

# QML PATHOLOGY

newsletter June 07

## >> Drug Screening in General Practice

**Dr Charles Appleton, Pathologist in Charge, Biochemistry**

Over the two decades since I joined Queensland Medical Laboratory (now QML Pathology), I have found that enquiries about or problems arising from drug testing have become an increasingly prominent part of the day of many of our doctors. The testing of drug levels in serum continues to be an important part of monitoring of therapeutic drug use but this is not the subject of this update.

The marked growth has been in the performance of drug screens for the detection or monitoring of potential or known illicit drug users.

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In general practice, in the midst of a busy day, a patient presents with an enquiry that is perhaps a little, perhaps a lot out of the ordinary. This enquiry may have medico-legal aspects lurking in the background. It is appropriate if any doubt exists, to telephone the laboratory before giving advice or taking action in an area that is potentially treacherous. Frankly, the field of drug testing, particularly for substances of abuse, is not intuitive.

### **There are a dozen or so clinical scenarios which may confront you:**

- Introduction or interpretation of occupational drug screens
- Worker in an industry which is about to commence occupational drug screening
- Worker who has returned a positive drug screen at work
- Interpretation of findings from regular drug screening of patients in drug rehabilitation programs
- Suspected overdose or adverse effect from drugs
- Parent of teenage child finding suspicious material or tablets
- Court-ordered drug testing
- Drug testing ordered by DoCS regarding child custody/safety
- Suspected drink spiking
- Sports drug testing
- 'Quality control' of purchased substances
- Requesting drug testing on a sample collected for other purposes.

The answer to many common questions is straight forward with some basic understanding of drug testing. The purpose of this article is to provide you with answers to the most frequently asked questions.

### **What is the most desirable sample for drug screening?**

When testing for illicit substances, urine is the preferred sample. There is an Australian Standard (AS/NZS 4308) which defines how a urine test is to be performed and when a particular finding is to be considered positive. Laboratories accredited to this Standard (as we are) produce results which are interpretable Australia-wide.

Saliva (oral fluid) is raising much interest in many work-related and traffic control situations at present. With wider use and over several years, the technology will 'mature'.

Hair testing is available but is referred interstate. The current cost is \$150 per drug and is not refunded by Medicare. At present, the Health Practitioners Board of Queensland is the main source of hair drug testing requests.

### **How do we do the test?**

In most medical settings, detailed knowledge of this is not required but you must be confident that the findings are

accurate and robust. Use of a laboratory accredited to the Standard ensures this.

Analysis includes an immunological screen for five classes of potentially abused substances and in non-occupational testing, thin layer chromatography (TLC). Although TLC is not as sensitive as the immunoassays, it will specifically identify several hundred individual drugs and their metabolite patterns.

Gas chromatography/mass spectroscopy (GCMS) is generally reserved for addressing medico-legal questions, as it is expensive and is not funded by Medicare.

Our booklet on Occupational Drug Testing may be of interest if more detailed information is required.

### **Immunoassay testing in brief:**

The immunoassays are 'drug class' tests and detect members of five classes:

#### **Opiates:**

The opiates include heroin, morphine and codeine as well as pholcodine (Duro-Tuss). In most cases, with therapeutic use, synthetic opioids such as methadone, oxycodone and tramadol, as well as buprenorphine, nalorphine and naltrexone do not produce a positive screen. Note that many of these are detected and reported with the TLC which we perform.

Use of codeine and pholcodine as well as ingestion of morphine from poppy seed as found on buns, bread rolls etc is not illegal. When a urinary drug screen is positive for opiates after use of one of these, this is known as an 'innocent positive'. The test has in fact detected an opiate, but the acquisition of that was not illicit.

#### **Amphetamines (sympathomimetic amines):**

The sympathomimetic amines include methamphetamine, amphetamine, MDMA ('ecstasy') and their close relatives. Pseudoephedrine and phentermine are also members of this class. TLC frequently provides specific identification of the drug/s involved. Use of pseudoephedrine is not illegal, and nor is phentermine if prescribed. Amphetamine is occasionally prescribed also. These constitute innocent positives.

#### **Cannabinoids:**

The cannabinoids are derived from Cannabis sativa only.

