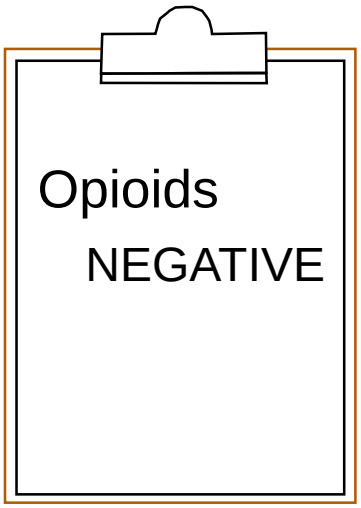
Case examples

Case #1:



You are managing the care of a 24-year-old woman who is being prescribed both methadone and oxycodone. You perform a urine toxicology screen and her opioids are negative. You can conclude:

A. She is noncompliant.
B. She is diverting.
C. She is a rapid metabolizer and these compounds were cleared prior to collection.
D. No conclusions can be drawn from this test.

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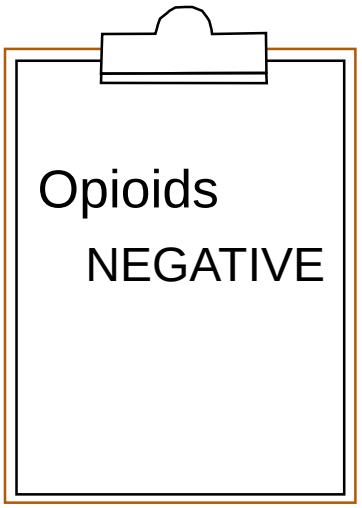

