

# TOXICOLOGY LABORATORY TEST REPERTOIRE

**Cardiff Toxicology Laboratory  
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Laboratory Open Monday – Friday 08:30 to 17:00

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Clinical advice	Joanne Rogers (Consultant Clinical Scientist) 029 218 26892 or <a href="mailto:Joanne.Rogers@wales.nhs.uk">Joanne.Rogers@wales.nhs.uk</a>

For urgent requests please contact the laboratory. Samples will be processed as soon as it is feasible to do so.

**Gel tubes are not acceptable for most assays** due to the potential for chromatographic interference. Samples from gel samples are accepted for cholinesterase phenotyping / pseudocholinesterase activity only.

It is possible for other medications to interfere with analysis. Please state current medications.

For therapeutic drug monitoring it is usual to collect trough samples once steady state is achieved. Some exceptions do apply (notably anti-TB drugs and olanzapine).

Samples should be separated and stored at 2-8°C prior to sending (except for thiopental – please see below)

Assay	Sample Requirement (ml)*	Sample Handling / Transport	Methodology	Reference Range	Turnaround Time (working days)	EQA	Clinical Utility	NHS Charge <sup>1</sup> 2023/2024 (£)
Amiodarone	EDTA Plasma 0.5 mL (minimum vol 200µL)  Sample timing less important due to long half-life.  Amiodarone is stable in plasma for 24 hours at room temperature or 1 month at -20°C.	First Class Post	LC-MS/MS	0.5 – 2.0mg/L	7	LGC Standards	Therapeutic drug monitoring (limited utility in toxicity due to long tissue half life)	£37.08
Amitriptyline and nortriptyline	EDTA Plasma 2 mL (minimum vol 1 mL)  Trough sample	First Class Post	HPLC	Sum of amitriptyline plus nortriptyline 80 – 200 µg/L	7	LGC Standards	Therapeutic drug monitoring	£37.08
Carboxy-haemoglobin	EDTA Whole Blood 0.5mL (minimum vol 100uL)	First Class Post	Spectrophotometry	< 2 % Smokers may be higher	7	LGC Standards	Suspected exposure / sample not suitable for blood gas analysis	£37.42
Cholinesterase Phenotype	EDTA Plasma 0.5 mL (minimum vol 150uL)  If collecting samples after an episode of prolonged apnoea please wait at least 48 hours after surgery.	First Class Post	Spectrophotometry	Total activity: 650 - 1450 U/L	7	UK NEQAS sample exchange	Suxamethonium apnoea – assessment of risk	£23.32
Clobazam	EDTA Plasma 200uL (minimum vol 50 uL)	First Class Post	LC-MS/MS	Clobazam: 30 – 300 ug/L Desmethyl Clobazam: 300 – 3000 ug/L	7	LGC Standards	Therapeutic drug monitoring (limited utility)	£37.08

<b>Assay</b>	<b>Sample Requirement (ml)*</b>	<b>Sample Handling / Transport</b>	<b>Methodology</b>	<b>Reference Range</b>	<b>Turnaround Time (working days)</b>	<b>EQA</b>	<b>Clinical Utility</b>	<b>NHS Charge<sup>1</sup> 2023/2024 (£)</b>
Clozapine	EDTA Plasma 0.5mL (minimum vol 100uL)  Trough sample	First Class Post	LC-MS/MS	350 – 600 µg/L	7	LGC Standards	Therapeutic drug monitoring / toxicity	£27.44

