

Opioid Use Disorder Education and Treatment ECHO Series

Session 2 - Urine Drug Screens

November 16, 2021

Kurt DeVine, MD, and Heather Bell, MD
Family Medicine and Addiction Physicians



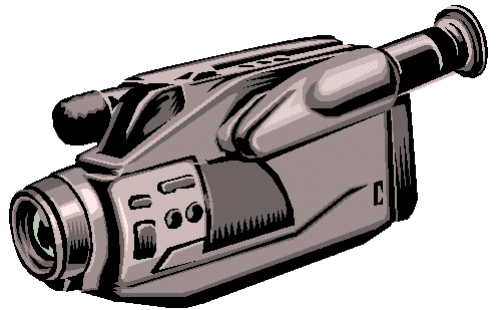
MINNESOTA ACADEMY OF
FAMILY PHYSICIANS
STRONG MEDICINE FOR MINNESOTA

0

Announcements



1



SESSIONS ARE RECORDED



YES, THERE'S *FREE* CME

Attendance

- Please chat us the names of people on ECHO if there are multiple people in your room!
- “Re-name” your self so we know who’s here!
- Please turn your video on!
 - Human connection!
 - And we do NOT care if you are eating!



4

StratisHealth

MINNESOTA ACADEMY OF
FAMILY PHYSICIANS

4

Case Presentations!

The ECHO model is based on case-based learning! The case presentation form is on the MAFP website and also on the announcements email!

BUT feel free to present in any de-identified format!

StratisHealth

MINNESOTA ACADEMY OF
FAMILY PHYSICIANS

5

Upcoming Tuesday ECHO Sessions

- **Tuesday, December 7, 2021:** ACE Scores/Trauma (Special guest: Susan Beaulieu)
- **Tuesday, December 21, 2021:** Mental Health and Addiction
- **Tuesday, January 4, 2022:** Overlap of Addiction and Chronic Pain

Upcoming Wednesday ECHO Sessions

- **Wednesday, November 17, 2021:** Dr. Eric Garland, PH.D. Mindfulness-Oriented Recovery Enhancement (MORE) Program: Recent NIH study on OUD
- **Wednesday, November 24, 2021:** Thanksgiving Break
- **Wednesday, December 1, 2021 & Wednesday, December 8, 2021:** Micro-inductions & Macro-inductions

“The Addiction Connection Podcast”

Weekly addiction
topics- Tuesday
release day!

www.buzzsprout.com/954034

(Or anywhere you get your podcasts!)

Email us questions:

theaddictionconnectionpodcast@gmail



8

StratisHealth

MINNESOTA ACADEMY OF
FAMILY PHYSICIANS

8

Urine Drug Screens Objectives:

- Understand the need for urine drug screens
- Become familiar with basic procedures for sample collection
- Identify the criteria for when a urine drug screen is needed
- Understand the advantages of witnessed urine collection
- Describe variables in interpreting results

9

StratisHealth

MINNESOTA ACADEMY OF
FAMILY PHYSICIANS

9

Why screen?

- Ensure patient is actually taking their medication
- Confirm patient is not taking other illicit substances
- Confirm that a patient who has a caregiver setting up their pills is receiving the proper medication



Will checking a UDAS* change what I do?

*Urine Drugs Analysis Screen

Basic Procedures

- Ask patient when they last took medicine prior to test
- Do not allow patients to bring bags or other items into the bathroom
- Have colored water in the toilet bowl
- Preferably have a room where water can be turned off
- Make sure they have an up-to-date care plan
- Others
 - Locked toilet
 - Nothing near groin (“jail purse”)



12

StratisHealth

MINNESOTA ACADEMY OF
FAMILY PHYSICIANS

12

When to Screen

- Patients newly started on opioids or other controlled substances
- When suspicion of misuse is reported
- If patient is high risk for abuse
- At every visit for buprenorphine follow-up
- If there are concerns of diversion
- If patient is attempting frequent early refills



13

StratisHealth

MINNESOTA ACADEMY OF
FAMILY PHYSICIANS

13

Witnessed Urine

- Much more likely to be accurate
- Can be random
- Necessary* part of any program with patients on chronic pain medications or buprenorphine (*In our opinion)
- Like-gendered staff
- If no staff, patient in gown to ensure nothing is “attached”



14

StratisHealth

MINNESOTA ACADEMY OF
FAMILY PHYSICIANS

14

How to Interpret

- Urine is as expected
- Urine finding(s) is/are unexpected
 - Urine does not show the medication the patient is taking
 - Wrong prescription medication
 - Illicit substance
 - Adulterated urine
 - It's not urine
 - Combination of a drug
 - Abnormal temperature



15

StratisHealth

MINNESOTA ACADEMY OF
FAMILY PHYSICIANS

15

How to Interpret cont.

