

Mercy University Hospital	Laboratory User Manual	
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**TITLE: LABORATORY USER MANUAL**

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<b>Attachments: (1)Test Directory (Biochemistry, Blood Transfusion, Haematology, Microbiology), (2)Blood Tube Guide, (3)A High Sensitivity Troponin Algorithm to be used as a guideline for patients with suspected Non-STEMI-Acute Coronary Syndrome.</b>		

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- 1.1** This user manual is designed to give an overview of services available in the Pathology Department. It is intended as a quick reference guide for all Pathology users, both within the Hospital, and those from outside agencies. Results of laboratory tests are made available to patients through their Clinicians or General Practitioners.
- 1.2** This manual specifies the minimum requirements for the labelling of specimens and for the completion of request forms to ensure sufficient information is received for the requested service to be optimally delivered.  
This manual is a controlled document as part of the Mercy University Hospital (MUH) Quality Management System.
- 1.3** All Pathology services undergo continuous review through quality assurance and audit activities. The laboratories are committed to performing its activities in accordance with the requirements of the following regulations and standards:
- The current version of the International Standard ISO 15189 titled “Medical Laboratories Particular Requirements for Quality and Competency”.
  - The current version of the International Standard ISO 22870 titled "Point of Care Testing (POCT) – Requirements for Quality and Competence
  - ADR Transport Regulations P650 2011 & P620 2011(*Accord Européen relatif au transport international des marchandises Dangereuses par Route*, also known as the European Agreement concerning the International Carriage of Dangerous Goods by Road)
  - Statutory instrument 347 of 2011 which adapts the ADR regulations as defined above into Irish law.
  - EU Directive 2002/98/EC titled “Setting Standards of Quality and Safety for the Collection, Testing, Processing, Storage and Distribution of Human Blood and Blood Components” and amending directive 2001/83/EC.
  - EU Directive 2004/33/EC Annex IV titled “Storage, Transport and Distribution Conditions for Blood and Blood Components”.
  - Statutory instrument 360 of 2005 which adapts the EU Directives as defined above into Irish law.
  - AML-BB current version titled “Minimum Requirements for Blood Transfusion Compliance with Article 14 (Traceability) and Article 15 (Notification of Serious Adverse Reactions and Events) of EU Directive 2002/98/EC”.
- 1.13** The MUH Laboratory Management is committed to:
- Staff recruitment, training, development and retention at all levels to provide a full and effective service to its users.
  - The proper procurement, validation and maintenance of such equipment and other resources as are needed for the provision of the service.
  - The collection, transport and handling of all specimens in such a way as to ensure specimen integrity and thereby the correct performance of laboratory examinations.
  - The use of accredited examination procedures and methods that will ensure the highest achievable quality of all tests performed.
  - Reporting results of examinations in ways which are timely, confidential, accurate and clinically useful.
  - The assessment of user satisfaction, in addition to internal audit and external quality assessment, in order to effect continual quality improvement.

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## **2.0 GUIDE TO USING THIS MANUAL**

- 2.1** A controlled electronic of this manual is available via the Hospital intranet site under Pathology Department for internal customers and on the Mercy University Hospital's website [www.muh.ie](http://www.muh.ie) under GP information.
- 2.2** The Test Directory sections of the manual outlines the tests performed, the specimen required, turnaround time, reference range and other information regarding specimen collection. The test directory may be updated without updating the entire document. Notification if deemed necessary will be issued regarding the updates.
- 2.3** When key changes are made to either the tests or the services identified in this manual, the customer will be notified. The electronic copy of the manual will be modified and made available to the customer.

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### 3.0

## QUALITY POLICY

### *MUH Mission-Core Purpose & Core Values* *Compassion Excellence Justice Respect Team Spirit*

*'In keeping with the philosophy of the sisters of mercy, our mission is to provide a high quality care service in the spirit of Christian concern, in order to maintain & improve the health and well-being of individuals, families & the community we service. This we achieve by caring and support for the sick, suffering & grieving without prejudice'*

.....

#### Quality Policy Statement

The Pathology Department is committed to implementing the above mentioned Hospital Mission Statement and specifically to providing a high quality, efficient, cost effective and comprehensive pathology service to its users. The Pathology Department is committed to providing high quality standards with regards to all aspects of the clinical laboratory service to ensure a high standard of patient care.