#### **Benzodiazepines:**

The benzodiazepine class includes all members of this group of sedatives and hypnotics. In general, these are legal if prescribed.

#### **Cocaine:**

Cocaine metabolites are derived from cocaine only.

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**Table 1: Sources of Innocent Positives**

OPIATES	<ul style="list-style-type: none"> <li>• Codeine – any of xxx-eine, xxx Forte, xxx Plus</li> <li>• Pholcodine (Duro-Tuss, cough and cold medications)</li> <li>• Poppy seed (morphine)</li> </ul>
SYMPATHOMIMETIC AMINES (AMPHETAMINES)	<ul style="list-style-type: none"> <li>• Pseudoephedrine</li> <li>• Phentermine (Duromine), amphetamine (Dexamphetamine) legal if prescribed</li> <li>• Dietary products of putrefaction'</li> </ul>
CANNABINOIDS	<ul style="list-style-type: none"> <li>• Several preparations containing hemp-seed oil</li> </ul>
BENZODIAZEPINES	<ul style="list-style-type: none"> <li>• Legal if prescribed</li> </ul>

The immunoassay screens can be performed urgently if clinically required and are available 24 hours a day. TLC is more time-consuming and can be performed as a follow-up test on the next working day.

### For how long after use of these drugs will we expect the screen to be positive?

After use of opiates, amphetamines or cocaine, we expect the screen to remain positive for no longer than three to four days.

With infrequent users of cannabis or of benzodiazepines, the screen will again remain positive for no longer than three to four days. However, when testing individuals who may have used these drugs heavily or for prolonged periods of time (that is subjects who have 'loaded up' their body fat with cannabis or benzodiazepine metabolites), the screen may be positive for considerably longer periods of time of up to and occasionally exceeding one month after cessation of use.

With each drug screen, the laboratory reports the urinary creatinine to enable assessment of the overall concentration of the urine. The above detection intervals assume urine of 'average' concentration (creatinine of 5 to 15 mmol/L).

If the urine is unusually dilute, (made evident by a very low urinary creatinine of less than 2 mmol/L), the detection interval will be shortened to as little as 30 to 50% of the time stated above. This is well-known to drug users. It is a common finding in the laboratory that subjects who are trying to hide something from detection will consume a large amount of water prior to the test so as to produce a dilute urine.

Conversely, subjects who present for testing in a dehydrated state will produce urine which is unusually concentrated. Urinary creatinine values which exceed 20 mmol/L render

the laboratory test somewhat more sensitive and it may be possible to detect drug use for longer periods of time than that stated.

### What does a positive test mean?

Urine drug screening detects drug users who are not necessarily affected by their drugs at the time of sample collection. The detection interval for the above drugs when used occasionally is 3-4 days, but the time after use for which a subjects performance, perception, or mood may be affected may be as brief as 8 to 12 hours. Hence it is clear that in most cases subjects who returned a positive urinary drug screen will not be affected at the time of collection by the drug which they have used.

### Gaps in detection:

There are a number of illicit substances and indeed therapeutic drugs which are subject to abuse which will not be detected by the standard screens. I am always hesitant to list them because this would provide an easy source of information for drug users. In general, if a query arises along these lines, I would encourage you to telephone one of the staff or pathologists such as myself, who are involved in drug testing.

### Other considerations:

#### False positives

A false positive finding is said to occur when a drug class is reported but further testing indicates that the finding is inexplicable. There is no drug present which would account for the finding. This problem was much more prevalent with older immunoassay tests when the assay reacted with metabolites of non-related drugs.

The screens have 'matured' to such an extent now that in the old sense, false positives are rare.

#### Innocent positives

This is a much more frequent concern. A screen gives a positive result because of the detection of a legal or over-the-counter member of the drug class. If this is misunderstood, illicit activity may be wrongly concluded. TLC often clarifies this but in cases where a positive screen appears inconsistent or inexplicable, I would strongly recommend that you telephone one of the staff or pathologists involved in the testing. I would much rather spend five minutes discussing a case with you now, than present in court after inappropriate action is taken in response to a misinterpreted result. See Table 1.

