



# TDM

**Therapeutic Drugs Monitoring Scheme**

## **Scheme Description**

### **LGC Standards Proficiency Testing**

1 Chamberhall Business Park  
Chamberhall Green  
Bury  
Lancashire  
BL9 0AP  
United Kingdom

Telephone: +44 (0) 161 762 2500  
Fax: +44 (0) 161 762 2501  
Email: [ptcustomerservices@lgcgroup.com](mailto:ptcustomerservices@lgcgroup.com)  
Website: [www.lgcstandards.com](http://www.lgcstandards.com)



TDM Scheme Description

Record of issue status and modifications

| ISSUE | ISSUE DATE    | DETAILS  | AUTHORISED BY          |
|-------|---------------|--|------------------------|
| 4     | August 2013   | Additional AE3, AE4 and NC samples added. TD1 Carbamazepine+CBZ epoxide clarified.   | K Morgan               |
| 5     | October 2013  | Restructure of TD1, TD2, TD3, Methotrexate and Clobazam/Norclonazepam. Updates to concentration ranges covered on analytes in scheme.  | K Morgan               |
| 6     | December 2013 | Clarification of traceability of Assigned Values, Clarification of Units for Methotrexate  | K Morgan               |
| 7     | August 2014   | Introduction of Sulpiride as an analyte  | K Morgan               |
| 8     | Sept 2014     | Sample TD1 named Therapeutic Drug Mixture. Inclusion of subcontracting information in 'Test Materials' section.  | K Morgan               |
| 9     | Sept 2015     | Update of concentration ranges, addition of new sample for Chlorpromazine; Norchlorpromazine (PS31) and addition of molar report options.<br>Removed Hard copy Report information. | K Morgan<br>A.McCarthy |
| 10    | June 2016     | Update of sample 31 SDPA to RobustSD   | K Morgan               |
| 11    | Sept 2016     | Update to concentration ranges (Lamotrigine) and clarification of SDPA (Norquetiapine). Addition of Brivaracetam (AE5) and Analgesic mixture (AM1).                                | K Morgan               |
| 12    | Dec 2016      | Removed Antibiotics sample 4, 5 and 6  | A.McCarthy             |
| 13    | Sept 2017     | Update of concentration ranges. Addition of new samples: PS32 Mianserin and PST1 Psychostimulants  | K Morgan               |
| 14    | Sept 2018     | Update of concentration ranges. Removal of AE3 (Retigabine) from scheme.   | K Morgan               |

Notes:

Where this document has been translated, the English version shall remain the definitive version

## **Scheme Aims and Organisation**

The primary aim of the Therapeutic Drugs Monitoring proficiency testing scheme (TDM) is to enable laboratories performing the analysis of therapeutic drugs to monitor their performance and compare it with that of their peers. The TDM scheme also aims to provide information to participants on technical issues and methodologies relating to Therapeutic Drug Monitoring.

The TDM scheme year operates from January to December. Further information about TDM, including test material availability, round despatch dates and reporting deadlines, are available on the current TDM application form.

The operation of all schemes is supported by an Advisory Group consisting of members of the professional bodies, scheme participants, and others experienced in the field of therapeutic drug monitoring. The scheme reports on the performance of U.K. participants to the National Quality Assurance Advisory Panels for Chemical Pathology and for Medical Microbiology.

## **Test Materials**

Details of test materials available in TDM are given in Appendix A. The test parameters are continually reviewed to ensure they meet the needs of current laboratory testing and regulatory requirements.

Samples are prepared using pre-screened human serum and newborn calf serum (for the majority of the psychoactive drug samples).

The human serum is pooled and is obtained from donors who have verbally declared themselves drug free. The serum has been sterile-filtered, tested and found negative for:

- HEP B antigen
- HEP C antigen
- Combo HIV 1 and 2
- Syphilis
- Alanine transferase

Certificates of Analysis of the serum are retained at LGC.

