



# Letterkenny University Hospital **BIOCHEMISTRY USER MANUAL**

## Change Description:

1. MF-0028 Instructions for 24 hour urine included (section 3.1.8)
2. Procalcitonin e-GFR, Corrected calcium and globulin to be added to user manual and test requirements.
3. Removal of dual reporting of HbA1c. Comment following results = NOTE: Removal of Dual reporting of HbA1c. Reporting in IFCC(mmol/mol) only. Ref range remains unchanged.
4. Updated references ranges for paediatric IgA and IgM reference ranges. Carbamazepine reference range updated to 4-12 ug/ml, B2M upper reference range is 2.4mg/l (not 2.2mg/l) and reference range for >60 year olds 0.2-3.0 mg/l. LH reference ranges updated
5. Staff updated
6. Oncall tests updated and Lactate sample requirements updated
7. Updated referral tests plasma and urine metanephrine sample requirements and C Peptide requirements and referral laboratory
8. Rubella : 'The following results were obtained with the Elecsys Rubella IgG assay. Results of assays from other manufacturers should not be used interchangeably
9. Under Sodium, potassium and chloride add 'See report for paediatric ranges'
10. random urine m magnesium unit 2.5 – 8.5 mmol (/24hrs removed)

**Effective Date:** 16.03.2023

**Due for Review:** 16.03.2025

## **GUIDE TO USING THIS MANUAL**

This User Manual has been prepared in conjunction with The Pathology Department User Manual (MP-GEN-0064) to inform the users of the Saolta University Health Care Group, Letterkenny University Hospital, Pathology Department of which services are available within the Pathology Department and how to obtain the services required.

**PLEASE REFER TO DOCUMENT MP-GEN-0064, THE PATHOLOGY DEPARTMENT GENERAL USER MANUAL FOR GUIDANCE ON USING THESE DOCUMENTS.**

Documents are available on Q-Pulse and also on the HSE website <http://www.hse.ie/luhPathology>.

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## 1. INTRODUCTION

### Service Description

The Biochemistry Department is responsible for measurement of clinical constituents (ranging from ions to complex proteins) of body fluids, for use not only in diagnosis of disease, but also in monitoring the course of disease, the effect of treatment, prognosis and screening. This Department also provides analysis of hormones, drugs and tumour markers. The Biochemistry Laboratory is INAB accredited to ISO15189 since March 2020. The scope of accreditation can be accessed on the INAB website [www.inab.ie](http://www.inab.ie). Reference 210MT.

The Biochemistry Medical Scientist on-call can be contacted in the laboratory on 173-814 or via switchboard (by dialling "0").

This is a guide to the Biochemistry laboratory in Letterkenny University hospital and aims to detail sample requirements for the repertoire of tests that are performed in house or sent out to referral laboratories. This handbook has been prepared to familiarize the user with departmental structure and policies as well as specific test requirements.

### Contact Details

|                                 |  |  |
|---------------------------------|--|--|
| <b>Laboratory Phone Numbers</b> | <b>On call</b>   | <b>173814</b>  |
|                                 | <b>Biochemistry Reception</b>  | <b>074 91 23557</b>  |
|                                 | <b>Main Laboratory</b>   | <b>074 91 23559</b>  |
|                                 | <b>Point of Care Office</b>  | <b>074 91 04614</b>  |
| <b>Name</b>                     | <b>Job title</b>   | <b>Contact / Email</b>   |
| <b>Dr. Michael Louw</b>         | Consultant Biochemist<br>(Clinical advisory services)                                | <a href="mailto:MichaelLouw@eurofins.ie">MichaelLouw@eurofins.ie</a><br>0749123559(Laboratory) |
| <b>Dr. Michael Mulhern</b>      | Consultant Microbiologist<br>(Clinical advisory for<br>Infectious serology services) | <a href="mailto:Michael.mulhern@hse.ie">Michael.mulhern@hse.ie</a><br>0749123559(Laboratory)   |
| <b>Dr. Jacqui Clarke</b>        | Laboratory Manager   | Jacqui.clarke@hse.ie<br>Work: 0749123558   |
| <b>Ms. Francesca Patton</b>     | Chief Medical Scientist  | Francesca.patton@hse.ie<br>Work: 0749123559  |
| <b>Ms. Susan Breen</b>          | Senior Medical Scientist   | Susan.breen@hse.ie   |
| <b>Ms. Aoife O'Donnell</b>      | Senior Medical Scientist   | aoife.odonnell3@hse.ie   |



|                        |                          |                           |
|------------------------|--------------------------|---------------------------|
| Ms. Caoimhe Haughey    | Senior Medical Scientist | Caoimhe.haughey@hse.ie    |
| Ms. Paulette Alexander | Senior Medical Scientist | Paulette.alexander@hse.ie |

## 2. BIOCHEMISTRY LABORATORY TESTS SAMPLE ACCEPTANCE POLICY

Please refer to the **General Information User Guide, MP-GEN-0064, Section 8 for sample** and request form labeling requirements. This manual is available on Q-Pulse and the HSE website <http://www.hse.ie/luhPathology>

## 3. BIOCHEMISTRY TEST INDEX AND REFERENCE RANGES

### Routine Biochemistry Tests (Time dependent analytes highlighted in Purple)

#### Laboratory Accreditation

The Biochemistry Laboratory is accredited to ISO15189 since March 2020.

The scope of accreditation for the Biochemistry Laboratory, Pathology department at Letterkenny University Hospital is controlled by the Irish National Accreditation Board (INAB) and detailed in Scope Registration Number 210MT on the INAB website [www.inab.ie](http://www.inab.ie).

### EXPECTED VALUES/REFERENCE RANGES

All reference ranges are based on manufactures recommendations unless otherwise stated and references available in Section 9.

All test names indicated with (\*) are INAB accredited. All Pregnancy related ranges are in TABLE 2.

| Test              | Specimen type |                       | Reference Range                       | Additional Information            | Turnaround time                  |
|-------------------|---------------|-----------------------|---------------------------------------|-----------------------------------|----------------------------------|
| Albumin *         | Blood         | Serum (Gold top tube) | 35 - 52 g/L                           | See report for paediatric ranges  | <24Hours or STAT samples <75mins |
| Alcohol *         | Blood         | Serum (Gold top tube) | <10 mg/dl                             | Not for medico-legal purposes     | <24Hours or STAT samples <75mins |
| Alk.Phosphatase * | Blood         | Serum (Gold top tube) | 40-129 U/L (Male) 35-104 U/L (Female) | See report for paediatric ranges. | <24Hours or STAT samples <75mins |



| Test                       | Specimen type |                           | Reference Range   | Additional Information  | Turnaround time                            |
|----------------------------|---------------|---------------------------|---|---|--|
| ALT*                       | Blood         | Serum (Gold top tube)     | 0-41 UL (Male)<br>0- 33 U/L (Female)  |   | <24Hours or<br>STAT<br>samples<br><75mins  |
| Alpha -1 Anti Trypsin      | Blood         | Serum (Gold top tube)     | 0.9 – 2.00 g/l  | *AAT <1.00g/l are sent to Royal College of Surgeons for Phenotyping analysis              | <24Hours                                   |
| Alpha Fetoprotein *        | Blood         | Serum (Gold top tube)     | 0-7.0 ng/ml   | Should not be used as a screening test.   | <24Hours                                   |
| Hepatitis B antibody (AHB) | Blood         | Serum (Gold top tube)     | Refer to interpretation on report   |   | <24Hours                                   |
| Ammonia *                  | Blood         | EDTA (purple top tube)    | Range (umol/l)<br>Male 16-60<br>Female 11-51  | On ice and transported to Lab immediately.<br><u>Must inform Lab before taking sample</u> | <24Hours                                   |
| Amylase *                  | Blood         | Serum (Gold top tube)     | 28-100 U/L  |   | <24Hours or<br>STAT<br>samples<br><75mins  |
| AST *                      | Blood         | Serum (Gold top tube)     | 0-40 U/L (Male)<br>0-32 U/L (Female)  |   | <24Hours or<br>STAT<br>samples<br><75mins  |
| Anti Streptolysin O (ASO)  | Blood         | Serum (Gold top tube)     | IU/ml<br><18 0 – 150<br>>18 0 – 200   |   | <24Hours                                   |
| Beta HCG*                  | Blood         | Serum (Gold top tube)     | <i>Please contact the Biochemistry laboratory for gestational ranges if required</i> (mIU/ml)<br>Male <2<br>Non-pregnant premenopausal females <1<br>Post-menopausal females <7.0 | Tumour Marker and to exclude ectopic pregnancy  | <24Hours or<br>STAT<br>samples<br><120mins |
| Bence Jones Protein*       | Full EMU      | Plain 24H Urine Container | See report form   | 24 hr Collection container (Available from Laboratory)                                    | 7 Days                                     |



| Test                         | Specimen type  |   | Reference Range   | Additional Information   | Turnaround time                        |
|------------------------------|----------------|---|---|--|--|
| <b>Beta 2 Microglobulin*</b> | Blood          | Serum (Gold top)                                      | <60 0.8-2.4 mg/L<br>>60 0.2 - 3.0 mg/L  |  | <24Hours                               |
| <b>Bicarbonate*</b>          | Blood          | Serum (Gold top tube)                                 | 22-29 mmol/L  |  | <24Hours or<br>STAT samples<br><75mins |
| <b>Bilirubin (Total) *</b>   | Blood          | Serum (Gold top tube)                                 | Range (umol/L)<br>Male <24<br>Female <15<br><4D old <290  |  | <24Hours or<br>STAT samples<br><75mins |
| <b>Bilirubin (Direct) *</b>  | Blood          | Serum (Gold top tube)                                 | <5.0 umol/L   |  | <24Hours or<br>STAT samples<br><75mins |
| <b>Blood Gases *</b>         | Arterial Blood | Arterial Blood<br>Balanced<br>Heparinised<br>Syringe. | (kPa)<br>PH: 7.35-7.45<br>PO2: 4.5-6.1<br>pCO2: 12.0-15.0<br>(mmol/L)<br>HCO3: 20-26 TCO2:<br>23-27<br>BE: +/-2.0 | Must inform Lab<br>before taking sample<br>Expel any air<br>bubble. Mix sample.<br>Send to the lab<br>immediately.<br>Needle must NOT<br>be left in syringe.<br>Label sample clearly | STAT sample<br><20mins                 |
| <b>C3/C4</b>                 | Blood          | Serum (Gold top tube)                                 | (g/L)<br>C3 0.90 – 1.80<br>C4 0.10 – 0.40   |  | 24Hours                                |
| <b>Calcium *</b>             | Blood          | Serum (Gold top tube)                                 | <b>Age Range (mmol/l)</b><br>18-60 2.15 - 2.50<br>60-90 2.20 - 2.55<br>>90 2.05 - 2.40                            | See report for<br>paediatric ranges  | <24Hours or<br>STAT samples<br><75mins |
|                              | 24H Urine      | Acid added to<br>24H container                        | Adult<br>2.5–7.5 mmol/24hr<br>Male<br>9000 –19000µmol/24Hrs<br>Female<br>6000-13000µmol/24Hrs                     | 24 hr urine<br>required24 hr<br>Collection container<br>(Available from<br>Laboratory)   | <24Hours                               |