#### Historical positives

When a subject has ceased drug use some time beforehand but still returns a confirmed positive screen, I refer to this as a 'historical positive'. With the standardisation of modern testing



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(when performed to the Australian Standard), this is less likely but as stated above, a heavy cannabis or benzodiazepine user who has ceased will typically return a confirmed positive screen for 3-4 weeks. This may run up to 6-7 weeks if he provides a concentrated urine at the time of the test.

### Passive positives

This is frequently used as a defence when a subject returns a positive cannabis screen – “I went to a party several nights ago and some of my fellow party-goers were smoking cannabis in the room!” Although we have seen cases, it is improbable that an individual could return a positive screen when this is their only exposure. In order for passive exposure to produce a confirmed positive finding, the exposure must be lengthy and intense.

### Collection Considerations

When collecting samples for drug rehabilitation or medico-legal purposes, supervision of collection is essential. In the case of the latter, for any finding to be legally robust, proper sealing and signing off of the sample, as well as handling including chain of custody documentation is also required. If the question arises, please contact your local laboratory or collection centre. We can provide instruction or documentation.

In many cases it may be appropriate to simply refer the patient to a collection centre with a request form for ‘Urinary Drug Screen - supervised with Chain of Custody’.

Within QML Pathology, we have a ‘shorthand’ for the level of supervision for medico-legal collections. Level 3 is the minimal legally robust form of supervision (see Table 2) and is generally adequate. This is the level which is specified in the standard.

**Table 2: Levels of Supervision**

<b>Level 1</b>	Collector stands in front of subject and directly observes passage of urine from the urethra to the container.
<b>Level 2</b>	Collector remains in the room with the subject but discreetly watches from the side.
<b>Level 3</b>	Collector asks subject to remove coats etc and empty pockets, and waits outside the cubicle (with door slightly ajar, whilst still allowing for individual privacy) while the subject passes urine. Prior to collection, a coloured solution must be added to the water in the toilet bowl, and taps made tamper evident e.g. paper bag taped around tap.

### When may the testing be billed to Medicare?

The two situations in which it is legal to bill Medicare for the testing are in the acute situation where toxicity or overdose of a prescribed or illicit substance is suspected, and when a subject is undergoing rehabilitation for an illicit or inappropriate drug use habit.

It is always illegal to bill Medicare for smoking cessation testing, testing for drugs which enhance sporting performance, and for testing which is medico-legal or occupational in nature. Appendix 1 details this.

Assay of therapeutic drug levels in blood for monitoring treatment is covered by Medicare under separate item numbers.

### Appendix 1 – What drug screening is covered by Medicare?

<b>Item 66623 – Screen for overdose or acute toxicity</b>
<ul style="list-style-type: none"> <li>• All qualitative and quantitative tests on blood, urine or other body fluid for: <ul style="list-style-type: none"> <li>– (a) a drug or drugs of abuse (including illegal drugs and legally available drugs taken other than in appropriate dosage); or</li> <li>– (b) ingested or absorbed toxic chemicals;</li> </ul> </li> <li>• Excludes: <ul style="list-style-type: none"> <li>– (c) the surveillance of sports people and athletes for performance improving substances; and</li> <li>– (d) the monitoring of patients participating in a drug abuse treatment program.</li> </ul> </li> </ul>
<b>Item 66626 – Screen used in drug rehabilitation</b>
<ul style="list-style-type: none"> <li>• Detection or quantitation or both of a drug, or drugs, of abuse or a therapeutic drug, on a sample collected from a patient participating in a drug abuse treatment program;</li> <li>• Excludes the surveillance of sports people and athletes for performance improving substances;</li> <li>• Excludes detection of nicotine and metabolites in smoking withdrawal programs</li> <li>• Includes all tests on blood, urine or other body fluid</li> <li>• Medicare allows up to 36 tests in a 12 month period.</li> </ul>

### See over for explanation of individual scenarios

**Dr Charles Appleton**  
MBBS (Q1d) FRCPA

Pathologist in Charge, Biochemistry  
Ph: (07) 3121 4420  
Email: charles.appleton@qml.com.au

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### The scenarios expanded:

#### 1 Occupational screening

Becoming commonplace especially in heavy or dangerous industries

- 3 forms** - Pre-employment screening  
 - Incident-related testing  
 - Random ongoing screening.

