

Urine Drug Screen

Useful for:

- Identifying undisclosed substances
- Confirming the use of the suspected drug
- Monitoring adherence to treatment
- Uncovering diversion
- Urine drug screen performed for clinical management (following drug overdose or abuse, poisoning, or for detoxification purposes) could not be used later for legal/evidential purposes as it does not include proof of patient identity or a secure specimen chain of custody procedure.

Lab details needed:

- Highlight to the lab specifically what you are looking for.
- Urine drug screen is a standard panel of tests for random checks of a range of compounds including amphetamines and related drugs, opioids (including codeine, morphine, heroin), benzodiazepines, cannabis, cocaine, and oxycodone. The first line testing is by immunoassays.
- The following tests are not part of the standard drug screen panel but are available and need to be requested separately: alcohol, methadone metabolites, synthetic cannabinoids, gamma hydroxybutyrate, buprenorphine and methylphenidate.
- A broad spectrum drug screening by gas chromatography – mass spectrometry (GC–MS screen) which covers hundreds of drugs and metabolites (e.g. antidepressants, antipsychotics, etc.) is also available on request. There are some classes of drugs which will not be detected by this method. Please contact the laboratory if you are looking for something specific.

Collection:

- Must be random and provided on-site.
- Consider the possibility that a patient may tamper with the sample. This is where the patient substitutes the sample with another sample of their own or a friend, or a synthetic urine product, or the patient dilutes the sample while in the toilet.
- Suspect tampering if the patient is acting suspiciously. Ask the patient to leave any bulky clothing or bags in the consult room. If tampering is suspected check the urine temperature.
- The lab automatically runs adulteration checks for creatinine, and sample integrity on all samples provided for urine drug screening, which can confirm tampering.
- Urine tests are done daily (Monday – Friday) at LabPLUS, Auckland District Health Board. Phone 0800–LABPLUS (0800–5227587). Urgent tests are available out of hours by arrangement with the laboratory.

Making sense of the results

The first-line testing for urine drug screen is by immunoassays which are screening tests and do not differentiate individual drugs within the class. Confirmatory testing by gas chromatography – mass spectrometry (GC–MS) is available on request which will determine the specific drugs detected within the class.

A positive result:

- Indicates recent use, but not the time since use, how much or how often. Most drug classes are detectable for up to 3 days post-exposure, with some classes having extended detection times.
- Enables the clinician to challenge any discrepancies in the patient's self-reporting of drug use.
- Please contact the laboratory if confirmatory testing for positive results in immunoassays is required.

A negative result:

- Suggests the patient has not recently taken the substance, or
- May metabolise the drug faster than expected, or
- Has taken it in such low concentration that it is below the lab cut-off, or
- Has tampered with the sample.
- Could suggest diversion in the case of prescribed medication.

If the results do not fit the clinical picture, please contact the laboratory for further discussion.

Specific substances

Amphetamines

- Immunoassay screening detects the following drugs but cannot differentiate between them: amphetamine, methamphetamine, dexamphetamine, methylenedioxymethamphetamine (MDMA: "ecstasy"), methylenedioxyamphetamine (MDA), pseudoephedrine (in high concentration), ephedrine, and cathinones.
- Phentermine and bupropion have amphetamine-like structures and can give positive screen.
- All positive amphetamine screens will undergo GC-MS characterisation. This allows us to differentiate between the types of amphetamines. Note: cathinones may cause a positive screen but cannot be seen by GC-MS.
- Methamphetamine is metabolised to amphetamine.
- If the patient is taking methamphetamine, both methamphetamine and amphetamine will be detected in urine, although amphetamine is not always present at reportable amounts.
- In the case of prescribed amphetamines, if a patient has taken their medication within 36 hours then the result will be positive.
- Amphetamine detection time if one-off use is 1 to 4 days.
- Certain endogenous molecules and pharmaceuticals may cause a false positive initial screen for "amphetamine type substances".
 - Selegiline, famprofazone and benzphetamine metabolise to methamphetamine and amphetamine.
 - Clobenzorex is metabolised to amphetamine.

Opiates

- Immunoassay screening detects the following drugs but cannot differentiate between them: morphine and 6-monoacetylmorphine, codeine and dihydrocodeine, hydrocodone, hydromorphone, pholcodine.
- The following drugs may cause 'Opiate Detected' immunoassay at high levels: naloxone, suboxone, oxycodone.
- The following drugs are not detected by Opiate immunoassay: methadone, pethidine, tramadol.
- Dietary intake (poppy seeds especially) has been shown to produce positive results for morphine for a time period. Consider this when interpreting the lab result. If dietary intake is a possible confounder, suggest withdrawal and retest.
- On confirmatory testing by GC-MS, the metabolite monoacetylmorphine may be converted to morphine. If heroin is suspected please include on the request form and additional testing can be performed.
- With the use of codeine, GC-MS will detect both codeine and morphine (metabolite of codeine). Note: norcodeine cannot be detected in the GC-MS method.
- Detection time if one-off use is 2 to 4 days.
- See also [Mayo Clinic Opiates](#).

Methadone

- Immunoassay detects the methadone metabolite EDDP.
- If the result is negative but history supports illicit use, patient may be using a small dose or metabolising quickly.
- GC–MS can detect Methadone and its metabolites. Please contact the laboratory if this is required.
- Detection time if one–off use is 2 to 4 days.
- See also [Mayo Clinic Methadone](#).

Benzodiazepines

- Immunoassay screening detects a range of benzodiazepines such as diazepam, nitrazepam, flunitrazepam, alprazolam, chlordiazepoxide, clonazepam, lorazepam, oxazepam, and temazepam, etc ; however, individual drugs cannot be differentiated.
- Benzodiazepines are metabolised extensively and the initial drug is often not found in a urine test, but its metabolised compounds are present. For example, diazepam has a long half–life of 1–3 days so the parent drug is often not found in urine. The main metabolite nordiazepam dominates and temazepam, and oxazepam may also be detected as metabolites of diazepam.
- Detection time if one–off use is 1 to 42 days depending on substance.
- See also [Mayo Clinic Benzodiazepines](#).

Cannabis

- Immunoassay detects tetrahydrocannabinol carboxylic acid (THC–COOH), the metabolite of the active ingredient in cannabis.
- Immunoassay does NOT detect synthetic cannabinoids, which has to be separately requested.
- Cannabis detection time if one–off use is 3 days.
- In a chronic user it can be detected up to 6 weeks, and occasionally longer for heavy chronic users, especially where BMI is high.

Oxycodone

- Immunoassay detects oxycodone and its metabolite oxymorphone.
- A positive result indicates exposure to oxycodone within 2 to 3 days prior to specimen collection.

Urinary ethanol:

- A measure of acute intoxication and use in the last 12 hours.
- Detection time if one–off use is 6 to 24 hours.

Attribution

Dr Carol Siu, Chemical Pathologist, Department of Biochemistry, LabPlus

Dr Gerald Woollard, Scientific Officer, Chromatography, Specialist Chemical Pathology, LabPlus

Dr Hima Madhavaram, Scientific Officer, Chromatography, Specialist Chemical Pathology, LabPlus

Lauren Bresnahan, Section Leader, Chromatography, Specialist Chemical Pathology, LabPlus

Dr Cam Kyle, Clinical Head and Pathologist, Department of Biochemistry, LabPlus