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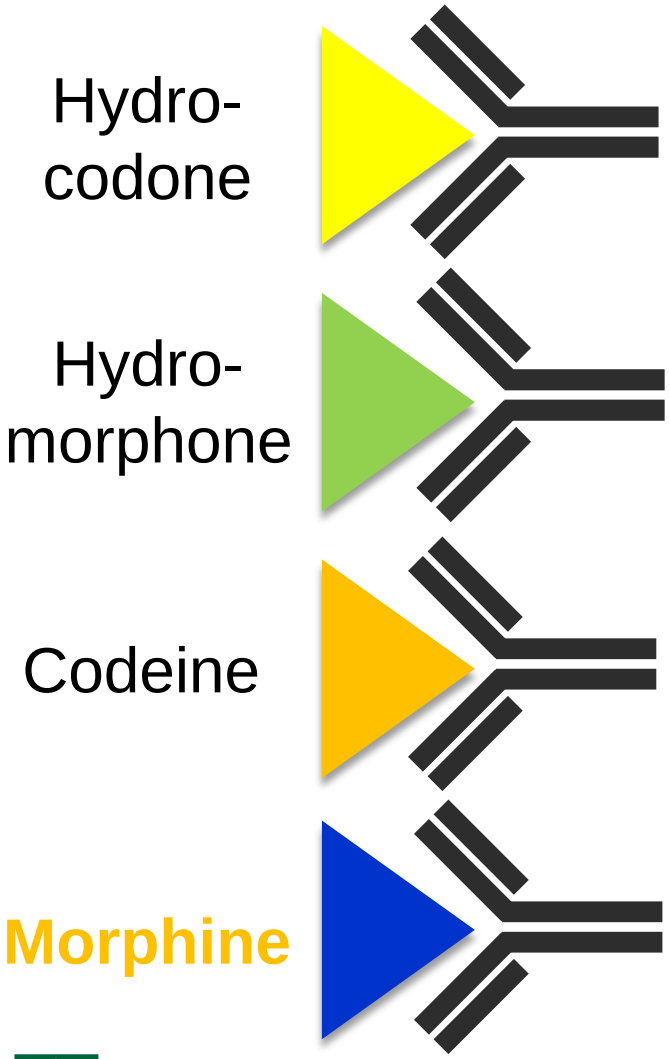
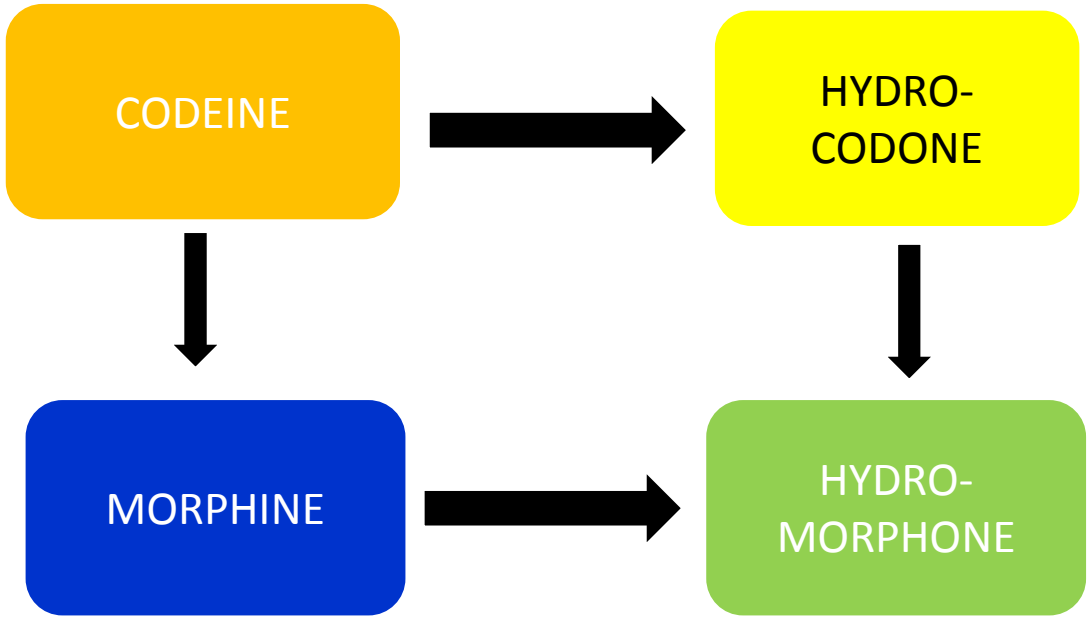
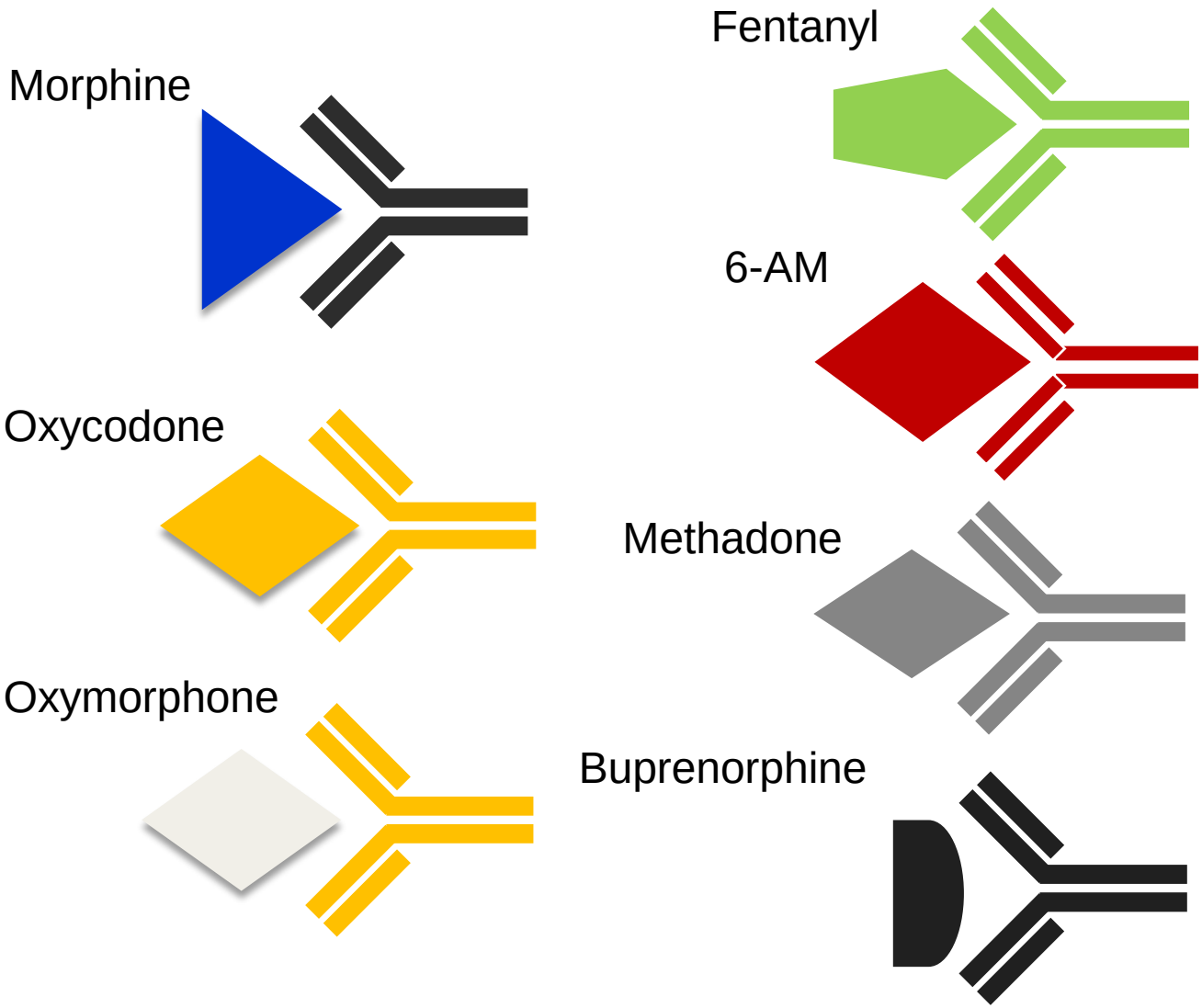
General Opioids Screen





