PATHOLOGY TEST INFORMATION FOR GP’s

Specimens are retained in the laboratory after analysis for a defined period. Subject to individual analyte stability, further tests on a specimen that is already in the laboratory can be requested by contacting the relevant laboratory section.

CLINICAL CHEMISTRY AND DIAGNOSTIC ENDOCRINOLOGY TESTS

Where Clinical Chemistry and Diagnostic Endocrinology tests are not listed please not hesitate to contact the CCE Laboratory (Duty Scientist)

<table>
<thead>
<tr>
<th>Test</th>
<th>Specimen</th>
<th>Turnaround time</th>
<th>Reference range</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACR (Albumin to Creatinine Ratio)</td>
<td>Urine (spot sample) analysed for ‘Microalbumin’ and creatinine.</td>
<td>8 hours</td>
<td>0 – 2.5 mg/mmol creatinine (Microalbuminuria male: 2.5 – 29.0 mg/mmol creatinine, female 3.5 – 29.0 mg/mmol creatinine)</td>
</tr>
<tr>
<td>Albumin</td>
<td>4.9 mL blood in LITHIUM HEPARIN GEL tube. Reported when either Liver or Bone profile is requested.</td>
<td>8 hours</td>
<td>35 - 50 g/L</td>
</tr>
<tr>
<td>ALT</td>
<td>4.9 mL blood in LITHIUM HEPARIN GEL tube. Included as part of Liver profile</td>
<td>8 hours</td>
<td>0-55 IU/L</td>
</tr>
<tr>
<td>Amylase</td>
<td>4.9 mL blood in LITHIUM HEPARIN GEL tube for. Urine (spot sample) may also be tested.</td>
<td>8 hours</td>
<td>28-97 IU/L (Plasma); 0 - 470 IU/L (Urine).</td>
</tr>
<tr>
<td>Anti-TPO</td>
<td>4.9 mL blood in LITHIUM HEPARIN GEL tube for.</td>
<td>1-3 days</td>
<td>&lt; 5.6 IU/ml</td>
</tr>
<tr>
<td>Bilirubin</td>
<td>4.9 mL blood in LITHIUM HEPARIN GEL tube. Included as part of Liver profile (Conjugated and unconjugated bilirubin can be requested in cases of raised total bilirubin)</td>
<td>8 hours</td>
<td>5-24 μmol/L</td>
</tr>
<tr>
<td>Bone profile</td>
<td>4.9 mL blood in LITHIUM HEPARIN GEL tube. Bone profile comprises Calcium, Calcium corrected for albumin, Albumin, Phosphate, and Alkaline Phosphatase.</td>
<td>8 hours</td>
<td>See individual tests.</td>
</tr>
</tbody>
</table>

Approved by: B. Cassidy

Active Date: 22/07/16
### Calcium
- Specimen: 4.9 mL blood in LITHIUM HEPARIN GEL tube. Included as part of Bone profile profile. Urine (24hr or spot sample) may also be tested; 24hr urine collected with acid preservative.
- Turnaround time: 8 hours
- Reference range: Plasma: 2.18 – 2.6 mmol/L (Calcium corrected for Albumin 2.2-2.6 mmol/L). Urine 2.5 – 7.5 mmol/24h.

### Calculi
- Specimen: Renal stones, gallstones, and miscellaneous stones and fragments.
- Turnaround time: 6 weeks.
- Report format: Interpretive comments added on individual case basis.

### Carbazepine
- Specimen: 4.9 mL blood in BROWN SERUM GEL tube for clotted blood. Trough sample should be taken immediately before next dose.
- Turnaround time: Routine: 8 hours.
- Reference range: 4 - 12mg/L

### Chloride
- Specimen: 4.9 mL blood in LITHIUM HEPARIN GEL tube. Included as part of Renal profile profile. Urine (spot sample) may also be tested.
- Turnaround time: 8 hours
- Reference range: 95 – 108 mmol/L

### Cholesterol
- Specimen: 4.9 mL blood in LITHIUM HEPARIN GEL tube. Random or Fasting sample. Reported as part of Lipid Screen (min 12h fast).
- Turnaround time: 8 hours
- Reference range: < 5.2 mmol/L is optimal (NCEP guidelines)

### CK (Creatine Kinase)
- Specimen: 4.9 mL blood in LITHIUM HEPARIN GEL tube.
- Turnaround time: 8 hours
- Reference range: Ref range for Caucasians: 33-208 IU/L (Female) 44-272 (Male). Ref range for Afro-Carribbeans twice these.

### Cortisol
- Specimen: 4.9 mL blood in LITHIUM HEPARIN GEL tube. Note time and date of collection on tube to facilitate appropriate interpretation of result. Morning sample preferred
- Turnaround time: 8 hours
- Reference range: Morning: 150–455 nmol/L

### Creatine Kinase (CK)
- See CK

### Creatinine
- Specimen: 4.9 mL blood in LITHIUM HEPARIN GEL tube. Included as part of Renal profile.
- Turnaround time: 8 hours
- Reference range: Plasma: 46-86 µmol/L (Female); 65-107 µmol/L (Male). Estimated GFR based on MDRD eGFR is added to reports.

### CRP (C-Reactive Protein)
- Specimen: 4.9 ml in LITHIUM HEPARIN GEL tube
- Turnaround time: 8 hours
- Reference range: less than 7.0 mg/L
## Ferritin

**Specimen:** 4.9 mL blood in LITHIUM HEPARIN GEL tube for clotted blood.

**Turnaround time:** 1-3 days

**Reference range:** Females: 8-247 µg/L; Males 22-275 µg/L

## Folate

**Specimen:** 4.9 mL blood in LITHIUM HEPARIN GEL tube for clotted blood. See Red Cell Folate.

**Turnaround time:** 1-3 days

**Reference range:** 3.8-18.2 µg/L

## Free T4

**Specimen:** 4.9 mL blood in LITHIUM HEPARIN GEL tube. Included as part of Thyroid Function Test (TFT)

**Turnaround time:** 1-3 days

**Reference range:** 9-20 pmol/l

## FSH

**Specimen:** 4.9 mL blood in LITHIUM HEPARIN GEL tube for clotted blood.

**Turnaround time:** 1-3 days

**Reference range:** 1.4-10.8 mIU/ml (Males)

Female: Follicular phase: 3.0-8.1 IU/L, Mid-cycle peak: 2.6-16.7 IU/L, Luteal phase: 1.4-5.5 IU/L

## Gamma GT (GGT)

**Specimen:** 4.9 mL blood in LITHIUM HEPARIN GEL tube. Included as part of Liver profile.

**Turnaround time:** 8 hours.

**Reference range:** 8-53 IU/L (Female); 11-67 IU/L (male).

## Globulin

**Specimen:** 4.9 mL blood in LITHIUM HEPARIN GEL tube for clotted blood. Globulin is a calculated parameter (Total Protein minus Albumin).

Included as part of Liver Profile or ‘Proteins’.

**Turnaround time:** 8 hours

**Reference range:** 26-39 g/L

## Glucose

**Specimen:** 2.6 mL blood in Fluoride-EDTA yellow tube

**Turnaround time:** 8 hours

**Reference ranges:**

- Fasting: 3.5 – 6.0 mmol/L
- 2 hour post 75 g load: up to 7.8 mmol/L

Random: there is no specific range for Random glucose.

