Practical guide to the use of urine drug screens in primary care

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UNM Family and Community Medicine

Disclosures

- I have no disclosures

Objectives

By the end of this lecture, the learners will

- know the indications for urine drug screening in primary care
- know the options for urine drug screens and confirmatory testing
- be able to interpret clinical urine drug screens
- begin to apply the use of clinical drug screens in primary care

Uses of Clinical Drug Screens

- Employment
- Legal reasons
  - Probation
  - Accidents on the job
- Clinical
  - Monitoring patients with addiction history for relapse
  - Monitoring patients on controlled substances for adherence and for substance abuse
  - Monitoring a patient with a condition in which drug use puts them at additional risk
    - Pregnancy
    - Hepatitis C
    - HIV

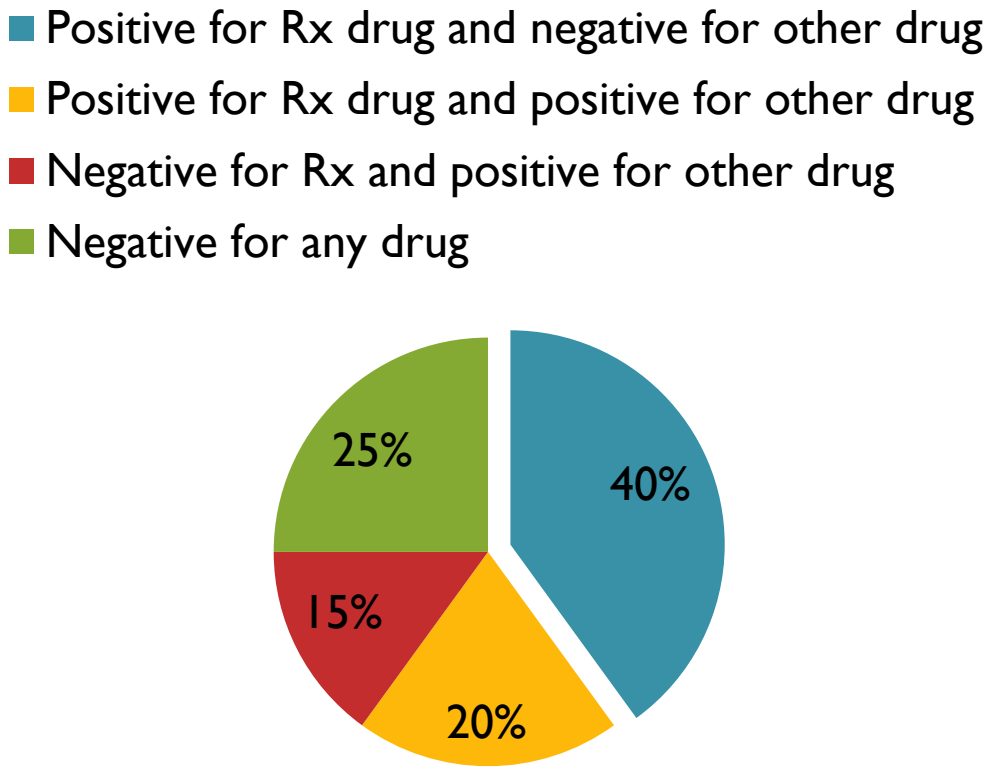
Think about why you are testing

- How many of you use urine drug screens…
  - Before prescribing a controlled substance?
  - During the continued use of a controlled substance?
  - General screening for substance use?
  - Suspicion of drug use?
  - Other?

Are we good at detection?

- Can providers tell which patients are abusing or diverting drugs?
- Do patients actually comply with our contracts, requests and recommendations?

Clinical "hunch" is often wrong



Center for Substance Abuse Research. (2013, June 3). Lab test results suggest majority of patients do not take prescription drugs as prescribed. *CESAR Fax, 22(22)*.

Think about why you are testing

- Clinical Drug Screening is done for the patient, not to the patient
- Never make drug testing punitive
- What will you do with an unexpected result?