Not Medicare refundable

#### 2 Worker concern based on past use

A consequence of occupational testing – worker anxiety  
 Awareness of detection intervals important  
 If proceed to laboratory testing, not Medicare refundable

#### 3 Unexpected positive at work

Again a consequence of occupational testing – worker anxiety  
 Awareness of innocent positives important  
 Awareness that the Standard requires the screen result to be confirmed by GCMS before action is important  
 Independent laboratory testing at time of presentation is usually not helpful but if performed, is not Medicare refundable

#### 4 Rehabilitation testing

Covers both use of illicit substances and compliance with prescribed medications  
 Supervised collection is important  
 This is one of the most challenging areas of obtaining valid urine collections  
 Rehabilitation testing is Medicare refundable - up to 36 tests per 12 months

#### 5 Special case – doctor supervising a family member

Extremely difficult situation because of necessity for strict supervision of collection – considerations of trust  
 ? medical appropriateness  
 Medicare refundable up to 36 tests per year

#### 6 Suspected overdose or toxicity

Usually presents to hospital but occasionally to GP  
 Paracetamol and tricyclic antidepressant O/D may be life threatening although patient relatively 'well'  
 Medicare funding applicable

#### 7 Unknown substance found at home

Difficult situation associated with loss of trust  
 Substance usually illicit material but occasionally talc, icing sugar, etc  
 "What are you going to do with the results?"  
 What if the 'child' is an adult  
 Illegal to bill Medicare but we may test the substance 'as favour'

#### 8 Unknown substance or syringe found at workplace

Origin is usually unknown  
 Typically want testing to determine if there is a drug user on site  
 Substance usually illicit material but we also see non-illicit tablets, insulin syringes, etc  
 "What are you going to do with the results?"  
 Illegal to bill Medicare but we may test the substance 'as favour'

#### 9 Parole/bail/drug court-ordered testing

Testing is typically 'woefully inadequate' but courts often do not give specific direction  
 Sometimes difficulty because court orders blood testing  
 Potentially high-risk – anger if positive finding returned  
 Beware of falsification of reports if subject given copy to pass to court  
 Must ensure subject knows of innocent positives  
 Technically illegal to bill Medicare but what if the subject was a known drug user?

#### 10 Dept of Child Safety or child custody case

Testing is usually tightly controlled and frequent  
 DoCS often pays for testing and usually pays for GCMS confirmations  
 Potentially very high-risk – these cases are the source of most death threats  
 Beware of falsification of reports if subject given copy to pass to supervisor  
 Must ensure subject knows of innocent positives  
 If subject is paying, technically illegal to bill Medicare but what if the subject was a known drug user?

#### 11 Possible 'spiked' drink

Consider the value of a fast answer for counselling  
 How long since the episode? - remember detection window  
 Remember undetectable drugs  
 What are you going to do if the test returns a positive?  
 Often "I just want to know" but beware of patient changing his/her mind if screen returns positive  
 Consider possibility of successful court action ensure all history, examination documented and sample collector supervised, sealed and transported with chain of custody  
 Usually bill Medicare as 'inappropriate drug use'

#### 12 Sports drug testing

"Why do you want the test?"  
 If looking for illicit or recreational drug use, the medical lab can assist  
 If looking for performance enhancing drugs, medical lab testing is inadequate – refer to Aust Sports Drug Testing Laboratory in Sydney  
 Concentration of the urine may play a critical role  
 Medicare billing depends on reason for the test

#### 13 'Quality control' of drugs – illicit or medicinal

In general, the lab will decline to assist. We do not want this reputation!  
 However, occasionally in medical or interesting cases, we may agree to assist  
 Illegal to bill Medicare, but for the unusual ones we may perform test free of charge

#### 14 Drug testing on sample obtained for other tests

Neither knowledge nor consent of patient  
 Consider ethics/legality  
 What are you going to do with the result?  
 Axiom: "Never perform a laboratory test unless you know what the result is going to be and you know that you want that result"

