

# Laboratory Testing in Pain Management: Opioid Interpretation

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# Questions in Opioid Management that Can be Addressed with Drug Tests?

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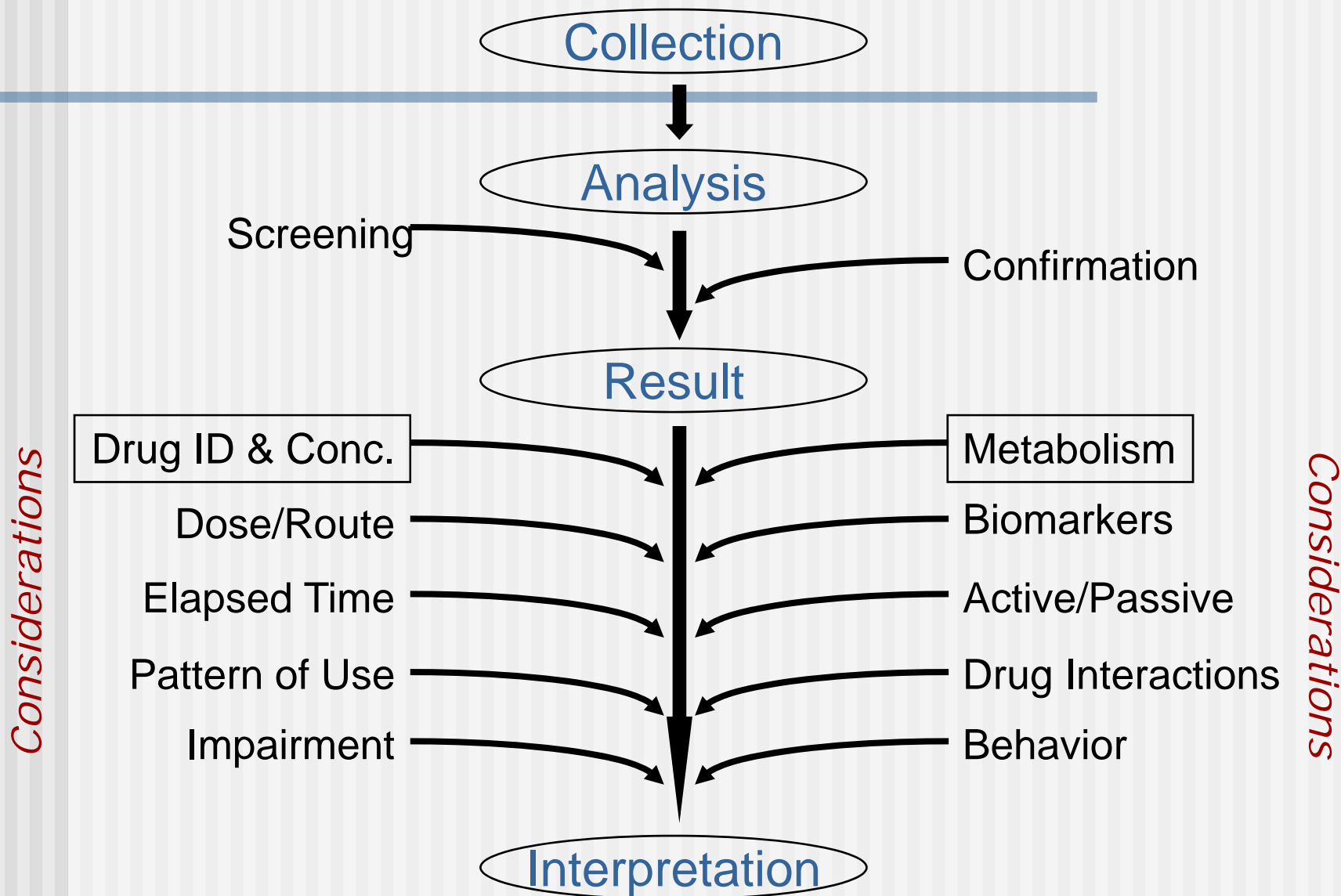
- Is the patient compliant with prescribed medication(s)?
- Is the patient using non-authorized medications?
- Is the patient diverting medication to others or to the illegal market?
- Is the patient using illicit drugs?
  - Now?
  - Lately?
  - In the past?
- Is the patient addicted or becoming addicted?
- Can the risk of drug toxicity from overdose and/or drug-drug interactions be reduced/avoided?
- Can physician liability be reduced?