Mrs. Smith

A 55 yo female with a history of chronic back pain comes in for her refills. She is prescribed oxycodone 5mg QID. A basic UDM is sent to TriCore and returns the next day. What do you think of these results?

Amphetamines	Positive
Barbiturates	Negative
Benzodiazepines	Negative
Cocaine	Negative
Methadone	Negative
Opiates	Negative
Propoxyphene	Negative
THC	Negative

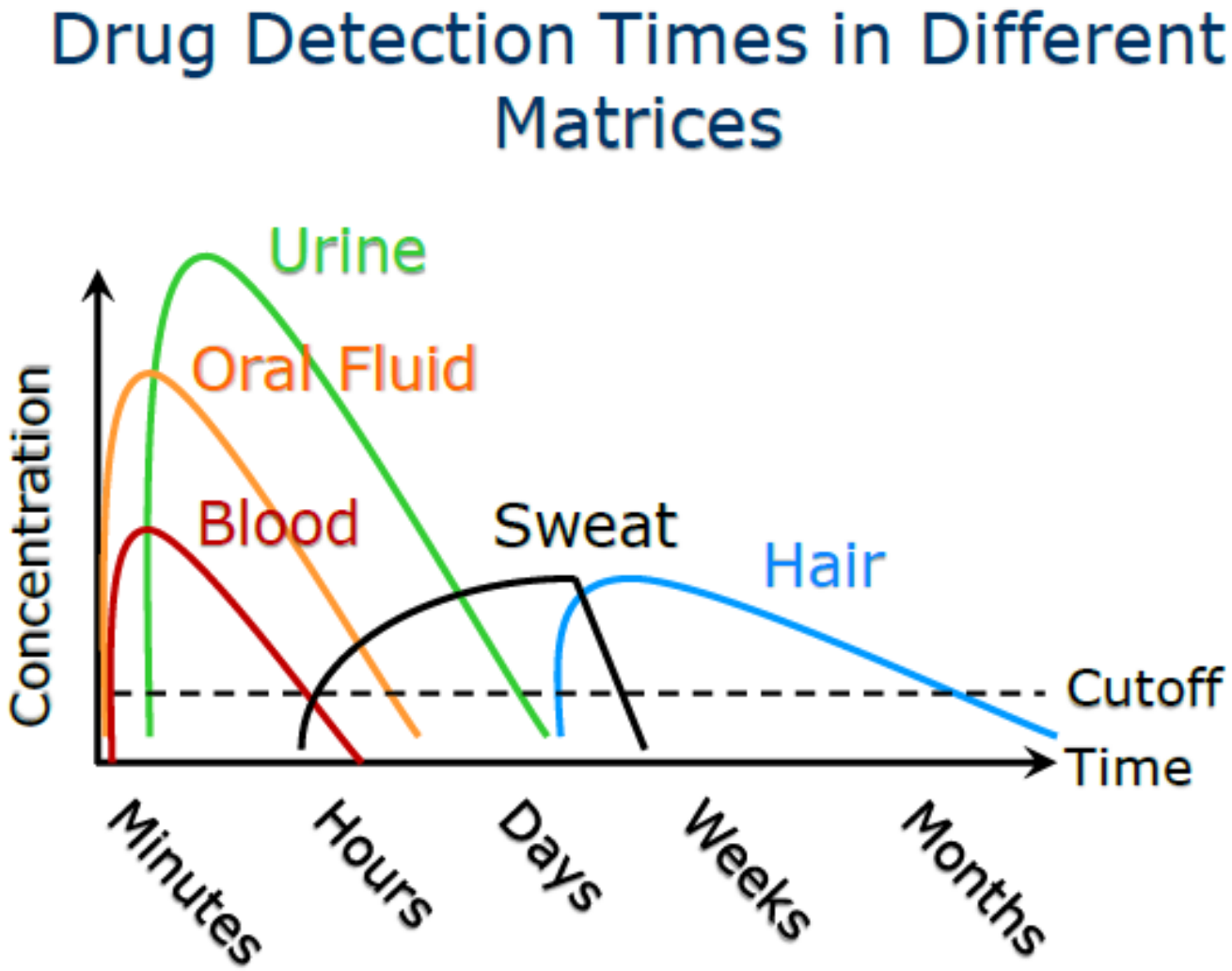
What are you looking for

- Drug tests DO detect
  - Recent drug USE only
  - Can detect longer term use with hair and nail testing
- Drug tests DO NOT detect
  - Impairment
  - Abuse
  - Addiction
  - Dependence

