INTERPRETATION OF DRUG TEST RESULTS

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DEFINITIONS

• **Parent Compound** – The actual drug. Enters and exits as the same chemical structure

• **Metabolite** – Breakdown product of a drug. This occurs in the body. Enters as parent compound exits as a metabolite

• **Half – Life** – The amount of time it takes for the drug concentration in the urine or blood to decrease by one half
MARIJUANA
THC Sources

• Marijuana
  *Hashish
  *Sinsemilla
  *Hash Oil

Prescription sources
  *Marinol
  *Sativex – Canada and UK only
MARIJUANA CLEARANCE

- HALF LIFE - 48 HRS
- SOCIAL USE – 5-7 DAYS
- MODERATE USE - 7-10 DAYS
- CHRONIC USE - 4-6 WEEKS
- PEAK LEVEL – 6-8 HRS mean value = 125 ng/ml
- EXPEDITE - WATER, EXERCISE
PASSIVE INHALATION

• NOT A REALITY
• REALISTIC - < 5 NG/ML SCREENING
• FORCED - < 15 NG/ML GCMS
• STATE LAWS - SOME STATES HAVE ADDRESSED THIS ISSUE
b) The term "marihuana" means all parts of the plant Cannabis sativa L., whether growing or not; the seeds thereof; the resin extracted from any part of such plant; and every compound, manufacture, salt, derivative, mixture, or preparation of such plant, its seeds, or resin- but shall not include the mature stalks of such plant, fiber produced from such stalks, oil or cake made from the seeds of such plant, any other compound, manufacture, salt, derivative, mixture, or preparation of such mature stalks (except the resin extracted there from), fiber, oil, or cake, or the sterilized seed of such plant which is incapable of germination.

FOR MORE ON THE TAX ACT AND RELATED TOPICS:  
http://www.druglibrary.org/schaffer/hemp/taxact/mjtaxact.htm
HEMP PRODUCTS

- NOT ALL PRODUCTS OR EVEN ALL LOTS WILL RESULT IN POSITIVES
- HEMP OIL - POSITIVE
- HEMP BEER - NEGATIVE
- SEEDY SWEETIES - POSITIVE
- AMMEND CORPORATE POLICIES TO ADDRESS HEMP PRODUCTS
MEDICAL MARIJUANA

• Raich v. Gonzales – Supreme court ruling upheld federal law allowing medical marijuana users to be charged with use.
• 14 states and DC currently allow the use of Medical marijuana. Oregon has 15,000 card carrying users.
• Can be prescribed for any reason at the discretion of the physician.
Michigan Federal Court Ruling

• 2/11/11: Lawsuit against Wal-Mart dismissed

  • The Federal Controlled Substances Act preempts MI state action

  • The Federal American with Disabilities Act preempts MI state action

  • The Michigan Medical Marijuana Act (MMMA) does not confer any employment protections on medical marijuana users.
New Reason for Marijuana Positive

• Cannabis Vodka
• Not legal in the U.S.
• Legal in Mexico and Canada

• Can it result in a positive test?
  • Yes
Cannabis Ice Cream

• **Flavors**
  - TRIPle Chocolate Brownie
  - Banannabis Foster
  - Straw-Mari Cheesecake

• **Cost**
  - $15 per half pint

• **Contains the equivalent of 2-4 joints**
Marijuana Bakeries

- Offer brownies or cookies
- Single dose up to X4 dose
- One X2 brownie $12.00
- One X2 cookie $10.00
Marijuana Sodas

- 35-65 mg THC/bottle
- $10 to $15 per bottle
- Available in California and Colorado
- Flavors similar to:
  - Dr. Pepper
  - Grape
  - Orange
  - Lemon/Lime
  - Cola
What is a Dilute Specimen

• When the Creatinine and the specific Gravity are low
• Creatinine <20 mg/dl and >2 mg/dl
• Specific Gravity <1.003 and >1.001
WHY DOES DILUTION WORK?