#### **In order to ensure that the needs and requirements of users are met, the Pathology Department will:**

- Develop and maintain a Quality Management System, that integrates the processes required for the conduct of examinations and which sets and regularly reviews quality objectives, and implements a continuous quality improvement programme.
- Ensure all staff are familiar with the contents of the quality manual and all procedures relevant to their work.
- Aim to be a centre of excellence, committed to best professional practice and conduct, including the safeguarding of patient information, the quality of examinations and compliance with the Quality Management System.
- Ensure the health, safety and welfare of all staff and visitors to the laboratory.
- Ensure compliance with all relevant environmental legislation.
- Ensure continuing compliance as set by ISO 15189:2012, AML-BB, INAB regulations, relevant EU Directives and Irish Legislation - Statutory Instruments S.I. 360 of 2005, S.I. 547 of 2006, and S.I. 562 of 2006.
- Ensure the Quality Policy is communicated, understood and implemented throughout the laboratory and is reviewed for suitability and effectiveness at annual management review.

**Authorised by:** The Pathology Laboratory Director

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### 3.1 ETHICS AND THE PATHOLOGY DEPARTMENT

The Pathology Department ensures the Mercy University Hospital Corporate code of ethics and business conduct is adhered to with the aim to promote and maintain confidence and trust as well as the prevention of development or acceptance of unethical practices. The Pathology Department in line with the policy of the Mercy University Hospital adheres to this ethical code through the policies and procedures that govern the day to day running of operations. (REF; Clinical Governance Committee; Corporate code of ethics and business conduct

## 4.0 GENERAL INFORMATION

### 4.1 LOCATION

The Pathology Department of the Mercy University Hospital is situated on the 4<sup>th</sup> floor of the Lee View Block. The Laboratories can be accessed via the connecting corridor from the 2nd floor of the Main Hospital Building. It is composed of four departments, Clinical Biochemistry, Haematology, Microbiology and Blood Transfusion which are situated within the Pathology Section as follows:

Haematology	1 <sup>st</sup> section
Biochemistry	2 <sup>nd</sup> section
Microbiology	3 <sup>rd</sup> section
Blood Transfusion	1 <sup>st</sup> section Clinical Pharmacology Wing

### 4.2 POSTAL ADDRESS

The postal address for specimen delivery is:



Name of Specific Section Required  
 Pathology Department  
 Mercy University Hospital  
 Grenville Place  
 Cork City  
 Ireland

### 4.3 GENERAL ENQUIRIES

The hospital number is 021-4271971 and ask for the appropriate extension.

Advice on interpretation of results and sampling procedures will be directed to the appropriate department.

<b>Biochemistry</b>	
Secretary – Results / Enquiries	Ext. 5731
Main Laboratory-Results / Enquiries	Ext. 5733
<b>Haematology</b>	
Main Laboratory- Results / Enquiries	Ext. 5749
<b>Microbiology</b>	
Office - Results / Enquiries	Ext. 5716
Main Laboratory-Results / Enquiries	Office No. only
<b>Blood Bank</b>	
Office	Ext. 5655

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Main Laboratory-Results / Enquiries	Ext. 5609/5088
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<b>Phlebotomy</b>	
Enquiries	Ext. 5302/5002

#### 4.4 CONTACT INFORMATION

Key members of staff are listed below including their position and contact information.

##### Contact Details of key members of staff

##### Clinical Biochemistry

Dr. Michael Louw	Consultant Chemical Pathologist		<a href="mailto:michael.louw@biomnis.ie">michael.louw@biomnis.ie</a>
Ms. Eithne Barden	Chief Medical Scientist	5730	<a href="mailto:ebarden@muh.ie">ebarden@muh.ie</a>
Medical Scientist on call in Clinical Biochemistry: Contact switch			

##### Haematology

Dr. Clodagh Keohane	Consultant Haematologist	Ext: 5746	<a href="mailto:ckeohane@muh.ie">ckeohane@muh.ie</a>
Ms. Katherine Duggan	Chief Medical Scientist	Ext: 5745	<a href="mailto:kduggan@muh.ie">kduggan@muh.ie</a>
Medical Scientist on call in Haematology : Contact switch			

##### Microbiology

Dr. Deirdre O'Brien	Consultant Microbiologist	Ext. 5718	<a href="mailto:diobrien@muh.ie">diobrien@muh.ie</a>
Ms. Liz Fitzpatrick	Chief Medical Scientist	Ext. 5715	<a href="mailto:lfitzpatrick@muh.ie">lfitzpatrick@muh.ie</a>
Ms. Joanne Crowley	Infection Control Specialist	Ext. 5717 Bleep 6625	<a href="mailto:jncrowley@muh.ie">jncrowley@muh.ie</a>

Microbiology on-call: Split between the Biochemistry on call person and Haematology On-call.

