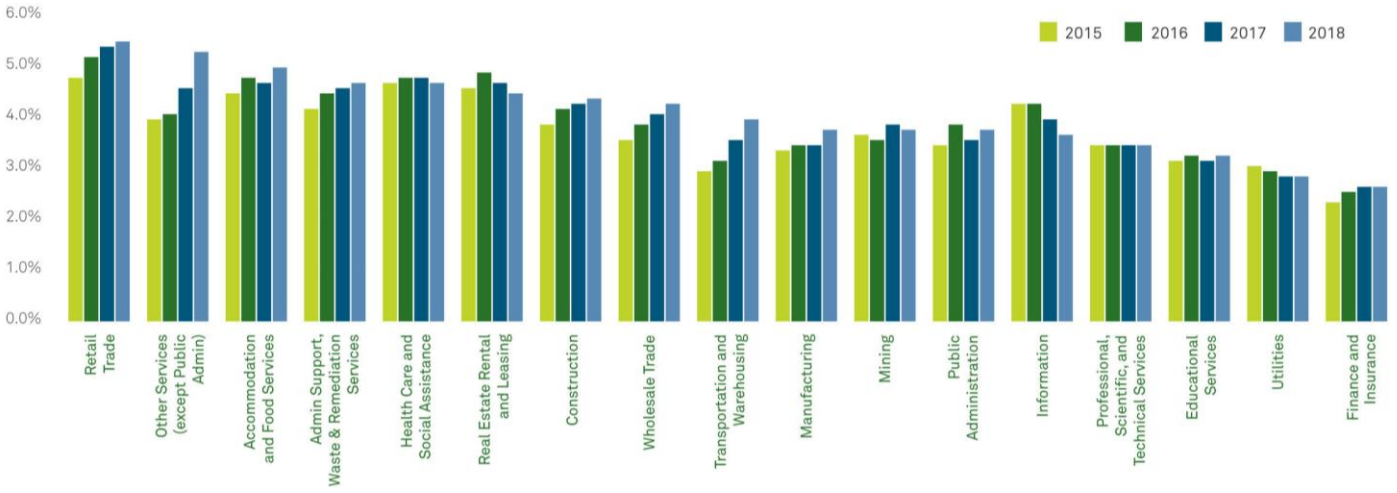
UDS & Patient Adherence: A Harm Reduction Approach

Lewis S. Nelson, MD
Rutgers New Jersey Medical School

@LNelsonMD
Lewis.nelson@Rutgers.edu

No Disclosures

Workforce drug positivity rates by industry sector



Education Services

Highest amphetamines positivity between 2015 and 2018

1.46% in 2015

1.61% in 2016

1.64% in 2017

1.66% in 2018

Finance and Insurance

19% increase in amphetamines

Retail Trade

30% increase in marijuana

Public Administration

36% increase in cocaine

Construction

20% increase in methamphetamine

Transportation and Warehousing

53% increase in marijuana

Other Services (expect Public Admin)

