Urine drug testing—it’s not always crystal clear

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Clinical Professor of Internal Medicine and Psychiatry
University of Illinois College of Medicine
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Kansas City, MO
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This business is a Drug Free Workplace!
We Conduct Drug Testing

- Pre-employment
- Random
- Post-accident
- Reasonable suspicion
- Return-to-duty

Well, young man, your blood test appears to show that you are doped-up on Prozac, Ritalin, Thorazine and Paxil.

Yeah, but no marijuana... so you're on the team!

www.russmo.com
Unfortunately

Drug tests are often misterpreted
Drug Tests do not detect

• Impairment
• Diversion
• Physiologic Dependence
• Addiction
Guidelines and Tips
Pearl #1
Drug Tests detect Recent Use
Pearl #2
You only get what you test for

<table>
<thead>
<tr>
<th>Drug Name</th>
<th>Abbreviation</th>
<th>Cutoff Level</th>
<th>Estimated Detection Time in Urine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphetamine</td>
<td>AMP</td>
<td>300 ng/ml</td>
<td>2-4 Days</td>
</tr>
<tr>
<td>Amphetamine</td>
<td>AMP</td>
<td>1000 ng/ml</td>
<td>2-4 Days</td>
</tr>
<tr>
<td>Barbiturates</td>
<td>BAR</td>
<td>300 ng/ml</td>
<td>3-6 Days</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>BZO</td>
<td>300 ng/ml</td>
<td>3-7 Days</td>
</tr>
<tr>
<td>Buprenorphine</td>
<td>BUP</td>
<td>10 ng/ml</td>
<td>2-3 Days</td>
</tr>
<tr>
<td>Cocaine</td>
<td>COC</td>
<td>150 ng/ml</td>
<td>2-4 Days</td>
</tr>
<tr>
<td>Cocaine</td>
<td>COC</td>
<td>300 ng/ml</td>
<td>2-4 Days</td>
</tr>
<tr>
<td>Ecstasy</td>
<td>MDMA</td>
<td>500 ng/ml</td>
<td>1-3 Days</td>
</tr>
<tr>
<td>Marijuana</td>
<td>THC</td>
<td>50 ng/ml</td>
<td>5-30 Days</td>
</tr>
<tr>
<td>Methadone</td>
<td>MTD</td>
<td>50 ng/ml</td>
<td>3-5 Days</td>
</tr>
<tr>
<td>Methamphetamine</td>
<td>MAMP</td>
<td>1000 ng/ml</td>
<td>3-5 Days</td>
</tr>
<tr>
<td>Morphine</td>
<td>MOP</td>
<td>300 ng/ml</td>
<td>2-4 Days</td>
</tr>
<tr>
<td>Opiates</td>
<td>OPI</td>
<td>2000 ng/ml</td>
<td>2-4 Days</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>OXY</td>
<td>100 ng/ml</td>
<td>2-4 Days</td>
</tr>
<tr>
<td>Phencyclidine</td>
<td>PCP</td>
<td>25 ng/ml</td>
<td>5-10 Days</td>
</tr>
<tr>
<td>Tricyclic Antidepressants</td>
<td>TCA</td>
<td>1000 ng/ml</td>
<td>3-6 Days</td>
</tr>
<tr>
<td>Propoxyphene</td>
<td>PPX</td>
<td>300 ng/ml</td>
<td>1-2 Days</td>
</tr>
</tbody>
</table>
Goals of testing

- Compounds that should be there
- Compounds that should not be there
Pearl #3
Timing is everything

<table>
<thead>
<tr>
<th>Drug</th>
<th>Cutoff level (ng/mL)</th>
<th>Detection time in urine*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphetamine (multidrug misusers, dose unknown)</td>
<td>1000</td>
<td>Up to 5 days</td>
</tr>
<tr>
<td>THCCOOH after smoking 1 marijuana cigarette</td>
<td>50</td>
<td>2 to 4 days</td>
</tr>
<tr>
<td>Benzoylecgonine after 20 mg IV cocaine</td>
<td>300</td>
<td>Up to 1.5 days</td>
</tr>
<tr>
<td>Benzoylecgonine after street doses of cocaine†</td>
<td>300</td>
<td>2 to 3 days; up to 1 week at higher doses</td>
</tr>
<tr>
<td>Morphine from low-dose heroin (3-12 mg)†</td>
<td>300</td>
<td>1 to 1.5 days</td>
</tr>
</tbody>
</table>

