CORK UNIVERSITY HOSPITAL
LABORATORY MEDICINE USER HANDBOOK

Test Directory (A-Z) Quick Link (press Ctrl and Select letter)

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<thead>
<tr>
<th>A</th>
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<th>C</th>
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<th>L</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>O</td>
<td>P</td>
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<td>V</td>
<td>W</td>
<td>X</td>
<td>Y</td>
<td>Z</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reference No:</th>
<th>PPG-CUH-PAT-31</th>
<th>Revision No:</th>
<th>12</th>
<th>Review Cycle:</th>
<th>1 year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author:</td>
<td>Mr Paul Cantwell</td>
<td>Owner:</td>
<td>Mr Paul Cantwell</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approver(s):</td>
<td>Dr Bartley Cryan, Mr Brendan O’Reilly</td>
<td>Approval Date:</td>
<td>07/09/2017</td>
<td>07/09/2017</td>
<td></td>
</tr>
</tbody>
</table>
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## 2 AMENDMENT TABLE

The Laboratory Medicine User Handbook is controlled in accordance with local quality management system requirements. The amendments to this and the previous revision are listed on in the table below. The full amendment history is available by contacting the Laboratory Medicine Quality Manager (refer to section 4.3: Contact Details).

<table>
<thead>
<tr>
<th>Amended Section(s)</th>
<th>Amendment</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Introduction</td>
<td></td>
</tr>
<tr>
<td>4 General information</td>
<td></td>
</tr>
<tr>
<td>• 4.1 The location of the laboratory</td>
<td>Text added: “Infectious Diseases Serology. Located on the ground floor, opposite Physiotherapy department.”</td>
</tr>
<tr>
<td>• 4.2 Opening Hours and Laboratory Telephone Extension Numbers</td>
<td>Haematology: Added Haematinics and Haematology Reception extension numbers Microbiology: Antibiotic assays added to Microbiology Main Laboratory.</td>
</tr>
<tr>
<td>• 4.3 Contact Details</td>
<td>General Laboratory: Remove Brendan O’Reilly and add Sinead Creagh Biochemistry: remove Dr Maria Fitzgibbon and add Dr Sean Costello Blood Transfusion: Updated contact details of BT &amp; HV personnel Haematology: added Dr Norma Reidy as Chief Medical Scientist at extension 22544 and corrected Ms Mary Ring’s number to 22544 Immunology Remove Peter Annis add Katherine Hooley Pathology: Remove Dr Adeline Chelliah and Gail O’Brien add Dr Susan Prendeville</td>
</tr>
<tr>
<td>• 4.7 Instructions for transportation of samples, including any special handling needs</td>
<td>Haematology Added: Samples for specialised coagulation must arrive into laboratory within 4 hours of phlebotomy.</td>
</tr>
<tr>
<td>7 Ordering of laboratory examinations</td>
<td>Blood Transfusion: Make reference to the use of the CUMH MN_CMS system for BT specimens and request forms</td>
</tr>
<tr>
<td>• Section 7.2</td>
<td>Virology: Storage time changed from 4 weeks to 1 week from reception date. The following text was deleted “However, samples &gt;48 hours are not suitable for additional antibiotic assay.”</td>
</tr>
<tr>
<td>• Section 7.3</td>
<td>Microbiology (Virology): The following text was deleted. “Clotted Blood for Antibiotic Assay Specimens must be sent to the laboratory within 2 hours of venepuncture. Any delay may affect the accuracy of the final result.”</td>
</tr>
<tr>
<td>• Section 7.5</td>
<td>Sample Collection</td>
</tr>
<tr>
<td>• Section 8.2</td>
<td>Virology: “All abnormal antibiotic assay results” deleted, and the following tests entered, Toxoplasma IgM, EBV IgM, CMV IgM, Parvovirus IgM, Rubella IgM, Leptospira IgM, Mycoplasma pneumoniae IgM, urinary antigens, RSV antigen.</td>
</tr>
<tr>
<td>9 • 9.4 Healthlink Messaging - Electronic delivery of laboratory reports to the GP practice</td>
<td>If you have any problems with any aspect of GP messaging your first point of contact is your GPPMS software provider or the Healthlink (01) 828 7115 or email <a href="mailto:info@healthlink.ie">info@healthlink.ie</a></td>
</tr>
</tbody>
</table>
10 Information Technology

- Section 10.5.3
  Ensure that labels printed match the details of patient identified for phlebotomy.
  Ensure labels are affixed to correct bottles. Do not cover specimen blood volume or container ‘fill to’ marks.

12 Blood Transfusion

- Updating BT Laboratory 2016 data.
  Make reference to the use of the CUMH MN_CMS system for BT specimens & Request Forms.
  Updating plasma storage and thawing parameters.
  More clarity to collection process of blood components.
  Split Haemovigilance section into General HV and section specifically for HV Training and Policies including requirement for clinical staff to attend HV training and referencing the clinical HV documents.

13 Test Directory (A-Z)

- ADAMTS13
  Added that samples can only be referred to UCL Monday or Tuesday (via Biomnis)

- Adenovirus Immunofluorescence
  Deleted.

- Antenatal Screen
  Comment: "Varicella-zoster virus (VZV) IgG" added.
  Report: "(IU/mL for Rubella IgG)" added.

- Antibiotic Assays
  Laboratory changed to Microbiology (Virology deleted).

- Arthralgia Screen
  Deleted.

- Atypical Pneumonia Screen
  Deleted.

- Bartonella henselae and quintana antibodies (IgG and IgM)
  Deleted.

- Blood Group and Crossmatch
  Included reference to "Add On" requests for crossmatched blood.

- Ceruloplasmin
  Changed ref range to : 0.18-0.58 g/L

- CSF (Culture and Sensitivity)
  Transport ASAP, directly to the laboratory

- Cryptosporidium spp. and Norovirus
  Added a comment: A Target Not Detected result does not automatically exclude infection from the above enteric pathogen as the level of DNA present may be lower than the limit of detection of the assay.

- ESR add-on
  Corrected to 24 hours

- Exanthem Screen
  Deleted.

- Flow Cytometry
  "Do not refrigerate" changed to "Samples may be refrigerated overnight. Optimal sample age less then 48 hours"

- Full Blood Count Reference intervals
  Added exact ages to the table.
  Addes Note: 6ml purple EDTA Vacuette or any other sample type is unsuitable for FBC

- G6PD add-on
  Added 24 hours

- Haptoglobin
  Changed ref range to : 0.44-2.15 g/L

- Heparin /PF4 Antibody Test
  (HIT; Heparin Induced Thrombocytopenia screening test)
  Request form must be completed and the site to access this is added.

- Hepatitis A Total Antibody
  Changed to Hepatitis A IgG Antibody.

- Hepatitis B Viral Load
  Deleted.

- Hepatitis C Viral Load
  Deleted.

- Human Immunodeficiency Virus (HIV) Viral Load
  Deleted.

- Human Metapneumovirus Immunofluorescence
  Deleted.

- Human Metapneumovirus Molecular
  Deleted.

- Influenza A and B
  Deleted.
<table>
<thead>
<tr>
<th>Immunofluorescence</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Influenza A and B Molecular</td>
</tr>
<tr>
<td>- Intra-Uterine Infection Screen/TORCH Screen</td>
</tr>
<tr>
<td>- JAK 2 Exon 12</td>
</tr>
<tr>
<td>- <em>Legionella pneumophila</em> Total (IgG + IgM) Antibodies</td>
</tr>
<tr>
<td>- Lupus tests</td>
</tr>
<tr>
<td>- Lyme Serology</td>
</tr>
<tr>
<td>- Lymphoma Granuloma</td>
</tr>
<tr>
<td>- Measles IgG Antibody</td>
</tr>
<tr>
<td>- Mumps IgG Antibody</td>
</tr>
<tr>
<td>- Mycobacteria Testing</td>
</tr>
<tr>
<td>- <em>Mycoplasma pneumoniae</em> IgM</td>
</tr>
<tr>
<td>- PAI-1 (Plasminogen Activator Inhibitor)</td>
</tr>
<tr>
<td>- Parainfluenza Immunofluorescence</td>
</tr>
<tr>
<td>- Parainfluenza Molecular</td>
</tr>
<tr>
<td>- Parvovirus B19 IgG and IgM</td>
</tr>
<tr>
<td>- Prothrombin Tim</td>
</tr>
<tr>
<td>- Protein S Reference Range</td>
</tr>
<tr>
<td>- Respiratory Syncytial Virus (RSV) Immunofluorescence</td>
</tr>
<tr>
<td>- Respiratory Syncytial Virus (RSV) Molecular</td>
</tr>
<tr>
<td>- Respiratory Viral Screen (Immunofluorescence)</td>
</tr>
<tr>
<td>- Respiratory Viral Screen (Molecular)</td>
</tr>
<tr>
<td>- Rubella IgG Antibody</td>
</tr>
<tr>
<td>- Swine Flu</td>
</tr>
<tr>
<td>- Thrombophilia tests,</td>
</tr>
<tr>
<td>- (PC, PS, APCR ATIII) lupus tests, Factor assays, Inhibitor screen</td>
</tr>
<tr>
<td>- Urine Culture</td>
</tr>
<tr>
<td>- 25 OH Vitamin D</td>
</tr>
</tbody>
</table>

Whole Document

All references to "Virology" changed to "Infectious Diseases Serology".
3 INTRODUCTION

3.1 Overview
The profile of laboratory services offered has changed dramatically in recent years and continues to evolve as new technologies and methodologies are discovered. It is our hope that this User Handbook will familiarise the user with departmental policies as well as specific test requirements.

Laboratory policy statements include brief descriptions of each laboratory, location for specimen delivery, key contact personnel, the hours of operation and instructions concerning specimen collection and transportation to the laboratory. Specific criteria for refusal of requests for examination of specimens should be noted. Regrettably service may not be provided if acceptance criteria are not fulfilled. Other special instructions are also included as well as details of the out-of-hours (on-call) service.

In order to obtain the best possible laboratory services, it is essential to ensure that all specimens are collected properly, and that both the specimen and request form are labelled with the appropriate information.

All tests are listed alphabetically in the “Laboratory Medicine Test Directory” with complete ordering information including the name of the test, department that will process the specimen, specimen and container required, reference intervals (where appropriate), special comments and turnaround times.

The information in this handbook is subject to change and will be updated to keep the information current.

3.2 Disclaimer
This handbook has been prepared by laboratory staff at Cork University Hospital and every care has been taken in its compilation. This handbook is intended to be used as a guide only. Practitioners should use this handbook as a guide to individual testing on the basis of clinical findings, not as a complete or authoritative statement of such testing.

Laboratory Medicine shall not be liable to users of the handbook nor to any other person, firm, company or other body for any loss, direct, indirect, or consequential, in contract or in tort or for any negligent mis-statement or omission contained herein, by reason of, arising from or in relation to any such user, other person, company or body relying or acting upon or purporting to rely or act upon any matter contained in this handbook.
3.3 Major Objectives

Laboratory Medicine is committed to providing the highest quality diagnostic and consultative services for all its users.

Major Objectives
1. To provide examinations that are fit for their intended use;
2. To provide all employees with the knowledge, training, and tools necessary to allow for the completion of accurate and timely work;
3. To provide an effective service to its users;
4. To uphold professional values and conduct;
5. To provide safe and suitable conditions for all staff and visitors to the laboratory;
6. To procure and maintain equipment and other resources needed for the provision of the service;
7. To ensure that all personnel are familiar with the contents of the Quality Manual and all procedures relevant to their work;
8. To collect, transport and handle of all specimens in such a way as to ensure the correct performance of laboratory examinations;
9. To report results of examinations in ways which are timely, confidential, accurate and clinically useful;
10. To operate a quality management system to integrate the organisation, procedures, processes and resources.
4  GENERAL INFORMATION

4.1  The location of the laboratory

Laboratory Medicine at Cork University Hospital is situated on the ground floor of the main Cork University Hospital building and can be accessed via the ground floor of the main hospital building.

The postal address of the CUH laboratory service is:
Laboratory Medicine
Cork University Hospital
Wilton
Cork City
Ireland

There are six Departments within CUH Laboratory Medicine whose main activities are described below.

<table>
<thead>
<tr>
<th>Department /Section</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Blood Transfusion</td>
<td>Ground floor, Laboratory building</td>
</tr>
<tr>
<td>2. Clinical Biochemistry</td>
<td>Ground floor, Laboratory building.</td>
</tr>
<tr>
<td>• Molecular Genetics</td>
<td>Ground floor on the link corridor between outpatients and laboratory reception</td>
</tr>
<tr>
<td>3. Clinical Microbiology</td>
<td>First floor, Laboratory building</td>
</tr>
<tr>
<td>• Infectious Diseases Serology</td>
<td>Located on the ground floor, opposite Physiotherapy department.</td>
</tr>
<tr>
<td>4. Haematology and Coagulation</td>
<td>Ground floor, Laboratory building</td>
</tr>
<tr>
<td>• Haematinsics</td>
<td>Ground floor, by outpatients</td>
</tr>
<tr>
<td>• Molecular Genetics</td>
<td>Ground floor on the link corridor between outpatients and laboratory reception</td>
</tr>
<tr>
<td>5. Pathology</td>
<td></td>
</tr>
<tr>
<td>• Histopathology</td>
<td>First Floor, Laboratory building (Swipe access only)*</td>
</tr>
<tr>
<td>• Cytopathology</td>
<td></td>
</tr>
<tr>
<td>• Electron Microscopy /Renal</td>
<td>Ground Floor, CUH (Adjacent to Theatre 9)</td>
</tr>
<tr>
<td>• Post Mortem</td>
<td>Ground Floor, Laboratory building adjacent to Biochemistry</td>
</tr>
<tr>
<td>• Neuropathology</td>
<td>Ground floor on the link corridor between outpatients and laboratory reception</td>
</tr>
<tr>
<td>6. Autoimmune Serology</td>
<td>Autoimmune Serology shares the ground floor of the Laboratory building with the Haematology and Biochemistry Departments.</td>
</tr>
</tbody>
</table>

*It is advisable that external couriers have contact numbers for laboratories, as laboratories are swipe access only.*
### 4.2 Opening Hours and Laboratory Telephone Extension Numbers

Prefix (021) 49 for direct access from outside Cork University Hospital. The telephone enquiry service should be used for emergency enquiries only.

Sample Deadline denotes the cut-off for receipt of routine samples. A detailed list of on-call tests is outlined in the section "On-Call Tests".

<table>
<thead>
<tr>
<th>Category</th>
<th>Contact No</th>
<th>Opening Hours</th>
<th>Sample Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Transfusion Laboratory</td>
<td>Ext. 22537</td>
<td>08:00-20:00 Mon-Fri</td>
<td>17:00 (Mon-Fri)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>09:00-12:00 Sat</td>
<td>09:30 (Sat)</td>
</tr>
<tr>
<td>Antenatal Section of Laboratory</td>
<td>Ext: 22668</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood Transfusion Laboratory Fax Number: (021) 4922004</td>
<td></td>
<td>Only emergency samples will be processed during the out-of-hours service.</td>
<td>A detailed list of on-call tests is outlined in the section “On-Call Tests”.</td>
</tr>
<tr>
<td>Medical Scientist On-call</td>
<td>Bleep:199</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical Biochemistry</td>
<td>Ext. 22528</td>
<td>08:00-20.00 Mon-Fri</td>
<td>16:30 Mon-Fri</td>
</tr>
<tr>
<td>Endocrinology / Tumour Markers</td>
<td>Ext. 22528</td>
<td>Only emergency samples will be processed during the out-of-hours service.</td>
<td>A detailed list of on-call tests is outlined in the section “On-Call Tests”. Non urgent specimens will be stored at 4°C and processed the next working day.</td>
</tr>
<tr>
<td>Molecular Genetics</td>
<td>Ext. 22361 /22531</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Therapeutic Drug Monitoring (TDM)</td>
<td>Ext. 22528</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific Proteins / Immunology</td>
<td>Ext. 22535</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical Scientist on call</td>
<td>Bleep: 253</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical Microbiology</td>
<td>Ext. 22501</td>
<td>09:00-17:00 Mon-Fri</td>
<td>16:30 Mon-Fri</td>
</tr>
<tr>
<td>Main Laboratory</td>
<td>Ext. 22503 /22505</td>
<td>Limited service after 17:00</td>
<td></td>
</tr>
<tr>
<td>Routine Bacteriology, Mycology</td>
<td>Ext. 22506</td>
<td>Only emergency samples will be processed during the out-of-hours service.</td>
<td>A detailed list of on-call tests is outlined in the section “On-Call Tests”. Non urgent specimens will be stored appropriately and processed the next working day.</td>
</tr>
<tr>
<td>and Antibiotic Assays</td>
<td>Ext. 22823</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infectious Diseases Serology</td>
<td>Ext. 22821</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category 3 Laboratory - TB</td>
<td>Ext. 22821</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category 3 Laboratory - Enterics</td>
<td>Ext. 28074 / 28075</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infection Control</td>
<td>Bleep: 375</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical Scientist on call</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haematology and Coagulation</td>
<td>Ext. 22541</td>
<td>Routine hours are defined as 09:00 to 17:00, except for the following tests FBC and routine Coagulation which are analysed between 08:00 to 20:00 Mon-Fri, and 09:00 to 12:00 Sat</td>
<td>16:30 Mon-Fri 12:00 Sat</td>
</tr>
<tr>
<td>Clerical Office -Results/Enquiries</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Main Laboratory Haematinics

**Specimen reception**

<table>
<thead>
<tr>
<th>Ext.</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>20172</td>
<td></td>
</tr>
<tr>
<td>22128</td>
<td></td>
</tr>
<tr>
<td>22547</td>
<td></td>
</tr>
</tbody>
</table>

**Medical Scientist on call (Haematology):**

- **Bleep:** 377

Only emergency samples will be processed during the out-of-hours service. A detailed list of on-call tests is outlined in the section “On-Call Tests”. Non urgent specimens will be stored and processed the next working day.

### Pathology

<table>
<thead>
<tr>
<th>Pathology</th>
<th>Contact No</th>
<th>Opening Hours</th>
<th>Sample Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Histopathology (Laboratory)</strong></td>
<td>Ext:22792</td>
<td>08:00-18:00 Mon-Fri 09:00 12:00 Sat 08:00-18:00 Mon-Fri</td>
<td>17:30 Mon-Fri Fixed &amp; unixed specimens 11:45 Sat. Fixed specimens only</td>
</tr>
<tr>
<td>Secretariat</td>
<td>Ext:22514/22510</td>
<td>08:00-18:00 Mon-Fri</td>
<td></td>
</tr>
<tr>
<td><strong>BreastCheck</strong></td>
<td>Ext:20497</td>
<td>08:00-18:00 Mon-Fri</td>
<td></td>
</tr>
<tr>
<td>Deirdre Galvin (Admin. Officer)</td>
<td>Ext:22883</td>
<td>08:00-18:00 Mon-Fri</td>
<td></td>
</tr>
<tr>
<td><strong>Cytopathology</strong></td>
<td>Ext. 22511</td>
<td>9am 5pm Mon Fri No service on Sat</td>
<td>4.30pm</td>
</tr>
<tr>
<td><strong>Specimen Reception</strong></td>
<td>Ext. 22792</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Consultant Pathologist</strong></td>
<td>Ext.22514/22510</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Post Mortem /Mortuary Services</strong></td>
<td>Ext. 22525/22883</td>
<td>24 hour service</td>
<td>11am cut-off</td>
</tr>
<tr>
<td><strong>Renal Pathology/Electron Microscopy</strong></td>
<td>Ext 21315 Bleep: 379</td>
<td>08:00-16:00 Mon-Fri</td>
<td>Mon – Fri 8am to 15:30pm</td>
</tr>
</tbody>
</table>

**Out of hours contact Pathologist on call via switch.**

- **Neuropathology Office**
  - **Ext. 22520**
  - **Opening Hours:** 09:00-17:00 Mon-Fri
  - **Sample Deadline:** 16:00 Mon-Fri

- **Neuropathology Laboratory**
  - **Ext. 22519**

**Mobile for Consultant Neuropathologist on call:** Contact CUH switchboard

### Immunology

<table>
<thead>
<tr>
<th>Immunology</th>
<th>Contact No</th>
<th>Opening Hours</th>
<th>Sample Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Autoimmune Serology</strong></td>
<td>Ext. 22535</td>
<td>08:00-17:00 Mon-Fri No service on Sat</td>
<td>16:30 Mon-Fri</td>
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### Laboratory Medicine Information Systems

<table>
<thead>
<tr>
<th>Laboratory Information Systems</th>
<th>Contact No</th>
<th>Opening Hours</th>
<th>Sample Deadline</th>
</tr>
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<tbody>
<tr>
<td><strong>Helpdesk</strong></td>
<td>Ext. 20150</td>
<td>09:00-17:00 Mon-Fri No service on Sat</td>
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</table>

This document is designed for online viewing. Printed copies, although permitted, are deemed Uncontrolled from 23:59 hours on 11/09/17.
### 4.3 Contact Details

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Tel Ext.</th>
<th>E. mail</th>
</tr>
</thead>
<tbody>
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<tr>
<td>Deirdre Harrington</td>
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<tr>
<td>Ms Connie Foley</td>
<td>Haemovigilance Midwife (CUMH)</td>
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<tr>
<td>Ms Patricia O’Leary</td>
<td>Haemovigilance Midwife (CUMH)</td>
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<td>7872163</td>
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<tr>
<td>Medical Scientist on call in Blood Bank: Bleep No:</td>
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<td></td>
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<tr>
<td>Dr Sean Costello</td>
<td>Consultant Clinical Biochemist</td>
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<tr>
<td>Neuropathology</td>
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</tr>
</tbody>
</table>

An urgent on call service is provided weekdays from 9.00 am Monday to 5.00 pm Friday and a limited on call at certain weekends only. For Neuropathologist on call rota and mobile contact nos. please check with Hospital Switchboard.
4.4 Availability of clinical advice on ordering of examinations and on interpretation of results

1. Clinical advice on ordering of examinations and on interpretation of examination results is available and can be obtained by contacting the appropriate clinical team (refer to section 4.3).
2. Interpretation and clinical advice is provided on the report where appropriate.
3. Refer to section 5.0 for further information regarding the ordering of examinations.
4. Refer to the A-Z Test Directory for a list of tests performed, samples required, primary sample volumes, special precautions, turnaround time, biological reference intervals, and clinical decision values.
5. Haematology Virtual Clinic provides a service to referring GP’s, outpatient clinics, other CUH medical/surgical departments and outside hospitals whereby they receive advice and helpful guidelines from the Consultant Haematologists. The main purpose of this service is to save patients unnecessary trips to the haematology outpatient clinics which are already heavily overbooked. It allows GP’s etc to follow up and treat their patients in the community as a result of the advice they receive from the haematology consultants.

4.5 The laboratory’s complaint procedure

The goal of Laboratory Medicine is to ensure that our users receive accurate, reliable, meaningful and timely laboratory results. It is your right as a service user of the HSE to make a complaint if you believe that standards of care, treatment or practice fall short of what is acceptable. If you need to make a complaint, we want the process to be easy, effective and fair.

In order to help you to do so please contact the appropriate Department, the Laboratory Manager or the Quality Manager (refer to 4.3 for contact details) or one of the Hospital complaints officers:

- [http://www.hse.ie/eng/services/yourhealthservice/feedback/Complaints/Officers/Hospital/South.html](http://www.hse.ie/eng/services/yourhealthservice/feedback/Complaints/Officers/Hospital/South.html)

HSE policy and procedures for 'The Management of Consumer Feedback to include Comments, Compliments and Complaints in the Health Service Executive' can be accessed through the HSE website or by clicking on the following link:

- [‘Your Service, Your Say’ The Policy and Procedures for the Management of Consumer Feedback to include Comments, Compliments and Complaints in the HSE (.pdf - 2812 KB)](http://www.hse.ie/eng/services/yourhealthservice/feedback/Complaints/Officers/Hospital/South.html)

4.6 Policy on protection of personal information

Laboratory Medicine is committed to protecting the privacy of personal information of its service users and patients. In the course of their work, health service staff are required to collect and use certain types of information about people, including 'personal data' as defined by the Data Protection Acts 1988 & 2003. The HSE has a responsibility to ensure that this personal data is;

- obtained fairly
- recorded correctly, kept accurate and up-to-date
• used and shared both appropriately and legally
• stored securely
• not disclosed to unauthorised third parties
• disposed of appropriately when no longer required

All staff working in the HSE are legally required under the Data Protection Acts 1988 and 2003 to ensure the security and confidentiality of all personal data they collect and process on behalf of service users and employees. Data Protection rights apply whether the personal data is held in electronic format or in a manual or paper based form.

HSE policy and procedures with regards to Data Protection can be obtained through the following link:
http://www.hse.ie/eng/services/yourhealthservice/info/DP/

4.7 Instructions for transportation of samples, including any special handling needs

Instructions for the transport of specimens to the Laboratory are described in a separate procedure for Sample Transportation: PPG-CUH-PAT-36.

NOTE: All Urgent Biochemistry samples should be brought directly to the Biochemistry Laboratory and handed directly to a member of staff.

Urgent samples from GP’s should be sent in the bag specifically labelled ‘Biochemistry Urgent Samples’ to allow for prompt processing. A supply of labelled bags is available from Biochemistry.

All GP Coagulation and Urgent Haematology specimens must be put into a separate transport/delivery bag, labelled ‘Coagulation and Urgent Haematology Specimens only’ to allow for prompt processing.

Samples for specialised coagulation must arrive into the laboratory within 4 hours of phlebotomy.
5 TYPES OF CLINICAL SERVICES OFFERED BY THE LABORATORY

5.1 Autoimmune Serology
Autoimmune serology provides a service for the screening and diagnosis of a large range of autoantibody associated diseases. These diseases include Rheumatoid arthritis, Systemic Lupus Erythematosus and Coeliac disease. Immunofluorescence, Elisa and other methodologies are undertaken in this section to detect the presence of autoantibodies in the serum of patients with suspected Autoimmune disease.

While Autoimmune Serology strives to provide a comprehensive in-house service for the more commonly encountered Autoimmune diseases, some auto antibodies - associated with less frequently encountered clinical conditions require off-site analysis. These serum samples are sent to external accredited laboratories for autoantibody determination. Please note that the use of external laboratories will increase the Turn Around Times (TAT’s) for these assays.

Examinations referred to other laboratories: Tests not done on-site are referred to outside laboratories for analysis. Test information is included in the test directory.

Information regarding in-house and referred tests is available in the Test Directory. Stated volumes required apply to adult patients. For paediatric samples please send as much blood (up to adult volume) as possible.

Because individual tests are often grouped into profiles, and secondary confirmatory assays are often undertaken, small blood volumes may result in incomplete analysis.

5.2 Department of Clinical Biochemistry
Clinical services offered (including examinations referred to other laboratories)
Clinical Biochemistry is a consultant led service that provides a diagnostic, analytical and interpretative service for a large range of analytes in body fluids. Clinical Biochemistry deals with the biochemical basis of disease and the use of biochemical tests for its diagnosis, prognosis, screening and management. The laboratory provides a reliable analytical service and advice on the management of patients with metabolic disturbances.

As well as routine diagnostic work, the Department is actively involved in teaching students of medical science, science, and medicine. The Department has research and teaching links with the Departments of Medicine and Pathology of UCC and with Cork Institute of Technology Biological Sciences Department. The Laboratory is involved in collaborative research with clinical colleagues, international collaborators in the EU IST framework and postgraduate research is also carried out. Staff members contribute as lecturers and project mentors to the UCC/CIT MSc. in Biomedical Sciences. The Royal College of Pathologists recognises the department for higher specialist training in Clinical Biochemistry.

Information regarding in-house and referred tests is available in the Test Directory. Services offered include:
- Routine Clinical Biochemistry e.g. liver, renal, cardiac, bone, glucose
- Lipids, e.g. cholesterol, triglycerides, lipoproteins
- Endocrinology, e.g. thyroid function, infertility testing, pituitary disorders
• Specific proteins, e.g. immunoglobulins, allergies, acute phase proteins
• Therapeutic drugs
• Cardiac markers
• Toxicology
• Molecular Genetics, e.g. Haemochromatosis

Tests not done on-site are referred to outside laboratories for analysis. Test information is included in the test directory.
For advice on molecular genetic investigations, contact Principal Biochemist (ext 22531).

5.3 Department of Clinical Microbiology

Clinical services offered (including examinations referred to other laboratories)
Clinical Microbiology is a consultant led service that offers a comprehensive range of diagnostic services in routine Bacteriology, Mycobacteriology, Mycology, Parasitology, Infectious Diseases Serology and Molecular Diagnostics as well as consultation in microbiology, infectious diseases and antibiotic utilisation and provision of statistical and cumulative data for infectious disease monitoring. The medical team is available at all times for consultation on any aspect of microbiology and infection control.

In addition to diagnostic services, education and training are an integral part of the daily routine of the department, with established links to the Medical and Science Faculties at University College Cork and the Biological Sciences Department of the Cork Institute of Technology. The laboratory is also involved in teaching both medical and biomedical science students and is involved in collaborative research work with clinical colleagues. The department is accredited by the Royal College of Pathologists for specialist training in Clinical Microbiology.

Information regarding in-house and referred tests is available in the Test Directory.
Services offered include:
1. Routine Bacteriology: Examination of Urine, Sputum, Blood, CSF and Swabs etc.
2. Serological testing for Hepatitis, HIV, Syphilis, Leptospirosis, etc. Please refer to the Test Directory for acceptable sample types for each test. Only the sample types specified will be tested. Any other sample types will be rejected and will NOT be tested.
3. Molecular testing for Chlamydia trachomatis, N. gonorrhoea and enteric pathogens is performed in-house.
4. Parasitology includes the investigation of faeces specimens for evidence of infestation.
5. Mycology: Examination of specimens such as skin scrapings and specimens from systemic infections for the presence of pathogenic fungi.
6. TB Laboratory: The investigation of specimens for Mycobacterium spp.

Tests not done on-site are referred to outside laboratories for analysis. Test information is included in the test directory.

General collection and transport guidelines:
1. Where possible, collect the specimen prior to the administration of antimicrobial therapy.
2. Collect the specimen with as little contamination from indigenous microbial flora as possible to ensure that the specimen will be representative of the infective site.
3. Collect the specimen using sterile equipment and aseptic technique to prevent the introduction of contaminating micro-organisms.
4. Collect an adequate amount of the specimen. Insufficient specimens may yield false-negative results.
5. Most specimens collected with a swab and transported dry are unacceptable.
6. Identify the specimen source and/or specific site correctly so that proper culture media will be selected during processing in the laboratory. Special requests such as Diphtheria, Actinomyces, Nocardia etc. should be noted on the microbiology request form.
7. Specimens should be transported as soon as possible.
8. If processing is delayed, refrigeration is preferable to storage at ambient temperature, with the following exceptions:
   - Blood cultures – hold specimen at room temperature
   - CSF – hold specimen at room temperature – do not transport through pneumatic tube system
   - Specimens for the detection of gonococci (keep GC specimens at room temperature)
   - Mycology specimens
9. Microbial cultures submitted by other laboratories for further identification should be submitted in pure culture on the appropriate medium in a sealed, screw-capped slope. Petri plates are acceptable if properly sealed for immediate transport.
10. Include foreign travel stating country as certain diseases/infections are associated with certain parts of the world.

Note: Telephone the laboratory if the proper procedure is in doubt.

5.4 Department of Haematology and Coagulation

Clinical services offered (including examinations referred to other laboratories)

The Haematology Department is a consultant led service that provides a comprehensive range of laboratory tests and clinical support for the management of haematological disorders.

Haematology is a regional laboratory service, in addition to stat and urgent service provision to the theatres, day services, cancer care and accident and emergency departments of CUH/CUMH. The laboratory accepts samples from Cork Dental Hospital, other citywide hospitals which have no laboratory facility (e.g. St. Finbarr’s Hospital) and General Practitioners. The Haematology laboratory is the referral laboratory for other HSE-South hospitals Bantry and Mallow and Kerry General Hospital, in which full range of testing is not available. The laboratory serves a catchment area of just over 450,000 for non-routine testing

As well as providing the diagnostic services provided, education and training are an integral part of the daily routine within the laboratory with established links to the Medical and Science faculties at UCC and the Biological Sciences department of the Cork Institute of Technology (CIT). Members of staff regularly teach at both institutions. In addition an
Irish Committee of Higher Medical Training/Royal College of Pathologists approved structured training programme for Non Consultant Hospital Doctors (NCHDs) is well established within the laboratory as are trainee medical scientist programmes approved by the Academy of Medical Laboratory Science. The laboratory is also involved in both intradepartmental and collaborative research.

Information regarding in-house and referred tests is available in the Test Directory.

Services offered include:

1. **Full Blood Counts**
   - Routine FBC which consists of a full blood count and white cell differential and Reticulocyte Count and Nucleated Red Blood Cell Counts in newborn babies.
   - The investigation of possible Haemolytic Anaemias includes the following tests: FBC (including the percentage of hyperchromic RBCs), Reticulocyte Count, RBC morphology
   - ESR

2. **Coagulation**
   - PT and INR to monitor Warfarin and Di-coumarin therapy
   - APTT to monitor intravenous Heparin therapy and the investigation of inherited and acquired bleeding.
   - Routine Screen for investigation of bleeding disorders: INR, APTT, Fibrinogen and Platelet Count. In the event of abnormal results occurring in the Intrinsic or Extrinsic Pathways the relevant Factor deficiencies are investigated including screens for Von Willebrand’s disease and Inhibitor screens
   - Anti-Factor Xa to monitor Low Molecular Weight Heparin therapy
   - Platelet function abnormalities are investigated by performing Platelet Function Tests.
   - Thrombophilia Screen: Appropriate ordering for Thrombophilia for the investigation of thrombotic episodes must be 6 weeks post thrombotic episode. Patients on anticoagulants are not suitable for Thrombophilia screening, see BCSH Guidelines.
   - Lupus Anticoagulant screen: PT, APTT, Fibrinogen assay, AFSL, and DVVT

   The TAT’s cited in the directory for the assays involved in the Thrombophilia Screen, refers to the time that the results are available in the Haematology Laboratory. The TAT for the full report is 3 - 4 weeks.

3. **Thrombophilia**
   Indications: Check BCSH guidelines published December 2010 to prevent unnecessary testing of patients, copy and paste following link to browser for guidelines: www.bcshguidelines.com/documents/Heritable_thrombophilia_bjh_07_2010.pdf

4. **Bone marrow investigations**
   Bone marrow examinations are undertaken when investigating patients for Leukaemia, Lymphoma, Myeloma, Myelofibrosis and Platelet abnormalities e.g. Thrombocytopenia / Thrombocytosis.
   Bone Marrow investigations for add on tests: contact Haematology Laboratory.
5. Flow Cytometry
Flow cytometry is used in the diagnosis and classification of acute leukaemia, chronic lymphoid leukaemia and Non-Hodgkin’s lymphoma. The technique employs fluorochrome-labelled monoclonal antibodies directed against specific cellular antigens. Abnormal cell populations are characterised by multiparameter analysis, using forward light scatter, side scatter and fluorescence signals to classify /identify each cell type (immunophenotype). Other applications of this technique include immune monitoring and lymphocyte subset analysis, e.g. CD4 count for HIV.

6. Haematinic Assays
Haematinic studies consist of serum B12, Folate and Ferritin assays. Vitamin B12 and Folate assays are carried out in the investigation of macrocytic anaemias. B12, Folate and Ferritin should be requested for investigation of abnormal FBC results and relevant clinical syndromes.
Use of haematinsics for screening of well patients is not recommended. Requests should be accompanied by clinical details. When B12 results are low Intrinsic Factor Antibody investigation is carried out. Serum Ferritin assays are performed when microcytic hypochromic anaemia is suspected, or cases of suspected Haemachromatosis. See BCSH guidelines.
N.B. Interference in these assays may occur in patients receiving or having diagnostic procedures utilizing monoclonal antibodies.

7. Haemoglobinopathy Screening and Glycosylated Haemoglobin Assays:
Investigation of possible haemoglobinopathy includes the following tests:
• HbS Screening test
• Hb Electrophoresis
• Hb Quantitation
Determined using HPLC / Electrophoresis Technologies
Glycosylated Haemoglobin assays are used in monitoring diabetic patients as the levels reflect time-averaged blood glucose levels. HbA1c is an objective test of metabolic control, which is independent of the patient’s cooperation, the time of day, insulin administration, meals, or exercise and provides the physician with an unbiased indication of the efficacy of prescribed therapy.

8. Autologous Stem Cell Storage and Reinfusion:
This is a clinical Haematology service used in the treatment of patients with Leukaemia, Lymphoma, and Myeloma. For further information contact the Consultant Haematologist.

Emergency Specimens
Laboratory must be informed of specimens which are emergencies and they will be processed within time frame stated for emergencies for each test.

Examinations referred to other laboratories:
Test information is included in the test directory.
5.5 Department of Pathology

Pathology is a comprehensive consultant led service, which includes Histopathology, Frozen Section, Direct Immunofluorescence, Electron Microscopy, Diagnostic Cytopathology, Neuropathology and a Post mortem service.

Information regarding in-house and referred tests is available in the Test Directory.

Autopsies /Post-Mortems

All persons who die in Cork University Hospital (not CUMH) are initially transferred to the mortuary, even if an autopsy is not indicated. A body cannot be released from the mortuary and funeral arrangements cannot be finalised until the mortuary staff can verify whether or not an autopsy will be required.

Please contact the Anatomical Pathology Technician at Ext: 22525 as soon as possible after ALL deaths to help clarify these issues.

Under no circumstances should anyone commit to either scheduling a post mortem or releasing a deceased person, as this is the responsibility of the post-mortem room staff.

Coroner’s Autopsies

The following types of death must be reported to the Coroner.

- Where the death may have resulted from an accident, suicide or homicide.
- Where any question of misadventure arises in relation to the clinical or pharmaceutical treatment of the deceased.
- Where a patient dies before a clinical diagnosis is made.
- Where a patient dies within 24 hours of admission to hospital.
- Where the death occurred while a patient was undergoing an operation, or was under the effect of an anaesthetic, or following an operation.
- Where the death occurred during, or as a result of, any procedure.
- Where the death resulted from any industrial disease.
- Where the death was due to neglect or lack of care (including self-neglect)
- Where the death occurred due to hospital service acquired infection

Do not ask the next of kin for consent to perform an autopsy examination if any of the above circumstances apply. If you have any doubt as to whether or not a death is properly reportable, consult with the Coroner who will advise accordingly. The fact that a death is reported to the Coroner does not mean that an autopsy will always be required.

The Cork City Coroner (Dr. Myra Cullinane) phone number is 086-2941446.

Cremation

If the family wishes to have the body cremated, the arrangements must be made by them through the Funeral Director/Anatomical Pathology Technician.

The Funeral Director/Anatomical Pathology Technician will liaise with the appropriate doctor who will complete the Medical Certificate Form (Form C).

Alternatively, if the death is a Coroner’s case, Form D will be completed by the Coroner.

It is the policy of Cork University Hospital to refer all documents relating to cremation to the Coroners office for completion. Cardiac pacemakers and/or any radioactive implant must be removed prior to a cremation (and, if appropriate, this action notified to the Coroner).
## Request / Hospital autopsies

Do not ask next of kin for consent to perform an autopsy examination if the death is properly reportable to the Coroner. (See “Coroner’s autopsies” above.) The family member granting consent should be the next of kin. Other immediate family members must not object to the examination. The doctor seeking consent (preferably SpR or Consultant) should explain fully to the next of kin the reasons for the examination, the answers sought etc. An information booklet “Information for next of kin/relatives on a hospital request post-mortem examination” EXT-CUH-PAT-665 (Form 452) is available which outlines the autopsy examination procedures at CUH and should be offered to the next of kin who is giving the consent.

The Consent to a Post Mortem Examination form (FOR-CUH-PAT-1109 (Form 450)) is quite detailed, but each section is critically important and must be completed in full. Incompletely or incorrectly filled Consent forms will not be accepted.

A Request for Post Mortem Examination form (FOR-CUH-PAT-1214 (Form 451)) must also be completed in full. Provide a brief clinical summary, the presumed cause of death, and list the specific problems to be examined.

The a) Consent form (FOR-CUH-PAT-1109 (Form 450)), b) Request form (FOR-CUH-PAT-1214 (Form 451)) and c) Medical Chart should be delivered to the post mortem room at the earliest opportunity. In addition the case should always be discussed in advance with the pathologist on PM duty.

A Request/Hospital autopsy service is available at CUH on weekdays. This service is not available at weekends or Bank Holidays. Please note that an autopsy examination requires significant scheduling. Requests received after 11.00a.m. are unlikely to be performed that same day.

## Perinatal Autopsy Examination

In the case of neonatal deaths, stillborn infants and foetuses >12 weeks gestational age, the protocol is as for an adult (see above section). Fully informed signed consent of the parent is required.

In the case of a fetus from a miscarriage ≤ 12 weeks gestation or in the case of any specimen which may contain a fetus or fetal tissue from this gestational age a “Consent to pathological examination of a fetus of ≤ 12 weeks gestational age” form (FOR-CUH-PAT-1627) needs to be completed and submitted to the pathology department. For full details of the protocol, contact the Histopathology Dept. at (021) 4922792.

## Neuropathology

Neuropathology provides a Consultant -provided quality diagnostic service mainly to Cork University Hospital for Neurosurgery, Neurology and Specialised Ophthalmology, outside referrals for approximately ⅓ of the country including all of the Cork hospitals, Tralee and Bantry and referrals from Limerick.
The following information is designed to help you use the Department:
Investigations: These include neurosurgical biopsies, neuromuscular biopsies, temporal artery biopsies, ophthalmic biopsies, CSF for Cytology, CSF for S100 and 14-3-3 protein, and blood for antineuronal antibodies. For advice regarding investigations contact the Consultant Neuropathologist ext 22520.

Request Forms. Please use the designated neuropathology request form for all requests. This is light grey (copies available from the Dept. extension 22520)

Patient Details. Please fill out the patient details correctly. Sticky labels are the best. Essential information for tissues must include patients MRN, full name, address, date of birth, nature of the specimen, hospital location, consultant to whom the report should be sent and relevant clinical information.

Protocols. Protocols for most investigations including muscle and nerve biopsy are available. Neurological/medical teams requesting surgeons to perform a biopsy should complete all the details on the neuropathology request form to accompany the patient to theatre. Please indicate the doctor to whom the results should go.

Autopsies/Brain referrals. For post mortems /Brain referrals on CNS disease cases please contact the Consultant Neuropathologist on duty. (Ext 22520). Coroner’s cases and Consent Autopsy protocols are shared with Histopathology (see Histopathology section). For information please ring ext 22520 or the post mortem room ext 22525.

High Risk Cases. Special precautions are required for investigations on atypical dementia and other high risk cases. Fresh CNS, CSF or tissue samples must be treated carefully and decontaminated according to recommended guidelines. Please consult the Neuropathologist on duty for advice. (ext 22520)

5.6 Point of Care Testing
The Executive Management Board (EMB) of CUH has established the Quality Safety Policy Evaluation Group (QSPEG) as the vehicle for the delivery of Clinical Governance throughout the Hospital. The EMB has also decided to adopt the Laboratory Medicine Policy Document for POCT, which was prepared for Accreditation, as hospital policy.

The Hospital Point of Care Committee has been established with similar terms of reference and standing as the Transfusion Committee or the Infection Control Committee to ensure the safe use of POCT with adequate guidelines to meet Patient Safety / Risk Management and Medico Legal concerns.

This means that the strict guidelines outlined in the Laboratory Medicine document, Point of Care Testing, are now the only accepted and appropriate way for the conduct of POCT activities at CUH.

Blood gas analysers and glucose meters situated outside the laboratory give high quality results if used and maintained correctly. Do NOT use this equipment unless you have been trained. Training courses are organised periodically by the Clinical Biochemistry
Laboratory. Follow the instructions for the disposal of waste in order to minimise health, safety and cross infection risks.

1. Blood Gas Analysers - Blood Gas Analysers are located in Intensive Care (General and Cardiac), Theatre, CUMH Neo Natal Units and Labour Wards.

2. Blood Glucose Meters - Blood Glucose Meters are located throughout the Hospital to monitor known diabetics. These are not to be used for the diagnosis of diabetes mellitus, for which a blood specimen must be sent to the laboratory.
6 INSTRUCTIONS FOR PATIENT-COLLECTED SAMPLES

6.1 Faeces / Stool Sample Collection

1. Specimen containers are available from the clinical area or general practitioner. Faeces / stool specimens are submitted for microbiology from patients with diarrhoea or stomach upset. Sometimes, a stool is sent on a person that has had close contact with a person that has had diarrhoea.

2. The container should be labelled with your full name, date of birth (or your Hospital Chart number if you have it), date / time of collection and the sample type, i.e. Faeces.

3. The sterile container should not be opened until you are ready to collect the sample.

4. Wash and dry your hands.

5. Do not submit faeces contaminated with urine or toilet water. Urinate into the toilet if needed.

6. Place plenty of lavatory paper in a clean potty or in the lavatory pan. Make sure there is no trace of disinfectant or bleach present, as this will interfere with the test. Faeces (a bowel movement) should then be passed on to the toilet paper. Do not send stool wrapped in toilet paper to the laboratory.

7. Note: If you have severe diarrhoea or a watery stool, a potty may be needed to collect the initial sample.

8. Open the container and, using the ‘spoon’ that is provided, transfer enough stool in order to fill approximately 1/3 of the container. Do not overfill the container. Also please ensure that the outside of the container is not soiled with stool.

9. You should ensure that the lid of the container is firmly closed. Note that a leaking container may be infectious. Place the container into the specimen bag attach to the laboratory request form.

10. Flush away the remaining paper and faeces down the lavatory.

11. Wash and dry hands thoroughly with soap and warm water.

12. Specimens should be brought to the laboratory as soon as possible.

6.2 Mid Stream Urine (MSU) Collection

1. Specimen containers are available from the clinical area or general practitioner.

2. The aim of collecting a mid stream urine sample is to help the doctor decide if you have a urinary tract infection (UTI or “kidney infection”). A ‘mid-stream’ sample is the best sample as the first urine you pass may be contaminated with bacteria from the skin.

3. The container should be labelled with your full name, date of birth (or your Hospital Chart Number if you have it), date / time of collection and the sample type, i.e. MSU.

4. The sterile container should not be opened until you are ready to collect the sample.

5. Prior to collection the genital area should be cleaned with tap water. Antiseptics should not be used. If the area is soiled, use soap and water and rinse thoroughly.

6. You should pass some urine into the toilet (discard the initial part of the urine sample); then without stopping the flow of urine, catch some urine in the sterile container (approximately half full). You should then finish passing urine.
into the toilet. Some specimen bottles contain boric acid preservative (red top container with white powder in it). Do not discard the white powder. Fill boric acid container to the line marked, close the lid and mix well. This gives the correct concentration of preservative. Do not use urinary dipstick on boric acid samples as this leads to erroneous results.

7. You should ensure that the lid of the container is firmly closed and place the container into the specimen bag attached to the laboratory request form.

8. Specimens should ideally be brought to the doctor’s surgery or laboratory within 2 hours of collection. If that is not possible the sample should be refrigerated until it can be brought to the doctor’s surgery or laboratory.

9. Wash and dry hands thoroughly with soap and warm water.

### 6.3 24 hour collection of urine

**Key Points;**
- Ensure that you are provided with a collection bottle (brown container) for the 24 hour urine collection before you leave the hospital.
- All of the urine passed during the 24 hour period should be collected. Failure to collect all urine may invalidate result.
- An exact timing of the 24 hour period is required.
- Ensure container is labelled with patient’s full name, date of birth, date of collection and time collection was started and time collection was finished.
- Do not void urine directly into the 24 hour container but into a suitable clean detergent free container and then pour urine into the 24 hour container.
- If the container contains a preservative, please exercise care when adding urine to the 24 hour container avoiding splashing.
- Keep container away from children at all times.

**Procedure;**
1. Empty your bladder at 8am on rising or at a more convenient time and discard that sample. The collection period has now started. Write start time on container.
2. Collect all urine passed during the next 24 hours and place in container.
3. On the following morning empty your bladder at 8am on rising (must be the same time as starting time) and add this sample to the collection. The collection is now complete. Write the finish time on the container.
4. Close the container cap securely and ensure container and request form contain required information
5. Bring collection to the laboratory on the day of completion.

**Incomplete collections;**
1. If you forget and lose a sample down the toilet, then discard all urine collected up to that time and start collection again.
2. If the collection requires a preservative return the container to the laboratory and request a new container.

### 6.4 Sputum Sample

1. Specimen containers are available from the clinical area or general practitioner. Sputum samples are submitted for microbiology from patients with a chest infection
2. The container should be labelled with the your full name, date of birth (or your Hospital Chart number if you have it), date / time of collection and the sample type, i.e. Sputum

3. Gargle and rinse mouth with tap water to remove food particles and debris. DO NOT use mouthwash or brush teeth with toothpaste immediately before collection.

4. Open the container and hold very close to mouth.

5. Take as deep a breath as possible and cough deeply from within the chest. DO NOT spit saliva into the container. Saliva is not a suitable specimen for examination. The specimen should look thick and be yellow or green in colour. There may be fluid with some green or yellow material.

6. Avoid contaminating the outside of the container. Close the lid tightly when specimen has been obtained.

7. Place specimen in plastic bag section of request form and seal bag.

8. Bring the container and form to your GP or the laboratory as soon as possible.

9. If there is unavoidable delay in transporting the specimen to the GP or Laboratory, it may be stored in a refrigerator prior to transportation. Prolonged delays will affect test results.

10. All sputum specimens should be transported to the laboratory in tightly capped containers placed in the plastic bag (attached to the form).

11. This should ideally then be placed in another leak-proof container before transport to the laboratory.

12. Specimens for TB testing:
   a. Three specimens are usually required. Take the specimens on 3 consecutive days. The ideal time to collect the specimens is early in the morning just after getting out of bed.
   b. Collect and transport all specimens as described above.