| Test  | Specimen type                      |   | Reference Range  | Additional Information  | Turnaround time                  |
|---|------------------------------------|---|--|---|----------------------------------|
| <b>Calcium/Creatinine ratio urine</b>       | Random Urine (only for paediatric) | Universal <b>NB</b> will only be accepted for paediatric patients Send to lab immediately after collection. | Calcium: Creatinine ratio is calculated.   | Reference ranges are not available for this urine test; Results must be considered in conjunction with age, sex and clinical status of the patient. | <24Hours                         |
| <b>CCP (Citrullinated Cyclic Peptide) *</b> | Blood                              | Serum (Gold Top)  | 0-17 U/ml  |   | <24Hours                         |
| <b>CEA*</b>                                 | Blood                              | Serum (Gold top tube)   | Age Range(ng/ml)<br><40 0 - 4.7<br>>40 0 - 5.2   | Should not be used as a screening test.   | <24Hours                         |
| <b>CA-15.3*</b>                             | Blood                              | Serum (Gold top tube)   | 0 – 28.5 U/ml  |   | <24Hours                         |
| <b>CA-19.9*</b>                             | Blood                              | Serum (Gold top tube)   | 0 - 39 U/ml  |   | <24Hours                         |
| <b>CA-125*</b>                              | Blood                              | Serum (Gold top tube)   | 0 - 35 U/ml<br><i>Based on NCCP Guidelines. Refer to NCCP for more details.</i>  |   | <24Hours                         |
| <b>Carbamazepine*</b>                       | Blood                              | Serum (Gold top tube)   | 4 - 12 ug/ml<br>Therapeutic range  |   | <24Hours                         |
| <b>Chloride*</b>                            | Blood                              | Serum (Gold top tube)   | 98 - 106 (mmol/l)  | See report for paediatric ranges  | <24Hours or STAT samples <75mins |
| <b>Cholesterol*</b>                         | Blood                              | Serum (Gold top tube)   | < 5.2 mmol/L   | Fasting   | <24Hours                         |
| <b>HDL Cholesterol*</b>                     | Blood                              | Serum (Gold top tube)   | Sex Range (mmo/L)<br>No Risk Moderate Risk High Risk<br>Male >1.45 0.90 – 1.45 <0.90<br>Female >1.68 1.15 – 1.68 <1.15<br>Fasting Sample |   | <24Hours                         |
| <b>LDL Cholesterol *</b>                    | Blood                              | Serum (Gold top tube)   | 0 – 2.59 mmol/L  | Fasting   | <24Hours                         |
| <b>Cortisol*</b>                            | Blood                              | Timed Serum (Gold top tube)   | Morning 0600-1000hrs 133 – 537nmol/L<br>Afternoon 1600-2000hrs 68.2– 327nmol/L   |   | <24Hours                         |



| Test                          | Specimen type  |   | Reference Range  | Additional Information   | Turnaround time                  |
|-------------------------------|--|---|--|--|----------------------------------|
|                               |  |   | Note: Due to Circadian rhythm of Cortisol levels, in serum and plasma, sample collection time must be noted.   |  |                                  |
| <b>Cortisol*</b>              | <b>Short Synacthen Investigation: Investigation of suspected adrenal insufficiency</b>                 |   | Adrenal insufficiency is excluded by a rise in basal cortisol >200nmol/L and a 30 min and 60 min value >450nmol/L.<br><br>Baseline and post Synacthen cortisol values do not apply to women on oral contraceptives |  | <24Hours                         |
| <b>Cortisol*</b>              | <b>Low dose overnight dexamethasone suppression test; Investigation of suspected Cushing Syndrome:</b> |   | A normal response is suppression of cortisol at 0900hrs to <50nmol/L. Failure to suppress is indicative of Cushing's syndrome.   |  | <24Hours                         |
| <b>C-Reactive Protein *</b>   | Blood  | Serum (Gold top tube)   | < 5 mg/L   |  | <24Hours or STAT samples <75mins |
| <b>Creatine Kinase *</b>      | Blood  | Serum (Gold top tube)   | 39-308 IU/L (M)<br>26-192 IU/L (F)   |  | <24Hours or STAT samples <75mins |
| <b>Creatinine *</b>           | Blood  | Serum (Gold top tube)   | 59 -104 umol/L (M)<br>45 - 84 umol/L (F)   | See report for paediatric ranges   | <24Hours or STAT samples <75mins |
| <b>Creatinine Clearance *</b> | Blood and Urine  | Serum (Gold top tube) and Urine (Beige top tube) or 24H container | 66 - 143 ml/min  | Blood & 24 hr collection of urine. Blood sample should be taken during the urine collection period. 24 hr Collection container (Available from Laboratory) | <24Hours                         |
| <b>CSF Protein *</b>          | CSF  | Universal   | 60YRS+ 0.15-0.60<br>18YRS+ 0.15-0.45<br>57D 0.05-0.35<br>29D 0.50-0.90<br>0 0.65-1.50  | Contact Laboratory   | STAT sample <75mins              |





| Test              | Specimen type    |                        | Reference Range  | Additional Information   | Turnaround time     |
|-------------------|------------------|------------------------|--|--|---------------------|
|                   |                  |                        | Based on: UK Standards for Microbiology Investigations.  |  |                     |
| CSF Glucose *     | CSF              | Universal              | 1 YRS+ 2.22-4.44<br>59D 1.94-5.00<br>29D 1.55-5.55<br>0 1.94-5.55<br>Based on: UK Standards for Microbiology Investigations.                             |  | STAT sample <75mins |
| Digoxin *         | Blood            | Serum (Gold top tube)  | 0.70 – 1.50 nmol/L   | Contact Laboratory Specimen should be taken at least 6 hours after last oral dose. | <24Hours            |
| Electrophoresis * | EMU or 24H Urine | 24Hr container (plain) | See report form  | EMU- full morning void or complete 24h collection                                  | Fortnightly         |
|                   | Blood            | Serum (Gold top tube)  |  | 24 hr Collection container (Available from Laboratory)                             |                     |
| Ferritin *        | Blood            | Serum (Gold top tube)  | Range(ug/l)<br>Male 30 – 400<br>Female 13 - 150  |  | <24Hours            |
| Folate*           | Blood            | Serum (Gold top tube)  | Range (ng/ml)<br>3.9 – 26.8  |  | <24Hours            |
| FSH*              | Blood            | Serum (Gold top tube)  | Phase Range (mIU/ml)<br>Follicular 3.5 – 12.5<br>Mid-cycle peak 4.7 – 21.5<br>Luteal phase 1.7 – 7.7<br>Post Menopausal 25.8 - 134.8<br>Males 1.5 - 12.4 |  | <24Hours            |
| Gamma GT *        | Blood            | Serum (Gold top tube)  | Male 8 – 61 U/L<br>Female 5 – 36 U/L   |  |                     |
| Gentamycin *      | Blood            | Serum (Gold top tube)  | (ug/ml)<br>Once <24Hours:  | Refer to "LUH Empiric Antibiotic   | <24Hours            |



| Test   | Specimen type |  | Reference Range   | Additional Information  | Turnaround time                  |
|--|---------------|--|---|---|----------------------------------|
|  |               |  | Trough <1<br>Peak >10<br><b>Multiple:</b><br>Trough <2<br>Peak 5-10<br><b>Endocarditis:</b><br>Trough <1<br>Peak 3 - 5  | Guidelines". Contact Dr M Mulhern, Cons. Microbiologist, if necessary.                                  |                                  |
| <b>Glucose *</b>                             | Blood         | Fluoride EDTA; Adult and Paediatric Grey top | Range (mmol/l)<br>Fasting: 4.11 – 6.05<br><br>Age<br>Children 3.33-5.55<br><60 4.11 – 5.89<br>60-90 4.56 – 6.38<br>>90 4.16 – 6.72<br><br>1hr PP <7.8mmol/l<br>2hrPP <6.7mmol/l | Fast for at least 10 hours.   | <24Hours or STAT samples <75mins |
| <b>Haemochromatosis *</b>                    | Blood         | EDTA (purple top tube)                       |   | Consent Request form (MF-BIO-0058) required from Biochemistry Department. See report for interpretation | 5 Weeks                          |
| <b>Haemoglobin A1c*</b>                      | Blood         | EDTA (purple top tube)                       | NOTE: Reporting in IFCC(mmol/mol). See <a href="http://www.hse.ie/go/diabetes">www.hse.ie/go/diabetes</a><br><br>19-40 mmol/mol<br>3.9-5.8 %                                    | No diabetic range   | <24Hours                         |
| <b>Haptoglobin</b>                           | Blood         | Serum (Gold top tube)                        | 0.3 – 2.0(g/L)  |   | <24Hours                         |
| <b>Hepatitis A IgM *</b>                     | Blood         | Serum (Gold top tube)                        |   | Sent to the Virus Reference Laboratory for Confirmation   | <24Hours                         |
| <b>Hepatitis B Surface Antigen (HBsAg) *</b> | Blood         | Serum (Gold top tube)                        |   | Sent to the Virus Reference Laboratory for Confirmation   | <24Hours                         |
| <b>Hepatitis C (anti HCV) *</b>              | Blood         | Serum (Gold top tube)                        |   | Sent to the Virus Reference Laboratory for Confirmation   | <24Hours                         |
| <b>HIV Ab/Ag *</b>                           | Blood         | Serum (Gold top tube)                        |   | Sent to the Virus Reference   | <24Hours                         |