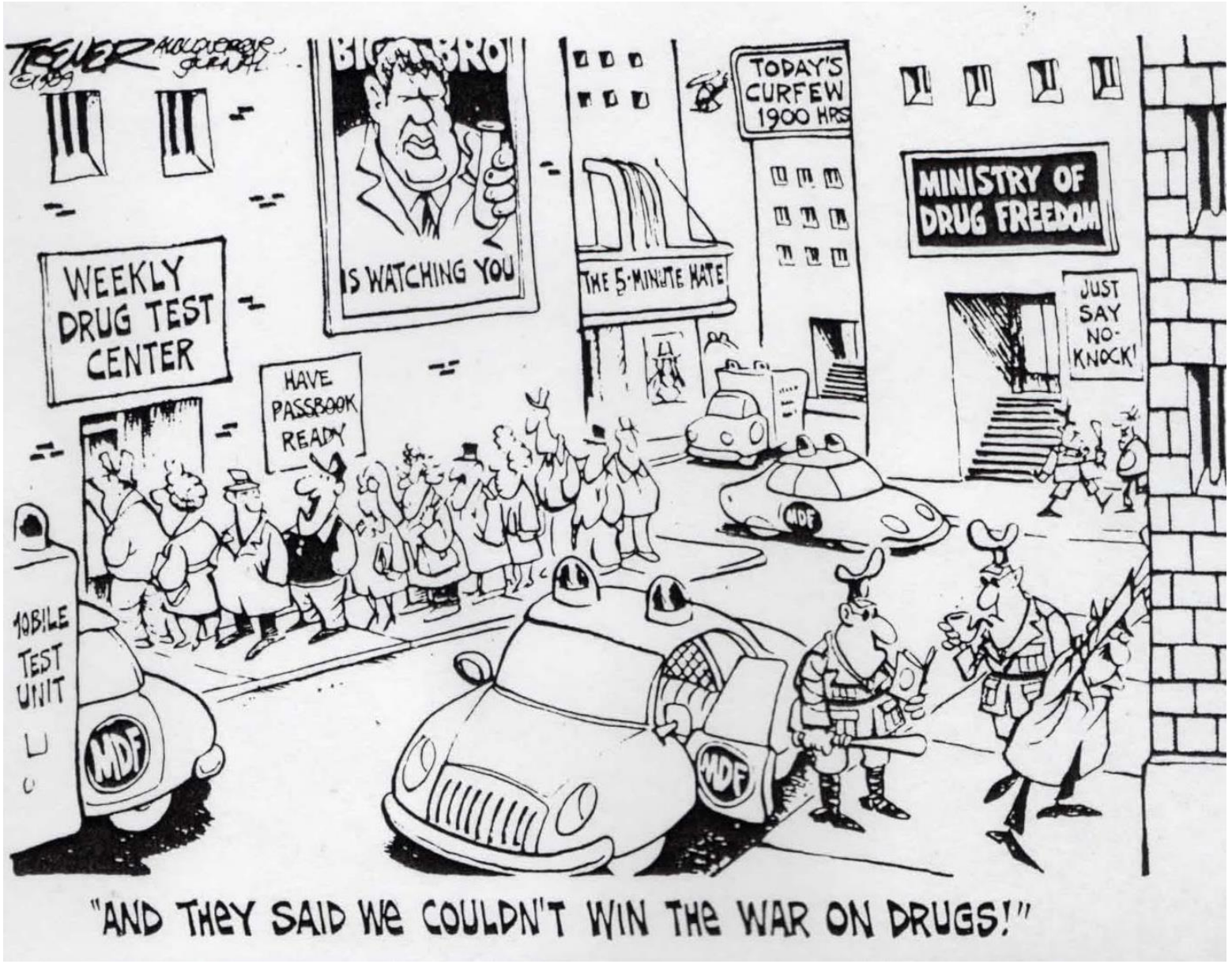
62% increase in marijuana

Percentages reflect year over year increases between 2015 and 2018. Percent increases have been rounded to the nearest whole number. Classifications are based on the North American Industry Classification System (NAICS). Seventeen of the 20 industry sectors were included in the Industry Insights; three classifications were excluded from the analysis due to insufficient testing volume.

Quest Diagnostics™

Quest Diagnostics Drug Testing Index™ 2019

Media Contact: 1.973.520.2800 | QuestDiagnostics.com/DTI


TOLLER
BIG BRO
IS WATCHING YOU
TODAY'S CURFEW 1900 HRS
MINISTRY OF DRUG FREEDOM
WEEKLY DRUG TEST CENTER
HAVE PASSBOOK READY
THE 5-MINUTE HATE
JUST SAY NO-KNOCK!
MOBILE TEST UNIT
MDF
MDF
MDF
"AND THEY SAID WE COULDN'T WIN THE WAR ON DRUGS!"

Appropriate Use of Drug Testing in Clinical Addiction Medicine

Expert Panel Members (in alphabetical order)
Louis Baxter, Sr., MD, DFASAM
Lawrence Brown, MD, MPH, DFASAM
Matthew Hurford, MD, *Expert Panel Moderator*
William Jacobs, MD
Kurt Kleinschmidt, MD
Marla Kushner, DO, DFASAM
Lewis Nelson, MD
Michael Sprintz, DO, FASAM
Mishka Terplan, MD, MPH, FASAM
Elizabeth Warner, MD
Timothy Wiegand, MD, FACMT, FAACT

ASAM Quality Improvement Council
(in alphabetical order)
John Femino, MD, DFASAM
Kenneth Freedman, MD, MS, MBA, DFASAM
Barbara Herbert, MD, DFASAM
Margaret Jarvis, MD, DFASAM, *Chair*
Margaret Kotz, DO, DFASAM
David Pating, MD, FASAM
Sandrine Pirard, MD, PhD, MPH, FAPA, FASAM
Robert Roose, MD, MPH, FASAM
Brendan McEntee, *ASAM Staff*
Penny Mills, MBA, ASAM, *Executive Vice President*
Taleen Safarian, *ASAM Staff*

Special External Reviewer
Michael Miller, MD, DFASAM, FAPA

IRETA Team Members (in alphabetical order)
Peter Cohen, MD, *Medical Advisor*
Leila Giles, BS
Matthew Hurford, MD, *Expert Panel Moderator*
Piper Lincoln, MS
Dawn Lindsay, PhD
Peter Luongo, PhD
Jessica Williams, MPH

Disclosure information for the **ASAM Expert Panel Members and Quality Improvement Council** is available in **Appendix 6**.