6.5 HbA1c collection

1. Wash your hands and dry thoroughly

2. Increase the needle size of your testing pen by two markers

3. Remove the top from the PINK blood bottle

4. Prod your finger

5. Blood needs to be dripped into the bottle

6. Ensure SMALL label with all relevant details is stuck to the smaller PINK topped bottle

7. Place small bottle in the larger universal container (MSU bottle), then in specimen bag

8. Seal plastic bag and fill in all details on form provided

9. Place in a padded/well protected envelope

10. Post the specimen/deliver to: CODE UN 3773, Haematology Dept, Cork University Hospital

**Blood sample must be submitted at least 2 weeks before clinic visit**
7 ORDERING LABORATORY EXAMINATIONS

7.1 Instructions for completion of the request form

1. For accurate identification of patients and specimens, it is essential that request forms be completed fully, legibly and accurately. Please remember that inadequate information on request forms makes it impossible to issue a report to the correct location or contact the doctor in case of urgent or unexpected results.

2. The laboratory has a number of different request forms most of which are colour coded for the department. Multiple tests for one department can be sent on one request form but separate specimens and request forms are required if tests are being sent to a different department or where the sample types are different. Request forms are issued from Hospital Stores. Order supplies in advance to facilitate timely delivery.

3. The electronic request using iSOFT Clinical Manager (iCM): Refer to section 10: Information Technology.

4. The use of patient addressograph labels on request forms is recommended, except for Blood Transfusion Laboratory requests which must be hand written. On all requests forms, complete the following:
   a. Patient’s Full Surname and Forename
   b. Patient’s MRN (Medical Record Number). If a MRN is not available or relevant (i.e. GP patients) a date of birth and address must be supplied on the form and specimen label.
   c. Patient’s Date of Birth
   d. Patient’s Sex and Title
   e. Date and time of specimen collection
   f. Name of the Requesting Consultant
   g. Location to where the results should be reported
   h. Type of specimen collected and if appropriate, the anatomical site of origin or tick the relevant box
   i. Clinical information relevant to or affecting sample collection, examination performance or result interpretation (e.g. history of administration of drugs).
   j. Name and bleep number of requesting doctor
   k. Analysis required

5. If a specimen is urgent please indicate on request form and the request will be prioritised. If results are extremely urgent please contact the relevant department to discuss your requirement. Overuse of the urgent service will adversely affect the turnaround time for all urgent tests.

6. Clinical details and relevant treatment information and details of foreign travel are extremely useful to the laboratory in interpreting results.

7. Refer to the A-Z Test Directory in this User Handbook for a list of tests performed, the sample required, turnaround time and other information regarding specimen collection. The pathologist, clinical biochemist and/or laboratory staff should be consulted where uncertainty exists about the availability, appropriateness, or selection of tests, the nature of the specimen required, or the interpretation of results.
7.2 Criteria for accepting and rejecting samples
The laboratory makes every effort to ensure that samples are processed as requested. However samples must be appropriate for the requested investigation, the safety of laboratory staff must not be threatened and there must be no ambiguity as to the identification of the patient. The criteria for sample acceptance, as described below, are strictly adhered to in the interest of patient safety. Failure to provide the required data shall lead to rejection of the specimen and request form.

7.2.1 Biochemistry, Haematology, Microbiology, Pathology

<table>
<thead>
<tr>
<th>Labelling Requirements*</th>
<th>Essential Information</th>
<th>Desirable Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Request Form</td>
<td>Patients full name or proper coded identifier**</td>
<td>Patient’s address</td>
</tr>
<tr>
<td></td>
<td>D.O.B. and/or Patient’s Medical Record Number (MRN/RID)</td>
<td>Patient’s sex</td>
</tr>
<tr>
<td></td>
<td>Patient’s location or destination for report or patient’s consultant or GP</td>
<td>Clinical details, relevant therapy and foreign travel (antibiotic treatment important for Microbiology), travel and prophylaxis history for Malaria</td>
</tr>
<tr>
<td></td>
<td>Specific requirements of individual departments:</td>
<td>Date and time of specimen collection (timing in relation to antibiotic dose <strong>essential</strong> for Antibiotic Assays and for some Chemical Pathology tests)</td>
</tr>
<tr>
<td></td>
<td>• Biochemistry /Haematology /Microbiology: Test Request</td>
<td>Pathology: Date and time specimen taken.</td>
</tr>
<tr>
<td></td>
<td>• Pathology/Cytopathology</td>
<td>Previous relevant Histopathology Numbers (CUH/MUH) if applicable).</td>
</tr>
<tr>
<td></td>
<td>- Requesting Clinician,</td>
<td>Signature of clinician / nursing staff (pp)</td>
</tr>
<tr>
<td></td>
<td>- Patient’s address,</td>
<td>Clinician’s bleep number</td>
</tr>
<tr>
<td></td>
<td>- Patient’s location,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Nature and site of specimen</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(including Right or Left)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Destination for report</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Clinical Information</td>
<td></td>
</tr>
<tr>
<td>Sample</td>
<td>Patients full name or proper coded identifier**</td>
<td>Pathology: Date and time specimen taken.</td>
</tr>
<tr>
<td></td>
<td>D.O.B. and/or Patient’s Medical Record Number (MRN/RID)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>All non-blood samples: sample type or exact site</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Neuropathology: Autopsy brain specimens must be labelled with the PM number, the referring Pathologist and the date of the PM. Further details are at discretion of referring Pathologist.</td>
<td></td>
</tr>
<tr>
<td>Requests using iCM</td>
<td>Samples requested using iCM have no accompanying forms.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Details must be complete on the sample container.</td>
<td></td>
</tr>
</tbody>
</table>

* The identifiers which appear on the sample container must match the information provided on the accompanying request form

**e.g. HIV specimens
## 7.2.2 Blood Transfusion

<table>
<thead>
<tr>
<th>Labelling Requirements*</th>
<th>Essential Information</th>
<th>Desirable Information</th>
</tr>
</thead>
</table>
| **Request Form**        | Addressographs on forms not accepted. | Clinical details.  
Patient’s Forename\(^\text{§}\)  
Patient’s Surname\(^\text{§}\)  
Patient’s Sex  
D.O.B.  
Medical Record Number (MRN/RID)  
Patient Address for Out-patients.  
Destination for report.  
Patient’s consultant or GP.  
Identity of person taking the samples (Doctor’s MCRN or Nurse/Midwife Bord Altranais PIN if possible) including contact details of person taking the sample (e.g. Bleep or telephone).  
Date and time of specimen collection.  
Tests Required.  
\(^\text{§}\)For patient’s whose identity is unknown (e.g. Unconscious or Major Emergency scenario) the use of pseudonyms/MRNs as per Emergency Department protocols will be accepted.  
**Note:** the CUMH uses the MN_CMS Millennium Electronic record.  
Transfusion forms generated correctly through the MN_CMS EHR are accepted in the CUH Blood Transfusion Department. |
| **Sample**              | Addressographs on samples not accepted. | Previous address & patient’s maiden name  
Transfusion & obstetric history & relevant therapy.  
\(^\text{§}\)For patient’s whose identity is unknown (e.g. Unconscious or Major Emergency scenario) the use of pseudonyms/MRNs as per Emergency Department protocols will be accepted.  
**Note:** the CUMH uses the MN_CMS Millennium Electronic record.  
Transfusion specimen labels generated. |
Requests using iCM Blood Transfusion Samples are not to be Requested using iCM and will not be processed.

*The identifiers which appear on the sample container must match the information provided on the accompanying request form

### 7.3 Time limits for requesting additional examinations

Users may request additional examinations on specimens already sent to the laboratory. To request the add-on tests use the form titled “Request Form for Additional Tests on Sample Previously sent to Laboratory Medicine” reference FOR-CUH-PAT-1732.

Analyses for additional tests are subject to the stability of the analyte. The analysis will be performed provided the specimen has been stored appropriately and there is sufficient specimen remaining to perform the additional tests.

The time limit for time limits for requesting additional examinations or further examinations for each department is given below:

<table>
<thead>
<tr>
<th>Department</th>
<th>Time Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autoimmune Serology</td>
<td>Within the 14-day specimen retention time (dependant on storage facilities) and subject to individual analyte stability.</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>The time limit for requesting additional examinations is generally within 7 days subject to individual analyte stability and dependant on storage facilities. Certain tests have a limited stability:</td>
</tr>
<tr>
<td></td>
<td>- Anti-TPO</td>
</tr>
<tr>
<td></td>
<td>- CK</td>
</tr>
<tr>
<td></td>
<td>- CSF</td>
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<tr>
<td></td>
<td>- Total and Direct Bilirubin</td>
</tr>
<tr>
<td></td>
<td>- Phosphate</td>
</tr>
<tr>
<td></td>
<td>- LDH</td>
</tr>
<tr>
<td></td>
<td>Please contact the laboratory with any queries.</td>
</tr>
<tr>
<td>Haematology</td>
<td>Not all add-on tests can be accommodated; the factors influencing the capability of requesting Add-On Tests include storage requirements and stability of parameters measured. Please contact the laboratory if in doubt. The following is not an exhaustive list:</td>
</tr>
<tr>
<td></td>
<td>- Retics on FBC specimens &lt;12 hours post phlebotomy</td>
</tr>
<tr>
<td></td>
<td>- ESR 24 hours</td>
</tr>
<tr>
<td></td>
<td>- Blood Films: Manual differential 12 hrs, slide Platelet 72 hrs and Red cell morphology 12 hrs</td>
</tr>
<tr>
<td></td>
<td>- DDI on Coagulation Sodium Citrate &lt;24 hours post phlebotomy</td>
</tr>
<tr>
<td></td>
<td>- APTT on Coagulation, Sodium Citrate specimens &lt;4 hours post phlebotomy</td>
</tr>
<tr>
<td></td>
<td>- Thrombophilia assays: contact laboratory</td>
</tr>
<tr>
<td></td>
<td>- HbA1c on FBC specimens 48 hours after receipt in laboratory</td>
</tr>
<tr>
<td></td>
<td>- Haemoglobinopathies on FBC specimens 48 hours after receipt in laboratory</td>
</tr>
<tr>
<td></td>
<td>- Haematinics on clotted specimens – extra assays 48 hours after receipt in laboratory</td>
</tr>
<tr>
<td></td>
<td>- Flow Cytometry on FBC specimens – contact laboratory</td>
</tr>
</tbody>
</table>
This document is designed for online viewing. Printed copies, although permitted, are deemed Uncontrolled from 23:59 hours on 11/09/17

7.4 List of factors known to significantly affect the performance of the examination or the interpretation of the results

Many sources of error exist that could affect the examination result. Refer to the A-Z Test Directory in this User Handbook for any special rejection criteria that may apply. Listed below are some of the major pre-examination reasons for test cancellation or delay.

Request form problems that will cause test cancellation or delay:
- Illegible patient demographics, illegible name of ordering clinician or incorrect ward /location
- Absent or incorrect patient identifier (e.g. MRN/RID or PPI)
- Absent or incorrect time and date of request
- Unclear or totally absent marking of test request boxes
- Type of body fluid not identified
- Form contaminated by specimen

Specimen problems that will cause test cancellation or delay:
- Leaking containers (rejected because of infection risk)
- Sample is unlabelled, incorrectly labelled or does not match the accompanying form
- Too few specimens or an insufficient volume for analysis. Send separate samples for each department. Split a CSF sample when requesting both cell count/culture and biochemistry. Send separate samples for in-house and send-out (reference laboratory) tests
- Misrouting of specimens e.g. inappropriate laboratory
- Incorrect lab request form used
- Sample collected into an incorrect preservative/anticoagulant
- iCM labels containing bar codes must be aligned with the original container label

Note: Large loose labels on specimens cause loss and damage to samples and costly damage to analysers
8 SPECIMEN COLLECTION

8.1 Instructions for preparation of the patient

Patients can help to ensure that their lab tests are accurate by following pre-testing instructions carefully and by providing complete medical histories, including lists of medications to their health care providers.

Variables that could affect test results

- Patient variables including exercise, diet, age, sex, circadian variation, posture, obesity, stress, smoking and medication may affect laboratory test results.
- An individual’s diet and lifestyle may affect laboratory test results. It is generally recommended that the night before laboratory tests patients avoid high-fat foods, alcohol and strenuous exercise.
- Patients should ask their doctors if certain medications should be stopped prior to lab testing as certain medications may interfere with the laboratory test results.

Blood Tests

- Patients may need to fast prior to certain blood tests. For example, patients should not eat or drink anything except water for 9 to 12 hours prior to glucose and lipid profile tests.
- The amount of blood drawn at the time of collection for laboratory testing depends on the tests that are ordered. Usually the amount collected is very small (around 3-6 teaspoons.)
- Some patients become anxious when they have their blood drawn. Patients should tell the health care professional who is drawing the blood if they feel faint or sick. Slow deep breaths prior to the needle stick may help to alleviate anxiety.
- After a blood draw, the phlebotomist makes sure that all signs of bleeding have stopped. A bandage is applied to the arm for a minimum of 15 minutes.
- Aspirin or other anticoagulant (blood thinners) drugs can prolong bleeding. In such cases, patients may need continued applied pressure until the bleeding has stopped. A cold pack may be necessary to reduce swelling and bruising.
- After a patient has blood drawn, even when bleeding has stopped, patients should not carry or lift a heavy object with that arm for a minimum of one hour.

Collecting Specimens at Home

- Patients must follow all instructions exactly for collection of specimens performed at home then brought to the laboratory for testing.
- Special containers with a powder or liquid preservative may be provided for urine collection. Patients should never empty or discard any powder or liquid from the container before beginning the collection of a specimen.
- Specimens should be delivered to the laboratory in the prescribed timeframe in order to assure accurate results.

Results

- Depending on the laboratory work performed, test results may be available within a few hours to as long as several weeks.
- Laboratory test results are often reported with a reference interval to assist the clinician in interpreting them. These reference intervals reflect the values in the majority of healthy individuals; however, a small number of healthy people (5%) may
have results that are higher or lower than those in the reference range. Therefore, laboratory results should be interpreted by clinicians who can decide whether or not the results indicate a medical condition.

- Clinicians consider personal medical history, family history, and results from physical examination when interpreting an individual patient’s laboratory test results.

8.2 Phlebotomy Service at Cork University Hospital

Senior Phlebotomist: Ms Hilda Forde
Contact Numbers: Phone: 22415 (Blood Room) Bleep no: 287

Phlebotomy is based in the Out-Patients Department.

Wards: The service is Monday to Friday.
7:30am to 12:15pm
1.45pm to 3.30pm (for pre-operative blood tests only).

Clinics: The service is Monday to Friday.
8:30am to 1:00pm
1:30pm to 4:00pm
4:00pm to 5:00pm (limited services for out-patient clinics only).

Weekend /Bank Holiday: 7.30am to 10.30am (for non-routine bloods, limited services).

The Phlebotomy Department provides a varied service within the hospital. It covers the Paediatric wards, all the adult wards, the psychiatric unit and the Emergency Department. The Blood Room clinic provides an important Paediatric out-patients service to the General Practitioners in the City and County.

Health and Safety
- Universal precautions are adhered to at all times.
- Gloves to be used when dealing with patients.
- Gloves to be changed after each patient.
- Needles not to be recapped after use.
- Needles and Holders to be disposed of safely.
- Sharp bins provided for disposal of sharps.
- Clinical waste bags provided for any bloodstained material.
- Spillages /blood – Appropriate disinfectant to be used to clean and disinfect.
- Large spillages of blood /body fluid contact Housekeeping (protocols laid down by infection control).

Prion Disease:
1. It is essential that all CSF samples from patients who have Prion Disease in their differential diagnosis be managed in the following manner
2. Each laboratory likely to receive the CSF must be informed.
3. The sample and form should be appropriately labelled.
4. Information regarding suspected Prion disease MUST be indicated on the request form
5. The CSF, in a universal container, is double-bagged and marked with a biohazard label.
8.3 Phlebotomy blood collection order of draw

<table>
<thead>
<tr>
<th>Specimen Volume</th>
<th>Order Of Draw</th>
<th>Closure Colour</th>
<th>Tube Contents</th>
<th>Assays</th>
</tr>
</thead>
<tbody>
<tr>
<td>3ml</td>
<td>Blue</td>
<td>Trisodium Citrate solution</td>
<td>Coagulation Studies</td>
<td></td>
</tr>
<tr>
<td>4ml</td>
<td>Red</td>
<td>Separation Gel Clotting Accelerator</td>
<td>Biochemistry Profiles, Viral Studies, Hormone Studies, Immunology, Anti Cardiolipin AB., B12, Folate, Ferritin, RA, Intrinsic Factor AB, Iron Studies, CRP’s, TDM (Therapeutic Drug Monitoring), Copper and Zinc levels.</td>
<td></td>
</tr>
<tr>
<td>4ml</td>
<td>Red</td>
<td>Clotted (Gel free)</td>
<td>Cryoglobulins, Methotrexate</td>
<td></td>
</tr>
<tr>
<td>4ml</td>
<td>Green</td>
<td>Heparin</td>
<td>Chromosomes, Lead Levels, DNA Analysis</td>
<td></td>
</tr>
<tr>
<td>3ml</td>
<td>Purple</td>
<td>EDTA</td>
<td>FBC, HBA1C, Hb. Electrophoresis, Malaria Parasites, Sickle Cell, Reticulocyte Count, Coombs Test, Cyclosporin, Tacrolimus ESR, Immunophenotyping, PTH, Cryoglobulins</td>
<td></td>
</tr>
<tr>
<td>6ml</td>
<td>Pink</td>
<td>EDTA</td>
<td>Crossmatch, Group &amp; Antibody Screen</td>
<td></td>
</tr>
<tr>
<td>4ml</td>
<td>Grey</td>
<td>EDTA sodium fluoroide</td>
<td>Glucose, Glucose Tolerance, Lactate, Alcohol Levels</td>
<td></td>
</tr>
<tr>
<td>9ml</td>
<td>Yellow</td>
<td>ACD-A</td>
<td>HLA Typing</td>
<td></td>
</tr>
</tbody>
</table>
8.4 Minimum Sample requirements for Paediatric/neonatal patients

The volume of serum/plasma obtained from blood depends on the haematocrit; therefore measurement of these analytes may require a larger volume of blood from patient with high haematocrit.

<table>
<thead>
<tr>
<th>Test</th>
<th>Sample Type</th>
<th>Minimum Volume</th>
<th>Additional Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>U/E, Creat, Ca, Mg, Phos, Bili, Lfts</td>
<td>Li Heparin or clotted sample (orange top/clear top)</td>
<td>1ml</td>
<td></td>
</tr>
<tr>
<td>TFT’s</td>
<td>Li Heparin or clotted sample (orange/clear top)</td>
<td>0.75ml</td>
<td></td>
</tr>
<tr>
<td>Glucose</td>
<td>Fluoride oxalate (yellow top)</td>
<td>0.5ml</td>
<td></td>
</tr>
<tr>
<td>Ammonia</td>
<td>Li Heparin (orange top)</td>
<td>0.5ml</td>
<td>Send on ice</td>
</tr>
<tr>
<td>Blood amino acids</td>
<td>Li Heparin (orange top)</td>
<td>150ul</td>
<td></td>
</tr>
<tr>
<td>Urine amino acids</td>
<td>Urine</td>
<td>4ml</td>
<td></td>
</tr>
<tr>
<td>Organic Acids</td>
<td>Urine</td>
<td>4ml</td>
<td></td>
</tr>
<tr>
<td>Acylcarnitine</td>
<td>Blood spot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very long chain fatty acids</td>
<td>EDTA (red top)</td>
<td>2ml</td>
<td></td>
</tr>
<tr>
<td>Lysosomal enzymes</td>
<td>EDTA</td>
<td>5ml</td>
<td>16 enzymes measured here, specific enzymes can be requested with a sample volume of 3ml</td>
</tr>
<tr>
<td>Transferrin isoforms</td>
<td>Clotted sample (Clear top)</td>
<td>0.75ml</td>
<td>Not for babies &lt;3 weeks</td>
</tr>
<tr>
<td>Biotinidase</td>
<td>Li Heparin</td>
<td>0.5ml</td>
<td>Frozen in &lt;1hour</td>
</tr>
<tr>
<td>Free fatty acids and β-hydroxybutyrate</td>
<td>Fluoride oxalate</td>
<td>2ml</td>
<td></td>
</tr>
<tr>
<td>Insulin and C-peptide</td>
<td>Clotted sample</td>
<td>2ml</td>
<td>Haemolysed samples unsuitable</td>
</tr>
<tr>
<td>Growth Hormone</td>
<td>Li heparin or clotted sample</td>
<td>1ml</td>
<td></td>
</tr>
<tr>
<td>Cortisol</td>
<td>Li heparin or clotted</td>
<td>0.75ml</td>
<td></td>
</tr>
<tr>
<td>17-hydroxyprogesterone</td>
<td>Li heparin or clotted</td>
<td>1ml</td>
<td>Only after 48hrs post birth</td>
</tr>
<tr>
<td>Mycophenolate</td>
<td>EDTA</td>
<td>1ml</td>
<td>Spin &lt;6hrs</td>
</tr>
</tbody>
</table>
8.5 Sample Storage Conditions

Biochemistry
1. Store blood and urine samples at room temperature, unless otherwise specified.
2. For the addition of test requests to existing samples, please contact the laboratory for advice on sample integrity.
3. If a delay arises, please contact the laboratory for advice on sample integrity (Tel: 021-4922528)

Haematology
1. If delays are unavoidable, HAEMATOLOGY specimens can be preserved by refrigeration at 2-8°C in a designated specimen fridge e.g. Full Blood Counts, HbA1c, Haematinics
2. Coagulation samples for INR must be stored at 18-22°C (Refrigeration may lead to cold activation of coagulation factors)
3. Addition of test requests to existing samples is not recommended due to issues of sample integrity. Contact individual laboratory for advice.

Exceptions to this include:
   a. Coagulation specimens for APTT need to be assayed within 4 hours of phlebotomy
   b. Samples for Flow Cytometry should be sent to the Haematology ASAP, ideally on the day of Venesection, at room temperature. If a delay is anticipated and is needed to be kept overnight, store at 2-8°C in a designated specimen
   c. Malaria tests must be examined on the day of venesection, therefore is not suitable for storage
   d. Bone marrows and Kleihauer (Foetal cells) – sent immediately to Haematology

Microbiology
1. In most cases, if delays are unavoidable, microbiology specimens can be preserved by refrigeration at 2-8°C in a designated specimen fridge, as this maintains the viability of the pathogens present and prevents the overgrowth of non-pathogenic bacteria.
   Exceptions to this include:
   a. Blood Cultures - Do not refrigerate or place on radiators, incubators or direct sunlight. The pneumatic tube can be utilised to transport plastic blood culture vials and is preferable to avoid unnecessary delays.
   b. CSF should be held at room temperature.
   c. Samples specifically for the isolation of Neisseria gonorrhoea. (i.e. cervical or urethral specimens) should be stored at room temperature. The viability of N. gonorrhoeae is lost over time.
   d. Faeces Samples for Ova, Cyst and Parasite investigation should not be refrigerated (should be stored at room temperature).

Microbiology (Infectious Diseases Serology)
Clotted Blood and EDTA Blood for Molecular Investigations
Serum and plasma must be removed and frozen at ≤-20°C by the laboratory within 24 hours of venepuncture to maintain the integrity of the viral genetic material. Therefore, samples must be sent to the laboratory without delay. Samples received greater than 24 hours from collection will NOT be processed.

Clotted Blood for Serological Investigations
Specimens should be transported to the laboratory without delay. If delay is unavoidable, please store at 2-8°C.

Oral Fluid
Oral fluid specimens should be collected using commercially available collection devices such as OraCol™ or OraSure™. Please contact the laboratory for further information.
Respiratory Secretions
Respiratory viruses are extremely thermolabile and therefore should be transported to the laboratory without delay. The quality of the sample is a major determinant in identifying the causative agent. If delay is unavoidable, please store at 2-8°C.

Stool
For molecular detection of viruses associated with gastroenteritis, specimens should be transported to the laboratory as soon as possible post collection. Alternatively, specimens may be stored at 2-8°C for up to 72hrs before dispatch. Stool for Strongyloides culture or Ova, Cyst and Parasite investigation must NOT be refrigerated. Send to the laboratory without delay.

Urine
Specimens should be transported without delay (particularly for molecular investigations). If delay is unavoidable, please store at 2-8°C.

Viral Swabs
Swabs should be transported to the laboratory without delay. If delay is unavoidable, please store at 2-8°C.

Pathology
Prolonged formalin fixation may have an adverse effect on subsequent molecular techniques. Specimens in Buffered Formal Saline should be stored at ambient temperature.

Neuropathology:
1. CSF/CNS fluids should be stored at 4°C if any delay occurs prior to delivery to the laboratory.
2. Any details of storage conditions should be recorded on the form.

Cytopathology
Samples for cytological examination will deteriorate with time and should therefore, be transported to the laboratory as soon as possible. In the event of a delay, samples should be stored at 2-8°C.
9 REPORTING OF RESULTS

9.1 Turnaround Times
Turnaround time (TAT) is given as the maximum number of working hours/days between sample receipt and issuing a report either in the computer or by phone under normal operating conditions. In addition to the routine service each department operates an “urgent” system whereby the target turnaround time is shorter. The turnaround time for individual tests is given in the A-Z Test Directory in this User Handbook.

Overuse of the urgent service will adversely affect the turnaround time for all urgent tests. Many specialised tests are performed on a weekly basis; if such tests are required urgently please phone the appropriate laboratory to discuss the request.

TAT are routinely monitored as part of the laboratories quality improvement program.
## 9.2 Critical Results Reporting

### Biochemistry

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALT IU/L</td>
<td>&gt;600</td>
<td>Magnesium mmol/L</td>
<td>&lt;0.4</td>
</tr>
<tr>
<td>Ammonia μmol/L</td>
<td>&gt;100 (neonate)</td>
<td>Sodium mmol/L</td>
<td>&lt;120 &gt;150</td>
</tr>
<tr>
<td>Amylase IU/L</td>
<td>&gt;750</td>
<td>Paracetamol mg/L</td>
<td>&gt;98</td>
</tr>
<tr>
<td>Calcium mmol/L</td>
<td>&lt;1.8, &gt;3.0</td>
<td>Phenobarbital mg/L</td>
<td>&gt;70</td>
</tr>
<tr>
<td>Carbamazepine mg/L</td>
<td>&gt;25</td>
<td>Phosphate mmol/L</td>
<td>&lt;0.35</td>
</tr>
<tr>
<td>Cortisol nmol/L</td>
<td>&lt;150</td>
<td>Phenytoin mg/L</td>
<td>&gt;28</td>
</tr>
<tr>
<td>Creatinine μmol/L</td>
<td>&gt;400 (200 if &lt;16 yr)</td>
<td>Salicylate mg/L</td>
<td>&gt;296</td>
</tr>
<tr>
<td>CK IU/L</td>
<td>5000</td>
<td>Theophylline mg/L</td>
<td>&gt;20</td>
</tr>
<tr>
<td>Digoxin ug/L</td>
<td>2.4</td>
<td>Triglyceride mmol/L</td>
<td>&gt;20</td>
</tr>
<tr>
<td>Glucose mmol/L</td>
<td>&lt;2.5, &gt;25</td>
<td>Urea mmol/L</td>
<td>&gt;30 (&gt;10 if &lt;16 yr)</td>
</tr>
<tr>
<td>Potassium mmol/L</td>
<td>&lt;2.5, &gt;6.5</td>
<td>Valproate mg/L</td>
<td>&gt;130</td>
</tr>
<tr>
<td>Lithium mmol/L</td>
<td>&gt;1.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Haematology

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC x 10^9/l</td>
<td>&lt;1.00</td>
<td>HB g/dl</td>
<td>&lt;7.0</td>
</tr>
<tr>
<td>WBC x 10^9/l</td>
<td>&gt;35 (GP), &gt;50 (Ward)</td>
<td>HB g/dl</td>
<td>&gt;17(F), &gt;19(M)</td>
</tr>
<tr>
<td>PLT x 10^9/l</td>
<td>&lt;50</td>
<td>PLT x 10^9/l</td>
<td>&gt;800 (GP), &gt;1000 (Ward)</td>
</tr>
<tr>
<td>Neutrophils</td>
<td>&lt;0.5 x 10^9/l (0.5 - 1.0 phoned next day)</td>
<td>CD4</td>
<td>CD4 &lt;200 absolute count (unexpected or 1st time)</td>
</tr>
<tr>
<td>Kliehauers</td>
<td>Foetal bleed &gt;12 mls</td>
<td>Fibrinogen</td>
<td>&lt;1.0</td>
</tr>
<tr>
<td>APTT</td>
<td>Results &gt; 100 secs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INR</td>
<td>&gt;4.5 (&gt;4.5 and &lt;5.0 and GP - Next morning OK all others to Sth doc)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Any significant drop in the HB level e.g. >2g/dl if baseline Hb is </= 8.0 g/dl and >3g/dl if baseline Hb is </= 9.0 g/dl

Positive sickle cell screens in patients with **pre-op** indicated on form

Positive HCGs in hospitalised in-patients

Urgent Factor assays

Positive HIT screens

Haemolytic Uremic Syndrome

Newly diagnosed Leukaemia’s

Positive Malaria infections

Positive Monospot Screening test

Equivocal Pregnancy Tests
Microbiology

Microscopy
- Positive gram stains: blood cultures, CSF’s and normally sterile body fluids, e.g. joint aspirates
- New ZN positive smears

Culture
- Positive blood cultures
- Positive CSF cultures
- Positive cultures of normally sterile body fluids, e.g. joint aspirates
- New MRSA, VRE or other multi drug resistant organisms
- Gonococci (except to STI clinic)
- New Mycobacterial culture positives
- Skin and soft tissue Group A Streptococci

Enterics
- New positive results: bacterial, viral or parasitic

Infectious Diseases Serology
- Positive results for HIV serology, Hepatitis C serology, Hepatitis B serology, Hepatitis A IgM, syphilis serology, Lyme IgM/IgG, Toxoplasma IgM, EBV IgM, CMV IgM, Parvovirus IgM, Rubella IgM, Leptospira IgM, Mycoplasma pneumoniae IgM, urinary antigens, RSV antigen.

Pathology

Frozen section reports

All positive temporal artery biopsies (Neuropathology)

Other reports at the discretion of the reporting Pathologist

9.3 Printed Reports
1. Reports are printed with reference ranges and/or suitable comments wherever appropriate, to aid interpretation of results. Reports will only be given to the submitter. Private individuals will not receive reports.
2. Please note the printed authorised report (or an amended subsequent report) issued by Laboratory Medicine is the medico-legal document within the patient record.
3. Printed reports are delivered by the portering staff to CUH wards.
4. External hospitals are printed and issued as follows:
   - Bon Secours Hospital posted
   - Mallow General Hospital collected daily
   - Mercy University Hospital collected daily
   - St. Mary’s Campus collected daily
   - St. Finbarr’s Hospital collected daily
   - South Infirmary Hospital South Infirmary porter collects reports periodically throughout the day.
5. Results for General Practitioners are printed and posted daily.
6. Emergency, critical and urgent positive reports are phoned directly to the wards and/or ordering clinician.
7. Results are electronically sent to some General Practitioners who have registered with GP messaging for more information (see below).
9.4 GP Messaging - Electronic delivery of laboratory reports to the GP practice

Laboratory Medicine facilitates the issue of electronic reports to GP practices. This is facilitated using Healthlink messaging. Healthlink is the national standard for messaging between Hospitals and General Practitioners. Laboratory Results can be either viewed directly on Healthlink or integrated into Practice Management Software.

Electronic laboratory facilitated reports are issued for Biochemistry, Haematology and Microbiology only.

Electronic reports are issued from Laboratory Medicine in real time. To avoid reports going to the wrong GP practice it is best to clearly print your laboratory GP location code on any test request forms being sent to Laboratory Medicine. Some practices have their laboratory GP location code incorporated into their practice stamp or on their computer generated address labels.

If you do not know your laboratory GP location code contact Laboratory Medicine at CUH on 021-4921309.

For those who are using Healthlink messaging, it is vital to regularly check reports imported into your PMS with either printed or from the Healthlink website. This is to ensure that results, reference ranges, demographics etc are being transferred correctly from Laboratory Medicine to your PMS.

If you have any problems with any aspect of GP messaging your first point of contact is your GPPMS software provider or the Healthlink (01) 828 7115 or email info@healthlink.ie.


10 INFORMATION TECHNOLOGY

10.1 Laboratory Medicine Results Access Policy and Confidentiality Guidelines

Laboratory medicine results are stored on a Laboratory Information System [LIS]; the system is currently i.Laboratory. All hospital medical, nursing and relevant clerical staff are granted access to the full range of patient data held, subject to the terms and conditions as outlined in this policy. Non hospital HSE contracted medical, nursing and relevant clerical staff are also granted access – either to data restricted and relevant to patients in their practice area e.g. Community hospitals and GPs; or to the entire range of patient data, e.g. public health staff.

The applicant will ensure that there is tight control on access to patient pathology results via Lab Enquire in their ward, office etc.

Please note: Histopathology results are only for look up/internal purposes and are not official Histopathology results and should not be used in any correspondence.

The applicant is responsible for the proper use of the facility.

- Usernames and Passwords must not be shared.
- Any patient specific information gained through work or on receiving reports from Laboratory Medicine is strictly confidential and must not be relayed or discussed with any third party unless they are specifically authorized to receive the information.
- Never examine any material or report that is not pertinent to your work.
- Only a doctor may authorise Laboratory Medicine information being passed to a third party. The points outlined in the Medical Council Guidelines section 31.03 should be borne in mind by any doctor passing information to a third party.
- All patient identifiable information must be held securely and locked away when not personally attended; such data must never be stored on removable storage devices (USB memory key, floppy disk, CD/DVD).
- If patient identifiable information is entered on computer, that computer should be password protected.
- Never transmit confidential named patient data by email with the exception of @hse.ie accounts or to the following addresses:

  Voluntary Hospitals:
  - AMNCH, Tallaght @amnch.ie
  - Beaumont Hospital @beaumont.ie
  - Cappagh National Orthopaedic Hospital @cappagh.ie
  - Coombe Women & Infants University Hospital @coombe.ie
  - Mater Public, Dublin @mater.ie
  - Marymount University Hospital and Hospice, Cork @marymount.ie
  - Mercy University Hospital, Cork @muh.ie
  - National Maternity Hospital, Holles Street, @nmh.ie
  - National Rehabilitation Hospital, @nrh.ie
  - Our Lady's Hospice, Harold's Cross, Dublin @olh.ie
  - Our Lady's Children's Hospital, Crumlin @olchc.ie and @olhsc.ie
  - Rotunda Maternity Hospital, Dublin @rotunda.ie
  - South Infirmary Victoria University Hospital, Cork @sivuh.ie
  - St. Francis Hospice, Dublin @sfh.ie
  - St. James's Hospital, Dublin @stjames.ie
  - St. John's Hospital, Limerick @stjohnshospital.ie
  - St. Luke’s Hospital, Rathgar, Dublin @slh.ie
  - St. Vincent’s Hospitals Group @st-vincents.ie, @svuh.ie, @stmichaels.ie, @svhg.ie
  - Temple Street Children’s University Hospital @cuh.ie
Private Hospitals And Clinics
- Aut Even Hospital, Kilkenny @auteven.ie
- Bon Secours Hospital, Tralee @bonsecours.ie
- St. Vincent’s Private Hospital, Dublin @svph.ie
- Whitfield Clinic, Waterford @whitfieldclinic.ie

Agencies:
- Central Remedial Clinic (Dublin, Limerick & Waterford) @crc.ie
- Department of Health @health.gov.ie
- Health Products Regulatory Authority @hpra.ie
- Healthlink, National Messaging Broker @healthlink.ie, @healthlink.doh.ie
- SouthDoc @southdoc.ie
- Caredoc, caredoc@healthmail.ie
- NEDOC North East Doctor On Call nedoc@healthmail.ie
- National Cancer Registry Ireland ncri@healthmail.ie

If you have a query about any other location enquire at https://www.healthmail.ie/support.cfm

- All printed or written records with personal data should be shredded as soon as they are no longer needed.
- Each employee is personally responsible for the security and confidentiality of all types of paper and electronic information which they come in contact with during the course of their work.

Each member of staff with access to Laboratory Medicine results MUST adhere to the following HSE policy:


10.2 Confidentiality Undertaking for Staff having Access to, or Receiving, Laboratory Results
I understand that, in the course of my work, I may come into contact with, or have access to, confidential information relating either to individual patients, members of staff or to general public health issues. I understand that misuse of this information, especially its disclosure to people or agencies that are not specifically authorised to receive it would constitute a breach of confidentiality. I also understand that the use and securing of personal information is subject to the provisions of the Data Protection Act and that unauthorized disclosure of personal information is an offence under the act.

I confirm that I have read the above Laboratory Medicine guidelines on confidentiality and that I agree to comply with them as formally undertaken by signing the On-Line Laboratory Medicine Results and Confidentially Guidelines form.

10.3 Instructions for using Lab Enquiry/Netterm
1. Click once ** the “Yellow Telephone” icon  from toolbar
2. Enter Username and Password.
3. From Ward Enquiry Menu Screen select 1.
4. From Ward Enquiry Screen where prompted Patient Number enter C for Cork PIMS registered patients OR T for Tralee PIMS registered patients followed by the patients Medical Record Number.
5. Under surname enter the first three letters of the patient’s surname.

**Note:** If an MRN/RID is unavailable type “U” for unknown and press Enter. This brings you to the Patient Search screen. Enter the patients Surname, Forename and DOB. Press F10 and then press Enter to go onto Subject Search. From the Subject Search screen select the patient from list using Up and Down arrows. Press the F10 key.

6. To search back from today’s date for all results Press the F10 key then press Enter.
7. At the Discipline prompt enter B for Biochemistry, H for Haematology or M for Microbiology and press Enter twice to only get results from that department.
8. Arrow up, Arrow down keys to view all tests on the specimen report displayed.
9. Page up and Page down keys to view all reports on patient.
10. When finished Press Enter to return to the Ward Enquiry search screen.

NB -When finished search click this button from toolbar to exit Lab Enquiry.

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**How To Change the Lab Enquiry Password (automatic account deactivation after three months if not updated)**

1. Type UPASS in the main menu after logging on the system.
2. Enter your current password and new password twice.
3. The new password cannot be the same as the last and must contain at least five letters and one number.
4. Accept new password. This new password takes immediate effect.
5. The password will be valid for three months and you will get a warning on screen every time you log on starting 20 days from the expiry date.
6. If you have any problems changing your password contact the Laboratory Information Systems Helpdesk by e-mail at CUHIT.Pathology@hse.ie or by phone on 021-4920150.

---

**10.4 Instructions i.Laboratory/Web Browser**

Please note the icon for this application can be found on Staff Directory under Online applications, or by clicking on the following link:


---

This document is designed for online viewing. Printed copies, although permitted, are deemed Uncontrolled from 23:59 hours on 11/09/17.
1. Enter the Username and Password (if you have a problem logging on check if pop blocker is on).
2. Where prompted Patient Number enter C for Cork PIMS registered patients OR T for Tralee PIMS registered patients followed by the patients Medical Record Number
3. Under surname enter the first three letters of the patient’s surname.
4. Then click the grey “NUMBER SEARCH” button on the right hand side of the screen.

Note: If an MRN/RID is unavailable enter the patients Surname, Forename and DOB and click Search. Patients matching your search information will be returned select the patient required by clicking on the patient MRN/RID in the PATIENT RECORD NUMBER column

5. On selecting a patient the user can select specific discipline\specimen date or continue for most recent result.

6. All the lab results on the patient selected will be displayed. The most recently authorised report from the lab will appear at the top of the list. Select the specimen results you are looking for by clicking once on the appropriate date and time box in the Specimen Dare & Time column.

7. The results on the specimen selected will be displayed. Use the scroll bar on the right hand side of the screen to look for tests not displayed on the first screen. High or low results will be highlighted in a different colored box. Usually light blue for just outside the normal range and dark pink for well outside the range. Single or double arrows pointing up or down will also be displayed for results outside the reference range.

8. To review another specimen on that patient click once the <<Select Order Specimen button.
9. When Finished click the LOG-OFF button.
10. The i.Laboratory report font size can be enlarged on your pc screen hold Ctrl on the keyboard and rolling the mouse wheel up alternatively select Ctrl and +

How To Change the Lab Enquiry password (automatic account deactivation after three months if not updated

1. On iLaboratory log in screen click Change password button.
2. Enter your current username, current password and new password where prompted.

Note: The new password cannot be the same as the last and must contain at least five letters and one number.
3. Then click the Ok button. This new password takes immediate effect.
4. The password will be valid for three months and you will get a warning on screen every time you log on starting 20 days from the expiry date.
5. If you have any problems changing your password contact the Laboratory Information Systems Helpdesk by e-mail at CUHIT.Pathology@hse.ie on by phone on 021-4920150
10.5 iSOFT Clinical Manager (iCM)

iSOFT Clinical Manager (iCM) is the Order Communications System used within the CUH/CUMH campus. Any report that is generated on the Laboratory Computer System from Biochemistry, Auto Immune Serology, Haematology or Microbiology is available on iCM. This is provided that all parts of the request profile are authorised or the request is submitted using the RID and is not a viewer restricted test.

NB for full details on use of iCM please refer to the ICT User Manual
All iCM user data including how to apply for an account, logging onto iCM and searching for patient data can be found on Staff Directory under Guidelines → iCM Users Guidelines or by clicking on the following link:
http://100.24.9.212/Menu_ApplicationForms/UserAccountRequestFormDoctors/UserGuides.asp

Logging on to iCM
Log into iPM
Select iCM Production
This opens the iCM Log-On Screen Log into iCM please note the Username format is different from Citrix 4.5 as it does not contain a dot between firstname and surname.e.g. If you log into Citrix 4.5 as test.frank then your ICM log in will be testfrank.
10.5.1 Selecting a Patient

1. On logging into ICM the Patient List displays a list of current patients in a specified area.
2. The List Displayed is shown in the Current List dropdown box which can be changed by selecting a different dropdown option. To select a patient click on chosen patient so their details will display on the header.

10.5.2 Ordering of Laboratory Specimens on ICM

1. Obtain specimen from patient.
2. Select patient from appropriate list on ICM.
3. Go to Orders Tab.
4. Click Enter Order Icon on header or Enter Order button to open Order Browse.
5. Use Relevant Order Set or predictive text option at the ‘Type to enter’ field to find appropriate investigation and
6. Select or deselect components of Order Set as required.
7. Ensure Order is submitted on behalf of Consultant.
8. Add order.
9. To prioritise samples select URGENT REQUEST as the Collection Time
10. Amend clinical details (inadequate details can cause laboratory process delays)
11. Click OK.
12. Submit Orders Pending.

10.5.3 Collection of Specimen

1. On Orders Screen - Add Specimen and select performing Department
2. Tick boxes to confirm investigations.
3. Amend number of labels if multiples required e.g. Blood Cultures
4. Click OK.
5. Ensure that labels printed match the details of patient identified for phlebotomy.
6. Ensure labels are affixed to correct bottles. Do not cover specimen blood volume or container ‘fill to’ marks.
7. Specimen Type on label should match Specimen Type on Bottle.
8. Bag Specimen

10.5.4 Results Viewing

1. Results are available in iCM once all parts of the request profile are authorised by Lab
2. Click on the Results tab for a selected patient
3. Results outside of normal parameters are flagged with red arrows.

NB As Microbiology results and Positive/Negative text based abnormal results are not flagged
A button in a result field indicates that there is an expanded result – right click to view entire comment.

A in a result filed indicates that a result has been modified - right click to view previous result.
view can be modified to select a specified date range or performing laboratory or test by selectively choosing options on the left hand sidebar

10.5.5 Contingency

Submitting Orders
Users should revert to manual contingency i.e. use paper forms for any requests submitted during downtimes (either iCM or Laboratory Information System {LIS})

Result Viewing

If iCM is down results will be available on Ward Enquiry/iLaboratory
If LIS is down only results authorised prior to downtime will be available on iCM. Laboratories can be contacted for URGENT results.

Remember
Patient identity must be confirmed before phlebotomy
Samples must be labelled at all times
For training, fault logging, etc please contact the ICT Helpdesk on 28000 or email cuh.helpdesk@hse.ie

10.6 Instructions for using the Blood Collection System Through Lab Enquiry

Please note that the ‘yellow’ blood collection slip can ONLY be generated through the ‘Lab Enquiry’ Icon. Web Browser CANNOT be used.

If the Lab Enquiry icon is not available, Please contact the Blood Transfusion Department at 22537

Double click on Lab Enquiry icon for results

Click once ** the "Yellow Telephone” icon from toolbar
• Enter Username: ....................... Press Return.
• Enter Password and press Return.
• From Ward Enquiry Menu Screen:
• Enter Option 1
• Press Enter.
• From Ward Enquiry Screen:
• At the Patient Number prompt type C for Cork PIMS registered patients followed by the patients Medical Record Number.
• Press Enter.
• If asked Type first three letters of patient’s surname and press Enter.
• Go to the latest Haematology Result. This allows you to check the Haemoglobin result prior to transfusion, if applicable.
• Select the appropriate button for the product required from the upper tool bar (i.e. ‘Collect BLOOD’ to collect a unit of red cells or ‘Col. PLATELETS’ to collect a unit of platelets) and click once.
• When finished search click this button from toolbar to exit Lab Enquiry.
• A yellow collection slip will be generated in the Laboratory, to be used as a collection identification slip by the person collecting the blood or blood product.
• Bleep the porter/person collecting the blood and inform them that a unit of blood or blood product is to be collected on the required patient.
• When the porter/person collecting the unit arrives in the laboratory to collect the unit of blood or blood product, they time-stamp the yellow collection slip.
• The yellow collection slip is then brought to the ward with the blood/ blood product, where it is again time-stamped on receipt.
• The nurse who receives the unit of blood at the ward then signs on the appropriate line on the yellow collection slip to verify receipt of the blood/ blood product.
• When the unit of blood/ blood product is ‘hung’, the smaller sticky strip from the bar-coded patient identification label on the blood/blood product is stuck on the appropriate line on the yellow collection slip, and the nurse who has transfused the blood/blood product signs on the appropriate line.
• The yellow collection slips are then collected and returned to the Blood Transfusion Laboratory, where they serve as transfusion confirmation records.

NB -When finished search click this button from toolbar to exit Lab Enquiry.
## ON CALL (EMERGENCY SERVICE)

The on-call service is restricted to true emergencies. The turn-around time will be adversely affected if excessive demands are made on the service.

### Tests Available On-Call

<table>
<thead>
<tr>
<th>Test</th>
<th>Laboratory</th>
<th>Unrestricted</th>
<th>Restricted Requiring Consultation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alanine amino Transferase</td>
<td>Biochemistry</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Albumin</td>
<td>Biochemistry</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Alkaline phosphatase</td>
<td>Biochemistry</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Ammonia</td>
<td>Biochemistry</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Amylase</td>
<td>Biochemistry</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Antibiotic Assays</td>
<td>Microbiology</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Antibody Screen</td>
<td>Blood Transfusion</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>APTT</td>
<td>Haematology</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Aspartate amino Transferase (AST)</td>
<td>Biochemistry</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Blood Cultures</td>
<td>Microbiology</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Blood gases</td>
<td>Biochemistry</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>B-HCG (Blood)¹</td>
<td>Biochemistry</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Calcium</td>
<td>Biochemistry</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Carbamazapine (Tegretol)²</td>
<td>Biochemistry</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Carboxyhaemoglobin</td>
<td>Biochemistry</td>
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</tr>
<tr>
<td>Chloride</td>
<td>Biochemistry</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Cold Agglutinins</td>
<td>Blood Transfusion</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>CAPD Fluid</td>
<td>Microbiology</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Creatine kinase (CK)</td>
<td>Biochemistry</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Creatinine</td>
<td>Biochemistry</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>C R P (C-Reactive Protein)</td>
<td>Biochemistry</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>CSF Microscopy and Culture</td>
<td>Microbiology</td>
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<td></td>
</tr>
<tr>
<td>CSF Protein and Glucose</td>
<td>Biochemistry</td>
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</tr>
<tr>
<td>Digoxin²</td>
<td>Biochemistry</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Direct Bilirubin</td>
<td>Biochemistry</td>
<td>✔</td>
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</tr>
<tr>
<td>Direct Coombs Test</td>
<td>Blood Transfusion</td>
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<td></td>
</tr>
<tr>
<td>ESR</td>
<td>Haematology</td>
<td>✔</td>
<td></td>
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<tr>
<td>Ethanol²</td>
<td>Biochemistry</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Epanutin (Phenytoin)²</td>
<td>Biochemistry</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Epilim (Sodium Valproate)²</td>
<td>Biochemistry</td>
<td>✔</td>
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</tr>
<tr>
<td>Gamma GT (GGT)</td>
<td>Biochemistry</td>
<td>✔</td>
<td></td>
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<tr>
<td>Fibrinogen</td>
<td>Haematology</td>
<td>✔</td>
<td></td>
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<tr>
<td>Full Blood Count (FBC)</td>
<td>Haematology</td>
<td>✔</td>
<td></td>
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<tr>
<td>Glucose</td>
<td>Biochemistry</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Group and Coombs</td>
<td>Blood Transfusion</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Group and Crossmatch³</td>
<td>Blood Transfusion</td>
<td>✔</td>
<td></td>
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<tr>
<td>Group and Hold</td>
<td>Blood Transfusion</td>
<td>✔</td>
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<tr>
<td>Haemolysin Test</td>
<td>Blood Transfusion</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>HIV1/2 antibody, HBsAg, HCV antibody (Needlestick Injury - Source)</td>
<td>Microbiology</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>HIV1/2 antibody, HBsAg, HCV antibody, Anti-HBs (Needlestick Injury - Victim)</td>
<td>Microbiology</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>INR</td>
<td>Haematology</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Iron²</td>
<td>Biochemistry</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Test</td>
<td>Laboratory</td>
<td>Unrestricted</td>
<td>Restricted Requiring Consultation</td>
</tr>
<tr>
<td>-------------------------------------------</td>
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<tr>
<td>Kleihauer testing</td>
<td>Haematology</td>
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<tr>
<td>Lactate</td>
<td>Biochemistry</td>
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<tr>
<td>Lactate Dehydrogenase (LDH)</td>
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<td></td>
</tr>
<tr>
<td>Lithium²</td>
<td>Biochemistry</td>
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<td></td>
</tr>
<tr>
<td>Magnesium</td>
<td>Biochemistry</td>
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<tr>
<td>Malaria Screen</td>
<td>Haematology</td>
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<tr>
<td>Methaemoglobin</td>
<td>Biochemistry</td>
<td></td>
<td></td>
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<tr>
<td>Microbiology – urgent samples⁴</td>
<td>Microbiology</td>
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<tr>
<td>Osmolality</td>
<td>Biochemistry</td>
<td></td>
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<td>Paracetamol</td>
<td>Biochemistry</td>
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<td>Phenotyping Red Cell Antigens</td>
<td>Blood Transfusion</td>
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<td>✓</td>
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<tr>
<td>Phosphate</td>
<td>Biochemistry</td>
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<tr>
<td>Pregnancy Test</td>
<td>Haematology</td>
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<td>Potassium</td>
<td>Biochemistry</td>
<td></td>
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<tr>
<td>Prolactin²</td>
<td>Biochemistry</td>
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<tr>
<td>Protein - Total</td>
<td>Biochemistry</td>
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<tr>
<td>Reticulocytes</td>
<td>Haematology</td>
<td></td>
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<tr>
<td>Salicylate</td>
<td>Biochemistry</td>
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<tr>
<td>Sickle Cell Screen</td>
<td>Haematology</td>
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<tr>
<td>Sodium</td>
<td>Biochemistry</td>
<td></td>
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<tr>
<td>Theophylline²</td>
<td>Biochemistry</td>
<td></td>
<td></td>
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<tr>
<td>Total bilirubin</td>
<td>Biochemistry</td>
<td></td>
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<tr>
<td>Transfusion Reaction Investigation</td>
<td>Blood Transfusion</td>
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<td>✓</td>
</tr>
<tr>
<td>Troponin I⁶</td>
<td>Biochemistry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urate</td>
<td>Biochemistry</td>
<td></td>
<td></td>
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<tr>
<td>Urea</td>
<td>Biochemistry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urinary creatinine</td>
<td>Biochemistry</td>
<td></td>
<td></td>
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<tr>
<td>Urinary electrolytes</td>
<td>Biochemistry</td>
<td></td>
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<tr>
<td>Urinary urea</td>
<td>Biochemistry</td>
<td></td>
<td></td>
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<tr>
<td>Urinary Osmolality</td>
<td>Biochemistry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urine Microscopy and Culture (urgent e.g. A/E)</td>
<td>Microbiology</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

**Notes:**

1. Urgent Beta HCG requests only will be processed.
2. Currently analysis of these drugs (TDM) is only available in an ‘over-dose’ situation. Routine monitoring of the anti-epileptic drugs, digoxin and theophylline on Saturday and Sunday mornings.
3. Blood is crossmatched only for Emergency purposes. Requests for blood for planned transfusion will generally not be crossmatched during emergency “On Call” hours and will be processed on the next routine working day.
4. Sterile body fluids marked “special attention” or “emergency”.
5. Sputa and swabs (excluding MRSA screens and HVS) marked “special attention” or “emergency” daily up to 8pm.
6. Prolactin requests will be processed only to exclude a prolactin-secreting tumour when emergency surgery is contemplated.
7. Troponin I requests which fulfil the agreed criteria.
8. All Coagulation Factor assays must be requested by prior approval by Consultant Haematologist On Call.
12 BLOOD TRANSFUSION

Laboratory Profile: The Blood Transfusion Laboratory at CUH provides testing and advice to users in relation to general transfusion issues including antenatal blood group serology. Since September 2008, it operates a quality management system to ISO15189 standards and since that time has been accredited by the Irish National Accreditation Board (INAB) under scope reference 199MT (details available from www.inab.ie). The laboratory continues to actively engage in the accreditation process to ensure compliance with the EU Blood Directive 2002/98/EC and other relevant legislation and works closely with Haemovigilance personnel to ensure all aspects of best transfusion practice, Haemovigilance and Traceability requirements are maintained.