Diagnosis of Diabetes Mellitus:

(a) Symptoms of diabetes plus:

- Random venous plasma glucose > 11.1 mmol/l, or
- Fasting venous plasma glucose > 7.0 mmol/l, or
- Plasma Glucose >11.1 mmol/l 2 hours after 75g glucose load in GTT

(b) Any of the above on two separate occasions (excluding acute illness).
Glucose Tolerance Test (GTT)
Specimen: 2.6 mL blood in Fluoride-EDTA yellow tube. Patient should be fasting for 8 hours or more. Once fasting blood is collected, the patient drinks a glucose drink (details outlined in CP-PHL-002).

The patient should not walk about or smoke until the second sample is taken exactly 2 hours after finishing the drink.

Turnaround time: 1 day.
Reference range: Interpretation of GTT (Venous plasma glucose in mmol/L)
WHO criteria (also adopted by BDA) for OGTT

<table>
<thead>
<tr>
<th>Fasting</th>
<th>6.1 – 6.9</th>
<th>&gt;6.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;6.1</td>
<td>N</td>
<td>IFG</td>
</tr>
<tr>
<td>6.1 – 6.9</td>
<td>IFG</td>
<td>DM</td>
</tr>
<tr>
<td>&gt;6.9</td>
<td>DM</td>
<td></td>
</tr>
</tbody>
</table>

WHO criteria for 2hr post 75g Glucose load

<table>
<thead>
<tr>
<th>Glucose load</th>
<th>7.8 –11.0</th>
<th>&gt;11.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.8 –11.0</td>
<td>IGT</td>
<td>IGT</td>
</tr>
<tr>
<td>&gt;11.0</td>
<td>DM</td>
<td>DM</td>
</tr>
</tbody>
</table>

N=Normal, DM=Diabetes Mellitus, IFG = Impaired Fasting Glycaemia, IGT=Impaired Glucose Tolerance.

HbA1c (Glycosylated Haemoglobin)
Specimen: 2.7 mL PINK EDTA tube.
Turnaround time: 4 days
Reference range: IFCC: 20-42 mmol/mol DM diagnosis > or = 48mmol/mol

hCG
Specimen: 4.9 mL blood in LITHIUM HEPARIN GEL tube.
Turnaround time: 8 hours
Reference range: < 5 IU/L Under 2 IU/L. excludes pregnancy.

HDL (HDL-Cholesterol)
Specimen: 4.9 mL blood in LITHIUM HEPARIN GEL tube. Included as part of Lipid Profile.
Fasting 12 hours + is required.
Turnaround time: 8 hours
Reference range: >1.5 mmol/L

Iron
Specimen: 4.9 mL blood in LITHIUM HEPARIN GEL tube
Turnaround time: 8 hours
Reference range: Male 12-32µmol/L Female 6-33 µmol/L

Iron Saturation no longer assayed See Iron Studies

Iron Studies
Specimen: 4.9 mL blood in LITHIUM HEPARIN GEL tube
'TIron Studies’ (FES) comprises Iron, Transferrin & Transferrin Saturation.
Turnaround time: 8 hours
Reference range: See individual tests.
**LDH (Lactate Dehydrogenase)**

<table>
<thead>
<tr>
<th>Specimen</th>
<th>4.9 mL blood in BROWN SERUM GEL tube for clotted blood.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnaround time</td>
<td>8 hours</td>
</tr>
<tr>
<td>Reference range</td>
<td>120-220 IU/L.</td>
</tr>
</tbody>
</table>

**LDL (LDL-Cholesterol)**

<table>
<thead>
<tr>
<th>Specimen</th>
<th>4.9 mL blood in LITHIUM HEPARIN GEL tube. Fasting for 12 hours or more is required.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnaround time</td>
<td>8 hours</td>
</tr>
<tr>
<td>Reference range</td>
<td>Desirable range: &lt;2.6mmol/L. (Lower levels are recommended for secondary prevention)</td>
</tr>
</tbody>
</table>

**LFT (Liver Function Tests) See Liver Profile.**

**LH**

<table>
<thead>
<tr>
<th>Specimen</th>
<th>4.9 mL blood in LITHIUM HEPARIN GEL tube.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnaround time</td>
<td>1-3 days</td>
</tr>
<tr>
<td>Reference range</td>
<td>1.4-6.5 mlU/ml (male)</td>
</tr>
<tr>
<td></td>
<td>Female: Follicular phase: 1.8-11.8 IU/I, Mid-cycle peak: 7.6-89.1 IU/I, Luteal phase: 0.6-14.0 IU/I</td>
</tr>
</tbody>
</table>

**Lipid screen / Lipid profile**

<table>
<thead>
<tr>
<th>Specimen</th>
<th>4.9 mL blood in LITHIUM HEPARIN GEL tube.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnaround time</td>
<td>8 hours</td>
</tr>
<tr>
<td>Reference range</td>
<td>See individual tests</td>
</tr>
</tbody>
</table>

**Lithium**

<table>
<thead>
<tr>
<th>Specimen</th>
<th>4.9 ml blood in a BROWN SERUM GEL tube for clotted blood. Sample must be taken 12 hours after dose.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnaround time</td>
<td>8 days</td>
</tr>
<tr>
<td>Therapeutic range</td>
<td>0.4 – 1.0 mmol/L</td>
</tr>
</tbody>
</table>

**Liver profile**

<table>
<thead>
<tr>
<th>Specimen</th>
<th>4.9 mL blood in LITHIUM HEPARIN GEL tube.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnaround time</td>
<td>8 hours</td>
</tr>
<tr>
<td>Reference range</td>
<td>See individual tests.</td>
</tr>
</tbody>
</table>

**Magnesium**

<table>
<thead>
<tr>
<th>Specimen</th>
<th>4.9 mL blood in LITHIUM HEPARIN GEL tube.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnaround time</td>
<td>8 hours</td>
</tr>
<tr>
<td>Reference range</td>
<td>Plasma: 0.7 – 1.0 mmol/L. Urine: 3 – 5 mmol/L; UMg should be &lt;1 if Mg-depleted.</td>
</tr>
</tbody>
</table>

**Microalbumin**

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Urine (spot sample) for ACR (Albumin to Creatinine Ratio). Timed collections may be analysed; please contact lab.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnaround time</td>
<td>8 hours</td>
</tr>
<tr>
<td>Reference range</td>
<td>0 – 2.5 mg/mmol creatinine (Microalbuminuria: 2.5 – 25.0 mg/mmol creatinine)</td>
</tr>
</tbody>
</table>
**Oestradiol**  
Specimen: 4.9 mL blood in LITHIUM HEPARIN GEL tube.  
Turnaround time: 1-3 days  
Reference range: Males: 40-161 pmol/L  
Female: Follicular: 92-921 pmol/l, Mid-Cycle: 139-2382 pmol/l, Luteal: 92-1145 pmol/l

**Osmolality**  
Specimen: 4.9 ml LITHIUM HEPARIN gel or Urine (spot)  
Turnaround time: 3 hrs  
Reference range: Plasma: 285 – 295 mmol/Kg  
Assess urine osmolality relative to plasma osmolality and electrolytes and in the context of disease investigation.