The newborn calf serum of New Zealand origin is collected from calves less than 14 days old. The serum has been sterile-filtered. Certificates of Analysis of the serum are retained at LGC.

Note: All test materials provided are intended for use as proficiency testing materials only and are not to be used for any other purposes.

Some aspects of the scheme, such as test material production, homogeneity testing and stability assessment, can from time to time be subcontracted. When subcontracting occurs, it is placed with a competent subcontractor and LGC is responsible for this work. The planning of the scheme, the evaluation of performance and the authorisation of the final report will never be subcontracted.

## **Statistical Analysis**

Information on the statistics used in TDM can be found in the General Protocol and in the Scheme Report. Methods for determining assigned values and the values for SDPA used for individual samples are given in Appendix A

## **Methods**

Methods are listed in PORTAL. Please select the most appropriate method from the list. If none of the methods are appropriate, then please report your method as 'Other' and record a brief description in the Comments Section in PORTAL.

## **Results and Reports**

TDM results are returned through our electronic reporting software, PORTAL, full instructions for which are provided by email. However, participants may request result submission forms on which to report and return results if they are unable to report through electronic means. This will incur an additional charge.

TDM reports will be available on the website within 10 working days of round closure. Participants will be emailed a link to the report when it is available.

## APPENDIX A - Description of abbreviations used

### Assigned Value (AV)

The assigned value may be derived in the following ways:

- From the robust mean (RMean). This is the median of participant results after the removal of test results that are inappropriate for statistical evaluation, e.g. miscalculations, transpositions and other gross errors. Generally, the assigned value will be set using results from all methods, unless the measurement is considered method-dependant, in which case the assigned value will be set by method as illustrated in the report tables.

For some analytes, where there is a recognised reference method for that type of measurement, this may be used as the assigned value for a particular analyte i.e. it would be applied to results obtained by any method.

*Traceability: Assigned values which are derived from the participant results, or a subset of the results are not traceable to an international measurement standard. The uncertainty of assigned values derived in this way is estimated from the participant results, according to ISO 13528.*

- From a formulation value (Formulation). This denotes the use of an assigned value derived from sample preparation details, where known and exact quantities of analyte have been used to prepare the sample.

*Traceability: Assigned values calculated from the formulation of the test sample are traceable, via an unbroken metrological traceability chain, to an international measurement standard. The measurement uncertainty of the assigned value is calculated using the contributions from each calibration in the traceability chain.*

- From a qualitative formulation (Qual Form). This applies to qualitative tests where the assigned value is simply based on the presence/absence of the analyte in the test material.

*Traceability: Assigned values calculated from the qualitative formulation of the test sample are traceable to a certified reference standard or a microbiological reference strain.*

- From expert labs (Expert). The assigned value for the analyte is provided by an 'expert' laboratory.

*Traceability: Assigned values provided by an 'expert' laboratory may be traceable to an international measurement standard, according to the laboratory and the method used. The uncertainty of measurement for an assigned value produced in this way will be provided by the laboratory undertaking the analysis. Details of traceability and the associated uncertainty will be provided in the report for the scheme/round.*

**Range**

This indicates the concentration range at which the analyte may be present in the test material.

**SDPA**

SDPA represents the 'standard deviation for proficiency assessment' which is used to assess participant performance for the measurement of each analyte. Wherever possible, the SDPA is based on a concentration dependent model derived from historic data. Otherwise the SDPA is based upon the RobustSD.

**Units**

This indicates the units used for the assessment of data. These are the units in which participants should report their results. For some analytes in some schemes participants may have a choice of which units to report their results, however, the units stipulated in this scheme description are the default units to which any results reported using allowable alternative results will be converted to.

**DP**

This indicates the number of decimal places to which participants should report their measurement results.