THCCOOH = 9-carboxy-Δ⁹-tetrahydrocannabinol; IV = intravenous
*May not accurately reflect detection after extraordinarily high doses in chronic users; †Administered via different routes; ‡Up to 1 month with frequent use
Pearl #4
Know your source
Blood

**Pros**

- Timing

**Cons**

- Invasive
- Requires phlebotomist

Oral fluids

Pros
- Collection easy
- Difficult to adulterate
- Detects recent use

Cons
- Oral contamination
- Saliva production rate variable
- Narrow window

Sweat

Pros
- Non-invasive
- Tamper resistant
- Longer term monitoring

Cons
- Removal risk
- Contamination
- Variable sweat production

Hair

Pros
• Long time window
• Ease of collection

Cons
• Environmental contamination
• Recent use?

Urine

Pros
• Easy to collect
• Concentration

Cons
• Adulteration
• Shy bladder

Pearl #5
Don’t jump the gun
**Urine drug screen**

<table>
<thead>
<tr>
<th>Report Address</th>
<th>Client</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Attn:**
- **Specimen ID:**
- **Donor ID:** ODOM, L
- **Date Received:** 10/01/13 06:29
- **Date Reported:** 10/01/13 13:10
- **Collection Date:** 10/01/13 14:58
- **Desc:** NDOT W/POS REVIEW
- **Code:**
- **Location:**
- **SSN:**
- **Coll Site:** 579932
- **SECURE CHECK**
- **SECURE CHECK**

**Analyses Ordered:** 91006 - DRUG SCREEN: 9 PANEL (5.15MX)

<table>
<thead>
<tr>
<th>DRUG</th>
<th>RESULT</th>
<th>QUANT</th>
<th>SCREEN CUTOFF</th>
<th>GC/MS CUTOFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marijuana Metabolite</td>
<td>NEGATIVE</td>
<td>50 ng/mL</td>
<td>15 ng/mL</td>
<td></td>
</tr>
<tr>
<td>Amphetamines</td>
<td>NEGATIVE</td>
<td>1000 ng/mL</td>
<td>500 ng/mL</td>
<td></td>
</tr>
<tr>
<td>Cocaine Metabolite</td>
<td>NEGATIVE</td>
<td>300 ng/mL</td>
<td>150 ng/mL</td>
<td></td>
</tr>
<tr>
<td>Opiates</td>
<td>NEGATIVE</td>
<td>2000 ng/mL</td>
<td>2000 ng/mL</td>
<td></td>
</tr>
<tr>
<td>Phencyclidine</td>
<td>NEGATIVE</td>
<td>75 ng/mL</td>
<td>25 ng/mL</td>
<td></td>
</tr>
<tr>
<td>Barbiturates</td>
<td>NEGATIVE</td>
<td>300 ng/mL</td>
<td>200 ng/mL</td>
<td></td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>NEGATIVE</td>
<td>300 ng/mL</td>
<td>200 ng/mL</td>
<td></td>
</tr>
<tr>
<td>Propoxyphene</td>
<td>NEGATIVE</td>
<td>300 ng/mL</td>
<td>200 ng/mL</td>
<td></td>
</tr>
<tr>
<td>Methadone</td>
<td>NEGATIVE</td>
<td>300 ng/mL</td>
<td>200 ng/mL</td>
<td></td>
</tr>
</tbody>
</table>
Immunoassay screens

- **Analyte**
- **Antibody**
- **Label**
Point of care testing

**Competitive type: positive test will show one line**
- Conjugate: colored particles labelled with target analyte
- Test line: antibodies to target analyte; unlabelled analyte will bind to test line → no color
- Control line: antibody to compound in matrix

![Diagram of a urine sample](image)