**Phenobarbitone**  
Specimen: 4.9 mL blood in BROWN SERUM GEL tube for clotted blood. Trough sample should be taken immediately before next dose  
Turnaround time: Routine: 8 hours.  
Reference range: 10 – 40 mg/L

**Phenytoin**  
Specimen: 4.9 mL blood in BROWN SERUM GEL tube for clotted blood  
Turnaround time: Routine: 8 hours.  
Reference range: 10 – 20 mg/L

**Phosphate (PO4)**  
Specimen: 4.9mL blood in LITHIUM HEPARIN GEL tube. Included as part of Bone profile. Urine (24hr or spot sample) may also be tested; 24hr urine Plain  
Turnaround time: 8 hours  
Reference range: Plasma: 0.74-1.52 mmol/L. Urine 16 – 48 mmol/24h.

**Potassium**  
Specimen: 4.9 mL blood in LITHIUM HEPARIN GEL tube. Included as part of Renal profile. Do NOT refrigerate sample. Urine (spot sample) may also be tested.  
Turnaround time: 8 hours  
Reference range: Plasma: 3.3 – 5.0 mmol/L. Interpret urine values relative to plasma value.

**Prolactin**  
Specimen: 4.9 mL blood in LITHIUM HEPARIN GEL tube.  
Turnaround time: 1-3 days (Turnaround time is 1 week for patients whose samples have potential analytical interferences from macroprolactin)  
Reference range: See report

**Progesterone**  
Specimen: 4.9 mL blood in LITHIUM HEPARIN GEL tube. Day 21 sample required (or 7 days before the onset of menses if not a 28 day cycle)  
Turnaround time: 1-3 days  
Reference range: Assuming correctly timed sample: <10 nmol/l: ovulation unlikely, 10-30 nmol/l: equivocal, >30 nmol/l: ovulation likely

**Protein, Total**  
Specimen: 4.9 mL blood in LITHIUM HEPARIN GEL tube. Included as part of Liver profile or Proteins. Urine (24hr or spot sample) may also be tested; 24hr urine collected in plain container  
Turnaround time: 8 hours  
Reference range: 65-83 g/L

Approved by: B. Cassidy  
Active Date: 22/07/16
PSA (Prostate Specific Antigen)

Specimen: 4.9 mL blood in LITHIUM HEPARIN GEL tube. PSA test is available for diagnostic and monitoring purposes only, not for screening.

Turnaround time: 1 working day

Clinical decision thresholds

<table>
<thead>
<tr>
<th>Age</th>
<th>PSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50 yrs</td>
<td>≥ 3.0 ng/ml</td>
</tr>
<tr>
<td>50 – 59 yrs</td>
<td>≥ 3.0 ng/ml</td>
</tr>
<tr>
<td>60 – 69 yrs</td>
<td>≥ 4.0 ng/ml</td>
</tr>
<tr>
<td>70 years and over</td>
<td>&gt; 5.0 ng/ml</td>
</tr>
</tbody>
</table>

PTH (Parathyroid Hormone)

Specimen: 2.7 mL blood in EDTA PINK tube. Must be a separate specimen.

Turnaround time: 1-3 days

Reference range: 1.6-6.9 pmol/l

Red Cell Folate

Specimen: 2.7 ml in EDTA (PINK). Use serum folate for first time testing. Red Cell Folate will be added if appropriate

Turnaround time: 28 days

Reference range: 126-651 µg/l

Renal profile

Specimen: 4.9 mL blood in LITHIUM HEPARIN GEL tube. Do NOT refrigerate sample.

Renal profile comprises Sodium, Potassium, Total CO2, Chloride, Urea, and Creatinine.

Turnaround time: 8 hours

Reference range: See individual tests.

Sodium

Specimen: 4.9 mL blood in LITHIUM HEPARIN GEL tube. Included as part of Renal profile. Urine (spot sample) may also be tested.

Turnaround time: 8 hours

Reference range: 133 – 146 mmol/L. Interpret urine values relative to plasma value.

Testosterone

Specimen: 4.9 mL blood in WHITE tube (no anticoagulant)

Turnaround time: 2 weeks

Reference range: Males: 7.1 – 31.1 nmol/l, females: 0.5 – 1.8 nmol/l

Note: SHBG is added to male testosterones >0.7, <10.0 nmol/l and females if testosterone is >1.5 nmol/l. Free androgen index is calculated for females and the free testosterone for males is calculated on request. Refer to reports for reference ranges.

Theophylline

Specimen: 4.9 mL blood in BROWN SERUM GEL tube for clotted blood. Dry tube (no anticoagulant) may be used. Trough sample should be taken immediately before next dose.

Turnaround time: Routine: 8 hours

Reference range: 10– 20 mg/L

Transferrin

Specimen: 4.9 mL blood in LITHIUM HEPARIN GEL tube. Included as part of Iron Studies. Transferrin Saturation is calculated.

Turnaround Time: 8 Hours

Reference Range: Males: 1.88- 3.02 g/l, Females: 1.93- 3.08g/l.
<table>
<thead>
<tr>
<th>Test</th>
<th>Specimen Description</th>
<th>Turnaround Time</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transferrin Saturation ( %Fe Sat)</td>
<td>4.9 mL blood in LITHIUM HEPARIN GEL tube. Included as part of Iron Studies.</td>
<td>8 Hours</td>
<td>%Fe SAT (F) : 10-50 %Fe SAT (M) : 19-55</td>
</tr>
<tr>
<td>TSH (Thyroid Stimulating Hormone)</td>
<td>4.9 mL blood in LITHIUM HEPARIN GEL tube. Included as part of Thyroid Function Test (TFT)</td>
<td>1 to 3 days</td>
<td>0.35-4.94 mIU/l</td>
</tr>
<tr>
<td>Thyroid Function Test</td>
<td>4.9 mL blood in LITHIUM HEPARIN GEL tube. Includes fT4 and TSH</td>
<td>1 to 3 days</td>
<td>See individual tests</td>
</tr>
<tr>
<td>Urate (Uric Acid)</td>
<td>4.9 mL blood in LITHIUM HEPARIN GEL tube.</td>
<td>8 hours</td>
<td>Plasma: 177-465 µmol/L. Urine: 1.5 – 4.4 mmol/L /24hrs</td>
</tr>
<tr>
<td>Urea</td>
<td>4.9 mL blood in LITHIUM HEPARIN GEL tube. Included as part of Renal profile.</td>
<td>8 hours</td>
<td>Plasma: 2.8– 8.6 mmol/L. Urine: 400 – 800 mmol/24hrs</td>
</tr>
<tr>
<td>Urine tests</td>
<td>See individual analytes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valporate (Epilim)</td>
<td>4.9 mL blood in BROWN SERUM GEL tube for clotted blood. Dry tube (no anticoagulant) may be used. Trough sample should be taken immediately before next dose</td>
<td>8 hours</td>
<td>40 – 100 mg/l</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>4.9 mL blood in LITHIUM HEPARIN GEL tube.</td>
<td>1 to 3 days</td>
<td>211-760 ng/l</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>4.9 mL blood in WHITE tube (no anticoagulant). Must be a separate specimen</td>
<td>2 weeks</td>
<td>Desirable range greater than 50 nmol/L</td>
</tr>
</tbody>
</table>
## HAEMATOLOGY

### Activated partial thromboplastin time (APTT)

**Specimen:** 3ml Coagulation tube (green cap) or 1.4 ml Paediatric Coagulation tube (green cap) Blood exactly aspirated to the mark and gently mixed. Specimen must be assayed within 4 hours of venepuncture

**Turnaround time:** 3 hours

**Reference range:** Please refer to reference range stated with result

### Activated Protein C Resistance (APCR-V)

This is a screening test for the FVL mutation. If requested as part of a thrombophilia screen please follow instructions in Thrombophilia screen section.