Journal of Addiction Medicine, 2017

- Testing is not meant to "catch" the patient
- A positive finding suggests need to talk with patient
- Review treatment plan
  - Not to prevent, limit, or change treatment

- Clinical Considerations in Drug Testing
  - Great utility in treatment of substance use disorders because denial is a feature of addiction
  - Testing identifies recent use it does NOT identify addiction or impairment
  - Language regarding the results of the test is important
    - Dirty/clean vs positive/negative

Screening and Confirmatory Tests

Screening (Presumptive) Assays – indicate the presumptive presence of drugs

Highly sensitive

Rapid, inexpensive

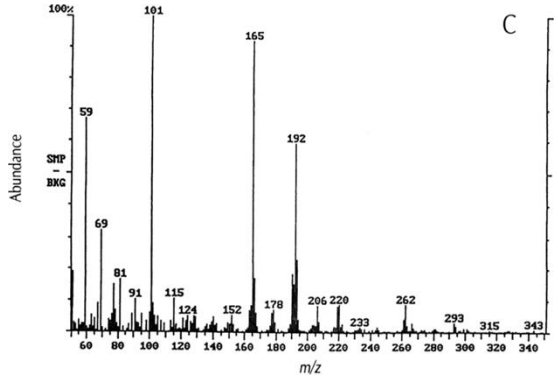
Cutoff: Yes/No

Confirmatory (Definitive) Tests – specifically identify the drug detected in the screening assay

Highly specific

Complicated, expensive

Quantitative



Screening and Confirmatory Tests

- Screening assays:
  - This is all that is done in low-consequence situations
  - Done when confirmatory testing is not practical

02/28/2017 23:09	Amphetamines Urine	N	[Not Detect-]	Final
Not Detected	* Interpretive Data:			
Drug Screen results are provided for medical management only. No chain of custody documentation. Testing does not meet NIDA standards. Positive results are not confirmed.				

- Confirmatory testing:
  - Excludes analytical false positives and false negatives
    - Gas Chromatography/Mass Spectrometry
    - Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)

Analytical vs Clinical Interpretation

- Analytical results
  - What the assay finds
- Clinical results
  - What the patient used

Drugs of Abuse Screening

NIDA/SAMHSA 5

- Opiates
- Amphetamines
- Cocaine
- Marijuana
- Phencyclidine

Non-NIDA (Extended)