Synthetic Opioids: Targeted Testing



OXYCODONE

OXYMORPHONE

SALIENT OBSERVATIONS:

- On methadone and oxycodone
- General opioids screen is negative

FACTS/ASSESSMENT:

- General opioids do not generally detect methadone or oxycodone

WHAT TO DO NEXT TIME:

- Consider targeted testing, if needed

Case #2:

Confirmation Results	
Methadone	400 ng/ml
Codeine	90 ng/ml
6-AM	NEGATIVE
Morphine	1000 ng/ml

A 40-year-old female with a history of opioid use disorder has been managed with methadone treatment. She recently received the following results and is asking for your assistance. She insists she has been compliant with treatment and has not used heroin or other opioids. She has read that poppy seeds are a possible cause of a positive test and was wondering whether you felt that was possible. You conclude:

A. Codeine is not usually seen with poppy seeds.
B. Poppy seed use might be suggested if morphine to codeine ratios were 1:3.
C. The levels for both codeine and morphine are too high for poppy seed use.
D. The negative 6-AM rules out heroin use.
E. This may be due to poppy seed use; however, heroin or other opioids can not be excluded.

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E. This may be due to poppy seed use; however, heroin or other opioids can not be excluded.

Can poppy seeds trigger a positive opioid result?

- Poppy seeds develop, bathed in opium-rich milky sap.
- Rigorous washing minimizes the presence of opium in the poppy seed.
- Naturally-occurring opioids (morphine and codeine) can therefore be detected with poppy seed consumption.
- Morphine and codeine levels from poppy seeds tend to be low (<2000 ng/ml) and in a ratio seen in nature of 10:1.

SALIENT OBSERVATIONS:

- Positive for morphine and codeine
- Morphine ~1000ng/ml
- Morphine: codeine (M:C) is ~10:1
- 6AM is negative

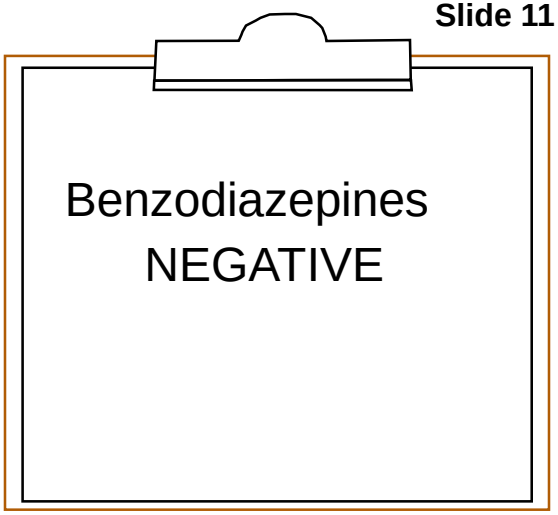
FACTS/ASSESSMENT:

- 6AM half life is 2-8 hours
- Morphine <2000 ng/ml
- In nature, M:C is ~10:1

WHAT TO DO NEXT TIME:

- Discourage use of poppy seeds in patients being treated for opioid use disorder

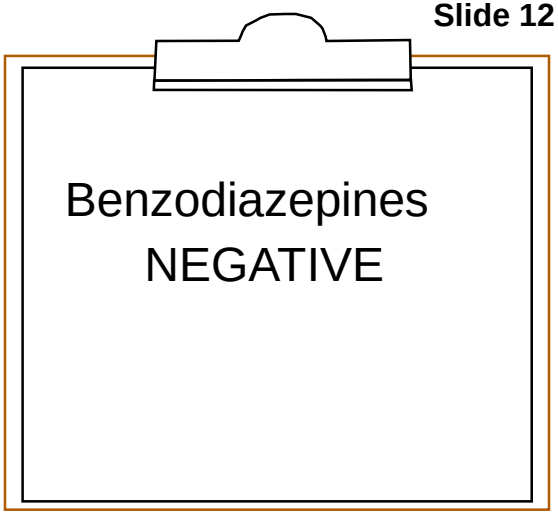
Case #3:



You are managing the care of a 42-year-old man who is being prescribed clonazepam. You perform a urine toxicology screen and his benzodiazepines are negative. The patient claims he is taking it regularly. Your best answer is:

A. He is noncompliant.
B. Consult with your laboratory. Depending upon the immunoassay screening performed, you might consider confirmation testing.
C. He is diverting.
D. His level is not great enough to trigger the screen.