| Test                                      | Specimen type |   | Reference Range  | Additional Information                                       | Turnaround time                  |
|---|---------------|---|--|--|----------------------------------|
|   |               |   |  | Laboratory for Confirmation                                  |                                  |
| <b>IgG*</b><br><b>IgM*</b><br><b>IgA*</b> | Blood         | Serum (Gold top tube)                                   | (Adult) (Range g/L)<br>IgG 7.0 – 16<br>IgA 0.7 – 4.0<br>IgM 0.4 - 2.3  | See report for paediatric ranges.                            | <24Hours                         |
| <b>Iron *</b>                             | Blood         | Serum (Gold top tube)                                   | 5.8 – 34.5 umol/L  |  | <24Hours                         |
| <b>Interleukin-6*</b>                     | Blood         | Serum (Gold top tube)                                   | 0-7pg/ml   | Request to be made by Consultant Haematologist by telephone. | <24Hours or STAT samples <75mins |
| <b>Lactate *</b>                          | Blood         | Fluoride EDTA; Adult or Paediatric Grey top tube. (ICE) | 0.5 – 2.2 mmol/L   | <b>Available on Blood Gas</b>                                | <24Hours                         |
| <b>LDH *</b>                              | Blood         | Serum (Gold top tube)                                   | Age Range (U/L)<br>>18 135 - 214(F)<br>>18 135 –225(M)   | See report for paediatric ranges.                            | <24Hours or STAT samples <75mins |
| <b>LH *</b>                               | Blood         | Serum (Gold top tube)                                   | Phase (mIU/ml)<br>Follicular 2.4 -12.6<br>Mid-cycle 14.0 -95.6<br>Luteal 1.0 -11.4<br>Post Menopausal 7.7 – 58.5<br>Males 1.7 -8.6 |  | <24Hours                         |
| <b>Lithium*</b>                           | Blood         | Serum (Gold top tube)                                   | (mmol/L)<br>Therapeutic 0.6 -1.2<br>Toxic > 2.0  | Specimen should be taken 12 hours post dose                  | <24Hours                         |
| <b>Magnesium *</b>                        | Blood         | Serum (Gold top tube)                                   | Adults, (mmol/L)<br><60y 0.66 - 1.07<br>60-90y 0.66 - 0.99<br>>90y 0.70 - 0.95   | See report for paediatric ranges                             | <24Hours or STAT samples <75mins |



| Test                                   | Specimen type |                         | Reference Range  | Additional Information                                 | Turnaround time                        |
|--|---------------|-------------------------|--|--|--|
|  | 24hr Urine    | Plain                   | 3.0 – 5.0 mmol/24Hr  | 24 hr Collection container (Available from Laboratory) | <24Hours                               |
|  | Random Urine  | Urine (Yellow top tube) | 2.5 – 8.5 mmol   |  | <24Hours                               |
| <b>Microalbumin Creatinine Ratio *</b> | Random Urine  | Urine (Yellow top tube) | < 2.26 g albumin/ mol creatinine   |  | <24Hours                               |
| <b>Microalbumin Excretion Rate *</b>   | 24hr Urine    | Plain Bottle            | < 30 mg / 24hr   | 24 hr Collection container (Available from Laboratory) | <24Hours                               |
| <b>NT-Pro BNP *</b>                    | Blood         | Serum (Gold top tube)   | Refer to interpretation on report  |  | <24Hours                               |
| <b>Oestradiol *</b>                    | Blood         | Serum (Gold top tube)   | (pg/ml)<br>Follicular: 30.9-90.4<br>Ovulation: 60.4-533<br>Luteal: 60.4-232<br>Post Menopausal Males <5.0 - 138<br>11.3 – 43.2 |  | <24Hours                               |
| <b>Osmolality *</b>                    | Blood         | Serum (Gold top tube)   | mOsm/Kg<br>>60 280 – 300<br>>42D 275 - 295<br>>1D 265 - 275  |  |  |
| <b>Osmolality *</b>                    | Urine         | Urine (Yellow top tube) | mOsm/Kg<br>50 - 1250   |  | <24Hours<br>STAT samples<br><75mins    |
| <b>Paracetamol *</b>                   | Blood         | Serum (Gold top tube)   | Therapeutic<br>10-30 (mg/L)  |  | <24Hours or<br>STAT samples<br><75mins |
| <b>Phenytoin *</b>                     | Blood         | Serum (Gold top tube)   | Therapeutic 10 - 20 (ug/ml)  |  | <24Hours                               |
| <b>Phosphate *</b>                     | Blood         | Serum (Gold top tube)   | 0.81 - 1.45 (mmol/L)   | See report for paediatric ranges                       | <24Hours or<br>STAT samples<br><75mins |



| Test                       | Specimen type |   | Reference Range  | Additional Information   | Turnaround time                     |
|----------------------------|---------------|---|--|--|-------------------------------------|
|                            | 24H Urine     | 24H Urine Container                                       | 13.00 – 42.00 mmol/24Hrs   |  | <24Hours                            |
| Potassium*                 | Blood         | Serum (Gold top tube)                                     | 3.5 – 5.3 (mmol/L)   | Potassium >6hrs old are unsuitable for analysis.<br>See report for paediatric ranges | <24Hours or STAT samples<br><75mins |
|                            | urine         | Random Urine (Yellow) top tube)<br>24hr (Plain container) | 20 – 80 mmol/l<br>25 – 125 mmol/24hr   | 24 hr Collection container (Available from Laboratory)                               | <24Hours                            |
| Progesterone *             | Blood         | Serum (Gold top tube)                                     | Follicular: (ng/ml)<br>0.05 - 0.193<br>Ovulation: 0.055 - 4.14<br>Luteal: 4.11 - 14.5<br>Post Menopausal Males<br><0.05 – 0.126<br><0.05 – 0.149 |  | <24Hours                            |
| Prolactin *                | Blood         | Serum (Gold top tube)                                     | m IU/L<br>Female 102-496<br>Male 86-324  |  | <24Hours                            |
| Total Protein *            | Blood         | Serum (Gold top tube)                                     | 66 – 87(g/L)   | See report for paediatric ranges   | <24Hours or STAT samples<br><75mins |
|                            | 24H Urine     | 24H Urine Container                                       | <0.14 g/24HR   |  | 24Hours                             |
|                            | Urine         | Random (yellow top tube)                                  | <0.15g/l   |  | <24Hours                            |
| Protein/Creatinine Ratio * | Urine         | Random  | 3 - 14 mg/mmol   |  | <24Hours                            |

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| Test                | Specimen type |  | Reference Range  | Additional Information   | Turnaround time                  |
|---------------------|---------------|--|--|--|----------------------------------|
|                     |               | (yellow top tube)                              |  |  |                                  |
| PSA (Total) *       | Blood         | Serum (Gold top tube)                          | Male (ng/ml)<br><50 <2.0<br>50-59 <3.0<br>60-69 <4.0<br>>70 <5.0<br><i>Based on NCCP Guidelines. Refer to NCCP for more details.</i> |  | <24Hours                         |
| PTH *               | Blood         | EDTA (purple top tube)                         | 15 - 65 pg/ml  | Transport immediately to lab   | <24Hours                         |
| Rheumatoid factor * | Blood         | Serum (Gold top tube)                          | 0-14 IU/mL   |  | <24Hours                         |
| Rubella IgG Abs *   | Blood         | Serum (Gold top tube)                          | < 10 IU/mL: No Evidence of Immunity.<br>≥ 10 IU/mL: Evidence of Immunity   | Results are obtained with the Elecsys Rubella IgG assay. Results of assays from other manufacturers should not be used interchangeably | <24Hours                         |
| Salicylate *        | Blood         | Serum (Gold top tube)                          | Therapeutic <300 mg/L  |  | <24Hours or STAT samples <75mins |
| Sodium *            | Blood         | Serum (Gold top tube)                          | 136 – 145 (mmol/L)   | See report for paediatric ranges   | <24Hours or STAT samples <75mins |
| Sodium *            | Urine         | Random Urine Yellow top tube<br>24 hour sample | 54 - 150 mmol/L<br>40.0 – 220.0mmol/24Hrs  |  | <24Hours                         |



| Test                  | Specimen type |   | Reference Range  | Additional Information   | Turnaround time   |
|-----------------------|---------------|---|--|--|---|
| <b>Sweat Test*</b>    | Sweat         | Collected by Medical Scientist, must arrange with Biochemistry Lab ext 3559 in advance. | Sweat Chloride<br>mmol/L<br>Not Elevated <30<br>Intermediate* 30-60<br>Elevated** > 60<br><br>Sweat Conductivity<br>mmol/L<br>Not Elevated <50<br>Intermediate* 50 - 90<br>Elevated** > 90<br><br>*Requires further CF assessment<br>**Supports Diagnosis of CF. | Cystic fibrosis should not be diagnosed based on conductivity measurement alone. Confirmation should be sought using sweat chloride or genotyping. Intermediate values between 60 and 90 mmol/l require further investigation by sweat chloride and/or genotyping. | Per appointment only, please call Biochemistry on ext 3559 to arrange |
| <b>Syphilis *</b>     | Blood         | Serum (Gold top tube)   |  | Sent to the Virus Reference Laboratory for Confirmation  | <24Hours  |
| <b>Testosterone *</b> | Blood         | Serum (Gold top tube)   | Male: (nmol/L)<br>>18 9.9 – 27.8<br>>20 8.6 – 29.0<br>>50 6.7 – 25.7<br>Female<br>>18 0.3 – 1.7<br>>50 0.1 – 1.4   |  | <24Hours  |
| <b>T4 (Free)</b>      | Blood         | Serum (Gold top tube)   | <b>AGE      NORMAL</b><br>20      11.0-21.0<br>1      13.0-21.0<br>1M      14.0-22.0<br>0      16.0-50.0   | Source of reference:<br><a href="https://caliper.research.sickkids.ca/#/search">https://caliper.research.sickkids.ca/#/search</a>  | <24Hours  |