- Failure to recognize altered urine specimen
 - Altered pH due to additives such as ammonia or bleach
 - Altered specific gravity due to dilution
 - Lacking presence of metabolites (if confirmatory testing obtained)
 - Cooler temperature due to substituted urine



How to Interpret cont.

Component	Value	Ref Range & Units	Status
UR CANNABINOID	PRESUMPTIVE POSITIVE (A)	NEG	Final
UR PHENCYCLIDINE	NEGATIVE	NEG	Final
UR COCAINE	NEGATIVE	NEG	Final
UR METHAMPHETAMINE	PRESUMPTIVE POSITIVE (A)	NEG	Final
UR OPIATE	PRESUMPTIVE POSITIVE (A)	NEG	Final
UR AMPHETAMINES	PRESUMPTIVE POSITIVE (A)	NEG	Final
UR BENZODIAZEPINE	NEGATIVE	NEG	Final
UR TRICYCLIC ANTIDEP	NEGATIVE	NEG	Final
UR METHADONE	NEGATIVE	NEG	Final
UR BARBITURATE	NEGATIVE	NEG	Final
URINE OXYCODONE	NEGATIVE	NEG	Final
UR PROPOXYPHENE	NEGATIVE	NEG	Final
UR BUPRENORPHINE	PRESUMPTIVE POSITIVE (A)	NEG	Final

Component	Value	Ref Range & Units	Status
UR CANNABINOID	NEGATIVE	NEG	Final
UR PHENCYCLIDINE	NEGATIVE	NEG	Final
UR COCAINE	NEGATIVE	NEG	Final
UR METHAMPHETAMINE	NEGATIVE	NEG	Final
UR OPIATE	NEGATIVE	NEG	Final
UR AMPHETAMINES	NEGATIVE	NEG	Final
UR BENZODIAZEPINE	NEGATIVE	NEG	Final
UR TRICYCLIC ANTIDEP	NEGATIVE	NEG	Final
UR METHADONE	NEGATIVE	NEG	Final
UR BARBITURATE	NEGATIVE	NEG	Final
URINE OXYCODONE	NEGATIVE	NEG	Final
UR PROPOXYPHENE	NEGATIVE	NEG	Final
UR BUPRENORPHINE	PRESUMPTIVE POSITIVE (A)	NEG	Final

How to Interpret cont.

- When to order confirmatory testing
 - Order confirmation [even on a negative test] for a medication a patient is supposed to be on
 - Order confirmation [on all positive] unexpected results to prove they are not falsely positive
 - Benzodiazepines, especially clonazepam/alprazolam



18

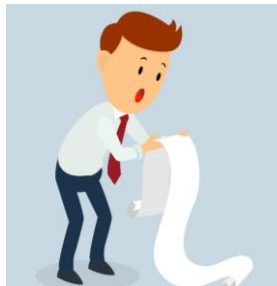
StratisHealth

MINNESOTA ACADEMY OF
FAMILY PHYSICIANS

18

When Not to Order Confirmatory?

- Buprenorphine patient admitted use
- When it's not going to change what you are going to do
- It costs how much?



19

StratisHealth

MINNESOTA ACADEMY OF
FAMILY PHYSICIANS

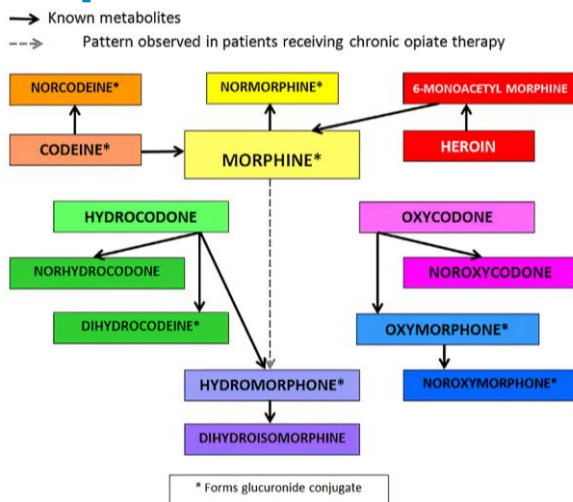
19

How to Interpret cont.