**CDM**

Concentration Dependent Model

TDM Scheme Description

**Therapeutic Drugs**

**Sample TD1**

**Therapeutic Drug Mixture**

**Participants will receive:** 3 x 5ml samples of lyophilised human serum (A, B, and C)

| Analyte                     | Method | Range (mass)   | AV    | SDPA           | Units         | DP |
|-----------------------------|--------|----------------|-------|----------------|---------------|----|
| Carbamazepine               | All    | 0 to 40        | RMean | Fixed from CDM | mg/L , µmol/L | 2  |
| CBZ-epoxide                 | All    | 0 to 30        | RMean | Fixed from CDM | mg/L, µmol/L  | 2  |
| Carbamazepine + CBZ-epoxide | All    | 0 to 70        | RMean | Fixed from CDM | mg/L, µmol/L  | 2  |
| Clonazepam                  | All    | 0 to 100       | RMean | Fixed from CDM | µg/L, nmol/L  | 2  |
| Lamotrigine                 | All    | 0 to 50        | RMean | Fixed from CDM | mg/L, µmol/L  | 2  |
| Phenytoin                   | All    | 0 to 40        | RMean | Fixed from CDM | mg/L, µmol/L  | 2  |
| Ethosuximide                | All    | 0 to 190       | RMean | Fixed from CDM | mg/L, µmol/L  | 2  |
| Phenobarbitone              | All    | 0 to 60        | RMean | Fixed from CDM | mg/L, µmol/L  | 2  |
| Primidone                   | All    | 0 to 40        | RMean | Fixed from CDM | mg/L, µmol/L  | 2  |
| Valproate                   | All    | 0 to 300       | RMean | Fixed from CDM | mg/L, µmol/L  | 2  |
| Caffeine                    | All    | 0 to 150       | RMean | Fixed from CDM | mg/L, µmol/L  | 2  |
| Digoxin                     | All    | 0 to 5         | RMean | Fixed from CDM | µg/L, nmol/L  | 2  |
| Lithium                     | All    | 0 to 4 mmol/L  | RMean | Fixed from CDM | mmol/L        | 2  |
| Theophylline                | All    | 0 to 55        | RMean | Fixed from CDM | mg/L, µmol/L  | 2  |
| Methotrexate                | All    | 0 to 10 µmol/L | RMean | Fixed from CDM | µmol/L        | 2  |
| TD-Amikacin                 | All    | 0 to 60        | RMean | Fixed from RSD | mg/L, µmol/L  | 2  |
| TD-Gentamicin               | All    | 0 to 16        | RMean | Fixed from CDM | mg/L, µmol/L  | 2  |
| TD-Tobramycin               | All    | 0 to 15        | RMean | Fixed from RSD | mg/L, µmol/L  | 2  |
| TD-Vancomycin               | All    | 0 to 47        | RMean | Fixed from CDM | mg/L, µmol/L  | 2  |

TDM Scheme Description

**Sample CN1**

**Clobazam and Norclobazam**

**Participants will receive:** 2 x 2ml samples of lyophilised human serum (A and B)

| Analyte     | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|-------------|--------|--------------|-------|----------------|--------------|----|
| Clobazam    | All    | 0 to 1000    | RMean | Fixed from CDM | µg/L, nmol/L | 2  |
| Norclobazam | All    | 0 to 6000    | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Other Therapeutic Drugs**

**Sample AE1**

**Anti-epileptic drugs mixture**

**Participants will receive:** 1 x 4ml sample of lyophilised human serum

| Analyte          | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|------------------|--------|--------------|-------|----------------|--------------|----|
| OH-oxcarbazepine | All    | 0 to 45      | RMean | Fixed from CDM | mg/L, µmol/L | 2  |
| Gabapentin       | All    | 0 to 100     | RMean | Fixed from CDM | mg/L, µmol/L | 2  |
| Tiagabine        | All    | 0 to 300     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |
| Levetiracetam    | All    | 0 to 125     | RMean | Fixed from CDM | mg/L, µmol/L | 2  |
| Pregabalin       | All    | 0 to 100     | RMean | Fixed from CDM | mg/L, µmol/L | 2  |