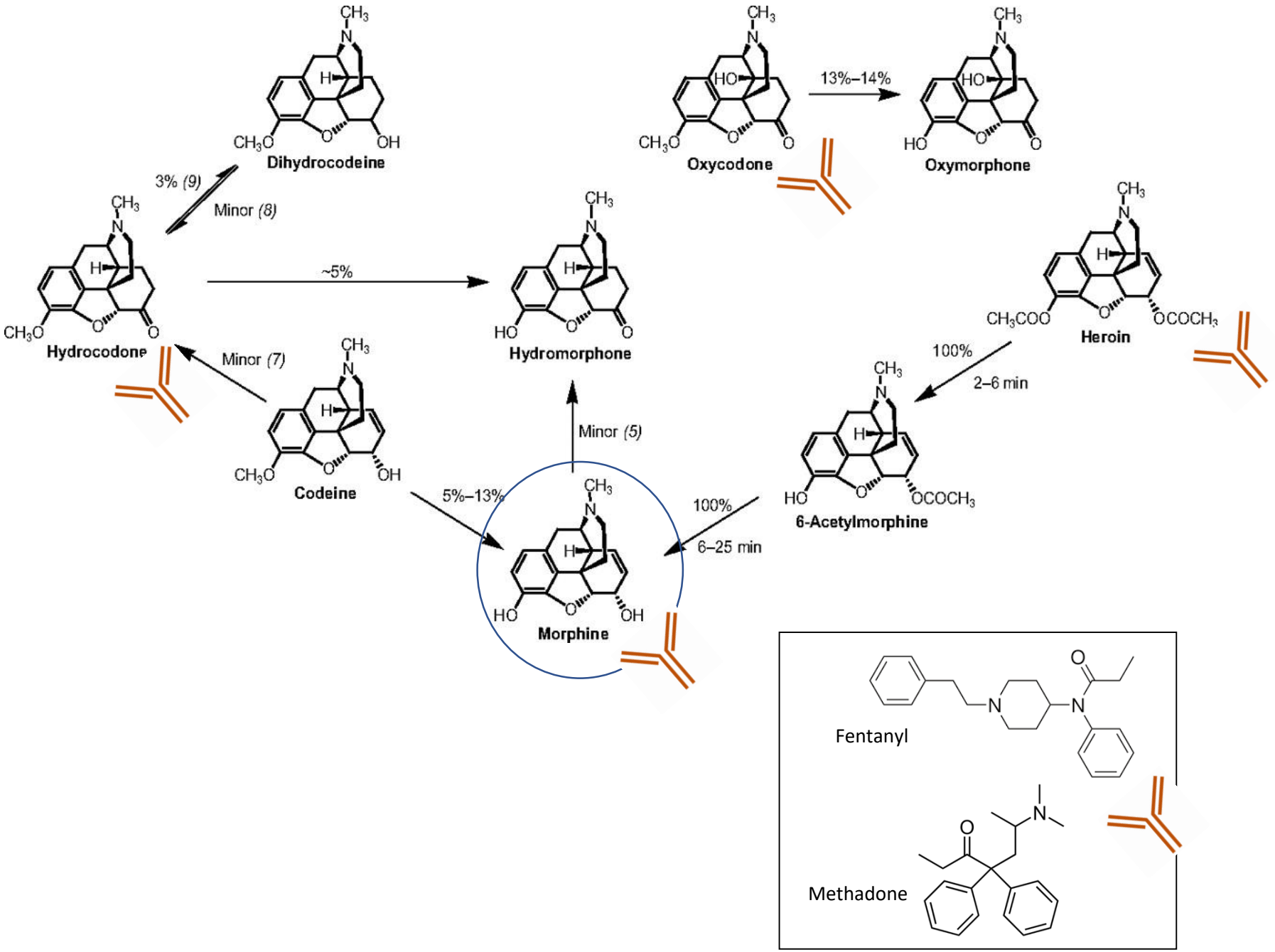
- Opiates
- Amphetamines
- Cocaine
- Marijuana
- Phencyclidine
- Barbiturates
- Benzodiazepines
- Methadone
- Propoxyphene

Screening Tests for Drugs of Abuse

- Enzyme immunoassay
  - Based on a substance's structure
  - Relatively inexpensive, easily automated
- Analytical false negatives are less common
- Analytical false positives happen
  - Particularly for amphetamines, almost never for cocaine
  - Confirm positive screens…if the results matter

Case

- A 30-year-old man presents to a treatment center.
- Urine sent for toxicology assay.
    a. it returns positive for opioids
    b. it returns negative for opioids


Dihydrocodeine
3% (9)
Minor (8)
Hydrocodone
~5%
Hydromorphone
Oxycodone
13%–14%
Oxymorphone
Heroin
100%
2–6 min
6-Acetylmorphine
Minor (7)
Codeine
5%–13%
Minor (5)
Morphine
100%
6–25 min
Fentanyl
Methadone

The "Opiate" Assay: Not So Good for "Opioids"

	Online DAT opiates II[1] assay	EMIT II+ opiate aassay[2]	TDx/TDx-flex opiate opiate assay[3]	Archetict/ Aeroset	AsSym opiate[3]	CEDIA opiate[4]	DRI opiate[4]	DRI oxycodone[4]
Morphine	100	100	100	100	100	100	100	<29
Codeine	134	98	>3.6	167	>3.6	125	167	<20
Ethyl morphine	101		<10		>100			
Diacetyl morphine (heroin)	82					53	86	<33
6-Acetylmorphine	78	69	>20	67	<30	81	79	<200
Dihydrocodeine	69	103	>3.6	106	>3.6	50	67	<100
Morphine-3-glucuronide	54	48	>57	47	>57	81	50	<11
Morphine-6-glucuronide			>5.7		<8.6	47	100	
Hydrocodone	28	121	>8.0	158	>12	48	18	<133
Hydromorphone	21	60	>4.4	54	>6.7	57	7.5	<333
Norcodeine	2							<10
Normorphine							0	<10
Oxycodone	0	12	>1.1	11	<1.7	3.1	1.9	100
Oxymorphone		1.5	<10	0	<15	1.9	0.7	103
Noroxycodone								<0.1
Noroxymorphone								<0.1
Meperidine	0	<0.6	<2.0	0	<3.0	0.2	0	
Levallorphan		<4	<6.0	13	<6.0			
Levorphanol		29	>6.0	27	>6.0		2.1	<50
Nalorphine		3	<20	2.3	<30			
Naloxone	0	0.04	<20	0	<30		0	<50
Imiprimine	0					1.6		
Ranitidine						0	0	
Thebaine	25		<20		<30		<15	
Naltrexone	0						0	<20
Fentanyl			<40		<60			