In 2016, 29,279 group and antibody screen specimens plus 1,861 infant blood group specimens were analysed with 8,201 units of red cells, 1,222 units of SD plasma and 1,646 units of platelets transfused. The laboratory also plays an important role in the care and management of antenatal patients and those patients who may require transfusions with various blood components or products while in hospital.

Hospital Transfusion Committee: A Hospital Transfusion Committee exists within CUH and is co-ordinated by blood transfusion laboratory personnel. This committee meets at least 4 times per year and its remit is to promote the highest standard of transfusion practice through peer review and advocate a high standard of care in Cork University Hospital (CUH) and Cork University Maternity Hospital (CUMH) for patients at risk of transfusion (i.e. those who must be transfused, and also those who, with good clinical management, may avoid the need for transfusion). The committee also monitors that the conditions and requirements of the EU Blood Directive 2002/98/EC including articles 14 and 15 in relation to Traceability and Haemovigilance are implemented at CUH and CUMH. Representatives of users of the blood transfusion laboratory service are essential and welcome on the committee. It provides a forum for information exchange and is chaired by a consultant haematologist (see list above).

Tests available: The following table outlines the tests available from the Blood Transfusion Laboratory, CUH. Details of tests are contained in the A to Z section of this Handbook.

<table>
<thead>
<tr>
<th>INAB Accredited Tests Available</th>
<th>Non INAB accredited Tests Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenatal Serology (Blood Group + Antibody Screen +/- Antibody Identification)</td>
<td>Antibody Titration</td>
</tr>
<tr>
<td>Blood Group and Coombs</td>
<td>Anti-c Quantitation</td>
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<tr>
<td>Blood Group and Crossmatch</td>
<td>Anti-D Quantitation</td>
</tr>
<tr>
<td>Blood Group and Hold</td>
<td>Anti-Platelet Antibody Investigation</td>
</tr>
<tr>
<td>Blood Transfusion Reaction</td>
<td>Cold Agglutinins</td>
</tr>
</tbody>
</table>
INAB Accredited Tests Available | Non INAB accredited Tests Available
---|---
Investigation (Blood Group + Antibody Screen +/- Antibody Identification + Crossmatch +/- Red Cell Phenotyping) | 
Direct Coombs Test | Foetal Genotype
Phenotyping Red Cell Antigens | Haemolysin Test
| HLA Antibody (Antibody to Human Leucocyte Antigen)
| HLA Typing
| HPA (Human Platelet Antigen + Antibody Investigation for NAITP)
| Leucocyte (White Cell) Antibody Investigation
| Platelet Antibody Investigation

It is very important that sample tubes used are within their expiry date. Please note that expired sample bottles may be rejected and repeat samples requested.

Sample bottles and request forms may be obtained from CUH Stores.

**On-call services:** Only emergency samples are processed during on-call hours. The list of tests available during out-of-hours on-call times are listed in this handbook with specific notes as appropriate. Samples for elective procedures should be brought directly to the laboratory before 5 p.m. on the day prior to surgery. It cannot be guaranteed that blood will be ready for elective surgery the following morning if samples arrive in the laboratory after this time.

**Consent:** Upon admission to the CUH, it is understood that consent is given by the patient by way of signature for any treatment deemed necessary by medical personnel that includes transfusion of blood and/or blood products.

**Turnaround time:** Turnaround time (TAT) is defined as the time from receipt of specimen in the laboratory until the result (and/or blood is issued) is reported either in the computer or by phone. The Blood Transfusion Laboratory will attempt to meet the turnaround times outlined in the test directory A to Z section of this handbook, subject to the availability of sufficient resources.

- The laboratory operates a “zero-tolerance policy” in relation to sample labelling which is in line with internationally recognised BCSH Guidelines. Inadequately labelled samples must be resampled.
- The presence of antibodies may lead to delays in the provision of blood in both emergency and non-emergency situations. It is therefore essential that samples for routine elective surgeries be sent to the laboratory to arrive no later than 5 p.m. on the previous working day to ensure blood will be ready.
- On occasion, the laboratory may request additional or repeat samples. This may be due to the investigation of unusual results, poor sample quality (e.g. haemolysis, labeling errors) or patients requiring several crossmatches etc.
Laboratory Requests:

Important considerations for blood transfusion laboratory requests:
- From the patient perspective, there are no specific requirements in terms of fasting etc. with regard to preparation prior to sample collection.
- Blood transfusion samples may only be taken by Doctors or specially trained Nurses/Midwives at CUH/CUMH.
- Request forms and samples for blood transfusion laboratory requests from all users of the service MUST be handwritten.

**Note:** The CUMH uses the MN_CMS Millennium Electronic record. Transfusion sample labels & forms generated correctly through the MN_CMS EHR are accepted in the CUH Blood Transfusion Department.

- Essential information required on both samples and forms MUST include:
  - Patient’s Forename
  - Patient’s Surname
  - MRN (in case of GP sample where no MRN available the address to be used)
  - Date of Birth
  - Identity of person taking the sample (Doctor/dedicated nurse) including bleep/contact number. Ideally, Doctors should include their MCRN, Nurses/Midwives should include An Bord Altranais PIN.
  - Date and time that the sample was taken.
  - Unconscious patients admitted to the emergency department should be identified using the system as agreed with the blood transfusion laboratory, CUH as detailed in local instructions (Please be familiar with current instructions in the emergency department).
  - In the event of a major incident when many patients may be admitted at the same time, the labelling protocols should be used as described in the local major incident policies available in the Emergency Department.
  - The volume of blood sample required for blood transfusion testing should be sufficient to meet the needs of testing procedures requested. The volumes required are outlined in A to Z section.
  - A fresh blood sample must be obtained 48 hours after commencement of a blood transfusion if a patient is to receive additional blood. Fresh blood samples are required from patients if they have been transfused or pregnant within the past 3 months. This “48hr rule” may be extended in pregnancy in certain cases to 7 days.
  - Adequate completion of requests should include clinical information so that work may be prioritised and processed accordingly in the laboratory (e.g. obstetric history, transfusion history, reason for transfusion).
  - Samples should be transported to the laboratory using the guidelines described in this document. All inpatient samples should be brought directly into the laboratory and not left at Laboratory Reception. Samples sent using the pneumatic chute system should be accompanied with a telephone call to alert Laboratory personnel.
  - Samples should arrive in the laboratory no later than 48 hrs after sampling.
  - Materials used in the collection of primary samples should be disposed of in accordance with local health and safety guidelines.

Ordering Frozen Products should be ordered by telephoning the CUH Blood Transfusion
Plasma (e.g., Octaplas/Uniplas), Prothrombin Complex Concentrate (e.g., Octaplex), Paediatric Cryoprecipitate, Albumin and other Blood Products:

Laboratory and by sending a fully completed Blood Product Requisition Form (LF-C-BTR-PROREQ) to the laboratory. Addressograph labels may be used on this form however this form MUST be signed by the requestor.

- Plasma is stored at less than -18°C and requires 30-45 minutes to be prepared depending on the number of units required. Once thawed, if not used within 4 hours, the Blood Transfusion Department must be contacted, as it may be necessary to discard the product.

- Plasma is NOT routinely necessary in the management of over-anticoagulation with warfarin and the National Haemovigilance Office has issued the following guidelines:

<table>
<thead>
<tr>
<th>Coagulation Status of Patient</th>
<th>Corrective Action</th>
</tr>
</thead>
</table>
| INR result between 3.0-6.0 (target 2.5) | 1. Reduce warfarin dose or stop.  
2. Restart warfarin when INR <5.0 |
| INR result between 4.0-6.0 (target 3.5) | 1. Stop Warfarin  
2. Restart warfarin when INR <5.0 |
| INR result between 6.0-8.0 with no bleeding or minor bleeding. | 1. Stop warfarin  
2. Restart warfarin when INR <5.0  
3. If other risk factors for bleeding exist, give 0.5-2.5 mg of oral or I.V. Vitamin K. |
| INR result >8.0 with no bleeding or minor bleeding | 1. Stop warfarin  
2. Give Prothrombin complex (e.g Octaplex) (50IU/kg) or Plasma (15 mL/kg)  
3. Give 5mg of oral or I.V. Vitamin K |

Life-threatening bleed

- Stop warfarin
- Give Prothrombin complex (e.g Octaplex) (50IU/kg) or Plasma (15 mL/kg)
- Give 5mg of oral or I.V. Vitamin K

Ordering Platelets:

Contact the CUH Blood Transfusion laboratory and inform the laboratory staff of the platelet requirements. Complete the blood product requisition form and send to the laboratory. Laboratory personnel may have to request a sample for grouping if no record of blood group is available in the laboratory. Laboratory personnel will arrange the delivery of platelets from IBTS. It may not always be possible to have ABO compatible platelets available from IBTS, so laboratory personnel may need to confirm suitability with requesting clinician.

Once labeled and prepared, the laboratory will contact the requesting location that the platelets are ready.

Requesting Additional Examinations:

Products should be ordered by telephoning the CUH Blood Transfusion Laboratory and by sending a fully completed Blood Product Requisition Form (LF-C-BTR-PROREQ) to the laboratory. Addressograph labels may be used on this form however this form MUST be signed by the requestor.

If requesting additional red cells it is important to note that from the commencement of a transfusion, the sample used for that crossmatch is only valid for a further 48 hours after which time a new sample is required. This is to check for the presence of developing red cell antibodies in the recipient following exposure to red cell antigens in donor blood.

The identity of the person requesting additional red cells should be made known to laboratory personnel.

Further tests on a specimen that is already in the laboratory can be requested by contacting the laboratory, where it will be established if the test may be possible.
Storage and collection of Red Cells:

Red cells are stored between 2-6°C in temperature-controlled and monitored fridges. When blood or blood products are required for a patient, the ward can generate a blood collection slip from certain designated PC terminals. This collection slip is printed in the laboratory and is used to identify the patient for whom blood is required, and as such is an integral part of the blood transfusion traceability system. Having first viewed the most recent haemoglobin result, the ward generates a collection slip for porters (which is printed in the laboratory). The ward then requests the porter to collect the blood or blood product. The porter collects the blood or blood product in accordance with current procedures. Training is provided to all staff involved in the collection of blood and blood components by CUH haemovigilance personnel. The collection slip then accompanies the blood or blood product to the ward, where it serves as the transfusion confirmation slip, which is then returned to the transfusion laboratory, when the blood or blood product has been transfused. Any queries in relation to this system of blood collection should be directed to Haemovigilance personnel or blood transfusion laboratory staff as described in this handbook.

Transfusion of red cells must begin within 30 minutes of the unit being removed from the designated blood storage refrigerator. If the transfusion has been deferred for any reason the blood must be returned to a designated storage fridge within 30 minutes. If the transfusion has not begun within 30 minutes the unit must be returned to the Blood Transfusion Laboratory for discard.

The transfusion should be completed within 4 hours of commencement of the transfusion to avoid the possibility of bacterial contamination of the unit.

Storage and collection of Platelets:

Platelets are stored between 20-24°C on a special platelet agitator in the blood transfusion laboratory. Platelets are collected in the same process as described for red cells above.

Platelets should not be stored at ward level and should be returned to the laboratory immediately if not being used.

Storage and collection of Plasma (e.g. Octaplas/Uniplus and Paediatric Cryoprecipitate):

These products are thawed in the laboratory upon request. Once thawed, they are stored at room temperature (monitored) in the laboratory and it is recommended that they are used within 4 hours from thawing.

Collection of these blood products is as described for red cells above.

Storage and collection of Albumin and other blood products:

Albumin (5% 500 mL) is stored at room temperature (monitored) in the laboratory. All other products are stored between 2-8°C in temperature controlled and monitored fridges.

Collection of these blood products is as described for red cells above.

Storage of samples in the Blood Transfusion Laboratory:

Original samples are stored for 1 week between 2-8°C. Separated plasma samples are stored for approximately 3 weeks below -30°C. Antenatal patient plasma samples containing antibodies are stored for the duration of the pregnancy approximately. After this time, samples are disposed in accordance with local policies.

Emergency O

A limited number of O Rh (D) Negative Blood are available for EXTREME
Rhesus (D) Negative Blood: In emergency situations. These units are stored in selected locations which include the blood transfusion laboratory issue fridge and the theatre reception fridge. The laboratory must be informed if these units are used and the accompanying form must be fully completed and returned to the laboratory.

Blood Transferred with a patient from an external location: Any blood transferred to the CUH with a patient from an external source (e.g. another hospital) should be brought directly to the blood transfusion laboratory. It is essential that any documentation accompanying the blood is completed accordingly and given to the transfusion laboratory personnel. It is imperative that the storage conditions of blood ‘in transit’ are controlled. It is also necessary to obtain a fresh group and hold sample as soon as possible from such patients so that additional blood be required, it can be used for crossmatching in the CUH blood transfusion laboratory.

General Haemovigilance: Haemovigilance may be defined as: “a set of surveillance procedures, from the collection of blood and its components, to the follow up of recipients to collect and assess information on unexpected or undesirable effects resulting from the therapeutic use of labile blood products, and to prevent their occurrence or recurrence” (National Haemovigilance Office, 2004.)

Since 2005 the role of the Haemovigilance staff has been greatly influenced by the transposition into Irish law of the EU Blood Directive 2002/98/EC. The directive became law in Ireland on the 8th February 2005 and has implications for all hospital blood banks. Eight articles apply directly to all staff involved in the transfusion process throughout the hospital. The major implications involve the implementation of quality systems for all aspects of transfusion, the total traceability of every blood product, the training of personnel involved in the transfusion process and the reporting of any serious adverse reactions or events associated with the transfusion of blood components. Compliance with this legislation is policed by the Health Products Regulatory Authority (HPRA, formerly known as the Irish Medicines Board) under the HPRA Act 1995 and in the event of directive non-compliance; the HPRA has censure authority up to and including the closure of a facility.

The remit of the haemovigilance personnel includes the following:
- Promotion of safe and effective transfusion practice for those receiving blood components/products.
- Participation in local working groups and on a national basis to promote the safe and effective transfusion practice for those receiving blood components/products.
- Provision of educational programmes for staff involved in the transfusion process.
- Participation in and development of audit initiatives as appropriate.
- Development and maintenance of effective channels of communication by encouraging networking, support and cross-clinical group working.
- Contribution to the shaping of policy relating to transfusion of blood components by responding to local and national developments.
- Investigation of any serious adverse reactions or events.
associated with the transfusion of blood components.
- Maintenance of blood component traceability.

Haemovigilance Training and Policies

Haemovigilance personnel have put policies and procedures in place via the Q-Pulse document management system in CUH promoting good transfusion practice in clinical areas. Scheduled Haemovigilance education sessions are provided by Haemovigilance personnel to all clinical staff. Clinical staff who are unable to attend these scheduled training sessions should make contact with the CUH/CUMH haemovigilance personnel to arrange training.

It is CUH policy that all clinicians should have completed both (Safe Transfusion Practice (Formerly Module 1) and Blood Components and Indications for Use( Formerly Module 2) of the SNBTS LearnPro elearning program. ([www.learnbloodtransfusion.org.uk](http://www.learnbloodtransfusion.org.uk)). Instructions on how to access the Q-Pulse system and the SNBTS-e-learning program are available from haemovigilance staff.

All hospitals have a legal requirement to trace each individual blood component, whether transfused or disposed of, in accordance with the EU Blood Directive (2002/98/EC). This information must be held and available for thirty years. Therefore, full and clear documentation associated with transfusion is essential.

All serious adverse reactions and events associated with the transfusion of blood components are investigated documented and, where required, reported to the National Haemovigilance Office through a confidential anonymous reporting system. If you suspect a transfusion reaction, you must contact the Blood Transfusion Laboratory or Haemovigilance personnel as identified in this Handbook. There is a Policy dealing with the recognition, investigation and management of a Suspected Transfusion Reaction on Q-Pulse. ([PPG-CUH-CUH-30](#)).

The decision to transfuse is the responsibility of the prescribing clinician and should be based on the best available evidence. The prescribing clinician should discuss the transfusion with the patient in accordance with hospital policy ([PPG-CUH-CUH-80](#)), document this discussion in the patient’s medical notes and should give the patient the ‘Having a Blood Transfusion – Information Leaflet for Patients and Guardians’– ([INF-CUH-CUH-9](#)). If the patient is to be discharged on the day of transfusion, the ‘Having a Blood Transfusion-Patients Transfused on Day of Discharge- Information Leaflet for Patients and Guardians’ ([INF-CUH-CUH-15](#)) should be given. (forms available from the Stationary Stores Department). Where clinically possible it is recommended that blood transfusions should only be given during routine working hours.

There is a policy available on Q-Pulse which details the procedure required for the prescription of blood & blood components. This policy also details the correct procedure for the taking of the pre-transfusion sample by medical staff. ([PPG-CUH-CUH-36](#)). There is also a policy covering the procedure for the taking of the pre-transfusion sample by nurses & midwives available on Q-Pulse. ([PPG-CUH-NUR-7](#)).

The procedure for the administration of blood & blood components is covered in the policy ([PPG-CUH-CUH-13](#)), available on Q-Pulse.
Results

Note: In the CUMH, transfusion results are available electronically through the MN_CMS Millennium Electronic Health Record.

It is the general policy of the laboratory not to issue results over the phone. Copy reports can be printed on request. In accordance with HSE policy, faxing of results can be facilitated in exceptional circumstances only. Users will be asked to fax a request for a faxed report, to ensure the laboratory can fax report to a secure fax number.

Advice and consultation:

Should clarification be sought on any issues related to the Blood Transfusion Laboratory service at CUH, queries may be directed to Blood Transfusion Laboratory or Haemovigilance personnel as identified in this Handbook.

Complaints/Positive Feedback

The Blood Transfusion Laboratory at CUH endeavours to produce a system of continual improvement to meet the needs and requirements of users and in the best interest of patients. To facilitate this, the Blood Transfusion Laboratory welcomes all feedback (both Negative and Positive) and users can provide feedback by way of telephone call, email or in hard copy writing to contacts provided. All feedback will be processed in accordance with the laboratory’s feedback / complaints system.

Data Protection/Patient Information Code of Conduct:

All staff in the laboratory are made aware of their responsibilities in relation to protection of personal patient information consistent with the Data Protection Act 2003 and Freedom of Information Act 2003. All records are retained in accordance with requirements outlined in EU Blood Directive 2002/98/EC and securely managed in accordance with local laboratory instruction MI-C-BTR-RECORDM.

Contingency

In the event that the laboratory’s computer system fails, a manual contingency plan is in place. Users may be informed that a manual back-system is in place and are requested to facilitate the laboratory by limiting requests to ‘urgent requests’ only, while IT systems are restored.

In the extremely unlikely event that the laboratory is unable to provide a service (e.g. Fire/Flood Damage), the IBTS may provide a back-up service. Users may be requested to facilitate the laboratory by limiting requests to ‘urgent requests’ only, while service is restored on site in CUH.
13 TEST DIRECTORY (A-Z)

Acanthamoeba (amoebic keratitis)
Laboratory: Microbiology (Main laboratory)
Specimen: Corneal scrapings collected onto a specific swab obtained directly from the Microbiology Laboratory.
Comment: Swab must be transported directly to microbiology where it will be referred to the UK for PCR testing. Testing performed by Micropathology Ltd, Coventry.
Turnaround: 1 week (1 working day from receipt of swab in UK)
Report: Acanthamoeba PCR detected or not detected.

Acanthamoeba (corneal scrape)
Laboratory: Neuropathology
Specimen: Corneal scrape – special fixative required, (CytoLyt) available from Neuropathology Laboratory, 22519.
Comment: Please contact Neuropathology Department in advance on 4922520
Turnaround: 1-2 days

ACTH
Laboratory: Sample referred from CUH Biochemistry to BIOMNIS Laboratories
Specimen: Special Tube (Aprotinin EDTA available from Biochemistry) on ice, must be frozen < 30 minutes
Comment: Consultant request only
Turnaround: 3 weeks
Ref. Range: See report form, or visit internet site www.biomnis.ie for up to date referral test information.

Activated Partial Thromboplastin Time (APTT)
Laboratory: Haematology
Specimen: Blood 3mL/1mL blue Vacuette® (sodium citrate 3.2%)
(Specimens which are haemolysed, under filled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling.)
Comment: A screening procedure used to evaluate abnormalities in the Intrinsic Coagulation Pathway and to monitor the effectiveness of heparin therapy. Also forms part of the Thrombophilia and /or Lupus screen. See Main Haematology Section on Guidelines for Investigation of Thrombophilia. Please note that specimens should arrive in the laboratory within 4 hours of sampling.
Test available Monday to Friday, during routine working hours, and for emergency reasons at all other times.
Turnaround: Urgent specimens: 2 hours. Ward specimens: 8 hours
Ref. Range: Age Mean Range (secs)
Day 1 43 31 - 55
Day 5 43 25 - 60
Day 30 41 26 - 55
Day 90 37 28 - 43
Day 180 36 28 - 43
Adult 27 23 - 31

Activated Protein C Resistance (APCR Test)
Laboratory: Haematology
Specimen: Blood 3mL, blue Vacuette® (sodium citrate 3.2%)
(Specimens which are haemolysed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling)
Comment: Test available Mon to Fri, during routine working hours. This test forms part of a Thrombophilia Screen, used as a screening test for Factor V Leiden mutation, see Main Haematology Section on Guidelines for Investigation of Thrombophilia (if positive an EDTA sample is confirmed by PCR analysis).

**Samples must be received within 4 hours.**

Turnaround: 3 – 4 weeks (Refer to the main Haematology Section on Coagulation).
Ref. Range: Ratio ≥ 0.8 Negative
Ratio: 0.71 – 0.79 Inconclusive
Ratio ≤ 0.70 Positive

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**Acyl Carnitine, blood spot**

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Sample referred from Clinical Biochemistry to The Children’s Hospital, Temple Street, Dublin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>Newborn screening card. 2 full circles</td>
</tr>
<tr>
<td>Comment:</td>
<td>Consultant request only</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>3 weeks</td>
</tr>
<tr>
<td>Ref. Range:</td>
<td>See report form.</td>
</tr>
</tbody>
</table>

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**Adenovirus Molecular Qualitative**

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Microbiology (Infectious Diseases Serology)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>Viral swab (eye, throat), stool, nasopharyngeal aspirate, sputum, broncho-alveolar lavage</td>
</tr>
<tr>
<td>Comment:</td>
<td>Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin)</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>5 working days</td>
</tr>
<tr>
<td>Report:</td>
<td>Detected or not detected</td>
</tr>
</tbody>
</table>

---

**Adenovirus Molecular Quantitative**

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Microbiology (Infectious Diseases Serology)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>4mL EDTA blood</td>
</tr>
<tr>
<td>Comment:</td>
<td>Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin). Plasma must be frozen by laboratory within 24 hours of sample collection.</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>5 working days</td>
</tr>
<tr>
<td>Report:</td>
<td>Detected or not detected</td>
</tr>
</tbody>
</table>

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**Adrenal Antibodies**

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Sample referred from Autoimmune Serology to Biomnis Laboratories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>Blood, 4 mL red top Vacuette (or similar container for clotted blood)</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>Approx. 3 Weeks</td>
</tr>
<tr>
<td>Ref. Range:</td>
<td>See report form, or visit internet site <a href="http://www.biomnis.ie">www.biomnis.ie</a> for up to date referral test information.</td>
</tr>
</tbody>
</table>

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**Alanine amino Transferase (ALT)**

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Clinical Biochemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>4.0 mL blood plain tube (clotted sample)</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, MGH: - 3 hours approx. GP or OPD- Results posted within 4 days</td>
</tr>
<tr>
<td>Ref. Range:</td>
<td>4 - 45 U/L</td>
</tr>
</tbody>
</table>

---
## Albumin (Blood)

| Laboratory: Clinical Biochemistry |
| Specimen: 4.0 mL in blood plain tube (clotted sample) |
| Turnaround: A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx. GP or OPD- Results posted within 4 days |
| Ref. Range: 35 – 52 g/L (0-4 days: 28-44 g/L) |

## Albumin (Urinary)

| Laboratory: Clinical Biochemistry |
| Specimen: Spot or 24 hour urine sample |
| Turnaround: 1 Day |
| Ref. Range: 0 – 30 mg/24 hr |

## Albumin: Creatinine Ratio (urine)

| Laboratory: Clinical Biochemistry |
| Specimen: Spot urine |
| Turnaround: 1 Day |
| Ref. Range: < 2.5 mg/mmol M < 3.5 mg/mmol F |

## Alcohol (Ethanol) (See also Toxicology Screen)

| Laboratory: Clinical Biochemistry |
| Specimen: 4.0 mL blood in glucose tube, (Sodium Fluoride, grey-capped) or in plain tube (clotted sample) or in Lithium Heparin tube. Spot urine sample |
| Comment: Do Not use alcohol swabs. For acute medical emergencies only. Not useful for screening for alcohol abuse. |
| Turnaround: 1 Day |
| Ref. Range: Not normally detected Concentrations of >180mg/dL are associated with disorientation. Levels >350mg/dL are usually required to produce coma. Fatal poisoning is associated with levels >450mg/dL |

## Aldosterone/Renin ratio

| Laboratory: Sample referred from Clinical Biochemistry to BIOMNIS Laboratories (Paediatric samples sent to Leeds General Infirmary) |
| Specimen: 4.0 mL blood in EDTA. State if the subject was standing (after at least 1 hour of walking) or recumbent (after at least 3 hours) |
| Comment: Consultant request only |
| Turnaround: 3 weeks |
| Ref. Range: See report form, or visit internet site www.biomnis.ie for up to date referral test information. |

## Alkaline phosphatase (Alk Phos)

| Laboratory: Clinical Biochemistry |
| Specimen: 4.0 mL blood in plain tube (clotted sample) |
| Turnaround: A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx. GP or OPD- Results posted within 4 days |

## Alpha-1-Antitrypsin

| Laboratory: Clinical Biochemistry |
| Specimen: 4.0 mL blood in plain tube (clotted sample) |
| Turnaround: 4 Days |
Ref. Range: 1.1–2.1 g/L (Adult). Contact Biochemistry lab for paediatric age-related ranges

**Alpha-1-Antitrypsin Phenotyping**

- **Laboratory:** Sample referred from Clinical Biochemistry to Pulmonary Research Division, Royal College of Surgeons in Ireland, Education and Research centre, Beaumont Hospital, Dublin 9.
- **Specimen:** 0.2 mL serum
- **Turnaround:** 2-3 weeks
- **Ref. Range:** Contact Biochemistry

**Alpha- Amino Adipic Semialdehyde (á-AASA)**

- **Laboratory:** Referred from Biochemistry to the Institute of Child Health, London
- **Specimen:** Spot Urine (5-10mls) on ice
- **Comment:** MUST BE FROZEN immediately.
  - Used to support a diagnosis of Pyridoxal Responsive Epilepsy.
  - Consultant request only
- **Turnaround:** 6-8 weeks

**Alpha Fetoprotein (AFP)**

- **Laboratory:** Clinical Biochemistry
- **Specimen:** 4.0 mL blood in plain tube (clotted sample)
- **Turnaround:** 4 Days
- **Ref. Range:** 0.9–8.8 μg/L

**Amikacin / Amikin**

Refer to Antibiotic Assays

**Amoeba Antibodies**

- **Laboratory:** Microbiology (Infectious Diseases Serology)
- **Specimen:** 4mL clotted blood
- **Comment:** Performed by a reference laboratory (PHE National Parasitology Reference Laboratory (NPRL), London)
- **Turnaround:** 3 weeks
- **Report:** Positive or negative

**Ammonia**

- **Laboratory:** Clinical Biochemistry
- **Specimen:** Blood sample in Li Hep or EDTA bottle
- **Comment:** Please inform laboratory in advance. Fill specimen to the top and transport on ICE.
  - Haemolysis invalidates result.
- **Turnaround:** Once the lab is contacted in advance, results could be ready in approx. 1 hour 15mins
- **Ref. Range:** Adult: 10 – 47 μmol/L (Adult).
  - Neonatal: Up to 100 μmol/L. Pre-term and/or sick babies may have concentrations up to 200 μmol/L. Lower concentrations after 1 month.
### Amphetamine

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Sample referred from Clinical Biochemistry to Toxicology Laboratory BEAUMONT Hospital Dublin, posted Monday, Tuesday, Wednesday and Thursday.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>Spot urine</td>
</tr>
<tr>
<td>Comment:</td>
<td>See Toxicology / Drug Screen</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>1 week</td>
</tr>
<tr>
<td>Ref. Range:</td>
<td>See report form or contact Toxicology Laboratory BEAUMONT Hospital 01-8092673 / (01)8092675, Emergency after hours (087) 2590749, Fax (01)8093986</td>
</tr>
</tbody>
</table>

### Amylase (Blood)

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Clinical Biochemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>4.0 mL blood in plain tube (clotted sample)</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>A/E or urgent sample: ~ 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: ~ 3 hours approx.</td>
</tr>
<tr>
<td>Ref. Range:</td>
<td>30 – 120 U/L</td>
</tr>
</tbody>
</table>

### Amylase (Urinary)

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Clinical Biochemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>Spot or 24 hour urine sample</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>1 Day</td>
</tr>
<tr>
<td>Ref. Range:</td>
<td>0 – 1200 IU/24 Hr</td>
</tr>
</tbody>
</table>

### Androstenedione (D4A)

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Sample referred from Clinical Biochemistry to St. James’s University Hospital, Leeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>3.0 mL blood in a plain tube (clotted sample)</td>
</tr>
<tr>
<td>Comment:</td>
<td>Consultant request only</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>3 weeks</td>
</tr>
<tr>
<td>Ref. Range:</td>
<td>See report form</td>
</tr>
</tbody>
</table>

### Angelman Syndrome (AS)

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Molecular Genetics in Biochemistry referred to National Centre for Medical Genetics. NCMG request form is available on website, <a href="http://www.genetics.ie/molecular">www.genetics.ie/molecular</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>Infants: 1ml EDTA blood Adults 3-5ml EDTA blood</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>6 weeks</td>
</tr>
<tr>
<td>Report:</td>
<td>Sent to referring clinician by NCMG and copy of report filed in pathology</td>
</tr>
</tbody>
</table>

### Angiotensin converting enzyme (ACE)

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Clinical Biochemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>4.0 mL blood in plain tube (clotted sample)</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>4 Days</td>
</tr>
<tr>
<td>Ref. Range:</td>
<td>0 – 45 IU/L</td>
</tr>
</tbody>
</table>

### Antenatal Screen

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Microbiology (Infectious Diseases Serology)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>4mL clotted blood</td>
</tr>
<tr>
<td>Comment:</td>
<td>Screen includes Rubella IgG, Hepatitis B Surface antigen, HIV Ag/Ab, Syphilis antibody, Varicella-zoster virus (VZV) IgG</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>Negative samples: 36 hours. Please allow extra time for samples testing positive in house for HIV Ag/Ab and Syphilis antibody (external confirmatory testing required).</td>
</tr>
<tr>
<td>Report:</td>
<td>Positive or negative (IU/mL for Rubella IgG)</td>
</tr>
</tbody>
</table>
Antenatal Serology
(Blood Group + Antibody Screen +/- Antibody Identification +/- Titration)

Laboratory: Blood Transfusion Laboratory
Specimen: 1 x 6 ml EDTA Pink Capped Tube
Comment: Antenatal blood grouping and antibody screening and identification in antenatal women. (Patients may also include the male partners of pregnant women for the purposes of establishing their blood groups and red cell phenotypes in the prediction of HDNB).
Blood Group, Antibody Screen and Identification, Red Cell Phenotyping are INAB accredited tests.
Request Form to be completed: Antenatal Serology Request Form (LF-C-BTR-ANTENAT)

Turnaround: 2 days.
NOTE: Samples received on Fridays and during weekends may be processed during next routine working day.

Ref. Range: Not applicable

Antibiotic Assays

Laboratory: Microbiology
Specimen: 4mL clotted blood
Test method: Photometric absorbance

Turnaround: Assays are batched and performed at 7am, 11am, 3pm, 7pm and 11pm. Please ensure the sample is in the laboratory at least 30 minutes before the allocated batch time.

Report: Quantitative result (mg/L)
Comment: Available 7 days. Specify peak (post) or trough (pre). It is very difficult to interpret random specimens. All forms should indicate the time since the last administration of the drug. Please refer to the Cork University Hospital Antibiotic Guidelines.
Teicoplanin levels are rarely indicated and are not processed. Streptomycin and Cycloserine levels are performed by a reference laboratory (South Mead Hospital, Bristol).

<table>
<thead>
<tr>
<th>Antibiotic - once daily dosage</th>
<th>Trough</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Amikacin - once daily dosage</td>
<td>&lt;5 mg/L</td>
<td></td>
</tr>
<tr>
<td>Gentamicin - once daily dosage</td>
<td>&lt;1 mg/L</td>
<td></td>
</tr>
<tr>
<td>Tobramycin - once daily dosage</td>
<td>&lt;1 mg/L</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Antibiotic - multiple dosage</th>
<th>Trough</th>
<th>Peak (1 hour post)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gentamicin x3 daily dosage</td>
<td>&lt;2 mg/L</td>
<td>5-12 mg/L</td>
</tr>
<tr>
<td>Amikacin x3 daily dosage</td>
<td>&lt;5 mg/L</td>
<td>15-30 mg/L</td>
</tr>
<tr>
<td>Tobramycin x3 daily dosage</td>
<td>&lt;2 mg/L</td>
<td>5-12 mg/L</td>
</tr>
<tr>
<td>Vancomycin BD</td>
<td>10-20 mg/L</td>
<td>20-40 mg/L</td>
</tr>
</tbody>
</table>

Anti Cardiolipin Antibodies

Laboratory: Haematology
Specimen: Blood 4mL Red Vacuette® (clotted blood)
Comment: Forms part of a Thrombophilia and/or Lupus screen, see Main Haematology Section on Guidelines for Investigation of Thrombophilia. Test available Mon to Fri during routine hours. This assay is only available when requested as part of Thrombophilia investigations.

Turnaround: 3 - 4 weeks
Ref. Range: IgG 0 - 10 GPL /mL
IgM 0 - 7 MPL /mL

**Anti-CCP**

Laboratory: Autoimmune Serology
Specimen: Blood, 4 mL red top Vacuette (or similar container for clotted blood)
Comment: Quantitative immunoassay using Phadia Immunocap 250 analyser. Test restricted to consultant requests.

Turnaround: 24 Hours
Ref. Range: 0 - 7 AU/mL

**Anti-c Quantitation**

Laboratory: Available by prior arrangement with Blood Transfusion Laboratory
Specimen: 2 x 6 mL EDTA Pink Capped Tube
Comment: Quantitations referred to: I.B.T.S., National Blood Centre, James’s St., Dublin 8.
Complete the Antenatal Serology request form LF-C-BTR-ANTENAT. Please note 3 forms of identification are required: Name, DOB and hospital number (address acceptable if none available) on both sample and form. Please submit samples on Mondays if possible.

Turnaround: 3 Weeks for Hard Copy reports. Verbal result from IBTS within 7 days.
Ref. Range: Refer to IBTS report

**Anti-D Quantitation**

Laboratory: Blood Transfusion Laboratory
Specimen: 2 x 6 mL EDTA Pink Capped Tube
Comment: Quantitations referred to: I.B.T.S., National Blood Centre, James’s St., Dublin 8. Complete the Antenatal Serology request form LF-C-BTR-ANTENAT. Please note 3 forms of identification are required: Name, DOB and hospital number (address acceptable if none available) on both sample and form.

Turnaround: 3 Weeks for Hard Copy reports. Verbal result from IBTS within 7 days.
Ref. Range: Refer to IBTS report

**Anti-neuronal Antibody Testing (Paraneoplastic Antibodies)**

Laboratory: Neuropathology Department
Specimen: 4.0 ml of clotted blood (red top vacuette)
Turnaround: Approximately 2 weeks.

**Anti Neutrophil Cytoplasmic Antibodies**

Laboratory: Autoimmune Serology
Specimen: Blood, 4 mL red top Vacuette (or similar container for clotted blood)
Comment: Immunofluorescence assay using Ethanol + Formalin fixed human Neutrophils as Substrate. Quantitative assays to detect auto antibodies against Proteinase 3 (PR3) and Myeloperoxidase (MPO) are automatically undertaken on sera showing associated positive immunofluorescent patterns. Anti-PR3 and Anti-MPO are quantitative immunoassays automatically undertaken following positive immunofluorescence ANCA’s on the Phadia Immunocap 250 analyser.
For stat PR3 and MPO testing please contact lab directly.
Anti Neutrophil Antibodies, Granulocyte Immunology and Auto immune Neutropenia

Laboratory: Referred from Haematology to NHSBT Centre, Bristol
Specimen: Clotted specimen and EDTA 6 mls
Comment: Must arrange with Haematology, transport within 24 hours, complete form from referral laboratory
Turnaround: 1 – 2 months
Ref. Range: Not applicable

Anti Nuclear Factor

Laboratory: Autoimmune Serology
Specimen: Blood, 4 mL red top Vacuette (or similar container for clotted blood)
Comment: Part of Autoantibody Screen. Pattern reported. Titre not reported.
Turnaround: 24 Hours
Ref. Range: Not applicable

Anti-Platelet Antibody Investigation

Laboratory: Blood Transfusion Laboratory
Specimen: 3 mL Clotted (Red Capped/Yellow Ring) Tube
Comment: Samples referred to: I.B.T.S., National Blood Centre, James’s St., Dublin 8 Complete the Blood Transfusion request form.
Turnaround: 3 Weeks
Ref. Range: Not Applicable

Anti-Streptolysin-O (ASO) Titre

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Turnaround: 36 hours
Report: Titre provided
Comment: >200 IU/mL may indicate acute streptococcal infection

Anti Thrombin 3

Laboratory: Haematology
Specimen: Blood 3mL blue Vacuette® (sodium citrate 3.2%)
(Specimens, which are haemolysed, underfilled or overfilled, cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling)
Comment: Forms part of a Thrombophilia Screen.
See Main Haematology Section on Guidelines for Investigation of Thrombophilia.

Samples must be received within 4 hours

Turnaround: 3 – 4 weeks
Ref. Range:

<table>
<thead>
<tr>
<th>Age</th>
<th>Range (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>39 – 87</td>
</tr>
<tr>
<td>Day 5</td>
<td>41 – 93</td>
</tr>
<tr>
<td>Day 30</td>
<td>48 – 108</td>
</tr>
<tr>
<td>Day 90</td>
<td>73 – 121</td>
</tr>
<tr>
<td>Day 180</td>
<td>84 - 124</td>
</tr>
<tr>
<td>Adult</td>
<td>80 - 120</td>
</tr>
</tbody>
</table>

Ascitic Fluid

See Sterile Body Fluid – Microscopy and Culture or Cytology

Aspartate amino Transferase (AST)

Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in plain tube (clotted sample)
### Aspergillus Antibodies
- **Laboratory:** Microbiology (Infectious Diseases Serology)
- **Specimen:** 4mL clotted blood
- **Comment:** Performed by a reference laboratory (Mycology Reference Centre, Leeds)
- **Turnaround:** 3 weeks
- **Report:** Quantitative result with an interpretative comment

### Autoantibody Screen
- **Laboratory:** Autoimmune Serology
- **Specimen:** Blood, 4 mL red top Vacuette (or similar container for clotted blood)
- **Comment:** Includes: Anti Nuclear Factor +/- Anti-dsDNA and Extractable Nuclear Antigen if ANF Positive + Anti-Mitochondrial, Anti Smooth Muscle and Anti-Gastric Parietal Cell Antibodies
- **Turnaround:** 24 Hours
- **Ref. Range:** Not applicable

### Autopsy (CNS cases)
- **Laboratory:** Neuropathology
- **Coroner’s cases and Consent Autopsy protocols are shared with Histopathology (see HISTOPATHOLOGY section), please contact the post-mortem room on 22525. For post-mortems on CNS disease cases, please contact the consultant Neuropathologist on duty (22520/22519). Examinations on high-risk, suspected prion disease cases are conducted in the CJD surveillance centre in Beaumont Hospital, contact 01-8377755
- **Turnaround:** 6-8 weeks

### Avian Antibodies / Fowl
- **Laboratory:** Microbiology (Infectious Diseases Serology)
- **Specimen:** 4mL clotted blood
- **Comment:** Performed by a reference laboratory (Mycology Reference Centre, Leeds)
- **Turnaround:** 3 weeks
- **Report:** Quantitative result with an interpretative comment

### Barbiturates
- **Laboratory:** Sample referred from Clinical Biochemistry to Toxicology Laboratory BEAUMONT Hospital Dublin, posted Monday, Tuesday, Wednesday and Thursday.
- **Specimen:** Blood: 4.0 mL blood in a plain tube (clotted sample). Urine: spot urine
- **Comment:** See Toxicology / Drug Screen
- **Turnaround:** 1 week
- **Ref. Range:** See report form or contact Toxicology Laboratory BEAUMONT Hospital 01-8092673 / (01)8092675, Emergency after hours (087) 2590749, Fax (01) 8093986

### Bartholin’s Abscess
- **Laboratory:** Microbiology (Main laboratory)
- **Specimen:** Aspirate using a syringe (ideally a minimum of 1mL) or using a sterile swab. **Note:** Do not send needle.
- **Specimens should be taken before antimicrobial therapy where possible.**
- **The volume of specimen influences the transport time that is acceptable. Larger volumes of purulent material maintain the viability of anaerobes for longer. Transport ASAP in charcoal containing transport media. The viability of N. gonorrhoeae is lost over time.**
Bence-Jones protein

Laboratory: Clinical Biochemistry (Immunology Laboratory)
Specimen: 20 mL urine
Turnaround: 4 Days
Ref. Range: Should be NEGATIVE

Benzodiazepines

Laboratory: Sample referred from Clinical Biochemistry to Toxicology Laboratory BEAUMONT Hospital Dublin, posted Monday, Tuesday, Wednesday and Thursday.
Specimen: Blood: 4.0 mL blood in a plain tube (clotted sample). Urine: spot urine
Comment: See Toxicology / Drug Screen
Turnaround: 1 week
Ref. Range: See report form or contact Toxicology Laboratory BEAUMONT Hospital 01-8092673 / (01)8092675, Emergency after hours (087) 2590749, Fax (01) 8093986

Beta 2 Glycoprotein 1

Laboratory: Haematology
Specimen: Blood 3mL red Vacuette® (serum)
Comment: Forms part of the Lupus and/or Thrombophilia Screen. This assay is only available when requested as part of Thrombophilia investigations.
Turnaround: 6 weeks
Ref. Range: IgG Normal: < 5U/mL Borderline: 5-8U/mL Elevated: >8U/mL

Beta-2-Microglobulin

Laboratory: Sample referred from Clinical Biochemistry to BIOMNIS Laboratories
Specimen: 4.0 mL blood in a plain tube (clotted sample)
Comment: Consultant request only
Turnaround: 3 weeks
Ref. Range: See report form, or visit internet site www.biomnis.ie for up to date referral test information

Bicarbonate (Plasma)

Laboratory: Clinical Biochemistry
Specimen: Fresh 4.0 mL blood in plain tube (clotted sample)
**Bile Acids**

Laboratory: Clinical Biochemistry  
Specimen: 4.0 mL blood in a plain tube (clotted sample)  
Turnaround: 2 days  
Ref. Range: 0-10 µmol/L

**Bilirubin - Direct**

Laboratory: Clinical Biochemistry  
Specimen: 4.0 mL blood in plain tube (clotted sample)  
Comment: Aged sample invalidates results  
Turnaround: A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx.  
Ref. Range: 1 – 10 µmol/L (adult) Please contact Clinical Biochemistry lab for Paediatric and Pregnancy-related Reference ranges.

**Bilirubin - Total**

Laboratory: Clinical Biochemistry  
Specimen: 4.0 mL blood in plain tube (clotted sample)  
Comment: Aged sample invalidates results  
Turnaround: A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx.  
Ref. Range: 2 – 20 µmol/L (adult) Please contact Clinical Biochemistry lab for Paediatric and Pregnancy-related Reference ranges.

**BK Virus Molecular**

Laboratory: Microbiology (Infectious Diseases Serology)  
Specimen: 4mL clotted blood, 4mL EDTA blood, urine  
Comment: Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin). Serum/plasma must be frozen by laboratory within 24 hours of collection.  
Turnaround: 5 working days  
Report: BK viral load
Blood Culture

Laboratory: Microbiology (Main laboratory)
Specimen: The blood culture vials and instrument in use are the BACTEC fluorescent system (Becton-Dickinson & Co. Ltd). An exception is the investigation for mycobacteria (see Mycobacteriology section). Blood culture vials should be kept at a cool room temperature in the wards (2-25°C). The number of vials stored in each ward should be limited to their general usage and excessive stocks avoided. There is an expiry date on each vial and they should not be used after this date.

Adults: Preferably, a volume of 8-10mL of specimen per vial.
Children/Neonates: Use paediatric vials – preferably, a volume of 1-3mL (the volume of blood should be no more than 1% of the patients total blood volume). No need for lytic/anaerobic vial unless clinically indicated.

Note: Do not exceed the manufacturer’s recommended maximum volume for each bottle.

Comment: If blood for other tests such as blood gases or ESR is to be taken at the same venepuncture, the blood culture bottles should be inoculated first to avoid contamination. It is preferable to take blood for culture separately. Disinfect the skin at the venepuncture site with isopropyl alcohol and allow to dry. Disinfect the septum of the blood culture bottle with alcohol and allow to dry.

For diagnosis of bacteraemia withdraw blood from a peripheral vein and divide the specimen equally among blood culture vials, ensuring that the needle is changed between bottles. If the patient has a central line or other vascular access site, it is often appropriate to take both central and peripheral blood cultures.

For neonates consider the use of a single aerobic paediatric vial appropriate for small volumes of blood.

If necrotising enterocolitis is suspected and sufficient blood is obtained, inoculate a paediatric and a lytic/anaerobic bottle.

Indicate if specific organisms are sought e.g. causative organisms of infective endocarditis. Consider bone marrow aspirate rather than blood sample for the diagnosis of typhoid fever and brucella species.

Blood cultures should be transported to the laboratory as soon as possible after venepuncture as delays can lead to false negative results.

NB. Do not refrigerate or place on radiators, incubators or direct sunlight. The pneumatic tube can be utilised to transport plastic blood culture vials and is preferable to avoid unnecessary delays.

Turnaround: Most organisms will be detected within 24-48 hours and normally blood cultures are incubated for 5 days, but this time may be extended e.g. 7 days for bone marrow or 10 days if endocarditis is suspected.