- Biochemistry on call Microbiology tests include: positive blood cultures, antibiotic levels, needle stick injuries. On Sunday morning between the hours of 9.00AM-1.00PM Urines/CSF
- Haematology on call Microbiology-all other tests as per A-Z

Contact switch.

##### Blood Bank

Dr. Clodagh Ryan	Consultant Haematologist	Ext: 5214	<a href="mailto:cryan@muh.ie">cryan@muh.ie</a>
Mr. James Hopkins	Chief Medical Scientist	Ext: 5655	<a href="mailto:jhopkins@muh.ie">jhopkins@muh.ie</a>
Geraldine O'Sullivan/Conway/Aine Mulry	Haemovigilance Officer	Ext: 5955 Bleep 6463	<a href="mailto:haemovigilance@muh.ie">haemovigilance@muh.ie</a>
Munster Regional Transfusion Centre		16001	

Medical Scientist on call in Blood Bank: Contact switch

#### 4.5 LABORATORY HOURS

Department	Routine Hours	Deadline for specimen in Lab
Clinical Biochemistry	08:00-20:00 hrs Mon-Fri	19:30
	09:00-12:00 hrs Sat	11:30

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<b>Haematology</b>	08:00-20:00 hrs Mon-Fri 09:00-12:00 hrs Sat	19:30 11:30
<b>Microbiology</b>	08:00-20:00 hrs Mon-Fri 09:00-12:00 hrs Sat (urgents only)	17.00
<b>Blood Bank</b>	08:00-20:00 hrs Mon-Fri	15.30

#### 4.6 PHLEBOTOMY SERVICE AT MERCY UNIVERSITY HOSPITAL

The Phlebotomy Department provides a varied service within the hospital. It covers the all the wards. The Blood Room Clinic provides an important outpatient service to the General Practitioners in the City and County.

Wards	The service is Monday to Friday 07.30am to 3.30 pm. Blood Room situated in the Out Patients Department
Clinics	The service is Monday to Friday 08.30am to end of clinic.
GP service	9.00 am to 3.30 pm Weekend /Bank Holiday: Closed

Routine specimens arriving after the stated deadlines will be processed on the next routine working day. Due to the volume of work processed by the Laboratories, GP specimens may not be processed if they arrive in the Laboratory after 3pm. Processing schedules are adjusted to meet the varied workflow of holiday seasons but required urgent testing is provided as needed, if urgent testing is required ensure specimens must be marked urgent

### 5 LABORATORY REQUEST FORMS AND SPECIMEN BOTTLES

This section deals with the information that is required to be documented on the laboratory request form and the specimen bottle or container, prior to the analyses of samples.

#### 5.1 LABOATORY REQUEST FORMS

##### 5.1.1 Categories of Request Forms available at the Pathology Department Laboratory

The Pathology Department has specific request forms available for the wards / clinical area. These forms should be used to request Pathology Department Services

**It is important that the correct form is submitted to the Pathology Department for the appropriate service request.** (This provides the laboratory with the information relevant to that test/service).

##### **Haematology Laboratory Request Forms include:**

LF-HAE-30 Haematology Department request form

##### **Biochemistry Laboratory Request Forms include:**

LF-BIO-31 Biochemistry Department request form

LF-BIO-32 Biochemistry, emergency on call form

LF-BIO-33 Biochemistry Troponin-1

LF-BIO-26 Biochemistry Immunology request form

##### **Microbiology Laboratory Request Forms include:**

LF-MIC-1 Microbiology request form

LF-MIC-2 Microbiology emergency on call form

LF-MIC-3 Microbiology Vancomycin/Gentamicin Levels



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**Blood Transfusion Forms include:**

**LF-BB-1 Blood Group and Compatibility Request Form** - used for blood group and antibody screen requests and requesting compatible blood, platelets or plasma products

**LF-BB-4 Request for Transfusion Reaction Investigation** used to report and request an Investigation to a suspected adverse transfusion reaction

**LF-BB-156 Derivative Request Form** - used for ordering derivative products.

**Referral Test Request Forms**

BT-255 Request for HLA Typing (Specialised Referred Test)  
Request for Molecular Analysis form

**5.1.2 Process For Ordering The Pathology Department request Forms-** Request forms and specimen/specimen containers are issued from Hospital Stores. **Forms for Blood Transfusion are available through the Haemovigilance Officer / Blood Transfusion Laboratory.**

**5.2 SPECIMEN COLLECTION**

5.2.1 It is the responsibility of the Medical Officer/trained personnel to:

- Obtain consent from the patient where necessary
- Positively identify the patient from whom the specimen is taken.
- Take the appropriate specimen type and volume. Ensure that the specimen container is suitable for use (i.e. specimen container intact and the expiry date is not exceeded).
- Safely dispose of the materials used in the collection of specimens.
- Ensure that the test / services requested are appropriate.
- Ensure that specimens are delivered to the Pathology Department within a timeframe appropriate to the nature of the tests requested.
- Ensure that appropriate transport containers are used (for the safety of all handlers).
- Ensure that patient confidentiality is maintained.