<p>Drugs of abuse comprising:  <b>Opioids:</b> Morphine, Codeine, 6MAM, Dihydrocodeine, Oxycodone, Tramadol  <b>Cocaine metabolite</b>  <b>Amphetamines:</b> Amphetamine, Methamphetamine, MDMA  <b>Benzodiazepines:</b> Alprazolam, Diazepam, Nordiazepam, Oxazepam, Temazepam  <b>Fentanyl</b>  <b>Cannabis metabolite</b>  <b>EDDP</b>  <b>Buprenorphine</b>  <b>Ketamine</b>  Gabapentin  Pregabalin</p>	<p>Urine, plain 1mL</p>	<p>First Class Post</p>	<p>UPLC-Accurate mass spectrometry  LC-MS/MS</p>	<p>Cut-offs applied to community drug monitoring samples:  Amphetamines 200ng/mL,  Benzodiazepines 30 ng/mL,  Tramadol, Oxycodone and Benzoylcegonine 100 ng/mL,  Morphine, Codeine and Dihydrocodeine 300 ng/mL,  6MAM and Fentanyl 10 ng/mL,  Cannabis 15 ng/mL,  EDDP and Ketamine 75 g/mL,  Norbuprenorphine and Buprenorphine 5 ng/mL,  Pregabalin 250 ng/mL,  Gabapentin 1000 ng/mL   <b>Please note, lower cut-offs are applied to paediatric and in-patient samples.</b></p>	<p>10</p>	<p>LGC Standards</p>	<p>Drugs of abuse</p>	<p>£28.00</p>
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Assay	Sample Requirement (ml)*	Sample Handling / Transport	Methodology	Reference Range	Turnaround Time (working days)	EQA	Clinical Utility	NHS Charge <sup>1</sup> 2023/2024 (£)
Ethambutol	EDTA Plasma 0.5 mL (minimum vol 250uL)  2 h post dose. If suspect delayed absorption collect samples at 2 and 6 h post dose. If concern over toxicity collect pre-dose.  Please state sample timing on the request.	First Class Post	GC-MS	2-6 mg/L For peak drug levels for a daily dose regimen. Pre-dose ethambutol concentrations should be less than 1 mg/L	7	SKML Anti TB Drugs	Therapeutic drug monitoring / toxicity	£43.91
Flecainide	EDTA Plasma 0.5 mL (minimum vol 200µL)  Trough sample  Flecainide is stable in plasma for 6 hours at room temp when frozen at -20°C this is increased to 2 months.	First Class Post	LC-MS/MS	0.15 – 0.9 mg/L	7	LGC Standards	Therapeutic drug monitoring	£55.83
Hydroxycarbazepine	EDTA Plasma 0.5 mL (minimum vol 100uL)  Sample timing less important due to long half-life.	First Class Post	LC-MS/MS	3 – 35 mg/L	7	LGC Standards	Therapeutic drug monitoring	£37.08

Assay	Sample Requirement (ml)*	Sample Handling / Transport	Methodology	Reference Range	Turnaround Time (working days)	EQA	Clinical Utility	NHS Charge <sup>1</sup> 2023/2024 (£)
Isoniazid	EDTA Plasma 2 mL (minimum vol 1 mL)  2 h post dose. If suspect delayed absorption collect samples at 2 and 6 h post dose.	First Class Post	HPLC	3 – 5 mg/L For peak drug levels for a daily dose regimen.	7	SKML Anti TB Drugs	Therapeutic drug monitoring	£43.91
Isopropanol	<i>see Volatile Alcohols</i>							
Itraconazole	EDTA Plasma 0.5 mL (minimum vol 250uL)  Trough sample	First Class Post	HPLC	➤ 0.5mg/L	7	UK NEQAS	Therapeutic drug monitoring	£37.08
Lamotrigine	EDTA Plasma 0.5 mL (minimum vol 100uL)  Trough sample	First Class Post	LC-MS/MS	3 – 15 mg/L	7	LGC Standards	Therapeutic drug monitoring	£23.32
Levetiracetam	EDTA Plasma 0.5 mL (minimum vol 100uL)  Trough sample	Levetiracetam is not stable in whole blood and plasma should be separated on the day of receipt and then stored in the fridge prior to sending. An 11% loss after 2 days has been reported in whole blood samples kept at room temperature.  First Class Post	LC-MS/MS	12 – 46 mg/L	7	LGC Standards	Therapeutic drug monitoring	£23.32
Methanol	<i>see Volatile Alcohols</i>							