Report: A provisional report is issued at 48 hours and a final report at 5 days if the blood culture is negative.

Positive results are phoned as soon as available to the requesting area or team.

Blood Gases (pH, pCO2, pO2, Actual Bicarbonate, Base Excess, O2 Saturation)

Laboratory: Clinical Biochemistry
Specimen: Li Hep syringe
Comment: If delay between sample being taken and arrival in CUH Biochemistry lab is to be greater than 15 minutes, sample must be sent on ice.

Turnaround: 15 Minutes
Blood Group and Coombs

**Laboratory:** Blood Transfusion Laboratory

**Specimen:**
- 1 x 6 ml EDTA Pink Capped Tube
- For Newborns: Cord Blood Sample in 6 ml EDTA Pink Capped Tube.
- For Paediatrics: 1 ml EDTA (Purple Cap/White Ring) Paediatric Bottle.

**Comment:** Consists of Blood Group and Direct Coombs Test. Usually performed on Newborns.

Complete the Blood Transfusion request form LF-C-BTR-BBCORD or LF-C-BTR-XMATCH.

Blood Group and Direct Coombs Test are INAB Accredited tests.

**Turnaround:**
- 24 hours. (Note: may be shortened to 1 hour in emergency)

**Ref. Range:** Not Applicable

Blood Group and Crossmatch

**Laboratory:** Blood Transfusion Laboratory

**Specimen:**
- 1 x 6 ml EDTA Pink Capped Tube
- For Paediatrics: 1 ml EDTA (Purple Cap/White Ring) Paediatric Bottle.

**Comment:** Samples for crossmatching for elective surgery must arrive in the laboratory before 2 p.m. on day before surgery to avoid undue delay. Blood is crossmatched in batches and in accordance with the locally agreed Maximum Surgical Blood Ordering Schedule (MSBOS), except in exceptional cases. Arrangements are in place for the emergency issue of blood. In exceptional circumstances, blood may be issued uncrossmatched on request.

Complete the Blood Transfusion request form LF-C-BTR-XMATCH.

The laboratory accepts “Add-On” requests for additional units to be crossmatched when appropriate. These requests must be accompanied with a completed written Blood Product Requisition Form LF-C-BTR-PROREQ. Crossmatch is an INAB accredited test.

**Turnaround:**
- 3 Hours. (Note: The presence of irregular antibodies, or the need for certain special requirements can lead to significant delays in efforts to obtain appropriate blood).

Routine (non-urgent) samples will be processed during routine hours unless specified as an emergency.

In emergencies the laboratory will attempt to provide crossmatched blood within 40 minutes to 1 hour (when possible i.e. no antibodies).

These turnaround times apply to “Add On” requests for blood also.

**Ref. Range:** Not Applicable
Blood Group and Hold

Laboratory: Blood Transfusion Laboratory
Specimen: 1 x 6 ml EDTA Pink Capped Tube
For Paediatrics: 1 ml EDTA (Purple Cap/White Ring) Paediatric Bottle.
Comment: Blood is grouped and an antibody screen is performed. The sample is then held in the laboratory for up to 3 weeks. Blood may be crossmatched subsequently on that sample on request.
Complete the Blood Transfusion request form LF-C-BTR-XMATCH.
Blood Group, Antibody Screen and Antibody Identification are INAB accredited tests.
Turnaround: 4 Hours. (Note: Group and hold samples are processed in batches in the laboratory. The presence of irregular antibodies can lead to significant delays in order to identify such antibodies).
Routine (non-urgent) samples will be processed during routine hours unless specified as an emergency.
In emergencies the laboratory will attempt to complete the group and hold within 40 minutes to 1 hour (when possible i.e. no antibodies).

Blood Transfusion Reaction Investigation

Laboratory: Blood Transfusion Laboratory
Specimens: 1 x 6 ml EDTA Pink Capped Tube and 2 x 4ml clotted sample (red cap yellow ring).
Comment: Complete the Blood Transfusion request form LF-C-BTR-XMATCH.
Tests may include Blood Group, Antibody Screen, Antibody Identification, Crossmatch, Direct Coombs Test, Red Cell Phenotyping. These are all INAB accredited tests.
Ensure that the unit/product implicated in suspected transfusion reaction is returned to the laboratory as soon as possible.
Ensure the Transfusion Reaction details are completed on the last page of the Blood Component Prescription and Transfusion Record (Report of a suspected Transfusion Reaction).
Turnaround: 4 Hours.

Bone Marrow Examination (Haematology)

Laboratory: Haematology
Specimen: Fresh bone marrow air-dried films.
Specimen must be labelled with the patient's name, MRN and DOB and sent to the Haematology Dept. ASAP
Comment: Examinations are undertaken for the investigation of patients with leukaemia, anaemia, myeloma, lymphoma, myeloproliferative disorders, thrombocytopenia and unexplained cytopenias.
Turnaround: Urgent marrows must be labelled as such and can expect a turn around time of 24 hours. Examples of urgent include suspected acute leukaemia, ITP in a child, myeloma with renal failure. Such marrows will also have verbal results phoned to requesting team the same day. Other indications can expect a TAT of up to two weeks for completed reporting including iron staining. However significant preliminary reports will be phoned by the reporting haematologist.

Ref. Range: N/A
**Bordetella pertussis Antibodies**

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: Test performed by reference laboratory (Respiratory and Vaccinee Preventable Bacteria Reference Unit (RVPBRU), London)
Turnaround: 2 weeks
Report: Quantitative value with interpretative comment. In the absence of recent vaccination, values greater than 100 IU/mL are consistent with recent infection.

**Bordetella Species Culture (Whooping Cough)**

Laboratory: Microbiology (Main laboratory)
Specimen: Specialist collection according to local protocols.
Comment: Test performed routinely Monday to Friday 9-5pm or by urgent request.
Turnaround: 7 days
Report: *Bordetella pertussis* not isolated or *Bordetella pertussis / parapertussis* isolated.

**Brain examinations (post mortem)**

Laboratory: Neuropathology
Specimen: Formalin-fixed brain / spinal cord
Comment: Post-mortem brain referrals are from Consultant Pathologists, please refer to the protocol for brain referrals (Neuropathology Department Information for Users).
Turnaround: 6-8 weeks

**Brain tumour – molecular analysis for 1p19q and MGMT methylation status**

Laboratory: Neuropathology
Specimen: Brain tumour biopsy
Comment: This investigation is selected by the Neuropathologist. Processed biopsies are sent to Molecular Laboratory, Beaumont Hospital, Dublin 9.
Turnaround: 2-3 weeks

**Breast Needle Core Biopsy Calcified and Non-Calcified**

Laboratory: Histopathology (Diagnostic Laboratory)
Specimen: Formalin fixed tissue. Immediately place in Buffered Formal Saline and please state date and time specimen taken.
Comment: To facilitate subsequent microscopic location of calcified deposits, breast needle core biopsies should be divided into calcified and non-calcified cores when the biopsies are taken.

Note: A separate form is required for biopsies taken from the right and left side.

Non-calcified cores are placed in yellow mesh cassettes which are subsequently placed in a correctly labelled specimen container containing buffered formalin.

Calcified cores are placed in orange mesh biopsy cassettes which are subsequently placed in a correctly labelled specimen container containing buffered formalin.

Turnaround: 80% cases in 2-3 days

**Bronchial/Nasal Brushings for PCD analysis**

Laboratory: Histopathology (Electron Microscopy/ Renal)
Specimen: Bronchial and Nasal brushings
Comment: Contact the laboratory in advance on extension 21315, Bleep 379 or by e-mail to arrange collection of Glutaraldehyde Fixative.

Turnaround: 2 months

**Bronchoalveolar Lavage Fluid Culture**

Laboratory: Microbiology (Main laboratory)
Specimen: Specialist collection according to local protocols. It is difficult to be specific on volume required; in principle as large a volume as possible is preferred (up to 30mL).

The specimen should be collected into a clean, sterile, leakproof container and transported to the laboratory ASAP. If processing is delayed, refrigeration is preferable to storage at ambient temperature. Please include any appropriate clinical details e.g. “Cystic fibrosis patient”. If an unusual pathogen is suspected, the laboratory should be informed, e.g. *Burkholderia pseudomallei* and *Nocardia* sp require longer incubation of cultures. Refer to Mycobacteria Testing for instructions for collection for TB.

Comment: Test performed routinely Monday to Friday 9-5pm or by urgent request.

Traps containing a specimen should be properly sealed. Do not send tubing to the laboratory.

Turnaround: Prelim: 24 hours; Final: 48-72 hours

Report: Aerobic culture with sensitivities, if appropriate, as well as microscopy and culture for Mycobacteria.

**Brucella Antibodies (IgG, IgM and Total)**

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood

Turnaround: 3 weeks

Report: Quantitative titre provided with interpretative comment

Comment: Performed by a reference laboratory (Brucella Reference Unit (BRU), Liverpool).

Not routinely available, please contact Microbiology Medical Team.

A negative result generally excludes a diagnosis of brucellosis. Positive Brucella agglutination reactions should be regarded as supportive evidence for the diagnosis of brucellosis provided there is reasonable epidemiological and clinical evidence to suggest the diagnosis. A rising or falling titre is more significant than a single titre.

**Bursa Fluid**

See Sterile Body Fluid – Microscopy and Culture.
C1 Esterase Inhibitor (Function)
Laboratory: Sample referred from Clinical Biochemistry to BIOMNIS Laboratories
Specimen: 4.0 mL blood in a plain tube (clotted sample) + 5 mL citrated whole blood on ice.
Comment: Consultant request only
Turnaround: 3 weeks
Ref. Range: See report form, or visit internet site www.biomnis.ie for up to date referral test information.

C1 Esterase Inhibitor (Total)
Laboratory: Sample referred from Clinical Biochemistry to BIOMNIS Laboratories
Specimen: 4.0 mL blood in a plain tube (clotted sample)
Comment: Consultant request only
Turnaround: 3 weeks
Ref. Range: See report form, or visit internet site www.biomnis.ie for up to date referral test information.

C3 / C4 (Complement)
Laboratory: Clinical Biochemistry (Immunology Laboratory)
Specimen: 4.0 mL blood in plain tube (clotted sample)
Turnaround: 4 Days
Ref. Range: C3: 0.87 - 2.0 g/L  C4: 0.19 - 0.52 g/L

CD3 / CD4 / CD8 / CD19 / CD56 Counts
Laboratory: Haematology
Specimen: Blood 3mL, purple, Vacuette® (EDTA).
Comment: A screening procedure to monitor the immune status of patients / clients.
Test available Mon to Fri during routine working hours.
Turnaround: 24 - 72 hours
Ref. Range

<table>
<thead>
<tr>
<th>CD3 Absolute Counts / μL</th>
<th>Age</th>
<th>Low</th>
<th>High</th>
<th>CD4 Absolute Counts /μL</th>
<th>Age</th>
<th>Low</th>
<th>High</th>
<th>CD8 Absolute Counts /μL</th>
<th>Age</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 6</td>
<td>900 - 5,000</td>
<td>Day 6</td>
<td>500 - 3,400</td>
<td>Day 6</td>
<td>300 - 1,900</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Month 2</td>
<td>2,800 - 7,000</td>
<td>Month 2</td>
<td>2,100 - 4,900</td>
<td>Month 2</td>
<td>500 - 1,600</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Year 2</td>
<td>1,600 - 6,700</td>
<td>Year 2</td>
<td>1,000 - 4,600</td>
<td>Year 2</td>
<td>400 - 2,100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 5</td>
<td>900 - 4,500</td>
<td>Year 5</td>
<td>500 - 3,400</td>
<td>Year 5</td>
<td>300 - 1,600</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 10</td>
<td>700 - 4,200</td>
<td>Year 10</td>
<td>400 - 2,000</td>
<td>Year 10</td>
<td>300 - 1,800</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 16</td>
<td>700 - 3,500</td>
<td>Year 16</td>
<td>400 - 2,000</td>
<td>Year 16</td>
<td>200 - 1,200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>690 - 2,540</td>
<td>Adult</td>
<td>400 - 1,590</td>
<td>Adult</td>
<td>190 - 1,140</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>CD 19 Absolute Counts / μL</th>
<th>Age</th>
<th>Low</th>
<th>High</th>
<th>CD 56 Absolute Counts /μL</th>
<th>Age</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 6</td>
<td>200 - 1,100</td>
<td>Day 6</td>
<td>200 - 1,900</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Month 2</td>
<td>300 - 1,900</td>
<td>Month 2</td>
<td>300 - 1,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 2</td>
<td>600 - 2,700</td>
<td>Year 2</td>
<td>200 - 1,200</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 5</td>
<td>200 - 2,100</td>
<td>Year 5</td>
<td>100 - 1,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 10</td>
<td>200 - 1,600</td>
<td>Year 10</td>
<td>90 - 900</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 16</td>
<td>200 - 600</td>
<td>Year 16</td>
<td>90 - 900</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>90 - 660</td>
<td>Adult</td>
<td>90 - 590</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### C Peptide
- **Laboratory:** Clinical Biochemistry
- **Specimen:** 2.0 mL blood in a plain tube (clotted sample) at 4°C.
- **Comment:** Consultant request only. Urgents available on request.
- **Turnaround:** 7 days
- **Ref. Range:** C-peptide levels should be appropriate to the glucose level at the time the sample was taken. Glucose should always be measured at the same time as the C-peptide to facilitate interpretation of results.

### CA 125
- **Laboratory:** Clinical Biochemistry
- **Specimen:** 4.0 mL blood in a plain tube (clotted sample)
- **Turnaround:** 4 Days
- **Ref. Range:** 0 – 35 kU/L

### CA 15-3
- **Laboratory:** Clinical Biochemistry
- **Specimen:** 4.0 mL blood a plain tube (clotted sample)
- **Turnaround:** 4 days
- **Ref. Range:** 0 – 31 kU/L

### CA 19-9
- **Laboratory:** Clinical Biochemistry
- **Specimen:** 4.0 mL blood in plain tube (clotted sample)
- **Turnaround:** 4 Days
- **Ref. Range:** < 37 kU/L

### Calcitonin
- **Laboratory:** Sample referred from Clinical Biochemistry to BIOMNIS Laboratories
- **Specimen:** 4.0 mL blood in a plain tube (clotted sample) on ice must be frozen < 4 hours.
- **Comment:** Consultant request only
- **Turnaround:** 3 weeks
- **Ref. Range:** See report form, or visit internet site [www.biomnis.ie](http://www.biomnis.ie) for up to date referral test information.

### Calcium (Blood)
- **Laboratory:** Clinical Biochemistry
- **Specimen:** 4.0 mL blood in plain tube (clotted sample)
- **Comment:** Aged samples may invalidate result.
- **Turnaround:** A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx. GP or OPD- Results posted within 4 days.
- **Ref. Range:** 2.10 – 2.65 mmol/L (Adults) Please contact Clinical Biochemistry lab for Paediatric and Pregnancy-related Reference ranges.

### Calcium (Urinary)
- **Laboratory:** Clinical Biochemistry
- **Specimen:** 24 Hr acidified sample
- **Turnaround:** 1 Day
- **Ref. Range:** 2.5 – 7.5 mmol/24hours

### Calcium: Creatinine Clearance
- **Laboratory:** Clinical Biochemistry
- **Specimen:** Spot urine sample and clotted blood sample
- **Turnaround:** 1 day
- **Ref. Range:** Contact Biochemistry laboratory
**Calcium Sensing Receptor (CASR) Mutation analysis**

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Referred from Molecular Genetics Lab in Biochemistry to Oxford NHS (via NCMG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen</td>
<td>3-5ml EDTA blood</td>
</tr>
<tr>
<td>Comment</td>
<td>Use NCMG request form with consent available from <a href="http://www.genetics.ie">www.genetics.ie</a>. Contact ext 22531 for Oxford Proforma. Please note: invoices will be issued to the referring clinician for tests not performed in NCMG.</td>
</tr>
<tr>
<td>Turnaround</td>
<td>8 weeks</td>
</tr>
<tr>
<td>Report</td>
<td>Sent to referring clinician and copy filed in pathology</td>
</tr>
</tbody>
</table>

**Calprotectin**

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Referred from Biochemistry to City Hospital, Birmingham</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen</td>
<td>5-10mg stool</td>
</tr>
<tr>
<td>Comment</td>
<td>Test helps distinguish IBD from IBS</td>
</tr>
<tr>
<td>Turnaround</td>
<td>2 weeks</td>
</tr>
</tbody>
</table>

**Cannabis**

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Sample referred from Clinical Biochemistry to Toxicology Laboratory BEAUMONT Hospital Dublin, posted Monday, Tuesday, Wednesday and Thursday.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen</td>
<td>Spot urine</td>
</tr>
<tr>
<td>Comment</td>
<td>See Toxicology / Drug Screen</td>
</tr>
<tr>
<td>Turnaround</td>
<td>1 week</td>
</tr>
<tr>
<td>Ref. Range</td>
<td>See report form or contact Toxicology Laboratory BEAUMONT Hospital 01-8092673 / (01)8092675, Emergency after hours (087) 2590749, Fax (01) 8093986</td>
</tr>
</tbody>
</table>

**CAPD**

See Continuous Ambulatory Peritoneal Dialysis Fluid

**Carbamazepine**

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Clinical Biochemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen</td>
<td>4.0 mL blood in plain tube (clotted sample)</td>
</tr>
<tr>
<td>Comment</td>
<td>Range quoted is appropriate for a trough sample.</td>
</tr>
<tr>
<td>Turnaround</td>
<td>1 Day</td>
</tr>
<tr>
<td>Ref. Range</td>
<td>Therapeutic Range 4 – 12 mg/L  Alert range &gt;25mg/L</td>
</tr>
</tbody>
</table>

**Carbapenamase Producing Enterobacteriaceae**

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Microbiology (Main laboratory)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen</td>
<td>Rectal swabs, placed in charcoal containing transport media. <strong>Specimens are only processed where there is prior agreement with the Consultant Microbiologist or the Infection Control Team.</strong></td>
</tr>
<tr>
<td>Comment</td>
<td>Test performed Monday to Friday 9-5pm. Label all Microbiology forms with CPE SCREEN. Indicate if the patient was previously CPE positive. Transport specimens ASAP. If processing of swabs is delayed, refrigeration is preferable to storage at ambient temperature.</td>
</tr>
<tr>
<td>Turnaround</td>
<td>Prelim: 24 hours; Final: 48-72 hours</td>
</tr>
</tbody>
</table>

**Carboxyhaemoglobin**

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Clinical Biochemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen</td>
<td>Li Hep syringe</td>
</tr>
<tr>
<td>Turnaround</td>
<td>1 hour 15 mins</td>
</tr>
<tr>
<td>Ref. Range</td>
<td>&lt; 1.5%  Smokers: &lt; 5%  Heavy smokers: &lt; 9%</td>
</tr>
</tbody>
</table>
**Cardiothoracic specimens**

**Laboratory:** Histopathology  
**Specimen:** Cardiothoracic  
**Comment:** All cardiothoracic specimens must be delivered directly to Histopathology laboratory reception without delay. Optimal fixation in Buffered Formalin Saline (BFS) ensures preservation of antigenicity. Prolonged fixation may adversely affect subsequent laboratory test results.  
**Optimal fixation times**  
- Small biopsy samples – 6 - 12 hours  
- Larger surgical specimens- 8-18 hours  
Lung resection specimens are inflated upon receipt to assist penetration of fixative; delay in delivery adversely affects inflation and fixation.  
Tissue should not be removed from resection specimens, for research purposes or otherwise, without prior consultation with a Pathologist. Where specimens are orientated by/with sutures, their designation should be clearly detailed on the accompanying request Form.  
**Turnaround:** Small biopsy - 80% of cases by day 5  
Non-biopsy cancer resection - 80% of cases by day 7  
Non-biopsy other - 80% of cases by day 7

**Carnitine, Free & Total**

**Laboratory:** Sample referred from Clinical Biochemistry to Sheffield Children’s NHS Trust  
**Specimen:** 1.0 mL blood in a plain tube (clotted sample) or Lithium Heparin sample on ice, must be frozen < 30 mins.  
**Comment:** Consultant request only  
**Turnaround:** 3 weeks  
**Ref. Range:** Non-applicable

**Catecholamines – Urine**

**Laboratory:** Sample referred to from Clinical Biochemistry to Beaumont hospital  
**Specimen:** 24-hour urine sample collected into a container that has acid added.  
24 hr urine containers are available from stores; acid is added in the Biochemistry lab.  
**Comment:** Diet must NOT include bananas, chocolate, tomatoes, citrus fruits, walnuts, pineapple, plums, dried fruit, tea or coffee in the 48 hours before collection  
**Turnaround:** 3 Weeks  
**Ref. Range:** Contact CUH Biochemistry Laboratory

**Catheter / Intravascular Cannulae**

**Laboratory:** Microbiology (Main laboratory)  
**Specimen:** Disinfect the skin around the cannula entry site, remove cannula using aseptic technique, and cut off 4cm of the tip into a sterile container using sterile scissors. The specimen should be collected into a clean, sterile, leakproof container and should be transported ASAP to prevent drying. If processing is delayed, refrigeration is preferable to storage at ambient temperature.
Comment: Not routinely processed, if required please contact the medical team. If infection considered clinically likely please take blood cultures through the cannula.

The routine culture of devices removed for other reasons is unnecessary. Urine catheters are not cultured since growth represents distal urethral culture. A urine specimen is more appropriate. Skin disinfection procedures depend on local protocols and may vary.

Turnaround: Prelim: 24 hours; Final: 48-72 hours

Ref. Range: Culture: Any clinically significant isolate with the appropriate sensitivities.

CEA

Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in plain tube (clotted sample)
Turnaround: 4 Days
Ref. Range: 0 – 5 ug/L

Centromere B Protein

Laboratory: Autoimmune Serology
Specimen: Blood, 4 mL red top Vacuette (or similar container for clotted blood)
Comment: Qualitative Elisa assay. Specific assay undertaken following Positive Anti ENA Screen.

Turnaround: 72 Hours
Ref. Range: Not applicable

Cerebrospinal Fluid (CSF) - Culture and Microscopy

Laboratory: Microbiology (Main laboratory)
Specimen: Ideally, the laboratory should receive a minimum volume of 1mL in a universal container. The specimen should be collected into a clean, sterile, leakproof container.

Information regarding suspected Prion disease MUST be indicated on the request form; the CSF MUST be double-bagged and marked with a biohazard label.

For Mycobacteria, as large a volume as possible should be sent (given the patient’s clinical circumstances). All specimens should be taken before antimicrobial therapy where possible, but therapy should not be delayed unnecessarily pending lumbar puncture.

Comment: Test performed as an urgent specimen. Do not refrigerate specimen. Do not send through the pneumatic tube. CSF is normally collected sequentially into separate containers. Common practice is to send the first and third specimens taken for microbiological examination and the second specimen for Biochemistry. If only one specimen of CSF is collected, it should be submitted to Microbiology first. Transport specimens ASAP directly to the laboratory. Do not refrigerate samples if delays in transportation are encountered. Cells disintegrate and a delay may produce a cell count that does not reflect the clinical situation of the patient. Prior notification to the laboratory in cases of suspected CJD /vCJD.

CSF, EDTA blood specimens may be sent to the Meningococcal Reference Laboratory for PCR. All isolates of N. meningitidis are referred for serotyping. All lymphocytic CSFs (WBCs >5/cmm) are routinely sent for Mycobacterial testing. With lymphocytic CSFs consideration should be given to other tests such as Viral PCR (CMV, HSV and VZV). With a culture negative lymphocytic CSF, a clearly labelled stool specimen for enteroviral investigation should be considered.
As the CSF specimen volume is limited, it is worth doing serology for antibodies to viral agents. The CNS Screen includes Mumps, Measles, Herpes Simplex and Varicella-zoster. Likewise serology for systemic syndromes associated with meningoencephalitis such as HIV, Syphilis and Lyme Disease should be considered. If the patient is immunosuppressed Cryptococcal meningitis should be considered.

**Turnaround:** Microscopy: Within 2 hours of receipt. Urgent positive report telephoned when available.
Culture: Prelim: 24 hours; Final: 48-72 hours. Culture may be prolonged for fungal investigation if required (up to 14 days)

**Report:** Report on the gross appearance of the CSF, the presence of a clot if applicable.
Microscopic report on the numbers of WBCs/cmm and RBCs/cmm.
The following WBCs/cmm are normal:

- **Neonates** 0-30
- **0-4 yr old** 0-20
- **5yr to puberty** 0-10
- **Adults** 0-5

A Gram stain is performed on all CSF specimens with a white cell count above the normal range as indicated above.

A differential leucotye count is reported where sufficient cells are counted ≥ 20 WBCs/cmm. Cell counts <20 WBCs/cmm the predominating WBC will be reported with comment insufficient WBC for accurate differential. Cell counts are not performed on specimens containing a clot, which would invalidate the cell count.

For haemorrhagic CSFs a WBC: RBC ratio of 1:500 to 1:1000 is generally regarded as not indicative of infection.

**Culture:** Any organism isolated with the appropriate sensitivity results.

### Cerebrospinal Fluid (CSF) - Cytology

- **Laboratory:** Neuropathology or Histopathology (Cytology Department)
- **Specimen:** Ideally the specimen should contain a minimum of 3ml. and be collected in a sterile universal container and be delivered to the laboratory before 4pm.
- **Comment:** This test is performed as an urgent sample. If there is delay in sending the sample to the laboratory it should be stored at 4°C.
- **Samples** from patients with suspected CJD should be sent to Neuropathology and not Cytopathology.
- **Information** regarding suspected Prion disease MUST be indicated on the request form; the CSF MUST be double-bagged and marked with a biohazard label.
- **Turnaround:** 2 days
- **Ref. Range:** Not applicable

### Cerebrospinal Fluid (CSF) – Glucose

- **Laboratory:** Clinical Biochemistry
- **Specimen:** 1.5 mL CSF specimen
- **Comment:** Fresh sample required, otherwise, sample should be kept in paediatric glucose bottle.
- **Turnaround:** 1 hour 15 mins
- **Ref. Range:** 2/3 plasma glucose value
### Cerebrospinal Fluid (CSF) – Immunophenotyping - primary CNS lymphoma or CNS involvement by Leukaemia/lymphoma

- **Laboratory:** Referred from Haematology Dept. to Haem. St. James hospital, Dublin 8
- **Specimen:** RPMI-heparin medium is stored in the haematology Dunmanway day unit, once the CSF is added the samples are to be sent directly to the haematology laboratory.
- **Comment:** Test available Monday-Friday during routine working hours CSF immunophenotyping is for diagnosis of primary CNS lymphoma or CNS involvement by Leukaemia/lymphoma only. Samples from patients with non haematological diagnoses will not be tested. CSF samples for flow cytometry must be taken directly into RPMI-heparin. CSF samples are extremely labile and samples not received in RPMI-heparin and will not be processed if greater than 1 hour old irrespective of Microbiology or Cytology cell counts
- **Turnaround:** 3 - 6 days
- **Ref. Range:** See referral laboratory report

### Cerebrospinal Fluid (CSF) – Oligoclonal bands

- **Laboratory:** Sample referred from Clinical Biochemistry to BIOMNIS Laboratories
- **Specimen:** 0.5 mL CSF and 4.0 mL blood in plain tube (clotted sample)
- **Turnaround:** 2 weeks
- **Ref. Range:** Oligoclonal Bands should be NEGATIVE

### Cerebrospinal Fluid (CSF) – Protein

- **Laboratory:** Clinical Biochemistry
- **Specimen:** 1.5 mL CSF specimen
- **Comment:** Presence of blood in sample will affect results
- **Turnaround:** 1 hour 15 mins
- **Ref. Range:** 200 – 400 mg/L

### Cerebrospinal fluid (CSF) – 14-3-3 protein and S100 protein

- **Laboratory:** Neuropathology
- **Specimen:** 2-3 mL clear CSF in a universal container, double-bagged and marked with a biohazard label. CSF should be transported as soon as possible to Neuropathology for freezing. If there is delay in sending the sample to the laboratory it should be stored at 4°C. Details of storage conditions should be recorded on the form.
  - The information regarding suspected Prion disease MUST be indicated on the request form.
  - Blood-stained samples are not suitable. EEG results must be available before the sample is analysed.
- **Comment:** Specimens sent to the UK CJD Surveillance Centre, Edinburgh, Scotland, approximately monthly.
  - Turnaround Time for results is approximately 11 days from the time of dispatch to CJD Surveillance Unit.
  - Specific request forms are provided by the CJD surveillance unit in Edinburgh and are available from the Neuropathology office (22520) and on Q-pulse. These incorporate the clinical information required to interpret the results and should accompany the CSF specimens.
- **Turnaround:** Approx. 11 days from the time of dispatch to CJD Surveillance Unit.
  (Batched and sent approx monthly)
Cerebrospinal Shunts
Laboratory: Microbiology (Main laboratory)
Specimen: CSF is usually obtained from the shunt reservoir and sent concurrently for investigation. When a shunt is removed all three portions should be sent in separate containers of appropriate size. This will include the proximal catheter, a valve or reservoir, and a distal catheter. The specimen should be collected into a clean, sterile, leakproof container. Transport specimens ASAP. If processing is delayed, refrigeration is preferable to storage at ambient temperature.
Comment: Test performed routinely Monday to Friday 9-5pm or by urgent request.
Turnaround: Prelim: 24 hours;
Final: 48-72 hours, culture may be prolonged for fungal /anaerobic investigation if required (up to 5 days).
Ref. Range: If pus is clearly seen, a Gram stain is performed.
In the absence of a concurrent CSF and if there is sufficient CSF visible in the shunt tubing or reservoir the numbers of WBCs/cmm and RBCs/cmm are reported.
Culture: Any clinically significant isolate with the appropriate sensitivities.

Cerebrospinal Fluid (CSF) – Spectrophotometry (Xanthochromia)
Laboratory: Clinical Biochemistry
Specimen: 1.0 mL CSF specimen
Comment: Sample must be light protected. Please use the specific request form.
Turnaround: 24 hours (weekdays only)
Ref. Range: Ring laboratory for interpretation

Ceruloplasmin
Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in a plain tube (clotted sample).
Turnaround: 4 Days
Ref. Range: 0.18-0.58 g/L

Cervical Swab for Microbiology
Refer to Genital swab

Chikungunya Antibodies
Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin)
Turnaround: By arrangement
Report: Positive or negative

Chlamydia psittaci Antibodies
Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: Performed by a reference laboratory (PHE South West Laboratory, Bristol)
Turnaround: 3 weeks
Report: Quantitative result with an interpretative comment
**Chlamydia trachomatis**

**Laboratory:** Microbiology  
**Specimen:** Nucleic acid amplification method. Appropriate PCR STD Specimen Collection and Transport Kits must be used. Please read the kit insert for information on specimen collection and associated limitations.  
**Comment:** Test available Monday to Friday 9-5pm.

The assay is verified for use with female Endocervical swab specimens, High Vaginal Swab specimens and male/female Urine specimens. (These specimens will also be tested for Neisseria gonorrhoea DNA). The preferred specimen type for Chlamydia testing in female patients is urine due to increased sensitivity and fewer problems during specimen processing.

Underfilled or overfilled Urine specimen containers are unsuitable for testing.

Endocervical/HVS specimen tubes with no swab or with two swabs cannot be tested. Specimens that appear bloody or have a dark brown colour are unsuitable for testing (may give false negative results). The presence of mucous may inhibit PCR and cause false negative test results. Mucous free specimens are required for optimal test performance. Do not use collection devices beyond their expiry date.

**Turnaround:** 96 - 120 hours  
**Report:** RT: PCR Chlamydia trachomatis Target Not Detected or Target Detected  
A Target Not Detected result does not automatically exclude infection from Chlamydia trachomatis as the level of DNA present may be lower than the limit of detection of the assay. The assay is only verified for use with female Endocervical/HVS swab specimens and male/female Urine specimens. Results from other specimen types should be interpreted with caution.

- **Chloride (Blood)**
  - **Laboratory:** Clinical Biochemistry  
  - **Specimen:** 4.0 mL blood in plain tube (clotted sample)  
  - **Turnaround:** A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx. GP or OPD- Results posted within 4 days.  
  - **Ref. Range:** 95 – 107 mmol/L

- **Chloride (Urinary)**
  - **Laboratory:** Clinical Biochemistry  
  - **Specimen:** Spot or 24 Hr sample  
  - **Turnaround:** 1 Day  
  - **Ref. Range:** 250 – 450 mmol/24 Hr

- **Cholesterol**
  - **Laboratory:** Clinical Biochemistry  
  - **Specimen:** 4.0 mL blood in plain tube (clotted sample)  
  - **Comment:** Fasting sample required  
  - **Turnaround:** A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx. GP or OPD- Results posted within 4 days.  
  - **Ref. Range:** Total Cholesterol Target Values: <5.0 mmol/L
Cholinesterase: Phenotyping And Genotyping

Laboratory: Sample referred from Clinical Biochemistry to, Cholinesterase Investigation Unit, Department of Clinical Biochemistry, North Bristol NHS Trust, Southmead Hospital, Bristol BS10 5NB,UK
Specimen: 4.0 mL EDTA whole blood
Sample should NOT be taken during Sux-induced after apnoea as the presence of the drug can lead to erroneously low enzyme activity. Test request should be delayed for 24 hours and for 6 weeks if fresh frozen plasma is administered.

Turnaround: 1 month
Ref. Range: Contact Biochemistry (ext 22531)

Chromosome Analysis / Karyotype <5 years old

Laboratory: Referred from Molecular Genetics Lab in Biochemistry to NCMG).
Patients <5yr are referred to NCMG. Referrals Mon-Thurs only.
Specimen: DO NOT refrigerate specimens.
Infants: 1mL Lithium Heparin blood
Comment: Copy of NCMG request form with consent available at www.genetics.ie.

Turnaround: See NCMG website (TAT depends on priority)
Report: Sent to referring clinician and copy of report filed in pathology

Chromosome Analysis / Karyotype >5 years old

Laboratory: Referred from Molecular Genetics Lab in Biochemistry via Med lab Path to the Doctor’s Lab, London (TDL).
Samples sent Mon-Thurs or by special arrangement before 9.30am on Fridays (contact ex 22531 to discuss).
Specimen: DO NOT refrigerate specimens.
Adults: 3mL Lithium Heparin blood
Infants: 1mL Lithium Heparin blood
Comment: Please use consent form available at http://www.sonichealthcare.ie/test-information/request-forms.aspx
Please note: invoices are issued directly to referring clinician.

Turnaround: 5-15 days
Report: Report sent to referring clinician and copy of report filed in pathology

Citrate (Urinary)

Laboratory: Sample referred from Clinical Biochemistry to BIOMNIS Laboratories
Specimen: 24 hour urine, must be frozen < 30 minutes post collection

Turnaround: 3 weeks
Ref. Range: See report form, or visit internet site www.biomnis.ie for up to date referral test information.

CLIFT (Crithidia Luciliae Immuno Fluorescence Test)

Laboratory: Autoimmune Serology
Specimen: Blood, 4 mL red top Vacuette (or similar container for clotted blood)
Comment: Qualitative immunofluorescent assay. Automatically checked following Positive Anti Nuclear Antibody assay showing a Homogenous ANA Patten of immunofluorescence. If CLIFT assay is positive a further quantitative Anti dsDNA Immunoassay is carried out.

Turnaround: 72 Hours
Ref. Range: Not applicable
**Clostridium difficile Testing**

**Laboratory:** Microbiology (Category 3 Laboratory)

**Specimen:** Fresh faeces specimen. 1-2g (1-2mL) is sufficient.

**Comment:** A molecular diagnostic assay is used for the direct qualitative detection of *Clostridium difficile* toxin B gene in human faeces samples.

Test performed Monday to Friday.

Testing on individuals < 2 years should be restricted but exceptions can be made where indicated by the Microbiology Medical team.

Requests for C. difficile are performed on inpatients, healthcare-associated and community individuals where the specimen takes the shape of the container and also on contacts during an outbreak.

Repeat testing is not routinely performed on specimens positive or negative within the last 21 days except by prior approval with the Microbiology Medical team.

Test of cure is not recommended.

Specimens should be sent to the laboratory as soon as possible after collection for testing. If there is a delay in transit specimens should be stored in a refrigerator at 2-8°C, and tested within 72 hours.

Samples greater than 3 days old on receipt in the laboratory are unsuitable for testing.

**Turnaround:** within 24 hours if received between Monday and Thursday; specimens received on Friday after 11:30am should be reported before 5 pm on the following Monday.

Positive reports are telephoned when available to the requesting area.

**Report:**
- *C. difficile* toxin PCR target NOT detected/TARGET DETECTED
- A Target Not Detected result does not automatically exclude infection from *C. difficile* as the level of DNA present may be lower than the limit of detection of the assay.

**CLL Prognostic Markers (TP53 and IGVH mutation status)**

**Laboratory:** Referred from Haematology Dept to Royal Marsden Hospital UK

**Specimen:** Blood 3 mL purple Vacuette (EDTA) 5 -10 mLs required and 3 mL green Vacuette (Lithium Heparin) Available Mon – Thurs, sample to reach Haematology Lab by 12 noon on day of sampling.

**Comment:** Prognostic markers for CLL

**Turnaround:** 3 - 4 weeks

**Report:** See referral laboratory report

**Coagulation Factor VIII Inhibitors – Quantitation Assay**

**Laboratory:** Haematology

**Specimen:**
- Blood 3mL x2, blue Vacuette® (sodium citrate 3.2%).
- Specimens that are haemolysed, underfilled or overfilled cannot be analysed check coagulation sample bottles are not expired to ensure correct filling.

**Comment:** Test available Monday to Friday, during routine working hours by arrangement with the Haematology dept. Quantitation of coagulation factor inhibitors reported in Bethesda Units. One Bethesda Unit is the amount of inhibitor in 1 mL of plasma that will neutralise 50% of the clotting factor activity.

**Samples must be received within 4 hours**

**Turnaround:** 2 – 4 weeks

**Ref. Range:**
- Weak Factor Inhibitor: \( \leq 10 \) BU/mL.
- Strong Factor Inhibitor: \( > 10 \) BU/mL.
Coagulation Factor Inhibitor Screen
Laboratory: Haematology
Specimen: Blood 3mL; blue Vacuette® (sodium citrate 3.2%). Specimens that are haemolysed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling.
Comment: Demonstrates the inhibitory effect of Coagulation Factor antibodies. Test available Monday to Friday, during routine working hours. See also Coagulation factor VIII Inhibitors – Quantitation Assay.
Samples must be received within 4 hours
Turnaround: Routine specimens: 2 weeks
Report: Positive / Negative

Cocaine
Laboratory: Sample referred from Clinical Biochemistry to Toxicology Laboratory BEAUMONT Hospital Dublin, posted Monday, Tuesday, Wednesday and Thursday.
Specimen: Spot urine
Comment: See Toxicology / Drug Screen
Turnaround: 1 week
Ref. Range: See report form or contact Toxicology Laboratory BEAUMONT Hospital 01-8092673 / (01)8092675, Emergency after hours (087) 2590749, Fax (01) 8093986

Coccidioides Antibodies
Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: Performed by a reference laboratory (Mycology Reference Centre, Leeds)
Turnaround: 3 weeks
Report: Positive or negative

Coeliac Screen
Laboratory: Autoimmune Serology
Specimen: Blood, 4 mL red top Vacuette (or similar container for clotted blood)
Comment: Includes IgA Anti-tTG plus IgA Anti-EMA if Anti-tTG Positive. IgA deficient sera automatically detected on Anti-tTG assay. Deficient sera are analyzed for total serum IgA. IgA deficient sera are tested for IgG Anti-EMA antibodies.
Turnaround: 24 Hours
Ref. Range: 0 - 5 AU/mL

Cold Agglutinins
Laboratory: Blood Transfusion Laboratory
Specimen: For Pre-Cardiac Surgery Patients: 1 x 6 ml EDTA Pink Capped Tube
For investigation of Cold Haemagglutinin Disease: 1 x 4 mL Clotted Sample (red cap/yellow ring tube) and 1 x 6 ml EDTA Pink Capped Tube BOTH brought to laboratory while still warm 37°C if possible.
Comment: This test is performed to detect cold agglutinins:
In Pre-Cardiac surgery patients at ambient room temperature (18-25°C).
In Cold Haemagglutinin Disease (CHAD).
Complete the Blood Transfusion request form LF-C-BTR-XMATCH.
NOTE: This is not an accredited test.
Turnaround: 8 Hours (Note: This may exceed 8 hours if positive for cold agglutinins)
Ref. Range: Not applicable

Conjunctivitis
See Eye Swab.
**Connexin (DFNB1) Mutation analysis**

**Laboratory:** Referred from Molecular Genetics Lab in Biochemistry to Leeds NHS (via NCMG)

**Specimen:** 3-5ml EDTA

**Comment:** Use NCMG request form with consent available from www.genetics.ie

Please note: invoices will be issued to the referring clinician for tests not performed in NCMG.

**Turnaround:** 40 days

**Report:** Sent to referring clinician and copy filed in pathology

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**Continuous Ambulatory Peritoneal Dialysis Fluid**

**Laboratory:** Microbiology (Main laboratory)

**Specimen:** Ideally, a volume of 20mL should be collected into a clean, sterile, leakproof container. In addition, blood culture bottles should be inoculated aseptically with 5-10mL of dialysate. Transport ASAP. If processing is delayed, refrigeration of the 20mL aliquot is preferable to storage at room temperature.

**Comment:** Test performed as an urgent specimen. If routine cultures are negative and abnormal dialysate findings persist, please discuss with the Microbiology medical staff. If mycobacterial culture is required it should be specifically requested.

**Turnaround:** Microscopy: 2 hours. Urgent report telephoned when available.
Prelim: 48 hours; Final: 5 days. Clinically significant isolates are telephoned when available.

**Report:** White cell count and aerobic culture. Where the white cell count is ≥50/cmm a Gram stain and white cell differential is performed.

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**Copper**

**Laboratory:** Clinical Biochemistry

**Specimen:** 4.0 mL blood in plain metal-free tube (Lithium Heparin)

**Turnaround:** 1 week

**Ref. Range:** 11 – 24 μmol/L

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**Copper (Urinary)**

**Laboratory:** Referred from Clinical Biochemistry to SAS Laboratory for Trace Elements, Guildford.

**Specimen:** 24 hr urine sample

**Comment:** N.B. Use designated 24 hr urine container only

**Turnaround:** 3 weeks

**Ref. Range:** Contact Clinical Biochemistry laboratory

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**Conical Scrapings**

See – Intraocular fluids /Corneal Scrapings

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**Cortisol**

**Laboratory:** Clinical Biochemistry

**Specimen:** 4.0 mL blood in plain tube (clotted sample)

**Turnaround:** 3 Days

**Ref. Range:**
- Cortisol AM: **101-536 nmol/L**
- Cortisol PM: **79-478 nmol/L**

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**Cortisol (Urinary)**

**Laboratory:** Referred from Clinical Biochemistry to Biochemistry Laboratory in the Mater Hospital, Dublin.

**Specimen:** 24 Hour urine collection

**Turnaround:** 2 Weeks

**Ref. Range:** 100 - 379 nmol/24 Hr
Coxiella burnetii IgG and IgM (Q fever)

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: Performed by a reference laboratory (Rare & Imported Pathogens Laboratory (RIPL), Porton Down)
Turnaround: 3 weeks
Report: Positive or negative

Creatine Kinase (CK)

Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in plain tube (clotted sample)
Turnaround: A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx. GP or OPD- Results posted within 4 days.
Ref. Range: Male: 40 – 180 U/L Female: 20 – 140 U/L

Creatinine (Blood)

Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in plain tube (clotted sample)
Turnaround: A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx. GP or OPD- Results posted within 4 days.
Comment: Estimated Glomerular filtration rate (eGFR) is available on request. Method adjusted 4-variable MDRD formula is used for calculation.
Ref. Range: Males (adult): 64 – 104 μmol/L Females (adult): 49 – 90 μmol/L Paediatric range available from laboratory

Creatinine (Urinary)

Laboratory: Clinical Biochemistry
Specimen: 24 hour sample for creatinine clearance (Spot sample for microalbumin / creatinine ratio, see below)
Turnaround: 1 Day
Ref. Range: Male: 8000 – 17700 μmol/24 Hr Female: 7000 – 154000 μmmol/24 Hr

Creatinine Clearance

Laboratory: Clinical Biochemistry
Specimens: 4.0 mL blood in a plain tube (clotted sample) and a 24-hour urine sample.
Turnaround: 1 Day
Ref. Range: 60 – 120 mls/min

CRP

Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in a plain tube (clotted sample)
Comment: Only done when appropriate clinical details are provided. This assay is not suitable for the stratification of risk of vascular disease.
Turnaround: A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx.
Ref. Range: 0 – 10 mg/L

Cryoglobulin

Laboratory: Clinical Biochemistry (Immunology Laboratory)
Specimen: Blood must be collected into a gel-free, plain tube at 37 °C and 2 EDTA tubes and all sent to the lab in flask containing water heated to 37 °C.
Comment: Pre-arrange with Laboratory – Ext. 22535
Turnaround: 5 Days
Ref. Range: Cryoglobulin should be NEGATIVE
Cryptococcal Antigen

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood, CSF (0.3mL minimum)
Comment: Performed by a reference laboratory (Mycology Reference Centre, Leeds)
Turnaround: 3 weeks
Report: Negative or Positive (Titre)

Cryptosporidium Species

Laboratory: Microbiology (Category 3 Laboratory)
Specimen: Faeces.
Comment: Performed routinely on all suitable faeces samples submitted for Routine Molecular Enteric Screening. Other types of clinical specimen such as duodenal aspirates are also stained for cryptosporidia.
Comment: Test performed routinely Monday to Friday 9-5pm. Diagnosis is based upon the molecular detection of Cryptosporidium parvum/hominis and/or demonstration of oocysts in faeces samples using a modified Ziehl-Neelsen stain.

A Target Not Detected result does not automatically exclude infection from the above enteric pathogen as the level of DNA present may be lower than the limit of detection of the assay.

Turnaround: 36 hours.
Report: PCR for Cryptosporidium parvum/hominis: Target DETECTED or target NOT detected.
Oocysts of Cryptosporidium seen or not seen

CSF

See Cerebrospinal Fluid

CSF Oligoclonal bands and CSF IgG Index

See Cerebrospinal Fluid - Oligoclonal bands and CSF IgG Index

CSF Viral Screen

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: CSF (>0.5mL)
Comment: Molecular tests for Enterovirus, Herpes Simplex virus (HSV1/2), Varicella-zoster virus (VZV). For patients <3 years of age, Human Herpes virus 6 (HHV-6) and Parechovirus also included in screen. Testing performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin).
Turnaround: 5 working days
Report: Detected or not detected

CSU - Catheter Urine

See Urine Microscopy and Culture

Cyclosporin (Neoral)

Laboratory: Clinical Biochemistry
Specimen: Trough sample required, (Blood 3mL, EDTA). Analysed on Thursdays
Turnaround: 1–2 Days
Ref. Range: Patient specific Interpretation of Cyclosporin is dependent on time interval between sample and last dose, clinical indication for use of the drug, duration of therapy and other drug therapy and method of measurement.
Cystic Fibrosis (CF)
Laboratory: Specimens referred from Molecular Genetics Lab in Biochemistry to NCMG.
Specimen: Adults: 3-5 ml EDTA blood, Infants: 1ml EDTA blood
Turnaround: 6-8 weeks
Report: Sent to referring clinician by NCMG and copy of report filed in pathology

Cytological Examination
Laboratory: Histopathology (Cytology Department)
Specimen: Cerebrospinal Fluid (CSF) - Cytology
See Cerebrospinal Fluid

Fine Needle Aspirate (FNAs)
An immediate fine needle aspiration service is available on request for both in-patients and out-patients. Aspirations are preformed by a consultant Cytopathologist for palpable lesions. This can be arranged by discussion with the Laboratory (Ext.22511) or with the consultant (Ext.20499).

An FNA clinic accepting GP referrals for patients with palpable swellings is available on Thursday afternoons. A Consultant FNA Referral form needs to be completed and faxed/sent to the laboratory to arrange an appointment. This form is available in the CUH Staff Directory under CUH Forms or alternatively, by contacting 021 4922883/4922510.

Assistance to those performing FNAs in radiology is available before 4.30pm Monday to Friday. The service must be pre-booked with the Cytopathology laboratory @ Ext.22511.

Other Diagnostic Specimens
- Sputa – specimens are collected in sterile universal containers early morning on three consecutive days
- Bronchial samples, Serous fluids etc - all collected according to local protocols in sterile universal containers and transported to the laboratory as soon as possible. Protocols available from the cytology laboratory.
- Serous fluids; Ideally a minimum volume of 30 mLs. Please do not submit drain bags.
- Urines – specimens are collected into sterile universal containers.
- Joint fluid – see Joint Aspirate for Crystals.
- Cell fixative solution (Cytolyt) is available in Radiology and Endoscopy for fixing respiratory samples and samples taken out of hours where appropriate.

Comment: Tests are performed routinely Monday to Friday during routine working hours.
Turnaround: Non gynaecological cytology – FNA – 80% of cases by day 5
Non gynaecological cytology – Exfoliative – 80% of cases by day 5

A verbal report may be available within 2 hours for clinically urgent samples by prior communication with the reporting Consultant.