**Sample AE2**

**Anti-epileptic drugs mixture**

**Participants will receive:** 1 x 4ml sample of lyophilised human serum

| Analyte    | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|------------|--------|--------------|-------|----------------|--------------|----|
| Topiramate | All    | 0 to 45      | RMean | Fixed from CDM | mg/L, µmol/L | 2  |
| Vigabatrin | All    | 0 to 65      | RMean | Fixed from CDM | mg/L, µmol/L | 2  |
| Felbamate  | All    | 0 to 155     | RMean | Fixed from CDM | mg/L, µmol/L | 2  |
| Zonisamide | All    | 0 to 55      | RMean | Fixed from CDM | mg/L, µmol/L | 2  |
| Rufinamide | All    | 0 to 105     | RMean | Fixed from CDM | mg/L, µmol/L | 2  |
| Lacosamide | All    | 0 to 30      | RMean | Fixed from CDM | mg/L, µmol/L | 2  |



TDM Scheme Description

**Sample AE4\***

**Perampanel**

**Participants will receive:** 1 x 2ml lyophilised human serum

| Analyte    | Method | Range (mass) | AV    | SDPA     | Units        | DP |
|------------|--------|--------------|-------|----------|--------------|----|
| Perampanel | All    | 0-1000       | RMean | RobustSD | µg/L, nmol/L | 2  |

\*not currently included in LGC's UKAS Scope of Accreditation

**Sample AE5\***

**Brivaracetam**

**Participants will receive:** 1 x 2ml lyophilised human serum

| Analyte      | Method | Range (mass) | AV    | SDPA     | Units        | DP |
|--------------|--------|--------------|-------|----------|--------------|----|
| Brivaracetam | All    | 0-20         | RMean | RobustSD | mg/L, µmol/L | 2  |

\*not currently included in LGC's UKAS Scope of Accreditation

**Sample CRD**

**Cardiac mixture**

**Participants will receive:** 1 x 2ml lyophilised human serum

| Analyte            | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|--------------------|--------|--------------|-------|----------------|--------------|----|
| Amiodarone         | All    | 0 to 4000    | RMean | Fixed from CDM | µg/L, nmol/L | 2  |
| Desethylamiodarone | All    | 0 to 4000    | RMean | Fixed from CDM | µg/L, nmol/L | 2  |
| Flecainide         | All    | 0 to 1500    | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample AM1\***

**Analgesic mixture**

**Participants will receive:** 2 x 5ml lyophilised human serum (A and B)

| Analyte    | Method | Range (mass) | AV    | SDPA      | Units        | DP |
|------------|--------|--------------|-------|-----------|--------------|----|
| Ibuprofen  | All    | 0 to 50      | RMean | RobustSD  | mg/L, µmol/L | 2  |
| Diclofenac | All    | 0 to 4       | RMean | Robust SD | mg/L, µmol/L | 2  |
| Tramadol   | All    | 0 to 1000    | RMean | RobustSD  | µg/L, µmol/L | 2  |

\*not currently included in LGC's UKAS Scope of Accreditation

**Drugs used for the Treatment of substance related disorders****Sample SA01                      Buprenorphine and Norbuprenorphine****Participants will receive:** 2 x 2ml lyophilised human serum (A and B)

| Analyte          | Method | Range (mass) | AV    | SDPA     | Units        | DP |
|------------------|--------|--------------|-------|----------|--------------|----|
| Buprenorphine    | All    | 0 to 20 µg/L | RMean | RobustSD | µg/L, nmol/L | 2  |
| Norbuprenorphine | All    | 0 to 20 µg/L | RMean | RobustSD | µg/L, nmol/L | 2  |