# Interpretation: What is Needed in the Lab Report?



- Compliant/non-compliant?
  - Taking prescribed Rx's? (Yes/No)
  - Taking non-prescribed Rx's? (Yes/No)
  - Taking illicit drugs? (Yes/No)
  - Taking Rx's as prescribed?
    - Evaluation of concentration
      - Normalization?
    - Adequate clinical cutoffs
  - Adulteration/substitution?

# Considerations in Interpretation of Test Results



# What Laboratory Tests Don't Reveal

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- Time of drug use
  - Amount of drug use
  - Frequency of drug use
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- But concentration, metabolite ratios together with toxicological info.....
  - Helps to establish boundaries
    - Days, weeks months
    - 1 mg, 10 mg, 100 mg, 1000 mg
  - Some specimen types provide more information than others; depends upon the question!

# What Laboratory Tests Reveal

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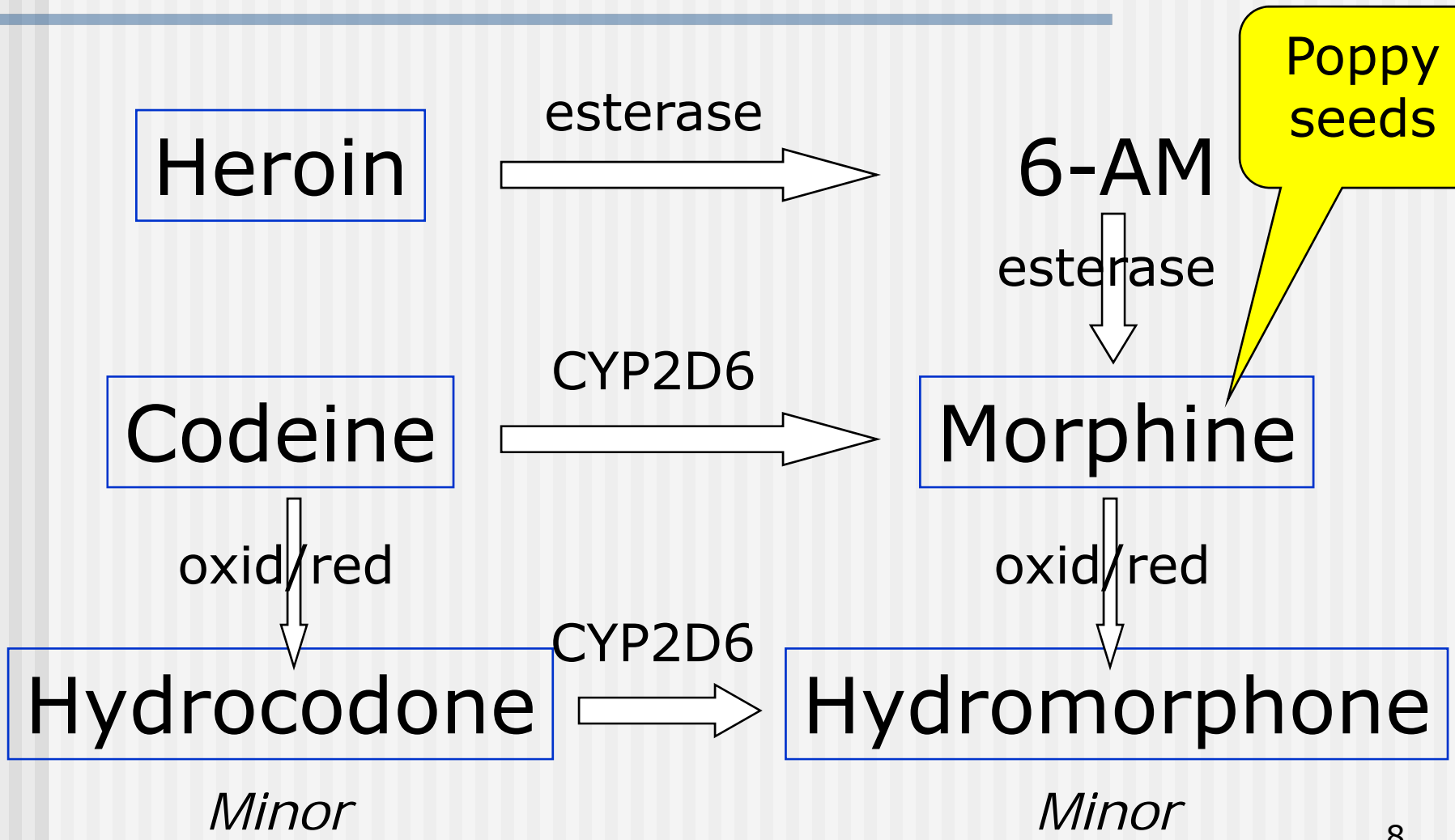
- Drug or drug class
  - But not always what was administered (Drug source)
    - Sometimes easy
    - Sometimes difficult/impossible
- Metabolite(s)
- Parent/metabolite ratio
- Concentration/quantity
- Isomeric ratio
  - Requires a special test
    - Important for amphetamines
- Specimen information, e.g., creatinine content, specific gravity

