

Biochemistry South Glasgow Sector		
LP_GBIO_R_026	Information for Users of the Toxicology Service	Version:1.5
Document Owner: Graeme Chalmers	Authorised by: Roy Talbot	Date of Issue: 08/09/2017

INFORMATION FOR USERS OF THE TOXICOLOGY SERVICE

URINE TESTING FOR MISUSED DRUGS

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1. DRUG MISUSE: AIMS AND TREATMENT

The Laboratory service is designed to be consistent with the aims and therapeutic options used in the investigation and treatment of drug misuse.

The aims in treating the drug misuser and the criteria of success depend on several factors: on the individual patient and their social circumstances; the type of drug involved and whether it produces dependency; whether the misuser has yet become dependent on it; whether it is being injected. Some of the therapeutic and social aims in treating patients who are injecting addictive drugs are:

- **Reduction of infection risk for patient and reduction in the incidence blood-borne virus infections**
- **Specific improvement in health of a drug misuser**
- **Elimination of criminality associated with drug dependency**
- **A reduction in the prevalence of drug misuse by treatment and education**

Full discussion of the treatment options is beyond the scope of this document. Please refer to 'Drug misuse and dependence: UK guidelines on clinical management'. This document can be found at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/628634/clinical_guidelines_2017.pdf

2. URINE SAMPLE COLLECTION

Urine samples should ideally be collected under supervised and controlled conditions. In the attempt to confuse detection of drug abuse or non-compliance a patient may substitute another person's urine, add toilet disinfectants and bleaches to the sample, dilute the sample with water, add prescribed drugs direct to the urine, and deliberately submit insufficient urine for investigation. If the supervision of the passing of urine is unacceptable, patients should ideally pass urine in a room there is no water supply or source of adulterants. Failing this, if the toilet cubicle does not contain a wash-hand basin, a proprietary disinfectant (such as "Blue Flush") may be used in the cistern so that attempted adulteration is immediately apparent.

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3. LABORATORY REQUESTS

Answers to the following questions are useful to us:

- **What is the nature of the suspected drug misuse?**
In order that we perform the appropriate investigations it is useful for us to know the patient's history. For instance not all patients are abusing drugs by injection. Requests to the Laboratory may be part of the investigation of overdose, psychosis, depression or altered behaviour.
- **Is the urine sample from a patient undergoing initial assessment?**
If so, is opiate identification through confirmation testing required?
- **What drugs are being prescribed and at what dosages? What proprietary drugs, if any, has the patient taken in the last week?**
We use less strict criteria (involving less work and cost) in the identification of a drug expected to be present.
- **Level of supervision employed.**
It is useful to know if the administration of a prescribed drug is being supervised - for example methadone by the pharmacist, and if urine specimen collection was closely supervised.

4. DRUG INFORMATION, INCLUDING INTERPRETATION OF REPORTS

4.1 OPIATE TESTING

Morphine and **codeine** are derived from the opium poppy: **Heroin** is synthetically produced from morphine. These drugs produce relaxed detachment from pain, anxiety and desires and therefore produce contentment. There are two main reasons for treatment; firstly the hazard of injection, particularly the risk of blood-borne viral infection and secondly, the high street value and association with drug-related crime.

Our first line test is a sensitive immunoassay which yields a positive result for the following drugs: **6-monoacetyl morphine** and **morphine** (the urinary metabolites of heroin), **dihydrocodeine**, **codeine**, **ethylmorphine**, **pholcodine**, **hydrocodone** and **hydromorphone**. The synthetic narcotic analgesics such as methadone, buprenorphine, oxycodone, tramadol and pethidine do **not** give a positive result with this test.

Specimens yielding positive immunoassay results are further analysed (if required) to confirm and identify the particular opiate(s) present and, in particular, to exclude non-abused and proprietary drugs such as pholcodine and codeine.

Reports: If the opiates immunoassay result is <300µg/L, **Urine Opiates** is reported as Negative. If the opiates immunoassay result is >300µg/L, **Urine Opiates** is reported as Positive. Unless from a location that has confirmation by GC-MS automatically (e.g. Forensic Psychiatry, Community Addiction Teams etc), confirmation of the opiate-positive result is not performed. An auto-comment appears on the report inviting the clinician to contact the Laboratory to request confirmation/identification of the drug(s). Once this further analysis has been performed, a second confirmation report is issued which will detail the specific drug(s) found, which may be abused opiates (e.g. morphine) prescribed opiates (e.g. dihydrocodeine), or present in a proprietary medicine (e.g. pholcodine).