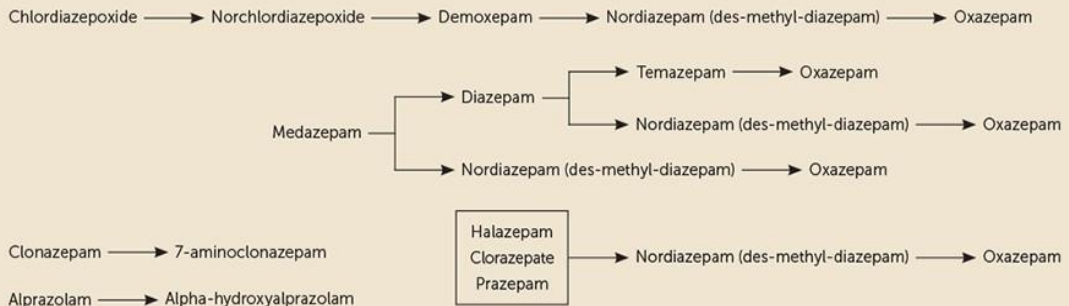
- Have lab make metabolites of common medications available to all clinicians
- Why metabolites are important



How to Interpret cont.



eFIGURE B



Metabolic pathways of benzodiazepines.

Information from Valentine JL, Middleton R, Sparks C. Identification of urinary benzodiazepines and their metabolites: comparison of automated HPLC and GC-MS after immunoassay screening of clinical specimens. J Anal Toxicol. 1996;20(6):419.

Detection Time

TABLE 2. Approximate Drug Detection Time in the Urine⁹⁻¹⁷

Drug	Length of time detected in urine	Drug	Length of time detected in urine
Alcohol	7-12 h	Opioids	
Amphetamine	48 h	Codeine	48 h
Methamphetamine	48 h	Heroin (morphine)	48 h
Barbiturate		Hydromorphone	2-4 d
Short-acting (eg, pentobarbital)	24 h	Methadone	3 d
Long-acting (eg, phenobarbital)	3 wk	Morphine	48-72 h
Benzodiazepine		Oxycodone	2-4 d
Short-acting (eg, lorazepam)	3 d	Phencyclidine	8 d
Long-acting (eg, diazepam)	30 d	Synthetic cannabinoids	
Cocaine metabolites	2-4 d	Single use	72 h
Marjuana		Chronic use	>72 h
Single use	3 d	Synthetic cathinone	Variable
Moderate use (4 times/wk)	5-7 d		
Chronic use (daily)	10-15 d		
Chronic heavy smoker	>30 d		

Adapted from Mayo Clin Proc, with permission.¹²

Detection Time- Fentanyl

- Urine test: 24-72 hours after last use
- Hair test: up to 3 months
- Blood test: 5-48 hours

* Depending on dose



24

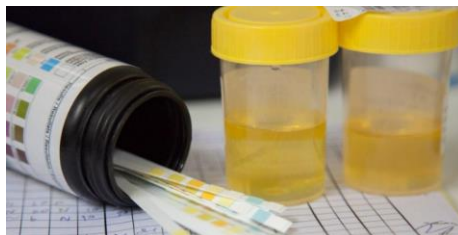
StratisHealth

MINNESOTA ACADEMY OF
FAMILY PHYSICIANS

24

Approaching the Patient with Unexpected Urine Results

- Expected drug not present
 - Prior to the test, you should have asked the patient what you're going to find in their urine
 - Ask the patient why the medication is not in their urine



25

StratisHealth

MINNESOTA ACADEMY OF
FAMILY PHYSICIANS

25

Approaching the Patient with Unexpected Urine Results cont.

- Illicit substance is in the urine
 - Taper off (prescribed controlled substance)
 - Evaluate for substance use disorder
 - Offer treatment



26

StratisHealth

MINNESOTA ACADEMY OF
FAMILY PHYSICIANS

26

Approaching the Patient with Unexpected Urine Results cont.

- Adulterated urine
 - Bring patient back for follow up and have witnessed urine
 - Social work to meet
 - Evaluate for SUD



27

StratisHealth

MINNESOTA ACADEMY OF
FAMILY PHYSICIANS

27

Approaching the Patient with Unexpected Urine Results cont.