**Specimen:** 2 x 3ml Coagulation tubes (green cap) and 1 x 2.7ml (Pink cap) FBC tube. Test cannot be performed if patient is on Heparin or any of the novel anticoagulants

**Turnaround time:** 6-8 weeks

**Reference range:** Ratio >2.1 is normal

### Antithrombin (only) If requested as part of a Thrombophilia screen follow instructions in Thrombophilia screen section.

**Specimen:** 2 x 3ml Coagulation tubes (green cap). Test cannot be performed if patient is on Rivaroxaban

**Turnaround time:** 6 weeks

**Reference range:** See report form

### Blood film

**Specimen:** 2.7 ml blood in EDTA tube (Pink CapFBC tube).

Blood film will be examined, if requested, with relevant clinical information or if indicated by the F.B.C. In the presence of a normal F.B.C., there are few indications for routine film examination, e.g. possible infectious mononucleosis. Film must be made within 12 hrs of venepuncture

**Turnaround time:** 96 hours

**Reference range:** See report form

### D-Dimers (DD)

**Specimen:** 3ml Coagulation tube (green cap) Blood exactly aspirated to the mark and gently mixed. Specimen must be assayed within 4 hours of venepuncture

**Turnaround time:** 3 hours

**Reference range:** 0 - 0.5mg/L

### ESR

**Specimen:** 3.5 ml Sedivette (Purple ESR tube) Blood exactly aspirated to the mark and mix gently. Except in the case of G.C.A. (giant cell arteritis) ESR is not an emergency test.

**Turnaround time:** 4 hours

**Reference range:** (Westegren) 0 - 10 mm 1st hour (Male) 0 - 20 mm 1st hour (Female)

### Factor V Leiden (FVL) (only) If requested as part of a Thrombophilia screen follow instructions in Thrombophilia screen section.

**Additional Information:** Prior to performing the genetic test for the FVL, the APCR-V assay must be performed as a screening test. The FVL mutation test is performed when the APCR-V is positive. Positive samples are referred to St. James Hospital for genetic testing.

**Specimen:** 2 x 3ml Coagulation tubes (green cap) and 1 x 2.7ml (Red cap) FBC tube

**Turnaround time:** 6-8 weeks

**Reference range:** Sent for FVL based on APCRV ratio (must be <2.1 ratio)
Full blood count (FBC)

Specimen: 2.7 ml blood in EDTA tube (Pink Cap FBC tube).

Blood aspirated to the mark and gently mixed. Full Blood Count (F.B.C.), results given for white and red cell counts, haemoglobin, haematocrit (P.C.V.), red cell indices - mean corpuscular volume (M.C.V.), mean corpuscular haemoglobin (M.C.H.), mean corpuscular haemoglobin concentration (M.C.H.C.), red cell distribution width (R.D.W.) and platelet count. White Blood Cell differential is given in absolute numbers.

Turnaround time: 3 hours

Reference range:

- **WBC**: 3.50 - 11.0 x 10^9/L
- **Differential**
  - Neutrophils: 2.00 – 8.00 x 10^9/L
  - Lymphocytes: 1.00 – 4.00 x 10^9/L
  - Monocytes: 0.20 – 1.00 x 10^9/L
  - Eosinophils: 0.00 – 0.50 x 10^9/L
  - Basophils: 0.00 – 0.20 x 10^9/L
- **RBC**: 4.5 – 5.50 x 10^12/L (Male) 3.80 - 4.80 x 10^12/L (Female)
- **HGB**: 13.0 – 18.0 g/dl (Male) 11.5 – 16.5 g/dl (Female)
- **HCT**: 0.400 – 0.50 L/L (Male) 0.370 – 0.470 L/L (Female)
- **MCV**: 80.0 – 100.0 fl
- **MCH**: 27.0 – 32.0 Pg
- **MCHC**: 30.0 – 36.0 G/dl
- **RDW**: 11.0 – 15.0 %
- **Platelets**: 150 - 400 X 10^9/L

Haemoglobin Electrophoresis

Specimen: 2.7 ml blood in EDTA tube (Pink Cap FBC tube). Analysis carried out using alkaline electrophoresis and HPCL to quantify HbA2 and HbF and to identify/quantify haemoglobin variants. Acid electrophoresis is used to confirm/identify rarer variant haemoglobins

Turnaround time: 10 days

Reference range:

- Adult
  - **HbA2**: 1.5 - 3.4 %
  - **HbF**: < 1.0%

I.M.S. (Infectious Mononucleosis) screen

Specimen: 2.7 ml blood in EDTA tube (Pink Cap FBC tube).

Turnaround time: 3 hours

Reference range: Positive or negative result

INR

See Prothrombin time

Lupus Anticoagulant

Specimen: Three x 3ml Coagulation tubes (green cap). Blood exactly aspirated to the mark and gently mixed. Test cannot be performed if patient is on Apixaban, Dabigatran or Rivaroxaban. Tests performed include PT, APTT, DRVVT, SCT and Lupus confirmatory tests.

Turnaround time: 14 days

Reference range:

- **PTTLA**: Please refer to reference range stated with result
- **DVV**: Please refer to reference range stated with result
## Malaria Parasite Screen (MPS)

**Specimen:** 2.7 ml blood in EDTA tube (Pink Cap FBC tube). Freshly collected sample taken to the Haematology lab immediately and handed to a member of staff. Must be received in Lab within 2 hours of venepuncture. Please complete Malaria request form available on Mater.ie as detailed clinical history and foreign travel details are required. Patients must attend MMUH Phlebotomy with completed malaria form as malaria request is not orderable on Healthlink.

Screen includes an immunochromatographical slide test (MST) and screening of specially stained films

**Turnaround time:** 1 hour MST, 24 hours MPS

**Reference range:** Positive or negative result

## Protein C (only) If requested as part of a Thrombophilia screen please follow instructions in Thrombophilia screen section.