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4.2 SYNTHETIC OPIOID ANALGESIC TESTING

(a) Methadone Testing

Illicit **methadone** use is usually oral, but it may be injected. More commonly it is prescribed for oral therapy for patients attempting to withdraw from opiate misuse by injection.

Our first test is an immunoassay for **methadone**. The assay is, so far as is presently known, specific for methadone; the urinary metabolite of methadone is not detected. A positive immunoassay result does not necessarily indicate compliance in a patient being dispensed methadone without supervision, as urine may be “spiked” with methadone. Urine samples in this scenario will often appear green and will be reflex tested by the Laboratory to establish whether metabolite is present (which would indicate whether *in vitro* adulteration has occurred). However, a specimen from a person receiving prescribed methadone which yields a positive methadone immunoassay result is not usually subjected to confirmatory tests unless there is evidence, from other assays, of drug abuse. In these cases we seek confirmation of the presence of methadone and of its ingestion by testing for the methadone metabolite.

Confirmatory testing is also automatically undertaken in cases where the clinical details supplied indicate that the patient is prescribed methadone but the methadone screening result is negative. Hence the reason it is important that this information is provided with the sample.

Reports: If the methadone immunoassay result is $<300\mu\text{g/L}$, **Urine Methadone** is reported as Negative. If the methadone immunoassay result is $>300\mu\text{g/L}$, **Urine Methadone** is reported as Positive.

(b) Buprenorphine Testing

Buprenorphine (Suboxone, Subutex) is known to have been abused by injection and oral ingestion. More commonly it is prescribed for oral therapy for patients attempting to withdraw from opiate misuse by injection.

A specific immunoassay exists for this drug, the use of which in this Laboratory has failed to detect any significant widespread abuse. This may be due to lack of availability of buprenorphine after it was rescheduled under the Misuse of Drugs Act. For this reason buprenorphine analysis is **not** carried out routinely, and testing is restricted to patients prescribed this drug or where there is strong clinical suspicion that the patient is taking this drug illicitly.

Reports: If the buprenorphine immunoassay result is $<5\mu\text{g/L}$, **Urine Buprenorphine** is reported as Negative. If the buprenorphine immunoassay result is $>5\mu\text{g/L}$, **Urine Buprenorphine** is reported as Positive.

(c) Others

Tramadol this drug does not give a positive result with the opiates screening test. Tramadol testing is currently not available in GG&C. Urine samples can be sent to an external reference laboratory for analysis. The test cost will have to be cross-charged as it is not covered by the Laboratory budget. Please contact the Laboratory Duty Toxicologist if this test is required.

Oxycodone this drug does not give a positive result with the opiates screening test. Oxycodone testing is currently not available in GG&C. Urine samples can be sent to an external reference laboratory for analysis. The test cost will have to be cross-charged as it is not covered by the Laboratory budget. Please contact the Laboratory Duty Toxicologist if this test is required.

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4.3 BENZODIAZEPINES TESTING

Benzodiazepines commonly used therapeutically, but may also be abused by oral ingestion and injection. The benzodiazepines which are predominantly abused are diazepam and temazepam.

There are a large number of benzodiazepines and the metabolism of each is extensive, little unchanged drug being found in urine. Immunoassays, while sensitive, do not detect every benzodiazepine. Please contact the Laboratory Duty Toxicologist if further information on benzodiazepine cross-reactivity is required.

Recently 'Designer Benzodiazepines' such as Etizolam and Phenazepam have been abused in the Glasgow area. The Laboratory's test manufacturer does not provide information on how these drugs react in our benzodiazepines assay. Urine samples can be sent to an external reference laboratory for analysis. However, the test cost will have to be cross-charged as it is not covered by the Laboratory budget. Please contact the Laboratory Duty Toxicologist if this is required.

Reports: If the benzodiazepine immunoassay result is $<200\mu\text{g/L}$, **Urine Benzodiazepines** is reported as Negative. If the benzodiazepine immunoassay result is $>200\mu\text{g/L}$, **Urine Benzodiazepines** is reported as Positive.

4.4 AMPHETAMINES TESTING

Although amphetamines can be abused by injection, oral ingestion is more common particularly with the methylene dioxy derivatives. These drugs produce little dependency but, with regular use tolerance develops and larger and larger doses are required for effect. Possible clinical presentations are: collapse, dehydration and hyperthermia; acute psychosis due to prolonged use and increasing doses; depression, following withdrawal after long-term use.

Abused drugs in this category are **amphetamine**, and its derivative **methylene dioxyamphetamine (MDA)**, **methamphetamine** and its derivative **methylene dioxymethamphetamine (MDMA, Adam, XTC, Ecstasy, E)** and additionally, **methylene dioxyethamphetamine (MDEA, Eve)**.