- Refusal to give urine
 - +/- Patient does not get refill of medication
 - Evaluate for SUD



28

StratisHealth

MINNESOTA ACADEMY OF
FAMILY PHYSICIANS

28

Approaching the Patient with Unexpected Urine Results cont.

- Combination of a drug
 - Retest
 - Evaluate for SUD



29

StratisHealth

MINNESOTA ACADEMY OF
FAMILY PHYSICIANS

29

Indications and Settings for Urine Drug Testing

- Outpatient (Primary care, pain clinic, MOUD)
- Hospital (ED and inpatient)
 - Correlation to clinical presentation
 - Information for inpatient setting (some requested for psychiatric admission)
 - Outpatient follow-up planning (chronic opioid treatment, MOUD, public health)



30

StratisHealth

MINNESOTA ACADEMY OF
FAMILY PHYSICIANS

30

Indications and Settings for Urine Drug Testing



- Other – Clinical versus non-clinical settings
 - Substance use disorder additional treatment settings
 - Occupational
 - Child protection (abuse/neglect, pregnancy)
 - Specialty court, e.g., drug court
 - Public health
 - Post-mortem

31

StratisHealth

MINNESOTA ACADEMY OF
FAMILY PHYSICIANS

31

Commonly Used Methods for Urine Drug Testing

Immunoassay (IA)

Identify drug classes

Based on similar drug structure and antibody recognition

Qualitative

Not confirmatory

Chromatography

Separate/isolate analyte, e.g., gas chromatography (GC), liquid chromatography (LC)

Qualitative, although semi-quantitative/relative to other substances detected and internal controls

Alone not confirmatory, part of the process for confirmation

Mass Spectrometry (MS)

Identify and **confirm** presence of analyte by breaking apart

Quantitative report, qualitative or relative quantitative interpretation

Confirmatory

32

StratisHealth

MINNESOTA ACADEMY OF FAMILY PHYSICIANS

32

Immunoassays for Urine Drug Testing = “Urine Drug Screen” (UDS)

- Identifies drug (few) and drug classes (some)
- Positive test is based on similar drug structure and antibody recognition of the drug/site on drug
- Rapid turn-around-time (TaT)
- Qualitative
- Not confirmatory
 - May test for same drug classes but structures between classes may appear similar enough to be detected (**false positive**)
 - e.g., Bupropion may trigger amphetamine
 - May differ in detection of specific drugs and some drugs present in sample may not be detected on some tests (**false negative**)
 - e.g., Clonazepam often not detected
 - Confirmation may identify presence (**true positive**) or absence (**true negative**) of drug

33

StratisHealth

MINNESOTA ACADEMY OF FAMILY PHYSICIANS

33

General Principles for Ordering Urine Drug Test

- Contributing factors
- Availability of tests and lab personnel expertise
- Tiered approach often used depending on indications and setting for test
- Extent of testing/instrumentation available varies depending on location
- “More than what’s in the manual”
- Turn-around-time (TaT)



34

StratisHealth

MINNESOTA ACADEMY OF
FAMILY PHYSICIANS

34

Potential Benefits and Pitfalls of Urine Drug Testing: Benefits

- Use advantages of urine specimen
 - Liquid state
 - Ease of sample collection
 - Non-invasive, sometimes
 - Drugs concentrated in urine
 - Longer window of detection than in blood
 - Captures results of drug metabolism



35

StratisHealth

MINNESOTA ACADEMY OF
FAMILY PHYSICIANS

35

Potential Benefits and Pitfalls of Urine Drug Testing: Pitfalls

- Treatment adjustments based primarily/only on test result
- Failure to recognize or lack ability to test for altered urine specimen
 - Altered pH due to additives such as ammonia or bleach
 - Altered specific gravity due to dilution
 - Lacking presence of metabolites (if confirmatory testing obtained)
 - Cooler temperature due to substituted urine



When do I need a specimen other than urine?

