



# Welcome!

Supreme Court of Ohio  
Specialized Dockets Conference

October 23-24, 2017



# Drug Testing: Do you know enough to be dangerous?

Presented by  
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*AmericanCourtServices.com*

# Prescription Drug Abuse (Opiates) in United States

- United States has 4.6% of Total World Population!
- United States Consumes 80% of World Supply of Opiates and Opioids!
- United States Consumes 99% of World Supply of Hydrocodone!



*National Institute of Health*



# Heroin: Return with a Vengeance

- In 2002: 404,000 Heroin users 12 years and older
- In 2012: 669,000 Heroin users 12 years and older
- 65% increase from 2002 to 2012
- 18-25 year olds account for most of new users



*National Institute of Health*



# Opiates: The Epidemic

## ▶ OPIATES & OPIOIDS

What is the difference between an Opiate and an Opioid?



# Opiates: The Epidemic

## ▶ OPIATES & OPIOIDS

What is the difference between an Opiate and an Opioid? **Opiates** are drugs derived from opium.

Generally, "**opioids**" refers to synthetic **opiates** (drugs created to emulate opium).

Today, the term **Opioid** is often used for the entire family of **opiates** including natural, synthetic and semi-synthetic substances.

# Opiates: The Epidemic

- ▶ OPIATES

Name the only naturally occurring Opiates.

**It matters when looking at drug tests results!**

# Opiates: The Epidemic

## ▶ OPIATES

Name the only naturally occurring Opiates.

The only TWO naturally occurring Opiates are:

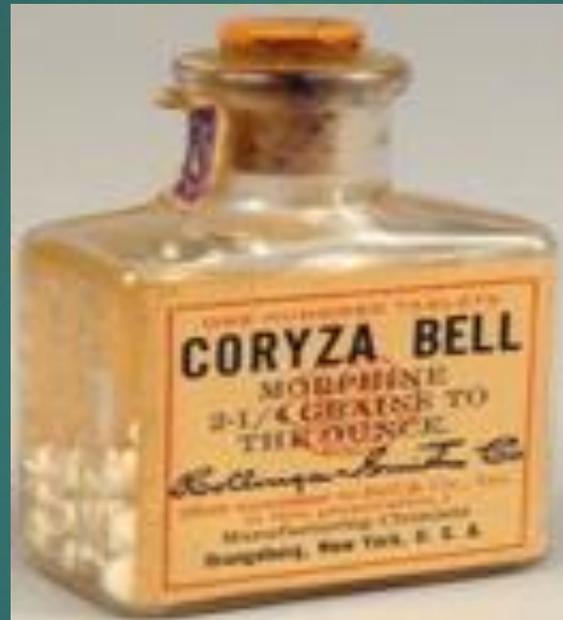
**Morphine**

**Codeine**

# The “god of Dreams”

Morphine

Greek god Morpheus, the “god of dreams.”

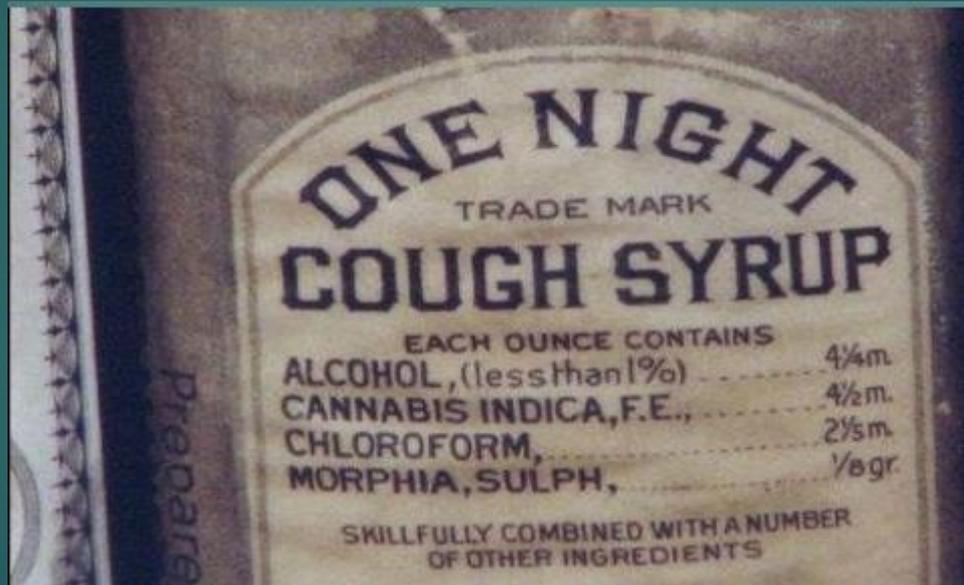


Commercialized in 1827 by Merck

“Gold standard opiate”

# Can I just get a Good Night's Sleep?

The Ultimate “good night’s sleep” was first marketed by the German pharmaceutical company, Merrick.