| Test   | Specimen type |                         | Reference Range                                    | Additional Information                                  | Turnaround time         |
|--|---------------|-------------------------|--|---|-------------------------|
| <b>T3 (Free) *</b>                               | Blood         | Serum (Gold top tube)   | 2.0-4.4 pg/mL                                      |   | <24Hours                |
| <b>Total Iron Binding Capacity (Calculated)*</b> | Blood         | Serum (Gold top tube)   | 40.8 – 76.6 umol/L                                 |   | <24Hours                |
| <b>Transferrin *</b>                             | Blood         | Serum (Gold top tube)   | 2.0 – 3.6 (g/L)                                    |   | <24Hours                |
| <b>Transferrin saturation*</b>                   | Blood         | Serum (Gold top tube)   | (%)<br>Female 20 – 55<br>Male 15 - 50              |   | <24Hours                |
| <b>Triglyceride*</b>                             | Blood         | Serum (Gold top tube)   | 0.4 – 2.3 mmol/L                                   | <b>Fasting</b> specimen                                 | <24Hours                |
| <b>Troponin T Hs *</b>                           | Blood         | Serum (Gold top tube)   | FEMALE [0-9] ng/L<br>MALE [0-17] ng/L              | Analysis on Roche e801<br>Haemolysed samples unsuitable | STAT samples<br><75mins |
| <b>TSH *</b>                                     | Blood         | Serum (Gold top tube)   | 0.270 – 4.20 uIU/ml                                |   | <24Hours                |
| <b>Uric acid *</b>                               | Blood         | Serum (Gold top tube)   | (umol/L)<br>(F) 142.8 - 339.2<br>(M) 202.3 - 416.5 |   | <24Hours                |
| <b>Uric acid *</b>                               | Random Urine  | Urine (Yellow top tube) | 2200 - 5475(umol/L)                                |   |                         |
|  | Urine         | 24 hr (Plain container) | 1200 - 5900 umol/24H                               | 24 hr Collection container (Available from Laboratory)  | <24Hours                |
| <b>Urea *</b>                                    | Blood         | Serum (Gold top tube)   | (mmol/L)<br>>18 2.1 – 7.1                          | See report for paediatric ranges                        | <24Hours or STAT        |





| Test                         | Specimen type |                                    | Reference Range  | Additional Information   | Turnaround time  |
|------------------------------|---------------|------------------------------------|--|--|------------------|
|                              |               |                                    | >60 2.9 – 8.2  | 24 hr Collection container (Available from Laboratory)   | samples <75mins  |
|                              | Urine         | 24 hr Collection (Plain container) | 428 - 714 mmol/24 H  |  | <24Hours         |
| <b>Vancomycin</b>            | Blood         | Serum (Gold top tube)              | Non-severe infection: Trough 10-15(ug/ml)<br><br>Severe infection: Trough 15-20<br>If trough <5 or >15,<br><br>contact: Cons.Microbiologist    | 24 hr Collection container (Available from Laboratory)<br>Refer to "LGH Empiric Antibiotic Guidelines". Contact Dr M Mulhern, Cons. Microbiologist, if necessary.  | <24Hours         |
| <b>Vitamin B12 *</b>         | Blood         | Serum (Gold top tube)              | 197-771 pg/ml  |  | <24Hours         |
| <b>Vitamin D 25OH *</b>      | Blood         | Serum (Gold top tube)              | Adequate Vitamin D >/ 50nmol/L<br><br>Insufficient Vitamin D >/30nmol/L<br><br>Deficient Vitamin D <30nmol/L<br><br>Vitamin D excess >125nmol/ | No retesting <3 months after commencing supplementation<br><br>Reference:IOM 2011: Dietary reference intakes for calcium and Vitamin D. Washington, DC: The National Academies Press.<br><br><a href="https://www.hse.ie/eng/about/who/cspd/n-cps/pathology/resources/lab-testing-for-vit-d-deficiency11.pdf">https://www.hse.ie/eng/about/who/cspd/n-cps/pathology/resources/lab-testing-for-vit-d-deficiency11.pdf</a> | <24Hours         |
| <b>Globulin (Calculated)</b> | Blood         | Serum (Gold top tube)              | 20-35 (g/L) *  |  | <24Hours or STAT |



| Test   | Specimen type |                       | Reference Range  | Additional Information | Turnaround time                        |
|--|---------------|-----------------------|--|------------------------|--|
|  |               |                       |  |                        | samples<br><75mins                     |
| <b>Albumin corrected calcium</b> (Calculated)            | Blood         | Serum (Gold top tube) | 2.10-2.60 (mmol/L)*  |                        | <24Hours or<br>STAT samples<br><75mins |
| <b>Estimated Glomerular filtration rate</b> (Calculated) | Blood         | Serum (Gold top tube) | Refer to interpretation on report*<br>This calculation is based on: <b>CKD-EPI equation*</b> |                        | <24Hours or<br>STAT samples<br><75mins |

**Table 1:** Biochemistry Tests

**NOTE:**

\* Tests requested outside the scope of on call tests after 8pm or at the weekends will be separated and stored and processed during the next routine hours.

\*If sample needs to be sent to referral Lab for supplemental/ confirmatory testing Turnaround Time will be longer. Days are expressed as Calendar days.

\*See Section 9:References for sources of references ranges



### Pregnancy related reference ranges

| TEST NAME   | UNITS        | FIRST TRIMESTER | SECOND TRIMESTER | THIRD TRIMESTER |
|---|--------------|-----------------|------------------|-----------------|
| *Vitamin D, 25-hydroxy                            | nmol/L       | 45 - 67         | 25 - 55          | 25 - 45         |
| *Alanine aminotransferase , ALT                   | U/L          | 3 - 30          | 2 - 33           | 2 - 25          |
| *Albumin  | g/L          | 31 - 51         | 26 - 45          | 23- 42          |
| *Alkaline phosphatase                             | U/L          | 17 - 88         | 25 - 126         | 38 - 229        |
| *Alpha-fetoprotein                                | ng/mL        | 18 - 119        | 96 - 302         | 160 - 550       |
| *Amylase  | U/L          | 24 -83          | 16 -73           | 15 - 81         |
| *Aspartate aminotransferase ,AST                  | U/L          | 3 -23           | 3 - 33           | 4 -32           |
| *Bicarbonate                                      | mmol/L       | 18 - 26         | 18 - 26          | 18 - 26         |
| *Bilirubin , conjugated , direct                  | µmol/L<br><5 | 0 - 1.7         | 0 - 1.7          | 0 - 1.7         |
| *Bilirubin , total                                | µmol/L       | 1.7 - 6.8       | 1.7 - 13.7       | 1.7 - 18.8      |
| Cancer Antigen (CA) 125                           | U/ml         | 0 - 51.5        | 0 - 30.8         | 0 - 56.3        |
| *Calcium, ionized                                 | mmol/L       | 1.13 - 1.28     | 1.1 - 1.25       | 1.1 - 1.33      |
| *Calcium, total                                   | mmol/L       | 2.2 - 2.65      | 2.05 - 2.25      | 2.05 - 2.43     |
| *Chloride   | mmol/L       | 101 - 105       | 97 -109          | 97 - 109        |
| *Cholesterol, HDL                                 | mmol/L       | 1.04 - 2.02     | 1.35 - 2.25      | 1.24 - 2.25     |
| *Cholesterol, LDL                                 | mmol/L       | 1.55 -3.96      | 1.99- 4.77       | 2.62 - 5.8      |
| *Cholesterol, Total                               | mmol/L       | 3.65 - 5.44     | 4.56 - 7.74      | 5.67 - 9.04     |
| Complement, C3                                    | g/L          | 0.44 - 1.16     | 0.58 - 1.18      | 0.6 - 1.26      |
| Complement, C4                                    | g/L          | 0.09 - 0.45     | 0.10 - 0.42      | 0.17 - 0.37     |
| *Creatinine                                       | µmol/L       | 35 - 62         | 35 - 71          | 35 - 80         |
| *Creatinine Kinase,CK                             | U/L          | 27 - 83         | 25 -75           | 13 - 101        |
| *Ferritin   | ng/mL        | 6 - 130         | 2 - 230          | 0 - 166         |
| *Folate   | nmol/L       | 6 - 34          | 1.8 - 54         | 3 - 47          |
| *GGT  | U/L          | 2 - 23          | 4 - 22           | 3 - 26          |
| *Hemoglobin A <sub>1c</sub> , glycated hemoglobin | %            | 4 - 6           | 4 - 6            | 4 - 7           |
| *Immunoglobulin A                                 | g/L          | 0.21 - 3.17     | 0.3 - 3.06       | 0.43 -3.19      |
| *Immunoglobulin G                                 | g/L          | 8.38 - 14.1     | 6.54 - 12.9      | 5.22 - 11.46    |
| *Immunoglobulin M                                 | g/L          | 0.01 -3.09      | 0.02 - 2.90      | 0 - 3.61        |
| *IRON   | µmol/L       | 13 - 26         | 8- 32            | 5 - 35          |



|  |           |              |             |               |
|--|-----------|--------------|-------------|---------------|
| *Lactate dehydrogenase   | U/L       | 78 - 433     | 80 - 447    | 82 - 524      |
| *Magnesium   | mmol/L    | 0.67 - 0.92  | 0.63 - 0.92 | 0.46 - 0.92   |
| *Osmolality (Serum)  | mmol/kg   | 275 - 280    | 276 - 289   | 278 - 280     |
| *Parathyroid hormone   | pg/mL     | 10 - 15      | 18 - 25     | 9 - 26        |
| *Phosphorus  | mmol /L   | 1 - 1.49     | 0.81 - 1.49 | 0.9 - 1.49    |
| *Potassium   | mmol /L   | 3.6 - 5      | 3.3 - 5     | 3.3 - 5.1     |
| *Total Protein   | g /L      | 62 - 76      | 57 - 69     | 56 - 67       |
| *Sodium  | mmol/L    | 133 - 148    | 129 - 148   | 130 - 148     |
| *Testosterone  | mmol/L    | 0.9 -7.32    | 1.2 - 8.4   | 2.2 - 10.7    |
| *TSH   | µIU/mL    | 0.6 - 3.4    | 0.37 - 3.6  | 0.38 - 4.04   |
| *TIBC  | µmol/L    | 42 - 73      | 54 - 93     | 68 - 107      |
| *Transferrin   | µmol/L    | 3.1 - 4.2    | 2.7 - 5.4   | 3.5 - 6.5     |
| *Triglycerides   | mmol/L    | 0.5 - 1.8    | 0.9 - 4.3   | 1.5 - 5.1     |
| *Uric Acid   | µmol/L    | 119 - 250    | 143 - 292   | 184 - 375     |
| *Vitamin B12   | pmol/L    | 87 - 323     | 96 - 484    | 73 - 388      |
| *24 hour creatinine clearance (serum creatinine, urine 24 hour collection)   | mL/min    | 69 - 140     | 55 - 136    | 50 - 166      |
| *24 hour protein excretion, total , quantitative, (urine 24 hour collection) | g / 24 hr | -            | 0 - 0.26    | 0 - 0.25      |
| *Progesterone  | ng/mL     | 8 - 48       | -           | 99 - 342      |
| *Prolactin   | m IU/L    | 763.2-4515.6 | 2332-6996   | 2904.4-7886.4 |
|  |           | Fasting      | 1hr PP      | 2hr PP        |
| Glucose Tolerance Test   |           | 4.1 – 5.0    | 2.5 – 9.9   | 2.5 – 8.4     |

Table.2 Expected Values in pregnancy



### Test availability and On-Call Service

- Routine tests are available between 8-8 on a Monday-Friday Daily basis.
- Medical Laboratory Scientists provide an emergency On Call service outside of the routine working hours for in -patients. This service is intended to respond to urgent test requests and provide results, where there is an immediate clinical requirement for decision making in the patients care.
- Any other tests required should be requested as normal. These non On-call tests will be processed during next routine hours.