Ref. Range: Not applicable.
Cytomegalovirus (CMV) IgG and IgM
Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: CMV IgM and CMV IgG antibodies are tested separately. The clinician must indicate the appropriate test by full history etc.
Turnaround: 36 hours
Report: Positive or negative

Cytomegalovirus (CMV) Molecular
Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL EDTA blood, urine, CSF, stool, pleural fluid, broncho-alveolar lavage, nasopharyngeal aspirate, blood spot (Guthrie card), amniotic fluid
Comment: Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin). Plasma must be frozen by laboratory within 24 hours of sample collection.
Turnaround: 5 working days
Report: Detected or not detected

D-dimers
Laboratory: Haematology
Specimen: Blood 3mL, blue Vacuette® (sodium citrate 3.2%)
Specimens must be received within 24 hours of phlebotomy.
Comment: The presence of cross-linked D-dimer domain is diagnostic for lysis of a fibrin clot. Test available Monday to Friday during routine working hours, and for emergency reasons at all other times.
Turnaround: Emergency specimens: 3 hours; Routine specimens: 8 hours
Ref. Range: Negative: 0 – 0.5 mg/L FEU
Positive: > 0.5mg/L FEU

Dengue Virus IgG and IgM
Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin)
Turnaround: 2 weeks
Report: Positive or negative

Dermatophytosis
See Mycology

DHEA Sulphate
Laboratory: Sample referred from Clinical Biochemistry to St. James’s University Hospital, Leeds
Specimen: 2.0 mL blood in a plain tube (clotted sample)
Comment: Consultant request only
Turnaround: 3 weeks
Ref. Range: See report form

DHT (Dihydrotestosterone)
Laboratory: Sample referred from Clinical Biochemistry to St. James’s University Hospital, Leeds
Specimen: 2.0 mL blood in a plain tube (clotted sample)
Comment: Consultant request only
Turnaround: 3 weeks
Ref. Range: See report form
Digoxin
Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in plain tube (clotted sample)
Comment: Samples for Digoxin must be taken at least 6 hours post dose. Range quoted is appropriate for a minimum 6 hours post dose sample.
Turnaround: Daily, urgent samples prioritised
Ref. Range: Therapeutic Range 0.5-1.0µg/L Toxic >2.4µg/L

Diphtheria
Laboratory: Clinical Biochemistry
Specimen: Blood 4mL red top Vacuette® (or similar container for clotted blood)
Comment: Test performed by reference laboratory (Respiratory Infections Laboratory, Colindale, London).
Turnaround: 2-3 weeks
Report: Reported in anti-toxin levels – see specific laboratory report.

Direct Coombs Test
Laboratory: Blood Transfusion Laboratory
Specimen: 3 mL Purple Capped (FBC) Tube.
For Paediatrics: 1 mL EDTA (Purple Cap/White Ring) Paediatric Bottle.
Comment: Investigation to demonstrate whether red cells are coated in vivo with immunoglobulins and/or complement.
Complete the Blood Transfusion request form LF-C-BTR-XMATCH. This is an INAB accredited test.
Turnaround: 3 Hours
Ref. Range: Negative or Positive (IgG, IgA, IgM, C3c, C3d).

Direct Immunofluorescence – Renal Biopsy
See Renal Biopsy

Direct Immunofluorescence – Skin/Oral Mucosa
Laboratory: Histopathology (EM Dept.)
Specimen: Fresh tissue in Michel’s transport medium (Tissue fixative for immunofluorescence)
Comment: Fresh specimens are accepted Mon- Fri 8am to 3:30pm only. Where a separate specimen from the same patient is taken for routine Histopathology, it should be delivered to the laboratory with the specimen for Direct Immunofluorescence.
Turnaround: 6-7 days

ds-DNA Elisa
Laboratory: Autoimmune Serology
Specimen: Blood, 4 mL red top Vacuette (or similar container for clotted blood)
Turnaround: 72 Hours
Ref. Range: 0 - 200 IU/mL

Duodenal Aspirate
Laboratory: Microbiology (Parasitology)
Specimen: Specimens will be obtained by specialist collection according to local protocols. The specimen volume may vary - ideally, a minimum volume of 1 mL should be sent to the lab. A screw-capped sterile universal container is practical for this purpose. Transport specimens ASAP. If processing is delayed do NOT refrigerate specimen, leave at room temperature. Delays of over 48h are undesirable.
Comment: Test performed Monday to Friday 9-5pm. Fluid from the duodenum is examined for the presence of *Strongyloides stercoralis* larvae, *Giardia lamblia* trophozoites, *Cyclospora*, and *Isospora belli*. Duodenal fluid is also examined for the presence of Microsporidia where specifically requested or where the patient is immunocompromised.

Turnaround: 24 hours. Microsporidia investigation referred to Reference laboratory. (turnaround time varies)

Report: Report on any parasites seen. Where possible the organism is reported to species level and the stage identified (trophozoite, cyst, oocyst, *etc*).

### Ear Swab

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Microbiology (Main laboratory)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>Swab any pus or exudate.</td>
</tr>
<tr>
<td>Comment:</td>
<td>Test performed routinely Monday to Friday 9-5pm. Transport specimens ASAP in charcoal containing transport media. If processing is delayed, refrigeration is preferable to storage at room temperature. Tymanocentesis (needle aspiration) and Myringotomy (surgical incision of tympanic membrane), to specimen middle ear effusion, is rarely justified.</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>Prelim: 24 hours; Final: 48-72 hours</td>
</tr>
<tr>
<td>Report:</td>
<td>Culture report: Any clinically significant isolate with the appropriate sensitivities.</td>
</tr>
</tbody>
</table>

### Echinococcus (Hydatid cyst) Antibodies

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Microbiology (Infectious Diseases Serology)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>4mL clotted blood</td>
</tr>
<tr>
<td>Comment:</td>
<td>Performed by a reference laboratory (PHE National Parasitology Reference Laboratory (NPRL), London)</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>3 weeks</td>
</tr>
<tr>
<td>Report:</td>
<td>Positive or negative</td>
</tr>
</tbody>
</table>

### E. coli 0157 Serology

Test not available. Please refer to Faeces – Molecular Analysis and Culture.

### E. coli PCR

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Microbiology (Infectious Diseases Serology)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>CSF (0.5mL)</td>
</tr>
<tr>
<td>Comment:</td>
<td>Performed by Irish Meningitis &amp; Sepsis Reference Laboratory (IMSRL), Dublin. Please ensure the specimen reaches the laboratory by 4pm to ensure prompt delivery to the reference laboratory.</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>Samples received by IMSRL before 11am, result between 4pm and 5pm the same day</td>
</tr>
<tr>
<td>Report:</td>
<td>Detected or not detected</td>
</tr>
</tbody>
</table>

### EGFR, ALK, BRAF, KRAS & NRAS

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Molecular Pathology: Molecular testing in the pathology laboratory CUH is performed on request from Consultant Histopathologists on FFPET samples from patients with Lung cancer, colon cancer and melanoma. The current repertoire of PCR tests includes, EGFR with reflex ALK, BRAF, KRAS &amp; NRAS.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>Histopathology Tissue Block</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>5-10 working days</td>
</tr>
</tbody>
</table>
## Electron Microscopy

**Laboratory:** Histopathology (EM Dept.)  
**Specimen:** Fresh unfixed tissue and brushings (For renal biopsies see Renal Biopsy)  
**Comment:** Specimens are accepted Mon – Fri 8am to 3:30pm  
Please contact the laboratory in advance of the procedure at Ext. 21315 or bleep 379, to organise collection of appropriate specimen container and fixative.  
Tissue samples for EM should be brought immediately to the laboratory and **handed directly to a Medical Scientist.**

Note: For PCD specimens, the clinicians collect the appropriate fixative from the laboratory staff in the EM lab.  
**Turnaround:** 4-6 weeks

## EMA (Endomysial Antibodies)

**Laboratory:** Autoimmune Serology  
**Specimen:** Blood, 4 mL red top Vacuette (or similar container for clotted blood)  
**Comment:** Immunofluorescence test using Primate Oesophagus as substrate.  
Part of Coeliac Screen. Confirmatory assay following Positive IgA Anti-tTG screen.  
**Turnaround:** 24 Hours  
**Ref. Range:** Not applicable

## Erythrocyte Membrane Analysis EMA for Hereditary Spherocytosis

**Laboratory:** Specimen referred from Haematology to Haematology, Our Lady’s Hospital Crumlin, Dublin 12  
**Specimen:** Blood 3mL, purple, Vacuette® (EDTA)  
Available Mon to Thurs only, to reach laboratory by 12 noon, Time of phlebotomy must be stated on form.  
**Comment:** Requested by Consultant Haematologist  
**Turnaround:** 3 weeks  
**Report:** See referral laboratory report

## ENA Screen (Extractable Nuclear Antigens)

**Laboratory:** Autoimmune Serology  
**Specimen:** Blood, 4 mL red top Vacuette (or similar container for clotted blood)  
**Comment:** Qualitative Immunoassay using Phadia Unicap 250 analyser. Screening assay for antibodies to Ro, La, U1RNP, Sm, SCL-70 & Jo-1. Undertaken on all positive ANF sera.  
**Turnaround:** 72 Hours  
**Ref. Range:** Not applicable

## Endocervical Swab

Refer to Genital swab  
**Enterobius vermicularis (Sellotape slide for Pinworm)**  
**Laboratory:** Microbiology (Category 3 Laboratory)  
**Specimen:** The specimen is collected first thing in the morning, before the patient has bathed or used the toilet. Apply sellotape to the perianal region, pressing the adhesive side of the tape firmly against the left and right perianal folds several times. Smooth the tape back on the slide, adhesive side down. The sellotape slide should be kept in a slide box in a sealed plastic bag. It is recommended that samples should be taken for at least 4-6 consecutive days.
Comment: Test performed routinely Monday to Friday 9-5pm. Transport specimens ASAP. Do not refrigerate or incubate specimens. Occasionally, an adult worm may be collected from a patient and should be sent in saline or water in a sterile leak-proof universal container for identification.

Turnaround: 24 hours
Report: Enterobius vermicularis ova present or Enterobius vermicularis adult worm present

### Enterovirus Molecular

**Laboratory:** Microbiology (Infectious Diseases Serology)

**Specimen:** Faeces (2-5g), viral throat swab, CSF (>0.5mL), 4mL EDTA blood

**Comment:** Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin).

Samples positive in Enteroviral screen are further tested to determine Enterovirus type, which includes ECHO virus and Coxsackie virus. A throat swab is requested for CSF samples positive for Enterovirus RNA so that characterisation can be carried out.

Turnaround: 5 working days, additional time required for positive samples
Report: Detected (with characterisation) or not detected

### Epstein-Barr Virus (EBV) IgG and IgM

**Laboratory:** Microbiology (Infectious Diseases Serology)

**Specimen:** 4mL clotted blood

**Comment:** EBV IgM (VCA) performed in-house. EBV IgG (VCA and NA) testing is performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin).

Turnaround: 36 hours for EBV IgM, 5 working days for EBV IgG
Report: Positive or negative

### Epstein-Barr Virus (EBV) Molecular

**Laboratory:** Microbiology (Infectious Diseases Serology)

**Specimen:** 4mL EDTA blood

**Comment:** Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin). Plasma must be frozen by laboratory within 24 hours of sample collection.

Turnaround: 5 working days
Report: Detected or not detected

### Erythropoietin

**Laboratory:** Sample referred from Clinical Biochemistry to BIOMNIS Laboratories

**Specimen:** Lithium Heparin or plain tube (clotted sample).

**Comment:** Consultant request only

Turnaround: 3 weeks
Ref. Range: See report form, or visit internet site [www.biomnis.ie](http://www.biomnis.ie) for up to date referral test information.

### ESR Erythrocyte Sedimentation Rate

**Laboratory:** Haematology

**Specimen:** Fresh blood 3mL purple Vacuette (EDTA), specimen must be <24 hours old from the time of phlebotomy. Minimum volume of sample required for ESR is 1.4 mL.

**Comment:** ESR Measurement is a non-specific test of inflammation and tissue damage. Test available Mon to Fri during routine working hours.

Turnaround: Urgent specimens: <2 hours (when laboratory informed); Routine ward specimens: 8 hours, GP Specimens: 2 days
Ref. Range: Males: 0 – 10mm/ hour Females: 0 – 20mm/hour
Eye Swab

Laboratory: Microbiology (Main laboratory)
Specimen: Culture both eyes with separate swabs. Any available pus should be sampled as well as the area of interest. Transport specimens ASAP in charcoal containing transport media. If processing is delayed, refrigeration is preferable to storage at ambient temperature. Please indicate if testing for Neisseria gonorrhoeae is required. Specific Viral or Chlamydia swabs in appropriate transport media are needed for the diagnosis of viral and chlamydial infections.

Comment: Test performed routinely Monday to Friday 9-5pm or by urgent request.
Turnaround: Prelim: 24 hours; Final: 48-72 hours.
Report: Culture report: Any clinically significant isolate with the appropriate sensitivities.

Factor I (see Fibrinogen)
Laboratory: Haematology

Factor II (see also INR Prothrombin Time)
Laboratory: Haematology
Specimen: Blood 3mL; blue Vacuette® (sodium citrate 3.2%).
Specimens which are haemolysed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling.

Comment: Determines the activity of coagulation Factor II (Prothrombin).
Test available Monday to Friday, during routine working hours.
Samples must be received within 4 hours

<table>
<thead>
<tr>
<th>Turnaround: 2 weeks</th>
<th>Ref. Range</th>
<th>Age</th>
<th>Mean (IU/mL)</th>
<th>Range (IU/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>0.48</td>
<td>0.26 - 0.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 5</td>
<td>0.63</td>
<td>0.33 - 0.93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 30</td>
<td>0.68</td>
<td>0.34 - 1.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 90</td>
<td>0.75</td>
<td>0.45 - 1.05</td>
<td></td>
<td></td>
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<tr>
<td>Day 180</td>
<td>0.88</td>
<td>0.60 - 1.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>1.08</td>
<td>0.70 - 1.46</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Factor V
Laboratory: Haematology
Specimen: Blood 3mL; blue Vacuette® (sodium citrate 3.2%).
Specimens that are haemolysed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling.

Comment: Determines the activity of coagulation Factor V. Test available Monday to Friday, during routine working hours, by arrangement with the Haematology Laboratory.
Samples must be received within 4 hours

<table>
<thead>
<tr>
<th>Turnaround: 2 weeks</th>
<th>Ref. Range</th>
<th>Age</th>
<th>Mean (IU/mL)</th>
<th>Range (IU/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>0.72</td>
<td>0.36 - 1.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 5</td>
<td>0.95</td>
<td>0.45 - 1.45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 30</td>
<td>0.98</td>
<td>0.62 - 1.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 90</td>
<td>0.90</td>
<td>0.48 - 1.32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 180</td>
<td>0.91</td>
<td>0.55 - 1.27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>1.06</td>
<td>0.62 - 1.50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Factor V Leiden Mutation (G1691A)

Laboratory: Haematology Molecular Genetics
Specimen: Blood 3mL purple Vacuette® (EDTA) N.B. Separate EDTA sample necessary if FBC also requested, citrate specimen also required for APC Resistance
Comment: If the APC Resistance screening test for Factor V Leiden (which forms part of the thrombophilia screen) is positive it is confirmed by PCR analysis in the Haematology Genetics laboratory.
See Main Haematology Section on Guidelines for Investigation of Thrombophilia.
Turnaround: 6 - 8 weeks
Ref. Range: Normal / Heterozygous / Homozygous, see Laboratory report

Factor VII

Laboratory: Haematology
Specimen: Blood 3mL; blue Vacuette® (sodium citrate 3.2%). Specimens that are haemolysed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling.
Comment: Determines the activity of coagulation Factor VII. Test available Monday to Friday, during routine working hours, by arrangement with the Haematology Laboratory.
Samples must be received within 4 hours
Turnaround: 2 weeks
Ref. Range:

<table>
<thead>
<tr>
<th>Age</th>
<th>Mean (IU/mL)</th>
<th>Range (IU/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>0.66</td>
<td>0.28 - 1.04</td>
</tr>
<tr>
<td>Day 5</td>
<td>0.89</td>
<td>0.35 - 1.43</td>
</tr>
<tr>
<td>Day 30</td>
<td>0.90</td>
<td>0.42 - 1.38</td>
</tr>
<tr>
<td>Day 90</td>
<td>0.91</td>
<td>0.39 - 1.43</td>
</tr>
<tr>
<td>Day 180</td>
<td>0.87</td>
<td>0.47 - 1.27</td>
</tr>
<tr>
<td>Adult</td>
<td>1.05</td>
<td>0.67 - 1.43</td>
</tr>
</tbody>
</table>

Factor VIII

Laboratory: Haematology
Specimen: Blood 3mL; blue Vacuette® (sodium citrate 3.2%). Specimens that are haemolysed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling.
Comment: Determines the activity of coagulation Factor VIII. Test available Monday to Friday by arrangement, during routine working hours, emergency requests out of routine hours always requires prior Haematology Consultant approval and planning.
Samples must be received within 4 hours
Turnaround: Emergency specimens < 4 hours;
Routine specimens 2 weeks.
Ref. Range:

<table>
<thead>
<tr>
<th>Age</th>
<th>Mean (IU/mL)</th>
<th>Range (IU/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>1.14</td>
<td>0.50 - 1.78</td>
</tr>
<tr>
<td>Day 5</td>
<td>1.02</td>
<td>0.50 - 1.54</td>
</tr>
<tr>
<td>Day 30</td>
<td>1.03</td>
<td>0.50 - 1.57</td>
</tr>
<tr>
<td>Day 90</td>
<td>0.87</td>
<td>0.50 - 1.25</td>
</tr>
<tr>
<td>Day 180</td>
<td>0.79</td>
<td>0.50 - 1.09</td>
</tr>
<tr>
<td>Adult</td>
<td>0.99</td>
<td>0.50 - 1.49</td>
</tr>
</tbody>
</table>

Factor VIII Chromogenic

Laboratory: Referred from Haematology to National Coagulation Laboratory, St James Hospital, Dublin 8 (Paediatric samples are referred to Haematology Dept., Our Lady’s Hospital, Crumlin, Dublin 12)
Specimen: Blood 3mL; blue Vacuette® (sodium citrate 3.2%).
Specimens that are haemolysed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling.

Comment: By arrangement with laboratory

**Samples must be received within 4 hours**

**Factor IX**

Laboratory: Haematology

Specimen: Blood 3mL; blue Vacuette® (sodium citrate 3.2%).
Specimens that are haemolysed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling.

Comment: Determines the activity of coagulation Factor IX. Test available Mon to Fri, during routine working hours and for emergency reasons **by arrangement** with the Haematology Laboratory.

**Samples must be received within 4 hours**

**Factor X**

Laboratory: Haematology

Specimen: Blood 3mL; blue Vacuette® (sodium citrate 3.2%).
Specimens that are haemolysed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling.

Comment: Determines the activity of coagulation Factor X. Test available Monday to Friday, during routine working hours, **by arrangement** with the Haematology Laboratory.

**Samples must be received within 4 hours**

**Factor XI**

Laboratory: Haematology

Specimen: Blood 3mL; blue Vacuette® (sodium citrate 3.2%).
Specimens that are haemolysed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling.

Comment: Determines the activity of coagulation Factor XI Test available Mon to Fri, during routine hours, **by arrangement** with the Haematology Laboratory.

**Samples must be received within 4 hours**
### Factor XII

**Laboratory:** Haematology  
**Specimen:** Blood 3mL; blue Vacuette® (sodium citrate 3.2%).  
**Comment:** Determines the activity of coagulation Factor XII. Test available Mon to Fri, during routine hours, by arrangement with the Haematology Laboratory.  
**Samples must be received within 4 hours**  
| Turnaround: 2 weeks |  
| --- | --- | --- |  
| Age | Mean (IU/mL) | Range (IU/mL) |  
| Day 1 | 0.38 | 0.10 - 0.66 |  
| Day 5 | 0.55 | 0.23 - 0.87 |  
| Day 30 | 0.53 | 0.27 - 0.79 |  
| Day 90 | 0.69 | 0.41 - 0.97 |  
| Day 180 | 0.91 | 0.49 - 1.34 |  
| Adult | 0.97 | 0.67 - 1.27 |  

### Factor XIII

**Laboratory:** Haematology  
**Specimen:** Blood 3mL; blue Vacuette® (sodium citrate 3.2%).  
**Comment:** A qualitative assay to diagnose congenital deficiency. Test available Mon – Thurs, (due to incubation requirements) during routine hours.  
**Samples must be received within 4 hours**  
| Turnaround: 3 weeks |  
| --- | --- | --- |  
| Age | Mean (IU/mL) | Range (IU/mL) |  
| Day 1 | 0.53 | 0.13 - 0.93 |  
| Day 5 | 0.47 | 0.11 - 0.83 |  
| Day 30 | 0.49 | 0.17 - 0.81 |  
| Day 90 | 0.67 | 0.25 - 1.09 |  
| Day 180 | 0.77 | 0.39 - 1.15 |  
| Adult | 1.08 | 0.52 - 1.64 |  

### Faecal Elastase

**Laboratory:** Sample referred from Clinical Biochemistry to Dr Jonathan Berg, Clinical Chemistry Dept., City Hospital, Dudley Road, Birmingham, West Midlands, B18 7QH Tel 0044215075353  
**Specimen:** Minimum 5g stool  
**Turnaround:** Stable at room temperature for up to 1 week and for 1 month, stored at 4°C  
**Ref. Range:** See report form
Faeces – Molecular Analysis and Culture

Laboratory: Microbiology (Category 3 Laboratory)
Specimen: Faeces sample for molecular analysis of *Salmonella* spp., *Shigella* spp., *Campylobacter* spp., verotoxin (VT1 and VT2; markers of enterohaemorrhagic disease), *Cryptosporidium parvum/hominis* and *Giardia lamblia*.

The specimen should be collected into a clean, sterile, leakproof container. Ideally, all specimens should be taken as soon as possible after onset of symptoms. Transport specimens ASAP. If processing is delayed, refrigeration is preferable to storage at ambient temperature. A number of important pathogens such as *Shigella* species may not survive the pH changes that occur in faeces specimens that are not promptly delivered to the laboratory, even if refrigerated.

Samples >72hrs old on receipt in the laboratory are unsuitable for testing. Hospital inpatient samples are not routinely retested for 14 days if they are continually in hospital for this period.

Comment: Rectal swabs are not suitable. Full clinical information should be provided, esp. presence and duration of symptoms, recent foreign travel or shellfish ingestion and previous antibiotics.

Clearance samples for Salmonella, Shigella and Campylobacter not routinely processed unless clinically indicated. Please discuss with Microbiology Medical team.

Turnaround: Negative: within 24 hours if received between Monday and Thursday; specimens received on Friday after 11:00am should be reported before 5 pm on the following Monday.

Positive: Campylobacter detection should be reported on the day of testing; *Cryptosporidium parvum/hominis* should be reported ≤ 36 hours; salmonella identification should be confirmed within 72 hours of processing; shigella identification should be confirmed within 72 hours if present; For verotoxin, a positive result should be reported within 24 hours if received between Monday and Thursday; specimens received on Friday should be reported before 5 pm on the following Monday.

Clinically significant isolates are telephoned when available.

Report: Report presence of specific pathogen and absence of other pathogens (Target Not Detected or Target Detected). Faeces is cultured on selective media for *Salmonella* and *Shigella* when positive by molecular testing.

Verotoxigenic positive samples are sent to Cherry Orchard Reference laboratory for confirmation.

In addition, when clinically indicated, specific media for *Yersinia* spp. and *Vibrio cholerae* will be inoculated. Where appropriate i.e. HUS the specimen is sent to Cherry Orchard Hospital lab for detailed analysis of various enterohaemorrhagic *E. coli*

A Target Not Detected result does not automatically exclude infection from the above enteric pathogens as the level of DNA present may be lower than the limit of detection of the assay.

Please refer to individual sections for *Clostridium difficile* testing, *Cryptosporidium Sp.* Parasitology and Rotavirus /Adenovirus antigens.

Fallopian Tube Aspirate / Tubo-ovarian Fluid

See Sterile Body Fluid – Microscopy and Culture.
Fanconi’s Anaemia

Laboratory: Referred from Biochemistry to Bristol Genetics Lab
Specimen: 5ml Lithium Heparin blood/bone marrow in Lithium Heparin Paediatrics – at least 1ml lithium heparin (preferably 2ml)
Comment: 24hrs notice required to facilitate courier arrangements (Contact ext 22531).
Request form available at www.nbt.nhs.uk/genetics
Turnaround: 28 days

Farmers Lung Antibodies

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: Performed by a reference laboratory (Mycology Reference Centre, Leeds)
Turnaround: 3 weeks
Report: Positive or negative

Ferritin

Laboratory: Haematology
Specimen: Blood 4mL Red Vacuette® (clotted blood).
Comment: The level of serum ferritin correlates well with the body iron reserves under various physiological and pathological conditions. Ferritin is an acute phase reactant.
Test available Monday to Friday, during routine working hours.
Ferritin should be requested for investigation of abnormal FBC results and relevant clinical syndromes.
Use of haematinics for screening of well patients is not recommended.
Requests should be accompanied by clinical details.
See BCSH guidelines.
Laboratory Diagnosis of Functional Iron Deficiency

Turnaround: 7 working days
Ref. Range: Females 11 – 307 ng/ml, Males 17 – 320 ng/ml

Fertility Screen

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: Screen includes Hepatitis B Surface antigen, anti-HBcore, HIV Ag/Ab, anti-HCV
Turnaround: Negative samples: 36 hours. Please allow extra time for samples testing positive in house for HIV and anti-HCV (external confirmatory testing required).
Report: Positive or negative

Fibrinogen (Factor 1)

Laboratory: Haematology
Specimen: Blood 3mL; blue Vacuette® (sodium citrate 3.2%).
Specimens which are haemolysed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling)
Specimens must be received within 12 hours of phlebotomy.
Comment: Determines the concentration of plasma fibrinogen. Forms part of a Thrombophilia and/or Lupus screen, see Main Haematology Section on Guidelines for Investigation of Thrombophilia. Test available Monday to Friday, during routine working hours, and for emergency reasons at all other times.
**Fibrinogen Phenotyping and Genetic Analysis**

**Laboratory:** Sample referred from Haematology to the DNA Laboratory, St., Thomas’s Hospital, London

**Specimen:** Blood 3 mL purple Vacuette® (EDTA) and Blood 3ml; blue Vacuette® (sodium citrate 3.2%), fill to mark on tube.

**Comment:** Request must be booked in advance with the Haematology Laboratory CUH, performed in the investigation of Dysfibrinogenanaemia

**Please note:** 1 month

**Filaria Antibodies**

**Laboratory:** Microbiology (Infectious Diseases Serology)

**Specimen:** 4mL clotted blood

**Comment:** Performed by a reference laboratory (PHE National Parasitology Reference Laboratory (NPRL), London)

**Turnaround:** 3 weeks

**Report:** Positive or negative

**Fluorescence In-Situ Hybridisation (FISH) for Microdeletions Syndromes (eg. Di George, Williams)**

**Laboratory:** Specimen referred from Molecular Genetics Lab in Biochemistry to NCMG.

**Specimen:** Adults: 2ml Lithium Heparin blood.
Infants: 1ml min Lithium Heparin blood)
DO NOT refrigerate specimens.

**Comment:** NCMG request form available from [www.genetics.ie](http://www.genetics.ie)

**Turnaround:** See NCMG website

**Report:** Sent to referring clinician from NCMG and copy of report filed in pathology

**Flow Cytometry**

**Laboratory:** Haematology

**Specimen:** Fresh Blood or Bone Marrow – 3mL, purple Vacuette (EDTA). Samples may be refrigerated overnight. Optimal sample age less than 48 hours.

**Comment:** Used as a diagnostic tool in identifying leukaemias. Test available Mon to Fri, during routine hours by arrangement with the Haematology laboratory. Please state specimen type on form, it is essential to provide relevant essential clinical information. Should be requested on the advice of a consultant haematologist.

**Turnaround:** Routine specimens: 72 hours
Urgent specimens: 24 hours

**Ref. Range:** Not applicable
Foetal Genotype

Laboratory: Available by prior arrangement with Blood Transfusion Laboratory
Specimen: 16mL EDTA maternal
3mL EDTA paternal
Comment: If possible, 24 hours notice to Blood Transfusion Laboratory, CUH required (Contact Ext 22537)
IBGRL Request Form F014 to be completed by requesting clinician (Available from Blood Transfusion Laboratory)
Samples referred to: IBGRL, Bristol, United Kingdom via IBTS.
NOTE: Foetal Sex Typing is NOT referred by the Blood Transfusion Laboratory, CUH.
Turnaround: 21 Working Days

Flecanide

Laboratory: Referred from Clinical Biochemistry to ASI, St George’s University Hospital, London.
Specimen: Serum (Trough sample)
Comment: Toxicity may occur at levels >700mg/L. Range quoted is appropriate for a trough sample.
Turnaround: 3 weeks
Therapeutic Range: 100-600µg/L

Foetal Maternal Haemorrhage by Flow Cytometry > 2.5mls bleed

Laboratory: Referred by Haematology to the Rotunda Hospital, Parnell St, Dublin 1
Specimen: EDTA specimen
Comment: Bleeds > 2.5 mls are referred
Turnaround: 1-3 days

Foetal Sex Typing

Laboratory: Referred from Biochemistry to IBGRL, Bristol. Prior notice required to facilitate courier arrangements (Contact ext 22531)
Specimen: 16mL EDTA maternal
3mL EDTA paternal
Comment: Pregnancy must be at least 7 weeks
IBGRL request form (FM4739) to be completed by referring clinician
Turnaround: 5 working days from receipt of specimen in Bristol

Foetus – First Trimester

Laboratory: Histopathology (Diagnostic Laboratory)
Comment: If pre-viable foetal tissue, however small, is identified following delivery, the Consent to Pathological Examination of a pre-16 week foetus form (form 453) must be completed in full by the doctor or midwife, signed by the parent, and submitted to the Histopathology laboratory with a completed Histopathology Request Form. For full details of the protocol contact the Histopathology laboratory at (021) 4922792

Foetus – Post First Trimester

See Autopsies/Post-Mortems under HISTOPATHOLOGY
### Folate (serum)

- **Laboratory:** Haematology  
- **Specimen:** Blood 4mL Red, Vacuette® (clotted blood).  
- **Comment:** Forms part of the investigation of Megaloblastic Anaemia.  
  Please note that international studies have indicated that folic concentrations < 4 ng/mL may be associated with deficiency. Therefore results < 4 ng/mL should be subject to clinical as well as laboratory interpretation.  
  Test available Monday to Friday, during routine working hours.  
  B12 and Folate should be requested for investigation of abnormal FBC results and relevant clinical syndromes.  
  Use of haematinics for screening of well patients is not recommended.  
  Requests should be accompanied by clinical details.  
  See BCSH guidelines.  
  The diagnosis of B12 and folate deficiency  

- **Turnaround:** 7 working days  
- **Ref. Range:** 3.1 – 20 ng/mL

### Formalin fixed tissue

- **Laboratory:** Histopathology  
- **Specimen:** Tissues for Histopathology excluding those listed below (See separate entries):  
  - Breast Needle Core Biopsy calcified and non-calcified  
  - Neck Dissection Specimens  
  - Renal Biopsy  
- **Comment:** Specimens should be placed in a container, large enough to contain adequate Buffered Formalin for fixation (recommend ratio of *at least* 2:1 for Buffered Formalin Volume: specimen size). Ideally all specimens should be submitted intact to allow accurate gross examination. Tissue should not be removed from the specimen, for research purposes or otherwise, without prior consultation with a Pathologist as this may compromise accurate diagnosis. Where specimens are orientated by/with sutures etc, their designation should be clearly detailed on the accompanying Request Form.  
- **Turnaround:**  
  - Small biopsy - 80% of cases by day 5  
  - Non-biopsy cancer resection - 80% of cases by day 7  
  - Non-biopsy other - 80% of cases by day 7  
  - Cancer specimens as per NCCP guidelines.

- **Ref. Range:** Not applicable

### Fragile X Syndrome (FRAX)

- **Laboratory:** Referred from Molecular Genetics Lab in Biochemistry to NCMG.  
- **Specimen:** Infant: 1ml EDTA & 1ml Lithium Heparin bloods  
  - Adults: 3-5mls EDTA & 2mls Lithium Heparin bloods  
- **Comment:** Both blood types required as both DNA analysis and karyotype performed.  
  NCMG request form available from website, [www.genetics.ie](http://www.genetics.ie)

- **Turnaround:** Up to 6 months  
- **Report:** Sent to referring clinician and copy of report filed in pathology

### Francisella tularensis Antibodies

- **Laboratory:** Microbiology (Infectious Diseases Serology)  
- **Specimen:** 4mL clotted blood

This document is designed for online viewing. Printed copies, although permitted, are deemed Uncontrolled from 23:59 hours on 11/09/17
**Free T4 (Thyroxine)**

Laboratory: Clinical Biochemistry  
Specimen: 4.0 mL blood in plain tube (clotted sample)  
Turnaround: 4 Days  
Ref. Range: 9.0 – 19.1 pmol/L  
Please contact Clinical Biochemistry lab for Paediatric and Pregnancy-related Reference ranges.

**Free T3 (Triiodothyronine)**

Laboratory: Clinical Biochemistry  
Specimen: 4.0 mL blood in plain tube  
Turnaround: 4 Days  
Ref. Range: 2.6 - 5.7 pmol/L  
Please contact Clinical Biochemistry lab for Paediatric and Pregnancy-related Reference ranges.

**Frozen Sections (Intraoperative Consultation), Neurosurgery**

Laboratory: Neuropathology  
Specimen: Fresh tissue (universal precautions)  
Comment: Routine service is available 9:00am to 5:00pm Monday – Friday. Please refer to the protocol for frozen section (Neuropathology Department information for Users). Cases to be arranged between the Neurosurgeon and Neuropathologist. Please contact extension 22520. Theatre rings Neuropathology Department (ext 22519/22520) at the time the specimen is being sent. Theatre Nurse brings the specimen to Theatre Reception Area. Specimen is given to the Porter on Call, who signs the Specimen Book. The Porter brings the specimen in the appropriate container directly to a staff member in the Neuropathology Department. Universal safety precautions must apply. Fresh nervous system tissue requires special precautions in high risk cases. These include suspected prion diseases, and other transmissible diseases e.g. tuberculosis, HIV. Label specimen container and request form with Biohazard sticker. Please contact the Neuropathologist on duty in advance.

Neuropathology Department logs receipt of the specimen and returns the box to the Porter. An urgent on-call service is available outside of these hours on weekdays and a limited on-call at certain weekends only. Cases should be arranged in advance between the Neurosurgeon and the Neuropathologist on call (contact switch).

Turnaround: 20 minutes. Result is telephoned back to theatre.
Frozen Sections – Urgent

Laboratory: Histopathology (Diagnostic Laboratory)
Specimen: Fresh tissue
Comment: The Frozen Section service is available **Mon – Fri 8am to 5:30pm**

Outside of these hours if a frozen section is anticipated, the pathologist on call must be contacted through the hospital switchboard for discussion of the case. If the fresh specimen poses a health risk to laboratory personnel (e.g. TB, HIV), frozen analysis should not be undertaken. Alternative approaches to rapid diagnosis may be discussed with Pathologist/Senior Medical Scientist.

Booking

Frozen sections Monday – Friday, should be booked in advance where possible (preferably 24hrs before elective surgery). The Histopathology laboratory should be contacted at ext. 22792 with the following details.

Date and Time schedule / Patient name / Theatre / Surgeon / Specimen type.

**Note:** if the frozen section is delayed or cancelled please notify the Histopathology laboratory at ext. 22792.

Transportation

Unfixed tissue for frozen section must be transported directly to the laboratory immediately in a correctly labelled dry container, accompanied by a completed Request Form and handed to a Medical Scientist, NCHD or Consultant Histopathologist in the Histopathology laboratory. Specimens from external hospitals must be transported according to UN3373 standards (triple packaging).

**Turnaround:** 20 minutes per frozen section. If multiple frozen sections are received TAT will increase accordingly.

**FSH**

Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in plain tube (clotted sample)
Turnaround: 4 Days
Ref. Range:
- Follicular phase: 3.0 – 8.1 IU/L
- Ovulation: 2.6 - 6.7 IU/L
- Luteal phase: 1.4 – 5.5 IU/L
- Post menopause: 26.7 – 133.4 IU/L
- Male: 1.0 – 12 IU/L

**Full Blood Count including automated WBC Differential,**
**Blood Films for Manual White Cell Differentials, Slide Platelets and Red Cell Morphology**

Laboratory: Haematology
Specimen: Blood 3mL purple Vacuette® (EDTA)
- Paediatric (1mL purple (EDTA) or 1.3 mL red)

**Note:** 6mL purple EDTA Vacuette or any other sample type is unsuitable for FBC.

Blood Films are made in the laboratory as required.

Comment: **Full Blood Counts:** Impedence / Fluorescence Flow Cytometry Technology.

Test available Monday to Friday, during routine working hours and for emergency reasons at all other times. FBC performed in the investigation of anaemias, infections, leukeamias, platelet disorders and myeloproliferative disorders and also for the monitoring of therapies, e.g. nutritional, chemotherapy.

**Manual differentials, slide platelets and red cell morphology** available when deemed necessary or when the laboratory is contacted by clinician.

Storage: If delays are unavoidable, samples can be preserved by refrigeration at 2-8°C in a designated specimen fridge.
Stability:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Ambient Temperature</th>
<th>Refrigerated</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC</td>
<td>36 hrs</td>
<td>56 hrs</td>
</tr>
<tr>
<td>RBC</td>
<td>48 hrs</td>
<td>72 hrs</td>
</tr>
<tr>
<td>HB</td>
<td>72 hrs</td>
<td>72 hrs</td>
</tr>
<tr>
<td>MCV</td>
<td>8 hrs</td>
<td>24 hrs</td>
</tr>
<tr>
<td>PLTS</td>
<td>48 hrs</td>
<td>48 hrs</td>
</tr>
</tbody>
</table>

Transport: Transport specimen to the laboratory at ambient temperature.

Turnaround:

**Full Blood Counts:**
- Emergency specimens < 2 hours.
- Urgent specimens, i.e. received from wards with urgent label: 4 hours.
- Routine in-hospital specimens: 8 hours.
- GP specimens: 2 days.

**Manual differentials, slide platelets and red cell morphology**
- Clinically significant: 4 hours
- Routine specimens 48 hours

Ref. Range: Reference ranges for 12 years and older

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Female</td>
<td></td>
</tr>
<tr>
<td>Haemoglobin</td>
<td>13.0 – 17.0</td>
<td>11.7 – 15.9</td>
</tr>
<tr>
<td>RBC</td>
<td>4.2 – 5.6</td>
<td>3.9 – 5.3</td>
</tr>
<tr>
<td>HCT</td>
<td>0.38 – 0.49</td>
<td>0.35 – 0.46</td>
</tr>
<tr>
<td>MCV</td>
<td>80–96</td>
<td>fl</td>
</tr>
<tr>
<td>MCH</td>
<td>27–33</td>
<td>pg</td>
</tr>
<tr>
<td>MCHC</td>
<td>32–36</td>
<td>g/dl</td>
</tr>
<tr>
<td>RDW</td>
<td>11–15</td>
<td>(not reported)</td>
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<tr>
<td>Platelet</td>
<td>140–440</td>
<td>$10^{9}$/l</td>
</tr>
<tr>
<td>WBC</td>
<td>4.4–11.3</td>
<td>$10^{9}$/l</td>
</tr>
<tr>
<td>Neutrophils</td>
<td>1.4–6.6</td>
<td>$10^{9}$/l</td>
</tr>
<tr>
<td>Lymphocytes</td>
<td>0.9–3.2</td>
<td>$10^{9}$/l</td>
</tr>
<tr>
<td>Monocytes</td>
<td>0.15–1.3</td>
<td>$10^{9}$/l</td>
</tr>
<tr>
<td>Eosinophils</td>
<td>0.04–0.4</td>
<td>$10^{9}$/l</td>
</tr>
<tr>
<td>Basophils</td>
<td>0–0.1</td>
<td>$10^{9}$/l</td>
</tr>
<tr>
<td>Male</td>
<td>Female</td>
<td></td>
</tr>
<tr>
<td>ESR</td>
<td>0–10</td>
<td>0–20</td>
</tr>
<tr>
<td>Retic abs</td>
<td>23–93</td>
<td>$10^{9}$/l</td>
</tr>
<tr>
<td>NRBC</td>
<td>0</td>
<td>/100 WBC</td>
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</table>
Ref. Range:  

<table>
<thead>
<tr>
<th>Test</th>
<th>Age-Related Reference Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 day</td>
</tr>
<tr>
<td>RBC</td>
<td>3.7-6.5</td>
</tr>
<tr>
<td>HCT</td>
<td>0.47-0.75</td>
</tr>
<tr>
<td>MCV</td>
<td>100-125</td>
</tr>
<tr>
<td>MCH</td>
<td>31-34</td>
</tr>
<tr>
<td>MCHC</td>
<td>30-36</td>
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<tr>
<td>PLT</td>
<td>150-450</td>
</tr>
<tr>
<td>WBC</td>
<td>10-26</td>
</tr>
<tr>
<td>NEUT</td>
<td>2.7-14.4</td>
</tr>
<tr>
<td>LYMP</td>
<td>2.0-7.3</td>
</tr>
<tr>
<td>MONO</td>
<td>0.12-1.7</td>
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<tr>
<td>EOS</td>
<td>0-0.85</td>
</tr>
<tr>
<td>BASO</td>
<td>0.0-0.12</td>
</tr>
<tr>
<td>RETIC</td>
<td>110-450</td>
</tr>
</tbody>
</table>

**Fungal Microscopy and Culture**

See Mycology

**GATA Mutational analysis**

Laboratory: Referred from Haematology to Weatherall MRC Molecular Haematology Unit  
Specimen: 3 mL EDTA  
Comment: By arrangement only with laboratory  
Turnaround: 2 – 3 weeks  
Ref. Range: Not Applicable

**G6PD Assay**

Laboratory: Haematology  
Specimen: Blood 3mL purple Vacuette® (EDTA)  
Comment: Used in the investigation of Hereditary Haemolytic Anaemias. It is recommended that assays not be performed after severe haemolytic crisis, since G6PD levels may be falsely elevated. Test available Monday to Friday, during routine working hours. Unsuitable for analysis if Reticulocyte count is >150 x 10^9/L  
Turnaround: 1 week  
Ref. Range: 4.6 – 13.5 U/g Hb. Note: Values for new-borns may range somewhat higher

**G6PD Screen**

Laboratory: Haematology  
Specimen: Blood 3mL purple Vacuette® (EDTA)  
Comment: Used in the investigation of Hereditary Haemolytic Anaemias. Samples which have been determined deficient or intermediate by this qualitative method are assayed using a quantitative method. It is recommended that assays not be performed after severe haemolytic crisis, since G6PD levels may be falsely elevated. Test available Monday to Friday, during routine working hours. Unsuitable for analysis if Reticulocyte count is >150 x 10^9/L  
Turnaround: 1 week  
Ref. Range: Normal/Decreased
### Gamma-Glutamyltransferase (γ-GT)

**Laboratory:** Clinical Biochemistry  
**Specimen:** 4.0 mL blood in plain tube (clotted sample)  
**Turnaround:** A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx. GP or OPD- Results posted within 4 days.  
**Ref. Range:** 0-55 U/L (Males) 0-38 U/L (Females). Contact laboratory for Paediatric ranges.

### Ganglioside Antibodies

**Laboratory:** Sample referred from Autoimmune Serology to Claymon Laboratories.  
**Specimen:** Blood, 4 mL red top Vacuette (or similar container for clotted blood)  
**Turnaround:** Approx. 3 Weeks  
**Ref. Range:** See report form, or visit internet site [www.claymon.com](http://www.claymon.com) for up to date referral test information.

### Gastric Parietal Cell Ab

**Laboratory:** Autoimmune Serology  
**Specimen:** Blood, 4 mL red top Vacuette (or similar container for clotted blood)  
**Comment:** Qualitative Immunofluorescence assay. Part of Autoantibody Screen.  
**Turnaround:** 24 Hours  
**Ref. Range:** Not applicable

### Gastrointestinal stromal tumours (GIST) - C-Kit Mutation Analysis, PDGFR Mutation Analysis

**Laboratory:** Specimen referred from Histopathology to Dept. of Pathology, Ninewells Hospital  
**Specimen:** Histopathology Tissue block  
**Turnaround:** 4 weeks

### GBM (Glomerular Basement Membrane Antibodies)

**Laboratory:** Autoimmune Serology  
**Specimen:** Blood, 4 mL red top Vacuette (or similar container for clotted blood)  
**Comment:** Quantitative Immunoassay using Phadia Unicap 250 analyser. Restricted to CUH patients.  
**Turnaround:** 72 Hours  
**Ref. Range:** 0 - 10 AU/mL

### GBMQ (GBM Quick Test)

**Laboratory:** Autoimmune Serology  
**Specimen:** Blood, 4 mL red top Vacuette (or similar container for clotted blood)  
**Comment:** Qualitative Quick Card Test (5 Minutes)  
**Turnaround:** On Request.  
**Ref. Range:** Not applicable
Genital Swab

See also *Chlamydia tracomatis* PCR and *N. gonorrhoea* PCR

Laboratory: Microbiology (Main laboratory)
Specimen: Specimens for culture and sensitivity testing should be taken in the following situations:
  - The patient is clearly symptomatic of gonoccal infection.
  - The patient has tested positive for *N. gonorrhoea* on the urine cobas assay but has not yet commenced treatment.
  - There is evidence of treatment failure.
  - The patient is a known contact, and immediate epidemiological treatment is to be given.

Because genital specimens are often taken from sites harbouring large numbers of commensal (normal) flora, attention to specimen selection and collection methods is critical.

Specimens should be collected using a sterile swab and transported ASAP in charcoal containing transport media.

The viability of *N. gonorrhoeae* is lost over time.

If processing is delayed, storage at ambient temperature is preferred.

Comment: Test performed routinely Monday to Friday 9-5pm or by urgent request.
Turnaround: Prelim: 24 hours; Final: 72 hours.
Report: Culture report on any clinically significant isolate with the appropriate sensitivities.

Genitourinary - TFE3/TFEB immuno + Renal tumour Cytogenetics

Laboratory: Specimen referred from Histopathology to Dept. of Pathology, Ninewells Hospital
Specimen: Histopathology Tissue block
Turnaround: 4 weeks

Gentamicin / Genticin

Refer to Antibiotic Assays

Glucocorticoid Remedical Aldosteronism (GRA)

Laboratory: Referred from Molecular Genetics Lab in Biochemistry to Addenbrookes NHS (via NCMG)
Specimen: 3-5ml EDTA blood
Comment: Use NCMG request form, available at [www.genetics.ie](http://www.genetics.ie)
Please note: invoices will be issued to the referring clinician for tests not performed in NCMG.
Turnaround: 2 weeks
Report: Sent to referring clinician and copy filed in pathology

Glucose

Laboratory: Clinical Biochemistry
Specimen: 4.0 mL Sodium fluoride EDTA
Comment: Grey-capped specimen tube
Turnaround: A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx.
GP or OPD- Results posted within 4 days.

Ref. Range: WHO Guidelines. See report form

Glucose (Urinary)

Laboratory: Clinical Biochemistry or ward / GP surgery
Specimen: Fresh spot urine sample
Comment: Measured using dipstick. Aged sample invalidates result.
Glutamic Acid Decarboxylase Antibodies

Laboratory: Sample for GAD and IA2 are referred from Autoimmune Serology to Immunology lab, Exeter.
Specimen: Blood, 4 mL red top Vacuette (or similar container for clotted blood)
Turnaround: Approx. 3 Weeks
Ref. Range: See report form.

Group B Streptococcal PCR

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 1mL EDTA blood, CSF (0.5mL)
Comment: Performed by Irish Meningitis & Sepsis Reference Laboratory (IMSRL), Dublin. Please ensure the specimen reaches the laboratory by 4pm to ensure prompt delivery to the reference laboratory.
Turnaround: Samples received by IMSRL before 11am, result between 4pm and 5pm the same day
Report: Detected or not detected

Growth hormone (GH)

Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in plain tube (clotted sample)
Turnaround: 2 Weeks
Comment: Haemolysed samples should be interpreted with care
Samples should be transported to the laboratory as soon as possible and must be frozen within 24 hours
Ref. Range: It is not possible to quote a reference range for random Growth Hormone due to the episodic nature of its secretion. These measurements therefore are not recommended. Contact Biochemistry

Gut Hormone profile

Laboratory: Sample referred from Clinical Biochemistry to SAS Laboratory, Charing Cross Hospital
Specimen: Blood, 10mL fasting in EDTA bottle sent to the laboratory on ice.
Comment: Consultant request only
Turnaround: 3 weeks
Ref. Range: See report form.

Haemochromatosis

Laboratory: Performed in the Molecular Genetics lab in Biochemistry
Specimen: 3.0 mL EDTA blood
Comment: Please see investigation guidelines and specific request form on CUH website, www.cuh.hse.ie
Turnaround: 4-6 Weeks
Report: Sent to referring clinician. Restricted access to genetic reports on laboratory database. Contact Biochemistry ext 22531/22361 to discuss results.

Haem-Oncology Molecular Genetics (Haematology)

Laboratory: Specimen referred from Haematology to Cancer Molecular Diagnostics laboratory, St. James Hospital, Dublin 8
Specimen: Blood 3mL purple Vacuette® (EDTA).
Comment: Leukaemia: PML-RARα, MRD and Chimaerism, TCR (T cell receptor), gene rearrangements, should be requested on the advice of a consultant haematologist.
Turnaround: 1 month but may vary
Ref. Range: See referral laboratory report
Haemoglobin HbA1c Glycosylated Haemoglobin

Laboratory: Haematology
Specimen: Blood 3mL purple Vacuette® (EDTA) (for Haemoglobin A1C a separate sample to the FBC sample is required)
Paediatric EDTA containers available from laboratory, NB Primary paediatric tubes must be clearly labelled.
Comment: Test available Monday to Friday, during routine working hours. As blood glucose rises, the increase in non–enzymatic glycation of proteins is proportional to both the level of glucose and the life span of the proteins in the circulation or tissues, therefore the measurement of HB A1c reflects the effectiveness of treatment in diabetes mellitus.
Due to elevated HbF levels this test is unsuitable for neonates and patients < 6 months
Turnaround: 24 – 48 hours
Ref. Range: 20 - 42 m mol/mol (IFCC)

Haemoglobin A2 Electrophoresis

Laboratory: Haematology
Specimen: Blood 3mL purple Vacuette® (EDTA)
Comment: Haemoglobin A2 concentration is useful for the diagnosis of the ã thalassemias and related disorders.
Test available Monday to Friday, during routine working hours.
Turnaround: 1 - 2 weeks
Ref. Range: >2yrs old 2 – 3.5%
at birth 0.2 – 0.3%

Haemoglobin F

Laboratory: Haematology
Specimen: Blood 3mL purple Vacuette® (EDTA)
Comment: Determined using HPLC / Electrophoresis Technologies. Test available Monday to Friday, during routine working hours.
Turnaround: 1 - 2 weeks
Ref. Range: < 2% in adults.

