Other samples and available tests

The laboratory also accepts non-urine specimens which may be useful adjuncts to urine drugs of abuse testing.

Unknown Substance Screening

Tablets, smoking materials e.g. cigarette ends, crack pipes, plant material or resin, and bottles of liquid may be analysed on request. We have an ever-expanding range of reference compounds available. Please contact the laboratory before sending specimens to discuss any specific requirements. It is also useful to have as full a history regarding the sample as possible, e.g. where it was found/purchased, patient history regarding prescription drugs and possible misuse of illicit substances.

Sample requirements

Random urine sample (10–20 mL) collected into a plain 25 mL universal container. Please ensure containers are tightly sealed, and are sent in a clear plastic bag separate from the accompanying request form. Please also ensure containers are labelled with the full name and date of birth of the client, and the specimen collection date and time.

Request forms

New request forms are available to download from our website:

www.synnovis.co.uk/our-tests/urine-drug-screen

Laboratory Testing

All samples are analysed using a combination of automated immunoassay and liquid chromatography with high-resolution mass spectrometry (LC-HR-MS – see the Urine Drug Screen section of this leaflet). Creatinine is measured as a marker of sample integrity. Individual drugs/metabolites and drug classes are reported as either 'positive' or 'negative' based on EWDTS 'cut-off' concentrations (www.ewdts.org); note that µg/L is equivalent to ng/mL).

Additional specialist tests by LC-HR-MS (see the Additional Tests section of this leaflet) are available on request, and can be carried out on the same specimen as supplied originally. Please check the Synnovis website regularly for service updates – further new tests will be added in response to service requirements.

Contact information

Laboratory address

Toxicology Unit, 3rd Floor, Bessemer Wing, King's College Hospital, Denmark Hill, London, SE5 9RS

Telephone: +44(0)203 299 5878
Web: www.synnovis.co.uk/departments-and-laboratories/drugs-of-abuse-laboratory-at-kings
Email: kch-tr.toxicology@nhs.net

Laboratory hours (telephone enquiries):
Mon-Fri, 09:00-17:30

Operations Lead/Clinical Scientist
Dr Kayleigh Davis
Principal Clinical Scientist
Dr Sarah Belsey
Consultant Toxicologist
Dr Dave Berry
Service Delivery Manager
Dr Colin Stone

Author: S Belsey, Authorised: 30th September 2022

synnovis
A SYNLAB pathology partnership

Urine Drugs of Abuse Screening

Information for Service Users

The Synnovis urine drugs of abuse screening service has changed in response to the changes that are occurring in the range of substances encountered. The current process of immunoassay screening followed by amfetamine and/or opiate confirmation has been discontinued. Instead users now receive a single report for specific drugs measured using high resolution-mass spectrometry, with at present immunoassay results for cannabinoids and benzodiazepines. Cut-offs (limits below which any results are reported as 'negative') are based on European Workplace Drug Testing Society (EWDTS) guidelines for named analytes, where available. In addition, a range of new tests have been introduced that can be requested separately. These separate tests include barbiturates (by immunoassay when requested), which nowadays are very rarely encountered in clinical practice.

Note: Analyses for medicolegal purposes should be arranged in advance with a specialist forensic laboratory in order to comply with chain-of-custody requirements, etc.

Basic guidance for interpretation

The information below is only a brief introduction to the interpretation of urine drug screening results. For any further information, or for more detailed interpretation of results for specific samples, please contact the laboratory directly.

Urine Drug Screen (UDS)

Creatinine

Creatinine is measured in all urines to check sample integrity.

Creatinine is reported under the 'Specimen Validity' Test Code as a qualitative comment:

· Sample valid (creatinine within expected range)
· Dilute sample (creatinine <2 mmol/L)
· Extremely dilute sample (creatinine <0.5 mmol/L)

Opioids (cut-offs 300 µg/L, except 6-MAM 10 µg/L)

Morphine - Total morphine is measured (i.e. unconjugated 'free' morphine + morphine-3-glucuronide and morphine-6-glucuronide as morphine equivalents). 'Positive' morphine results can arise from the administration of (i) morphine, (ii) codeine, (iii) diamorphine, (iv) heroin (illicit diamorphine), (v) the antitussive pholcodine, or (vi) from the ingestion of poppy seeds.

Codeine - Total codeine is measured (i.e. unconjugated 'free' codeine + codeine glucuronide). 'Positive' codeine results can arise from the administration of (i) codeine (e.g. in over-the-counter analgesic preparations), (ii) heroin, or (iii) from the ingestion of poppy seeds.

Dihydrocodeine (DHC) – Total DHC is measured (i.e. unconjugated 'free' DHC + DHC glucuronide). Positive results can arise only from the administration of DHC.