### Biochemistry On-call tests

| Biochemistry On-Call tests (On-Call Telephone number <b>173-814</b> )                         |                          |
|---|--------------------------|
| Blood gases * (including carbon monoxide) Point of care                                       |                          |
| Renal Profile   | Alcohol                  |
| Cardiac enzymes   | Paracetamol              |
| Amylase   | Salicylate               |
| Bone Profile  | Glucose                  |
| Liver Profile   | CRP                      |
| Troponin  | bHCG**(8am -8pm, 7 days) |
| Uric Acid (Antenatal samples only)  | Lactate***               |
| Xanthochromia****   | Iron (for Overdose)      |
| Antibiotic assays- assayed 08.00 -20.00, 7 days.<br>Renal assays are tested up to 12 midnight | Interleukin-6            |
| Procalcitonin- orderable by Consultant phone request only                                     | Urine Sodium             |
|   |                          |

\*Biochemistry On call MUST be contacted prior to sending blood gas specimen. Failure to do so may result in specimen not being processed. Blood Gas is available on the wards as part of Point of care testing.

\*\* 8am – 8 pm, 7 days

\*\*\*Lactate available on Blood gas

\*\*\*\*Processed in Altnagelvin, must contact lab immediately

- For further requests, tests may be performed if the Consultant Pathologist has been contacted by the requesting clinician, and the Pathologist On-call has determined that the tests are sufficiently urgent to perform on-call.
- Otherwise, tests other than those listed above will be separated and stored and processed during the next routine hours.
- However, in the event that specialized tests are required to be processed during On-call hours e.g. Urine Organic Acids or any specimens that must be sent on ice, clinicians MUST contact Biochemistry On-Call to pre arrange.



## Turnaround Times

- Expected turnaround times for common requests are identified in Table 1 above.
- Turnaround time is defined as the time from specimen receipt in the Pathology Department to the time results are available.
- The times stated are deliverable in 90% of instances in normal circumstances. There are times, due to factors outside the laboratories control, that the stated turnaround times may be exceeded. These events are infrequent and will be explained to users at the time.
- Sending a specimen without notification to relevant on-call staff may result in delay in specimen being processed and increased turnaround times.
- If the laboratory fails to meet expected turnaround times please contact Chief Medical Scientist or Laboratory Manager (see contact list).

## Transport of Specimens

Please refer to the **General Information User Guide, MP-GEN-0064, Section 13/ Sample Transport procedure MP-GEN-0060** for sample transport requirements. This manual is available on Q-Pulse and the HSE website <http://www.hse.ie/luhPathology>

Specimens must be transported in such a manner that:

- Patient confidentiality is maintained during transportation and on receipt of specimens.
- STAT and routine in house specimens are transported to the lab ASAP.
- GP or outside locations must be transported to the lab within 48 hours (72 hours for Serology specimens) or in accordance with criteria for time dependant analytes.
- Extremes of temperature are avoided during transport and specimens should be ideally transported at ambient temperature in the appropriate specimen container.
- Specimens will be required to be packed and transported in accordance with the European Agreement concerning the International Carriage of Dangerous Goods by Road (UN ADR).

### 3.1.1 High Risk Patients and Danger of Infection Specimens

- All biological specimens are handled as though each specimen is a high-risk danger of infection specimen. However in known cases of high risk, please advise laboratory of the risk by using the yellow high risk labels, attach to request form and specimen.
- Transport of specimens to the laboratory must be done to minimise risk of infection to all those who come into contact with specimen.



- All specimens should be treated as potentially bio-hazardous and standard precautions should apply.
- Infection Prevention and Control guidelines are available on Q-pulse for dealing with biological spills should be followed in the event of leak or spill during transport or handling.

### **3.1.2 Internal transport of specimens**

- Specimens must be placed within the specimen bag attached to the request form and sealed. The request form is either attached to bag or sits into bag envelope compartment.
- Transport of specimens to laboratory from within hospital, is by use of portering service, Healthcare assistants or/and pneumatic tube system.
- Many wards/departments in the hospital have a pneumatic tube system linked to all the departments.
- Each chute station displays the operating instructions and a problem guide.
- Report all faults with pneumatics to 173-503

### **3.1.3 Specimens on ice**

- If specimen is required to be stored on ice, place ice into a specimen bag, place specimen into another specimen bag and place into ice specimen bag, this ensures the sample label is not damaged by ice water.
- Send specimens on ice to laboratory immediately. Specimens on ice should **NEVER** be sent via pneumatic tube system.

### **3.1.4 Procedure for the Out of Hours Delivery and Storage of Specimens to pathology**

- Urgent specimens may be sent by chute to 3557, alternatively the specimen may be delivered to the scientist “on-call”. The person generating the request must contact the scientist “on-call”.

### **3.1.5 External transport of specimens**

- Outside Routine hours specimens may be deposited in the laboratory specimen box located opposite the Pathology laboratory main door.
- Specimens may be hand delivered to laboratory central reception office without arrangement during routine hours.

### **3.1.6 GP collections**

- A courier service is arranged with Laboratory Manager for predefined days and is done by taxi companies. Service users have been instructed on the transport requirements (MP-GEN-0060) Transport of specimens to the laboratory.

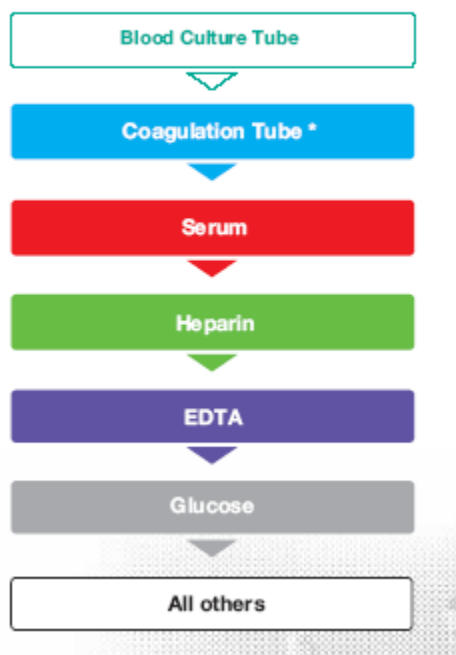


### 3.1.7 Contamination, interfering factors and specimen storage

#### !!! AVOID CONTAMINATION !!!

- When taking a series of blood specimens, it is essential that the Order of Draw is followed.
- Failure to adhere to this sequence will lead to contamination of blood specimens with anticoagulants/preservatives.
- This contamination produces spurious and invalid results in major biochemical parameters.

Recommended Order of Draw for  
Multiple Specimen Collection:



- Avoid haemolysis, drip contamination, over-heating and prolonged venous constriction.
- Ensure thorough and instant mixing of blood with anticoagulant (heparin, fluoride EDTA or potassium EDTA) for plasma specimens.
- Do not transfer blood from one tube to another, ex. EDTA to Lithium heparin.
- Do not leave Clinical Biochemistry blood specimens in the fridge (4°C) or overnight at room temperature without prior centrifugation.

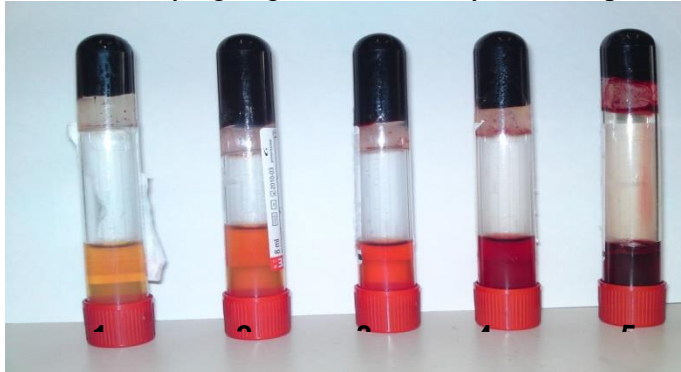


### 3.1.8 Factors affecting Biochemistry laboratory results

#### Haemolysis

- Haemolysis is defined as red blood cell break down and the release of haemoglobin and intracellular contents, ex. potassium into the serum. Haemolysis is most frequently an in vitro phenomenon caused by trauma in specimen collection or processing, although slow leakage may also occur.
- Haemolysis is graded as slight, moderate or gross.
- Slight haemolysis has little effect on most test values.
- Gross haemolysis causes a slight dilutional effect on analytes present at a lower concentration in the red cells compared to plasma. However, a marked elevation may be observed for analytes present at a higher concentration in red cells than in plasma.
- Some tests are affected more than others. Notable examples of tests affected by haemolysis are found in LP-CHEM-004.

There are varying degrees of haemolysis, examples shown below;



- Normal sample, (2) slightly haemolysed, (3) haemolysed, (4) haemolysed (5) grossly haemolysed
- Test results on specimens with non interfering levels of haemolysis are usually processed.
- Haemolysed samples that interfere with the quality of the analyte requested, will NOT be processed by the laboratory and every effort to inform the requesting clinician is made, and reported on the LIS as, Unsuitable for analysis (UFA) as soon as detected.



### Neonatal Specimens

- When requesting investigations on new born babies, to prevent specimen rejection the baby's PCN, date of birth and name must be used, not the mother's details.
- Request forms and specimens must be labelled with the baby's current details at the time of sampling.
- For multiple births, the mandatory requirements are surname, DOB, unique identification number (Hospital number) PLUS twin/triplet number.

### Patient Instructions for 24 hour Urine Collection

#### **PLEASE DO NOT URINATE DIRECTLY INTO THE SAMPLE CONTAINER**

Your doctor has requested tests, which require the collection of all urine you pass over a 24-hour period.