What can be tested?

- Urine
- Blood
- Hair
- Saliva
- sweat
- Nails
- Breath

Length of detection



Length of time specific drugs are detected in urine

Drug	Time of detection
Alcohol	7 – 12 hours
Amphetamines	48 hours
Barbiturates	Short: 24 -48 hours, Long: up to 3 weeks
Benzodiazepines	Short: 3 days, Long: up to 30 days
Cocaine	2 – 4 days
Marijuana	3 – 30 days
Methamphetamines	3 – 5 days
MDMA	48 hours
Opioids	Depends on drug/metabolite
PCP	8 days

Length of detection - Marijuana

- Marijuana use
  - Single use
  - Moderate use (4xwk)
  - Daily use
  - Heavy use
- Time of detection
  - 3 days
  - 5 – 7 days
  - 10 -15 days
  - > 30 days

Length of detection - opioids

Specific drug	Time of detection
Codeine	48 hours
Heroin	48 hours
Hydromorphone	2-4 days
Methadone	3 days or longer
Morphine	48-72 hours
Oxycodone	2-4 days
propoxyphene	6-48 hours

What drug testing is available?

- Screening testing
  - Point of Care
  - Send out to lab
- Confirmatory testing
  - GCMS
  - LCMS
  - other

Screening tests

- Drug screening tests usually test for monoclonal antibodies which are highly specific to the individual drugs or their metabolites
- High sensitivity (low levels of drugs can be detected) but may not be specific
  - May have high number of false positives on some assays
- Relatively inexpensive
- Available as a send out to lab and as POC (point of care) tests

Point of care or send to lab?

- What is the difference?
- POC in clinic
  - Immediate result
  - Low cost
  - Able to discuss with the patient at the visit
  - Can make prescription decisions at the time of visit
  - Tests for the most commons substances, including oxycodone
- Send to lab
  - Can get a more detailed assays
  - Higher cost
  - Have to wait for the result

What drugs can we test for?

- "SAMHSA Five"
  - Marijuana, Cocaine, Amphetamines, Opiates, PCP
- Point of care testing
  - Amphetamines, Barbiturates, Benzodiazepines, Cannabinoid, Cocaine, Methamphetamines, Methadone, MDMA, Opioids, Oxycodone, PCP, Propoxyphene
- Laboratory testing options
  - Amphetamines, Barbiturates, Benzodiazepines, Cannabinoid, Cocaine, Darvon, Methadone, Opiates, PCP, TCA, Demerol, Oxycodone, Tramadol, Fentanyl, Soma, Zolpidem, Buprenorphine
  - Alcohol, acetaminophen

QuickTox

- Cocaine
- Opiates
- Methamphetamines
- THC
- Amphetamines
- PCP
- Benzodiazepines
- Barbiturates
- Methadone
- Tricyclics
- MDMA
- Oxycodone