Case #3:



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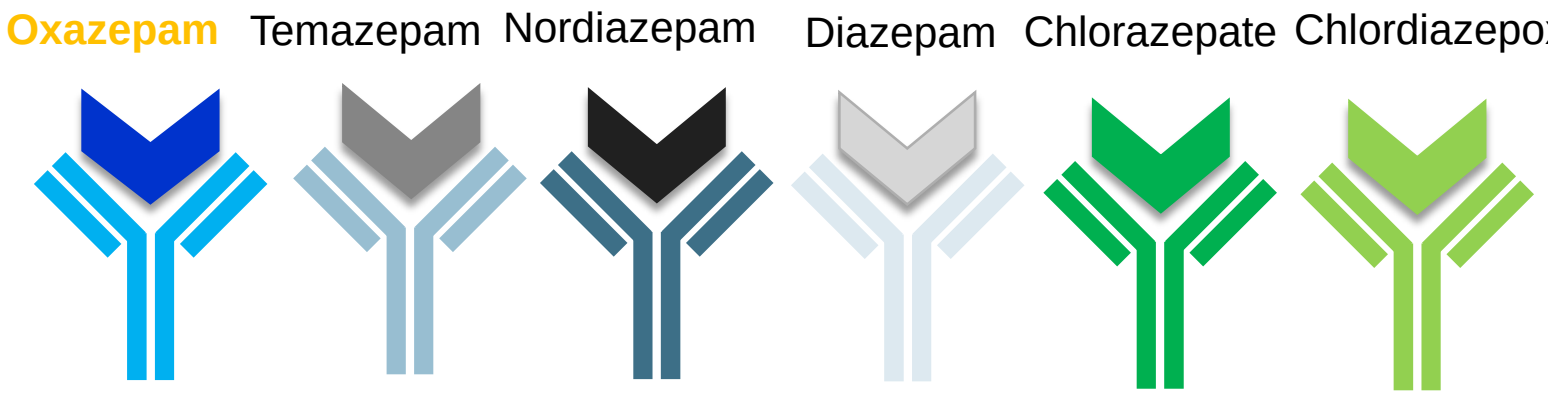