1. On the day that the collection is to start, empty your bladder at 8:00 am and **DISCARD THIS URINE**.
2. All urine passed over the next 24 hours should be collected into the labelled bottle provided by the laboratory, Collect **ALL** further urine passed during the day and night **UP TO AND INCLUDING** the following morning. You must empty the bladder at 8:00am. The collection is then finished.
3. Whenever possible, please keep the collection bottle in fridge or a suitable cool place. (**ENSURE THE LID IS ON TIGHTLY**)
4. On the morning the collection is completed, hand the bottle and request form to the staff at the laboratory or clinic that provided you with the collection bottle. Please check that your name, date, start time and finish time are recorded on the collection bottle.
5. If you forget and lose a sample down the toilet, then please **THROW AWAY ALL THE URINE** collected until that time and start again the following morning. If you are making an acid collection, you need to obtain a new container from the laboratory.
6. Please note that a request form **MUST** accompany the sample.

#### **4. Some 24hour urine containers contain acid**

These are labelled: -



**This bottle contains a small quantity of Acid as a preservative**  
**5. Handle with care**

These collection containers contain 20mls of 50% hydrochloric acid and must be kept out of reach of children. Exercise extreme care when adding urine to the container to avoid any splashes of acid or leaks from the top.

#### **1.1.1.1 Hydrochloric Acid – Hazard identification**

Causes burns. Irritating fumes to the respiratory system.

#### **1.1.1.2 First aid measures**

Eve contact                      Irrigate thoroughly with water for at least

For further information please contact the Chief Medical Scientist on 07491 -23559

For further information please contact the Chief Medical Scientist on 07491 -23559

## **6. BIOCHEMISTRY REFERRAL LABORATORIES**

- Referral tests are specialised investigations that are processed by the Biochemistry laboratory and are transported to various referral laboratories.
- Results and reports are returned directly to the requesting clinician, so please ensure request forms are completed clearly stating return address or location.
- Please note that referral may take in excess of 2 weeks for turnaround of results.
- Any result enquiries should be made to the appropriate referral laboratory.
- Please contact Biochemistry on 0749123559 to discuss the referral request if necessary.
- Some referral tests require consent form and clinical information forms which are available from the Pathology Department Reception.

| Laboratory  | Address   | Contact details                                     |
|---|---|---|
| Alpha 1<br>Antitrypsin<br>Deficiency<br>Targeted<br>Detection<br>Program (A1AT) | Respiratory<br>Research Dept of<br>Medicine<br>Royal College of<br>Surgeons Ireland | Results and Test Enquiries<br><br><b>01 8093871</b> |



| Laboratory                     | Address   | Contact details  |
|--------------------------------|---|--|
|                                | Smurfit Education and Research Centre<br>Beaumont Hospital<br>Dublin 9,   |  |
| <b>Altnagelvin Hospital</b>    | Dept of Biochemistry,<br>Altnagelvin Hospital<br>Derry  | Results and Test Enquiries<br><b>048-71313036</b>  |
| <b>Eurofins Biomnis</b>        | 34 Three Rock Road,<br>Sandyford Business Estate,<br>Sandyford,<br>Dublin<br>18, D18A4C0,   | Results and Test Enquiries<br><b>1800 252966</b><br><br>Telephone enquiries 09:00 - 17:30 GMT<br>Web link; main website<br><a href="https://www.eurofins.ie/biomnis/">https://www.eurofins.ie/biomnis/</a> |
| <b>Blackrock Clinic</b>        | Dept of Pathology<br>Blackrock<br>Co.Dublin   | Results and Test Enquiries<br><br>012832222  |
| <b>Beaumont Hospital</b>       | PO Box 1297<br>Beaumont Road<br>Dublin 9  | Telephone<br><b>01-8093000</b>   |
| <b>CytoGenetics Crumlin</b>    | Crumlin Molecular Genetics<br>National Centre for Medical Genetics,<br>Our Lady's Hospital for Sick Children<br>Crumlin<br>Dublin 12<br>Ireland | Cytogenetic enquiries <b>01-409 6970</b>   |
| <b>Cherry Orchard Hospital</b> | Public Health Laboratory, Dublin  | Results and Test Enquiries<br><b>01-6264702</b>  |



| Laboratory  | Address  | Contact details  |
|---|--|--|
| City Hospital<br>Belfast                              | Lisburn Rd, Belfast<br>BT97AB  | Results and Test Enquiries<br><b>048-90329241</b>      |
| Our ladys<br>Hospital for sick<br>children            | Dept of Pathology<br>Crumlin, Dublin 12  | Results and Test Enquiries<br><b>01-455811</b>         |
| The Doctors<br>Laboratory                             | 55,Wimpole Street,<br>London W1G 7DF   | Results and Test Enquiries<br><b>0044-207-307-7383</b> |
| Guy and<br>St.Thomas<br>Hospital trust                | Medical Toxicology<br>Unit, Avonley Rd,<br>London SE145ER                              | Results and Test Enquiries<br><b>0044-207-771-5371</b> |
| Glasgow Royal<br>Infirmary                            | Biochemistry<br>Department,<br><br>Glasgow<br>0405F                                    |  |
| Great Ormond St.<br>Childrens<br>Hospital             | Gt.Ormond St,<br>London<br>WC1N 3JH  | Results and Test Enquiries<br><b>0044-2078138321</b>   |
| Virus Reference<br>Laboratory                         | National Virus<br>Reference<br>Laboratory,<br>University College,<br>Belfield,Dublin 4 | Results and Test Enquiries<br><b>01-7161323</b>        |
| State Laboratory                                      | Environmental<br>section, Youngs<br>Cross,Celbridge,<br>Co.Kildare                     | Results and Test Enquiries<br><b>01-8217700</b>        |
| Royal Victoria<br>Hospital<br>Endocrine<br>Laboratory | Kelvin Building<br>RVH,<br>Belfast   | Results and Test Enquiries<br><b>048-90-240503</b>     |
| PRU Sheffield   | PRU Service<br>Agency,<br>Dept of Immunology   | Results and Test Enquiries<br><b>0044-1142715552</b>   |



| Laboratory   | Address  | Contact details   |
|--|--|---|
|  | POBox 894<br>Sheffield   |   |
| <b>National Tissue Typing Reference Laboratory</b> | National Blood Centre, James Street, Dublin 8  | Results and Test Enquiries<br><b>01-4322975</b>                                   |
| <b>Mater Hospital Dublin</b>                       | Dept of Pathology, Eccles St, Dublin 7   | Results and Test Enquiries<br><b>01-8031122</b>                                   |
| <b>Nottingham University Hospital</b>              | Department of Clinical Pathology, City campus, Hucknall rd, Nottingham NG51PB                      | Results and Test Enquiries<br><b>0044-115-9627907</b>                             |
| <b>Manchester Royal Infirmary</b>                  | Clinical Research Dept, Oxford Road, Manchester M139WL   | Results and Test Enquiries<br><b>0044-161-276-4179</b>                            |
| <b>Med Lab Pathology IRL</b>                       | Unit 3, Sandyford Business centre, Dublin 18   | Results and Test Enquiries<br><b>01-2933690</b><br><b>info@medlabpathology.ie</b> |
| <b>Kings College Hospital</b>                      | Denmark Hill, London, SE5905   | Results and Test Enquiries<br><b>0044-1713463147</b>                              |
| <b>John Radcliffe Hospital</b>                     | Immunology Dept, The church hill hospital, Oxford Radcliff NHS Trust, Old Road, Headington, Oxford | Results and Test Enquiries<br><b>0044-1865-741166</b>                             |
| <b>St Vincents Hospital</b>                        | Pathology Department, Elm Park, Dublin 4   | Results and Test Enquiries<br><b>01-2694533</b>                                   |
| <b>St.James,Hospital</b>                           | Central Pathology Laboratory, Dublin 8   | Results and Test Enquiries<br><b>01-4162038</b>                                   |



## 7. BIOCHEMISTRY REFERRAL TESTS

- Sample requirements and Referral Laboratory
- Contact **Biochemistry on 0749123559** to discuss the referral request if necessary.

| Test                                   | Sample Type                                   | Sample Handling                                   | Sent to:               |
|--|---|---|------------------------|
| <b>Alpha 1 Antitrypsin</b>             | Serum   | Refrigerated                                      | Beaumont RSCI Research |
| <b>ACE</b>                             | Serum   | Refrigerated                                      | St. Vincents Hospital  |
| <b>ACTH</b>                            | 1 EDTA <b>must be on ice</b>                  | Separate into plain tube<br><b>Frozen &lt;1hr</b> | RVHE                   |
| <b>ADH</b>                             | EDTA preferably on ice                        | <b>Frozen &lt;4hrs</b>                            | Biomnis                |
| <b>Aldolase</b>                        | Serum   | Refrigerated                                      | Biomnis                |
| <b>Aldosterone</b>                     | EDTA preferably on ice                        | <b>Frozen &lt;4hrs Include sample timing.</b>     | RVHE                   |
| <b>Aluminium</b>                       | Navy/Trace element tubes                      | Refrigerate                                       | Public Analyst Lab     |
| <b>Androgens</b>                       | Serum   | Refrigerated                                      | Biomnis                |
| <b>AntiMullerian Hormone</b>           | Serum <b>on ice</b>                           | <b>Frozen &lt;4hr</b>                             | Biomnis                |
| <b>Anti-neuronal nuclei AB (ANNA)</b>  | Serum   | Refrigerated                                      | John Radcliff          |
| <b>(ANMDA)NMDA receptor antibodies</b> | Serum   | Refrigerated                                      | John Radcliff          |
| <b>Amino Acids</b>                     | Lithium Heparin plasma preferable             | Refrigerated                                      | Temple St              |
| <b>Amiodarone</b>                      | Serum preferably on ice                       | <b>Frozen &lt;4hr</b>                             | Biomnis                |
| <b>Amyloid</b>                         | Serum <b>must be on ice</b>                   | <b>Frozen &lt;1hr</b>                             | Biomnis                |
| <b>Azathiopine</b>                     | Lithium Heparin whole blood preferably on ice | <b>Do NOT spin Frozen &lt;4hr</b>                 | Biomnis                |
| <b>Bile acids</b>                      | Serum   | Refrigerated                                      | Biomnis                |
| <b>B.burdorferi/Lyme disease</b>       | Serum   | Refrigerated                                      | VRL                    |



