the spinal cord to the brain
 - L-DOPA helped the users regain some of their movement and voluntary control
- Laws to restrict designer drugs
 - These laws restrict the chemicals used to product the drugs
 - New drugs are constantly being introduced that aren't in the law books and therefore are 'legal'
- Can drugs make you smarter?
 - Ethics of smart drugs
 - Is it cheating to take them when writing tests?
 - Table salt
 - Contains iodine

- Found a 15 point difference between people who have access to iodine regularly in their diet than in other parts of the world
 - 20% of the world does not have access to enough iodine
- Smart Drugs
 - Iodine
 - People who get enough of this in their diet they have an IQ 10-15 points higher than people who live somewhere they don't get it
 - Omega 3
 - Used in the brain so people think it'll make you smarter
 - If you do not get enough you will not be 100% healthy, people have created a pattern between this thinking that if you take excess you will be healthier than normal
 - Some drugs improve cognitive function
 - However not by enough to really make a difference in a healthy person
 - People with alzheimer's or dementia will show improvement
 - Small improvements for sleep deprived people
 - However does not translate to normal people
 - Drugs for narcolepsy to keep you awake
 - Used to enhance the number of hours you can use to study for the exam
 - Amphetamines to improve concentration
 - Used for assembly line workers
 - Ephedra is similar to amphetamines
 - Ritalin
 - Used to treat ADHD
 - A lot of these drugs will make you feel good which makes you think you are performing better
 - Effects are small and vary from person to person
 - Some will improve memory in one person and impair the memory in another
 - Or it improves one skill while it impairs another
 - Benefits are highly questionable
 - More emotional effects than cognitive ones
 - Side effects
 - All drugs have side effects
 - Could help you or could impair you and you won't know until you actually take the drug
 - Not everyone has a prescription for these smart drug
 - The prescription medication can be counterfeited
 - Counterfeit drugs is a \$75 billion dollar industry all over the world