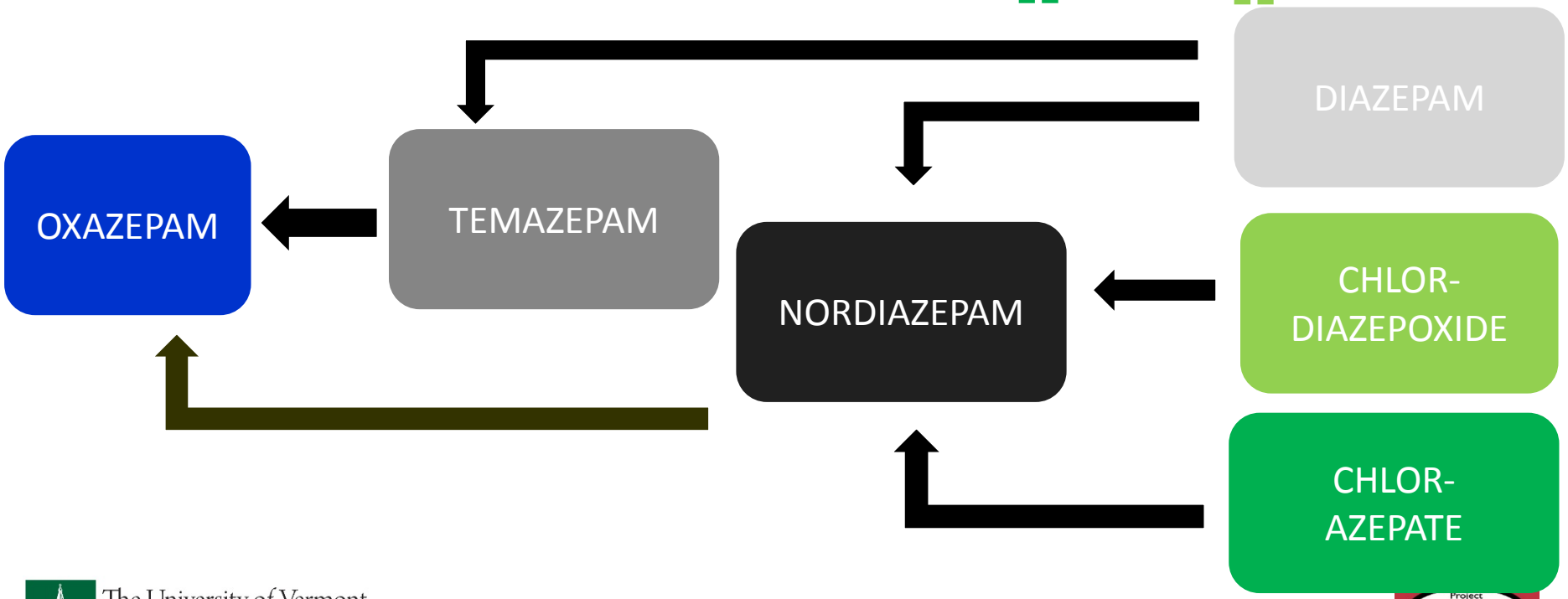
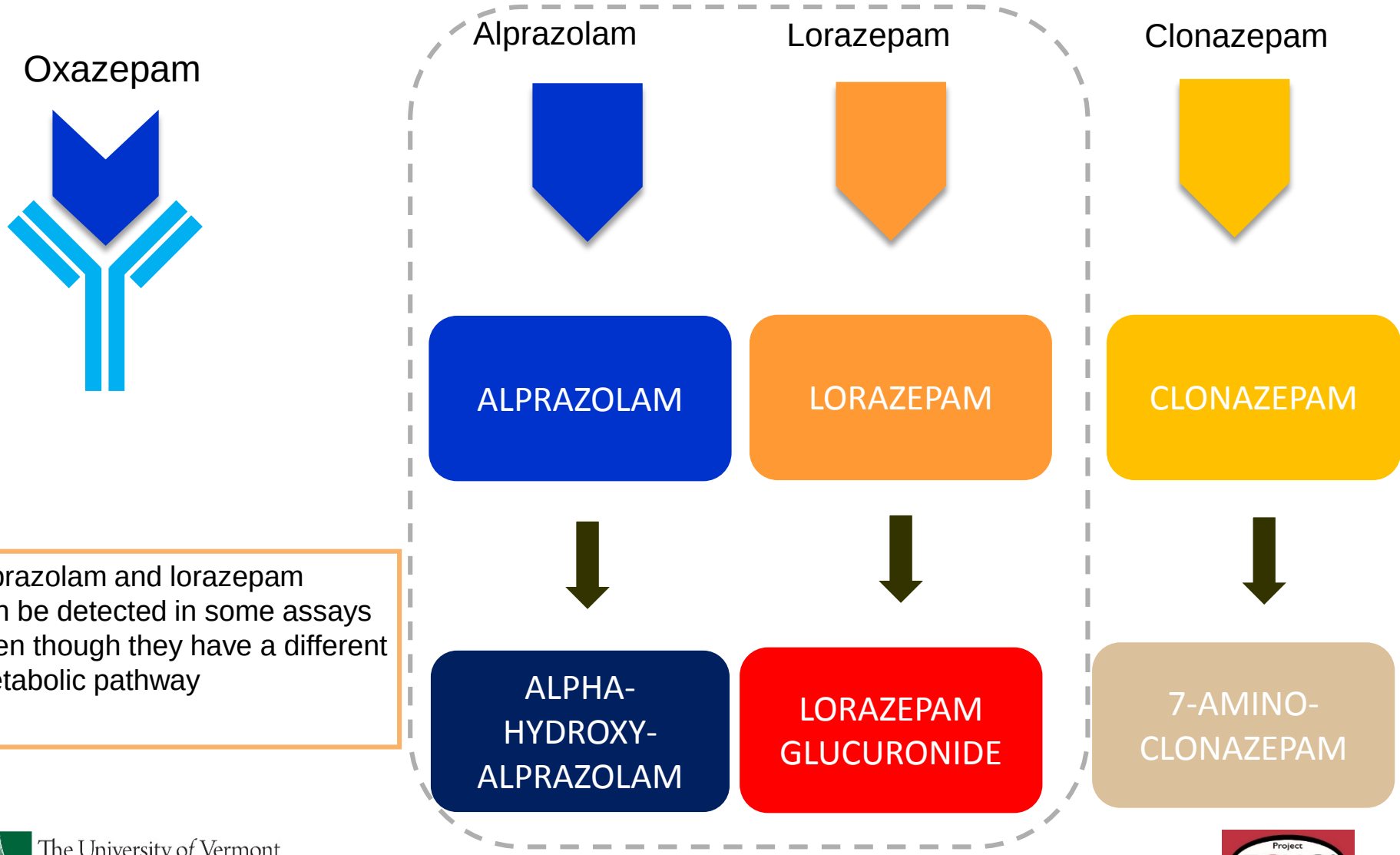
Benzodiazepine immunoassay screen





