URINE DRUG SCREENING QUICK FACT SHEET

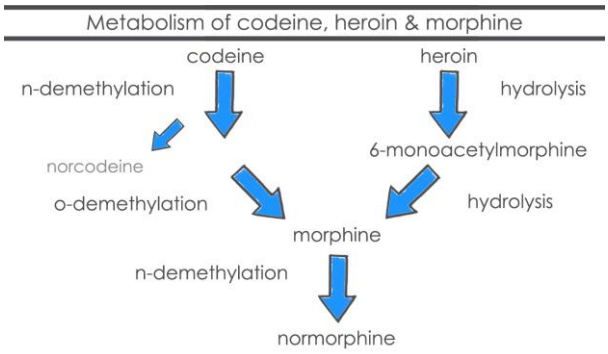
Average detection times in urine

**Lipid-soluble drugs = longer detection times with chronic use, use quantitative testing to measure recent use*

- Amphetamines: 1-4 days
- Barbiturates: 1 day (short-acting), 1-4 weeks (intermediate, long-acting)
- Benzodiazepines*: 1 day (short-acting), 1-4 weeks (intermediate, long-acting), diazepam up to 30 days
- Cocaine: 1-3 days
- Marijuana*: 1-3 days (acute use), > 30 days (chronic heavy use)
- PCP*: 2-7 days (acute use), several weeks (chronic use)
- Opiates: 1-4 days
- LSD: 24 hours

Detection times can be affected by

- Absorption (dose, route of administration)
  Faster absorption = shorter detection time
- Volume of distribution (body mass)
  Greater distribution = longer detection time
- Metabolism (individual variability)
  Slower metabolism = longer detection time
- Elimination (kidney disease, urine pH)
  Slower elimination = longer detection time



Opioid metabolism and detection principles

- Morphine can be produced by heroin, codeine or morphine
- Codeine, norcodeine and morphine can all be present after use of codeine or combined use of morphine and codeine
- Morphine only is more consistent with morphine or heroin use
- Use of morphine cannot account for presence of codeine
- Codeine alone is possible if patients lack the cytochrome P450 2D6 to convert it to morphine
- Heroin metabolite (6-MAM) is only detectable for up to 8 hours before it hydrolyzes to morphine

Drug screening versus drug testing

- **Screening assays**: Processes providing categorical information, whether a substance (or substance category) is (or is not) present in a sample
  - Immunoassay techniques, principle of competitive binding
  - Fast, inexpensive (~$15), portable, non invasive, highly sensitive
  - Insufficiently broad, low specificity with high cross-reactivity, cannot detect recent use (6-8 hours after last use), easy tampering

- **Confirmatory testing**: Processes providing additional information, including the quantity and specific substance present, and used to confirm positive results
  - GC/MS (gas chromatography with mass spectrometry)
  - Most accurate and reliable method of confirmatory testing (rare false positive or negative results)
  - More expensive (~$40) and time-consuming (need to be sent to laboratory)

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Drug screening cross-reactivity myths and facts

**False positive results can vary among immunoassay techniques. Verify with your laboratory.*

- **Cannabis (THC)**
  - No distinction between natural and synthetic unless quantitative method used, both will give positive
  - Passive inhalation causes positive screen only in extreme cases and should be viewed as drug use
  - Hemp food products will not cause a positive screen (non-significant traces of THC)
  - False positive results: *Proton pump inhibitors (PPI), efavirenz (antiretroviral for HIV)*
- **Cocaine & benzoylecgonine**
  - Very specific, no cross-reactivity with same class anaesthetics: *Llidocaine, prilocaine, procaine*
- **Amphetamine & methamphetamine**
  - Will detect ephedrine, pseudoephredrine and phenylephrine, low sensitivity for MDMA
  - High cross-reactivity (use confirmatory GC/MS to identify which substance is being detected)
  - False positive results: *OTC decongestants, cough, cold & sinus medications, weight loss agents, Parkinson's disease agents, ADHD agents, phenothiazines (typical antipsychotics), trycylic antidepressants, trazodone, buproprion, labetalol, ranitidine and tocolytic agents, fenofibrate (MDMA)*
- **Phencyclidine (PCP)**
  - False positive results: *Venlafaxine (case reports), dextromethorphan (isolated reports, negative RCT)*
- **Opioids**
  - Very responsive for morphine and codeine
  - Synthetic and semi-synthetic opioids are not reliably detected by all screens (ask your laboratory)
    - *Methadone, fentanyl, meperidine, oxycodone, hydrocodone, oxymorphone, hydromorphone*
  - False positive results: *Quinolone antibiotics and rifampin, quinine in tonic water (a few case reports), poppy seeds are a common cause of false positives (low concentration of morphine and codeine on confirmatory testing)*
- **Benzodiazepines**
  - Detection of the primary metabolites oxazepam and nordiazepam
  - False positive results: *Sertraline (SSRI), oxaprozin (NSAID), nefopam*
- **Tricyclic antidepressants**
  - Higher cross-reactivity due to 3-ringed structure
  - False positive results: *Carbamazepine, quetiapine, diphenhydramine*

Urine tampering

**Methods used to falsify a urine screen or test so that the substance use would not be detected*

- **In vitro adulteration**: addition of chemical to sample after micturition, interfering with the immunoassay or converting target drug; commercial versus household products (ex: bleach, zinc sulphate, soap, peroxide…)
- **In vivo adulteration**: ingestion of chemical prior to micturition, including dilution through excess water consumption (1-2 litres); ingredients added to avoid detection by visual inspection (vitamin B2) and by creatinine (creatine)
- **Urine substitution**: substance-positive specimen substituted for substance-negative specimen during sampling

Urine tampering detection

- **Observation of the patient** (turn off water sources, remove outer garments, wash hands, supervise)
- **Visual inspection of the urine**
  - Typical specimen is translucent, light yellow, small number of bubbles disappearing in 1-2 minutes
  - Suspicious urine specimen is bubbly, frothy, cloudy, clear or dark in color, has undissolved crystals (Drano, salt) or is unusually orange and fluorescent (vitamin B2)
- **On-site & laboratory analyses**
  - Temperature (90-100ºF or 32-38ºC within 4 minutes), outside this suggests substitution
  - pH (4.5 to 8.0, with acceptable range of 3 to 11), outside this suggests in-vitro adulteration
  - Specific gravity 1.003 – 1.020, under suggests dilution, over suggests in-vitro adulteration
  - Creatinine < 20 mg/dL (< 1.8 mmol/L) suggests in vitro or in vivo dilution

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