# Opiates: The Epidemic

## ▶ OPIOIDS

How many **Opioids** can you name?

(Remember! An Opioid is a synthetic or semi-synthetic Opiate.)

**This matters, too, when looking at drug tests results!**

# Opiates: The Epidemic

Synthetic or semi-synthetic **Opioids** include:

- ❑ Heroin
- ❑ Hydrocodone, Hydromorphone
- ❑ Oxycodone, Oxymorphone
- ❑ Buprenorphine
- ❑ Meperidine
- ❑ Tramadol
- ❑ Methadone
- ❑ **Fentanyl - The new “Deadly”**

**80% OF HEROIN USERS  
INJECT WITH A FRIEND.  
WHICH IS WEIRD,  
BECAUSE 80% OF OVERDOSE VICTIMS  
FOUND BY PARAMEDICS ARE  
ALL ALONE.**

# Opiates: The Epidemic

- Deaths in Central Ohio attributed to Opiate overdoses are up by almost 90 percent compared to the same period last year.
- 2016 Franklin County Deaths: 143
- 2017 Franklin County Deaths: 268
- 56 percent of the 2017 deaths were **Fentanyl** related.
- 76 percent of the deaths were white (mostly males)
- 23 percent of the deaths were African American (5% increase from 2016)

# Opiates: The Epidemic

- Ohio led the nation with “Investigative Fentanyl Samples” (2015)
  - National Forensic Laboratory Information System
- **ARE YOU ADEQUATELY TESTING FOR FENTANYL?**
- In 2016 4,149 fatal overdoses
  - a 36% increase from 2015 (Led the nation)
- 70 percent of children in Ohio’s foster care system are children of parents addicted to opiates.





# Morphine

## Sources of Morphine

Morphine is produced from the Poppy Plant.



When interpreting a drug test result that is positive for Morphine, what are the possible sources of the Morphine?

# Morphine

## Sources of Morphine

- ▶ Codeine (Yes?) (No?)
- ▶ Morphine (Yes?) (No?)
- ▶ Hydromorphone (Yes?) (No?)
- ▶ Heroin (Yes?) (No?)
- ▶ Poppy Seeds (Yes?) (No?)  
Less than 2,000 ng/mL

# Heroin

- ▶ Synthesized in 1874 by the new German Company Bayer & Company.



- ▶ Marketed as more potent, but less addictive than morphine.

# How Opiates Metabolize

## OPIATES: WHAT ARE THEY USING?

A number of different drugs fall under the Opiate drug class. Confirmed laboratory results will provide metabolite information that can help identify exactly what your client is using.

### HEROIN USE

MAY BE POSITIVE FOR:

- 6-MONOACETYLMORPHINE (6-MAM)
- MORPHINE ONLY
- CODEINE AND MORPHINE
- 6-MONOACETYLMORPHINE, MORPHINE AND CODEINE

### CODEINE USE

MAY BE POSITIVE FOR:

- CODEINE ONLY
- CODEINE AND MORPHINE
- MORPHINE ONLY
- CODEINE AND HYDROCODONE (ONLY IF CODEINE LEVELS ARE VERY HIGH)

### MORPHINE USE

MAY BE POSITIVE FOR:

- MORPHINE
- MORPHINE AND HYDROMORPHONE (ONLY IF MORPHINE LEVELS ARE VERY HIGH)

### HYDROCODONE USE

MAY BE POSITIVE FOR:

- HYDROCODONE
- HYDROCODONE AND HYDROMORPHONE
- HYDROMORPHONE

### OXYCODONE USE

MAY BE POSITIVE FOR:

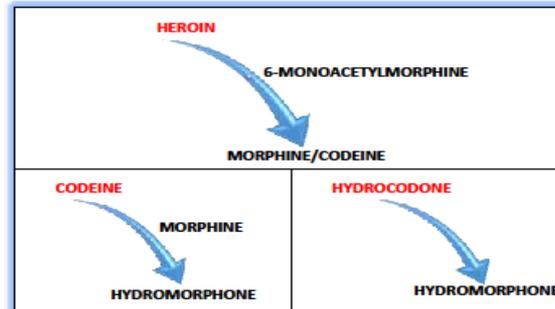
- OXYCODONE
- OXYCODONE AND OXYMORPHONE
- OXYMORPHONE
- OXYCODONE AND HYDROCODONE (ONLY IF OXYCODONE LEVELS ARE VERY HIGH)



Support Phone: 614-252-6340 Ext. 192  
Email: support@americancourtservices.com

## BREAK IT DOWN

Opiates typically metabolize within a 72-hour period. Over this time period, different metabolites can be identified in urine depending on how quickly each substance is metabolized as well as the time the sample is collected.



## HOW TO DETECT HEROIN USE

- ✓ Heroin is converted into 6-Monoacetylmorphine (6-MAM) within a matter of minutes from use. It is extremely rare to ever see "Heroin" on a drug screen result.
- ✓ 6-MAM is typically detectable in a specimen within 6 to 10 hours from using heroin. If 6-MAM is detected, it is definitely from heroin use.
- ✓ The absence of 6-MAM does not mean that heroin was not used – a positive result for Morphine, Codeine, a combination of the two or presence of all three could also be indicative of heroin use.

# How Opiates Metabolize

## ▶ CASE STUDY #1

Codeine	2,321	ng/mL
Morphine	17,439	ng/mL
6-Acetylmorphine	749	ng/mL
Creatinine	179.4	mg/dL

Diagnosis?

# How Opiates Metabolize

## ▶ CASE STUDY #1

Codeine	2,321	ng/mL
Morphine	17,439	ng/mL
6-Acetylmorphine	749	ng/mL
Creatinine	179.4	mg/dL

Diagnosis: **Heroin Use**

# How Opiates Metabolize

## ▶ CASE STUDY #2

Codeine	24,231	ng/mL
Morphine	4,866	ng/mL
Creatinine	124.8	mg/dL

**Rx: Tylenol 3**

Consistent or Not Consistent?

# How Opiates Metabolize

## ▶ CASE STUDY #2

Codeine	24,231	ng/mL
Morphine	4,866	ng/mL
Creatinine	124.8	mg/dL

**Rx: Tylenol 3**

Consistent or Not Consistent? **Consistent**

# How Opiates Metabolize

## ▶ CASE STUDY #3

Codeine	1,175 ng/mL
Morphine	7,789 ng/mL
Hydromorphone	311 ng/mL
Creatinine	92.7 mg/dL

Diagnosis?

# How Opiates Metabolize

## ▶ CASE STUDY #3

Codeine	1,175 ng/mL
Morphine	7,789 ng/mL
Hydromorphone	311 ng/mL
Creatinine	92.7 mg/dL

Diagnosis: **Heroin Use**

# How Opiates Metabolize

## ▶ CASE STUDY # 4

Oxycodone	1,352	ng/mL
Oxymorphone	978	ng/mL
Creatinine	152.7	mg/dL

Rx: Percocet

Consistent or Not Consistent?

# How Opiates Metabolize

## ▶ CASE STUDY # 4

Oxycodone	1,352	ng/mL
Oxymorphone	978	ng/mL
Creatinine	152.7	mg/dL

Rx: Percocet

Consistent or Not Consistent? **Consistent**

# How Opiates Metabolize

## ▶ CASE STUDY # 5

Codeine	42,700	ng/mL
Morphine	3,868	ng/mL
Hydrocodone	476	ng/mL
Creatinine	137.3	mg/dL

**Diagnosis?**

# How Opiates Metabolize

## ▶ CASE STUDY # 5

Codeine	42,700	ng/mL
Morphine	3,868	ng/mL
Hydrocodone	476	ng/mL
Creatinine	137.3	mg/dL