Variably-detected benzodiazepines



Alprazolam and lorazepam can be detected in some assays even though they have a different metabolic pathway

SALIENT OBSERVATIONS:

- On clonazepam
- Benzodiazepine screen is negative

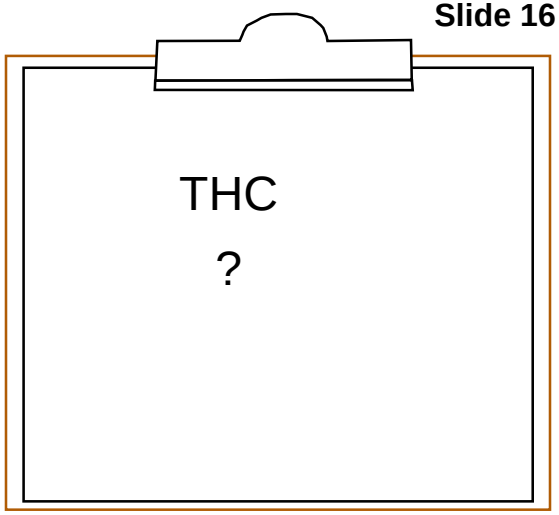
FACTS/ASSESSMENT:

- Routine benzodiazepine immuno-assays don't detect clonazepam

WHAT TO DO NEXT TIME:

- Consider confirmation testing, if indicated

Case #4:



On Monday morning, a mother of a 17-year old boy brings her son to the clinic. She says he has been “hanging around” with a “bunch of troublesome boys” for a few months and she suspects they have been smoking pot (THC). You ask the son privately if he has been using pot and he insists that he had been routinely but stopped about two weeks ago. He admits that on Friday night he was in a car with friends who were smoking but he promises he didn’t. He insists you to take a urine sample to prove his abstinence to his mother. You recommend:

A. You obtain a urine sample for immunoassay screening.
B. You obtain a urine sample for confirmation testing.
C. Due to a concern for second hand smoke, you recommend you don’t obtain a sample, saying it will likely be positive and won’t help his case.
D. Due to the fact that he quit only about a week or two ago, you don’t obtain a sample, saying THC will still be in his system and a positive result might be misleading.

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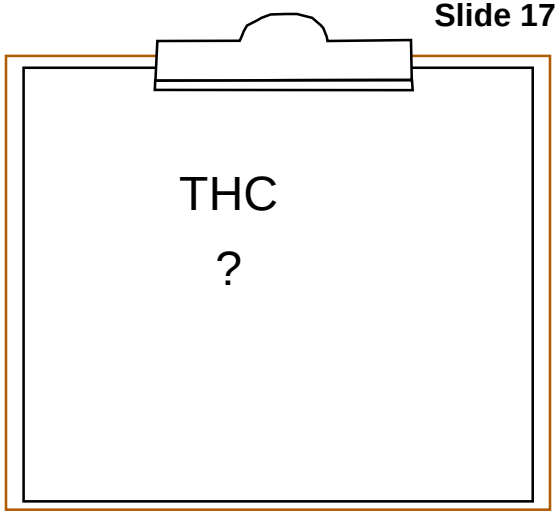

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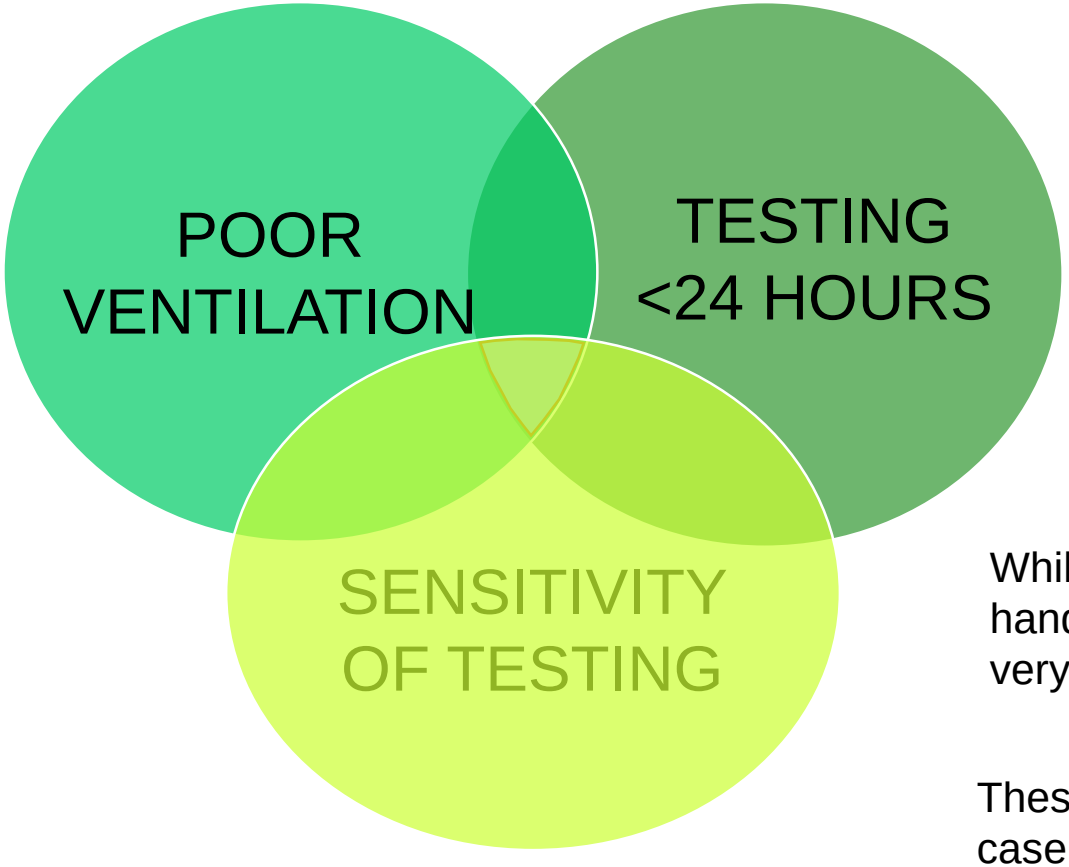
Complex case: Navigating THC results

Two elements of this case:

1) Can second hand smoke trigger a positive THC test?
2) How long can you expect marijuana to last in urine?