Urine flow
Confirmation
GC/MS or LC/MS
Output is quantitative

<table>
<thead>
<tr>
<th>Prescribed Medications:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxycontin 60 mg CR</td>
</tr>
<tr>
<td>Duloxetine 30 mg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Date: August 24, 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Medications:</td>
</tr>
<tr>
<td>Oxycontin 60 mg CR</td>
</tr>
<tr>
<td>Duloxetine 30 mg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Test</strong></td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Oxycodone</td>
</tr>
<tr>
<td>Noroxycodone</td>
</tr>
<tr>
<td>Oxymorphone</td>
</tr>
<tr>
<td>Duloxetine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specimen Validity Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Test</strong></td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Creatinine (mg/dL)</td>
</tr>
<tr>
<td>Oxidant (mcg/mL)</td>
</tr>
<tr>
<td>pH</td>
</tr>
<tr>
<td>Specific gravity</td>
</tr>
</tbody>
</table>

Timing
Dose
Use Pattern
Metabolism
Hydration status
Pearl #6
Cut-offs

Opiates—2000
  Morphine—2000
  Codeine—2000
6-acetylmorphine—10
  6-AM—10
Amphetamines—500
  Methamphetamine—250 (with amphetamine—100)
  Amphetamine, MDMA, MDA, MDEA—250
Phencyclidine—25
  PCP—25
Benzoylcognine—150
  BE—100
THC—50
  THC—15
Cut-offs

Sensitivity and Specificity

To increase sensitivity, shift to the left (purple line)

But by shifting to the left, it increases proportion of false positive, which means reduced specificity

Image taken from: http://library.med.mun.ca/Weblinks/TUTORIAL/BIOSTATS/BIOSTATS.html
Opioids
- Morphine
- Codeine
- 6-monoacetylmorphine
- Hydrocodone
- Hydromorphone
- Oxycodone
- Oxymorphone

Amphetamines
- Amphetamine
- Methamphetamine
- MDA
- MDMA
- MDEA

Cocaine
Marijuana
Phencyclidine
<table>
<thead>
<tr>
<th><strong>Opioids</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Opiates</strong></td>
</tr>
<tr>
<td>Opium</td>
</tr>
<tr>
<td>Morphine</td>
</tr>
<tr>
<td>Codeine</td>
</tr>
<tr>
<td><strong>Semi-Synthetic</strong></td>
</tr>
<tr>
<td>Heroin</td>
</tr>
<tr>
<td>Hydrocodone</td>
</tr>
<tr>
<td>Hydromorphone</td>
</tr>
<tr>
<td>Oxycodone</td>
</tr>
<tr>
<td>Oxymorphone</td>
</tr>
<tr>
<td>Buprenorphine</td>
</tr>
<tr>
<td><strong>Synthetic</strong></td>
</tr>
<tr>
<td>Fentanyl</td>
</tr>
<tr>
<td>Methadone</td>
</tr>
<tr>
<td>Tramadol</td>
</tr>
</tbody>
</table>
Morphine and Codeine
Stimulants
Cocaine

“You’re fired, Jack. The lab results just came back, and you tested positive for Coke.”
Other “caines”

I just went to the dentist!
Amphetamines
ampheta**mine**

metha**mphetamine**

β-phenylethylamines

3,4 methylenedioxyamphetamine (MDA)

3,4 methylenedioxymethamphetamine (MDMA)

3,4 methylenedioxyethylamphetamine (MDEA)

3,4 methylenedioxyphényl-2-butanamine (MBDB)
Amphetamine Testing Metabolism

methamphetamine → amphetamine
Amphetamine Testing

Chirality

**Chirality**

An object that cannot be superimposed on its mirror image is called chiral.

- **Chiral objects**
  - Nonsuperimposable mirror images

- **Nonchiral objects**
  - Superimposable mirror images

![Molecular structure of amphetamine](image)
Vicks inhalers can cause you to test a false positive for Meth on drug tests.
Vicks inhalers can cause you to test a false positive for Meth on drug tests.
Methylenedioxymethamphetamine
MDMA
Synthetic cathinones
Cannabis

9 carboxy-11-nor THC

11 hydroxy THC
Issues

• Dronabinol
• Creatinine Correction
• Passive inhalation
• Hemp oil
• Legal status
• Synthetic cannabinoids
Dronabinol (Marinol®)
Creatinine Correction

9 carboxy THC level at entry
193 ng/mL
9 carboxy THC level one week later
234 ng/mL
Creatinine Correction