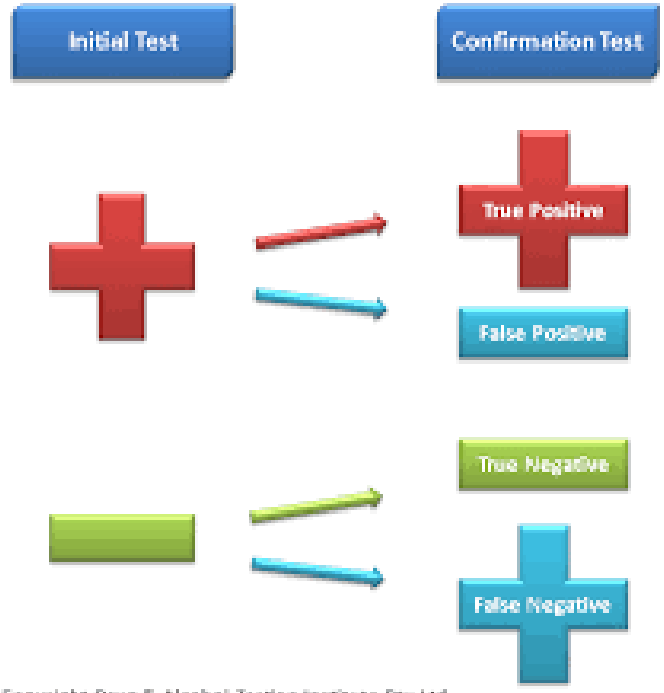
Screening options at TriCore

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

- UDM Pain
  - Amphetamines
  - Barbiturates
  - Benzodiazepines
  - Cocaine
  - Demerol
  - Fentanyl
  - Methadone
  - Opiates
  - Oxycodone
  - PCP
  - Propoxyphene
  - Soma
  - THC
  - Tramadol
  - Tricyclics
  - Zolpidem

Be aware of limitations of the test

- What is the metabolite tested?
- What can cause a FALSE POSITIVE test for your patient?



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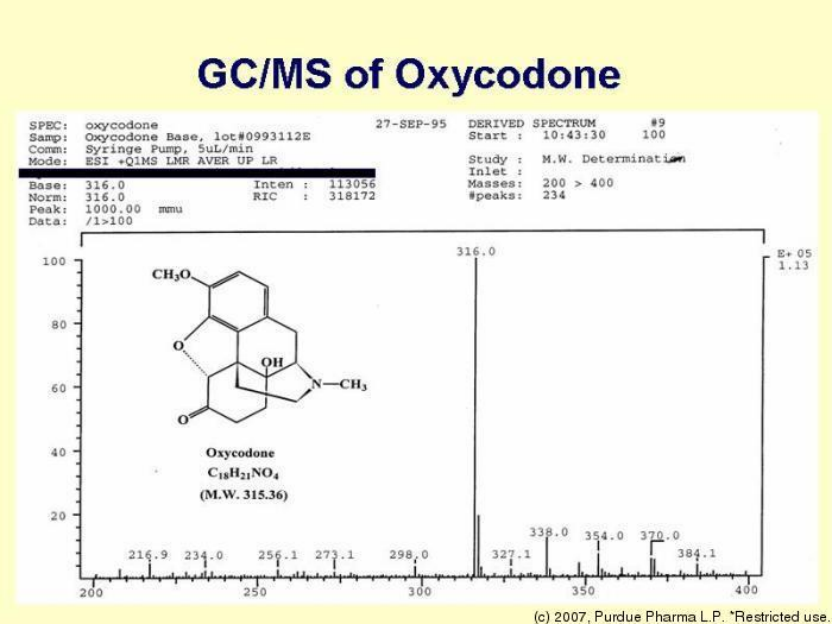
Drug Name	Target Drug	Cutoff Level
Amphetamine (AMP 1000))	D-Amphetamine	*1,000 ng/mL
Amphetamine (AMP 300)	D-Amphetamine	*300 ng/mL
Barbiturates (BAR)	Secobarbital	300 ng/mL
Benzodiazepines (BZO)	Oxazepam	300 ng/mL
Cocaine (COC 300)	Benzoylecgonine	*300 ng/mL
Cocaine (COC 150)	Benzoylecgonine	**150 ng/mL
EDDP (Methadone Metabolite)	2-Ethylidene-1, 5-dimethyl-3, 3-diphenylpyrrolidine	300 ng/mL
Marijuana (THC)	11-nor-?9-THC-9 COOH	*50 ng/mL
Methadone (MTD)	Methadone	300 ng/mL
Methamphetamine(M-AMP 1000)	D-Methamphetamine	1000 ng/mL
Methamphetamine(M-AMP 500)	D-Methamphetamine	**500 ng/mL
Methylenedioxymeth- amphetamine (MDMA)	D,L Methylenedioxy-methamphetamine	500 ng/mL
Opiates (OPI2 2000)	Morphine Morphine	**2000 ng/mL
Opiates (OPI 300)	Morphine Morphine	*300 ng/mL
Oxycodone (OXY)	Oxycodone	100 ng/mL
Phencyclidine (PCP)	Phencyclidine	*25 ng/mL
Tricyclic Anti- depressants (TCA)	Nortriptyline	1000 ng/mL