| Test                                       | Sample Type                                   | Sample Handling        | Sent to:                    |
|--|---|------------------------|-----------------------------|
| <b>C- Peptide</b>                          | Serum preferably on ice                       | <b>Frozen &lt;4hrs</b> | RVHE                        |
| <b>C1 Esterase</b>                         | Serum   | Serology               | University Hosp, Galway     |
| <b>Caeruloplasmin</b>                      | Serum   | Refrigerated           | University Hosp, Galway     |
| <b>Caffeine</b>                            | Serum   | Refrigerated           | Biomnis                     |
| <b>Calcitriol</b>                          | Serum preferably on ice                       | <b>Frozen &lt;4hrs</b> | Biomnis                     |
| <b>Calcitonin</b>                          | Serum preferably on ice                       | <b>Frozen &lt;4hrs</b> | Biomnis                     |
| <b>Calcium - Ionised</b>                   | Blood gas analyser in ICU/ AE - venous sample |                        |                             |
| <b>Carnitine</b>                           | Lithium Heparin<br><b>must be on ice</b>      | <b>Frozen &lt;1hr</b>  | Biomnis                     |
| <b>Catecholamines</b>                      | Sample of 24 urine, measure PH/Volume         | <b>Frozen &lt;1hr</b>  | Beaumont Hospital           |
| <b>Cholinesterase</b>                      | Serum / Lithium Heparin                       | Refrigerated           | Biomnis                     |
| <b>Chromosome Analysis<br/>DO NOT SPIN</b> | 2 x Lithium Heparin/2xEDTA & Consent form     | Adults - Refrigerated  | Biomnis                     |
|  |   | <5yrs - Refrigerated   | Crumlin                     |
| <b>Chromium</b>                            | 10mls urine and or 1ml serum/li hep plasma    | Refrigerated           | Biomnis                     |
| <b>Chromogranin A</b>                      | Serum preferably on ice                       | <b>Frozen &lt;4hrs</b> | Biomnis                     |
| <b>Clobazam</b>                            | Serum preferably on ice                       | <b>Frozen &lt;4hrs</b> | Biomnis                     |
| <b>Clonazepam</b>                          | Serum preferably on ice                       | <b>Frozen &lt;4hrs</b> | Biomnis                     |
| <b>Cobalt</b>                              | 10mls urine and or 1ml serum/li hep plasma    | Refrigerated           | Biomnis                     |
| <b>Copper</b>                              | Serum, trace element bottle                   | Refrigerated           | Biomnis                     |
| <b>Cystic Fibrosis DO NOT SPIN</b>         | 2 EDTA + Consent form                         | Refrigerated           | Molecular Genetics, Crumlin |





| Test                           | Sample Type  | Sample Handling                      | Sent to:                    |
|--------------------------------|--|--------------------------------------|-----------------------------|
| CMV IgG                        | Serum  | Separate and Refrigerated            | VRL                         |
| Cyclosporin                    | EDTA   | Refrigerated                         | Beaumont                    |
| DHEA                           | Serum  | Refrigerated                         | Biomnis                     |
| Diazepam                       | Serum preferably on ice                                      | Frozen <4hrs                         | Biomnis                     |
| Erythropoietin                 | Serum  | Refrigerated                         | St.James Hospital           |
| EBV (Epstein Barr)             | Serum  | Refrigerated                         | VRL                         |
| Fatty acids                    | 2 ml EDTA plasma<br>must be on ice                           | Frozen <1hr                          | Biomnis                     |
| Fecal Elastase ELF             | Feces  | Frozen                               | Biomnis                     |
| Fecal Fats                     | Min 24hr max 72hr<br>Fecal collection taken<br>Mon- Tues     | Refrigerated                         | Biomnis                     |
| Fecal Reducing Substances      | Random Fecal sample  | Frozen                               | Biomnis                     |
| Fecal Lactose Intolerance test | Runny fresh (<20mins) Fecal sample min 20g<br>must be on ice | Freeze immediately, transport frozen | Temple St                   |
| Felbamate                      | Serum preferably on ice                                      | Frozen <4hrs                         | Biomnis                     |
| Flecainide                     | Serum preferably on ice                                      | Frozen <4hrs                         | Biomnis                     |
| Fluoxetine (Prozac)            | Serum preferably on ice                                      | Frozen <4hrs                         | Biomnis                     |
| Fragile X                      | 2 x EDTA, 2xLi-Hep<br>DO NOT SPIN                            | Refrigerated                         | Molecular Genetics, Crumlin |
| Free Light chains              | Serum  | Refrigerated                         | University Hosp, Galway     |
| Fructosamine                   | Serum  | Refrigerated                         | Biomnis                     |
| FK506                          | EDTA   | Refrigerated                         | Beaumont                    |



| Test  | Sample Type   | Sample Handling                                | Sent to:             |
|---|---|--|----------------------|
| <b>G6PD DO NOT SPIN</b>   | 2ml EDTA whole blood  | Refrigerated                                   | Biomnis              |
| <b>Gabentine</b>  | Serum preferably on ice   | <b>Frozen &lt;4hrs</b>                         | Biomnis              |
| <b>Gastrin</b>  | Serum <b>must be on ice</b>   | <b>Frozen &lt;1hr</b>                          | Biomnis              |
| <b>GAD Antibody</b>   | Serum   | Refrigerated                                   | PRU Sheffield        |
| <b>Glucagon</b>   | EDTA Aprotinin tubes (small pink tube in cold rm, do not send in chute) <b>must be on ice</b>             | Separate into plain tube <b>Frozen &lt;1hr</b> | Biomnis              |
| <b>Growth Hormone</b>   | RED Serum preferably on ice   | <b>Frozen &lt;4hrs</b>                         | Royal Victoria(RVHE) |
| <b>Gut Hormone</b>  | 1 EDTA Aprotinin tubes (small pink tube in cold rm, do not send in chute) <b>must be on ice</b>           | Separate into plain tube <b>Frozen &lt;1hr</b> | Biomnis              |
| <b>Gut Hormone Profile (glucagon/pancreatic polypeptide/vasoactive intestinal polypeptide/ Gastrin)</b> | 3 EDTA Aprotinin tubes (small pink tube in cold rm, do not send in chute) + 1 Serum <b>must be on ice</b> | <b>Frozen &lt;1hr</b>                          | Biomnis              |
| <b>Herpes</b>   | Serum   | Refrigerated                                   | VRL                  |
| <b>Hep B Core antigen</b>   | Serum   | <b>Frozen &lt;1hr</b>                          | VRL                  |
| <b>Hep B Viral Load</b>   | Serum   | <b>Frozen &lt;1hr</b>                          | VRL                  |
| <b>Hep C PCR</b>  | Serum   | <b>Frozen &lt;1hr</b>                          | VRL                  |
| <b>Hep C Viral Load</b>   | Serum   | <b>Frozen &lt;1hr</b>                          | VRL                  |
| <b>Homocysteine (cardiovascular events)</b>   | Fasting Serum/ Plasma (clinical details MUST be provided) <b>must be on ice</b>                           | <b>Frozen &lt;1hr</b>                          | Biomnis              |



| Test  | Sample Type   | Sample Handling  | Sent to:                |
|---|---|--|-------------------------|
| <b>Homocystine (Homocystinuria)</b>                 | Fasting Plasma (clinical details MUST be provided)<br><b>must be on ice</b> | <b>Frozen &lt;1hr</b>  | Biomnis                 |
| <b>Free/total homocysteine</b>                      | Lithium Heparin   | <b>Requires separated within 20 minutes</b>  | Temple Street           |
| <b>17 Hydroxyprogesterone</b>                       | Serum   | Refrigerated   | Biomnis                 |
| <b>Hydroxyproline</b>                               | Lithium Heparin<br><b>must be on ice</b>                                    | <b>Frozen &lt;1hrs</b>   | Biomnis                 |
| <b>HIAA</b>   | 24 HR urine   | Refrigerated   | Beaumont                |
| <b>Islet cell AB(ICA)</b>                           | Serum   | Refrigerated   | PRU Sheffield           |
| <b>IG subclasse</b>                                 | Serum   | Refrigerated   | University Hosp, Galway |
| <b>IGF 1</b>  | Serum preferably on ice   | <b>Frozen &lt;4hrs</b>   | RVHE                    |
| <b>IGF 1 BP3</b>                                    | Serum preferably on ice   | <b>Frozen &lt;4hrs</b>   | Biomnis                 |
| <b>Imuran</b>                                       | Lithium Heparin whole blood preferably on ice                               | <b>Do NOT spin Frozen &lt;4hrs</b>   | Biomnis                 |
| <b>Inhibin</b>                                      | Serum preferably on ice   | <b>Frozen &lt;4hrs</b>   | Biomnis                 |
| <b>Insulin</b>                                      | Serum preferably on ice, haemolysed samples unsuitable                      | <b>Frozen &lt;4hr centrifuged immediately</b>  | Biomnis                 |
| <b>Insulin tolerance test</b>                       | Serum preferably on ice   | Growth hormone to Galway (if haemolysed, credit with HU), Cortisol and Glucose result included | University Hosp, Galway |
| <b>Iodine</b>                                       | Serum   | Refrigerated   | Biomnis                 |
| <b>Ionised Calcium</b>                              | Blood gas analyser in ICU/ AE - venous sample                               |  |                         |
| <b>Karotyping (chromosome analysis) DO NOT SPIN</b> | 2 x Lithium Heparin, 2xEDTA & Consent form                                  | Adults - Refrigerated  | Biomnis                 |
|   |   | <5yrs - Refrigerated   | Crumlin                 |



| Test                          | Sample Type  | Sample Handling  | Sent to:                |
|-------------------------------|--|--|-------------------------|
| <b>Ketones</b>                | Urine (20 mls universal) / 2 Lithium Heparin, send to Biochemistry reception immediately. Record Glucose result with request for BHB | (3 hydroxybutyrate( <b>BHB</b> ))Spin 1 lithium Hep and freeze<br>( <b>Acetoacetate (AOA)</b> )<br>2nd Lithium hep-take<br>2ml whole blood add to PCA tube (4ml perchloric acid), centrifuge 5mins, freeze supernatant. PCA tubes in bio cold rm, left top shelf | Biomnis                 |
| <b>LAMAC</b>                  | Serum preferably on ice  | <b>Frozen &lt;4hrs</b>   | Biomnis                 |
| <b>Lamotrigine</b>            | Serum preferably on ice  | <b>Frozen &lt;4hrs</b>   | Biomnis                 |
| <b>Largital</b>               | Serum preferably on ice  | <b>Frozen &lt;4hrs</b>   | Biomnis                 |
| <b>Lead DO NOT SPIN</b>       | Lithium Heparin, whole blood   | Refrigerated   | Biomnis                 |
| <b>Levetiracetam / Keppra</b> | Serum preferably on ice  | <b>Frozen &lt;4hrs</b>   | Biomnis                 |
| <b>Levodopa ( Sinemit)</b>    | Lithium Heparin preferably on ice  | <b>Frozen &lt;4hrs</b>   | Biomnis                 |
| <b>Leptospira</b>             | Serum  | Refrigerated   | VRL                     |
| <b>Free Light Chains</b>      | Serum - provide clinical information   | Refrigerated   | University Hosp, Galway |
| <b>Lipase</b>                 | Serum  | Refrigerated   | Biomnis                 |
| <b>Lipoprotein A</b>          | Serum / Lithium Heparin  | Refrigerated   | Biomnis                 |
| <b>Lorazepam</b>              | Serum preferably on ice  | <b>Frozen &lt;4hrs</b>   | Biomnis                 |
| <b>Manganese</b>              | Serum  | Refrigerated   | Biomnis                 |
| <b>Mercury DO NOT SPIN</b>    | 5ml EDTA whole blood   | Refrigerated   | Biomnis                 |
| <b>Metabolic Screen</b>       | Organic acid and Amino acids   | Random Urine <b>Frozen</b>   | Beaumont                |