# clinical data Jun 07

## Infectious Diseases Report - Geographic Distribution - May 2007

SEROLOGY	Regions (as per key below)															Total			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	May	Apr	Mar	Feb
Adenovirus (not typed)	1		2		1		1		2	1	4					12	7	5	2
Adenovirus (typing pending)		1					2		2							5	2	2	1
Barmah Forest virus	7	5	1				3		6	4	5	23		3	1	58	69	80	35
Bordetella pertussis	8	6	2				11		3		14	3	1	3		51	32	25	45
Brucella species																0	1	1	0
Campylobacter jejuni																0	0	0	0
Chlamydia pneumoniae																0	0	0	0
Chlamydia trachomatis, not typed	70	60	25	20	6		78		27	22	97	68	9	30	13	525	423	563	526
Coxiella burnetii	3		2			1			1		1		1	1		10	7	11	7
Cryptococcus species											1				2	3	1	3	1
Cytomegalovirus (CMV)	3	5	2				6		3	3	8	5	1		3	39	23	29	24
Entamoeba histolytica																0	1	0	0
Enterovirus - not typed	1	1					2					2				6	8	3	2
Epstein-Barr virus (EBV)	10	18	6	1			24		13	4	36	14	4	6	5	141	135	173	148
Flavivirus unspecified	5											2		12		19	18	14	9
Hepatitis A virus		1														1	2	8	2
Hepatitis B virus	3	7	2				13		1	2	49	3		3		83	67	90	90
Hepatitis C virus	24	49	25	4	2	1	31		22	4	63	28	4	7	10	274	205	275	284
Hepatitis D virus																0	1	0	1
Hepatitis E virus																0	0	0	0
Herpes simplex Type 1	16	35	10	6	2		39		14	11	50	19	3	7	3	215	197	275	201
Herpes simplex Type 2	13	31	16		2		27		17	3	45	23	1	6	6	190	142	197	163
Herpes simplex virus - not typed	7	7	1	2			10		6	2	11	4	1	1	2	54	46	44	43
HIV-1	1	2					1		2		1			2		9	4	14	8
HTLV-1																0	0	0	0
Influenza A virus		2					2		1				1	1		7	7	16	26
Influenza B virus																0	2	0	1
Legionella species																0	0	0	0
Leptospira species	4	1	1	1					2			1	1	1		12	2	8	12
Measles virus																0	1	2	1
Mumps virus																0	2	0	0
Mycoplasma pneumoniae	4	14	4		1		17	1	5	2	20	6		1	2	77	79	80	96
Neisseria gonorrhoeae	10	4	1	1			12				13			2	1	44	25	28	25
Parainfluenza virus Type 1																0	0	0	0
Parainfluenza virus Type 2		1							1		2					4	3	5	1
Parainfluenza virus Type 3			1				1		2							4	1	2	2
Parvovirus	3	2					3	1	3	1	6	2	3	4	1	29	10	24	14
Pneumocystis carinii							1		1		2					4	3	3	3
Respiratory Syncytial virus		7	2			2	11		10	9	14	3				58	53	97	27
Ross River virus	10	13	4	5			13	1	22	21	13	25	8	14	12	161	177	180	67
Rubella virus									1							1	0	5	0
Salmonella paratyphi A																0	0	0	1
Salmonella paratyphi B																0	1	1	0
Salmonella typhi																0	1	0	1
Shigella dysenteriae																0	0	0	0
Shigella flexneri																0	0	0	0
Streptococcus Group A	16	10	3	2			16	17	10	3	19	12	3	4	1	116	84	95	83
Toxoplasma gondii							1		1		1					3	1	0	3
Treponema pallidum	32	9	9		3	1	23	4	8	9	37	10	1	12	1	159	122	118	113
Trichomonas vaginalis	4	2			2						1			1		10	12	9	6
Varicella Zoster virus	7	23	7	1		2	27	1	15	10	42	9	1	8	3	156	137	164	156
Yersinia enterocolitica																0	0	0	0
<b>TOTAL</b>	<b>262</b>	<b>316</b>	<b>126</b>	<b>43</b>	<b>19</b>	<b>7</b>	<b>375</b>	<b>25</b>	<b>201</b>	<b>112</b>	<b>554</b>	<b>262</b>	<b>43</b>	<b>129</b>	<b>66</b>	<b>2540</b>	<b>2114</b>	<b>2649</b>	<b>2230</b>