**Sample SA02                      Methadone and EDDP****Participants will receive:** 2 x 2ml lyophilised human serum (A and B)

| Analyte   | Method | Range (mass)   | AV    | SDPA     | Units        | DP |
|-----------|--------|----------------|-------|----------|--------------|----|
| Methadone | All    | 0 to 1500 µg/L | RMean | RobustSD | µg/L, nmol/L | 2  |
| EDDP      | All    | 0 to 1500 µg/L | RMean | RobustSD | µg/L, nmol/L | 2  |

**Psychoactive Drugs****Sample PS01                      Amitriptyline and Nortriptyline****Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte       | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|---------------|--------|--------------|-------|----------------|--------------|----|
| Amitriptyline | All    | 0 to 500     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |
| Nortriptyline | All    | 0 to 500     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

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**Sample PS02**                      **Imipramine and Desipramine**  
**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte     | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|-------------|--------|--------------|-------|----------------|--------------|----|
| Imipramine  | All    | 0 to 500     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |
| Desipramine | All    | 0 to 500     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample PS03**                      **Clomipramine and Norclomipramine**  
**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte         | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|-----------------|--------|--------------|-------|----------------|--------------|----|
| Clomipramine    | All    | 0 to 550     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |
| Norclomipramine | All    | 0 to 550     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample PS04**                      **Clozapine and Norclozapine**  
**Participants will receive:** 1 x 5ml lyophilised human serum

| Analyte      | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|--------------|--------|--------------|-------|----------------|--------------|----|
| Clozapine    | All    | 0 to 2500    | RMean | Fixed from CDM | µg/L, nmol/L | 2  |
| Norclozapine | All    | 0 to 2500    | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample PS05**                      **Doxepin and Nordoxepin**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte    | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|------------|--------|--------------|-------|----------------|--------------|----|
| Doxepin    | All    | 0 to 450     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |
| Nordoxepin | All    | 0 to 450     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample PS06****Fluoxetine and Norfluoxetine**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte       | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|---------------|--------|--------------|-------|----------------|--------------|----|
| Fluoxetine    | All    | 0 to 600     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |
| Norfluoxetine | All    | 0 to 600     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample PS07****Fluphenazine**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte      | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|--------------|--------|--------------|-------|----------------|--------------|----|
| Fluphenazine | All    | 0 to 25      | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample PS08****Sertraline and Norsertaline**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte      | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|--------------|--------|--------------|-------|----------------|--------------|----|
| Sertraline   | All    | 0 to 500     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |
| Norsertaline | All    | 0 to 500     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample PS09****Trimipramine and Nortrimipramine**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte         | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|-----------------|--------|--------------|-------|----------------|--------------|----|
| Trimipramine    | All    | 0 to 600     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |
| Nortrimipramine | All    | 0 to 500     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample PS10 Risperidone and HO-risperidone**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte        | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|----------------|--------|--------------|-------|----------------|--------------|----|
| Risperidone    | All    | 0 to 140     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |
| HO-risperidone | All    | 0 to 350     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample PS11 Mirtazapine and Normirtazapine**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte        | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|----------------|--------|--------------|-------|----------------|--------------|----|
| Mirtazapine    | All    | 0 to 300     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |
| Normirtazapine | All    | 0 to 300     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample PS12 Maprotiline and Normaprotiline**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte        | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|----------------|--------|--------------|-------|----------------|--------------|----|
| Maprotiline    | All    | 0 to 450     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |
| Normaprotiline | All    | 0 to 300     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample PS13 Thioridazine**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte      | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|--------------|--------|--------------|-------|----------------|--------------|----|
| Thioridazine | All    | 0 to 2000    | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

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**Sample PS14 Haloperidol**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte     | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|-------------|--------|--------------|-------|----------------|--------------|----|
| Haloperidol | All    | 0 to 70      | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample PS15 Olanzapine**