| Test  | Sample Type  | Sample Handling  | Sent to:                |
|---|--|--|-------------------------|
| <b>Metanephrines Plasma</b>   | fasting 3mL lithium heparin plasma   | <b>Frozen &lt;1hrs</b>   | Biomnis.                |
| <b>Metanephrines Urine (Adult)</b>  | 24hr urine (1 aliquot)   | <b>Keep refrigerated during collection</b><br><b>Frozen &lt;1hrs</b> | Biomnis.                |
| <b>Metanephrines Urine (Child)</b>  | Random urine (2 aliquot)   | <b>Frozen &lt;1hrs</b>   | Biomnis.                |
| <b>Microarray DNA Genetic Testing</b><br><b>DO NOT SPIN</b>   | 2 x EDTA whole blood   |  |                         |
| <b>Myoglobin</b>  | Serum / Urine  | Refrigerated   | London                  |
| <b>Mycoplasma</b>   | Serum  | Refrigerated   | Biomnis                 |
| <b>Mumps</b>  | Serum  | Refrigerated   | VRL                     |
| <b>Measles</b>  | Serum  | Refrigerated   | VRL                     |
| <b>Newcastle Screen (refer to protocol in Referral folder in Biochemistry reception for further detail)</b> | 5 lithium hep, 5 serum, 1 Aprotinine, 1 EDTA, 2 Fluoride Oxalate, Urine and Guthrie card | Refrigerated   | VRL                     |
| <b>Nickel</b>   | Serum  | Contact Biochemistry for the required test tubes.                    | Biomnis / Temple St     |
| <b>Nitrazepam</b>   | Serum preferably on ice  | Refrigerated   | Biomnis                 |
| <b>Olanzapine</b>   | Serum preferably on ice  | <b>Frozen &lt;4hrs</b>   | Biomnis                 |
| <b>Oligioclonal band</b>  | Serum + CSF  | <b>Frozen &lt;4hrs</b>   | Biomnis                 |
| <b>Organic Acids</b>  | Urine  | Refrigerated, include CSF Glucose / CSF protein                      | University Hosp, Galway |
| <b>Oxalate</b>  | Serum <b>must be on ice</b>  | <b>Frozen &lt;1hr</b>  | Temple street           |
| <b>Oxycarbamezepine</b>   | Serum <b>must be on ice</b>  | <b>Frozen &lt;1hrs</b>   | Biomnis                 |
| <b>Parvovirus</b>   | Serum  | <b>Frozen &lt;1hrs</b>   | Biomnis                 |



| Test                                    | Sample Type  | Sample Handling  | Sent to: |
|---|--|--|----------|
| <b>Pancreatic polypeptide</b>           | 1 EDTA Aprotinin tube (small pink tube in cold rm,   | Refrigerated   | VRL      |
| <b>Phenylalanine</b>                    | Lithium Heparin, plasma  | Separate into plain tube<br><b>Frozen &lt;30mins</b>                       | Biomnis  |
| <b>Porphyrin Screen</b>                 | 2 EDTA ( <b>DO NOT SPIN</b> ), 1 Lit Hep, 1 Fecal sample, 1 24hr urine collection<br><b>Protect all from light</b> | Refrigerated   | Tem      |
| <b>Primidone</b>                        | Serum preferably on ice  | Protect from light, spin Lit Hep, take 100ml aliquot from urine collection | St James |
| <b>Pro- Insulin</b>                     | Serum preferably on ice  | <b>Frozen &lt;4hrs</b>   | Biomnis  |
| <b>Procollagen PPT3 (P3P)</b>           | Serum preferably on ice  | <b>Frozen &lt;4hrs</b>   | Biomnis  |
| <b>Prozac</b>                           | Serum preferably on ice  | <b>Frozen &lt;4hrs</b>   | Biomnis  |
| <b>Pyruvic Acid</b>                     | Lithium heparin  | <b>Frozen &lt;4hrs</b>   | Biomnis  |
| <b>Reducing substances</b>              | Random Fecal sample  | <b>Frozen &lt;4hrs</b>   | Biomnis  |
| <b>Renin</b>                            | EDTA preferably on ice   | <b>Frozen</b>  | Biomnis  |
| <b>Respiradone</b>                      | Serum preferably on ice  | <b>Frozen &lt;4hrs</b>   | RVHE     |
| <b>Rufinamide (Innovlen)</b>            | Serum preferably on ice  | <b>Frozen &lt;4hrs</b>   | Biomnis  |
| <b>Selenium</b>                         | Serum - <b>White tube only</b>   | <b>Frozen &lt;4hrs</b>   | Biomnis  |
| <b>Serolimus (Rapumune) DO NOT SPIN</b> | Serum  | Separate immediately into white tube, Refrigerated                         | Biomnis  |
| <b>Serotonin DO NOT SPIN</b>            | Whole Blood Lith Heparin /10ml 24Hr Urine (dietary restrictions) <b>must be on ice</b>                             | Refrigerated   | Biomnis  |



| Test   | Sample Type                                  | Sample Handling  | Sent to:            |
|--|--|--|---------------------|
| <b>SHBG</b>  | serum  | <b>DO NOT SPIN blood</b><br><b>Sample Frozen &lt;1hr</b> /<br>(urine) frozen | Biomnis             |
| <b>Tacrolimus(prograf)</b><br><b>FK506DO NOT SPIN</b>    | EDTA whole blood                             | Refrigerated   | Biomnis             |
| <b>Testosterone Female /</b><br><b>boys &lt;14</b>       | Serum  | Refrigerated   | Beaumont            |
| <b>Theophylline</b>                                      | Serum preferably on<br>ice                   | Refrigerated   | Biomnis             |
| <b>Thyroglobulin</b>                                     | Serum  | <b>Frozen &lt;4hrs</b>   | Biomnis             |
| <b>Thyroid receptor AB</b>                               | Serum  | Refrigerated   | Biomnis             |
| <b>Thyroglobulin</b><br><b>binding AB</b>                | Serum preferably on<br>ice                   | Refrigerated   | PRU Sheffield       |
| <b>Tiagabine</b>   | Serum preferably on<br>ice                   | <b>Frozen &lt;4hrs</b>   | Biomnis             |
| <b>Titanium</b>  | Lithium Hep plasma                           | <b>Frozen &lt;4hrs</b>   | Biomnis             |
| <b>Topiramate</b>  | Serum preferably on<br>ice                   | Refrigerated   | Biomnis             |
| <b>Toxaplasma</b>  | Serum  | <b>Frozen &lt;4hrs</b>   | Biomnis             |
| <b>TORCH Screen</b>                                      | Serum  | Refrigerated   | VRL                 |
| <b>Transplant Workup</b>                                 | Serum x2                                     | Refrigerated   | VRL                 |
| <b>Toxicology</b>  | Whole blood &<br>Serum                       | Refrigerated   | VRL                 |
| <b>Trileptal</b>   | Serum preferably on<br>ice                   | Refrigerated   | State<br>Laboratory |
| <b>Tryptase</b>  | Serum  | <b>Frozen &lt;4hrs</b>   | Biomnis             |
| <b>Valproic Acid</b>                                     | Serum  | Refrigerated   | Biomnis             |
| <b>Vasoactive Intestinal</b><br><b>polypeptide (VIP)</b> | EDTA Aprotinin tube<br><b>must be on ice</b> | Refrigerated   | Biomnis             |
| <b>Vigabatrin</b>  | Serum preferably on<br>ice                   | Separate into plain tube<br><b>Frozen &lt;30mins</b>                         | Biomnis             |



| Test                                      | Sample Type   | Sample Handling  | Sent to:                |
|---|---|--|-------------------------|
| Varicella                                 | Serum   | Frozen <4hrs   | Biomnis                 |
| Vitamin A, K1                             | Serum <b>must be on ice</b>   | Separate and refrigerate                                 | VRL                     |
| Vitamin B1<br>Thiamine, B6 DO<br>NOT SPIN | EDTA whole blood,<br>protect from light                                       | <b>Protect from light and<br/>freeze &lt;1hr</b>         | Biomnis                 |
| Vitamin C                                 | Lithium Heparin<br>only, protect from<br>light <b>must be on ice</b>          | <b>DO NOT SPIN- freeze<br/>&lt;4hrs</b>                  | Biomnis                 |
| Vitamin E                                 | Serum preferably on<br>ice, must protect<br>from light                        | <b>Protect from light and<br/>freeze &lt;1hr</b>         | Biomnis                 |
| Xanthochromia                             | CSF protected from<br>light, include Serum<br>Bilirubin and Protein<br>result | Protect from light,<br>Frozen <4hrs                      | Biomnis                 |
| Zinc                                      | White serum tube<br>only  | CSF protected from light                                 | Altnagelvin<br>Hospital |
| Zonisamide                                | Serum preferably on<br>ice  | Separate immediately<br>into white tube,<br>Refrigerated | Biomnis                 |
|   |   |  |                         |

## 8. AVAILABILITY OF UNCERTAINTY OF MEASUREMENT FOR USERS

All calculated data for uncertainty of measurement is available to users on request. (LP-CHEM-0022). Specimens should be transported to the laboratory without delay to ensure optimal results. Please see Policy on Transport of Specimens to the Laboratory MP-GEN-0060.

## 9. SAFE DISPOSAL OF SAMPLES AND MATERIAL USED IN SAMPLE COLLECTION

‘The laboratory will provide means for safe collection, storage and disposal of waste by workers, including the use of secure and identifiable containers, after suitable treatment where appropriate. The Laboratory will be guided in this matter by the regulations laid down in the document ‘Healthcare Waste Packaging Guidelines’ issued by the Department of Health and Children.’





## 10. REFERENCES

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