Urine Creatinine at entry
193 mg/dL

Urine Creatinine one week later
288 mg/dL
The correction

Cannabis at entry $\times$ normalized Cr/Cr at entry
$= \text{ normalized cannabis}$

$193 \times \frac{100}{193} = 100$

Cannabis one week later $\times$ normalized Cr/Cr one wk later
$= \text{ normalized cannabis}$

$234 \times \frac{100}{288} = 81$
Legal status

[Image of a California Medical Marijuana Identification Card]

[Image of a store with various items]
Passive inhalation

6 smokers
6 non-smokers

Smoking session duration = 1 hour

Session 1—5.3% THC without ventilation  
Session 2—11.3% THC without ventilation  
Session 3—11.3% THC with ventilation  

Cone et al. 2015.
Hemp oil and hemp seed

Sedatives
Issues in Testing

Long half-lives and active metabolites
Benzodiazepine Metabolism

Nordiazepam = 36-200 hours
Alcohol testing

Figure 1

It should be evident that when a drug is being metabolized with zero-order kinetics that the half life becomes longer as the concentration (or dose) increases. This is one mechanism for the longer apparent half life seen following overdose.
### Biomarkers

#### Exhibit 3. Summary Table of Alcohol Biomarkers by Particular Use

<table>
<thead>
<tr>
<th>Biomarker</th>
<th>Screening for Heavy Drinking</th>
<th>Identify Relapse, Especially to Heavy Drinking</th>
<th>Time To Return to Normal With Abstinence</th>
<th>Monitoring Abstinence</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDT</td>
<td>✓</td>
<td>✓</td>
<td>2–3 weeks</td>
<td></td>
</tr>
<tr>
<td>EtG, Ets</td>
<td></td>
<td>✓</td>
<td>1–3 days</td>
<td>✓</td>
</tr>
<tr>
<td>GGT</td>
<td>✓</td>
<td></td>
<td>2–4 weeks</td>
<td></td>
</tr>
<tr>
<td>MCV</td>
<td></td>
<td>✓</td>
<td>Up to several months</td>
<td></td>
</tr>
<tr>
<td>PEth</td>
<td></td>
<td>✓</td>
<td>2–4 weeks</td>
<td></td>
</tr>
<tr>
<td>Sensor Device</td>
<td></td>
<td></td>
<td>Continual</td>
<td></td>
</tr>
<tr>
<td>SGOT/AST*</td>
<td>✓</td>
<td></td>
<td>2–4 weeks</td>
<td></td>
</tr>
<tr>
<td>SGPT/ALT**</td>
<td></td>
<td></td>
<td>2–4 weeks</td>
<td></td>
</tr>
</tbody>
</table>

* Serum glutamic-oxaloacetic transaminase/aspartate transaminase

** Serum glutamic pyruvic transaminase/alanine aminotransferas
Ethyl glucuronide (EtG)
Ethyl sulfate (EtS)
Ethyl alcohol metabolism
Cut-offs

EtG—500 ng/mL

EtS—100 ng/mL
What about hand sanitizers?

I DON'T ALWAYS DRINK HAND SANITIZER

BUT WHEN I DO, I PREFER PURELL
He is a 39 year old man with history of chronic pain to the right hip s/p MVA in 2006. He has had a THR that became infected and required 2 revisions.

He reports pain management with OxyContin 40mg BID “down from 80” and occasional diazepam.

On addiction interview, he says “I was in the service. I have never used drugs!”
**TOXICOLOGY**

01/23/09

**0954**

<table>
<thead>
<tr>
<th>CLINICAL URINE DRUG ABUSE SCREEN</th>
<th>NEUTRAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMPHETAMINE</td>
<td>NEGATIVE</td>
</tr>
<tr>
<td>BARBITURATES</td>
<td>NEGATIVE</td>
</tr>
<tr>
<td>BENZODIAZEPINES GC/MS CONFIRM</td>
<td><strong>POS</strong></td>
</tr>
<tr>
<td>COCAINE</td>
<td><strong>POS</strong></td>
</tr>
<tr>
<td><strong>252</strong></td>
<td>&lt; 30 ng/mL</td>
</tr>
</tbody>
</table>

Cocaine performed by GC/MS as Benzoylecgonine.