# Some Problems and Pitfalls in Interpretation

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- Metabolism to other drugs
  - What drug caused this positive test?
- Dilute specimens
  - Should they be normalized?
- How to interpret?

# Metabolism: Heroin/Codeine/Morphine





# Interpretation---SPECIAL ISSUES

## Opiate Source Differentiation?

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- *You have a positive test for morphine*
- Where did it come from?
- Possible sources
  - Heroin
  - Codeine
  - Morphine
  - Poppy seeds
- Aids in interpretation
  - 6-AM (heroin)—heroin biomarker
  - Other heroin biomarkers, e.g., 6-AC, papaverine
  - Codeine (ratio of codeine to morphine)

# Pain Patient Test Example: What Did They Use?

<b>Benzodiazepines</b>	<b>POSITIVE</b>		200 ng/mL	
alpha-hydroxy-Alprazolam	NONE DETECTED			200 ng/mL
Desmethyldiazepam	NONE DETECTED			200 ng/mL
Lorazepam	NONE DETECTED			200 ng/mL
Oxazepam	<b>POSITIVE</b>	677		200 ng/mL
Temazepam	<b>POSITIVE</b>	340		200 ng/mL
Cannabinoids (Marijuana)	NONE DETECTED		20 ng/mL	5 ng/mL
Cocaine Metabolite	NONE DETECTED		100 ng/mL	50 ng/mL
<b>Opiates</b>	<b>POSITIVE</b>		100 ng/mL	
Oxymorphone	NONE DETECTED			100 ng/mL
Codeine	NONE DETECTED			100 ng/mL
<b>Morphine</b>	<b>POSITIVE</b>	22500		100 ng/mL
Dihydrocodeine	NONE DETECTED			100 ng/mL
Hydrocodone	NONE DETECTED			100 ng/mL
<b>Hydromorphone</b>	<b>POSITIVE</b>	442		100 ng/mL
Oxycodone	NONE DETECTED			100 ng/mL
Methadone	NONE DETECTED		200 ng/mL	200 ng/mL
<b>Propoxyphene</b>	<b>POSITIVE</b>	8400		300 ng/mL