Confirmatory Testing

- There are limitations to screening clinical drug tests
- GC/MS and LC/MS confirmations are most common



Confirmatory testing

- Uses highly specific processes with liquid chromatography or gas chromatography mass spectroscopy
- Can be added to a drug screen when positive test is seen and you want to check for false positive
  - For example, a patient who took a decongestant will have a positive screen for amphetamines but a confirmation test should be negative

Common confusing assays

- Amphetamines
- Benzodiazepines
- Opioids

Amphetamines

- One of the most difficult assays to interpret
- Many drugs can cause false positive result
  - **Amantadine**
  - Benzphentamine
  - **Buproprion**
  - Chlorpromazine
  - Clobenzorex
  - L-Deprenyl
  - **Desipramine**
  - **Dextroamphetamine**
  - **Ephedrine**
  - Fenproporex
  - Isometheptene
  - Isoxsuprine
  - **Labetalol**
  - MDMA
  - Methamphetamine
  - Phentermine
  - **Phenylephrine**
  - Phenylpropanolamine
  - **Promethazine**
  - **Pseudoephendrine**
  - **Ranitidine**
  - Ritodrine
  - **Selegiline**
  - Thioridazine
  - **Trazodone**

Amphetamines

- Always remember to ask about a detailed medication history
  - Prescription drugs
  - Over the counter drugs
  - Herbal medications
  - Cold medications and home remedies

What about stimulant prescriptions?

- Dextroamphetamine/amphetamine
  - Adderall
  - Screens positive for amphetamine
- Methylphenidate
  - Concerta, Ritalin, Methylin
  - May **not** screen positive
- Lisdexamfetamine
  - Vyvanse
  - Should screen positive for amphetamine