**Reference:** Venepuncture policy for Phlebotomists Registered Nurses and Medical Practitioners

5.2.1 It is the policy of the Pathology Department to treat all diagnostic specimens as potentially infectious or high risk. Therefore, we advise that universal precautions be taken in the collection, packaging and the delivery of specimens being sent to the laboratories for analysis.

5.2.2 Specimens should be freshly drawn venous specimens without dilution by IV fluid. Specimens should not be exposed to direct sunlight or extremes of temperature, transported at room temperature (unless for referral for cold agglutinins) as expediently as possible to the appropriate Laboratory.

5.2.3 Specimens referred to the Pathology Department should conform to the requirements for the timing of specimen collection, as defined in Section 5.3.

5.2.4 The date and time of receipt to the testing Laboratory is noted either through a date and time stamped or through the LIS.

5.2.5 On receipt in the laboratory, specimens are registered with a specimen number and recorded in the LIS/registration log book, as per Standard Operating Procedures.

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5.2.6 Scientific staff will review request forms and specimens to determine if they are suitable for the tests requested. Where it is determined that the request form and/or specimen is not suitable, the requesting ward will be informed.

**5.2.7 Incorrectly or incompletely labelled request forms/ specimen bottles may result in the tests not being undertaken.**

### 5.3 TIMING AND CONDITION OF BLOOD SPECIMENS

**5.3.1 Timing of Specimens** for some tests must be collected with the patient fasting, or with knowledge of when food was last taken (e.g. glucose). Some tests must be collected in the basal state or with due regard to diurnal variations. Some tests may be performed only after prior arrangement with the laboratory e.g. stool parasitology. Where doubt exists, the appropriate laboratory should be consulted.

**5.3.2 Condition of sample:** Laboratory personnel must inspect prior to testing each specimen received for:

- presence of **haemolysis**
- presence of **clots**
- **Inadequate specimen volume**
- **Age** of the specimen
- **Incorrect Storage Conditions**

Where specimens are found to be unsuitable on receipt at the Laboratory, a **second specimen** will be requested.

#### 5.3.3 General Collection and Transport Guidelines for microbiology specimens

Where possible, collect specimen prior to the administration of antimicrobial therapy. If patient is on antibiotics, please identify which one on laboratory request form.

Collect specimen with as little contamination from indigenous microbial flora as possible to ensure that the sample will be representative of the infective site.

Collect specimen using sterile equipment and aseptic technique to prevent introduction of foreign micro-organisms.

Collect an adequate amount of specimen. Inadequate amounts may yield false-negative results.

Generally only swabs with transport medium should be used.

Specimens should be transported as soon as possible. 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.
Breath Test Specimens – hold specimens at room temperature
Quantiferons – hold specimens at room temperature

#### 5.3.4 Guidelines for the collection of samples in relation to previous transfusions/pregnancies

##### Routine Requests for Compatibility Testing:

Patient Type	<sup>1</sup> Working limits for use of blood samples for pre-transfusion testing
Patient transfused or pregnant in last 3 months	Up to 72 Hours (3 days)
Patient not transfused and not pregnant in last 3 months	<sup>2</sup> Up to 7 Days*

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<sup>1</sup> This is the time between the sample being taken and subsequent transfusion

<sup>2</sup> Once transfusion has started, sample is valid for 72 hours from the time commenced.

**Refer to BCSH Guidelines for Pre-transfusion Compatibility procedures in Blood Transfusion Laboratories, 2012**

**\*Currently samples received from the Pre assessment clinic are valid for up to 14 days provided they fulfil all the other suitability criteria**

#### 5.4 REQUEST FORM AND SPECIMEN LABELLING

The criteria for specimen acceptance, as described below, are strictly adhered to in order to comply with accreditation standards and in the interest of patient safety. Failure to provide the required data shall lead to rejection of the specimen and request form. Laboratory personnel are acting correctly when they take action to ensure that the minimum standards set out in this policy are met at all times.