Our immunoassay will detect the presence of all of the above drugs. A few non-abused drugs cross-react with this test, leading to potentially false positive results. For this reason all samples giving positive immunoassay results are automatically confirmed by a different laboratory technique to identify the compound present.

Reports: If the immunoassay result for amphetamines is $<1000\mu\text{g/L}$, **Urine Amphetamines** is reported as Negative. If the immunoassay result for amphetamines is $>1000\mu\text{g/L}$, **Urine Amphetamines** is reported as TF (To Follow) and confirmatory testing is added.

4.5 COCAINE TESTING

Use of **cocaine** in Britain is now widespread. Cocaine is a powerful CNS stimulant which produces exhilaration, feelings of superiority and confidence, suppression of appetite, and strong psychological dependence. In addition, it has a very limited duration of effect which leads to more frequent use. It is also smoked in the freebase form (crack).

Tests for cocaine abuse are based on detection of its urinary metabolite **benzoylecgonine**.

Reports: If the immunoassay result for cocaine is $<300\mu\text{g/L}$, **Urine Cocaine** is reported as Negative. If the immunoassay result for cocaine is $>300\mu\text{g/L}$, **Urine Cocaine** is reported as Positive.

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4.6 CANNABIS TESTING

The use of **cannabis** is widespread. Although cannabis is less harmful than other drugs of abuse, heavy use may be associated with psychosis and schizophrenia.

Our test detects the urinary metabolite $\Delta 9$ THC and can detect cannabis use up to 12 days after a single "joint". It provides no evidence for intoxication at the time of sampling. Cannabis may be detected in urine for up to 45 days after chronic heavy use of this drug.

Cannabis testing is not carried out routinely for most locations (exclusions are Psychiatric patients and Inpatients), but is freely available when specifically requested.

Reports: If the immunoassay result for cannabis is $<50\mu\text{g/L}$, **Urine Cannabis** is reported as Negative. If the immunoassay result for cannabis is $>50\mu\text{g/L}$, **Urine Cannabis** is reported as Positive.

4.7 NEW PSYCHOACTIVE SUBSTANCES (AKA 'Legal-Highs')

The use of 'NPS'-type substances is widespread, despite being banned by either the Misuse of Drugs Act 2010 (with various amendments) or the Psychoactive Substances Bill 2016.

The picture is ever-changing with >500 of these compounds known. There are numerous classes of NPS (including synthetic cathinones, synthetic cannabis, designer benzodiazepines etc) all of which may (or may not) be detected by routine immunoassays. For example it is known that because of the lack of structural homology to cannabis, synthetic cannabinoids (e.g. 'Spice') do **not** give a positive result using a Cannabis assay.

If a NPS-type substance is strongly suspected, a urine sample can be sent to an external reference laboratory for testing. However the result may not be back within a clinically useful time-frame (i.e. >7 days) and the cost of the analysis will have to be cross-charged as it cannot be absorbed into the Laboratory budget.

5. PRIVATE DRUG TESTS

This Laboratory primarily provides a clinical toxicology service. Non-clinical drug tests are **not** funded by the NHS. Common examples of non-clinical requests include drug testing related to employment or child custody/legal cases. These are often requested via Primary Care. **The tests we routinely carry out for clinical reasons have no chain of custody and are therefore not suitable for these purposes.**

If private drug testing is requested, please contact the Duty Toxicologist to discuss the arrangements for this **in advance of sample collection.**

Private drug testing with chain of custody sampling is provided by the Laboratory, but there is a cost associated with this that must be passed on to the client requesting the test.

6. SAMPLES WITH MEDICO-LEGAL IMPLICATIONS

There are occasionally samples where the results of a *clinical* toxicology drug screen may subsequently be used for medico-legal purposes (e.g. child protection cases etc). If this is the case, it should be borne in mind that results may be challenged in a Court of Law on the basis of no sample chain-of-custody or possibility of repeat analysis by an independent external reference laboratory of a 'sealed' sample. The laboratory can supply tamper-proof tape (to ensure a sealed sample) along with Chain of Custody documentation. In certain cases where a crime may have been committed (e.g. a patient who thinks their drink has been spiked) the most appropriate course of action is to suggest the patient contacts the Police.

In any cases where results could potentially be used for medico-legal purposes, please contact the Duty Toxicologist **in advance of sample collection** for advice, further information and to request the tamper-proof tape and documentation when appropriate.

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7. LABORATORY CONTACT DETAILS

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