Characteristics of Specimen Type for Drug Testing

	Blood	Saliva	Urine	Sweat	Hair
Collection Methods	Invasive	Non-invasive	Invasive	Noninvasive	Noninvasive
Principal Analyte	Parent drug or metabolites	Parent drug	Metabolites	Parent drug and Metabolites	Parent drug and metabolites
Window of Detection	up to 12 hours	*up to 24 hours	up to 3 days	Days	Months
Disadvantages	very narrow window of detection	narrow window of detection small sample amount limits repeat analysis	Specimen Adulteration Observed collection an invasion of privacy	Contamination of specimen during removal of collection device	Hair color and texture bias

* BZE can be measured in saliva up to 36 hours after use (21)

Reproduced with permission from Blackwell Publishing; *Saliva Testing for Drugs of Abuse*, Edward J. Cone, page 9. *Saliva as a Diagnostic Fluid*. Editors Daniel Malamud and Lawrence Tabak, Published by the New York Academy of Volume 694, 1993

Opioid Metabolism-Buprenorphine

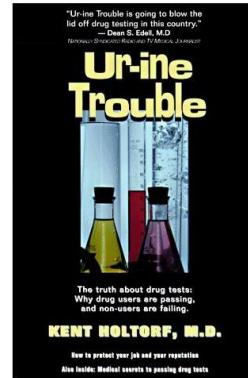
- Cut-off 5 ng/mL versus 10 ng/mL
- Interpretation of ratios
 - Buprenorphine
 - Major metabolites in basic urine tests
 - Norbuprenorphine

Table 5: Cross-Reactivity with Related Drugs (5ng/mL Cutoff)

Analyte	Conc. (ng/mL)	% Cross-Reactivity
Buprenorphine	5	100.00
Norbuprenorphine	5.5	90.91
Buprenorphine Glucuronide	3,000	0.17
Norbuprenorphine Glucuronide	4,000	0.13
6-Acetyl morphine	100,000	N.D.
Codeine	100,000	N.D.
Dihydrocodeine	100,000	N.D.
EDDP	100000	N.D.
EMDP	100,000	N.D.
Ethyl Morphine	100,000	N.D.
Heroin	100,000	N.D.
Hydrocodone	100,000	N.D.
Hydromorphone	100,000	N.D.
LAAI	100,000	N.D.
Levorphanol	100,000	N.D.
Methadone	100,000	N.D.
Meperidine	100,000	N.D.
Morphine 3 Glucuronide	100,000	N.D.
Morphine 6 Glucuronide	100,000	N.D.
Morphine	100,000	N.D.

Summary

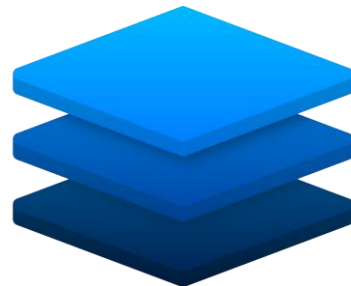
- **Why** - Indications for urine drug testing
- **What** - Information wanted/needed
- **Where** - Clinic setting
- **Which** - Test(s) available
- **How** - Obtain urine specimen
- **When** - Frequency of testing
- **Who** - Your lab personnel/experts



Do I need point of care testing?

Should I get levels?

- THC?
- Buprenorphine/norbuprenorphine?
- Benzodiazepines?
- Opioids?
- Amphetamine or methamphetamine?



Gabapentin



Amphetamines... many false positives

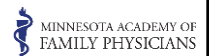
Kratom



Tianeptine



46



46

Additional References

- Urine Drug Tests: Ordering and Interpretation. Neelima Kale, PhD, MD, MBA, University of Texas
http://www.afp-digital.org/afp/january_1_2019/MobilePagedArticle.action?articleId=1453496#articleId1453496
- Clinical Interpretation of Urine Drug Tests: What Clinicians Need to Know About Urine Drug Screens. Karen E. Moeller, PharmD, BCPP; Julie C. Kissack, PharmD, BCPP; Rabia S. Atayee, PharmD, BCPS; and Kelly C. Lee, PharmD, MAS, BCPP
<https://www.sciencedirect.com/science/article/abs/pii/S0025619616308254>
- Role of Urine Drug Testing in the Current Opioid Epidemic. Gagan Mahajan, MD.
<https://journals.lww.com/anesthesia-analgesia/pages/articleviewer.aspx?year=2017&issue=12000&article=00039&type=Fulltext>

47



47

For questions regarding content from this boot camp:

Heather Bell

heather.bell1012@gmail.com

 @echocsct

Kurt Devine

kmdevine.truk@gmail.com



Podcast:
The Addiction
Connection



MINNESOTA ACADEMY OF
FAMILY PHYSICIANS
STRONG MEDICINE FOR MINNESOTA