**Specimen:** 2 x 3ml Coagulation tubes (green cap)

**Turnaround time:** 6 weeks

**Reference range:** 70-130%

## Free Protein S (only) If requested as part of a Thrombophilia screen please follow instructions in Thrombophilia screen section

**Specimen:** 2 x 3ml Coagulation tubes (green cap)

**Turnaround time:** 6 weeks

**Reference range:**
- Female 53-140%
- Male 62-155%

## Prothrombin time (PT)

**Specimen:** 3ml normal or 1.4 ml Paediatric Coagulation bottles (green cap) Blood exactly aspirated to the mark and gently mixed. International normalised ratio (I.N.R.) is derived from the P.T. and the sensitivity of the thromboplastin reagent. Specimen must be assayed within 12 hours of venepuncture

**Turnaround time:** 3 hours

**Reference range:** Please refer to reference range stated with result

## Reticulocytes

**Specimen:** 2.7 ml blood in EDTA tube (Pink Cap FBC tube).

**Turnaround time:** 3 hours

**Reference range:** 16 - 80 x 10^9/L

## Sickle Cell Screen

**Specimen:** 2.7 ml blood in EDTA tube (Pink Cap FBC tube).

**Turnaround time:** 24 hours

**Reference range:** Positive or negative result BUT all results must be verified on Haemoglobin electrophoresis.

## Thrombophilia Screen

**Specimen:** 6 x 3ml Coagulation tube (green cap) or 2 x 10ml coagulation tube (green cap) and 1 x 2.7 ml blood in EDTA tube (Pink cap FBC tube). Testing while on novel anticoagulants is not recommended as it can interfere with coagulation assays Tests performed include PT, APTT, Fibrinogen, Lupus Anticoagulant, Protein C, Free Protein S, Antithrombin, Activated Protein C Resistance, and Factor V Leiden. Patients should be 2-3 weeks post thrombotic event before testing, samples should be sent to the lab as soon as possible after phlebotomy. Requests must meet the guideline for Heritable Thrombophilia testing which is available on Mater.ie. Thrombophilia screen tests cannot be performed if the patient is on Apixaban, Rivaroxaban or Dabigatran.

The following tests will not be performed if the patient is on VKA: PC, PS, LA.

The following tests will not be performed if the patient is on heparin: LA, APCR, and Antithrombin.

**Turnaround time:** 6 weeks, Factor V Leiden referred to St.James’s Hospital.

**Reference range:** See report form
CELLULAR PATHOLOGY

Specimen Preservation

Appropriate preservation of tissue samples is of utmost importance for successful histological diagnosis. Most tissue specimens may be placed immediately into 10% buffered Formalin. Small pre-filled containers are obtainable from the Histology Laboratory. Avoid squeezing specimens into small containers and ensure large specimens are, at a minimum, fully immersed in the 10% Formalin solution. If in doubt about how to treat a Histology or Cytology specimen, please contact a member of the Histology staff before putting the specimen into a fixative.

Specimen Labelling and Transport

The body of the specimen container must be labelled with the patient and specimen details. Consecutive specimens are labelled A, B, C etc. A completed request form must accompany all specimens. Minimum information includes patient surname and forename, date of birth, address, GP name and address, clinical details, specimen type and specimen site. Desirable information includes the date and time of specimen collection. Urgent requests must be phoned to the laboratory.

Reports and Additional Requests

Reports are available from the Laboratory Office, not from the laboratory. Reports follow SNOMED International (College of American Pathologists) nomenclature. Tissue embedded in paraffin blocks and stained slides are stored for a minimum of 30 years, wet tissue is kept for a minimum of 2 weeks after the final report is issued and fluids are kept for a minimum of 48 hours after the final report is issued (College of American Pathologists minimum retention times, 2009). Any additional examinations may be requested by contacting a Consultant Pathologist or Pathology N.C.H.D., within these time limits.
### TISSUE SPECIMENS
**10% Neutral Buffered Formalin – Fixed Tissue Specimens**

<table>
<thead>
<tr>
<th>Specimen:</th>
<th>Small tissue specimens in 10% buffered formalin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnaround Time:</td>
<td>5 working days (additional time may be required for special procedures).</td>
</tr>
<tr>
<td>Special Precautions:</td>
<td>All tissue specimens must be preserved in 10% buffered formalin before transport to the laboratory.</td>
</tr>
</tbody>
</table>

### CYTOLOGY (NOTE: CERVICAL CYTOLOGY EXAMINATIONS NOT PERFORMED BY THIS LABORATORY)

**Pleural / Ascitic Fluids**

<table>
<thead>
<tr>
<th>Specimen:</th>
<th>50mls aliquot deliver as soon as possible. Do not bring bag to laboratory. Place 3 IU heparin per ml of fluid to prevent clot formation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnaround time:</td>
<td>3 working days (additional time may be required for special procedures).</td>
</tr>
<tr>
<td>Special precautions:</td>
<td>Clotted specimens are unsuitable for Cytology. A clot sequesters cells and may lead to erroneous results.</td>
</tr>
</tbody>
</table>

**Urine**

<table>
<thead>
<tr>
<th>Specimen:</th>
<th>Approximately 50 ml specimen to be sent to the laboratory as soon as it is obtained. <strong>The first morning specimen is not suitable for processing.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnaround time:</td>
<td>3 working days (additional time may be required for special procedures).</td>
</tr>
<tr>
<td>Special precautions:</td>
<td><strong>If delay in transport, add Cytolyt (available from Cellular Pathology) to specimen. This helps prevent cell degeneration caused by acidic nature of urine</strong></td>
</tr>
</tbody>
</table>

**Sputum**

<table>
<thead>
<tr>
<th>Specimen:</th>
<th>Three consecutive deeply coughed early morning specimens, preferably after physiotherapy, constitute the usual screening procedure. <strong>Salivary or contaminated specimens (food) are unsuitable for testing. Deliver as soon as possible.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnaround time:</td>
<td>3 working days (additional time may be required for special procedures).</td>
</tr>
</tbody>
</table>
IMMUNOLOGY

Lipaemic, haemolysed or microbial contaminated samples may give poor results and may not be accepted.

Add-on Test Requests

Routine samples are retained for a period post analysis. Further tests on a specimen that is already in the laboratory can be requested by contacting the laboratory. Sample stability limits for add on requests are outlined below for specific tests. For all other tests, the sample stability limit is 28 days.

<table>
<thead>
<tr>
<th>Test</th>
<th>Specimen:</th>
<th>Turnaround time:</th>
<th>Reference range:</th>
<th>Additional information:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Allergen Specific IgE</strong></td>
<td>4.9 ml in BROWN Serum Gel tube for clotted blood. Specific allergens must be requested.</td>
<td>8 days</td>
<td>Less than 0.35 kUa/L</td>
<td>Perennial Allergic rhinitis Panel: Total IgE, house dust mite, mixed moulds, cat &amp; dog dander.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Eczema Panel: Total IgE, house dust mite, milk, egg white.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Asthma Panel: Total IgE, house dust mite, mixed moulds, cat &amp; dog dander</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fish Panel: Total IgE, Cod, Shrimp</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wheat Panel: Total IgE, wheat, TTG.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mixed nut, mixed food.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Samples with insufficient information will be held for one month for specific requests to be added.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Specific food allergen requests will be accepted providing an adequate clinical history is provided.</td>
</tr>
<tr>
<td><strong>Alpha-1-antitrypsin</strong></td>
<td>4.9 ml in BROWN Serum Gel tube for clotted blood</td>
<td>2 days</td>
<td>0.90 – 2.00 g/L</td>
<td>Alpha-1-antitrypsin phenotype will be requested if the AAT is less than 1.0 g/L</td>
</tr>
<tr>
<td><strong>Anti nuclear antibody pattern</strong></td>
<td>See nuclear antibody</td>
<td></td>
<td></td>
<td>Sample stability: 7 days</td>
</tr>
<tr>
<td><strong>ASO (anti streptolysin O)</strong></td>
<td>4.9 ml in BROWN Serum Gel tube for clotted blood</td>
<td>2 days</td>
<td>Less than 200 IU/mL</td>
<td>Anti streptolysin O usually appears 1 week after infection and reach a peak in about 3-4 weeks. A two-fold increase in the ASO value, using serial analysis, within one to two weeks of the initial result is supportive of a prior streptococcal infection. In the absence of complications or re-infection, the ASO level will usually fall to pre-infection activity within 6-12 months. A single ASO analysis may not be meaningful due to variability of ASO values within the normal population.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sample stability: 7 days</td>
</tr>
<tr>
<td><strong>Aspergillus fumigatus specific IgG antibody</strong></td>
<td>4.9 ml in BROWN SERUM GEL tube for clotted blood</td>
<td>8 days</td>
<td>Less than 40 mgA/L for non CF patients, less than 90 mgA/L for CF patients</td>
<td></td>
</tr>
</tbody>
</table>
Antibody Screen