Haemoglobins S, C, D and E Electrophoresis

Laboratory: Haematology
Specimen: Blood 3mL purple Vacuette® (EDTA).
Comment: Determines the percentage of Hb S, C, D and E, that may be present in variant haemoglobins. Test available Monday to Friday, during routine working hours.
Turnaround: 1 - 2 weeks
Ref. Range: Normal: <1.0%

Haemoglobin S Sickle Screen

Laboratory: Haematology
Specimen: Blood 3mL purple Vacuette® (EDTA).
Comment: Test available Monday to Friday during routine working hours. The laboratory must be contacted for all emergency and out of hour requests. Used in screening for sickle cell disease and sickle cell trait. In the neonatal period HB F will be present in large amounts and so may mask the presence of HB S, if necessary the test should be repeated when the infant > 6 months.
Turnaround: Emergency specimens: 2 hours
Routine specimens: 24 hours
Ref. Range: Positive / Negative

Haemoglobinopathies
Laboratory: Sample referred from Haematology to the National Haemoglobin Reference Laboratory, Oxford Haemophilia Centre, Churchill Hospital, Oxford OX3 7LJ
Specimen: Example: HbE, Thalassaemias and high affinity haemoglobin
EDTA sample: minimum 2 mL blood
Due to elevated HbF levels Thalassaemia screening is unsuitable for neonates and patients < 6 months
Comment: A consent form is required to perform this test.
www.oxfordradcliffe.nhs.uk/molhaem (Haemoglobinopathies website)
Test available Monday – Wednesday before 12.00 noon
Turnaround: 12 weeks but may vary depending on complexity of analysis
Ref. Range: See report form or contact National Haemoglobin Reference Laboratory.

### Haemolysin Test

| Laboratory: | Blood Transfusion Laboratory |
| Specimen: | 1 x 4 mL Clotted Sample (red cap with yellow ring) |
| Comment: | Usually performed on mothers of new-born babies in the investigation of ABO incompatibilities. Complete the Blood Transfusion request form LF-C-BTR-XMATCH. This is not an accredited test. |
| Turnaround: | 3 hours |
| Ref. Range: | Positive or Negative |

### Haemophilia MH Research

| Laboratory: | Referred from Haematology consultant to Oxford University Hospitals NHS JR320 tel 01865-220336 |
| Specimen: | 3 ml EDTA, minimum x 2 EDTA, 6 – 20 mls |
| Comment: | By arrangement only with Haematology |
| Turnaround: | 1 – 2 months |
| Ref. Range: | Not applicable |

### Haemophilus influenzae B Antibodies (IgG)

| Laboratory: | Clinical Biochemistry |
| Specimen: | Blood 4mL red top Vacuette® (or similar container for clotted blood) |
| Comment: | Test performed by reference laboratory (HPA Laboratory, Manchester). |
| Turnaround: | 3 weeks |
| Report: | Positive or negative |

### Haemophilus influenzae PCR

| Laboratory: | Microbiology (Infectious Diseases Serology) |
| Specimen: | 1mL EDTA blood, CSF (0.5mL) |
| Comment: | Performed by Irish Meningitis & Sepsis Reference Laboratory (IMSRL), Dublin. Please ensure the specimen reaches the laboratory by 4pm to ensure prompt delivery to the reference laboratory. |
| Turnaround: | Samples received by IMSRL before 11am, result between 4pm and 5pm the same day |
| Report: | Detected or not detected |

### Hantavirus Antibodies

| Laboratory: | Microbiology (Infectious Diseases Serology) |
| Specimen: | 4mL clotted blood |
| Comment: | Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin) |
| Turnaround: | By arrangement |
| Report: | Positive or negative |

### Haptoglobin

| Laboratory: | Clinical Biochemistry |
Specimen: 4.0 mL blood in plain tube (clotted sample)
Turnaround: 4 Days
Ref. Range: 0.44-2.15 g/L

**HCG +â**

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Clinical Biochemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>4.0 mL blood in plain tube (clotted sample)</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>1 Day</td>
</tr>
<tr>
<td>Ref. Range:</td>
<td>0 – 5 IU/L</td>
</tr>
</tbody>
</table>

**Helicobacter pylori Antibodies**

This test is not available at the CUH laboratories.

**Helicobacter pylori Culture and Sensitivity**

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Microbiology (Main laboratory)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>Specimens will only be processed by prior arrangement with the laboratory. As media must be freshly prepared a minimum of 48 hours notice is required for preparation of media, reagents etc. Two gastric biopsy specimens, one from the antrum and one from the body of the stomach, are taken during endoscopy, for culture. The biopsies are immediately introduced into transport medium, supplied by the laboratory, and sent directly to the Microbiology laboratory where they are processed immediately. Preferably patients should have ceased antimicrobial therapy and PPI therapy two weeks prior to endoscopy.</td>
</tr>
<tr>
<td>Comment:</td>
<td>Transport specimens directly to the laboratory. In cases where a delay in transport cannot be avoided (specimens being transported from outside hospitals), the specimens must be packed on ice. <em>Note:</em> H. pylori rapidly loses viability at room temperature and when exposed to air. Please include any appropriate clinical details, e.g. previous therapy failure, stating the antibiotics previously administered. Please state if the patient was on therapy when the biopsies were taken, as this will warrant further incubation time.</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>Turnaround: Prelim report: 7 days, Final report: 14 days in cases where patients were taking antimicrobial agents at the time the biopsies were obtained.</td>
</tr>
<tr>
<td>Report:</td>
<td>Culture with the appropriate sensitivities</td>
</tr>
</tbody>
</table>

**Heparin Assay (Anti Xa )**

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Haematology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>Blood 3mL, blue Vacuette® (sodium citrate 3.2%) Specimens which are haemolysed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling</td>
</tr>
<tr>
<td>Comment:</td>
<td>Used to monitor the effectiveness of low molecular weight heparin therapy. It is essential to state the details of the type of low molecular weight heparin (LMWH) on the request form. Test performed once weekly (presently Wednesdays) Specimen must be taken: 4 hours post administration.</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>1 week.</td>
</tr>
<tr>
<td>Ref. Range:</td>
<td>Refer to report</td>
</tr>
</tbody>
</table>

**Heparin /PF4 Antibody Test** *(HIT; Heparin Induced Thrombocytopenia screening test)*

| Laboratory: | Haematology by prior arrangement with Haematology laboratory staff during routine hours only. Positive specimens are referred for ELISA testing to Haematology to National Coagulation Laboratory, St., James Hospital, Dublin 8 |
Specimen: Two Blood 3mL blue Vacuette® (sodium citrate 3.2%) and Two Blood 4mL red top Vacuette® (or similar container for clotted blood) (Specimens which are haemolysed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling).

Comment: Patients must be off all anticoagulants, and details of the anticoagulation history of the patient must be supplied. 4T Score MUST be supplied on all requests. HIT request form must be filled in. Available at http://www.stjames.ie/GPsHealthcareProfessionals/Referral/ReferralForms/HIT%20request%20form%20Version%202%2025th%20August%202015.pdf

Turnaround: Screening Test: 4 hours ELISA Test (referral laboratory): 4 weeks

Ref. Range: See report form or contact Haematology to St., James Hospital Dublin

**Hepatitis A IgM Antibody**

- **Laboratory:** Microbiology (Infectious Diseases Serology)
- **Specimen:** 4mL clotted blood
- **Comment:** A qualitative test for the detection of IgM antibody to Hepatitis A virus. It can be used as an aid in the diagnosis of acute or recent Hepatitis A infection. Hepatitis A IgM testing is only routinely performed on samples from children <14yrs or on samples from people recently returned from overseas. Otherwise request with a full patient history or in outbreak situations. Anti-HAV IgM reactivity should be correlated with patient history and other hepatitis markers for diagnosis of past or present infection.

- **Turnaround:** 36 hours
- **Report:** Positive or negative

**Hepatitis A IgG Antibody**

- **Laboratory:** Microbiology (Infectious Diseases Serology)
- **Specimen:** 4mL clotted blood
- **Comment:** Test is used to determine the immune status to Hepatitis A and is often used to monitor the success of Hepatitis A vaccination. It is often performed prior to vaccination in certain risk groups, e.g., army personnel going on overseas duty.

- **Turnaround:** 36 hours
- **Report:** Positive or negative

**Hepatitis B Australia Antibody (Anti-HBs)**

- **Laboratory:** Microbiology (Infectious Diseases Serology)
- **Specimen:** 4mL clotted blood
- **Turnaround:** Routine: 36 hours. Urgent: within 2 hours of receipt.
- **Report:** Quantitative value (mIU/mL)
- **Comment:** This test is used to check the immune status to hepatitis B and is often used to monitor the success of hepatitis B vaccination. Please indicate patient vaccination history on the request form. For an inoculation injury, ≥10mIU/mL is considered protective for that incident. For a completed course of vaccination ≥100mIU/mL is considered an adequate response and such patients do not require further boosting or testing. For further information, please discuss with the Microbiology medical team.
<10mIU/mL | Non responder. Exclude past infection or chronic carriage*. Repeat 3 dose course of hepatitis B vaccine (a different brand of vaccine may be considered). **Double dosing should be considered.** Recheck anti-HBs at 2-4 months post completion.

10–99mIU/mL | Poor responder. Immediate booster and retest at 2-4 months using 2 assays; if both are >10mIU/mL, this indicates an adequate response**.

≥100mIU/mL | Adequate response.

Source: National immunisation guidelines

*Check anti-HBc and HBsAg to exclude past infection or chronic carriage before beginning 2nd course vaccination.

**For those at high occupational risk of contracting hepatitis B, efforts should be made to achieve a response of greater than 100mIU/mL.

### Hepatitis B Core Antibody (Anti-HBc)

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Microbiology (Infectious Diseases Serology)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>4mL clotted blood</td>
</tr>
<tr>
<td>Comment:</td>
<td>Test will detect total antibody to Hepatitis B Core antigen, i.e., IgM and/or IgG. A positive result indicates present or past infection with the Hepatitis B virus. This test should be interpreted in conjunction with other Hepatitis B markers.</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>36 hours</td>
</tr>
<tr>
<td>Report:</td>
<td>Positive or negative</td>
</tr>
</tbody>
</table>

### Hepatitis B Surface Antigen

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Microbiology (Infectious Diseases Serology)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>4mL clotted blood</td>
</tr>
<tr>
<td>Comment:</td>
<td>A positive result may indicate acute or chronic carriage of the Hepatitis B virus. Positive specimens are considered presumptive positive only and a repeat specimen is requested. Positive specimens are tested with a full Hepatitis B virus marker profile, which includes anti-HBc, HBeAg, anti-HBe and anti-HBsAg.</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>Routine: 36 hours. Urgent: within 2 hours of receipt.</td>
</tr>
<tr>
<td>Report:</td>
<td>Positive or negative</td>
</tr>
</tbody>
</table>

### Hepatitis C Antibody

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Microbiology (Infectious Diseases Serology)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>4mL clotted blood</td>
</tr>
<tr>
<td>Comment:</td>
<td>Positive specimens are considered presumptive positive only and a repeat specimen is requested. All new positives are referred to National Virus Reference Laboratory (NVRL) in Dublin for confirmation.</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>Routine: 36 hours. Urgent: within 2 hours of receipt. Please allow more time for samples testing positive in house.</td>
</tr>
<tr>
<td>Report:</td>
<td>Positive or negative</td>
</tr>
</tbody>
</table>

### Hepatitis C Antigen

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Microbiology (Infectious Diseases Serology)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>4mL clotted blood</td>
</tr>
<tr>
<td>Comment:</td>
<td>Test performed weekly. This test is restricted to dialysis patients. A repeat sample is requested for all new positives.</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>8 days</td>
</tr>
<tr>
<td>Report:</td>
<td>Positive or negative</td>
</tr>
</tbody>
</table>

### Hepatitis D Antibody (Total)

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Microbiology (Infectious Diseases Serology)</th>
</tr>
</thead>
</table>
Specimen: 4mL clotted blood  
Comment: Hepatitis delta virus (HDV) is in fact a sub-viral particle that relies on hepatitis B virus (HBV) to cause infection in humans. 
Performing by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin).  
Turnaround: 10 working days  
Report: Positive or negative

**Hepatitis E IgG**

Laboratory: Microbiology (Infectious Diseases Serology)  
Specimen: 4mL clotted blood  
Comment: Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin)  
Turnaround: 10 working days  
Report: Positive or negative

**Hepatitis E IgM**

Laboratory: Microbiology (Infectious Diseases Serology)  
Specimen: 4mL clotted blood  
Comment: Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin)  
Turnaround: 10 working days  
Report: Positive or negative

**Hepatitis Screen**

See Hepatitis B Surface Antigen and Hepatitis C Antibody

**Hereditary Fever Syndromes (FMF, TRAPS)**

Laboratory: Referred from Molecular Genetics Lab in Biochemistry to National Amyloidosis Centre at UCL  
Specimen: 3ml EDTA blood + 3ml Serum  
Comment: Special request form available from ext 22531  
Please note: invoices will be issued to the referring clinician for tests not performed in NCMG.  
Turnaround: 4-6 weeks  
Report: Sent to referring clinician and copy filed in pathology

**Herpes Simplex Virus IgG**

Laboratory: Microbiology (Infectious Diseases Serology)  
Specimen: 4mL clotted blood  
Comment: Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin)  
Turnaround: 5 working days  
Report: Positive or negative

**Herpes Simplex Virus 1/2 Molecular**

Laboratory: Microbiology (Infectious Diseases Serology)  
Specimen: Viral swab (Remel swabs unsuitable), CSF, nasopharyngeal aspirate, sputum, broncho-alveolar lavage  
Comment: Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin)  
Turnaround: 5 working days  
Report: Detected or not detected
### 5-HIAA

| Laboratory: | Sample referred from Clinical Biochemistry to Beaumont hospital. |
| Specimen: | 24-hour urine sample collected into a container, which has acid, added. 24 hr urine containers are available from stores; acid is added in the Biochemistry lab. Avoid following foods for 48h before collection: bananas, chocolate, tomatoes, grapefruit, walnuts, avocado, pineapple, plums, dried fruit, citrus fruit, tea and coffee |
| Turnaround: | 3 weeks |
| Ref. Range: | See report form. |

### High Density Lipoprotein (HDL)

| Laboratory: | Clinical Biochemistry |
| Specimen: | 4.0 mL blood in plain tube (clotted sample) |
| Turnaround: | A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, S1, SF, SMOH, MGH: - 3 hours approx. GP or OPD- Results posted within 4 days. |
| Ref. Range: | Male: > 1.0 mmol/L Female: > 1.2 mmol/L |

Target values apply to pts at low or moderate risk CVD

### High Vaginal Swab (HVS)

| Laboratory: | Microbiology (Main laboratory) |
| Specimen: | It is important to avoid vulval contamination of the swab. The posterior fornix, including any obvious candidal plaques should be swabbed. Low vaginal swabs are discouraged because the presence of high numbers of commensal flora makes them difficult to interpret (see Low Vaginal Swab for investigation of vulvo-vaginitis in paediatric patients). Only swabs sent in suitable transport medium will be processed – swabs that are sent without transport medium may be dry and may not yield the targeted organisms. Transport specimens ASAP. If processing is delayed, refrigeration is preferable to storage at ambient temperature. |
| Comment: | Specimens are generally examined for the presence of Candida or Group B Streptococci. Specimens will be processed for *Trichomonas vaginalis* and Bacterial Vaginosis (BV) only if a slide is received. Please indicate on the request form if the specimen is post-operative /post delivery so that supplementary testing can be performed. Vaginal swabs are not recommended for gonococcal culture on adults; an endocervical specimen is more appropriate. A separate specimen using the specific swabs and transport medium should be collected for the detection of *C. trachomatis*. |
| Turnaround: | Prelim: 24 hours; Final: 48-72 hours |
| Report: | Microscopy (by request): WBCs, yeasts, trichomonads and clue cells if present. Excess pus cells suggest infection; motile trichomonads indicate trichomoniasis, yeasts and hyphae suggest Candidiasis; clue cells in the absence of normal flora is suggestive of anaerobic vaginosis. Culture: Any clinically significant isolate with the appropriate sensitivities. |
Histopathology Specimens

Laboratory: Histopathology
Specimen: See separate entries for:
- Breast needle core biopsy calcified and non-calcified.
- Direct Immunofluorescence – Skin/Oral mucosa
- Electron Microscopy
- Formalin fixed tissue
- Frozen Sections - Urgent
- Liver Biopsy for Copper/Iron Estimation
- Neck Dissection Specimens
- Renal Biopsy
- Cardiothoracic Specimens

Pathologists are available for discussion of Histopathology cases, both pre and post receipt within the laboratory.

**Urgent Specimens:** Where case is deemed urgent by the clinician, this must be clearly indicated on the Request Form.

The Histopathology laboratory does not operate an out-of-hours service. However a consultant pathologist is on-call and may be contacted through the main hospital switchboard, Ph. 021-4922424/4922100

**Histone Antibodies**

Laboratory: Sample referred from Autoimmune Serology to Biomnis Laboratories.
Specimen: Blood, 4 mL red top Vacuette (or similar container for clotted blood)
Turnaround: Approx. 3 Weeks
Ref. Range: See report form, or visit internet site www.biomnis.ie for up to date referral test information.

**Histoplasma Antibodies**

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: Performed by a reference laboratory (Mycology Reference Centre, Leeds)
Turnaround: 3 weeks
Report: Positive or negative

**HLA Antibody (Antibody to Human Leucocyte Antigen)**

Laboratory: Blood Transfusion Laboratory
Specimen: 4 mL Clotted
Comment: Referred to: I.B.T.S., National Blood Centre, James’s St., Dublin 8. Complete the Blood Transfusion request form LF-C-BTR-ANTENAT or LF-C-BTR-XMATCH This is not an INAB accredited test.
Turnaround: 3 weeks
Ref. Range: Not applicable.

**HLA Typing**

Laboratory: Blood Transfusion Laboratory
Specimen: 3 x 4 ml EDTA purple cap (FBC) tube or 9 mL ACD yellow capped tube. Arrange for samples to be delivered to laboratory between Monday to Thursday.
Comment: HLA typing referred to: HLA Department, I.B.T.S., National Blood Centre, James's St., Dublin 8. Mon. to Thurs. Complete the Blood Transfusion request forms LF-C-BTR-ANTENAT or LF-C-BTR-XMATCH This is not an INAB accredited test.
Turnaround: 3 Weeks
Ref. Range: Not Applicable.
### HLH Granule release assay (Haemophagocytic Lymphohistiocytosis)

- **Laboratory:** Referred from Haematology to Great Ormond Street Hospital
- **Specimen:** EDTA x 5mls
- **Comment:** By arrangement only with laboratory
- **Turnaround:** 7 days
- **Ref. Range:** Not applicable

### Homocystine – Free and Total (Paediatric patients)

- **Laboratory:** Sample referred from Clinical Biochemistry to The Children’s Hospital, Temple Street, Dublin
- **Specimen:** Lithium Heparin sample which must be separated within 10 minutes of collection. Time must be stated on bottle and on form
- **Comment:** Please advise the lab in advance
- **Turnaround:** 1 week
- **Ref. Range:** See report or contact Biochemistry Laboratory, Temple Street Hospital

### HMMA (VMA)

- **Laboratory:** Sample referred from Clinical Biochemistry to BEAUMONT Hospital Dublin
- **Specimen:** Spot urine sample. Sample must be brought to Biochemistry laboratory immediately to have acid added.
- **Turnaround:** 2 weeks
- **Ref. Range:** See report form or contact Biochemistry Laboratory BEAUMONT Hospital

### HPA (Human Platelet Antigen + Antibody Investigation for NAITP)

- **Laboratory:** Blood Transfusion Laboratory
- **Specimen:** Baby: 1 mL EDTA  
  Mother: 5 mL EDTA and 20 mL Clotted  
  Father: 20 mL EDTA
- **Comment:** Only by prior arrangement with Blood Transfusion Laboratory, CUH  
  Complete Form NBC/HLA/F320 (Available from Blood Transfusion Laboratory, CUH)  
  Referred to: I.B.T.S., National Blood Centre, James’s St., Dublin 8.  
  This is not an accredited test.
- **Turnaround:** Refer to IBTS, Dublin.
- **Ref. Range:** Refer to IBTS, Dublin.

### HTLV-I / II Antibodies

- **Laboratory:** Microbiology (Infectious Diseases Serology)
- **Specimen:** 4mL clotted blood
- **Comment:** Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin)
- **Turnaround:** 5 working days
- **Report:** Positive or negative

### Human Herpes Virus 6 (HHV-6) Molecular

- **Laboratory:** Microbiology (Infectious Diseases Serology)
- **Specimen:** 4ml clotted blood, 4mL EDTA blood, CSF
- **Comment:** Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin)
- **Turnaround:** 5 working days (additional time required for confirmation of reactive samples). Serum/plasma must be frozen by laboratory within 24 hours of sample collection.
- **Report:** Detected or not detected
Human Herpes Virus 8 (HHV-8) Molecular
Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL EDTA blood
Comment: Test performed by a reference laboratory (Virus Reference Department, London)
Turnaround: 15 days
Report: Detected or not detected

Human Immunodeficiency Virus (HIV) Serology
Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: Detects HIV antigen and antibody to HIV1 and HIV2. Newly positive specimens are referred to the National Virus Reference Laboratory, University College Dublin, for confirmation. A repeat specimen is requested on all newly diagnosed positive patients.
Turnaround: Negative samples: 36 hours
Samples positive in house: 2 weeks (confirmation required)
Report: Positive or negative

HVA
Laboratory: Sample referred from Clinical Biochemistry to BEAUMONT Hospital Dublin
Specimen: Spot urine sample. Sample must be brought to Biochemistry laboratory immediately to have acid added
Turnaround: 2 weeks
Ref. Range: See report form or contact Biochemistry Laboratory BEAUMONT Hospital

Hydatid Cyst
See Echinococcus Antibodies

Hydroxyprogesterone (Alpha 17-Hydroxyprogesterone)
Laboratory: Sample referred from Clinical Biochemistry to Leeds General Infirmary
Specimen: 2.0 mL blood in a plain tube (clotted sample)
Comment: Consultant request only
Turnaround: 3 weeks
Ref. Range: See report form

Hydroxyprogesterone (Alpha 17-Hydroxyprogesterone) Blood Spots
Laboratory: Sample referred from Clinical Biochemistry to University Hospital of Wales.
Specimen: Blood spots taken at 4 points through the day. See comment.
Comment: Consultant request only
Turnaround: 3 – 4 weeks
Ref. Range: Contact laboratory

IgD
Laboratory: Sample referred to Sheffield Protein Reference Unit.
Specimen: 4.0 mL blood in a plain tube (clotted sample)
Comment: Consultant request only
Turnaround: 4 weeks
Ref. Range: See report form

IgE Total and Specific
Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in plain tube (clotted sample)
Turnaround: Up to 14 Days
Ref. Range: Contact CUH Biochemistry Laboratory

IgG Subclasses
Laboratory: Sample referred to BIOMNIS Laboratories
Specimen: 4.0 mL blood in a plain tube (clotted sample)
### Immunoglobulins / Electrophoreisis

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Clinical Biochemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen</td>
<td>4.0 mL blood a plain tube (clotted sample)</td>
</tr>
<tr>
<td>Comment</td>
<td>Age related reference values are available from Laboratory on request</td>
</tr>
<tr>
<td>Turnaround</td>
<td>5 Days</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ref. Range</th>
<th>IgA: 0.8 – 2.8 g/L (15 – 45 Yrs)</th>
<th>For paediatric references, please contact laboratory.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.8 – 4.0 g/L (&gt; 45 Yrs)</td>
<td></td>
</tr>
<tr>
<td>IgG:</td>
<td>6.0 – 16.0 g/L</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For paediatric references, please contact laboratory.</td>
<td></td>
</tr>
<tr>
<td>IgM:</td>
<td>0.5 – 1.9 g/L (15 – 45 Yrs)</td>
<td>For paediatric references, please contact laboratory.</td>
</tr>
<tr>
<td></td>
<td>0.5 – 2.0 g/L (&gt;45 Yrs)</td>
<td></td>
</tr>
</tbody>
</table>

### Infectious Mononucleosis Screening test

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Haematology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen</td>
<td>EDTA specimen</td>
</tr>
<tr>
<td>Comment</td>
<td>This test is only performed if results of the Full Blood Count and/or manual differential suggests Infectious Mononucleosis, clinicians are requested to send a confirmatory test to Clinical Microbiology for EBV status on all positive screens. Comment added to all Negative results: A negative Monospot screen does not preclude IM infection. Result must be interpreted in conjunction with clinical details.</td>
</tr>
<tr>
<td>Turnaround</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Report</td>
<td>Positive or Negative</td>
</tr>
</tbody>
</table>

### INR (International Normalised Ratio)

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Haematology: See Prothrombin Time (PT)</th>
</tr>
</thead>
</table>

### In Situ Hybridisation for Her2:Chromosome 17 ratio

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Histopathology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen</td>
<td>Formalin Fixed Paraffin Embedded Tissue.</td>
</tr>
<tr>
<td>Comment</td>
<td>This test is performed on a subset of breast and gastric cancer cases and other cases as required.</td>
</tr>
<tr>
<td>Turnaround</td>
<td>10 working days</td>
</tr>
<tr>
<td>Report</td>
<td>Report is expressed as a ratio of Her 2 gene copy number divided by Chromosome 17 copy number.</td>
</tr>
</tbody>
</table>

### Intrinsic Factor Antibodies

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Haematology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen</td>
<td>Blood 4mL Red Vacuette® (clotted blood).</td>
</tr>
<tr>
<td>Comment</td>
<td>Test available Monday to Friday, during routine working hours. Tests for IF antibodies are carried out on patients with suspected megaloblastic anaemia and a depressed serum vitamin B₁₂ to aid in the diagnosis of pernicious anaemia. Free B12 levels of &gt;444 ng/L can give false positive results.</td>
</tr>
<tr>
<td>Turnaround</td>
<td>7 working days</td>
</tr>
<tr>
<td>Results</td>
<td>Negative / Indeterminate / Positive</td>
</tr>
</tbody>
</table>

### Insulin

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Clinical Biochemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen</td>
<td>2 mL blood in a plain tube (clotted sample)</td>
</tr>
</tbody>
</table>
Consultant request only

**Insulin Antibodies**

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Sample referred from Autoimmune Serology to BIOMNIS Laboratories.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen</td>
<td>Blood, 4 mL red top Vacuette (or similar container for clotted blood)</td>
</tr>
<tr>
<td>Turnaround</td>
<td>Approximately 3 Weeks</td>
</tr>
</tbody>
</table>

**Insulin like Growth Factor 1**

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Clinical Biochemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen</td>
<td>4.0 mL blood in a plain tube (clotted sample), fresh sample.</td>
</tr>
</tbody>
</table>

**Intraocular Fluids / Corneal Scrapings**

The laboratory, in conjunction with local ophthalmologists, has agreed the following protocol for the collection of specimens, inoculation of media, and transport to the laboratory:

- **Corneal scrapings:**
  - Scrapings should be taken aseptically (e.g. sterile scalpel blade)
  - Aseptically remove the cap of the nutrient broth.
  - Carefully, dip the tip of the scalpel, which contains the scrapings, into the broth and agitate gently.
  - Ensure that the scraping has been removed and discard the scalpel into a sharps bin.
  - Close the lid on the nutrient broth, label as appropriate, and send to the laboratory immediately.
  - If Acanthamoeba keratitis is considered, please supplement the above by an additional scraping taken in the same fashion but placed on PCR swab (obtained from Microbiology laboratory, refer to Acanthamoeba above). Send to the laboratory with the appropriately completed form – the laboratory must be notified in advance. The contact lens case and rinse fluids should also be sent to the laboratory.

- **Intraocular fluids:**
  - Intraocular fluids which have been taken aseptically should be injected directly into an equal volume of nutrient broth, labelled as appropriate and sent to the laboratory as soon as possible with an appropriately labelled form.

<table>
<thead>
<tr>
<th>Comment</th>
<th>Test performed routinely Monday to Friday 9-5pm or by urgent request.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnaround</td>
<td>Prelim: 24 hours; Final: 48-72 hours</td>
</tr>
<tr>
<td>Report</td>
<td>Culture: Any clinically significant isolate with the appropriate sensitivities.</td>
</tr>
</tbody>
</table>

**Intra-Uterine Contraceptive Device (IUCD)**

| Laboratory | Microbiology (Main laboratory)                                     |

This document is designed for online viewing. Printed copies, although permitted, are deemed Uncontrolled from 23:59 hours on 11/09/17.
Specimen: IUCDs should only be sent if clinical suspicion of infection exists. Place the entire IUCD, including any exudate, in a clean, sterile, leakproof container and transport ASAP. Specimen should be delivered to the laboratory as soon as possible to protect the viability of fragile organisms such as *Neisseria* spp.

Comment: Test performed Monday to Friday 9-5pm.

Turnaround: Prelim: 24 hours; Final: 48 – 72 hours. *Note: Culture for Actinomycosis takes up to 17 days.*

Report: Any clinically significant isolate with the appropriate sensitivities. Culture for *Actinomyces* spp. Proceeding which will be reported if positive.

**Intra-Uterine Infection Screen / TORCH Screen**

**Laboratory:** Microbiology (Infectious Diseases Serology)

**Specimen:** 4mL clotted blood (Minimum volume for baby specimens: 1mL)

**Comment:** TORCH Screen includes *Toxoplasma gondii* IgM, Rubella IgM, CMV IgM and Parvovirus B19 IgM.

**Turnaround:** 36 hours.

Positive Toxoplasma IgM must be confirmed by reference laboratory — at least 3 weeks.

**Report:** Positive or negative

**Intravascular Cannulae – Culture**

See Catheter / Intravascular Cannulae

**Iron**

**Laboratory:** Clinical Biochemistry

**Specimen:** 4.0 mL blood in plain tube (clotted sample)

**Comment:** Marked haemolysis invalidates the result

**Turnaround:** 4 Days

**Ref. Range:** Male: 12.5-32.2 μmol/L  Female: 10.7-32.2 μmol/L

**JC Virus Molecular**

**Laboratory:** Microbiology (Infectious Diseases Serology)

**Specimen:** 4mL clotted blood, 4mL EDTA blood, CSF, urine

**Comment:** Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin). Serum/plasma must be frozen by laboratory within 24 hours of sample collection.

**Turnaround:** 5 working days

**Report:** Positive or negative

**JAK2 in MPD (and CALR)**

**Laboratory:** Referred from Haematology Dept. to CMD in St James Hospital, Mon to Thurs to reach haematology lab by 12 noon,

**Specimen:** Blood 3mL, purple, Vacuette® (EDTA) or Bone Marrow in 10mls in RPMI

**Comment:** Mutation analysis in MPD

**Turnaround:** 3 weeks

**Ref. Range:** See referral laboratory report

**JAK2 Exon 12 mutation**

**Laboratory:** Referred from Haematology Dept. Addenbrookes Hospital Cambridge, Mon to Thurs to reach haematology lab by 12 noon,

May also be sent to Oncology Cytogenetics, 5th Floor Tower Wing, Guy’s Hospital, Great Maze Pond, London SE1 9RT

**Specimen:** Blood 3mL, purple, Vacuette® (EDTA) or Bone Marrow in 10mls in RPMI

**Comment:**

**Turnaround:** 1 -2 months

**Ref. Range:** See referral laboratory report
Joint Aspirate for Crystals

Laboratory: Histopathology (Cytology Department)
Specimen: Joint Fluid
Comment: Tests are performed routinely Monday to Friday during routine working hours. Can be immediate if urgently requested by prior communication, routine 1-2 days.
Ref. Range: Not applicable

Joint Fluid - Microbiology

See Sterile Body Fluid – Microscopy and Culture.

Karyotyping (see Chromosome analysis)

Kleihauer Test for Foetal Cells

Laboratory: Haematology, and bleeds of >2.5mls in postnatal patients are referred to Rotunda Hospital for flow Cytometry
Specimen: Blood 3mL purple Vacuette® (EDTA)
Comment: Test available Monday to Friday, during routine working hours, and for emergency reasons at all other times. It is a procedure that identifies individual cells containing HB F. It has proved useful in determining the extent of foetal bleed into the maternal circulation, and can be used to calculate the dose of Anti-D to be administered to the patient. Kleihauer test is only validated for the administration of Anti-D to Rh Neg mothers. Kleihauer test is not performed on Rhesus Positive women except in cases of Women who have had a late intrauterine foetal death (IUFD) after 18 completed weeks of pregnancy. >2.5mls in postnatal patients are referred to Rotunda Hospital for flow Cytometry
>12ml bleeds are phoned to requesting ward
Turnaround: Emergency specimens: <2 hours
Routine specimens: 24 – 72 hours.
Ref. Range: To calculate dosage of Anti-D required refer to CUMH Anti-D dosage Policy.

Lacrimal (Tear Duct) Fluid

Laboratory: Microbiology (Main laboratory)
Specimen: Stones / secretions should be collected into a clean, sterile, leakproof container and immediately transported to the laboratory.
Comment: Test performed routinely Monday to Friday 9-5pm or by urgent request.
Turnaround: Prelim: 24 hours; Final: 48-72 hours
Report: Culture report: Any clinically significant isolate with the appropriate sensitivities.

Lactate

Laboratory: Clinical Biochemistry
Specimen: Blood in Fluoride Oxalate tube, on ice
Turnaround: 2 hours
Ref. Range: 0.5 – 2.0 mmol/L

Lactate dehydrogenase (LDH)

Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in plain tube (clotted sample)
Comment: Haemolysis invalidates result
Turnaround: A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx. GP or OPD- Results posted within 4 days.
Ref. Range: 220 – 450 U/L
### La (SS-B)

**Laboratory:** Autoimmune Serology  
**Specimen:** Blood, 4 mL red top Vacuette (or similar container for clotted blood)  
**Comment:** Qualitative Elisa assay. Automatically undertaken on all Anti-ENA positive sera.  
**Turnaround:** 72 Hours  
**Ref. Range:** Not applicable

### Lead

**Laboratory:** Sample referred from Clinical Biochemistry to BIOMNIS Laboratories  
**Specimen:** 4.0 mL blood in Li Hep – whole blood  
**Turnaround:** 3 weeks  
**Ref. Range:** See report form, or visit internet site [www.biomnis.ie](http://www.biomnis.ie) for up to date referral test information.

### Leishmania Antibodies

**Laboratory:** Microbiology (Infectious Diseases Serology)  
**Specimen:** 4mL clotted blood  
**Comment:** Performed by a reference laboratory (PHE National Parasitology Reference Laboratory (NPRL), London)  
**Turnaround:** 3 weeks  
**Report:** Positive or negative

### Leptospira IgM

**Laboratory:** Microbiology (Infectious Diseases Serology)  
**Specimen:** 4mL clotted blood  
**Comment:** EIA for Leptospira IgM. Test performed once per week. Positive sera are sent to Rare & Imported Pathogens Laboratory (RIPL) in Porton Down for confirmation.  
**Turnaround:** Negative samples: 8 days  
**Ref. Range:** Samples requiring confirmatory testing: 2-3 weeks  
**Report:** Negative or positive

### Leucocyte (White Cell) Antibody Investigation

**Laboratory:** Blood Transfusion Laboratory  
**Specimen:** 1 x 4 mL Clotted (Red Capped/Yellow Ring) Tube  
**Comment:** Samples referred to: I.B.T.S., National Blood Centre, James’s St., Dublin 8. Complete the Blood Transfusion request form LF-C-BTR-XMATCH or LF-C-BTR-ANTENAT. This is not an INAB accredited test.  
**Turnaround:** 3 Weeks  
**Ref. Range:** Not Applicable

### LH

**Laboratory:** Clinical Biochemistry  
**Specimen:** 4.0 mL blood in plain tube (clotted sample)  
**Turnaround:** 4 Days  
**Ref. Range:**  
<table>
<thead>
<tr>
<th>Phase</th>
<th>IU/L</th>
<th>Post menopause:</th>
<th>Male:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follicular phase</td>
<td>1.8-11.8</td>
<td>5.2 - 62 IU/L</td>
<td>0.6 - 12 IU/L</td>
</tr>
<tr>
<td>Midcycle</td>
<td>7.6 - 89.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luteal phase</td>
<td>0.6 - 14.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Lithium

**Laboratory:** Clinical Biochemistry  
**Specimen:** 4.0 mL blood in a plain tube (clotted sample)  
**Comment:** Sample 12 hours post dose (trough sample)  
**Turnaround:** 1 Day
Ref. Range: 0.5 – 0.8 mmol/L. Recommended range for maintenance therapy. Acute therapy may require levels up to 1.2 mmol/L

**Liver Biopsy for Copper /Iron Estimation**

Laboratory: Sample referred from Histopathology Laboratory to Trace Element Unit, Kings Healthcare Trust, London

Specimen: Liver Biopsy unfixed

Comment: Biopsy: Transfer from the needle without delay. At least 1 cm is required (or results may be invalid due to liver non-homogeneity). Clearly label a universal container with Patients name, date of birth, specimen type and date sample is taken. Place the biopsy between two pieces of 2.5cm filter paper moistened with distilled water (larger pieces do not need to be on filter paper). If the specimen is to be divided eg for histology, use a new scalpel blade and divide the sample in two. The second piece for histology is placed in a second clearly labelled container in neutral buffered formalin. Transport the specimen(s) to the Histology laboratory.

Turnaround: 4-6 weeks

**LKM (Liver/Kidney Microsome Antibodies)**

Laboratory: Autoimmune Serology

Specimen: Blood, 4 mL red top Vacuette (or similar container for clotted blood)

Comment: Reported if seen on Autoantibody Screen.

Turnaround: 24 Hours

**Low Density lipoprotein (LDL)**

Laboratory: Clinical Biochemistry

Specimen: 4.0 mL blood in plain tube (clotted sample)

Comment: Calculation. Results not reported if Triglyceride > 4.5 mmol/L

Turnaround: A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx. GP or OPD- Results posted within 4 days.

Ref. Range: <3.0 mmol/L

**Low Vaginal Swab**

Laboratory: Microbiology (Main laboratory)

Specimen: Investigation of vulvo-vaginitis in paediatric patients. Only swabs sent in suitable transport medium will be processed – swabs that are sent without transport medium may be dry and may not yield the targeted organisms. Transport specimens ASAP. If processing is delayed, refrigeration is preferable to storage at ambient temperature.

Comment: Test performed routinely Monday to Friday 9-5pm or by urgent request.

Turnaround: Prelim: 24 hours; Final: 48-72 hours

Ref. Range: Culture: Any clinically significant isolate with the appropriate sensitivities

**Lupus Anticoagulant Screen**

Laboratory: Haematology

Specimen: Blood 3mL x 2, blue Vacuette® (sodium citrate 3.2%) and 1x 4mL red top Vacuette (clotted).

(Specimens which are haemolysed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling).

Samples must be received within 4 hours.

Note: BCSH guidelines on thrombophilia testing must be adhered to.
Comment: Test available Monday to Friday, during routine working hours. Lupus anticoagulants are immunoglobulins that interfere with phospholipid-dependent coagulation tests. The screen comprises the following tests: PT, APTT, Fibrinogen assay, AFSL, and DVVT. Anti-Cardiolipin antibodies are also included as part of the screen if a clotted sample is received. **Samples without Clinical details WILL NOT be processed.**

**Turnaround:** 3 – 4 weeks (Refer to the main Haematology Section on Coagulation).

**Ref. Range:** Strongly Positive, Moderately Positive, Weakly Positive or Negative

**Lyme Serology / *Borrelia burgdorferi* Antibodies**

**Laboratory:** Microbiology (Infectious Diseases Serology)

**Specimen:** 4mL clotted blood, CSF (1mL)

**Comment:** **CSF only tested where antibody confirmed in blood.**

If clinically suspicious the test should be repeated after a month as antibodies take some time to develop. Serum samples testing positive in house and CSF specimens are sent to a reference laboratory (Rare and Imported Pathogens Laboratory (RIPL), Porton Down).

**Turnaround:** Negative serum samples: 36 hours

Serum samples positive in house and CSF: 3 weeks

**Report:** Positive or negative

**Lymphogranuloma venereum LGV**

**Laboratory:** Microbiology

**Specimen:** Male Rectal swab. Appropriate PCR STD Specimen Collection and Transport Kits must be used. Please read the kit insert for information on specimen collection and associated limitations.

**Comment:** Performed by a reference laboratory (Molecular Microbiology, Central Pathology Laboratory, St James Hospital, Dublin 8).

This test is only performed on male rectal specimens that have tested positive for Chlamydia tracomatis and where the patient has the following clinical details:

- HIV positive
- A contact of a known LGV confirmed case
- Symptomatic of LGV

**Turnaround:** 7 working days

**Report:** Detected or not detected

**M2 (Pyruvate Dehydrogenase Elisa Test)**

**Laboratory:** Autoimmune Serology

**Specimen:** Blood, 4 mL red top Vacuette (or similar container for clotted blood)

**Comment:** Quantitative Elisa. Undertaken automatically on all sera showing specific Anti-Mitochondrial Immunofluorescence on Autoantibody Screen.

**Turnaround:** 96 Hours

**Ref. Range:** 0 - 5 IU/ML

**Magnesium (Blood)**

**Laboratory:** Clinical Biochemistry

**Specimen:** 4.0 mL blood in plain tube (clotted sample)

**Comment:** Haemolysis invalidates result

**Turnaround:** A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx. GP or OPD - Results posted within 4 days.

**Ref. Range:** 0.7 – 1.0 mmol/L
Magnesium (Urinary)

| Laboratory: | Clinical Biochemistry |
| Specimen: | 24 Hr collection |
| Turnaround: | 1 Day |
| Ref. Range: | 3.0 – 5.0mmol/24 Hr |
| Comment: | In the presence of hypomagnesaemia, magnesium excretion > 1 mmol/24hours is suggestive of renal magnesium wasting and magnesium excretion < 0.5 mmol/24hours is suggestive of magnesium deficiency |

Malaria Antigen and Blood Film Screen

| Laboratory: | Haematology |
| Specimen: | Blood 3mL purple Vacuette® (EDTA) <12 Hours old |
| Comment: | Test available Monday to Friday during routine working hours, and for emergency reasons at all other times. Please notify laboratory when sending request. An immunodiagnostic test is used for the detection of circulating Plasmodium falciparum antigens and an antigen that is common to four species of malaria, Plasmodium falciparum, Plasmodium vivax, Plasmodium ovale, and plasmodium malariae in whole blood. Blood films are examined to confirm presence of same, to identify other forms of Malaria. P. malariae, P. ovale, P. falciparum, P. vivax and P. knowlesi, also to estimate the percentage of infestation of Plasmodium falciparum or P. knowlesi if present. Low parasite density may produce a negative result on the antigen screening method. This screening test is not intended for use in screening asymptomatic populations. Blood films are examined to confirm presence of malaria, to identify the form of Malaria present and also to estimate the percentage infestation. Positive samples are referred from Haematology PHE Malaria Reference Laboratory, Faculty of Infectious & Tropical Diseases, London School of Hygiene & Tropical Medicine, Keppel Street, LONDON, WC1E 7HT. Please supply history of travel, prophylaxis, previous infections, etc. |
| Turnaround: | A verbal report is always given on day of sample receipt. Emergency specimens: 4 hours Routine specimens: 2 days Positive samples referred as outlined above: 1 month (phoned report available within 3 working days) |
| Ref. Range: | Negative / Positive (with % Parasitaemia if P. falciparum or P. knowlesi). |

Maturity Onset Diabetes of the Young (MODY)

| Laboratory: | Referred from Molecular Genetics Lab in Biochemistry to Royal Devon & Exeter NHS(via NCMG) |
| Specimen: | 3-5ml EDTA blood |
| Comment: | Special request form available from http://www.diabetesgenes.org/sites/default/files/mody_request_form_april_2013_0.doc Please note: invoices will be issued directly to the referring clinician. |
| Turnaround: | 8 weeks |
| Report: | Sent to referring clinician and copy filed in pathology |

Measles IgG Antibody

| Laboratory: | Microbiology (Infectious Diseases Serology) |
| Specimen: | 4mL clotted blood |
| Turnaround: | 36 hours |
| Report: | Positive or negative |
### Measles IgM Antibody

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Microbiology (Infectious Diseases Serology)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>4mL clotted blood, oral fluid</td>
</tr>
<tr>
<td>Comment:</td>
<td>Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin)</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>5 working days</td>
</tr>
<tr>
<td>Report:</td>
<td>Positive or negative</td>
</tr>
</tbody>
</table>

### Measles Molecular

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Microbiology (Infectious Diseases Serology)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>4mL clotted blood, oral fluid, CSF</td>
</tr>
<tr>
<td>Comment:</td>
<td>Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin). Serum must be frozen by laboratory within 24 hours of sample collection.</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>7 working days</td>
</tr>
<tr>
<td>Report:</td>
<td>Detected or not detected</td>
</tr>
</tbody>
</table>

### Meningitis C Vaccine Antibodies

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Clinical Biochemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>Blood 4mL red top Vacuette® (or similar container for clotted blood)</td>
</tr>
<tr>
<td>Comment:</td>
<td>Performed by a reference laboratory (Irish Meningococcal and Meningitis Reference Laboratory, The Children’s Hospital, Temple Street, Dublin).</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>8-10 weeks</td>
</tr>
<tr>
<td>Report:</td>
<td>Positive or negative</td>
</tr>
</tbody>
</table>

### Meningococcal PCR

See *Neisseria meningitidis* PCR

### Metabolic Screen / Blood (Amino Acid Chromatography)

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Sample referred from Clinical Biochemistry to The Children’s Hospital, Temple Street, Dublin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>Lithium Heparin sample which must be separated immediately</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>1 week</td>
</tr>
<tr>
<td>Ref. Range:</td>
<td>See report or contact Biochemistry Laboratory Temple Street Hospital.</td>
</tr>
</tbody>
</table>

### Metabolic Screen / Urine

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Sample referred from Clinical Biochemistry to The Children’s Hospital, Temple Street, Dublin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>Spot urine, transport to Bio lab immediately for the addition of 5% Merthiolate</td>
</tr>
<tr>
<td>Comment:</td>
<td>Sample assayed for Creatinine, Protein, Ph, reducing substances, blood, glucose, ketones, mucopolysaccharides, sulphur amino acids, amino acid chromatography, ketoacids (DNPH)</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>1 week</td>
</tr>
<tr>
<td>Ref. Range:</td>
<td>See report or contact Biochemistry Laboratory Temple Street Hospital.</td>
</tr>
</tbody>
</table>

### Metanephrines (plasma)

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Sample referred from Clinical Biochemistry to Biochemistry Department, Freeman Hospital, Newcastle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>2 EDTA blood samples (5-7 mLs) taken 10 minutes apart. Send to laboratory on ice.</td>
</tr>
<tr>
<td>Comment:</td>
<td>Consultant request only</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>3 weeks</td>
</tr>
</tbody>
</table>
Metanephrines (Urinary)

Laboratory: Sample referred from Clinical Biochemistry to Beaumont Hospital
Specimen: 24-hour urine sample collected into a container that has acid added. 24 hr urine containers are available from stores; acid is added in the Biochemistry lab.
Turnaround: 3 weeks
Ref. Range: See report form

Methadone

Laboratory: Sample referred from Clinical Biochemistry to Toxicology Laboratory BEAUMONT Hospital Dublin, posted Monday, Tuesday, Wednesday and Thursday.
Specimen: Spot urine
Comment: See Toxicology / Drug Screen
Turnaround: 1 week
Ref. Range: See report form or contact Toxicology Laboratory BEAUMONT Hospital 01-8092673 / (01) 8092675, Emergency after hours (087) 2590749, Fax (01) 8093986

Methaemoglobin

Laboratory: Clinical Biochemistry
Specimen: Lithium Heparin syringe
Turnaround: 1 hour 15 mins
Ref. Range: < 1.5%

Methicillin-Resistant Staph aureus (MRSA)

Laboratory: Microbiology (Main laboratory)
Specimen: Swabs should be placed in charcoal containing transport media. Use a clean, sterile, leakproof container for CSU and sputum. Transport specimens ASAP. If processing is delayed, refrigeration is preferable to storage at ambient temperature.
Comment: Test performed Monday to Friday (cut-off is 1pm).
Label all Microbiology forms with MRSA SCREEN. Indicate if the patient was previously MRSA positive. In screening investigations, patient surveillance cultures usually include one swab from both nares, one swab from both axillae and one swab from both sides of groin (3 swabs in all). Swabs from nares, axillae and umbilicus are sufficient for infants and neonates. The anterior nares are the usual site cultured from hospital staff. Occasionally a more extensive screening of staff who are carriers is required e.g. during an outbreak. When MRSA is detected in any microbiological specimen, on completion of treatment rescreen as recommended by national and local guidelines. For electronic orders through the iCM system, one request should be entered for nares, one for axilla and groin (one number, print two labels), and one for any other site that is to be tested.
Turnaround: Prelim: 24 hours; Final: 24-48 hours
Report: MRSA not isolated or MRSA isolated. Appropriate sensitivities on new isolates.

Methotrexate (High Dose)

Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in plain tube (Gel free clotted sample)
Comment: Measured in CUH only on patients with high-dose Methotrexate. Contact Biochemistry laboratory in advance – it is desirable to check the 48hr post dose level on Wednesdays.
Turnaround: Same day
Ref. Range: Post high dose Methotrexate levels are measured at 48hr, 72hr and every 24hrs until level is <0.05 µmol/L to guide Calcium Folinate (Leucovorin) rescue therapy.

### Microarray (Array CGH) Analysis

**Laboratory:** Referred from Biochemistry to NCMG  
**Specimen:** Adults: 5ml EDTA blood  
Infants: 2ml min EDTA blood  
**Comment:** NCMG request form available on [www.genetics.ie](http://www.genetics.ie)  
Please note: invoices will be issued to the referring clinician for tests not performed in NCMG.  
**Turnaround:** 6-10 weeks  
**Report:** Sent to referring clinician by NCMG and copy of report filed in pathology.