### REGIONS

1 Cairns  
2 Gold Coast/Northern Rivers  
3 Ipswich

4 Mackay  
5 Mount Isa  
6 New England  
7 North Brisbane Suburbs

8 Northern Territory  
9 Redcliffe  
10 Rockhampton  
11 South Brisbane Suburbs

12 Sunshine Coast  
13 Toowoomba  
14 Townsville  
15 Wide Bay/Burnett

April 2007 and further historical clinical data can be obtained by contacting your local Medical Liaison Officer

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# QML Pathology updates Jun 07

## The Changing Spectrum of Routine Disease

As our nation continues to grow so does Australia's cultural and ethnic diversity. The increasing multiculturalism in Australia, particularly in Brisbane, has resulted in a number of new or rare cases being presented. Such cases as thalassaemia, sickle cell anaemia, tuberculosis and syphilitic neurological conditions are emerging in every day general practice.

Over the next few months QML Pathology will hold a series of workshops in South East Queensland addressing and profiling some of the new cases that are appearing in the community. The first workshop of the series is scheduled for Thursday, 30 August at Victoria Park Golf Course in Herston. Pathologists Dr Renu Vohra, Dr Lydia Pitcher and Dr Paul Bartley will present a number of case studies. Workshop invitations will be distributed shortly. For further information contact the QML Pathology Marketing Dept. on (07) 3121 4004.

## Skin Punch Biopsy Devices

We are pleased to advise that QML Pathology now have punch biopsy devices both with and without internal plunger available. The punch biopsy with internal plunger system allows the lodged skin specimen inside the metal lumen of the punch to be easily ejected. For further information please contact Stores Department on (07) 3121 4328 or your local QML Pathology Branch Laboratory.

Type of biopsy	Sizes available (mm)
Punch Biopsy without plunger	2, 3, 4, 5, 6, 8
Punch Biopsy with internal plunger	2, 3, 4



**Punch Biopsy without plunger**



**Punch Biopsy with internal plunger**

## Doctor's Noticeboard

• Dr Chin Ng, Rheumatologist, would like to advise that he has commenced consulting at Sunnybank. He continues to be a visiting consultant at Princess Alexandra Hospital. His contact details are as follows:

Suite 213B, Level 2  
Times Square (opposite Sunnybank Private Hospital)  
250 McCullough Street  
Sunnybank QLD 4109  
ph: (07) 3423 7881  
fax: (07) 3423 0852  
mob: 0411 099 335  
email: myrheumatologist@gmail.com

• Dr Magdi Gindi would like to announce that he commenced General Practice on the 8th June 2007 at:

Bayview Clinic  
51 Bayview Street  
Runaway Bay QLD 4216  
ph: (07) 5537 3860  
Hours: Mon - Fri 8.00am - 6.00pm  
Sat 9.00am - 1.00pm

## New Collection Centres

### Hamilton Island

Hamilton Island Medical Centre  
Resort Drive, Hamilton Island QLD 4803  
Phone: 0434 075 498  
Opening Hours: 8.15am - 11.30am (Mon, Wed and Fri)

### Mt Warren Park

Mt Warren park Shopping Centre  
20-30 Mt Warren Park Boulevard  
Mt Warren Park QLD 4207  
Phone: (07) 3287 2274  
Opening Hours: 8.00am - 12.30pm  
1.00pm - 4.00pm (Monday-Friday)

### Pialba

46 Main Street, Pialba QLD 4655  
Phone: (07) 4121 0479  
Opening Hours: 8.00am - 4.00pm (Monday-Friday)

### Underwood

Shop 41B, Underwood Marketplace Shopping Centre  
3215 Logan Road, Underwood QLD 4127  
Phone: (07) 3341 0617  
Opening Hours: 8.00am - 12.30pm  
1.00pm - 4.00pm (Monday-Friday)

## Relocated Collection Centres

### Ballina

Shop 2, 99 Tamar Street, Ballina NSW 2478  
Phone: (02) 6686 0976  
Opening Hours: 7.30am - 5.30pm (Monday-Friday)  
8.00am - 11.00am (Saturday)