- Normal urine production is 1 ml/min
- Drink 1 liter of water and the urine production goes to 7.5 – 8.5 ml/min from 30 – 150 min post consumption
- Drink 2 liters of water and urine production peaks at 1 hr at 16ml/min and stays as high as 6 ml/min for 4.5 hrs
- Creatinine range on a random void – 100 – 200mg/dl
- Specific Gravity is the weight or mass of a given volume of a substance compared to water. Normal range = 1.010 – 1.025
Positive test results separated by 1 month or more normally indicate new use.

All results should be normalized: ngTHC/mg Creatinine

A ratio of 1.5 or greater between sequential positive test results new use. This has a degree of certainty of 99% or greater. The longer the period between testing the higher the degree of certainty.
NEW RESEARCH STUDY

• Social user will clear THCA from the urine in 5 days using a 15 ng/ml cut off
• Social users will clear THCA from the system in 7 days using a 6 ng/ml cut off
• Research paper by Huestis, Smith and Barnes ;JAT May/June 2009
Calculation

\[
\frac{\text{ng Drug}}{\text{mg Creatinine}} \times 100 = \frac{\text{ng Drug}}{\text{mg Creatinine}}
\]
WHAT WILL CAUSE A POSITIVE MARIJUANA SCREENING

1. Protonix, Nexium
2. Aids medications
3. NSAID
4. Prilosec

GC/MS
1. Marijuana/Marinol
COCAINÉ FACTS

- Cocaine is a white powder that is usually snorted but can be injected.
- Free Basing – purifying cocaine prior to injecting.
- Crack – A form of freebasing - white to tan solid called rocks.
- Cocaine is used in hospitals usually topically.
- Medical problems – destruction of the nasal septum and lungs.
- Cocaine cost $80 - $100 per gram.
- Crack cost $5 - $20 per rock.
- Crack produces a faster high than cocaine.
- Cocaine high last 20 – 40 minutes.
- Crack high last 5 -12 minutes.
COCAINE FACTS

• Cocaine – takes 6 months to two years for a user to become addicted
• Crack – 95% of users are psychologically addicted after the first use
• Street names – coke, blow, snow, nose candy
• Central nervous system stimulant
• What’s it feel like - no need for food or sleep
• First used by Incas in 2500BC
• Sigmund Freud first recommended its use to treat morphine and alcohol addiction
• Sherlock Holmes was a cocaine user
• 1800 added to wines received rave reviews from Pope Pius X and the Grand Rabbi of France
NEW FEDERAL CUT OFF LEVELS

• Effective October 2010
• Cocaine Screening – 150 ng/ml
• Benzoylecgonine - 50 ng/ml

Will this impact the defense approach?
PASSIVE INHALATION

• CONTROLLED STUDIES
  • DR. ED CONE - 22-123NG/ML GC/MS

• REPORTS FROM ER
  • POSITIVES DETECTED ON INFANTS AND CHILDREN NO CONTROL OF INTRODUCTION OF DRUG. BELIEVED TO BE PASSIVE COULD BE ORAL, FORCED INHALATION, OR ABSORPTION
DERMAL ABSORPTION

- BASELT-5 MG FREE BASE APPLIED TO SKIN RESULTED IN GC/MS LEVEL 55 - 9 NG/ML 12 TO 84 HRS AFTER EXPOSURE
- FREDERICK-2 MG COCAINE HCL APPLIED TO SKIN RESULTED IN 100 - 200 NG/ML 3 HRS AFTER EXPOSURE
- ELSOHLY-HANDS AND MONEY IMMERSED IN 70% COCAINE POWDER RESULTED IN LOW LEVEL POSITIVES. (< 150 ng/ml)
What will cause a Positive COCAINE

- SCREENING
  1. Cocaine
  2. Benzoylecgonine
  3. Coca ethylene
  4. Ecgonine

- GC/MS
  1. Benzoylecgonine
NARCOTICS
NARCOTICS

Naturally Occurring → Street drugs → Synthetic
NATURALLY OCCURRING OPIATES

- **MORPHINE** – Prescription medications Astramorph PF, Oramorph SR, Infumorph solution, Duramorph, MSIR MS Contin, Roxanol and Morphine Sulfate. Nonprescription medications contain opium which will be detected as morphine in urine: Amogel PG, Ciabismul, Donnagel-PG, Infantol Pink, Kaodene with Paregoric, Paregoric and Quiagel PG.