Specimen: 4.9 ml in BROWN SERUM GEL tube for clotted blood
Turnaround time: 7 days
Reference range: Negative is normal
The antibody screen includes parietal cell antibody (PCA), mitochondrial antibody (AMA), smooth muscle antibody (SMA), which are tested on rat tissue.
If the PCA is positive, suggest testing for Thyroid peroxidise antibody.
If the AMA is positive, the sample will automatically be tested for M2 (PBC) antibodies.

Additional Information: Positive samples will not be repeated within 3 months

Avian antibodies

Specimen: 4.9 ml in BROWN SERUM GEL tube for clotted blood
Turnaround time: 8 days
Reference Range: Budgie mix (feathers, droppings, serum): Less than 8 mgA/L
Pigeon mix (feathers, droppings, serum): Less than 38 mgA/L

Beta-2-glycoprotein-1 IgG antibody

Specimen: 4.9 ml in BROWN SERUM GEL tube for clotted blood
Turnaround time: 8 days
Reference range: Less than 10 U/mL
Sample stability: 7 days

Beta-2-Microglobulin (B2M)

Specimen: 4.9 mL blood in BROWN SERUM GEL tube for clotted blood
Turnaround time: 3 days
Reference range: 1.2 – 2.4

BJP Identification

Specimen: Urine samples analysed by electrophoresis and immunofixation for presence of BJP.
Turnaround time: 14 days
Reference range: No BJP detected is normal.

Bullous Pemphigoid

Specimen: See Skin Antibodies in Serum (Indirect Skin abs)

Cardiolipin IgG & IgM antibody

Specimen: 4.9 ml in BROWN SERUM GEL tube for clotted blood
Turnaround time: 8 days
Reference range: Less than 10 U/mL

CCP (cyclic citrullinated peptide) antibody

Specimen: 4.9 ml in BROWN SERUM GEL tube for clotted blood
Turnaround time: 4 days
Reference range: Less than 11 U/mL

Centromere antibody

Specimen: See nuclear antibody
<table>
<thead>
<tr>
<th>Test</th>
<th>Specimen</th>
<th>Turnaround time</th>
<th>Reference range</th>
<th>Sample stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceruloplasmin</td>
<td>4.9 ml in BROWN SERUM GEL tube for clotted blood</td>
<td>2 days</td>
<td>0.20 – 0.60 g/L</td>
<td>7 days</td>
</tr>
<tr>
<td>C1-esterase inhibitor</td>
<td>4.9 ml in BROWN SERUM GEL tube for clotted blood</td>
<td>2 days</td>
<td>0.21 – 0.39 g/L</td>
<td>7 days</td>
</tr>
<tr>
<td>Complement (C3 &amp; C4)</td>
<td>4.9 ml in BROWN SERUM GEL tube for clotted blood</td>
<td>2 days</td>
<td>Adult C3: 0.75 – 1.88 g/L. C4: 0.14 – 0.61 g/L</td>
<td>7 days</td>
</tr>
<tr>
<td>dsDNA antibody (Immunoassay)</td>
<td>4.9 ml in BROWN SERUM GEL tube for clotted blood</td>
<td>8 days</td>
<td>Less than 15 IU/mL. If the result is greater than 10 IU/mL, DNA CL will automatically be requested (unless it was previously DNACL+)</td>
<td>48 hours</td>
</tr>
<tr>
<td>DNA CL (Immunofluorescence assay using Crithidia luciliae)</td>
<td>The dsDNA antibody sample is used, if the result was greater than 10 IU/mL. Not available by direct request.</td>
<td>8 days</td>
<td>Negative is normal. This assay is more specific but less sensitive than the DNA ELISA</td>
<td>8 days</td>
</tr>
<tr>
<td>ENA antibodies (Ro, La, RNP, Sm, Scl-70 &amp; Jo-1)</td>
<td>4.9 ml in BROWN SERUM GEL tube for clotted blood</td>
<td>12 days</td>
<td>If the antinuclear antibody was ANA +, it is automatically tested for ENA antibodies. The sample is initially screened for ENA antibodies, if this is positive, the sample is automatically tested for the individual antibodies (ENAC). ENA Screen ratio &lt;0.7 is negative. Samples with levels &gt;0.7 will be tested for specific ENA antibodies</td>
<td>12 days</td>
</tr>
<tr>
<td>EMA antibodies (IgA) antibody</td>
<td>4.9 ml in BROWN SERUM GEL tube for clotted blood</td>
<td>12 days</td>
<td>EMA is only used to confirm TTG positive samples. Previously positive samples are not repeated for EMA. The tTG antibody test is used to monitor patients.</td>
<td>6 months</td>
</tr>
</tbody>
</table>

Additional Information:
- Positive samples will not be repeated within 6 months.
- EMA is only used to confirm TTG positive samples. Previously positive samples are not repeated for EMA. The tTG antibody test is used to monitor patients.
## Immunoglobulins IgG, IgA & IgM

**Specimen:** 4.9 ml in BROWN SERUM GEL tube for clotted blood. Requests for Immunoglobulins are also assayed for Protein Electrophoresis & vice v.

**Turnaround time:** 10 days

**Reference range:** Adults IgG: 7.00 – 16.00 g/L  IgA: 0.80 – 4.00 g/L  IgM: 0.4 – 2.30 g/L

The results are not released until compared with Protein Electrophoresis results. If there is a band present, sample is immunofixed.