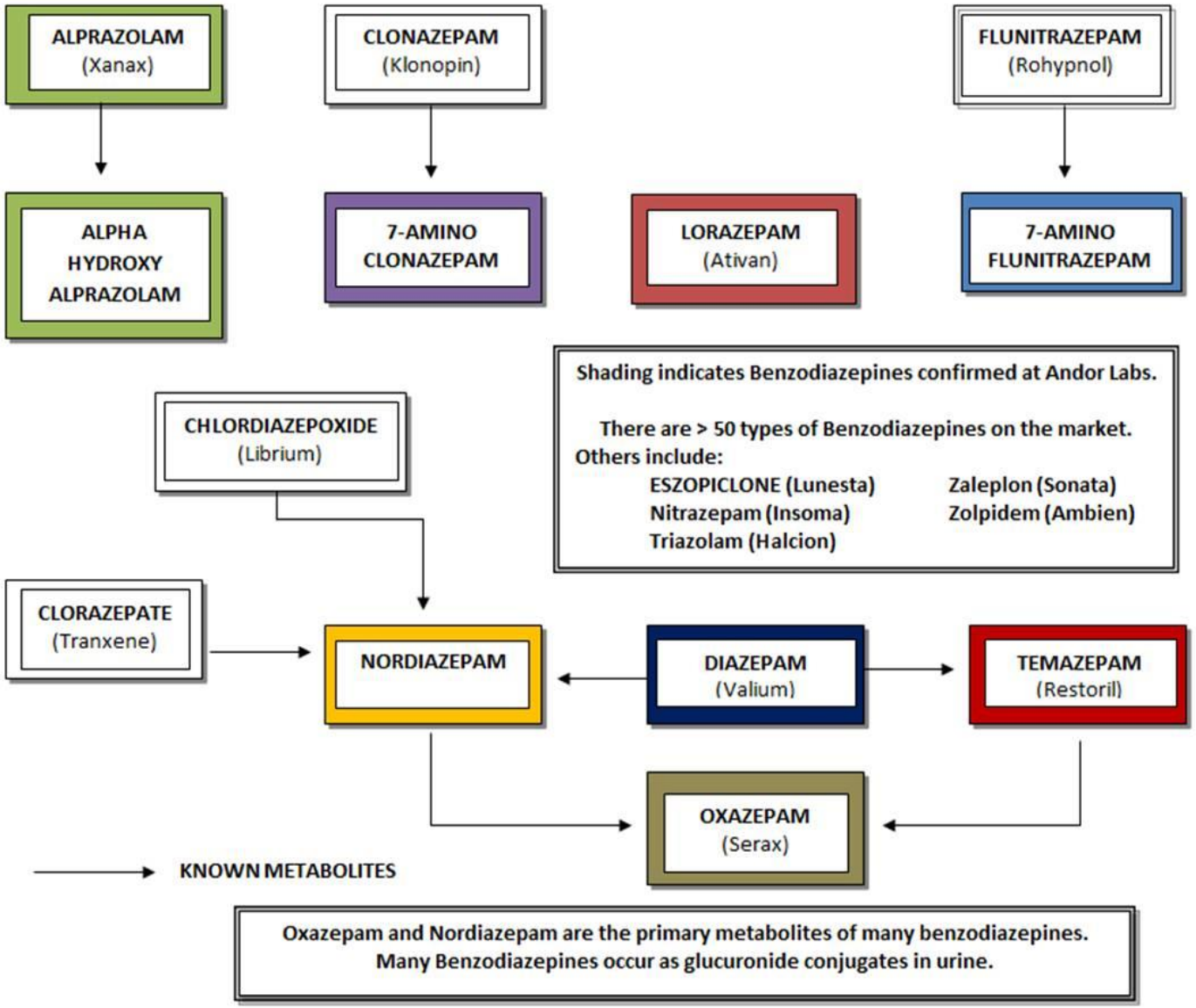
Barbiturates

- Duration of detection is variable depending on the drug and dose
- No common false positive results
- Short-acting detected 1-4 days
  - Butalbital
  - Pentobarbital
  - Secobarbital
- Long-acting detected for weeks
  - Phenobarbital

Benzodiazepines

- Urine drug testing can be complicated by the multiple drugs available
- Most assays detect unconjugated oxazepam
- Chlorazepate, chlordiazepoxide, diazepam, and temazepam metabolize to oxazepam
- Clonazepam metabolizes to 7-amino benzodiazepine
- Alprazolam, lorazepam and triazolam are excreted as glucuronide conjugates
- When in doubt, order confirmatory test or call lab about an assay that will detect what you're looking for

Benzodiazepine Metabolism



Benzodiazepine Assays

- Laboratories can test for multiple assays
  - Chlordiazepoxide, clonazepam, oxazepam, N-desmethyldiazepam
  - May or may not always pick up alprazolam or lorazepam
- Point of care testing usually tests for oxazepam

Benzodiazepines

- Possible false positives for benzodiazepines
  - Oxaprozin
  - **Sertraline**
  - Tolmetin

Cocaine

- Screening urine immunoassays measure benzoylecgonine
- Immunoassays for benzoylecgonine are quite specific and have not been reported to have false positives with other drugs
- Both cocaine and "crack" will show positive result