Second hand smoking with THC



Stanimir G.Stoev/Shutterstoc

While detection of second hand smoking is possible, very specific conditions are necessary.

These conditions are not met in this case.

Hermann et al., Drug Alcohol Depend. 2015 151; 194-202.

Select factors that influence THC levels

BODY SIZE AND METABOLIC RATE

- THC is lipophilic
  - Increased BMI will prolong THC detection
- Slow metabolic rate will reduce clearance

AMOUNT AND REGULARITY OF USE

Frequency of use	Detection window (days) at 3 ng/ml
Single use	3 days
Moderate (4 x/week)	5 days
Heavy (daily)	10 days
Chronic heavy use	30 days

SENSITIVITY OF TESTING

- Immunoassay sensitivity: Usually set at 50 ng/ml
- Confirmation sensitivity: Range 3-15 ng/ml

http://www.mayomedicallaboratories.com/test-info/drug-book/marijuana.html

SALIENT OBSERVATIONS:

- Don’t know his BMI
- Routine use: ~ A few months
- Stopped 2 weeks ago
- Secondhand smoke exposure > 2 days

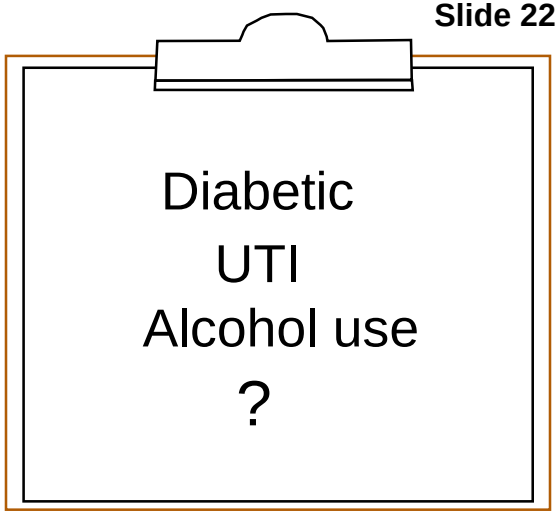
FACTS/ASSESSMENT:

- Secondhand smoke is unlikely
- Sensitive testing may trigger positives
- Immunoassay is more likely to reflect recent use in this case

WHAT TO DO NEXT TIME:

- If testing, choose an immunoassay, as it more likely to reflect recent use in this case

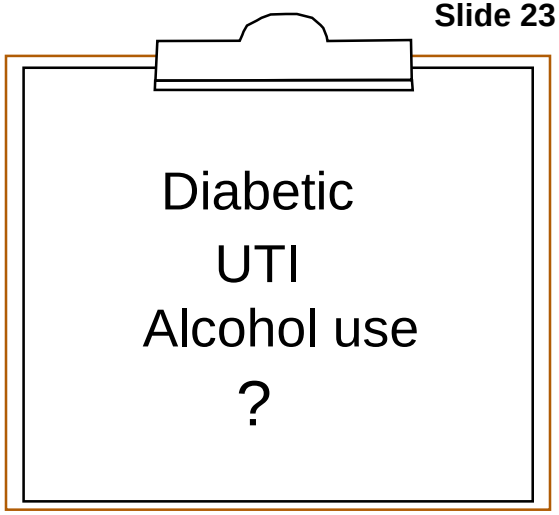
Case #5:



A diabetic, 32-year old female with a history of alcoholism presents with headaches. Physical examination demonstrates bruising, which she says is due to a fall. While there, she also complains of urinary tract symptoms and initial urinalysis supports a urinary tract infection. She is a poor historian and you are concerned she has relapsed with her alcohol use disorder, although she demonstrates no signs of current inebriation. You decide to test her alcohol levels in urine, while submitting a urine culture. Your best test in this case is:

A. Perform a Point of Care Breathalyzer test.
B. Order a screen for ethanol.
C. Order a confirmation test for ethanol.
D. Order a screen for ethyl glucuronide (EtG).
E. Order a confirmation test for ethyl sulfate (EtS).