### Microdeletion Syndromes (see FISH)

### Microsatellite Instability

**Laboratory:** Specimen referred from Histopathology to Department of Histopathology, Beaumont, D9  
**Specimen:** Tissue block  
**Turnaround:** 20 days

### Mineral Analysis (copper/iron)

**Laboratory:** Histopathology  
**Specimen:** Liver biopsy unfixed  
**Comment:** Place specimen on filter paper in dry universal container  
**Turnaround:** 4-6 weeks (specimen is referred to external laboratory)

### Mitochondrial Antibodies (Immunofluorescence Test)

**Laboratory:** Autoimmune Serology  
**Specimen:** Blood, 4 mL red top Vacuette (or similar container for clotted blood)  
**Comment:** Immunofluorescence assay. Part of Autoantibody Screen. Quantitative Anti-M2 assay automatically undertaken on all immunofluorescence positive sera.  
**Turnaround:** 24 Hours  
**Ref. Range:** Contact Laboratory

### Mitochondrial Genetics

**Laboratory:** Referred from Molecular Genetics lab in Biochemistry to Newcastle Mitochondrial NCG via NCMG  
**Specimen:** 3-5ml EDTA blood  
**Comment:** Special request form available at [http://www.mitochondrialncg.nhs.uk/documents/NCG_Referred_Form.pdf](http://www.mitochondrialncg.nhs.uk/documents/NCG_Referred_Form.pdf)  
Please note: invoices will be issued directly to the referring clinician.  
**Turnaround:** 8-10 weeks  
**Report:** Sent to referring clinician and copy filed in pathology

### Mouth Swab

**Laboratory:** Microbiology (Main laboratory)  
**Specimen:** Specimen pus if present otherwise swab any lesions or inflamed areas. A tongue depressor or spatula may be helpful to aid vision and avoid contamination from other parts of the mouth. Swabs should be transported as soon as possible in charcoal containing transport media. If processing is delayed, refrigeration is preferable to storage at ambient temperature.  
**Comment:** Test performed routinely Monday to Friday 9-5pm or by urgent request. For possible herpes infection consider a Viral Culture. A separate swab in appropriate viral transport media is necessary.  
**Turnaround:** Microscopy for Vincent’s angina: 24 hours  
**Culture Final:** 24-48 hours
Report: Presence or absence of Vincent’s organisms.
Culture: Any clinically significant isolate with the appropriate sensitivities.

**MSU – Midstream Urine**
See Urine Microscopy and Culture or Cytology

**MTHFR (Methylenetetrahydrofolate Reductase) C667T Mutation**
Laboratory: Sample referred from Haematology to Biomnis Claymon
Specimen: 3.0 mL blood EDTA
Comment: When the body is deficient in methylenetetrahydrofolate reductase its ability to absorb folate is inhibited. Folic acid is essential for red cell production and for the development and health of the foetus and deficiency may lead to hyperhomocystenemia and preeclampsia
Turnaround: Approx. one month
Ref. Range: See referral laboratory report form

**Mumps IgG Antibody**
Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Turnaround: 36 hours
Report: Positive or negative

**Mumps IgM Antibody**
Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood, oral fluid
Comment: Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin)
Turnaround: 5 working days
Report: Positive or negative

**Mumps Molecular**
Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: Oral fluid, throat swab, CSF, urine
Comment: Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin)
Turnaround: 7 working days
Report: Positive or negative
**Muscle Biopsy**

**Laboratory:** Neuropathology  
**Specimen:** Fresh Muscle (universal precautions)  
**Comment:** The muscle biopsy must be at least 1.5cm x 1.5cm x 1.5cm in size. For certain suspected metabolic or mitochondrial disorders, a larger sample may be required for molecular or biochemical analysis. Please contact the Neuropathologist to discuss the case in advance.  
The biopsy should be sent immediately FRESH to the Neuropathology Department. Universal safety precautions for fresh tissue should apply. For specimens which have to be sent over a distance (e.g. Mercy, Bantry, Mallow, Limerick etc.) the biopsy can be wrapped in clingfilm to avoid drying out during transport. Telephone 021 4922519 to let us know that the biopsy is en route. The biopsy should be delivered directly to a staff member in the Neuropathology Dept. Please pack sample according to Packing Instruction 650. Taxi driver/courier should be instructed not to leave specimen at laboratory reception and also instructed in how to deal with spillages. The muscle biopsy should reach the department by 4.00pm. On receipt of the specimen a staff member will telephone the referring hospital laboratory to confirm that the tissue has arrived safely.  
Muscle histochemistry is performed in batches once weekly, on Wednesdays. The biopsy can be taken on any day and sent to arrive in the Neuropathology Department no later than 4.00pm. Additional information is available in the protocol for muscle biopsy (available from the Neuropathology Dept.).  
**Turnaround:** Approximately 3 weeks

**Muscle Mitochondrial Enzyme and Genetic Analysis**

**Laboratory:** Neuropathology  
**Specimen:** Frozen Muscle  
**Comment:** Please refer to muscle biopsy protocol above. Specimens sent to Newcastle Mitochondrial NCG Diagnostic Service, Newcastle Upon Tyne, UK.  
**Turnaround:** Variable. For Mitochondrial enzyme analysis 8-14 weeks from time of dispatch; for mitochondrial Genetic Analysis several months.

**Mutation analysis for inherited bleeding disorders, Haemophilia carrier testing for direct mutational detection, mutation analysis for inherited Factor VIII or Factor IX deficiency**

**Laboratory:** Referred from Haematology Dept. to Haemostasis Molecular Diagnostics (HMD), National Coagulation Laboratory, Centre for Clinical and Laboratory Medicine, CPLM, St James Hospital, Dublin 8  
**Specimen:** Min x 2 EDTA, 6-20 ml  
**Comment:** Contact Coagulation Medical Team at 01 4162141  
Counselling and consent required before testing  
Samples must be received in the laboratory within 7 days of phlebotomy  
**Turnaround:** 1 – 3 Months, but can vary depending on gene  
**Ref. Range:** N/A
## Mycobacteria Testing

**Laboratory:** Microbiology (TB Laboratory)

<table>
<thead>
<tr>
<th>Specimen Types</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sputum</strong></td>
<td>Collect early in the morning on at least 3 consecutive days. Sputum should be expectorated from the lower respiratory tract by deep coughing. Preferably, collect a minimum volume of 5mL per specimen. Saliva and postnasal secretions are not suitable. Specimens collected on 3 consecutive days should not be pooled. This may be important if Mycobacteria other than <em>Mycobacterium tuberculosis</em> are isolated as interpretation is based on repeated isolation.</td>
</tr>
<tr>
<td><strong>Bronchial washings</strong></td>
<td>Minimum specimen size is preferably 5mL.</td>
</tr>
<tr>
<td><strong>Urine</strong></td>
<td>Only processed after prior consultation with Consultant Microbiologist. Collect early morning urine on 3 consecutive days. A minimum volume of 20mL is desirable.</td>
</tr>
<tr>
<td><strong>Gastric lavage fluid</strong></td>
<td>It is essential to contact the laboratory prior to taking this sample to arrange processing of same. Collect samples only on Monday to Friday. Collect early in the morning (before breakfast) on 3 consecutive days. Preferably, collect a minimum volume of 5mL per specimen. If the samples are not delivered promptly to Microbiology, gastric acid present in sample will render them useless for processing. Deliver samples straight to Microbiology by 9.00am.</td>
</tr>
<tr>
<td><strong>Blood Culture</strong></td>
<td>Please contact the TB laboratory first as specific bottles for TB culture are available from the laboratory on request (ext. 22823), (Mallow General Hospital, Bantry General Hospital and Mercy University Hospital laboratories must contact the Microbiology medical team on ext 22500/20120 to request bottles for sampling). Blood is added directly to the culture bottles (1-5mL of blood or marrow). The culture bottles should be transported immediately to the laboratory; Samples processed Monday to Friday 9-5. Bone marrow is added directly to the culture bottles; see procedure for blood above.</td>
</tr>
<tr>
<td><strong>CSF, body fluids, aspirates, pus</strong></td>
<td>Collect aseptically as much as possible into a sterile container. Preferably, a volume of 5-10mL of CSF is required.</td>
</tr>
<tr>
<td><strong>Skin / tissue biopsy / post-mortem specimens</strong></td>
<td>Collect aseptically into a sterile container without preservative. Select a caseous portion if possible. The majority of organisms will be found in the periphery of a caseous lesion. As large a specimen as possible should be sent. Microscopy is generally not performed on swabs.</td>
</tr>
</tbody>
</table>

**Comment:** Microscopy and culture performed routinely Monday to Friday 9-5pm. If smear results are desired on the same day that the specimen is submitted, the specimen should reach the laboratory before 3pm and the TB laboratory notified. For the initial diagnosis of mycobacterial infection all specimens should be fresh and taken when possible before anti-tuberculosis treatment is started. Specimens should be transported as soon as possible. Specimens other than blood should be refrigerated if transport to the laboratory or specimen processing is delayed for more than 1 hour. For body fluids use a sterile, leakproof, disposable plastic container. Swabs should be transported in Amies transport medium with charcoal. Laryngeal swabs are not recommended and only be used when pus or sputum is unobtainable. Isoniazid, rifampicin and ethambutol susceptibility reported where appropriate. Pyrazinamide and streptomycin susceptibility testing performed in IMRL, St James’ Hospital.

**Turnaround:**
- **Microscopy:** 24-72 hours
- **Culture:** 6-8 weeks
- Positive smear and culture results are telephoned to requesting clinician.

**Report:**
- **Microscopy:** Acid-fast bacilli not seen or seen with enumerator
- **Culture:** TB Culture negative or Mycobacterium species isolated with sensitivities where appropriate
Mycology – Fungal Microscopy and Culture (Dermatophytosis – skin, hair, nails)

Laboratory: Microbiology (Mycology section)
Specimen: Scalp specimens are best obtained by scraping with a blunt scalpel. The contents should include hair stubs, the contents of plugged follicles and skin scales. Hair may also be plucked from the scalp with forceps (infected hairs are usually easy to remove in this way). Cut hairs are unsatisfactory as the focus of infection is usually below or near the surface of the scalp.
Nail clippings should be taken from any discoloured, dystrophic or brittle parts of the nail. These should be cut as far back as possible from the free edge of the nail and include its full thickness, scrapings can also be taken from beneath the nail to supplement the clipping specimen.
Skin specimens should be collected by scraping outwards from the edges of the lesions, with either a blunt scalpel blade or with the edge of a glass microscope slide. The edge of the lesion is where there is likely to be the most fungus.

Comment: Some general points on specimen collection are given below:
It is often helpful to clean the lesions of the skin or scalp (and sometime nail) with surgical spirit or 70% alcohol prior to collection of specimens as this improves the chances of detecting the fungus by microscopy and also reduces the likelihood of contamination of subsequent cultures. Prior cleaning is essential if greasy ointments or powders have been applied to the region.
Transport at room temperature.
Do not use fixatives.
All specimens should be collected and transported in a properly labelled, sealed sterile container i.e. universal containers, Mycological Transport Pack or glass slides in the appropriate slide holder. Loose slides should not be used. The use of clear sticky tape (sellotape) is not recommended.

Important note: If you clinically suspect Hendersonula toruloidea which causes dermatophyte-like lesions of the palms, soles and toe-web or Tinea nigra, which is a rare condition which causes dark pigmented areas, usually on the skin of the palm, and is clinically distinctive from dermatophyte lesions, please inform the laboratory when sending skin samples for analysis.

Test method: Keratinised tissues are treated with potassium hydroxide in the laboratory to detect hyphae of dermatophytes. Many pathogenic fungi will grow slowly on conventional media but may be recovered more reliably on special fungal media, which require incubation for up to 4 weeks. Some isolates may require referral to the Mycology Referral Laboratory in Bristol for identification and/or susceptibility testing which can take up to an additional 4 weeks.

Turnaround: Direct smear: 1 week.
Culture: 1-3 weeks

Report: Direct smear: Fungal elements seen or not seen. Typical microscopic appearance indicates fungal infection but does not identify the particular fungal species. Culture of yeast or fungus provides species identification.
Positive microscopy is diagnostic for a fungal infection, however a negative microscopy result does not exclude a diagnosis of fungal infection.
Culture: Fungus not isolated or organism name isolated

Mycoplasma pneumoniae IgM

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Turnaround: 36 hours
Report: Positive or negative
Mycophenolic Acid

Laboratory: Sample referred from Clinical Biochemistry to Harefield Hospital
Specimen: 0.5ml Plasma EDTA, plasma needs to be separated within 6 hours.
Comment: 12 hour trough level
Turnaround: 2 weeks
Therapeutic Range: Interpretation of Mycophenolic Acid is dependent on time interval between sample and last dose, clinical indication for use of the drug, duration of therapy, other drug therapy and method of measurement

Myeloperoxidase Antibodies

Laboratory: Autoimmune Serology
Specimen: Blood, 4 mL red top Vacuette (or similar container for clotted blood)
Comment: Quantitative Elisa
Turnaround: 72 Hours
Ref. Range: 0 - 20 AU/mL

Neck Dissection Specimens

Laboratory: Histopathology (Diagnostic Laboratory)
Specimen: Formalin fixed tissue
Comment: Cork boards and pins are available from the Histopathology Specimen reception at ext. 22792 for orientation of these specimens. The specimen should be accompanied by a detailed diagram on/attached to the Request Form designating the appropriate levels/landmarks required for correct gross handling of the case.
Turnaround: 80% of cases by day 7

Neisseria gonorrhoea PCR

Laboratory: Microbiology
Specimen: Nucleic acid amplification method. Appropriate PCR STD Specimen Collection and Transport Kits must be used. Please read the kit insert for information on specimen collection and associated limitations.
Comment: Test available Monday to Friday 9-5pm. Specimens received for Neisseria gonorrhoea PCR will also be tested for Chlamydia tracomatis DNA. The assay is verified for use with female Endocervical swab specimens, High Vaginal Swab specimens and male/female Urine specimens. The preferred specimen type for N. gonorrhoea testing in female patients is urine due to increased sensitivity and fewer problems during specimen processing. Underfilled or overfilled Urine specimen containers are unsuitable for testing. Endocervical/HVS specimen tubes with no swab or with two swabs cannot be tested. Specimens that appear bloody or have a dark brown colour are unsuitable for testing (may give false negative results). The presence of mucous may inhibit PCR and cause false negative test results. Mucous free specimens are required for optimal test performance. Do not use collection devices beyond their expiry date.
Turnaround: 96 - 120 hour
Report: RT: PCR Neisseria gonorrhoea Target Not Detected or Target Detected. A Target Not Detected result does not automatically exclude infection from Neisseria gonorrhoea as the level of DNA present may be lower than the limit of detection of the assay. The assay is only verified for use with female Endocervical/HVS swab specimens and male/female Urine specimens. Results from other specimen types should be interpreted with caution.
**Neisseria meningitidis PCR**

Laboratory: Microbiology (Infectious Diseases Serology)  
Specimen: 1mL EDTA blood, CSF (0.5mL)  
Comment: Performed by Irish Meningitis & Sepsis Reference Laboratory (IMSRL), Dublin. Please ensure the specimen reaches the laboratory by 4pm to ensure prompt delivery to the reference laboratory.  
Turnaround: Samples received by IMSRL before 11am, result between 4pm and 5pm the same day  
Report: Detected or not detected

**Nerve Biopsy**

Laboratory: Neuropathology  
Specimen: Fresh nerve (universal precautions)  
Comment: Please refer to the nerve biopsy protocol (Neuropathology Information for Users).

The biopsy site should be chosen by the primary care physician. In general, the sural nerve is the most frequently biopsied nerve. A fascicular or complete nerve biopsy can be done. In practice approximately two centimetres of the entire nerve including the perineurium is cut. The laboratory should be notified in advance that a nerve biopsy is en route. It should be sent immediately FRESH to the Neuropathology Dept. Universal safety precautions for fresh tissue should apply.

For specimens which have to be sent over a distance (e.g. Bantry, Mallow etc.) the biopsy can be wrapped in gauze lightly moistened with NORMAL SALINE, to keep moist during transport. Telephone ext 021 4922519 to let us know the biopsy is en route. The biopsy should be delivered directly to a staff member in the Neuropathology Dept. Sample should be packed according to Packing Instruction 650. Taxi driver/courier should be instructed not to leave specimen at laboratory reception and also instructed in how to deal with spillages. The nerve biopsy should reach the department by 4.00pm. On receipt of the specimen a staff member will telephone the referring hospital laboratory to confirm that the tissue has arrived safely.

Please indicate on the Neuropathology request form the clinician to whom the result should be sent and if a copy is needed for another clinician. The primary care team should fill out the clinical details on the request form before the patient goes to theatre.

For any further queries please contact the Neuropathology laboratory (021 4922519) or Dr Bermingham (021 4920475).

Turnaround: 3 weeks. Certain cases may take longer.

**Neuroblastoma Screen (Catecholamines and Metanephrines)**

Laboratory: Sample referred to Beaumont Hospital, Dublin  
Specimen: Fresh spot urine (20 mL, if possible). MUST be acidified in lab within 10 minutes of collection.  
Comment: Please notify the Biochemistry laboratory in advance. State what drugs the patient (<16 years) is on during collection.  
Turnaround: 3 weeks  
Ref. Range: Contact CUH Clinical Biochemistry Laboratory
Neuromuscular genetics (HNPP, CMT, DM, DMD, FA, SCA etc)

Laboratory: Referred from Molecular Genetics lab in Biochemistry to NCMG
Specimen: 3ml EDTA blood
Comment: Contact 22531 for further information
Please note: invoices will be issued to the referring clinician for tests not performed in NCMG.

Turnaround: See website: www.genetics.ie
Report: Sent to referring clinician and copy of report filed in pathology

Neurosurgical Biopsies (Routine)

Laboratory: Neuropathology
Specimen: Formalin-fixed tissue
Turnaround: 5 days

Neurosurgical Biopsies (High-Risk)

Laboratory: Neuropathology
Specimen: Formalin-fixed tissue
Comment: Special precautions are required for investigation of atypical dementia and other high-risk, infectious cases. Biohazard labels must be used. Contact the Neuropathologist on duty (22520).
N.B. Suspected prion disease cases are examined in the CJD surveillance centre in Beaumont Hospital 01 8377755

Turnaround: N/A, case dependent

Norovirus – Norwalk-like viruses (NLV) / Small Round Structured Viruses (SRSV)

Laboratory: Microbiology (Category 3 Laboratory)
Specimen: A fresh liquid faeces specimen is essential. 1-2mL is sufficient.
Comment: Test not routinely available. Test seasonally available in-house, otherwise test will be referred to external laboratory. Please discuss with the Microbiology Medical team if required.

A Target Not Detected result does not automatically exclude infection from the above enteric pathogen as the level of DNA present may be lower than the limit of detection of the assay.

Turnaround: In-house: 5 working days; External referral: 2 weeks.
Report: Target Detected or Target Not Detected for Norovirus.

Nose Swab

Laboratory: Microbiology (Main laboratory)
Specimen: Specimen anterior nares gently rotating the swab on the surface. Transport specimens ASAP in charcoal containing transport media. If processing is delayed, refrigeration is preferable to storage at ambient temperature.
Comment: Processed routinely on <12 years or with relevant clinical details (recurrent boils, infected eczema, impetigo or renal patients).
Aerobic culture – To detect nasal carriage of bacteria, especially Staphylococcus aureus during an outbreak of staphylococcal infection. Test performed routinely Monday to Friday 9-5pm or by urgent request.

Turnaround: Prelim: 24 hours; Final: 48-72 hours

Oestradiol

Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in plain tube (clotted sample)
Turnaround: 4 Days
Ref. Range:  
Follicular phase: 77 – 922 pmol/L  
Ovulation: 140 - 2383 pmol/L  
Luteal: 77 - 1145 pmol/L  
Post Menopause: 37 - 103 pmol/L  
Males: 40 - 162 pmol/L

Oncotype DX Testing  
Laboratory: Specimen referred from Histopathology to Genomic Health Inc.,  
Specimen: Tissue block  
Turnaround: 7-10 days

Ophthalmic Biopsies  
Laboratory: Neuropathology  
Specimen: Formalin fixed tissue  
Turnaround: 5 days

Ophthalmic Biopsies – corneal smears (acanthamoeba)  
Laboratory: Neuropathology  
Specimen: Corneal scrape – special fixative required, (CytoLyt), available from Neuropathology.  
Comment: Please contact Neuropathology Department in advance on 4922520  
Turnaround: 1-2 days

Opiates  
Laboratory: Sample referred from Clinical Biochemistry to Toxicology Laboratory BEAUMONT Hospital Dublin, posted Monday, Tuesday, Wednesday and Thursday.  
Specimen: Spot urine  
Comment: See Toxicology / Drug Screen  
Turnaround: 1 week  
Ref. Range: See report form or contact Toxicology Laboratory BEAUMONT Hospital 01-8092673 8092673 / (01)8092675, Emergency after hours (087) 2590749, Fax (01) 8093986

Organic Acids  
Laboratory: Sample referred from Clinical Biochemistry to The Children’s Hospital, Temple Street, Dublin  
Specimen: Spot urine  
Comment: Sample must be frozen immediately  
Turnaround: 1 week  
Ref. Range: See report or contact Biochemistry Laboratory Temple Street Hospital

Osmolality (Serum)  
Laboratory: Clinical Biochemistry  
Specimen: 4.0 mL blood in plain tube (clotted sample)  
Turnaround: 3 Hours  
Ref. Range: 275 – 295 mOsm/kg

Osmolality (Urine)  
Laboratory: Clinical Biochemistry  
Specimen: Spot urine sample  
Turnaround: 1 Day  
Ref. Range: Dependant on the patient’s state of hydration

Ovarian Antibodies  
Laboratory: Sample referred from Autoimmune Serology to Claymon Laboratories  
Specimen: Blood, 4 mL red top Vacuette (or similar container for clotted blood)  
Turnaround: Approx. 3 Weeks
**Oxidative Burst analysis**

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Specimen referred directly from ward (through Stores department) to Haematology, Our Lady’s Hospital Crumlin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>Blood 3mL, purple, Vacuette® (EDTA) Specimen must reach referral laboratory within 3 1/2 hours of phlebotomy, and delivery is organised with Stores Department to be sent by taxi at 8.00 am. Sample must be taken between 07:30 and 08:00</td>
</tr>
<tr>
<td>Comment:</td>
<td>Requested by Consultant Haematologist</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>3 weeks</td>
</tr>
<tr>
<td>Report:</td>
<td>See referral laboratory report</td>
</tr>
</tbody>
</table>

**PAI-1 (Plasminogen Activator Inhibitor)**

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Sample referred from Haematology to Biomnis Claymon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>Blood 3mL; blue Vacuette® (sodium citrate 3.2%) x 3 fill to mark on tubes Request must be booked in advance with the Haematology Laboratory CUH. (PAI-1) is an important component of the coagulation system that down-regulates fibrinolysis in the circulation. Reduced PAI-1 levels may result in increased fibrinolysis and an associated bleeding diathesis.</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>1 month</td>
</tr>
<tr>
<td>Ref. Range:</td>
<td>See referral lab report</td>
</tr>
</tbody>
</table>

**Pancreatic Islet Cell Antibodies**

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Sample referred from Autoimmune Serology to Biomnis Laboratories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>Blood, 4 mL red top Vacuette (or similar container for clotted blood)</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>Approx. 3 Weeks</td>
</tr>
<tr>
<td>Ref. Range:</td>
<td>See report form, or visit internet site <a href="http://www.biomnis.ie">www.biomnis.ie</a> for up to date referral test information.</td>
</tr>
</tbody>
</table>

**Paracetamol**

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Clinical Biochemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>4.0 mL blood in or plain tube (clotted sample)</td>
</tr>
<tr>
<td>Comment:</td>
<td>Sample 4 – 12 Hours post ingestion</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>1 Hour 15 mins</td>
</tr>
<tr>
<td>Ref. Range:</td>
<td>Therapeutic Range 1.7 – 20mg/L Interpretation of Paracetamol toxicity is highly dependent on time of putative overdose. Refer to nomogram</td>
</tr>
</tbody>
</table>

**Paraneoplastic screen (See anti-neuronal antibodies)**

**Parasitology (enteric) – Ova, Cysts and Parasites (OCPs)**

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Microbiology (Category 3 Laboratory)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>Fresh faeces specimen in a sterile leak-proof container. Do not refrigerate or incubate specimens. Three examinations spaced 2-3 days apart are recommended for best recovery of parasites. Unless the patient has severe diarrhoea or dysentery, no more than one specimen should be examined within a single 24-hour period, as shedding of cysts and ova tends to be intermittent. If <em>Entamoeba histolytica</em> or <em>Giardia lamblia</em> are suspected and the first 3 specimens are negative, ideally 3 additional specimens should be submitted at weekly intervals.</td>
</tr>
</tbody>
</table>

*Note: Fresh specimens are essential for the examination of trophozoites. Transport specimens ASAP. Protozoan trophozoites will not survive if the specimen dries out. Cysts will not form once the specimen has been passed.*
Comment: Specimens will be processed only by prior arrangement with the laboratory. Full clinical details are essential. Faeces specimens from patients with chronic diarrhoea, patients with a history of foreign travel or immunocompromised patients will be processed. If in doubt, please contact the medical staff. Please indicate if specific organisms are sought. Specifically indicate on the request form if Cyclospora or Microsporidia are sought. Oocysts of Cryptosporidium spp. can be identified with special staining techniques; (Cryptosporidium parvum/hominis detected via molecular techniques in faeces) their presence may indicate active infection or carriage.

Turnaround: Faeces specimens for ova/parasites will be examined 2-3 times a week depending on staff availability.

Report: OCP not seen or a report on any parasites seen. The presence of white or red cells is significant and indicates mucosal inflammation. Diagnosis of amoebic colitis requires the presence of Entamoeba histolytica trophozoites containing ingested red cells. Cysts or trophozoites of Giardia intestinalis confirm a diagnosis of giardiasis. The presence of characteristic ova can identify infection with hookworms and other roundworms (nematodes) e.g. Enterobius vermicularis in sticky tape preparations, Ascaris lumbricoides, flat flukes (trematodes) e.g. Fasciola hepatica, tapeworms e.g. Taenia saginata, Taenia solium. Occasionally complete worms are passed, enabling specific identification of the adult worm.

Parechovirus Molecular
Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: Respiratory secretions, stool, CSF
Comment: Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin)
Turnaround: 5 working days
Report: Detected or not detected

Parvovirus B19 IgG and IgM
Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Turnaround: 36 hours
Report: Positive or negative

PCP (Pneumocystis jirovecii)
Laboratory: Histopathology (Cytology Department)
Specimen: Bronchial lavage (neat or in cytolyt)
Comment: Tests are performed routinely Monday to Friday during routine working hours
Turnaround: Samples can be processed as urgent with prior communication with laboratory.
Ref. Range: Not applicable

Penile swab
Refer to Genital swab

Pericardial Fluid / Peritoneal Fluid / Pleural Fluid
See Sterile Body Fluid – Microscopy and Culture

Perinatal: Placenta, Products of Conception, Ectopic Pregnancies
Laboratory: Histopathology (Diagnostic Laboratory)
Specimen: Formalin fixed tissue. Immediately placed in 10% Buffered Formalin and please state date and time specimen taken.
Note: With complicated monochorionic twins where injection studies might be required please discuss with pathology before putting placenta into Formalin. Note: A separate form is required for Products of Conception FOR-CUH-PAT-1627 (Consent to pathological examination of a fetus <12 weeks gestational age).

Turnaround: Turnaround: 80% in 7 days.

**Peritoneal Dialysis Fluid**

See Continuous Ambulatory Peritoneal Dialysis Fluid

**Pernasal Swab /Pertussis**

*See Bordetella species – Culture*

**PFA 100 (Platelet Aggregation Screen)**

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Haematology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>Blood 3mL; blue Vacuette® (sodium citrate 3.2%) x2. Specimens must be sent to the Haematology Lab. Within 2 hours of collection. Samples must not be sent in the pneumatic tube system. Patients on aspirin are unsuitable for this test. Specimens that are haemolysed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling Specimens with platelet counts &lt;150 x 10⁹/l are unsuitable for testing.</td>
</tr>
<tr>
<td>Comment:</td>
<td>Test available Mon-Fri before 4pm hours by arrangement with the Haematology dept. The process of platelet adhesion and aggregation following a vascular injury is simulated in vitro, based on change in vacuum /pressure brought about by platelet plug formation. The most common causes of platelet dysfunction are related to uremia, von Willebrand disease and exposure to agents such as acetyl salicylic acid.</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>8-24 hours</td>
</tr>
<tr>
<td>Ref. Range:</td>
<td>Collagen/Epinephrine 82 – 150 secs Collagen/ ADP 62 – 100 secs</td>
</tr>
</tbody>
</table>

**Phaeochromocytoma & Paraganglioma Genetic Screen**

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Referred from molecular genetics lab in Biochemistry to LEEDS NHS via NCMG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>3-5ml EDTA blood</td>
</tr>
<tr>
<td>Comment:</td>
<td>NCMG request form available at <a href="http://www.genetics.ie">www.genetics.ie</a> Please note: invoices will be issued directly to the referring clinician.</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>40 days for 8 gene screen</td>
</tr>
<tr>
<td>Report:</td>
<td>Sent to referring clinician and copy filed in pathology</td>
</tr>
</tbody>
</table>

**Phencyclidine**

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Sample referred from Clinical Biochemistry to Toxicology Laboratory BEAUMONT Hospital Dublin, posted Monday, Tuesday, Wednesday and Thursday.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>Spot urine</td>
</tr>
<tr>
<td>Comment:</td>
<td>See Toxicology / Drug Screen</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>1 week</td>
</tr>
<tr>
<td>Ref. Range:</td>
<td>See report form or contact Toxicology Laboratory BEAUMONT Hospital 01-8092673 / (01)8092675, Emergency after hours (087) 2590749, Fax (01) 8093986</td>
</tr>
</tbody>
</table>

**Phenobarbitone / Phenobarbital**

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Clinical Biochemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen:</td>
<td>4.0 mL blood in plain tube (clotted sample)</td>
</tr>
<tr>
<td>Comment:</td>
<td>Take trough sample immediately before next dose. When making comparative measurements, it is advisable that sampling times be consistent</td>
</tr>
<tr>
<td>Turnaround:</td>
<td>4 Days. Urgents on request</td>
</tr>
</tbody>
</table>
Ref. Range: Therapeutic Range 10-40 mg/L (Adult) Range quoted is appropriate for a trough sample.
Febrile convulsion in children - Range 15-20 mg/L

### Phenotyping Red Cell Antigens

**Laboratory:** Blood Transfusion Laboratory  
**Specimen:** 1 X 6 mL EDTA Pink Capped Tube  
**Comment:** Phenotypic analysis of patient red cell antigens (e.g. male partners of antenatal patients found to have developed red cell antibodies during pregnancy in the prediction of HDNB)  
Complete the Blood Transfusion or Antenatal Serology request forms LF-C-BTR-XMATCH or LF-C-BTR-ANTENAT.  
This is an INAB accredited test.  
**Reference Range:** Not Applicable  
**Turnaround:** 3 Hours

### Phenytoin

**Laboratory:** Clinical Biochemistry  
**Specimen:** 4.0 mL blood in plain tube (clotted sample)  
**Comment:** Take trough sample immediately before next dose. When making comparative measurements, it is advisable that sampling times be consistent  
**Reference Range:** Not Applicable  
**Turnaround:** 1 Day

### Phosphate (Blood)

**Laboratory:** Clinical Biochemistry  
**Specimen:** 4.0 mL blood in plain tube (clotted sample)  
**Comment:** Haemolysis invalidates result  
**Reference Range:**  
- Adult Range: 0.8 – 1.5 mmol/L  
- Paediatric Range: 0.8 – 1.5 mmol/L  
  - Up to 1 month: 1.25 – 2.25 mmol/L  
  - 1 – 12 months: 1.15 – 2.15 mmol/L  
  - 1 – 3 years: 1.00 – 1.80 mmol/L  
  - 3 – 15 years: 1.00 – 1.80 mmol/L  
**Turnaround:** A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx. GP or OPD: Results posted within 4 days.

### Phosphate (Urinary)

**Laboratory:** Clinical Biochemistry  
**Specimen:** 24 Hour urine collection, to be acidified as soon as possible in laboratory.  
**Reference Range:** 12.9 – 42 mmol/24 Hr  
**Turnaround:** 1 Day

### Pinworm

See Enterobius vermicularis

### Platelet Aggregation Tests

**Laboratory:** Haematology
Specimen: Six (minimum) Blood 3mL; blue Vacuette® (sodium citrate 3.2%). Samples must not be sent in the pneumatic tube system. Specimens must be sent to the Haematology Lab. within 2 hours of collection. Patients on aspirin are unsuitable for this test. Specimens that are haemolysed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling. Specimens with platelet counts <150x10⁹/l are unsuitable for testing.

Comment: Test available Mondays only, by prior arrangement with the Haematology dept. The process of platelet adhesion and aggregation following a vascular injury is simulated in vitro, and the platelets aggregates, which form as a result of being exposed to collagen, ristocetin, ADP and adrenaline, are detected by changes in light transmittance. The most common causes of platelet dysfunction are related to uremia, von Willebrand disease and exposure to agents such as acetyl salicylic acid.

Turnaround: 8-24 hours,
Ref. Range: N / A, reported as Normal / Reduced / No Response / Inconclusive

Platelet Antibody Investigation
Laboratory: Blood Transfusion Laboratory
Specimen: 1 x 4 mL Clotted sample (red cap with yellow ring).
Comment: Referred to: I.B.T.S., National Blood Centre, James’s St., Dublin 8. Complete the Blood Transfusion request forms LF-C-BTR-ANTENAT or LF-C-BTR-XMATCH
This is not an INAB accredited test.

Turnaround: 3 weeks
Ref. Range: Not applicable.

Pneumococcal Antibodies (IgG)
Laboratory: Clinical Biochemistry
Specimen: Blood 4mL red top Vacuette® (or similar container for clotted blood)
Comment: Test performed by reference laboratory (HPA Laboratory, Manchester).

Turnaround: 2-3 weeks
Report: Refer to specific laboratory report

Pneumococcal PCR
Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 1mL EDTA blood, CSF (0.5mL)
Comment: Performed by Irish Meningitis & Sepsis Reference Laboratory (IMSRL), Dublin. Please ensure the specimen reaches the laboratory by 4pm to ensure prompt delivery to the reference laboratory.

Turnaround: Samples received by IMSRL before 11am, result between 4pm and 5pm the same day
Report: Detected or not detected

PNH Paroxysmal nocturnal haemoglobinuria
Laboratory: Referred by Haematology to Haematology, St James Hospital, Dublin 8
Specimen: Blood 2 x 3mL, purple Vacuette® (EDTA).
Comment: Test available Monday to Wednesday, before 12.00 noon. PNH is characterised by intermittent intravascular haemolysis due to hypersensitivity of RBC’S to the haemolytic action of complement caused by the lack of proteins DAF and MIRL. Diagnosis is possible by using monoclonal antibodies where the abnormal RBC population is identified by agglutination technique.

Turnaround: Positive results phoned within 24 hours of receipt of result, printed reports in 3 weeks
Ref. Range: No evidence of PNH Clone/PNH Clone detected
Polio Antibodies

Laboratory: Clinical Biochemistry
Specimen: Blood 4mL red top Vacuette® (or similar container for clotted blood)
Comment: Test performed by reference laboratory (Respiratory Infections Laboratory, Colindale, London).
Turnaround: 4 weeks

Porphyrin Screen

Laboratory: Sample referred from Clinical Biochemistry to St. James Hospital Dublin
Specimen: Spot urine sample  EDTA whole blood sample  Faeces sample  Lithium Heparin plasma sample
Comment: All samples must be protected from light at all times using tinfoil
Turnaround: 3 weeks
Ref. Range: See report or contact Biochemistry Dept. St James’ Hospital

Post-Mortems

See Autopsies/Post-Mortems Section 3.5 Dept. of Pathology

Potassium (Blood)

Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in plain tube (clotted sample)
Comment: Haemolysis invalidates result
Turnaround: A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx. GP or OPD- Results posted within 4 days.
Ref. Range: 3.5 – 5.0 mmol/L (Plasma Potassium 3.4–4.5 mmol/L)

Potassium (Urinary)

Laboratory: Clinical Biochemistry
Specimen: Spot or 24 Hr sample
Turnaround: 1 Day
Ref. Range: 30 – 90 mmol/24 Hr

Pouch of Douglas Fluid

See Sterile Body Fluid – Microscopy and Culture

Prader Willi Syndrome (PWS)

Laboratory: Referred from Biochemistry to National Centre for Medical Genetics (NCMG)
Specimen: Infants: 1ml EDTA blood  Adults 3-5ml EDTA blood
Comment: Copy of NCMG request form available on website www.genetics.ie
Turnaround: 6 weeks
Report: Sent to referring clinician and copy of report filed in pathology

Pregnancy Tests

Laboratory: Haematology
Specimen: Fresh Urine Specimen (must be <48 hrs old, preferably refrigerated), early morning specimen recommended..
Comment: Urine tests for confirming pregnancy are based on detecting elevated levels of human chorionic gonadotropin (HCG) which the placenta begins to produce in increasing amounts about 10 days after fertilisation. Test available Monday to Friday during routine working hours and for emergency reasons at all other times.
Turnaround: Emergency specimens: 30 minutes  Routine specimens: 8 - 24 hours
Ref. Range: Positive or Negative or Inconclusive
**Progesterone**

**Laboratory:** Clinical Biochemistry  
**Specimen:** 4.0 mL blood in plain tube (clotted sample). For evidence of ovulation draw blood 7 days prior to expected day of menstruation. Confirm correctness of timing at subsequent menses.  
**Turnaround:** 4 Days  
**Ref. Range:** Mid – luteal level (7 day Pre-menstruation ) > 30.0 nmol/L Suggests evidence of Ovulation (Royal College of Gynaecologists)  
Follicular: 0.6-4.7 nmol/L Ovulation: 2.4-9.4 nmol/L  
Luteal: 5.3-86.0 Post-Menopause: 0.3-2.5 nmol/L  
Male: 0 – 0.2 nmol/L

**Prolactin**

**Laboratory:** Clinical Biochemistry  
**Specimen:** 4.0 mL blood in plain tube (clotted sample)  
**Turnaround:** 4 Days  
**Ref. Range:** Female: 110 - 562 mU/L; Male: 73 – 411 mU/L

**Propoxyphene**

**Laboratory:** Sample referred from Clinical Biochemistry to Toxicology Laboratory BEAUMONT Hospital Dublin, posted Monday, Tuesday, Wednesday and Thursday.  
**Specimen:** Spot urine  
**Comment:** See Toxicology / Drug Screen  
**Turnaround:** 1 week  
**Ref. Range:** See report form or contact Toxicology Laboratory BEAUMONT Hospital 01-8092673 / (01)8092675, Emergency after hours (087) 2590749, Fax (01)8093986

**Protein (Total)**

**Laboratory:** Clinical Biochemistry  
**Specimen:** 4.0 mL blood in plain tube (clotted sample)  
**Turnaround:** A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx. GP or OPD- Results posted within 4 days.  
**Ref. Range:** 62 – 82 g/L Please contact Clinical Biochemistry lab for Paediatric and Pregnancy-related Reference ranges.

**Protein (Urinary)**

**Laboratory:** Clinical Biochemistry  
**Specimen:** Spot or 24 Hr sample  
**Turnaround:** 1 Day  
**Ref. Range:** < 140 mg/24hr
Protein C

Laboratory: Haematology
Specimen: Blood 3mL; blue Vacuette® (sodium citrate 3.2%).

Specimens that are haemolysed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling.

Comment: Test available Monday to Friday during routine working hours, and for emergency reasons by arrangement. In this assay the Protein C present in the test plasma is activated by an enzyme, this in turn hydrolyses a chromogenic substrate which is then measured. Decreased levels are reported in congenital abnormalities, also in patients with hepatic disorders, those receiving oral anticoagulants and in cases of DIC. Congenital abnormalities often result in severe recurrent venous thrombosis. This assay forms part of the Thrombophilia screen, see Main Haematology Section on Guidelines for Investigation of Thrombophilia.

Samples must be received within 4 hours

Turnaround: Routine specimens: 3 – 4 weeks
(Refer to the main Haematology Section on Coagulation).

Ref. Range:

<table>
<thead>
<tr>
<th>Age</th>
<th>Mean (%)</th>
<th>Range (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>35</td>
<td>17 - 53</td>
</tr>
<tr>
<td>Day 5</td>
<td>42</td>
<td>20 - 64</td>
</tr>
<tr>
<td>Day 30</td>
<td>43</td>
<td>21 - 65</td>
</tr>
<tr>
<td>Day 90</td>
<td>54</td>
<td>28 - 80</td>
</tr>
<tr>
<td>Day 180</td>
<td>59</td>
<td>37 - 81</td>
</tr>
<tr>
<td>Adult</td>
<td>95</td>
<td>70 - 120</td>
</tr>
</tbody>
</table>

Protein S

Laboratory: Haematology
Specimen: Blood 3mL; blue Vacuette® (sodium citrate 3.2%).

Specimens that are haemolysed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling.

Comment: Test available Monday to Friday, during routine working hours. Protein S is a vitamin K dependent protein, which serves as a co-factor for the anticoagulant activity of activated protein C in the degradation of factors V and VIII. This assay forms part of the Thrombophilia screen, see Main Haematology Section on Guidelines for Investigation of Thrombophilia.

Samples must be received within 4 hours

Turnaround: 3 – 4 weeks

Ref. Range:

<table>
<thead>
<tr>
<th>Age</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>12-60%</td>
</tr>
<tr>
<td>Day 5</td>
<td>22-78%</td>
</tr>
<tr>
<td>Day 30</td>
<td>33-93%</td>
</tr>
<tr>
<td>Day 90</td>
<td>54-118%</td>
</tr>
<tr>
<td>Day 180</td>
<td>55-119%</td>
</tr>
<tr>
<td>Adult male</td>
<td>68 - 143%</td>
</tr>
<tr>
<td>Adult female</td>
<td>60 – 114%</td>
</tr>
</tbody>
</table>

Protein/Creatinine Ratio (Urinary)

Laboratory: Clinical Biochemistry
Specimen: Spot urine

Turnaround: 1 day

Ref. Range: Protein/Creatinine: >45 mg/mmol is significant proteinuria
Prothrombin DNA Mutation Studies (G20210A)

Laboratory: Haematology Molecular Genetics
Specimen: Blood 3mL purple Vacuette® (EDTA)
Comment: Forms part of a Thrombophilia screen.
Turnaround: 6 - 8 weeks
Ref. Range: Normal / Heterozygous /Homozygous, see report

Prothrombin Time (PT)

Laboratory: Haematology
Specimen: Blood 3mL, blue Vacuette® (sodium citrate 3.2%)
Specimens which are haemolysed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling).
Comment: Test available Monday to Friday, during routine working hours and for emergency reasons at all other times.
The test is used as a screen to detect (a) single or combined deficiencies of the extrinsic coagulation system, (b) liver disease (c) vitamin K deficiency (d) monitoring oral anticoagulants, (e) assaying the specific coagulation Factor II. It also forms part of the Thrombophilia and/or Lupus screen.
Specimens must be received within 48hrs
Many commonly administered drugs may affect the results. This should be kept in mind especially when unusual or unexpected results have been obtained.

The prothrombin time (measured in seconds) is a very sensitive test to advancing liver disease in patients with liver disorders. The PT ratio – the patients PT over the midpoint of the normal range is useful. The laboratory recognises that some protocols dealing with liver disease and paracetamol overdose use the INR. This is a less sensitive measure of liver disease as it is adapted for patients on warfarin.

Turnaround: Urgent specimens: 2 hours Wards: 8 hours GPs: 24 hours
Ref. Range: Age Mean Range (seconds)
Day 1 13.0 10.1 – 15.9
Day 5 12.4 9.5 – 15.3
Day 30 11.8 9.3 – 14.3
Day 90 11.9 9.6 – 14.2
Day 180 12.3 10.7 – 13.8
Adult 10.5 9.7 – 11.3

PSA Total

Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in plain tube (clotted sample)
Turnaround: 4 Days
Ref. Range: 0 – 4.0 µg/L

PTH

Laboratory: Clinical Biochemistry
Specimen: 4.0 mL EDTA plasma
Turnaround: 1 week
Ref. Range: 15 – 68 ng/L
### Purines & Pyrimidines

**Laboratory:** Referred from Biochemistry to the Purine Research Lab, St. Thomas’s Hospital, London  
**Specimen:** Spot Urine (5-10mls) on ice – must be frozen immediately.  
**Comment:** Consultant request only  
**Turnaround:** 4 Weeks

### Pyruvate Kinase

**Laboratory:** Sample referred from Haematology to The Red Cell Centre, King’s College Hospital, London, SE5 9RS Westminster Bridge Rd., London  
**Specimen:** Blood 3mL, purple Vacuette® (EDTA), minimum 1 mL.  
**Comment:** Request must be booked in advance with the Haematology Laboratory CUH, performed as part of the investigations into haemolytic anaemias.  
**Turnaround:** 1 month.  
**Ref. Range:** See referral laboratory report or contact King’s College London, 0044 2032 999000

### Q Fever

See *Coxiella burnetii* IgG and IgM

### QuantiFERON®-TB Gold test (QFT)

**Laboratory:** Microbiology (TB Laboratory)  
**Specimen:** Special kit available from the Microbiology Laboratory after prior agreement with medical team. Please follow the manufacturers instructions supplied with the kit. **NB.** Only 1mL of blood per tube, under of overfilled bottles are not accepted. Shake vigorously x 10 times. Return the complete kit (in box).  
**Comment:** Errors in collecting or transporting blood specimens can decrease the accuracy of QFT. Do not refrigerate the kit at anytime. Blood specimens must be processed within 12 hours after collection while white blood cells are still viable. Before the QFT is conducted, confirm arrangements for testing with the laboratory. Specimens are only accepted by this laboratory on Mondays, Tuesdays and Wednesdays before 2pm(excluding Bank Holidays). Test performed by reference laboratory (Biomnis Ireland, Sandyford Industrial Estate).  
**Turnaround:** 1 week  
**Report:** Positive (≥0.35), negative (<0.35) or indeterminate. A positive result suggests that *M. tuberculosis* infection is likely; a negative result suggests that infection is unlikely; and indeterminate result suggests QFT-G results cannot be interpreted as a result of low mitogen response. A positive result does not distinguish between active and latent infection. A repeat will be requested where samples are close to 0.35 cut-off.
**Renal Biopsy**

**Laboratory:** Histopathology (Renal Pathology/Electron Microscopy Department)

**Specimen:** Renal Biopsy (unfixed tissue)

**Comment:** Specimens are accepted Mon – Fri 8am to 3:30pm. It is essential to inform the laboratory in advance of the date and approximate time of the procedure at Ext.21315 or bleep 379.

On the day of the procedure, the specimen container for the biopsy is collected from the EM/Renal laboratory. This consists of a universal container with filter paper soaked in Phosphate Buffered Saline, into which the tissue is placed directly after the procedure.

The tissue is then brought to the Renal/EM department, where it is handed directly to a medical scientist. The specimen is divided into portions for Light Microscopy, Direct Immunofluorescence Microscopy and Electron Microscopy in the EM/Renal Lab.

**Turnaround:** 80% cases verbal report in 2 days
80% cases fully authorised report in 2 weeks

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**Renal Stone**

**Laboratory:** Sample referred from Clinical Biochemistry to the Mater Hospital Dublin.

**Specimen:** Renal Stone

**Comment:** Renal Stone assayed for NH4, Uric acid, Cystine, CO₂, Oxalate, Calcium, Phosphate, Magnesium

**Turnaround:** 1 month

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**Renin: See Aldosterone/Renin ratio**

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**Respiratory Syncytial Virus (RSV) Antigen**

**Laboratory:** Microbiology (Infectious Diseases Serology)

**Specimen:** Nasopharyngeal aspirate in sterile container. Effort should be made to collect a liquid specimen. Sputum specimens and swabs are not suitable. If not tested immediately, specimens should be stored at 2 to 8°C for up to 24 hours.

**Turnaround:** 24 hours

**Report:** Positive or negative. Positive results called back to requesting clinician.

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**Respiratory Viral Screen (Molecular)**

**Laboratory:** Microbiology

**Specimen:** Viral swab (nasopharyngeal, throat), nasopharyngeal aspirate, sputum, broncho-alveolar lavage

**Comment:** Adenovirus, Influenza A and B, Respiratory Syncytial Virus, Parainfluenza, Human Metapneumovirus. For immunocompromised patients, Herpes Simplex Virus 1/2 and Cytomegalovirus may also be included in screen. Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin). During Influenza season a Respiratory viral screen for Adenovirus, Influenza A and B, Respiratory Syncytial Virus, Parainfluenza, Human Metapneumovirus is processed in CUH.

**Turnaround:** 5 working days

**Report:** Detected or not detected

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**Reticulocyte Count**

**Laboratory:** Haematology

**Specimen:** Blood 3mL purple Vacuette® (EDTA)
Paediatric (1mL purple (EDTA) or 1.3 mL red)

**Comment:** The number of reticulocytes present in blood is an index of RBC production by the bone marrow. Specimen must be <12 hours
Rheumatoid Factor IgM

Laboratory: Autoimmune Serology
Specimen: Blood, 4 mL red top Vacuette (or similar container for clotted blood)
Comment: Quantitative Nephelometric assay.
Turnaround: 24 Hours
Ref. Range: 0 - 14 IU/mL

Ribosomal P Protein

Laboratory: Autoimmune Serology
Specimen: Blood, 4 mL red top Vacuette (or similar container for clotted blood)
Comment: Qualitative Elisa. Automatically undertaken on all Anti-ENA positive sera.
Turnaround: 72 Hours
Ref. Range: Not applicable

Rickettsia Antibodies

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: Performed by a reference laboratory (Rare & Imported Pathogens Laboratory (RIPL), Porton Down)
Turnaround: 3 weeks
Report: Positive or negative

Ro (SS-A)

Laboratory: Autoimmune Serology
Specimen: Blood, 4 mL red top Vacuette (or similar container for clotted blood)
Comment: Qualitative Elisa. Automatically undertaken on all Anti-ENA positive sera.
Turnaround: 72 Hours
Ref. Range: Not applicable

Rotavirus / Adenovirus Assay

Laboratory: Microbiology (Category 3 Laboratory)
Specimen: Fresh faeces specimen. 1-2g is sufficient.
Comment: Immunochromatographic test using anti-Adenovirus monoclonal and anti-Rotavirus monoclonal reagents. Test performed Monday to Friday 9-5pm on children ≤3 years.
Turnaround: 24 hours.
Report: Positive reports are telephoned when available to the requesting area.