Diagnosis? **Codeine use**



**American**  
Court Services

# Directly Observed Specimen Collections



# Directly Observed Specimen Collections

Why Every Specimen Collected  
should be Directly observed

INTEGRITY

COMPETENCY

UNIFORMITY

PROFICIENCY

I. C. U. P

# The ACS Hall of Shame



# The ACS Hall of Shame



# The ACS Hall of Shame



# Drug Testing: EtG

- **Testing for Alcohol:**  
Breath Vs. Urine
- **ETG (Ethyl Glucuronide) Testing:**
  - Windows of Detection
  - Biomarkers:  
Ethyl Glucuronide  
Ethyl Sulfate
  - Incidental Exposure limited by cutoff  
EtG: 500 ng/mL  
EtS: 100 ng/mL



# Drug Testing: EtG

## Testing for Alcohol:

### Breath Vs. Urine

- **Breath Tests:** “point-in-time.”
- **Breath Tests:** equates approximate blood alcohol content from the deep-lung air absorbed by **Alveoli**.
- **Breath Tests:** Correlates BAC with “level of effect.” (How Intoxicated)

Human Partition Ratio Variation	Actual BAC	Breathalyzer Reading	Error %
1300:1	0.08	0.050	-38%
1400:1	0.08	0.054	-33%
1500:1	0.08	0.057	-29%
1600:1	0.08	0.061	-24%
1700:1	0.08	0.065	-19%
1800:1	0.08	0.069	-14%
1900:1	0.08	0.072	-10%
2000:1	0.08	0.076	-5%
<b>2100:1</b>	0.08	0.08	0%
2200:1	0.08	0.084	5%
2300:1	0.08	0.088	10%
<b>2400:1</b>	0.08	0.091	14%
2500:1	0.08	0.095	19%
2600:1	0.08	0.099	24%
2700:1	0.08	0.103	29%
2800:1	0.08	0.106	33%
2900:1	0.08	0.110	38%
3000:1	0.08	0.114	43%
3100:1	0.08	0.118	48%

# Drug Testing: EtG

## Testing for Alcohol: Breath Vs. Urine

- **Urine Tests:** NOT a “point-in-time” test, but an expanded window of detection.
- **Urine Tests:** Determines the volume of EtG & EtS in ng/mL of urine.
- **Urine Tests:** Cannot correlate level of EtG / EtS with “level of effect” or volume of alcohol.



# Drug Testing: EtG

## ETG (Ethyl Glucuronide) Testing:

### Windows of Detection

- **Urine:** EtG & EtS are detectable in urine for 48 to 72 – 80 hours.
- Window of Detection determined by the volume of alcohol consumed, the donor's rate of metabolism and the hydration of the donor's bladder.



# Drug Testing: EtG

## ETG (Ethyl Glucuronide) Testing:

### Biomarkers

Ethyl Glucuronide

Ethyl Sulfate



- Ethyl Glucuronide and Ethyl Sulfate are the two specific biomarkers that are produced in the liver as the body is metabolizing alcoholic beverage manufactured for consumption.
- These biomarkers are not detected at levels below the EtG / EtS cutoff levels of 500 and 100 ng/mL respectively.

# Drug Testing: EtG

## ETG (Ethyl Glucuronide) Testing:

### Cutoff Levels

- Incidental Exposure limited by cutoff  
EtG: 500 ng/mL  
EtS: 100 ng/mL
- Cutoff levels are designed to exclude alcohol found in many over-the-counter cold remedies, medications and food products WHEN TAKEN AS DIRECTED.