**Participants will receive:** 1 x 5ml lyophilised human serum

| Analyte    | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|------------|--------|--------------|-------|----------------|--------------|----|
| Olanzapine | All    | 0 to 150     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample PS16 Perphenazine**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte      | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|--------------|--------|--------------|-------|----------------|--------------|----|
| Perphenazine | All    | 0 to 25      | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample PS17 Quetiapine**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte                              | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|--------------------------------------|--------|--------------|-------|----------------|--------------|----|
| Quetiapine                           | All    | 0 to 1000    | RMean | Fixed from CDM | µg/L, nmol/L | 2  |
| Norquetiapine (N-desalkylquetiapine) | All    | 0 to 500     | RMean | RobustSD       | µg/L, nmol/L | 2  |

**Sample PS18 Citalopram and Norcitalopram****Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte       | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|---------------|--------|--------------|-------|----------------|--------------|----|
| Citalopram    | All    | 0 to 500     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |
| Norcitalopram | All    | 0 to 250     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample PS19 Dothiepin and Northiaden****Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte               | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|-----------------------|--------|--------------|-------|----------------|--------------|----|
| Dosulepin (Dothiepin) | All    | 0 to 500     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |
| Northiaden            | All    | 0 to 500     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample PS20 Venlafaxine and Norvenlafaxine****Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte                                 | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|---|--------|--------------|-------|----------------|--------------|----|
| Venlafaxine                             | All    | 0 to 450     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |
| Norvenlafaxine (O-Desmethylvenlafaxine) | All    | 0 to 550     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample PS21 Paroxetine****Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte    | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|------------|--------|--------------|-------|----------------|--------------|----|
| Paroxetine | All    | 0 to 525     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

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**Sample PS22                      Fluvoxamine**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte     | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|-------------|--------|--------------|-------|----------------|--------------|----|
| Fluvoxamine | All    | 0 to 1000    | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample PS23                      Zuclopenthixol**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte                         | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|---------------------------------|--------|--------------|-------|----------------|--------------|----|
| Zuclopenthixol (zuclopenthixol) | All    | 0 to 125     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample PS24                      Amisulpride**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte     | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|-------------|--------|--------------|-------|----------------|--------------|----|
| Amisulpride | All    | 0 to 650     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |

**Sample PS25                      Aripiprazole and Dehydroaripiprazole**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte             | Method | Range (mass) | AV    | SDPA           | Units        | DP |
|---------------------|--------|--------------|-------|----------------|--------------|----|
| Aripiprazole        | All    | 0 to 1000    | RMean | Fixed from CDM | µg/L, nmol/L | 2  |
| Dehydroaripiprazole | All    | 0 to 500     | RMean | Fixed from CDM | µg/L, nmol/L | 2  |



**Sample PS26****Ziprasidone**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte     | Method | Range (mass) | AV    | SDPA     | Units        | DP |
|-------------|--------|--------------|-------|----------|--------------|----|
| Ziprasidone | All    | 0 to 500     | RMean | RobustSD | µg/L, nmol/L | 2  |

**Sample PS27****Duloxetine**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte    | Method | Range (mass) | AV    | SDPA     | Units        | DP |
|------------|--------|--------------|-------|----------|--------------|----|
| Duloxetine | All    | 0 to 400     | RMean | RobustSD | µg/L, nmol/L | 2  |

**Sample PS28****Escitalopram**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte      | Method | Range (mass) | AV    | SDPA     | Units        | DP |
|--------------|--------|--------------|-------|----------|--------------|----|
| Escitalopram | All    | 0 to 350     | RMean | RobustSD | µg/L, nmol/L | 2  |

**Sample PS29****Trazodone**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte   | Method | Range (mass) | AV    | SDPA     | Units        | DP |
|-----------|--------|--------------|-------|----------|--------------|----|
| Trazodone | All    | 0 to 1500    | RMean | RobustSD | µg/L, nmol/L | 2  |

**Sample PS30****Sulpiride**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte   | Method | Range (mass) | AV    | SDPA     | Units        | DP |
|-----------|--------|--------------|-------|----------|--------------|----|
| Sulpiride | All    | 0 to 2000    | RMean | RobustSD | µg/L, nmol/L | 2  |