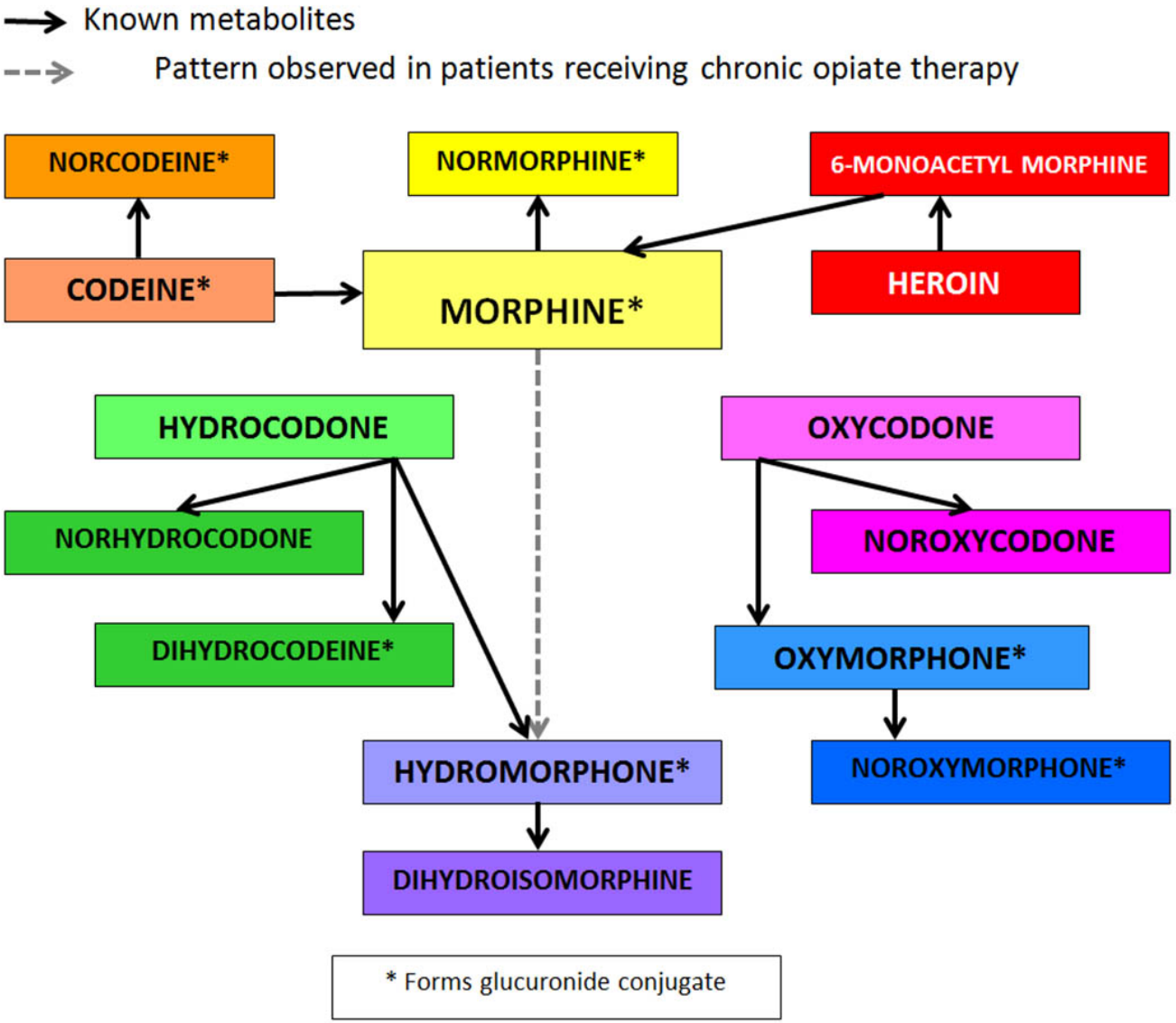
Marijuana

- Immunoassays test for THC- tetrahydrocannabinol
- THC is highly lipophilic and stored in fat tissues
- Passive exposure
  - "I was just around other people smoking"
  - Possible, but unlikely unless around extreme concentrations of passive marijuana smoke
- Current assays have few false positives
  - Dronabinol
  - Hemp seed oil
  - Hemp containing foods
  - Past assays may have false positives with ibuprofen and naproxen but have now been modified to eliminate this cross-reactivity