EMIT Drugs-of-Abuse Urine Assays Cross-Reactivity List

Answers for life.

SIEMENS

EMIT II Plus

Cross-Reactivity Guide

Applicability of Cross-Reactivity Data

The information contained in this Cross-Reactivity List is applicable to any Drugs-of-Abuse Urine Assays that utilize the Siemens Syva® EMIT® II Plus Drugs-of-Abuse Reagents. Siemens analyzers that use these reagents are the ADVIA® 1200/1650/1800/2400, Dimension® RxL/EXL™ Dimension Vista,® and the Vital Viva®/Viva E®/V-Twin®/Viva Jr® chemistry analyzers. The Siemens Syva EMIT II Plus Drugs-of-Abuse assays can also be run on other, non-Siemens clinical chemistry analyzers using Siemens-validated application parameters. These include, but are not limited to, the Beckman Coulter AU® series analyzers, COBAS MIRA series analyzers, and the HITACHI (Roche) 700 and 900 series analyzers.

Case

- A 21-year-old woman on buprenorphine presents to a treatment clinic.

- UDS: +methadone
- She states she does not use methadone

<u>False Positive (Analytical)</u>
Quetiapine
Olanzapine
Doxylamine
Verapamil
Diphenhydramine

Interpretation of a True Positive Opiate Screen (Analytical)

- Clinical true positive (patient “misuses” an opioid)

  However:

  - Unclear which opioid
  - Cannot tell time of use or amount used
  - Does not correlate with effectiveness or impairment
  - Does not indicate route of administration

- Clinical false positive (positive test, not “misusing” opioids)


COLORADO AND WASHINGTON USHER IN A NEW ERA OF JOB DISCRIMINATION LAWSUITS...
I DON'T CARE IF IT'S LEGAL... IF YOU WANT TO WORK HERE, YOU HAVE TO PASS A DRUG TEST.
KIRK
©2012 The Toledo Blade
email: kirk@toledoblade.com

Interpretation of a True Negative Opiate Screen (Analytical)

- Patient is not using
  - Diversion of pain medicine
- Collection/Lab error
- Wrong assay used
  - e.g.: “Opiate” assay for oxycodone*
- Cutoffs are often used*
- Detection periods are short*

TABLE 2. **Length of Time Drugs of Abuse Can Be Detected in Urine**

Drug	Time
Alcohol	7-12 h
Amphetamine	48 h
Methamphetamine	48 h
Barbiturate	
Short-acting (eg, pentobarbital)	24 h
Long-acting (eg, phenobarbital)	3 wk
Benzodiazepine	
Short-acting (eg, lorazepam)	3 d
Long-acting (eg, diazepam)	30 d
Cocaine metabolites	2-4 d
Marijuana	
Single use	3 d
Moderate use (4 times/wk)	5-7 d
Daily use	10-15 d
Long-term heavy smoker	>30 d
Opioids	
Codeine	48 h
Heroin (morphine)	48 h
Hydromorphone	2-4 d
Methadone	3 d
Morphine	48-72 h
Oxycodone	2-4 d
Propoxyphene	6-48 h
Phencyclidine	8 d

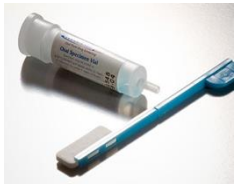
Data from references 7 through 12.