<table>
<thead>
<tr>
<th>ETHANOL</th>
<th>NEUTRAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>40000</strong></td>
<td>&lt; 100 ng/mL</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OPIATES</th>
<th>NEUTRAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL MORPHINE by GC/MS</td>
<td>&gt;40000</td>
</tr>
<tr>
<td>TOTAL CODEINE by GC/MS</td>
<td>&lt;100</td>
</tr>
<tr>
<td>TOTAL HYDROCODONE by GC/MS</td>
<td>&lt;100</td>
</tr>
<tr>
<td>TOTAL HYDROMORPHONE by GC/MS</td>
<td>&lt;100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BENZODIAZEPINES GC/MS CONFIRM</th>
<th>NEUTRAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urine Nordazepam</td>
<td>1525</td>
</tr>
<tr>
<td>Nordazepam may be present as a metabolite of chlordiazepoxide, clorazepate, diazepam, halazepam or prazepam.</td>
<td></td>
</tr>
</tbody>
</table>

| Urine Oxazepam                    | 3028    |
| Oxazepam may be present as a metabolite of chlordiazepoxide, clorazepate, diazepam, halazepam, prazepam or temazepam. |

| Urine Temazepam                   | 2307    |
| Temazepam may be present as a metabolite of diazepam. |

<table>
<thead>
<tr>
<th>CLINICAL URINE DRUG ABUSE SCREEN</th>
<th>NEUTRAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL OXYCODONE by GC/MS</td>
<td>&lt;100</td>
</tr>
<tr>
<td>PHENCYCLIDINE</td>
<td>NEGATIVE</td>
</tr>
<tr>
<td>THC (CANNABIS)</td>
<td>NEGATIVE</td>
</tr>
<tr>
<td>CREATININE URINE RANDOM</td>
<td>212</td>
</tr>
<tr>
<td>ADULTERANTS</td>
<td>20–300 mg/dL</td>
</tr>
</tbody>
</table>

**COMMENTS:**

ADULTERANTS TESTED FOR INCLUDE CHROMATES AND NITRITES.
He states,

“Your lab screwed up. It’s not my urine. I’ll do another test right now.”
### TOXICOLOGY

**02/04/09**

<table>
<thead>
<tr>
<th>Substance</th>
<th><strong>POS</strong></th>
<th><strong>NEGATIVE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>AMPHETAMINE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BARBITURATES</td>
<td><strong>POS</strong></td>
<td></td>
</tr>
<tr>
<td>BENZODIAZEPINE</td>
<td><strong>POS</strong></td>
<td></td>
</tr>
<tr>
<td>BENZODIAZEPINES GC/MS CONFIRM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COCAINE</td>
<td></td>
<td>&lt; 30 ng/mL</td>
</tr>
<tr>
<td>COCAINE GC/MS CONFIRM</td>
<td><strong>441H</strong></td>
<td></td>
</tr>
</tbody>
</table>

Cocaine performed by GC/MS as Benzoylazonine.

<table>
<thead>
<tr>
<th>Substance</th>
<th><strong>POS</strong></th>
<th><strong>NEGATIVE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>ETHANOL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urine Nordiazepam</td>
<td>289</td>
<td>&lt;40 ng/mL</td>
</tr>
<tr>
<td>Nordiazepam may be present as a metabolite of clordiazepoxide, clorazepate, diazepam, halazepam or prazepam.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urine Oxazepam</td>
<td>1026</td>
<td>&lt;40 ng/mL</td>
</tr>
<tr>
<td>Oxazepam may be present as a metabolite of clordiazepoxide, clorazepate, diazepam, halazepam, prazepam or temazepam.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urine Temazepam</td>
<td>380</td>
<td>&lt;40 ng/mL</td>
</tr>
<tr>
<td>Temazepam may be present as a metabolite of diazepam.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Substance</th>
<th><strong>POS</strong></th>
<th><strong>NEGATIVE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>OPIOATES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL MORPHINE by GC/MS</td>
<td>765H</td>
<td>&lt; 100 ng/mL</td>
</tr>
<tr>
<td>TOTAL CODEINE by GC/MS</td>
<td>&lt;100</td>
<td>&lt; 100 ng/mL</td>
</tr>
<tr>
<td>TOTAL HYDROCODONE by GC/MS</td>
<td>&lt;100</td>
<td>&lt; 100 ng/mL</td>
</tr>
<tr>
<td>TOTAL HYDROMORPHINE by GC/MS</td>
<td>&lt;100</td>
<td>&lt; 100 ng/mL</td>
</tr>
<tr>
<td>TOTAL OXYCODONE by GC/MS</td>
<td>&lt;100</td>
<td>&lt; 100 ng/mL</td>
</tr>
<tr>
<td>PHENCYCLIDINE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>THC (CANNABIS)</td>
<td>NEGATIVE</td>
<td></td>
</tr>
</tbody>
</table>