10%



26.9%



62%



35%



0.2 - 0.8 %



14%

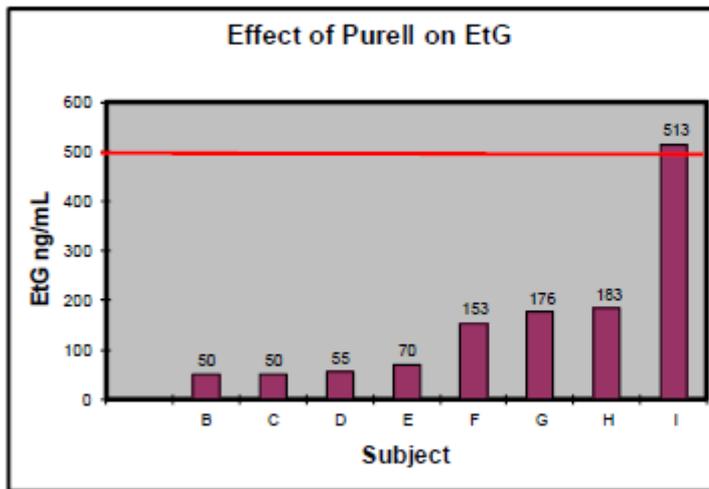


0.5%



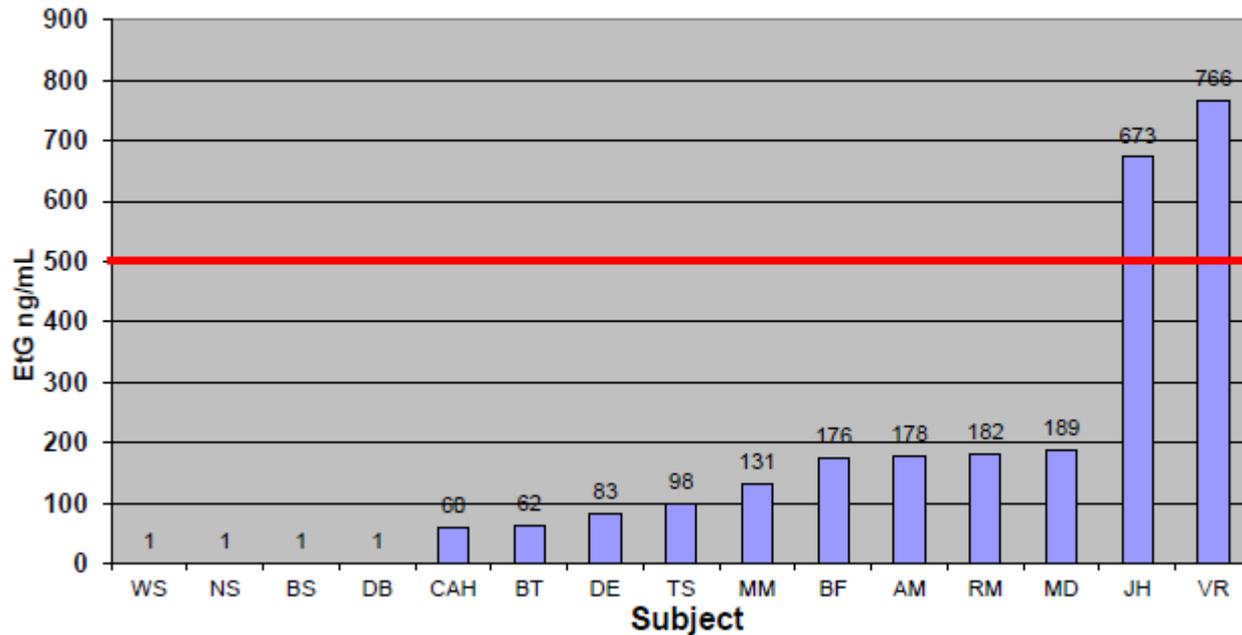
3 - 6 %

# Drug Testing: EtG Alcohol by Products



# Drug Testing: EtG Alcohol by Products

Effect of Nyquil on EtG



# Drug Testing: EtG

- **ETG (Ethyl Glucuronide) Testing:**
  - Incidental Exposure limited by cutoff  
EtG: 500 ng/mL  
EtS: 100 ng/mL



**Alcohol-Free NyQuil Cold & Flu Relief Liquid**

Looking for an option to original NyQuil®? Alcohol-Free NyQuil Cold & Flu Relief Liquid medicine provides powerful relief from cold symptoms, including cough, sore throat, headache, minor aches and pains, fever, runny nose, and sneezing.

# Drug Testing: EtG



# Drug Testing: Diluted Specimens

Dilution is the most common method used to avert / mask drug tests.

- ▶ Specimens become diluted when the donor consumes excessive amounts of fluids in a short period of time prior to collection.
- ▶ Specimens may be diluted by adding fluids “post collection.”
- ▶ Average Creatinine levels are 145 – 150 mg/dL
- ▶ Creatinine gives urine color and odor.
- ▶ Human kidneys cannot produce urine with creatinine less than 5 mg/dL.