(*clinical false negative)

Matrix considerations

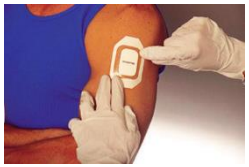
- Window of detection
- Time to obtain results (availability of POCT)
- Ease of collection (need for trained personnel, collection facilities)
- Invasiveness/unpleasantness of collection
- Availability of the sample (e.g., renal health, shy bladder, baldness, dry mouth)
- Susceptibility of the sample to tampering

Drugs and metabolites are concentrated in urine
Can compare to creatinine



Drugs are found in much lower concentrations
Easy to observe

Drugs and metabolites incorporated into hair
Concentrations of drugs low with sporadic use



Prospective collection, 1-2 weeks
Inter and intraindividual variability

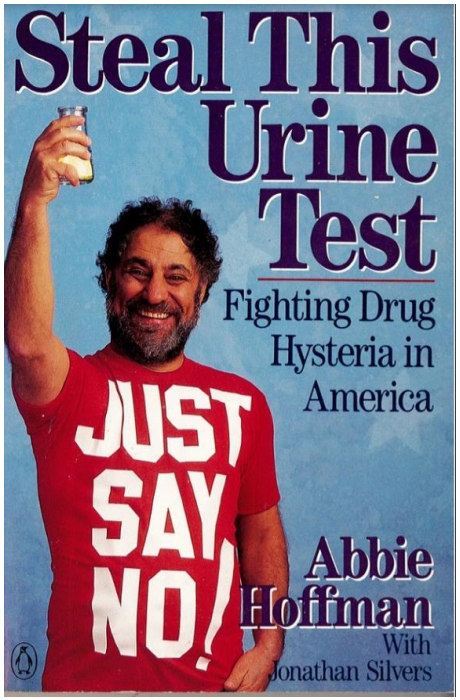
Invasive and expensive to test
More direct relationship to impairment

Easy to collect and observe
Essentially limited to ethanol

TABLE 4. Comparing Testing Characteristics Across Matrices

	Blood	Breath	Oral Fluid	Urine	Sweat	Hair
General detection period	<24 hours [2] 1–8 hours [25] 1–48 hours [26]	~1 hr per standard drink	<24 hours [2] 12–24 hours [27] 1–36 hours [28] 5–48 hours [29] 12–48 hours [25]	1.5–4 days [29] 1–3 days [25,26,30]	Continuous, usually 1–4 weeks [2,26]	7–90 days [2] 7–100 days [26]
POCT/On-site immunoassay available	Yes, primarily used for alcohol	For alcohol	Yes	Yes	No	No
Primarily detects	Parent drug compound; blood alcohol concentration	Parent drug compound; blood alcohol concentration	Parent drug compound	Drug metabolite	Parent drug compound	Parent drug compound
Best use in treatment setting	Determination of acute impairment or intoxication for alcohol	Determination of acute impairment or intoxication for alcohol	Short-term detection in ongoing treatment	Intermediate-term detection in ongoing treatment	Medium-term prospective monitoring	Long-term monitoring; 3-month drug use history
Ease of collection	Requires staff trained in phlebotomy	Easily collected	Easily collected	Requires specialized collection facility (restroom)	Easily collected	Easily collected
Intrusiveness of collection	High for intravenous access	Low	Low	High	Low	Low
Resistance to tampering	High	High	High, but some uncertainty	Low	High, but some uncertainty	High when chemically untreated
Retesting same sample	Difficult	Generally not possible	Difficult	Possible	Possible depending on patch used	Easy

ASAM Appropriate Use of Drug Testing in Clinical Addiction Medicine, 2017


Steal This Urine Test
Fighting Drug Hysteria in America
JUST SAY NO!
Abbie Hoffman
With Jonathan Silvers


Spectrum Labs
URINE LUCK®
DETOXIFYING AGENT
URINE LUCK®
DETOXIFYING AGENT


REAL
The WHIZZINATOR XXX
Mission Dynamics
EASY TO USE
LIFELIKE LOOK & FEEL
SAFE TOXIN FREE URINE
4 oz RESERVOIR
2 HEATING PADS
SYRINGE FOR REFILLING
TEMPERATURE INDICATOR
SYNTHETIC URINE INCLUDED
ELEVEN COLORS TO CHOOSE FROM
DETAILED INSTRUCTIONS WITH PICTURES
ONLY $89.95
SATISFACTION 100% GUARANTEED


NEW LOOK! NEW FORMULA!
spectrum Labs
QUICK FIX®
PLUS
NOVELTY SYNTHETIC URINE
CONTAINS UREA
3 oz

Conceptual summary

- Screening vs confirmatory
- Testing results:
  - Analytical: what the assay finds
  - Clinical: what the patient used
- What the results find are one thing
  - What you do with the results are another

We often have questions about choosing testing panels and proper interpretation of results. Where can I get help?

- Medical or analytical toxicologist
- Staff at a clinical or testing laboratory
- A physician with MRO certification

Lewis.Nelson@Rutgers.edu