Rubella IgG Antibody

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: This test is used in the determination of immune status to Rubella. Typically, this test is done as part of an antenatal or occupational health screen. Rubella IgM testing is recommended for the diagnosis of recent primary rubella infection.
Turnaround: 36 hours
Report: Quantitative value IU/mL
Rubella IgM Antibody

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: Patient history required. The presence of IgM antibodies suggests recent infection with the virus.
Turnaround: 36 hours
Report: Positive or negative

Salicylate

Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in a plain tube (clotted sample)
Turnaround: 1 Hour
Ref. Range: Therapeutic Range 0-193 mg/L
In adults, symptoms of Salicylate toxicity may occur at levels >300mg/L

Schistosoma haematobium

Laboratory: Microbiology (Category 3 Laboratory)
Specimen: Collection of a terminal urine specimen is recommended (between 10am and 2pm as this is the period of maximum schistosomal activity). Sterile containers without boric acid must be used. In patients without haematuria, eggs may be found trapped in the blood and mucus in the terminal portion of the urine specimen. Transport specimens ASAP. Delays of over 48 hours are undesirable.
Comment: Test performed Monday to Friday 9-5pm. If the urine cannot be examined within an hour of collection, it is advisable to add 1mL of undiluted formalin to preserve any eggs that may be present.
Turnaround: 24 hours
Report: Schistosoma spp. Not seen or Schistosoma seen

Schistosoma Antibodies (Bilharzia)

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: Performed by a reference laboratory (PHE National Parasitology Reference Laboratory (NPRL), London).
Turnaround: 3 weeks
Report: Positive or negative

SCL-70

Laboratory: Autoimmune Serology
Specimen: Blood, 4 mL red top Vacuette (or similar container for clotted blood)
Comment: Qualitative Elisa. Automatically undertaken on all Anti-ENA positive sera.
Turnaround: 72 Hrs
Ref. Range: Not Applicable.

SHBG

Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in plain tube (clotted sample)
Comment: SHBG is analysed (females only) in conjunction with testosterone. Androgen index (AI) is then calculated.
Turnaround: 2 Weeks
Ref. Range: Male 13-71 nmol/L; Female 19.8-115 nmol/L AI < 11 (female)

Sirolimus

Laboratory: Sample referred from Clinical Biochemistry to Harefield Hospital
Specimen: 4.0 mL blood in an EDTA sample tube.
Turnaround: 2 weeks
Ref. Range: Interpretation of Sirolimus is dependent on time interval between sample and last dose, clinical indication for use of the drug, duration of therapy, other drug therapy and method of measurement

### Skin for Fibroblast Culture (Paediatric Neurology cases)

- **Laboratory:** Neuropathology
- **Specimen:** 3x3mm skin bx taken into sterile culture medium
- **Comment:** Please contact Neuropathology in advance. Culture medium available from Neuropathology Lab. Sample sent to Sheffield Children’s Hospital. Protocols available on request.
- **Turnaround:** 4-6 weeks
- **Ref. Range:** N/A

### Skin Swab

See Wound Swab

### Sm (Smith Antigen)

- **Laboratory:** Autoimmune Serology
- **Specimen:** Blood, 4 mL red top Vacuette (or similar container for clotted blood)
- **Comment:** Qualitative Elisa. Automatically undertaken on all Anti-ENA positive sera.
- **Turnaround:** 72 Hours
- **Ref. Range:** Not applicable

### Small Round Structured Viruses (SRSV)

See Norovirus

### Smooth Muscle Antibodies

- **Laboratory:** Autoimmune Serology
- **Specimen:** Blood, 4 mL red top Vacuette (or similar container for clotted blood)
- **Comment:** Qualitative Immunofluorescence assay initially part of Auto Antibody Screen. Positive sera are titred to end point. Sera showing specific Anti-Actin pattern on Immunofluorescence are commented upon.
- **Turnaround:** 72 Hrs.
- **Ref. Range:** Not Applicable.

### Sodium (Blood)

- **Laboratory:** Clinical Biochemistry
- **Specimen:** 4.0 mL blood in plain tube (clotted sample)
- **Turnaround:** A/E or urgent sample: - 1 hour 15 minsapprox. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx. GP or OPD- Results posted within 4 days.
- **Ref. Range:** 132 – 144 mmol/L

### Sodium (Urinary)

- **Laboratory:** Clinical Biochemistry
- **Specimen:** 24 Hr sample
- **Turnaround:** 1 Day
- **Ref. Range:** 130 – 220 mmol/24 Hr (reflects daily intake)

### Spinal Muscular Atrophy (SMA)

- **Laboratory:** Referred from Biochemistry to National Centre for Medical Genetics (NCMG)
- **Specimen:** Infants: 1ml EDTA blood
  
  Adults 3-5ml EDTA blood
- **Comment:** Copy of NCMG request form available on website [www.genetics.ie](http://www.genetics.ie)
- **Turnaround:** 6 weeks
- **Report:** Sent to referring clinician and copy of report filed in pathology
Sputum Culture

Laboratory: Microbiology (Main laboratory)
Specimen: Sputum from the lower respiratory tract expectorated by deep coughing. Check that specimen is of adequate quality as specimens of saliva and postnasal secretions are usually unsuitable. Ideally, the laboratory should receive a minimum volume of 1mL. The specimen should be collected into a clean, sterile, leakproof container. Sputum may be refrigerated for up to 2–3 hours without an appreciable loss of pathogens. Any delay beyond this time may allow overgrowth of Gram-negative bacilli, and Haemophilus species and S. pneumoniae may die. Transport specimens ASAP. If processing is delayed, refrigeration is preferable to storage at ambient temperature.

Comment: Please include any appropriate clinical details e.g. “Cystic fibrosis patient”. If an unusual pathogen is suspected, the laboratory should be informed, e.g. Burkholderia pseudomallei and Nocardia sp require longer incubation of cultures. Refer to Mycobacteria testing for instructions for collection for TB culture. If a fungal infection is clinically suspected, please include as much information as possible regarding patient medical history, travel history and occupation,

Turnaround: Prelim: 24 hours; Final: 4 days. Prolonged incubation is required for Burkholderia spp. and fungal culture, which are reported if positive.

Report: Culture report: Any clinically significant isolate with the appropriate sensitivities.

STD Screen

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: Screen includes Hepatitis B Surface antigen, HIV Ag/Ab, Syphilis antibody

Turnaround: Negative samples: 36 hours. Please allow extra time for samples testing positive in house for HIV Ag/Ab and Syphilis antibody (external confirmatory testing required).

Report: Positive or negative

Sterile Body Fluid – Microscopy and Culture

Laboratory: Microbiology (Main laboratory)
Specimen: Specialist collection according to local protocols. Ideally, a minimum volume of 1mL should be collected into a clean, sterile, leakproof container. The volume of specimen influences the transport time that is acceptable. Large volumes of purulent material maintain the viability of anaerobes for longer. Results from delayed specimens must be interpreted with caution bearing in mind the difficulties in isolating anaerobes from these specimens Transport specimens ASAP. If processing is delayed, refrigeration is preferable to storage at ambient temperature.

Comment: Test performed routinely Monday to Friday 9-5pm or by urgent request.

Turnaround: Microscopy: 2 hours. Culture: Prelim: 24 hours; Final: 48-72 hours. Urgent report telephoned when available.

Report: Total white cell count, differential leucocyte count (if appropriate), Gram Stain and Culture. All isolates are reported with appropriate sensitivities. Total white cell counts and differential leucocyte count are not performed on specimens containing a clot, which would invalidate the cell count.

Striated Muscle Antibodies

Laboratory: Sample referred from Autoimmune Serology to Biomnis Laboratories.
Specimen: Blood, 4 mL red top Vacuette (or similar container for clotted blood)

Turnaround: Approx. 3 Weeks

Ref. Range: See report form, or visit internet site www.biomnis.ie for up to date referral test information
### Strongyloides Antibodies

- **Laboratory:** Microbiology (Infectious Diseases Serology)
- **Specimen:** 4mL clotted blood
- **Comment:** Performed by a reference laboratory (PHE National Parasitology Reference Laboratory (NPRL), London).
- **Turnaround:** 3 weeks
- **Report:** Positive or negative

### Strongyloides Microscopy and Culture

- **Laboratory:** Microbiology (Infectious Diseases Serology)
- **Specimen:** Faeces
- **Comment:** Performed by a reference laboratory (PHE National Parasitology Reference Laboratory (NPRL), London). Faecal specimens should NOT be refrigerated.
- **Turnaround:** 3 weeks
- **Report:** Positive or negative

### Surgical Specimens for Histological Examination

- **Laboratory:** Histopathology (Main Laboratory)
- **Specimen:** Formalin Fixed Tissue
- **Turnaround:** 5-6 working days (Urgent cases can be fast-tracked by request.)
- **Ref. Range:** Not applicable

### Sweat Test

- **Laboratory:** Clinical Biochemistry
- **Specimen:** Sweat
- **Comment:** Sweat is collected in GD ward or GC Day Unit
- **Turnaround:** Done daily.
- **Ref. Range:** Contact CUH Biochemistry Laboratory

### Synovial Fluid

See Sterile Body Fluid – Microscopy and Culture

### Syphilis Antibody

- **Laboratory:** Microbiology (Infectious Diseases Serology)
- **Specimen:** 4mL clotted blood
- **Comment:** Sera positive by chemiluminescent immunoassay are further tested by RPR (rapid plasma reagin) and TPPA (*Treponema pallidum* particle agglutination). New syphilis positives are sent to a reference laboratory for confirmation.
- **Turnaround:** Negative: 36 hours
  Referred samples: 2 weeks
- **Report:** Positive or negative

### Tacrolimus (FK506 / Prograf)

- **Laboratory:** Clinical Biochemistry
- **Specimen:** 4.0 mL blood in an EDTA tube
- **Comment:** Trough sample required. Analysed on Thursday.
- **Turnaround:** 1-2 days
- **Ref. Range:** Interpretation of Tacrolimus is dependent on time interval between sample and last dose, clinical indication for use of the drug, duration of therapy, other drug therapy and method of measurement.

### Tear Duct – Culture

See Lacrimal

### Temporal Artery Biopsies

- **Laboratory:** Neuropathology
- **Specimen:** Formalin-fixed artery
- **Turnaround:** 3 days
### Testosterone

**Laboratory:** Clinical Biochemistry  
**Specimen:** 4.0 mL blood in plain tube (clotted sample)  
**Turnaround:** 1 Week  
**Ref. Range:**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50Y</td>
<td>8.3</td>
<td>0.48</td>
</tr>
<tr>
<td>&gt;50Y</td>
<td>7.7</td>
<td>0.43</td>
</tr>
</tbody>
</table>

**Children:** Please contact Laboratory for age-related Reference range

### Tetanus antibodies (IgG)

**Laboratory:** Clinical Biochemistry  
**Specimen:** Blood 4mL red top Vacuette® (or similar container for clotted blood)  
**Comment:** Test performed by reference laboratory (Respiratory Infections Laboratory, Colindale, London).  
**Turnaround:** 2-3 weeks  
**Report:** Greater than 0.43IU/mL indicates previous exposure to tetanus toxoid.

### Theophylline

**Laboratory:** Clinical Biochemistry  
**Specimen:** 4.0 mL blood in plain tube (clotted sample)  
**Comment:** Take trough sample immediately before next dose. When making comparative measurements, it is advisable that sampling times be consistent  
**Turnaround:** 4 days. Urgents on request.  
**Ref. Range:** Therapeutic Range 10-20 mg/L Range quoted is appropriate for a trough sample.

### Throat Swab

**Laboratory:** Microbiology (Main laboratory)  
**Specimen:** Swab the tonsillar area and/or posterior pharynx avoiding the tongue and uvula. Transport specimens ASAP in charcoal containing transport media. If processing is delayed, refrigeration is preferable to storage at ambient temperature. If diphtheria or gonorrhoea is suspected special testing should be requested. Ideally, inoculation of specimens for N. gonorrhoeae is made directly on to culture media at the bedside and incubated without delay. Specimens for viral isolation should be submitted in appropriate viral transport medium (available from Microbiology, CUH).  
**Comment:** Test performed routinely Monday to Friday 9-5pm or by urgent request.  
**Turnaround:** Culture Final: 24-48 hours  
**Report:** Culture for ß-haemolytic streptococci, other bacteria (if appropriate), or yeasts.
Thrombophilia Screen

Laboratory: Haematology
Specimen: Three Blood 3mL, blue Vacuette® (sodium citrate 3.2%) and,
One Blood 4mL red Vacuette (clotted specimen),
One Blood 3mL purple Vacuette (EDTA specimen). Due to potential contamination of genetic material a separate EDTA sample is required. 

**Samples must be received within 4 hours.**

Specimens that are haemolysed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling.

**Note: BCSH guidelines on Thrombophilia testing must be adhered to.**

Comment: Test available Mon to Fri, during routine working hours.

Thrombosis occurs when activation of blood coagulation overwhelms the ability of the natural anticoagulant mechanism and fibrinolytic system to prevent thrombus formation taking place. Thrombophilia screen consists of: INR, APTT, FIB, Actin FSL, DVV test, Antithrombin 3, Protein C, Activated Protein C Resistance and Protein S assays. Anti-Cardiolipin is also included as part of the screen (which includes the Beta 2-Glycoprotein 1 assay when appropriate) if a clotted sample is received.

Requests must conform with BCSH guidelines

**Samples without Clinical details WILL NOT be processed.**

Turnaround: 3 – 4 weeks
Ref. Range: Refer to individual assays

Thyroglobulin & Thyroglobulin Antibodies

Laboratory: Sample referred from Clinical Biochemistry to BIOMNIS Laboratories
Specimen: 4.0 mL blood in Li Hep or plain tube (clotted sample)
Comment: On patients with diagnosed thyroid cancer only. Consultant request only.
Turnaround: 3 weeks
Ref. Range: See report form, or visit internet site [www.biomnis.ie](http://www.biomnis.ie) for up to date referral test information

Thyroid Antibodies (Anti-Thyroid Peroxidase Abs/ Anti-TPO Abs)

Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in a plain tube (clotted sample)
Turnaround: 4 days
Ref. Range: 0 – 5.6 IU/mL

Thyroid Stimulating Hormone (TSH)

Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in plain tube (clotted sample)
Turnaround: 4 days
Ref. Range: 0.35 – 4.94 mU/L
Please contact Clinical Biochemistry lab for Paediatric and Pregnancy-related Reference ranges.

Tissue / Biopsy

Laboratory: Microbiology (Main laboratory)
Specimen: Tissue specimens for Microbiology must not be placed in formalin. The specimen should be collected into a clean, sterile, leakproof container. For small specimens, add several drops of sterile saline to keep moist (include on label the nature of any additives e.g. 10mL saline). Do not allow tissue to dry out. Bone marrow aspirates should be inoculated directly into a blood culture bottle as per the Blood Culture guidelines. Transport specimens ASAP. If processing is delayed, refrigeration is preferable to storage at ambient temperature. It is vital that the specimen container is properly labelled.
Comment: Test performed routinely Monday to Friday 9-5pm or by urgent request. The volume of specimen influences the transport time that is acceptable. Large volumes of purulent material maintain the viability of anaerobes for longer. The recovery of anaerobes is compromised if the transport time exceeds 3 hours. If a fungal infection is suspected, please include as much information as possible regarding patient medical history, travel history and occupation.

Turnaround: Culture: Prelim: 24 hours; Final: 48-72 hours
Report: Culture report: Any clinically significant isolate with the appropriate sensitivities.

**Tobramycin**

Refer to Antibiotic Assays

**TORCH**

See Intra-Uterine Infection Screen

**Toxicology / Drug Screen: Blood**

Laboratory: Sample referred from Clinical Biochemistry to Toxicology Laboratory BEAUMONT Hospital Dublin, posted Monday, Tuesday, Wednesday and Thursday.
Specimen: 4.0 mL blood in a plain tube (clotted sample)
Comment: Tested for Benzodiazepines, Barbiturates, Alcohol, Tricyclics, Paracetamol and Salicylate
Turnaround: 1 week
Ref. Range: See report form or contact Beaumont Toxicology Dept. Tel (01) 8092673 / (01) 8092675, Emergency after hours (087) 2590749, Fax (01) 8093986.

**Toxicology / Drug Screen: Urine**

Laboratory: Sample referred from Clinical Biochemistry to Toxicology Laboratory BEAUMONT Hospital Dublin, posted Monday, Tuesday, Wednesday and Thursday.
Specimen: Spot urine
Comment: Tested for Benzodiazepines, Barbiturates, Opiates, Cocaine, Propoxyphene, Cannabis, Amphetamine, Methadone, Phencyclidine, Alcohol
Turnaround: 1 week
Ref. Range: See report form or contact Beaumont Toxicology Dept. Tel (01) 8092673 / (01) 8092675, Emergency after hours (087) 2590749, Fax (01) 8093986.

**Toxocara Antibodies**

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: Performed by a reference laboratory (PHE National Parasitology Reference Laboratory (NPRL), London)
Turnaround: 3 weeks
Report: Positive or negative

**Toxoplasma gondii IgG Antibody**

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Turnaround: 36 hours
Report: Positive or negative

**Toxoplasma gondii IgM Antibody**

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Turnaround: Negative samples: 36 hours
Positive Toxoplasma IgM must be confirmed by a reference laboratory – at least 3 weeks
Report: Positive or negative
TPMT Phenotyping

Laboratory: Sample referred from Clinical Biochemistry to Dr Loretta Ford, Clinical Chemistry Dept., City Hospital, Dudley Road, Birmingham, West Midlands, B18 7QH Tel 004421 5074271

Specimen: 5 – 10 mL EDTA whole blood

Turnaround: 2 weeks

Ref. Range Contact laboratory

Transferrin

Laboratory: Clinical Biochemistry

Specimen: 4.0 mL blood in plain tube (clotted sample)

Turnaround: 4 Days

Ref. Range: 1.8 – 3.2 g/L

% Transferrin Saturation

Laboratory: Clinical Biochemistry

Specimen: Not applicable

Comment: Calculated from the Iron and Transferrin results.

Turnaround: 4 Days

Ref. Range: Contact biochemistry

Trichinella Antibodies

Laboratory: Microbiology (Infectious Diseases Serology)

Specimen: 4mL clotted blood

Comment: Performed by a reference laboratory (PHE National Parasitology Reference Laboratory (NPRL), London)

Turnaround: 3 weeks

Report: Positive or negative

Trichomonas vaginalis

Laboratory: Microbiology (Main laboratory)

Specimen: Testing for Trichomonas vaginalis will not be performed unless a labelled slide is sent accompanying the swab.

For Trichomonas, the posterior fornix should be swabbed. The slide should then be placed in a slide holder.

Comment: This examination must be specifically requested.

Turnaround: 24 hours.

Report: Trichomonas vaginalis seen or not seen

Tricyclics

Laboratory: Sample referred from Clinical Biochemistry to Toxicology Laboratory BEAUMONT Hospital Dublin, posted Monday, Tuesday, Wednesday and Thursday.

Specimen: Blood: 4.0 mL blood in a plain tube (clotted sample)

Comment: See Toxicology / Drug Screen

Turnaround: 1 week

Ref. Range: See report form or contact Toxicology Laboratory BEAUMONT Hospital 01-8092673 / (01)8092675, Emergency after hours (087) 2590749, Fax (01) 8093986
Triglycerides
Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in plain tube (clotted sample)
Comment: Fasting sample required
Turnaround: A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx.
GP or OPD results posted within 4 days.
Ref. Range: 0.3 – 1.7 mmol/L

Troponin I – High Sensitive
Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in plain tube (clotted sample)
Turnaround: 1 hour 15 mins
Ref. Range: The 99th. Centile is = <34ng/L (male)
is = <16ng/L (female)
Optimally for the biochemical diagnosis of MI it is recommended that two samples are taken for Troponin I (hs) measurement; the first at presentation and the second 3 to 6 hours later.
In a patient with evidence of ischaemia: AMI is likely if, at least one result is > 34 ng/L (for males) or >16ng/L (for females) and Troponin I (hs) values change by 50% or more between the two samples.

Trypanosoma cruzi Antibodies
Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: Performed by a reference laboratory (PHE National Parasitology Reference Laboratory (NPRL), London)
Turnaround: 3 weeks
Report: Positive or negative

Tryptase (Mast Cell)
Laboratory: Sample referred from Clinical Biochemistry to BIOMNIS Laboratories
Specimen: 4.0 mL blood in Li Hep or plain tube (clotted sample)
Comment: Draw blood as soon as possible after anaphylactic shock, again at 2 hours and 8 hours after.
Turnaround: 3 weeks
Ref. Range: See report form, or visit internet site www.biomnis.ie for up to date referral test information

Ttg (tissue Trans Glutaminase antibodies)
Laboratory: Autoimmune Serology
Specimen: Blood, 4 mL red top Vacuette (or similar container for clotted blood)
Comment: Quantitative Immunoassay using Phadia Immunocap 250 analyser. Part of Coeliac screen. Anti EMA undertaken automatically on all positive sera to confirm.
Turnaround: 24 Hours
Ref. Range: 0 - 2.5 AU/ML

Tuberculosis Testing
Refer to Mycobacteriology

Tubule Antibodies
Laboratory: Sample referred from Autoimmune Serology to Claymon Laboratories.
Specimen: Blood, 4 mL red top Vacuette (or similar container for clotted blood)
Turnaround: Approx. 3 Weeks
Ref. Range: See report form, or visit internet site www.claymon.com for up to date referral test information
<table>
<thead>
<tr>
<th><strong>Laboratory</strong></th>
<th><strong>Autoimmune Serology</strong></th>
<th><strong>Specimen</strong></th>
<th>Blood, 4 mL red top Vacuette (or similar container for clotted blood)</th>
<th><strong>Comment</strong></th>
<th>Qualitative Elisa. Automatically undertaken on all Anti-ENA positive sera.</th>
<th><strong>Turnaround</strong></th>
<th>72 Hours</th>
<th><strong>Ref. Range</strong></th>
<th>Not applicable</th>
</tr>
</thead>
</table>

### Ulcer Swab

- **See** Wound Swab

### Urate (Blood)

- **Laboratory**: Clinical Biochemistry
- **Specimen**: 4.0 mL blood in plain tube (clotted sample)
- **Turnaround**: A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx. GP or OPD- Results posted within 4 days.
- **Ref. Range**: Male: 236 – 486 µmol/L, Female: 160 – 393 µmol/L

### Urate (Urinary)

- **Laboratory**: Clinical Biochemistry
- **Specimen**: 24 Hour collection
- **Turnaround**: 1 Day
- **Ref. Range**: 1500 – 4500 µmol/24 Hr

### Urea (Blood)

- **Laboratory**: Clinical Biochemistry
- **Specimen**: 4.0 mL blood in plain tube (clotted sample)
- **Turnaround**: A/E or urgent sample: - 1 hour 15 mins approx. CUH wards, CUMH, SI, SF, SMOH, MGH: - 3 hours approx. GP or OPD- Results posted within 4 days.
- **Ref. Range**: 2.8 – 8.4 mmol/L

### Urea (Urinary)

- **Laboratory**: Clinical Biochemistry
- **Specimen**: Spot or 24 Hr urine sample
- **Turnaround**: 1 Day
- **Ref. Range**: 428 – 714 mmol/24 Hr

### Urethral Swab

- **Refer to Genital swab**

### Urinary Legionella Antigen

- **Laboratory**: Microbiology (Infectious Diseases Serology)
- **Specimen**: Urine
- **Comment**: Test performed only by special arrangement with Microbiology Consultant.
- **Turnaround**: 36 hours
- **Report**: Positive or negative

### Urinary Schistosomiasis

- **See** Schistosoma haematobium

### Urinary Streptococcus pneumoniae Antigen

- **Laboratory**: Microbiology (Infectious Diseases Serology)
- **Specimen**: Urine
- **Turnaround**: 36 hours
- **Report**: Positive or negative
### Urine Microscopy and Culture

**Laboratory:** Microbiology (Main laboratory)

**Specimen:** Ideally, a minimum of 1mL is required for routine culture. The specimen should be collected into a clean, sterile, leakproof container. For samples which may be delayed in delivery to the laboratory (>24hrs) a sample container containing boric acid (preservative) should be used, fill to the line marked.

**Note:** A minimum of 5mL is *essential* for boric acid samples, where smaller volumes are collected, do not use a boric acid container. Excessive fluid intake will dilute the urine and may decrease the colony count to <10^5 CFU/mL. Separate specimens must be collected for detection of Mycobacteria or *S. haematobium* (see same). A fresh specimen is essential for the investigation of casts.

<table>
<thead>
<tr>
<th>Specimen Types</th>
<th>Specimen Types</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Midstream urine (MSU)</strong></td>
<td>Recommended for routine use. Genitalia are cleaned. The first part of voided urine is discarded and without interrupting the flow, approximately 10mL is collected into a sterile container. The remaining urine is discarded.</td>
</tr>
<tr>
<td><strong>Bag specimen urine (BSU).</strong></td>
<td>Used commonly for infants and young children. The sterile bags are taped over the genitalia and the collected urine is transferred to a sterile leakproof container. There are frequent problems of contamination with this method of collection.</td>
</tr>
<tr>
<td><strong>Clean catch urine (CCU).</strong></td>
<td>Thorough periurethral cleaning is recommended. The whole specimen is collected into a sterile container and then an aliquot sent for examination.</td>
</tr>
<tr>
<td><strong>Suprapubic aspirate (SPA).</strong></td>
<td>The use of this invasive procedure is usually reserved for clarification of equivocal results from voided urine e.g. in infants.</td>
</tr>
<tr>
<td><strong>Catheter urine (CSU).</strong></td>
<td>May be obtained from suprapubic or per urethral catheters. The specimen should not be obtained from the collection bag.</td>
</tr>
<tr>
<td><strong>Ileal conduit-urostomy urine</strong></td>
<td>is collected via a catheter passed aseptically into the stomal opening after removal of the external appliance. Results from this type may be difficult to interpret and should be performed only if there is an indication for treatment, such as pyrexia or constitutional upset.</td>
</tr>
<tr>
<td><strong>Cystoscopy urine</strong></td>
<td>is obtained directly from the bladder using a cystoscope.</td>
</tr>
</tbody>
</table>

**Comment:** It is important that there should be minimal delay before culture. If processing is delayed >6 hours, refrigeration for up to 48 hours and use of boric acid containers is recommended. Ensure containers are filled to the line (20mL).

**Turnaround:**
- Microscopy: Routine: 24 hours. Urgent: 2 hours of receipt.
- Culture: Preliminary: 24 hours. Final: 24-72 hours

**Report:**
- Microscopy: Report on the range of WBCs and RBCs per cmm as well as the presence of epithelial cells, casts, bacteria, yeasts and *Trichomonas* spp. if present.
- Culture: Report bacterial growth in orgs/mL with sensitivities and comment where appropriate. Culture will only be carried out where WCC is >20/cmm., but the following are cultured in all cases; Antenatal, <16 year, Renal, ICU, potentially immunocompromised.

### Valproate

**Laboratory:** Clinical Biochemistry

**Specimen:** 4.0 mL blood in plain tube (clotted sample)

**Comment:** Chronic oral dosing: trough sample immediately before next dose

**Turnaround:** 1 Day

**Ref. Range:** 50-100 mg/L Range is appropriate for a trough sample.
Vancomycin
Refer to Antibiotic Assays

Vancomycin Resistant Enterococci (VRE)

Laboratory: Microbiology (Main laboratory)
Specimen: Rectal swabs, placed in charcoal containing transport media.
Comment: Test performed Monday to Friday 9-5pm. Label all Microbiology forms with VRE SCREEN. Indicate if the patient was previously VRE positive. Transport specimens ASAP. If processing of swabs is delayed, refrigeration is preferable to storage at ambient temperature.
Turnaround: Prelim: 24 hours; Final: 48-72 hours
Report: “VRE not isolated”, *Enterococcus* species isolated with the following comment: This is a Vancomycin resistant Enterococcus

Varicella-zoster Virus IgG Antibody

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: VZV IgG testing is performed on all antenatal patients
Turnaround: 36 hours
Report: Positive or negative

Varicella-zoster Virus IgM Antibody

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin)
Turnaround: 5 working days
Report: Positive or negative

Varicella-zoster Virus Molecular

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: CSF (1mL), viral swab (skin, eye), vesicle fluid
Comment: Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin)
Turnaround: 5 working days
Report: Detected or not detected

Vasculitic Screen

Laboratory: Autoimmune Serology
Specimen: Blood, 4 mL red top Vacuette (or similar container for clotted blood)
Comment: Includes Auto Antibody Screen + Anti Neutrophil Cytoplasmic Antibody assay.
Turnaround: 48 Hours or stat by contacting laboratory.
Ref. Range: Not applicable. Refer to follow on tests if Screen Positive.

Very Long Chain Fatty acids

Laboratory: Sample referred from Clinical Biochemistry to Willink Institute, Manchester.
Specimen: 4.0 mL blood in EDTA or Lithium Heparin
Turnaround: 3 weeks
Ref. Range: See report form

Vincent’s Angina
See Mouth Swab

Viral Screen (Eye)

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: Viral swab
Comment: Adenovirus, Herpes Simplex Virus 1/2, Varicella-zoster Virus. Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin).

Turnaround: 5 working days
Report: Detected or not detected

### Viscosity

**Laboratory:** Viscosity testing is referred from Clinical Biochemistry (Immunology section) to St. James’ Hospital, Dublin

**Specimen:** 2 samples in EDTA bottles.

**Comment:** Viscosity >2.9 associated with Hyperviscosity Syndrome

**Turnaround:** 3 Days

**Ref. Range:** 1.19 – 1.43 (at 37 °C) Refer to Biochemistry Dept. St. James Hospital.

### Vitamin A (Retinol)

**Laboratory:** Sample referred from Clinical Biochemistry to Nutristasis Unit, St. Thomas Hospital, London.

**Specimen:** 4.0 mL blood in a plain tube (clotted sample)

**Comment:** Consultant request only. Protect from light.

**Turnaround:** 3 weeks

**Ref. Range:** See report form, or visit internet site [www.nutristasis.com](http://www.nutristasis.com) for up to date referral test information

### Vitamin B12

**Laboratory:** Haematology

**Specimen:** Blood 4mL red Vacuette (clotted specimen).

**Comment:** Test available Monday to Friday, during routine working hours. Vitamin B12 is a coenzyme necessary to the biosynthesis of DNA and RNA. Deficiency in man is associated with megaloblastic anaemia it is also vital to the normal metabolism of folic acid. It is of particular importance to recognise vitamin B12 deficiency as it causes both neurologic and psychiatric damage, which is preventable when diagnosed at an early stage. Values between 120 and 135 ng/l are considered indeterminate and should be interpreted in conjunction with full blood count results (including macrocytosis and clinical parameters). B12 and Folate should be requested for investigation of abnormal FBC results and relevant clinical syndromes. Use of haematinics for screening of well patients is not recommended. Requests should be accompanied by clinical details. See BCSH guidelines.


**Turnaround:** 7 working days

**Ref. Range:** 120 – 650 ng/l
120 – 135 ng/l indeterminate

### 1, 25 Dihydroxy Vitamin D (Calcitrol)

**Laboratory:** Sample referred from Clinical Biochemistry to BIOMNIS Laboratories

**Specimen:** ML blood in a plain tube (clotted sample) on ice, must be frozen < 1 hr. (minimum 2.0 mL serum required)

**Comment:** Consultant request only.

**Turnaround:** 3 weeks

**Ref. Range:** See report form, or visit internet site [www.biomnis.ie](http://www.biomnis.ie) for up to date referral test information.
**Vitamin D (25Hydroxy Vitamin D) / Hydroxycholecalciferol**

**Laboratory:** Clinical Biochemistry

**Specimen:** 4.0 mL blood in a plain tube (clotted sample).

**Comment:** Appropriate clinical details essential

**Turnaround:** 10 days

**Ref. Range:**
- <25 nmol/L: Deficient
- 20-50 nmol/L: Insufficient
- 50-75 nmol/L: Adequate
- >75 nmol/L: Optimal
- >125 nmol/L: Risk of Excess

**Vitamin E (Tocopherol)**

**Laboratory:** Sample referred from Clinical Biochemistry to Nutristasis Unit, St. Thomas Hospital, London

**Specimen:** 4.0 mL blood in a plain tube (clotted sample).

**Comment:** Sample must be separated < 1 hour.

**Turnaround:** 3 weeks

**Ref. Range:** See report form, or visit internet site www.nutristasis.com for up to date referral test information

**Vitamin K (Phytonadione)**

**Laboratory:** Sample referred from Clinical Biochemistry to Nutristasis Unit, St. Thomas Hospital, London

**Specimen:** 4.0 mL blood in a plain tube (clotted sample) on ice, must be separated and frozen within 1 hour

**Comment:** Protect from light. Consultant request only.

**Turnaround:** 3 weeks

**Ref. Range:** See report form, or visit internet site www.nutristasis.com for up to date referral test information

**Von-Willebrand Multimers / Collagen binding**

**Laboratory:** Referred from Haematology Dept. National Coagulation Laboratory, Centre for Clinical Pathology and Laboratory Medicine (CPLM), St James Hospital, Dublin 8

**Specimen:** Blood 3mL; blue Vacuette® (sodium citrate 3.2%) x 3

**Comment:** This is part of the Von Willebrand Screen which includes VW:Ag, VW:RCo, and Factor VIII. Multimers are only analysed in specific circumstances or on request by Coagulation Consultant.

**Turnaround:** 6 weeks

**Ref. Range:** Qualitative result

**Von Willebrand Screen: Ristocetin Co-factor vWF Activity, Von-Willebrand Factor Antigen and Factor VIII**

**Laboratory:** Haematology

**Specimen:** Blood 3mL x 3, blue Vacuette® (sodium citrate 3.2%)

Specimens that are haemolyzed, underfilled or overfilled cannot be analysed, check coagulation sample bottles are not expired to ensure correct filling.

**Comment:** Test available Monday to Friday, during routine working hours. Screen includes Factor V111 assay, vWF:ag (vW factor Ag), vWFActivity (Ristocetin Co-Factor)

**Samples must be received within 4 hours**

**Turnaround:** 3 – 4 weeks

**Ref. Range:** vWF activity: 0.55 – 1.56 IU/mL
vWF Ag level: 0.50 – 1.60 IU/mL
Factor VIII Adult 0.50 – 1.49 IU/mL
VWF Cleaving Protease (vWFcp) Assay (ADAMTS13 Activity and Antibodies)

Laboratory: Sample is referred from Haematology to Molecular Genetics Laboratory, University College London.
Specimen: Blood 3mL blue Vacuette® (sodium citrate 3.2%) fill tube to mark.
Comment: Request must be booked in advance with the Haematology Laboratory CUH. Requested by Consultant Haematologist for further investigation of von Willebrand Disease. ADAMTS13 Assay Request form to be completed, must be sent on dry ice and samples can only be referred Monday or Tuesday (via Biomnis).

Turnaround: 1 – 2 months
Ref. Range: See report or contact University College London, 1st Floor Chenies Mews.

Warfarin Plasma Resistance Concentration and gene

Laboratory: Sample is referred from Haematology to The Centre for Haemostasis and Thrombosis, 1st Floor North Wing, St Thomas’ Hospital
Specimen: 2 x EDTA and 2 x Citrate, needs to be booked with the laboratory prior to sampling.
Comment: Requested by Coagulation Consultant

Turnaround: 2 – 3 Weeks
Ref. Range: N/A

West Nile Virus Antibodies

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin)

Turnaround: By arrangement
Report: Positive or negative

Whipple’s Disease

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL EDTA blood, CSF
Comment: PCR test performed by a reference laboratory (Molecular Pathology, Leeds)

Turnaround: 14 days
Report: Positive or negative

Whooping Cough

See Bordetella Species – Culture

Winter Vomiting Bug

See Norovirus – Norwalk-like viruses (NLV) /Small Round Structured Viruses (SRSV)
Wound Swab (Skin / Abscess / Decubitus ulcer / Bite / Burn swab)

Laboratory: Microbiology (Main laboratory)
Specimen: Always list site and type of wound on request form. Specimens of pus, if present, are preferred to swabs. Pus / fluids up to a volume of 20mL should be supplied (ideally a minimum of 1mL). Swabs should be soaked in exudate where possible. Specimen a representative part of the lesion. Specimen the deepest part of the wound, avoiding the superficial microflora.

Comment: The volume of specimen influences the transport time that is acceptable. Large volumes of purulent material maintain the viability of anaerobes for longer. Specimens should be transported to the laboratory within 3 hours after which the recovery of anaerobes is compromised. Results from delayed specimens must be interpreted with caution bearing in mind the difficulties in isolating anaerobes from these specimens. Routine processing of superficial swabs of ulcers should be discouraged. Swabbing dry crusted areas is unlikely to be helpful. If specimens are taken from ulcers the debris on the ulcer should be removed, the ulcer cleaned with saline and either a biopsy, or preferably a needle aspiration of the edge of the wound taken. A less invasive irrigation-aspiration method may be preferred. Using a small needle-less syringe, place the syringe tip under the ulcer margin and irrigate gently with at least 1mL sterile saline without preservative. After massage of the ulcer margin, repeat the irrigation with a further 1mL sterile saline. Massage the ulcer margin again, aspirate approximately 0.25mL of the fluid and place in a sterile, leakproof container.

Turnaround: Urgent microscopy Within 2 hours of receipt.
Culture: Preliminary report: 24 hours; Final report: 24-72 hours
Report: Microscopy: Report on the numbers of WBCs/cmm and the presence of organisms if present. Culture: “No growth” or “skin flora” or report any clinically significant organism isolated with sensitivities.

Yersinia Antibodies

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood
Comment: Performed by reference laboratory (Gastrointestinal Bacteria Reference Unit (GBRU), London)
Turnaround: 3 weeks
Report: Positive or negative for Yersinia enterocolitica and Yersinia pseudotuberculosis

Zika Virus

Laboratory: Microbiology (Infectious Diseases Serology)
Specimen: 4mL clotted blood (Serology), 4mL EDTA blood (Molecular)
Comment: Performed by a reference laboratory (National Virus Reference Laboratory (NVRL), Dublin)
Turnaround: 10 days
Report: Positive or Negative (Serology), Detected or Not Detected (Molecular)

Zinc

Laboratory: Clinical Biochemistry
Specimen: 4.0 mL blood in a metal-free plain tube (clotted sample).
Turnaround: 1 week
Ref. Range: 9 – 22 μmol/L
14 GLOSSARY OF ABBREVIATIONS

The abbreviations used in this handbook include names of tests are in accordance with current use and accepted recommendations.

ACE  Angiotensin converting enzyme
ACTH  Adrenocorticotrophic hormone
ADH  Antidiuretic hormone
AFB  Acid fast bacilli
AFP  Alpha- Fetoprotein
ALT  Alanine aminotransferase
ALP  Alkaline phosphatase
ANCA  Antineutrophil 172riiodothy antibody
ANF  Antinuclear Factor
APC  Activated protein C
APTT  Activated partial Thromboplastin time
ASOT  Antistreptolysin O titre
AST  Aspartate aminotransferase
BJP  Bence Jones Protein
C3  Third component of complement
C4  Fourth component of complement
CA  Carbohydrate antigen (tumour markers)
CEA  Carcinoembryonic antigen
CK  Creatine kinase
CMV  Cytomegalovirus
CRP  C-reactive protein
CSF  Cerebrospinal fluid
DDI  D-Dimers
DHEA  Dehydroepiandrosterone
DHEAS  Dehydroepiandrosterone sulphate
DVVT  Dilute Viper Venom test
EBV  Epstein Barr virus
EDTA  Ethylene diamine tetra-acetic acid
EGFR  Epidermal Growth Factor Receptor
EMA  Endomycial Antibodies
ENA  Extractable Nuclear Antigens
EPO  Erythropoietin
ESR  Erythrocyte sedimentation rate
FISH  Flourescence In Situ Hybridisation
FBC  Full blood count, full blood examination, complete blood count
FNAB  Fine needle aspiration biopsy
FSH  Follicle stimulating hormone
FT3  Free Triiodothyronine (T3)
FT4  Free thyroxine (T4)
GBM(Q)  Glomerular Basement Membrane Antibodies (Quick test)
GC  Gonococci
GGT  Gamma glutamyl transferase (transpeptidase)
GTT  Glucose tolerance test
HAV  Hepatitis A virus
Hb  Haemoglobin
HbA1c  Glycated haemoglobin
HbA2  Haemoglobin A2
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HbF</td>
<td>Haemoglobin F, fetal haemoglobin</td>
</tr>
<tr>
<td>HbS</td>
<td>Sickle haemoglobin, haemoglobin S</td>
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<tr>
<td>HBsAg</td>
<td>Hepatitis B surface antigen</td>
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<tr>
<td>HBV</td>
<td>Hepatitis B virus</td>
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<tr>
<td>hCG</td>
<td>Human chorionic gonadotrophin</td>
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<tr>
<td>HCO₃⁻</td>
<td>Bicarbonate</td>
</tr>
<tr>
<td>HCT</td>
<td>Haematocrit, packed cell volume</td>
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<tr>
<td>HCV</td>
<td>Hepatitis C virus</td>
</tr>
<tr>
<td>HDL</td>
<td>High density lipoprotein</td>
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<tr>
<td>HDNB</td>
<td>Haemolytic Disease of the Newborn</td>
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<tr>
<td>HGH</td>
<td>Human growth hormone</td>
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<tr>
<td>HIAA</td>
<td>5-Hydroxyindole acetate</td>
</tr>
<tr>
<td>HLA</td>
<td>Human leucocyte antigen</td>
</tr>
<tr>
<td>HMMA</td>
<td>4-hydroxy-3-methoxymandelate</td>
</tr>
<tr>
<td>HPV</td>
<td>Human papillomavirus</td>
</tr>
<tr>
<td>HSV</td>
<td>Herpes simplex virus</td>
</tr>
<tr>
<td>HVA</td>
<td>Homovanillate</td>
</tr>
<tr>
<td>HVS</td>
<td>High Vaginal Swab</td>
</tr>
<tr>
<td>HZV</td>
<td>Herpes zoster virus (varicella zoster)</td>
</tr>
<tr>
<td>ICCS</td>
<td>Intercellular cement substance</td>
</tr>
<tr>
<td>Ig</td>
<td>Immunoglobulin</td>
</tr>
<tr>
<td>IGF</td>
<td>Insulin-like growth factor</td>
</tr>
<tr>
<td>INR</td>
<td>International normalised ratio</td>
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<tr>
<td>IUCD</td>
<td>Intrauterine Contraceptive Device</td>
</tr>
<tr>
<td>kg</td>
<td>Kilogram</td>
</tr>
<tr>
<td>kPa</td>
<td>Kilopascal</td>
</tr>
<tr>
<td>KRAS</td>
<td>KRAS gene</td>
</tr>
<tr>
<td>LD</td>
<td>Lactate dehydrogenase</td>
</tr>
<tr>
<td>LDL</td>
<td>Low density lipoprotein</td>
</tr>
<tr>
<td>LGV</td>
<td>Lymphogranuloma venereum</td>
</tr>
<tr>
<td>LH</td>
<td>Luteinising hormone</td>
</tr>
<tr>
<td>MCH</td>
<td>Mean cell haemoglobin</td>
</tr>
<tr>
<td>MCHC</td>
<td>Mean cell haemoglobin concentration</td>
</tr>
<tr>
<td>MCV</td>
<td>Mean cell volume</td>
</tr>
<tr>
<td>MGUS</td>
<td>Monoclonal gammopathy of unknown significance</td>
</tr>
<tr>
<td>MMR</td>
<td>Measles, Mumps, Rubella IgG antibodies</td>
</tr>
<tr>
<td>MRSA</td>
<td>Methicillin-Resistant <em>Staph aureus</em></td>
</tr>
<tr>
<td>MSI</td>
<td>Microsatellite Instability</td>
</tr>
<tr>
<td>MSU</td>
<td>Midstream Urine</td>
</tr>
<tr>
<td>MTHFR</td>
<td>Methyltetrahydrofolate Reductase</td>
</tr>
<tr>
<td>PCR</td>
<td>Polymerase chain reaction</td>
</tr>
<tr>
<td>pCO₂</td>
<td>Partial pressure of carbon dioxide (CO₂)</td>
</tr>
<tr>
<td>PCP</td>
<td>Pneumocystis jirovecii</td>
</tr>
<tr>
<td>PCV</td>
<td>Packed cell volume</td>
</tr>
<tr>
<td>PIE</td>
<td>Pulmonary infiltration with eosinophilia</td>
</tr>
<tr>
<td>PNH</td>
<td>Paroxysmal nocturnal haemoglobinuria</td>
</tr>
<tr>
<td>pO₂</td>
<td>Partial pressure of oxygen (O₂)</td>
</tr>
<tr>
<td>PR</td>
<td>Prothrombin ratio</td>
</tr>
<tr>
<td>PSA</td>
<td>Prostate specific antigen</td>
</tr>
<tr>
<td>PT</td>
<td>Prothrombin time</td>
</tr>
<tr>
<td>PTH</td>
<td>Parathyroid hormone</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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</tr>
<tr>
<td>PTHrP</td>
<td>Parathyroid hormone related peptide</td>
</tr>
<tr>
<td>RAST</td>
<td>Radioallergosorbent test- see specific IgE</td>
</tr>
<tr>
<td>RCC</td>
<td>Red cell count</td>
</tr>
<tr>
<td>RDW</td>
<td>Red cell distribution width</td>
</tr>
<tr>
<td>RFLP</td>
<td>Restriction fragment length polymorphism</td>
</tr>
<tr>
<td>RPR</td>
<td>Rapid plasma reagin test</td>
</tr>
<tr>
<td>RSV</td>
<td>Respiratory syncytial virus</td>
</tr>
<tr>
<td>SHBG</td>
<td>Sex hormone binding globulin</td>
</tr>
<tr>
<td>SLE</td>
<td>Systemic lupus erythematosus</td>
</tr>
<tr>
<td>SM</td>
<td>Smith Antigen</td>
</tr>
<tr>
<td>STI</td>
<td>Sexually transmitted infection</td>
</tr>
<tr>
<td>T3</td>
<td>Triiodothyronine</td>
</tr>
<tr>
<td>T4</td>
<td>Thyroxine (tetraiodothyronine)</td>
</tr>
<tr>
<td>TBG</td>
<td>Thyroxine binding globulin</td>
</tr>
<tr>
<td>TORCH</td>
<td>Toxoplasmosis, rubella cytomegalovirus, herpes</td>
</tr>
<tr>
<td>TPHA</td>
<td>Treponema pallidum haemagglutination</td>
</tr>
<tr>
<td>TRH</td>
<td>Thyrotropin releasing hormone</td>
</tr>
<tr>
<td>TSH</td>
<td>Thyroid stimulating hormone</td>
</tr>
<tr>
<td>tTG</td>
<td>Tissue Trans Glutaminase Antibodies</td>
</tr>
<tr>
<td>VCA</td>
<td>Viral capsid antigen (EBV)</td>
</tr>
<tr>
<td>VIP</td>
<td>Vasoactive intestinal polypeptide</td>
</tr>
<tr>
<td>VRE</td>
<td>Vancomycin- Resistant Enterococci</td>
</tr>
<tr>
<td>vWf</td>
<td>von Willebrand factor</td>
</tr>
<tr>
<td>vWFAg</td>
<td>von Willebrand factor antigen</td>
</tr>
<tr>
<td>WCC</td>
<td>white cell count, leucocyte count</td>
</tr>
<tr>
<td>XDP</td>
<td>Cross linked fibrin degradation products, D-dimer</td>
</tr>
</tbody>
</table>
## 15 NAMES AND ADDRESSES OF REFERRAL LABORATORIES

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Referring Dept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addenbrookes Hospital</td>
<td>Addenbrookes Hospital Cambridge, Diagnostics Services, Department of Haematology, Hills Raod, Cambridge, CB2 0QQ</td>
<td>Haematology</td>
</tr>
<tr>
<td>Alpha One Foundation</td>
<td>RCSI Building, Beaumont Hospital, Dublin 9</td>
<td>Biochemistry</td>
</tr>
<tr>
<td>Anaerobe Reference Laboratory</td>
<td>NPHS Microbiology Cardiff University Hospital of Wales Health Park Cardiff CF14 4XW</td>
<td>Clinical Microbiology</td>
</tr>
<tr>
<td>Analytical Services International Ltd</td>
<td>St. George’s University Of London Cranmer Terrace, London SW17 ORE</td>
<td>Biochemistry</td>
</tr>
<tr>
<td>Antimicrobial Reference Laboratory</td>
<td>Department of Medical Microbiology Southmead Hospital Westbury on Trym Bristol BS10 5NB</td>
<td>Clinical Microbiology</td>
</tr>
<tr>
<td>Biochemical Genetics Unit</td>
<td>Box 247Addenbrooke’s Hospital Hills RoadCambridgeCB2 0QQ</td>
<td>Biochemistry</td>
</tr>
<tr>
<td>Biochemistry Department, St. James's Hospital</td>
<td>James's Street, Dublin 8, Ireland</td>
<td>Biochemistry</td>
</tr>
<tr>
<td>Biochemistry, Mater Misericordiae University Hospital (MMUH)</td>
<td>Eccles St., Dublin 7</td>
<td>Biochemistry</td>
</tr>
<tr>
<td>Biomnis Ireland</td>
<td>Three Rock Road, Sandyford Business Estate, Dublin 18, Ireland</td>
<td>Biochemistry, Haematology</td>
</tr>
<tr>
<td>Brucella Reference Unit (BRU)</td>
<td>Liverpool Clinical Laboratories, Royal Liverpool and Broadgreen University Hospitals NHS Trust, Duncan Building, Prescot St., Liverpool L7 8XP, England</td>
<td>Clinical Microbiology</td>
</tr>
<tr>
<td>Cancer Molecular Diagnostics CMD, St. James’s Hospital</td>
<td>Cancer Molecular Diagnostics, CMD, St James Hospital, James’s St., Dublin 8</td>
<td>Haematology</td>
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