**Sample stability:** 7 days

### Haptoglobin

**Specimen:** 4.9 ml in BROWN SERUM GEL tube for clotted blood

**Turnaround time:** 2 days

**Reference range:** 0.30 – 2.00 g/L

**Sample stability:** 7 days

### IgE

**Specimen:** 4.9 ml in BROWN SERUM GEL tube for clotted blood

**Turnaround time:** 8 days

**Reference range:** 0 - 3 years old: less than 56 kU/L  3 - 7 years old: 56-110 kU/L 8 - 10 years old: 124-148 kU/L  Greater than 10 years old: Less than 114 kU/L

### Intrinsic factor antibody

**Specimen:** 4.9 ml in BROWN SERUM GEL tube for clotted blood

**Turnaround time:** 21 days

**Reference range:** Less than 6 U/mL

### Jo-1 antibody

**Specimen:** See ENA antibody

### La antibody

**Specimen:** See ENA antibody

### LKM antibody

**Specimen:** 4.9 ml in BROWN SERUM GEL tube for clotted blood

**Turnaround time:** 21 days

**Reference range:** Less than 3 U/mL

### M2 (PBC) antibody

**Specimen:** 4.9 ml in BROWN SERUM GEL tube for clotted blood

**Turnaround time:** 7 days

**Reference range:** Less than 6 IU/mL

### Mitochondrial antibody

**Specimen:** See antibody screen

### Nuclear antibody (ANA)

**Specimen:** 4.9 ml in BROWN SERUM GEL tube for clotted blood

**Turnaround time:** 7 days

**Additional information:** Negative is normal. ANA is tested on Hep2 cells to detect and identify anti nuclear antibody (centromere, homogeneous, nucleolar and speckled patterns). If the ANA is greater than a weak positive, it will automatically be tested for dsDNA and ENA (extractable nuclear antigen, which includes anti Ro, La, RNP, Sm, Jo-1 & Scl-70) antibodies. Positive samples will not be repeated within 3 months

---

**Approved by:** B. Cassidy  
**Active Date:** 22/07/16
### Paraprotein identification /Protein Electrophoresis

**Specimen:** 4.9 ml in BROWN SERUM GEL tube for clotted blood

Requests for Protein Electrophoresis (SPEP) are also automatically assayed for serum Immunoglobins. If a possible paraprotein band is detected then, the sample is automatically reflexed for immunofixation, unless a paraprotein was previously typed & identified.

**Turnaround time:** 10 days

**Reference range:** No paraprotein detected is normal. Report comments added on an individual case basis.

### Parietal cell antibody

**Specimen:** See antibody screen

### Rheumatoid Factor

**Specimen:** 4.9 ml in BROWN SERUM GEL tube for clotted blood. Fluids cannot be tested.

**Turnaround time:** 2 days

**Reference range:** RF <3.5 U/mL: Negative result, RF 3.5 – 5.0 U/mL: Equivocal result, RF >5 U/mL: Positive result

### RNP antibody

**Specimen:** See ENA antibody

### Ro antibody

**Specimen:** See ENA antibody

### ScI-70 antibody

**Specimen:** See ENA antibody

### Skin antibodies in serum

**Specimen:** 4.9 ml in BROWN SERUM GEL tube for clotted blood

**Turnaround time:** 7 days

**Reference range:** Negative is normal

### Sm antibody

**Specimen:** See ENA antibody

### Smooth muscle antibody

Specimen: See antibody screen

### Thyroid Antibodies

Please see under Clinical Chemistry and Diagnostic Endocrinology

### Tissue transglutaminase antibody

**Specimen:** 4.9 ml in BROWN SERUM GEL tube for clotted blood

**Turnaround time:** 4 days

**Reference range:** Less than 3 U/mL

**Additional information:** The IgA level is automatically checked, as IgA deficiency causes false negative results for tTG IgA antibody. If the patient is IgA deficient, the tTG IgG antibody assay is completed instead of the tTG IgA antibody. The endomysial IgA antibody assay is used to confirm positive tTG IgA samples, if they were not previously positive.
**MICROBIOLOGY**

**SPUTUM: Culture and Sensitivity**

Specimen: A minimum volume of 1ml sample in a sterile screw cap container e.g. MSU container and sealed in a plastic biohazard bag

Sputum – expectorated.

Turnaround time: Routine final report: 48-72 hours

Special precautions: Salivary specimens are unsuitable for culture and will not be processed

Samples should reach the laboratory within 4 hours of collection to avoid overgrowth with Gram-negative bacilli. Also *H. influenzae* and *S. pneumoniae* may not survive beyond this time. Results from specimens not received in the laboratory on the same day as collection should be interpreted with care.

**SPUTUM: Tuberculosis**

Specimen: Early morning freshly expectorated sputum is recommended for *Mycobacterium tuberculosis*

Sputum (3 consecutive mornings): minimum 5ml per sample

Samples must be taken into a sterile screw cap container e.g. MSU container and sealed in a plastic biohazard bag

Turnaround time: *Auramine Stains:*

Same day if received before 8am Monday to Friday, or the next day.

Culture:

7 weeks (most cultures become positive within the first four weeks of incubation, however if the strain is slow-growing or if there are scanty numbers of organisms present in the specimen prolonged incubation may be required)

Note: Positive microscopy and positive cultures are phoned immediately to the requesting source

Sensitivity Testing:

The first isolate from each positive patent is identified and the culture is sent to a reference laboratory for susceptibility testing. Results are normally available within three weeks of the date on which the culture is dispatched.

**FAECES: Culture and Sensitivity, *Clostridium difficile* toxin**

Specimen: Approximately 5-6 grams is sufficient for routine culture. This should be collected into a sterile leak proof container e.g. MSU). The optimal times of specimen collection is as soon as possible after onset of symptoms and before any antibiotics have been administered.

Transport to laboratory as soon as possible because a number of important pathogens such as *Shigella species* may not survive the pH changes that occur in stool specimens, even if refrigerated.

Routine culture:

*Salmonella, Shigella and Campylobacter species.*

Specimens are stored at 4°C until they are processed.

Approximately 5 - 6 grams is sufficient for routine culture. A larger sample is required when testing for food poisoning organisms.

If clinically appropriate:

*Yersinia spp, vibrio cholerae, E. coli 0157 and Clostridium difficile* toxin

Turnaround time: Negative culture: 48-72 hours

Positive culture: 72 – 96 hours

*Clostridium difficile* toxin: Same day if received before 11am Monday to Friday

Additional information

Full clinical details MUST be provided with every request e.g. presence/duration of symptoms, recent travel, shellfish ingestion and previous antibiotic therapy.

If required, examination for ova, cysts and parasites should be specifically requested- see below.
### FAECES: Ova, Cysts and Parasites

<table>
<thead>
<tr>
<th>Specimen:</th>
<th>Approximately 5-6 grams is sufficient for routine culture. This should be collected into a sterile leak proof container e.g. MSU container.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnaround time:</td>
<td>48 - 72 hours</td>
</tr>
<tr>
<td>Additional information:</td>
<td>Three examinations spaced 2 – 3 days apart are recommended for optimal recovery, as shedding of cysts and ova tends to be intermittent. Full clinical details are essential e.g. Foreign travel, immunocompromised.</td>
</tr>
</tbody>
</table>

### SWAB ANALYSIS

**Ear swab**

<table>
<thead>
<tr>
<th>Specimen:</th>
<th>Samples of pus or exudates should be collected onto a plain sterile swab in transport medium (orange cap) and sent to the laboratory as soon as possible. Dry swabs are not suitable</th>
</tr>
</thead>
</table>
| Turnaround time: | Final bacterial culture report: 48-72 hours  
Final Fungal culture: 5 days |