6-Monoacetylmorphine (6-MAM; also known as 6-acetylmorphine, 6-AM) is a specific metabolite of diamorphine. Concentrations of 6-MAM in urine are low (cut-off 10 µg/L), and it has a short plasma half-life (a few hours), and so a 'negative' 6-MAM result does not exclude prior use of diamorphine. On the other hand, the presence of 6-MAM proves recent administration (typically within 12-24 h) of diamorphine.

Amfetamine, metamfetamine, MDMA (cut-offs 200 µg/L)

Amfetamine, metamfetamine ('crystal meth'), and 3,4-methylenedioxymetamfetamine (MDMA, 'ecstasy') are analysed separately. Small proportions (< 10 %) of metamfetamine are metabolised to amfetamine following oral administration, hence this compound may also be reported as 'positive' after use of metamfetamine. Amfetamine-like compounds are typically detectable for 2-5 days post-administration.

Cocaine (as benzoylecgonine, cut-off 100 µg/L)

Cocaine is rapidly hydrolysed in blood after insufflation, smoking, or ingestion. The major metabolite found in urine is benzoylecgonine, which can typically be detected for 1-3 days following use of cocaine.

Methadone & EDDP (cut-offs 250 and 75 µg/L, respectively)

Methadone and its urinary metabolite 2-ethylidene-1,5-dimethyl-3,3-diphenylpyrrolidine (EDDP) are measured separately. This is important because detection of parent drug without metabolite suggests addition of methadone directly to the urine sample. It is possible for only EDDP to be positive, and not methadone, when methadone is taken therapeutically.

Benzodiazepines (immunoassay cut-off 300 µg/L)

Analysis of benzodiazepines is complex since there are a large number of drugs available and many have common metabolic pathways. It is therefore often very difficult to identify exactly which compound(s) have been administered. The immunoassay used detects the major benzodiazepines and their (common) metabolites, e.g. diazepam, nordazepam, oxazepam and temazepam, as well as others such as chlordiazepoxide. The detection window for benzodiazepines is typically up to 7 days, but varies depending on the half-life of the drug, and may be longer in chronic users.

Cannabis (immunoassay cut-off 50 µg/L)

Cannabis is detected in urine primarily as its metabolite 11-nor-Δ-9-tetrahydrocannabinolic acid (11-THC-COOH). A 'positive' cannabis result indicates that the client may have taken cannabis within the last 2–10 days, although this period may be longer (up to 30 days) for chronic users. A 'negative' result indicates that the patient has not taken cannabis within the last 2-3 days, although other factors such as the dose, other drugs taken and urine concentration make this time period hard to specify exactly.

Additional Tests

Barbiturates (immunoassay cut-off 300 µg/L)

Barbiturates are rarely encountered in current drugs of abuse testing, though our immunoassay is available on request to detect use of the most common barbiturates.

Buprenorphine & metabolites (cut-offs 5 µg/L)

Buprenorphine and its urinary metabolites norbuprenorphine, buprenorphine glucuronide and norbuprenorphine glucuronide are measured separately. Following buprenorphine administration (sublingual or intravenous), urinary concentrations of unconjugated buprenorphine are very often 'negative' (< 5 µg/L), and only metabolites can be detected. As with methadone, the detection of parent drug without metabolites suggests addition of buprenorphine directly to the sample.

Mephedrone (cut-off 200 µg/L)

Mephedrone ('meow meow', M-CAT) is a synthetic stimulant derived from cathinone. Most immunoassay-based 'screening' methods fail to detect this compound due to poor cross-reactivity.

Ketamine & norketamine (cut-off for 'total' 50 µg/L)

Ketamine is used clinically as a sedative and anaesthetic, but may be abused because of its hallucinogenic effects. Ketamine and one of its major metabolites, norketamine, are measured separately and reported as a 'total' (ketamine + norketamine) concentration.

Tramadol & metabolites (cut-off for 'total' 200 µg/L)

Tramadol is an opioid analgesic with significant abuse potential. It is metabolised to *O*- and *N*-desmethyltramadol, both of which are measured separately and are reported together with the parent drug to give a 'total tramadol' concentration in urine samples.

Pregabalin and Gabapentin (cut-off 500 µg/L)

Pregabalin and Gabapentin are used to relieve neuropathic pain, and to help control seizures. Both have significant abuse potential, and are requested individually.

Methylphenidate, Ethylphenidate & Ritalinic Acid (cut-offs 500 µg/L)

Methylphenidate is a psychostimulant prescribed as first-line treatment in Attention Deficit Hyperactivity Disorder (ADHD), however it also abused for its stimulant properties. Ethylphenidate is a metabolite of methylphenidate when co-ingested with ethanol, but is also sold as a 'legal high'. Both are metabolised to Ritalinic acid, and all are measured separately.