- **OPIUM** – Non-prescription medications Amogel PG, Ciabismul, Donnagel-PG, Infantol Pink, Kaodene with Paregoric, Paregoric and Quiagel PG.

- **HEROIN** – Illicit drug obtained from the opium poppy which is native to Turkey.

- **CODEINE** – Non Prescription medication Kaodene with Codeine
NATURALLY OCCURING OPIATES

SOURCES OF MORPHINE

- MORPHINE
  - CODEINE
  - HEROIN
  - POPPY SEEDS
PERILOUS PASTRIES

- HIGHEST MORPHINE - 11,571 NG/ML
- HIGHEST CODEINE - 4,861 NG/ML
- LONGEST DETECTION - 72+ HRS
- MOST STUDIES INDICATE CONCENTRATIONS OF 200 - 3000 NG/ML
- CLEARANCE - 24 HRS
Metabolism of Opiates

Heroin → Codeine

Codeine

6-AM → Morphine

Hydrocodone

Hydromorphone

Dihydrocodeine

Oxycodone

Oxymorphone
SYNTHETIC or SEMI-SYNTHETIC OPIATES

• alphaprodine (Nisentil®)
• hydromorphone (Dilaudid®)
• oxymorphone (Numorphan®)
• hydrocodone (Hycodan®, Lorcet-HD®, Vicodin®)
• dihydrocodeine (Synalgos®)
• oxycodone (Percodan®, Percocet®, Tylox®)
• propoxyphene (Darvon®)
• methadone (Dolophine®)
• meperidine (Demerol®)
• fentanyl (Duragesic®, Sublimaze®)
• pentazocine (Talwin®)
• buprenorphine (Buprenex®, Subutex®)
ELIMINATION OF CODEINE AND MORPHINE
SIGNIFICANCE OF 6-AM

• Heroin – half life in blood – 2-6 min
• 6-AM – half life in blood – 6-25 min
• 6-AM - elimination half life in urine 10 minutes
• 6-AM – only 45% of a 70 mg Heroin dose was recovered in the urine and only 1.3% was as 6-AM
• 6-AM – If present you can say beyond question of a doubt the offender used Heroin
• 6-AM – If absent it does not mean the offender did not use Heroin
• 6-AM – Effective 10/1/2010 automatic on all federally mandated drug test.
OPANA - OXYMORPHONE

- Released in extended release form July 2006
- Very powerful semi-synthetic opioid analgesic
- Available from 5 – 40 mg dose
- 6-8 times more potent than morphine
- Medical Examiners Offices are reporting a dramatic increase in overdose cases from Oxymorphone since July 2006
- Oxymorphone is the natural metabolite of Oxycodone
- Increase in Oxymorphone positives in urine drug analysis
- Highly addictive
CHEESE

- STARTER HEROIN – HEROIN MIXED WITH TYLENOL PM (ACETAMINOPHEN AND DIPHENDRYAMINE)
- TARGETED MARKET MIDDLE AND HIGH SCHOOL
- HIGHLY ADDICTIVE – CREATES EUPHORIA, DISORIENTATION, SLEEPINESS AND HUNGER
- WITHDRAWAL COULD BEGIN AS SOON AS 12 HOURS AFTER DISCONTINUATION OF USE
- POPULAR IN THE WEST AND SOUTHWEST
FENTANYL