Assay	Sample Requirement (ml)*	Sample Handling / Transport	Methodology	Reference Range	Turnaround Time (working days)	EQA	Clinical Utility	NHS Charge <sup>1</sup> 2023/2024 (£)
Mexiletine	EDTA Plasma 0.5 mL (minimum vol 200µL)  Mexiletine is stable in plasma for 24 hours at room temp and 1 month at -20°C.	First Class Post	LC-MS/MS	0.6 – 1.7 mg/L	7	Reference Material	Therapeutic drug monitoring	£37.08
Midazolam / 1-Hydroxymidazolam	EDTA Plasma 200uL (minimum vol 50 uL)  In brain stem death testing, >13h after infusion has stopped	Discuss with laboratory prior to sending samples.  Courier if urgent.	LC-MS/MS	LLOQ of 10 ug/L. Consider application of neurological criteria in light of result.	24 Hours	LGC Standards & Reference Material	Prior to application of neurological criteria in confirmation of death	£100.00
Mitotane	EDTA Plasma 0.5 mL (minimum vol 150uL)  Trough sample / >12h post dose	First Class Post	GC-MS	14 – 20 mg/L	7	Reference Material	Therapeutic drug monitoring	£37.08
Olanzapine	EDTA Plasma 0.5 mL (minimum vol 100uL)  12 hours post dose	Samples must be separated within 7 hours. Protect from light  First Class Post	LC-MS/MS	20 – 40 µg/L  12h post dose	7	LGC Standards	Therapeutic drug monitoring	£43.91
Oxcarbazepine	See <i>hydroxycarbazepine</i>							
Perhexiline	EDTA Plasma 0.5 mL (minimum vol 250uL)	First Class Post	GC-MS	0.15 – 0.60	7	Perhexiline QA Programme QEH Australia	Therapeutic drug monitoring	£27.44

Assay	Sample Requirement (ml)*	Sample Handling / Transport	Methodology	Reference Range	Turnaround Time (working days)	EQA	Clinical Utility	NHS Charge <sup>1</sup> 2023/2024 (£)
Pseudocholinesterase (activity only)	EDTA Plasma 0.5 mL (minimum vol 150uL)	First Class Post	Spectrophotometry	650 – 1450 U/L	7	UK NEQAS sample exchange	Acute organo-phosphate exposure (limitations apply)  For assessment of risk for suxamethonium apnoea cholinesterase phenotyping is usually advised	£20.58
Pyrazinamide	EDTA Plasma 0.5 mL (minimum vol 150uL)  2 h post dose. If suspect delayed absorption collect samples at 2 and 6 h post dose.	First Class Post	HPLC	20-40 mg/L For peak drug levels for a daily dose regimen	7	SKML Anti TB Drugs	Therapeutic drug monitoring	£37.08
Quetiapine	EDTA Plasma 0.5 mL (minimum vol 100 uL)	First Class Post	LC-MS/MS	50-500 µg/L	7	LGC Standards	Therapeutic drug monitoring (limited utility)	£37.08
Risperidone and 9-hydroxy risperidone	EDTA Plasma 0.5 mL (minimum vol 100uL)  Sample timing less important due to long half-life.	First Class Post	LC-MS/MS	Total risperidone (sum of risperidone and 9-hydroxy risperidone) 20-60 µg/L	7	LGC Standards	Therapeutic drug monitoring	£37.08

Assay	Sample Requirement (ml)*	Sample Handling / Transport	Methodology	Reference Range	Turnaround Time (working days)	EQA	Clinical Utility	NHS Charge <sup>1</sup> 2023/2024 (£)
Thiopental	EDTA Plasma 1 mL (minimum vol 250uL)	Discuss with laboratory prior to sending samples.  Due to stability concerns samples <b>MUST</b> arrive <b>within 12 hours of venepuncture</b> . Alternatively plasma may be frozen for transportation.	GC-NPD	None	24 Hours.	Reference Material	Brain stem death testing.	£49.61
Topiramate	EDTA Plasma 0.5 mL (minimum vol 100uL)  Sample timing less important due to long half-life.	First Class Post	LC-MS/MS	5 – 20 mg/L	7	LGC Standards	Therapeutic drug monitoring	£23.32
Volatile Alcohols (methanol, ethanol, isopropanol and acetone)	Fluoride Oxalate Plasma Fluoride Oxalate Blood Urine, plain	Courier if urgent.	GC-FID	N/A	24 Hours	LGC Standards	Suspected toxicity	£49.61

\*Minimum volumes do not allow for repeat analysis in case of assay failure.

<sup>1</sup>An additional sample handling charge of £5.67 per sample from NHS Wales and £6.14 per sample for non-Welsh locations applies.

There is a surcharge for non-NHS patients as follows:

An additional charge of £5 for tests less than £20

An additional charge of 25% for those tests greater than £20