There are no clinical guidelines for urine drug testing in New Zealand; the only guidelines that exist (AS/NZS 4308:2008) are for medico-legal, work place or court-directed purposes.

Screening for drugs of abuse for at Waikato Hospital is only performed on urine. Samples are tested by liquid chromatography with mass spectrometry which gives a definitive result. The sensitivity of the technology used is very high and trace levels of drugs may be detected.

Clinical urine drug screens may be requested for:

* Identifying undisclosed drug use
* Confirming the use of suspected drugs
* Monitoring adherence to treatment
* Suspicion of drug diversion.
* Suspected overdose, lowered level of consciousness, high levels of agitation, seizures, unusual behaviour

Urine drug screen results for clinical management cannot be used for legal/evidential purposes, as a secure specimen chain of custody is not included as part of the pre-analytical process.

Supporting Information

* Any drugs of interest should be specified and relevant clinical information should be included. Without this information, testing, additional to the routine screen will not be performed.

Collection of urine sample

* Sample tampering, sample sharing and the re-submission of samples collected and stored at an earlier time, along with the emergence of “fake” urine are all considerations that need to be taken into account when collecting a urine sample for drug testing.
* Minimise opportunities for tampering to occur and note any suspicions on laboratory request form.
* Urine creatinine, urea and urate is measured on all urines for drug testing. Overly dilute samples may still be processed as the high sensitivity of the testing methodology is likely to still detect drugs.
* Samples that are not urine, such as water or other liquids that may mimic the appearance of urine, will not be tested. These samples will have undetectable urine creatinine and urea.

Routine Drug Screen

Twenty one commonly abused drugs are routinely reported. See Table 1 for the routine list.

In many cases it is the primary drug metabolites that are reported rather than the parent drug. This not only increases the window of detection which is important in abstinence monitoring and infrequent testing but ensures the results reflect drugs consumed. In drug treatment programmes, it is possible for drugs to be spiked into the urine sample to provide an expected positive result.

There are an additional fifty or so drugs that can be screened for including additional benzodiazepines, anti-depressants, anti-psychotics that may be taken in overdose.

Interpreting Results:

* Methamphetamine

This drug is reported routinely and result is definitive for methamphetamine exposure. Trace amounts of methamphetamine are detectable, however it is impossible to differentiate between minimal environmental exposure and residual levels resulting from a previous high exposure. Some pharmaceutical drugs, (selegilene, famprofazone, benzphetamine) metabolise to methamphetamine and will therefore be detected in urine.

Synthetic cathinones may cause a clinical presentation similar to methamphetamine use. If methamphetamine result is negative but presentation is consistent with stimulant drugs, additional drug screening may be indicated. Contact the Biochemistry laboratory.

* Morphine

Dietary intake of poppy seeds has been shown to produce positive results for morphine. Consider this when interpreting lab results.

* Cannabis result is specific for 11-nor-∆9-THC-COOH indicating use of normal, psychoactive cannabis. CBD is a separate compound and does not cause a false positive, however, many medicinal cannabis preparations do not contain CBD exclusively and a positive result will indicate the presence of THC in addition to CBD.
* Synthetic cannabis is not detected by this test. See section on What we do not screen for,

What we do not screen for:

* Paracetamol: in cases of paracetamol overdose, a serum/plasma level provides the concentration of paracetamol present, critical for the management of toxicity and determining if N-acetylcystine treatment is indicated.
* NPS (novel psychoactive substances) are a diverse group of drugs. They include synthetic cannabinoids, synthetic cathinones, synthetic opioids and new hybrid benzodiazepines. Due to the difficulty in obtaining reference standards, combined with the constantly changing pattern of drug prevalence and use in NZ, we do not routinely screen for them.

A negative result is not conclusive of abstinence but may merely reflect the inability to detect a novel substance.