• Approximately 4 times more powerful than morphine
• Duragesic patch – Favorite form of abuse – eaten
• Fentanyl Lollipops – Target children
SYRUP AND SODA

- Also know as Sizzurp, Purple Drank and Lean
- Mixture of Promethazine and Codeine cough syrup, Jolly Ranchers and Sprite
- Popularized in rap culture particularly Houston
- Texas, Louisiana, Mississippi and Florida are reporting an increase in misuse and deaths
- Effect – Euphoria and impaired motor skill

\[ \text{Promethazine} + \text{Codeine} + \text{Jolly Ranchers} + \text{Sprite} = \text{Sizzurp} \]
What will cause a Positive OPIATES

- SCREENING
  1. High levels of imipramine
  2. High levels of (Ranitidine) Zantac
  3. Cough suppressants
  4. Benzodiazepines
  5. Very high levels of Meperidine

- GC/MS
  1. Codeine, Morphine, Hydrocodone, Hydromorphone and Oxycodone
NEW FEDERAL CUT OFF LEVELS AND NEW DRUGS

- Amphetamine screen = 500 ng/ml
- Amphetamines confirmation = 250 ng/ml
- Amphetamines will include—amphetamine, methamphetamine, MDMA, MDE and MDEA
METHAMPHETAMINE

• 1919: Methamphetamine is first synthesized.
• 1936: The first reported misuse of amphetamines occurs by student subjects in a research project at University of Minnesota testing effects of the drug. Once exposed to the drug, students were seeking and using the drug outside the research study.
• 1940's: Methamphetamine is regularly issued to Japanese soldiers.
• 1950's: Earliest record of intravenous methamphetamine use; American soldiers in Japan and Korea report injecting heroin and methamphetamine ("Speedballing").
• 1963: Illicitly manufactured methamphetamine first appears in California.
• 2002: 5.3% of Americans aged 12 and over say that they have used methamphetamine at some point in their lives. 0.3% say they have used it in the past month.
D-METHAMPHETAMINE

- CRYSTAL METH, CRANK, ICE
- CNS STIMULANT
- HIGHLY ADDITIVE
- CLEARENCE 24-48 HRS
- METABOLITE-AMPHETAMINE
- LEGAL SOURCES-DESOXYN, and DIDREX

Methamphetamine Crystals 0.5 grams
M.Dillon © 1996

DON'T LET DRUG DEALERS CHANGE THE FACE OF YOUR NEIGHBOURHOOD. Call Crimestoppers anonymously on 0800 555 111.
L-METHAMPHETAMINE

• Sources – Selegiline and Vicks stick inhaler
• Identify – D/L isomer analysis
• Performed on request for methamphetamine positives
• Positive = < 20% D-Methamphetamine
AMPHETAMINE

- Prescribed for ADD and weight control
- Metabolite of Methamphetamine
- Must be present to report a positive methamphetamine
- Routine Panel – At least 200 ng/ml amphetamine
MDMA

- MDMA, XTC, ECSTASY, ADAM, X
- STIMULANT AND HALLUCINOGENIC
- LEGAL IN EUROPE 1914
- SCHEDULE I IN U.S.
- 3,4-METHYLENEDIOXY METHAMPHETAMINE
- RAVE PARTIES - TEENS AND YOUNG ADULTS
MDMA

- **THE HUG DRUG** - EMPATHY FOR OTHERS, REDUCES INHIBITIONS
- **DEHYDRATION** - DRINK WATER
- **“SHORT CIRCUIT” SIGNAL TO BRAIN** CONTROLLING TEMPERATURE
- **TEETH GRINDING** - PACIFIERS
- **SUPPRESS NEED TO EAT OR SLEEP**
- **OD-HYPOTHERMIA** BODY TEMPS OF 107-109
- **SIMILAR DRUGS** MDA AND MDEA
- **GREAT BRITAIN** – Because animal studies have indicated that MDMA increases extra cellular levels of the chemical messengers serotonin and dopamine, researchers are investigating the use of MDMA in various treatment regimens.
MDA

