

Urine drug screening

Urine drug screens (UDS) are a valuable tool in our management of patients on chronic opioid therapy, however, the results can be misleading and clinical judgment is needed in interpreting results.

The basic, initial UDS most clinicians use is usually done by immunoassay. It can identify drugs present in the urine by class (e.g. opioids, benzodiazepines, amphetamines). Immunoassay UDS will give positive results for both a drug being taken and for its metabolites. Codeine, for example, is metabolized to hydrocodone or morphine and then to dihydrocodeine and hydromorphone. Heroin is metabolized to morphine. All of these will be identified as opiates on the basic UDS. Oxycodone is metabolized to oxymorphone; these will be identified as oxycodone on immunoassay UDS.

It is therefore important to consider drug metabolism in interpreting UDS test results:

- hydromorphone may be detected in a patient on morphine
- hydrocodone may be detected in a patient taking codeine
- oxymorphone may be the only drug detected in a patient on oxycodone since it is a long lasting metabolite
- morphine may be the only drug detected in a heroin user.

When a basic urine drug screen gives results that do not fit or which cannot be explained, it is a good idea to send the sample for confirmatory testing. This testing is usually done by gas chromatography-mass spectrometry (GC/MS) and will provide more sensitive and specific results.

Drug Detection Times (since last use):

Drug or Class	Detection Time
Alcohol	6 - 12 hours
Amphetamine or methamphetamine	48 hours
Barbiturates, short acting	24 hours
Barbiturates, long acting	3 weeks
Benzodiazepines, short acting	3 days
Benzodiazepines, long acting	30 days
Cocaine	2 – 4 days
Marijuana, single use	3 days
Marijuana, daily use	2 weeks
Codeine	48 hours
Heroin	2 – 4 days
Hydromorphone	2 – 4 days
Methadone	3 days
Morphine	2 – 3 days
Oxycodone	2 – 4 days

Detection of drugs can also be affected by other factors. A high level of hydration may cause a false negative result. Dosing intervals can affect detection; a low drug dose or long dosing intervals may cause the blood level to be too low to be detected. Drug metabolism may also affect detection. Opioids are

metabolized by the CYP2D6 enzyme. Genetic differences can cause patients to be poor or rapid metabolizers. Drugs that inhibit CYP2D6 and may cause higher opioid drug levels include amiodarone, most SSRIs, bupropion, chlorpheniramine, and H2 blockers. Drugs that induce CYP2D6 and cause rapid metabolism and a shorter opioid detection level include rifampin and dexamethasone.

False Positives:

The basic screening urine drug test can be susceptible to false positives. The detection level for opiates on immunoassay screening was increased to 2,000 ng/ml to avoid cross reaction with foods, such as poppy seeds. There are a number of medications that may cross react with immunoassay drug screens and cause false positives. If in doubt, confirmatory GC/MS testing offers a highly reliable and specific confirmation and it identifies specific drugs, not classes of drugs.

Drug or Class	Drugs which Potentially Cause False Positive Readings on Screening Tests
Amphetamines	Amantadine, chlorpromazine, desipramine, ephedrine, fluoxetine, labetalol, phentermine, phenylephrine, ranitidine, trazodone
Barbiturates	Ibuprofen, naproxen
Benzodiazepines	Sertraline
Cannabinoids	Dronabinol, NSAIDs (ibuprofen, ketoprofen, naproxen, piroxicam, sulindac, tolmetin), promethazine, PPIs
Cocaine	Amoxicillin, coca leaf teas, tonic water
Methadone	Chlorpromazine, diphenhydramine, ibuprofen, verapamil
Opiates	Dextromethorphan, diphenhydramine, poppy seeds, rifampin, quinine
Phencyclidine	Dextroamphetamine, dextromethorphan, diphenhydramine, ibuprofen, imipramine, tramadol, venlafaxine

Other Things to Consider:

A negative UDS does not necessarily mean the patient is diverting their drugs. It may be because the patient’s drug level was below threshold due to dose and dosing, especially if the patient is very well hydrated. A good practice is to ask when the last dose was taken when obtaining a UDS.

Drug metabolites may cause traces of unexplained opioids. It is important to double check the metabolic products of the prescribed opioids to see whether an unexpected finding on UDS may be due to the metabolism of the prescribed drug. Detecting minor amounts of metabolites may be appropriate when larger amounts of the parent drug are detected.

Synthetic opioids (fentanyl and methadone) are not detected by immunoassay UDS. They are detected by confirmatory GC/MS.

Semi-synthetic opioids (oxycodone, oxymorphone, buprenorphine, and hydromorphone) may not be detected well or may be inconsistently detected by screening immunoassay UDS. They are detectable by confirmatory GC/MS.

Passive inhalation of marijuana smoke is not enough to cause a positive UDS result.

None of the UDS tests will indicate what dose of medication the patient is actually taking.

In conclusion, the best approach to take when confronted with unexpected UDS results is to send the sample for confirmatory testing, and review the metabolism of prescribed drugs, possible causes of false positives, and the CURES database. After the confirmatory test results are available, if discrepancies remain, it is important to have a non-confrontational discussion with the patient about the urine test discrepancies to see whether they can be explained. If there is no viable explanation for the urine drug results, the next steps should be guided by the seriousness of the problem.

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