TDM Scheme Description

**Sample PS31\* Chlorpromazine and Norchlorpromazine**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte           | Method | Range (mass) | AV    | SDPA     | Units        | DP |
|-------------------|--------|--------------|-------|----------|--------------|----|
| Chlorpromazine    | All    | 0 to 1000    | RMean | RobustSD | µg/L, nmol/L | 2  |
| Norchlorpromazine | All    | 0 to 1000    | RMean | RobustSD | µg/L, nmol/L | 2  |

\*not currently included in LGC's UKAS Scope of Accreditation

**Sample PS32\* Mianserin**

**Participants will receive:** 1 x 5ml lyophilised newborn calf serum

| Analyte   | Method | Range (mass) | AV    | SDPA     | Units        | DP |
|-----------|--------|--------------|-------|----------|--------------|----|
| Mianserin | All    | 0 to 1000    | RMean | RobustSD | µg/L, nmol/L | 2  |

\*not currently included in LGC's UKAS Scope of Accreditation

**Psychostimulants**

**Sample PST1 \* Atomoxetine, Methylphenidate and Ritalinic acid**

**Participants will receive:** 2 x 5 ml lyophilised human serum (A and B)

| Analyte         | Method | Range (mass) | AV    | SDPA     | Units | DP |
|-----------------|--------|--------------|-------|----------|-------|----|
| Atomoxetine     | All    | 0 to 2500    | RMean | RobustSD | µg/L  | 2  |
| Methylphenidate | All    | 0 to 100     | RMean | RobustSD | µg/L  | 2  |
| Ritalinic acid  | All    | 0 to 500     | RMean | RobustSD | µg/L  | 2  |

\*not currently included in LGC's UKAS Scope of Accreditation

**Smoking Related Drugs****Sample NC01 \*                    Nicotine and Cotinine in Urine**

**Participants will receive:** 2 x 5 ml lyophilised human urine (A and B)

| Analyte  | Method | Range (mass) | AV    | SDPA     | Units      | DP |
|----------|--------|--------------|-------|----------|------------|----|
| Nicotine | All    | 0 to 5       | RMean | RobustSD | mg/L, µg/L | 3  |
| Cotinine | All    | 0 to 3       | RMean | RobustSD | mg/L, µg/L | 3  |

\*not currently included in LGC's UKAS Scope of Accreditation

**Antibiotic Drugs****Sample AT01                      Gentamicin and Vancomycin****Participants will receive:** 1 x 1ml human serum

| Analyte    | Method | Range | AV    | SDPA           | Units      | DP |
|------------|--------|-------|-------|----------------|------------|----|
| Gentamicin | All    | TBC   | RMean | Fixed from CDM | mg/L, µg/L | 2  |
| Vancomycin | All    | TBC   | RMean | Fixed from CDM | mg/L, µg/L | 2  |

**Sample AT02                      Tobramycin****Participants will receive:** 1 x 1ml human serum

| Analyte    | Method | Range | AV    | SDPA           | Units      | DP |
|------------|--------|-------|-------|----------------|------------|----|
| Tobramycin | All    | TBC   | RMean | Fixed from CDM | mg/L, µg/L | 2  |

**Sample AT03                      Amikacin****Participants will receive:** 1 x 1ml human serum

| Analyte  | Method | Range | AV    | SDPA           | Units      | DP |
|----------|--------|-------|-------|----------------|------------|----|
| Amikacin | All    | TBC   | RMean | Fixed from CDM | mg/L, µg/L | 2  |

**Sample AT07                      Teicoplanin****Participants will receive:** 1 x 1ml human serum

| Analyte     | Method | Range | AV    | SDPA           | Units      | DP |
|-------------|--------|-------|-------|----------------|------------|----|
| Teicoplanin | All    | TBC   | RMean | Fixed from CDM | mg/L, µg/L | 2  |