Case #5:



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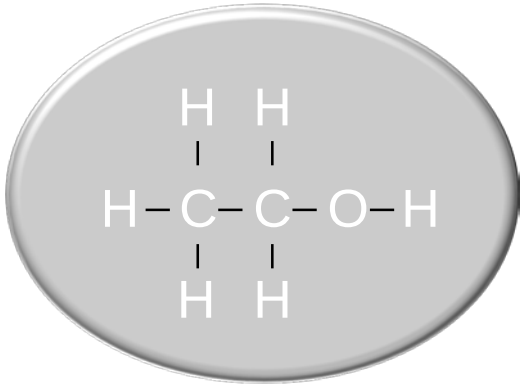
Complex case: Assessing alcohol metabolites

Two elements of this case:

1. Three common testing choices for alcohol that differ predominantly by window of detection
2. Stability of these metabolites can interfere with our interpretations depending on the clinical setting

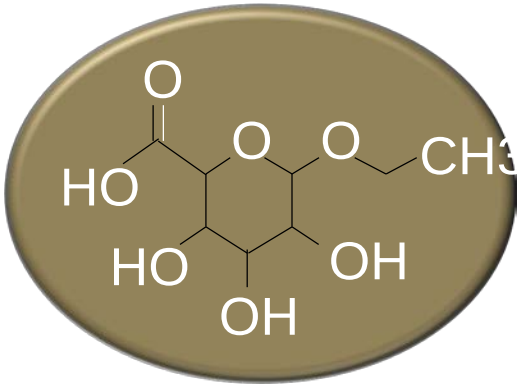
Alcohol and metabolites: Detection window

Ethanol



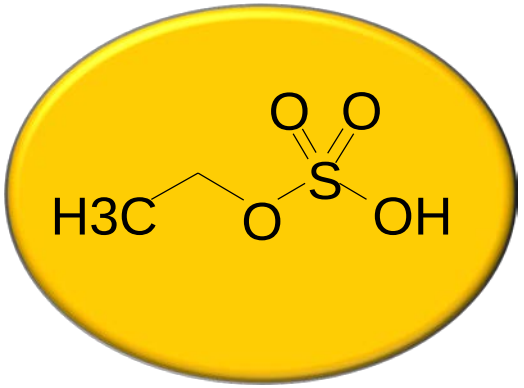
<8-10 hours

Ethyl Glucuronide



2 – 72 hours

Ethyl Sulfate

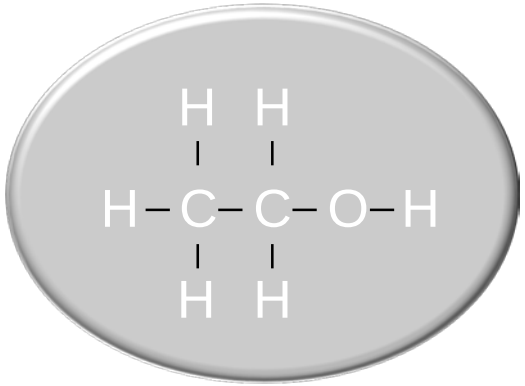


Up to 96 hours

Child Adolesc Psychiatr Clin N Am. 2016 Jul; 25(3): 549–565.

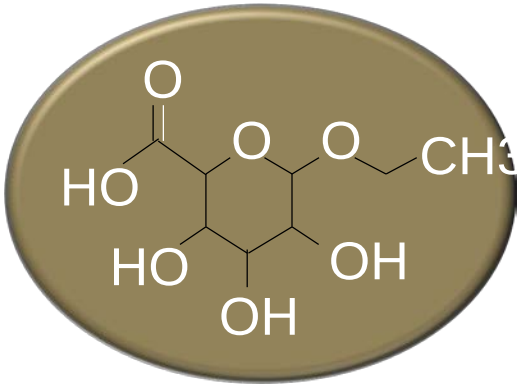
Alcohol and metabolites: Stability

Ethanol



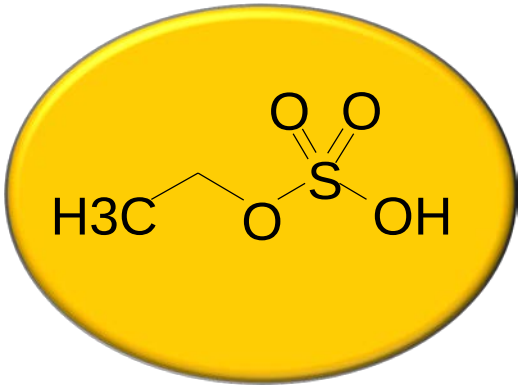
Volatile in specimen cup
Sugars can ferment *in vitro*

Ethyl Glucuronide



Bacterial degradation
Can be produced with sugars

Ethyl Sulfate



Relatively stable

Child Adolesc Psychiatr Clin N Am. 2016 Jul; 25(3): 549–565.

SALIENT OBSERVATIONS:

- Diabetic
- History of alcohol use disorder
- Urinary tract infection (UTIs)
- Not inebriated

FACTS/ASSESSMENT:

- Ethanol test verifies use <10 hours
- Sugars can ferment
- Fermented sugars can create EtG
- Bacteria (in UTIs) can degrade EtG

WHAT TO DO NEXT TIME:

- Consider testing for EtS, if indicated