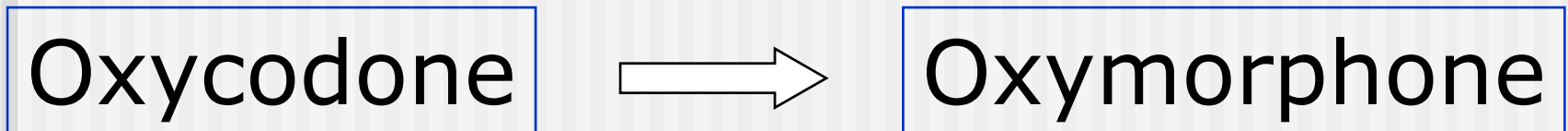
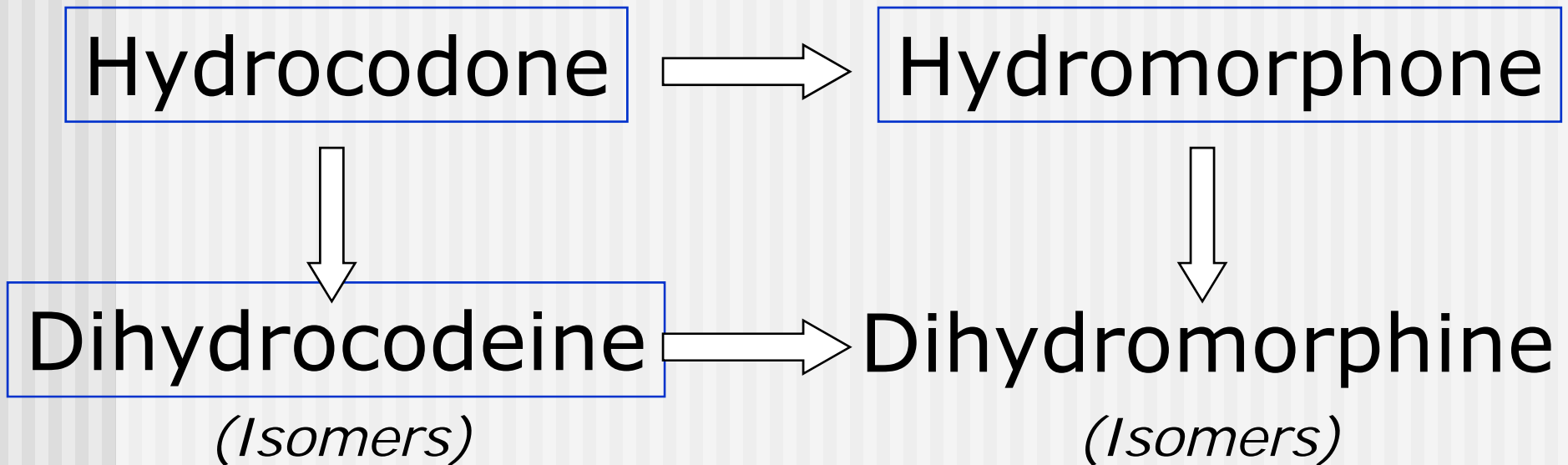
677 > 1000  
340

22500 > 22500  
442 > 22,942

# Metabolism:

Hydrocodone/Hydromorphone  
Oxycodone/Oxymorphone

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# Interpretation---SPECIAL ISSUES

## Opiate Source Differentiation?

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- *You have a positive test for hydromorphone*
- Where did it come from?
- Possible sources
  - Hydromorphone
  - Hydrocodone
  - Chronic morphine use
- Aids in interpretation
  - What else is present?
    - Hydrocodone
    - Excess morphine

# Some Problems and Pitfalls in Interpretation (cont.)

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- Is the concentration consistent with the dose?
  - Extreme cases only
  - 10 mg morphine  $\neq$  190,000 ng/mL
- How to deal with “dilute” specimens
  - Use lower cutoff
  - Normalization to specific gravity/creatinine
- Why was the test negative?
  - Ultra-rapid metabolizer
  - Adulterated