- Psychedelic, stimulant recreational drug
- Appeared around 1963-1964
- Reported that MDA was the Mellow Drug of America in the 60”s
- 3,4-Methylenedioxyamphetamine
MDEA

- Psychedelic, stimulant recreational drug
- Street name EVE
- Hyperthermia associated with use
- 3,4-methylenedioxym-ethylamphetamine
ENERGY DRINKS

• Contain Caffeine
• Hard to tell which have alcohol
• Sell those with and without alcohol side by side in store
BOURBON & COKE VS. ENERGY DRINK

- Caffeine = 13 mg
- Alcohol = 0.6 oz.

- Caffeine = 87 mg
- Alcohol = 1.12 oz.
STRAWBERRY METHAMPHETAMINE

• BRIGHT PINK IN COLOR WITH A STRAWBERRY FLAVOR
• KNOW AS STRAWBERRY QUICK
• STARTED IN CALIFORNIA AND MOVING EAST
• TARGETED MARKET MIDDLE AND HIGH SCHOOL
• IF THEY START YOUNG THEY WILL BE LONG-TIME BUYERS
VYVANSE

• Recently released to treat Attention-Deficit/Hyperactivity Disorder (ADHD)
• Lisdexamfetamine dimesalate
• Rapidly absorbed from the GI track and converted to D-amphetamine
• Urine drug screen for someone on this drug would result in a positive for D-amphetamine
• Abuse Potential - High
What will cause a Positive AMPHETAMINES

• SCREENING
  1. Over the counter cold and cough medications
  2. Prescription Meds – allergy, weight control, ADD, and cold/cough
  
   GC/MS – Didrix, Desoxyn, and Deprenyl
  1. Amphetamine
  2. Methamphetamine
  3. MDMA/MDA/MDE
PHENCYCLIDINE

- PCP-Angel dust, rocket fuel
- Commercial use as equine anesthetic
- Produces hallucinations, violent hostility, acute anxiety, paranoia, and a feeling of impending doom
- Inexpensive and easy to make
- Not a popular drug of abuse
What will cause a Positive PCP

- SCREENING
  1. Diphenhydramine (Benadryl)
  2. Dextromethorphan (DM in cough medications).
  3. Effexor – antidepressant

- GC/MS
  1. Phencyclididine
Metabolism of Benzodiazepines

- Diazepam (Valium)
- Nordiazepam
- Chlorodiazepoxide (Librium)
- Oxazepam (Serax)
- Temazepam (Restoril)
- Oxazepam (Serax)
- Prazepam (Centrax)
- Camazepam (Paxor)
- Clorazepate (Tranxene)
- Halazepam (Paxipam)
- Ketazolam (Loftran)
Metabolism of Benzodiazepines

- Alprazolam (Xanax)
- a-Hydroxyalprazolam
- Lorazepam (Ativan)
Barbiturates
Barbiturates: Drug Facts

• Most commonly abused barbiturates include
  • Amobarbital (Amytal)
  • Pentobarbital (Nembutal)
  • Secobarbital (Seconal)

• Medical uses
  • Epilepsy
  • Sleep disorders
  • Relief from anxiety, nervousness, & restlessness

• Generally replaced by safer alternative – benzodiazepines

• Street Names: barb, black beauty, blue, downer, pink, yellow jacket

• First synthesized on 1862, St. Barbara’s Day

• Method of administration: orally by tablet

• Clearance
  • Short-acting = 24 to 48 hours
  • Medium-acting = 48 to 96 hours
  • Long-acting = 14 to 21 days
Where to get More Information

Websites

• Erowid
  • www.erowid.org

• US DOT Office of Drug & Alcohol Policy & Compliance
  • www.dot.gov/ost/dapc

• SAMHSA Division of Workplace Programs
  • www.drugfreeworkplace.gov

• RTI Forensic Science Education
  • www.RTI.org/forensiced
Thank You!

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