**Eye swab**

| Specimen: | Swab: samples of areas of interest should be taken onto a plain sterile swab in transport medium (orange cap)  
Pus: should be collected into a sterile leak proof container or, if the volume is small, onto a plain sterile swab in transport medium (blue cap) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnaround time:</td>
<td>Routine culture and sensitivity: 48-72 hours</td>
</tr>
<tr>
<td>Additional Information:</td>
<td>Specimens should be collected before application of topical treatments.</td>
</tr>
</tbody>
</table>

**Mouth swab**

<table>
<thead>
<tr>
<th>Specimen:</th>
<th>Plain swab in transport medium (blue) to sample pus, lesions or inflamed areas.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnaround time:</td>
<td>48 hours</td>
</tr>
<tr>
<td>Special precautions:</td>
<td>The use of a tongue depressor or spatula can aid vision and help avoid contamination</td>
</tr>
</tbody>
</table>

**Wound Swab (state site)**

| Specimen: | Skin/Superficial wound./Abscess/Deep Wound  
A representative part of the lesion should be sampled (blue cap swab). Pus or exudates may be collected into a sterile leakproof container. |
|-----------|-------------------------------------------------------------------------------------------------|
| Turnaround time: | Negative culture: 48-72hours  
Positive culture: 2-5days |
| Additional Information: | As a general principle, specimens should be collected before antimicrobial therapy is commenced. Routine culture of superficial swabs of ulcers should be discouraged. Before sampling ulcers, the debris should be removed and the ulcer cleaned with sterile saline. Swabs should be taken from under the tip of the ulcer margin. |
| Storage: | Specimens are stored at 4°C until they are processed. |
### Genital Tract & Associated Specimens

<table>
<thead>
<tr>
<th>Investigation</th>
<th>Site</th>
<th>Container</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STD Screen Female:</strong></td>
<td>Cervical: <em>Neisseria gonorrhoeae</em></td>
<td>Plain swab in transport medium (Blue)</td>
</tr>
<tr>
<td></td>
<td>High vaginal (HVS): <em>Trichomonas vaginalis</em> and <em>Candida</em> species</td>
<td>Plain swab in transport medium (Blue)</td>
</tr>
<tr>
<td>Referral see Note*</td>
<td>*Endocervical: <em>Chlamydia trachomatis</em>, <em>N. gonorrhoeae</em> (Molecular)</td>
<td>GenProbeTranswab (Yellow)</td>
</tr>
<tr>
<td><strong>STD Screen Male:</strong></td>
<td>Urethral: <em>N. gonorrhoeae</em></td>
<td>Plain swab in transport medium (Orange)</td>
</tr>
<tr>
<td></td>
<td>Rectal: <em>N. gonorrhoeae</em></td>
<td>Plain swab in transport medium (Blue)</td>
</tr>
<tr>
<td></td>
<td>First void Urine: <em>Chlamydia trachomatis</em>, <em>Neisseria gonorrhoeae</em></td>
<td>Sterile screw cap MSU container</td>
</tr>
<tr>
<td><strong>IUCD</strong></td>
<td>IUCD</td>
<td>Sterile screw cap MSU container</td>
</tr>
<tr>
<td><strong>Genitourinary Screen</strong></td>
<td>High vaginal swab (HVS): Bacterial/fungal vaginosis</td>
<td>Plain swab in transport medium (Blue)</td>
</tr>
<tr>
<td>(Female)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Herpes Simplex virus 1,2</strong></td>
<td><em>High vaginal (HVS)</em></td>
<td>Virus transport swab (Pink)</td>
</tr>
<tr>
<td>Referral see Note*</td>
<td><em>Serology</em></td>
<td>4.9 ml blood in plain White tube (No anticoagulant)</td>
</tr>
<tr>
<td></td>
<td><em>Vesicular lesions if present</em></td>
<td>Virus transport swab (Pink)</td>
</tr>
</tbody>
</table>

**Turnaround time:**
- STD Screen: Final report 72 - 96 hours
- GU Screen: Final report 72 - 96 hours

Molecular detection of *Chlamydia trachomatis*, *N. gonorrhoeae*: 5 days. Referred to National Virus Reference Laboratory. *N.B.* Please ensure culture swabs also are sent to Microbiology laboratory if *N. gonorrhoeae* is suspected.

HSV / HPV: 2 - 14 days. Referred to national Virus Reference Laboratory.

**Additional information:**
Swabs for *N. gonorrhoeae* and *Trichomonas vaginalis* must be received in the laboratory within 24 hours of sampling.

Low vaginal swabs are discouraged because of the presence of high numbers of commensal flora. This makes for a difficulty in interpretation.

Supplemental investigations may be performed with relevant clinical details so these are absolutely necessary when submitting specimens for STI investigation.

### FUNGAL: Fungal Microscopy and Culture

<table>
<thead>
<tr>
<th>Specimen:</th>
<th>Non-systemic infection: Skin/Scalp scrapings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnaround time:</td>
<td>Microscopy: 5-7 days Final culture report: 14-21 days</td>
</tr>
<tr>
<td>Additional information:</td>
<td>Skin scrapings: clean area with 70% alcohol prior to collection of samples as this improves the chances of detecting the fungus by direct microscopy and also reduces the likelihood of contamination of subsequent cultures. Take the sample from the active periphery of the lesion into a DERMAPAK envelope or a clean piece of paper. Hair: Extract hair stumps, broken hairs, and lustreless hairs with a forceps and any follicular fragments with a sterile needle. Place in a sterile screw capped container. Nail clippings: should be taken from any discoloured, dystrophic or brittle parts of the nail. These should be cut back as far as possible from the...</td>
</tr>
</tbody>
</table>

Page 21 of 22

Approved by: B. Cassidy

Active Date: 22/07/16
free edge of the nail and include its full thickness. Scrapings can also be taken from beneath the nail to supplement the clippings sample.

**Turnaround time:**
- Microscopy: Up to 7 days
- Final culture report 14-21 days

**MRSA: Screening**

**Specimen:**
- Plain sterile swab in transport medium (blue cap) of site
- Nasal and groin swab only for MRSA.

**Turnaround time:**
- Negative result: 24-48 hours
- Positive result: 48-96hrs

**Specimen Requirements**
- If MRSA screening is specifically required, please state clearly on request form the site from which the swab has been taken and provide relevant clinical details.

**URINE: Pregnancy Test**

**Specimen:**
- Urine Sterile MSU container.
- Minimum volume 1ml

**Turnaround time:**
- Urgent samples: <30minutes from receipt in laboratory
- Routine samples: same day

**URINE: Culture & Sensitivity**

**Specimen:**
- Midstream Urine (MSU) -after adequate peri-urethral washing with soap and water (NB not disinfectant), the first small amount of urine is voided and discarded. Then, without interrupting the flow, approximately 10ml is collected into a sterile container. The remainder of the urine is discarded. Minimum 1ml for bacterial pathogens

**Turnaround time:**
- Microscopy: same day of receipt
- Negative culture: 24-48hours
- Positive culture: 48-96hours

**Virology**

A general request for "Viral Screen" is not acceptable. Please state clearly the virus (es) under investigation.

**Specimen:**

**Turnaround time:** See report form. Refer to website: www.nvrl.ie