**02/04/09 0954** TOTAL OXYCODONE by GC/MS
Metabolism of Opioids

- Codeine → Morphine
- Codeine → Hydrocodone
- Morphine → 6-MAM*
- 6-MAM* → Hydromorphone
- 6-MAM* → Heroin
- Heroin → 6-MAM*
- Heroin → Oxymorphone
- Hydromorphone → Oxymorphone
- Oxycodone → Oxymorphone

*$6\text{-MAM}=6\text{-monoacetylmorphine}$

t$_{\frac{1}{2}}$ = 25-30 min for 6-MAM*

t$_{\frac{1}{2}}$ = 3-5 min for Heroin
“OK, doc. I did use cocaine twice. Once on Jan 1 and once on Feb 1. No other times.”
What is going on?

What do you recommend?
Opiate Screen

A. Fentanyl
B. Morphine
C. Naltrexone
D. Codeine
E. Methadone
F. Buprenorphine
G. Hydrocodone
H. Meperidine
I. Oxycodone
J. 6-monoacetyl-morphine
K. Propoxyphene
L. Tramadol
Opiate Screen

A. Fentanyl
B. Morphine
C. Naltrexone
D. Codeine
E. Methadone
F. Buprenorphine
G. Hydrocodone
H. Meperidine
I. Oxycodone
J. 6-monoacetyl-morphine
K. Propoxyphene
L. Tramadol

Drug Test Results

6-monoacetylmorphine and morphine present
Drug Test Results

6-monoacetylmorphine and morphine present

Heroin
Drug Test Results

Morphine and Quinidine present
Drug Test Results

Morphine and Quinine present
Drug Test Results
Drug Test Results

Oxycodone and Hydrocodone
Drug Test Results

Oxycodone and Hydrocodone
Drug Test Results

Hydrocodone and Hydromorphone
Drug Test Results

Hydrocodone and Hydromorphone

Hydrocodone  ➔  Hydromorphone
Drug Test Results

Hydrocodone and Hydromorphone

Hydrocodone → Hydromorphone

Oxycodone → Oxymorphone
Drug Test Results

Buprenorphine Present
Drug Test Results

Buprenorphine Present
Norbuprenorphine Absent
Drug Test Results

Buprenorphine Present
Norbuprenorphine Absent
Drug Test Results

Benzoylcegonine Present

Explanation—Received in Emergency Department
Drug Test Results

Benzoylcegonine Present

Explanation—Received in Emergency Department

The American Academy of Otolaryngology-Head and Neck Surgery considers cocaine to be a valuable anesthetic and vasoconstricting agent when used as part of the treatment of a patient by a physician. No other single drug combines the anesthetic and vasoconstricting properties of cocaine.

Position Statement—Medical Use of Cocaine
Drug Screen Results

Methamphetamine Present in a Patient Treated for Depression
Drug Screen Results

Methamphetamine Present in a Patient Treated for Depression
Drug Screen Results

Methamphetamine Present in a Patient Treated for Parkinson’s Disease
Drug Screen Results

Methamphetamine Present in a Patient Treated for Parkinson’s Disease
True or False

Synthetic cannabinoids will test positive for cannabis on the screen but not the confirmation
True or False

Synthetic cannabinoids will test positive for cannabis on the screen but not the confirmation

FALSE
True or False

It is impossible to test for synthetic cannabinoids at this time
True or False

It is impossible to test for synthetic cannabinoids at this time

FALSE
What assists in the drug test interpretation of urine in which cannabis and ethyl glucoronide are present?
What assists in the drug test interpretation of urine in which cannabis and ethyl glucoronide are present?

Cut-offs
American Society of Addiction Medicine