# Drug Testing: Diluted Specimens

<b>Test Pure Magnum Force</b>	
	<p>Designed to remove all toxins. Effective for up to 5-hours for larger persons or persons with high toxin levels. Three flavors: Cherry, Orange, and Tropical fruit. <a href="#">Ingredients</a></p> <p><b>Buy Now</b>    39.95    <a href="#">Add to my cart!</a>    <a href="#">View Cart</a> </p>
<b>Duz'z It</b>	
	<p>Our Duz'z It one hour carbo drink is the largest on the market today. One full liter designed for heavy toxins. Comes in two flavors, Orange and Tropical Fruit Punch. Effective for up to 6 hours. Taste great! <a href="#">Ingredients</a></p> <p><b>Buy Now</b>    49.95    <a href="#">Add to my cart!</a>    <a href="#">View Cart</a> </p>
<b>Never Fail</b>	
	<p>We combined two of our best 1 hour products to give you the confidence you need. This is the strongest one hour solution offered today. Effective for up to 6 hours. Designed for all toxins. <a href="#">Ingredients</a></p> <p><b>Buy Now</b>    89.95    <a href="#">Add to my cart!</a>    <a href="#">View Cart</a> </p>
<b>Emergency Capsules</b>	
	<p>Designed for to remove all toxins in 1 hour with a 99.95% success rate. Effective for up to 6 hours. Completely undetectable. <a href="#">Ingredients</a></p> <p><b>Buy Now</b>    39.95    <a href="#">Add to my cart!</a>    <a href="#">View Cart</a> </p>

# Drug Testing: Diluted Specimens

Vitamin B1 (Thiamine HCL)	4.40mg
Vitamin B2 (Riboflavin)	4.40mg
Vitamin B6 (Pridoxine HCL)	4.40mg
Vitamin B12 (Cyanocobalamin)	12mg
Proprietary Blend	1290mg

Uva Ursi Leaf Extract, Cinnamon Bark, Dandelion Root Extract, Gentian Root Extract, Milk Thistle Seed Extract, Barberry Root Extract, Turmeric Root Extract, Panax Ginseng Extract, Creatine Monohydrate, Grape Skin.

Other Ingredients: Magnesium Stearate, Gelatin (capsule)

# Drug Testing: Quantitative Levels

- **Quantitative Results:** What do the numbers mean?

Oxycodone	Positive
<b>Metabolites Comment:</b> Oxycodone: 11390 ng/mL Oxymorphone: >12500 ng/mL   <i>Results consistent with Oxycodone use.</i>	

## **Prescription Drugs:**

Is my client over-medicating?

Quantitative levels in urine may **NOT** be used as therapeutic levels to determine adherence with prescriptions dosages. Quantitative levels mean only that the lab detected a measurable amount of a drug in the urine specimen.

# Drug Testing: Quantitative Levels

- **Quantitative Results:** What do the numbers mean?



# Drug Testing: THC

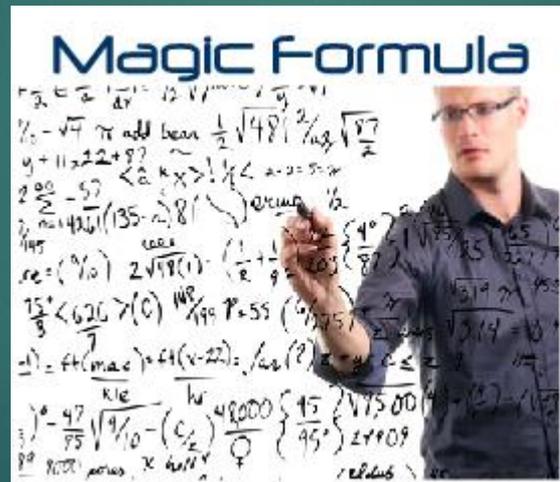


Can Creatinine levels be used for more than determining if a specimen is diluted or substituted?

I'm glad you asked that question! **YES!!!!**

# Drug Testing: THC

- ▶ My client smokes Marijuana. Several recent tests have been positive for THC.
- ▶ HOW DO I KNOW IF A POSTIVE RESULT IS FROM NEW OR PREVIOUS USE?



# Drug Testing: THC

▶ Let's compare two positive THC results.

▶ SPECIMEN 1:

THC level = 698 ng/mL

▶ SPECIMEN 2:

THC level = 535 ng/mL

DOES SPECIMEN 2 REFLECT NEW OR PREVIOUS USE?

# Drug Testing: THC

- ▶ Determination of New or Previous Use is based upon the “Normalized” level of THC.
- ▶ THC is “Normalized” by dividing the “raw” THC level by the Creatinine level and multiplying the result by 100.
- ▶ RESULTS MUST BE “CONFIRMED.”
- ▶ EXAMPLE: (Specimen # 1)
  - Raw THC level = 698 ng/mL
  - Creatinine level = 114.8 mg/dL
  - Normalized THC =  $698/114.8 \times 100 = 608.01$

# Drug Testing: THC

▶ Let's compare two positive THC results.