Opioids

- Opiates are drugs derived from opium, the extract of poppy seeds
  - Morphine, Codeine and Heroin
- Opioid is a more comprehensive term and includes all agonists and antagonists with morphine-like activity
  - Natural opiates- morphine, codeine, heroin
  - Semi-synthetic- hydrocodone, hydromorphone
  - Synthetic- oxycodone, methadone, buprenorphine, fentanyl

Opioid Metabolism



Opioids

- Screening assays can be difficult to interpret
- Semi-synthetic and synthetic drugs do not always yield a positive screen
- Hydrocodone commonly positive on opiate assay
- Oxycodone, Methadone and Buprenorphine are commonly a separate assay
- Oxycodone can also cause positive opiate assay in high doses

Opioids

- Possible false positives
  - Dextromethorphan
  - Diphenhydramine and metabolites
  - Poppy seeds
  - Quinine
  - Quinolones
  - Rifampin
  - Verapamil and metabolites

  - Verapamil and Diphenhydramine may also cause false positive for methadone

Opioids

- Confirmatory testing very useful in our clinical settings
- Can add a confirmation test to a positive screen
  - Call the lab to add on to same specimen
  - Result will yield specific opioid results
    - Hydrocodone
    - Hydromorphone
    - Oxycodone
    - Oxymorphone
    - Codeine
    - Morphine
      - Heroin metabolizes to morphine and 6-MAM, may also see codeine

Alcohol

- More difficult to screen for
- Ethanol
  - Urine
  - Blood
  - Detects use within the past 24 hours
- Ethyl Glucuronide (Etg)
  - Urine
  - Detects use within 3 to 4 days
  - Not available in a lot of laboratories

What will you do with results?

"You're fired, Jack. The lab results just came back, and you tested positive for Coke."

Mrs. Smith

A 55 yo female with a history of chronic back pain comes in for her refills. She is prescribed oxycodone 5mg QID. A basic UDM is sent to TriCore and returns the next day. What do you think of these results?

Amphetamines		Positive
Barbiturates		Negative
Benzos	Negative	
Cocaine		Negative
MTD		Negative
Opiate		Negative
Propoxyphene		Negative
THC		Negative

What are you going to do with the results?

- True Positives
  - Adherence to therapy with prescribed drugs
  - Detects use of illicit or non-prescribed substances
- False Positives
  - Error in the test
  - Cross reactivity
- True Negatives
  - Patient is not using the substance tested for
- False Negatives
  - Not testing correct drug
  - Adulteration or substitution
  - Dilute specimen
  - Drug metabolism is different

Specimen Validity

- Specimen validity tests determine whether a urine specimen has been **diluted**, **adulterated**, or **substituted** to obtain a negative result.

Diluted	Adulterated	Substituted
Diluted urine has something added that makes the urine so dilute that the targeted drug is below the detected cutoff	An adulterated specimen is one containing a substance that is not normally found in urine, or is normally found, but is in abnormal concentration	Synthetic urine products can be submitted. Or may be using another person's urine

Coping with Cheating

- Observe the collection
  - Difficult to do in a clinical setting
- Test randomly, not scheduled
  - Ask patient to come in between appointments
  - Test when they are picking up a refill Rx
- Test for adulterants
- Monitor for pH
- Monitor for specific gravity
- Monitor for temperature

Unexpected results?

- Ask the patient
  - Ask the patient what might be in the urine when you test it
  - Let the patient know the result and ask why they think it could be an unexpected result
  - Do not be accusatory
  - Remember we are testing FOR the patient, not TO the patient
  - We are not policing them, we're attempting to help them
- Review medications and herbal supplements for cross reactivity
- Send for a confirmatory test

Any Questions?