* GHB: Gamma hydroxybutyrate (GHB) is used as an illicit drug and may be implicated in drug-facilitated sexual assault. The window of detection of GHB is very short in both blood and urine and unlikely to be detected >24 hours following ingestion. GHB also occurs naturally in humans at low levels, so a low detectable level may be inconclusive. Urine is not tested for GHB as part of our drug screen.

Further information:

Negative results, if unexpected, may suggest non-compliance or diversion of prescribed medication.

Results may be reported as “Trace” positive where the result is clearly non-negative but it falls below the lowest reportable level, and may be clinically significant.

Analysis time by LC-MS/MS is long and batches are run overnight for next-working day reporting. Samples need to be received in the laboratory by midday if next-working day results are required.

In critical situations, samples can be expedited by this requires verbal consultation with the Chemical Pathologist or the Technical Specialist of Toxicology.

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

Stephen DuToit, Chemical Pathologist, Biochemistry Laboratory, Waikato Hospital

Alison Bell, Technical Specialist Toxicology, Biochemistry Laboratory, Waikato Hospital

Date: 14 September 2023

Table 1: Routinely reported drugs/metabolites

|  |  |
| --- | --- |
| Drug or metabolite screened for | Presence indicative of past use of: |
| 11-nor-∆9-THC-COOH | cannabis |
| 7-aminoclonazepam | clonazepam |
| lorazepam | lorazepam |
| nordiazepam | diazepam |
| oxazepam | diazepam, temazepam, oxazepam |
| temazepam | diazepam, temazepam |
| zopicone | zopiclone |
| methamphetamine | methamphetamine |
| MDMA | MDMA |
| ritalinic acid | methylphenidate |
| benzoylecgonine | cocaine |
| codeine | codeine |
| morphine | codeine, morphine,  |
| oxymorphone | oxycodone |
| dihydrocodeine | dihydrocodeine |
| EDDP | methadone |
| norbuprenorphine | buprenorphine |
| tramadol | tramadol |
| pregabalin | pregabalin |
| gabapentin | gabapentin |
| quetiapine | quetiapine |

Table 2: Full list of drugs/metabolites available (alphabetical)

|  |  |  |
| --- | --- | --- |
| 2-oxo-3-hydroxy LSD | EDDP (methadone metabolite) | norfluoxetine  |
| 6-monoacetylmorphine | ephedrine | nortriptyline  |
| 7-aminoclonazepam | fentanyl | O-desmethyltramadol |
| 7-aminoflunitrazepam | flunitrazepam | OH-alprazolam |
| 7-aminonitrazepam | fluoxetine  | OH-bupropion |
| alprazolam | gabapentin  | OH-triazolam |
| amisulpride | haloperidol | olanzapine |
| amitriptyline  | hydrocodone | orphenadrine |
| amphetamine | imipramine | oxazepam |
| aripiprazole | ketamine | oxycodone |
| benzoylecgonine  | lorazepam | oxymorphone  |
| benztropine | LSD | paroxetine |
| buprenorphine | MDA | pethidine |
| bupropion | MDEA | phentermine |
| cathinone | MDMA (Ecstasy) | pholcodine |
| chlorpheniramine | methadone | pregabalin |
| citalopram | methamphetamine | promethazine |
| clobazam | methylone | protriptyline |
| clomipramine | methylphenidate | pseudoephedrine |
| clonazepam | metoclopramide | quetiapine |
| clozapine | metoprolol | risperidone |
| codeine | midazolam | ritalinic acid  |
| cotinine | mirtazepine | sertraline |
| desipramine | moclobemide | temazepam |
| desmethylclomipramine | morphine | THC-COOH (11-nor-∆9THC-COOH) |
| desmethyldoxepin | naloxone | tramadol |
| desmethylvenlafaxine | naltrexone | triazolam |
| dextromethorphan | nitrazepam | trimipramine |
| diazepam | norbuprenorphine | venlafaxine |
| dihydrocodone  | norclozapine | zopiclone |
| diphenhydramine | norcodine |   |
| doxepin | nordiazepam |   |
| doxylamine | norfentanyl |  |