▶ SPECIMEN 1:

Raw THC level = 698 ng/mL

Creatinine level = 114.8 mg/dL

Normalized THC =  $698/114.8 \times 100 = 608.01$  ng/mL

➤ SPECIMEN 2:

Raw THC level = 535 ng/mL

Creatinine level = 48.6 mg/dL

Normalized THC =  $535/48.6 \times 100 = 1,100.82$  ng/mL

# Drug Testing: THC

- ▶ NOW, what do we do?
- ▶ Divide the later Normalized THC level by the former Normalized THC level

➤ EXAMPLE 1:

Normalized THC level = 608.01 ng/mL

Normalized THC level = 1,100.82 ng/mL

$1,100.82/608.01 = 1.81$

IS THIS NEW OR PREVIOUS USE OF THC?

# Drug Testing: THC

- ▶ New or Previous Use of THC is based upon the “New Use Ratio” established by labs and accepted by NADCP.
- NEW USE RATIOS:
  - Ratio of 0.01 – 0.49 = Previous Use
  - Ratio of 0.50 – 0.99 = Questionable
  - Ratio of 1.00 – 1.49 = Indicative of New Use
  - Ratio of 1.50 and above = Definitely New Use & Legally Defensible with Reasonable & Scientific Certainty.

# Drug Testing: THC

▶ WAS THIS NEW OR PREVIOUS USE OF THC?

➤ EXAMPLE:

Normalized THC level = 608.01 ng/mL

Normalized THC level = 1,100.82 ng/mL

$1,100.82/608.01 = \text{THC to Creatinine Ratio } 1.81$

**NEW USE**

# Drug Testing: THC

▶ Let's compare two other positive THC results.

▶ SPECIMEN 1:

Raw THC level = 956 ng/mL  
Creatinine level = 98.4 mg/dL  
Normalized THC =

➤ SPECIMEN 2:

Raw THC level = 1194 ng/mL  
Creatinine level = 256.4 mg/dL  
Normalized THC =

# Drug Testing: THC

▶ Let's compare two positive THC results.

▶ SPECIMEN 1:

Raw THC level = 956 ng/mL  
Creatinine level = 98.4 mg/dL  
Normalized THC = **971.54**

➤ SPECIMEN 2:

Raw THC level = 1194 ng/mL  
Creatinine level = 256.4 mg/dL  
Normalized THC = **465.68**

**NEW OR PREVIOUS USE?**



# Drug Testing: BZO

## Legal benzodiazepines in the United States

- ▶ Diazepam (Valium)

- ▶ Nordiazepam \*
- ▶ Oxazepam \*
- ▶ Temazepam \*



- ▶ Oxazepam (Serax)

- ▶ Oxazepam \*



- ▶ Temazepam (Restoril)

- ▶ Temazepam \*
- ▶ Oxazepam \*



# Drug Testing: BZO

- ▶ Chlordiazepoxide (Librium)

- ▶ Nordiazepam \*
- ▶ Oxazepam \*



- ▶ Clorazepate (Tranzene)

- ▶ Nordiazepam \*
- ▶ Oxazepam \*

- ▶ Alprazolam (Xanax)

- ▶ Alpha OH Alprazolam \*



- ▶ Lorazepam (Ativan)

- ▶ Lorazepam \*

# Drug Testing: “False” Positives

## “False” Positives Vs. Cross Reactivity (“Look-a-Likes”)

- “False” Positives occur when an “instant” device malfunctions or during a lab-based immunoassay screen when the molecular “footprint” of elements or compounds “look like” known drugs of abuse.
- “Cross Reactive” positives may result from prescription-based or over-the-counter medications.
- Cross Reactivity with food groups or other substances.
- GC/MS or LC/MS/MS will eliminate any question

# Drug Testing: Windows of Detection

## Opiates



Typically two to four days.

# Drug Testing: Windows of Detection

## Cocaine



Typically two to four days.

# Drug Testing: Windows of Detection

## Amphetamines



## Benzodiazepines



Typically two to four days.

# Drug Testing: Windows of Detection

## Medication Assisted Treatment Drugs:

Methadone



Buprenorphine



Typically two to four days.





Thank you for your time  
and attention today!