**Always perform the following steps in this order:**

Check the identity of the patient.

Label the container – SURNAME, FIRST NAME RID, DOB, WARD and DATE of collection.

Sign, Initial

Place the specimen in the labelled container.

**ADDRESSOGRAPH LABELS ARE NOT ACCEPTABLE ON:  
BLOOD TRANSFUSION SAMPLE BOTTLES AND REQUEST FORMS  
BLOOD CULTURE BOTTLES**

**5.4.1** It is essential that the following **patient identifiers** be recorded in a legible manner on all specimen bottles referred to the Laboratory:

1. **Surname**
2. **First Name**
3. **Date of Birth**
4. **Regional Identifier (RID)**

**5.4.2** The following **specimen information** is required and should be documented in a legible manner on the specimen bottle:

1. **Date of Specimen**
2. **Time Specimen was taken**
3. **Initials of person taking the specimen**
4. The **ward** may also be recorded on the specimen

**ALL SPECIMENS AND FORMS MUST BE LABELLED IMMEDIATELY AFTER SAMPLING.  
LABELLING SHOULD TAKE PLACE BESIDE THE PATIENT / AT THE BEDSIDE TO PREVENT  
MISIDENTIFICATION AND LABELLING ERRORS**

When placing into specimen carrier bag, ensure that details on specimen correspond to details on form.

In situations where the patient places the specimen into the container (e.g. when taking an MSU), identity of patient must be checked and container labelled, before giving to the patient.

#### 5.5 COMPLETION OF REQUEST FORM

**5.5.1** The request form must contain the following details, either on a printed label or clearly written: Specimens will be rejected if Patient Information Details (PID) are insufficient (see individual lab requirements) or do not match details on form.

**5.5.2** It is very helpful for us to receive a brief set of clinical details on the request form.

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**5.5.3** Please note the specific requirements of individual laboratories

**Biochemistry / Haematology:** Analysis / Tests Required

**Microbiology:** Analysis / Tests required and specimen type

**Blood Transfusion:** See 5.5.7

**5.5.4** Each Department has its own colour coded request form. There are also emergency forms for on-call on urgent specimens for Biochemistry and Microbiology. Please use appropriate form.

**5.5.4** Some of the laboratory request forms have more than one page; if using printed labels please put a printed label on each page of the request form.

**5.5.5** It is essential that the following **patient identifiers patient identifiers** be recorded in a legible manner on all Pathology Department Request forms:

1. **Surname**
2. **First Name**
3. **Date of Birth\***
4. **RID (RID)\***
5. **Patient Gender**
6. **Clinical Details.**

**Note:** Biochemistry, Haematology and Microbiology-accept RID/DOB as patient identifiers. Blood Transfusion requests must contain all patient identifiers.

**5.5.6** The following **specimen information** is required and should be documented in a legible manner on the request form:

1. Date of Specimen
2. Time Specimen was taken (timing in relation to antibiotic dose essential for Antibiotic Assays & for some Biochemistry tests)
3. Consultant or GP& Bleep No. when available, .MCRN no.
4. Patient's address
5. Clinical details & relevant therapy (previous transfusion history, antibiotic treatment important for Microbiology)

**5.5.7** The **Blood Group and Compatibility Request Form (LF-BB-1)** must also include:

- **Patient Address**
- **Hospital, Ward**
- **Consultant's Name**
- **Prescribers Name, Bleep No., MCRN No., Sample Collector Name, Signature, Date, Time (Declaration must be signed)**
- **Clinical Condition / Reason for Transfusion / Reason for Requesting Tests.** Relevant clinical information appropriate to the test(s) requested must be supplied. The specific clinical indication for a transfusion request / reason for transfusion must be documented on the form.
- **Patient transfusion history** (if known): Indicate if the patient was previously transfused/transfused in last 3 months (date and details) i.e. details of previous transfusions including the facility and date of transfusion.
- **Transfusion Reactions** (if any): Indicate if the patient has had a previous transfusion reaction (date and details)
- **Stem cell/organ Transplant** (if applicable): Indicate if the patient has received a transplant (date and details)
- **Obstetric History:** Indicate if the patient is pregnant/pregnant in past 3 months/ received Anti-D Ig (date and details)
- **Test and Component/Product Required:** Group and Crossmatch. Group and Antibody Screen /Hold, , Other tests

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- **Number and Type of Component/Product(s)** required, and **Date and Time required**
- **Patient Special Requirements** (if any) e.g. CMV-/Irradiated
- A clear indication as to whether the tests/services requested are urgent or routine.  
**Where a request is urgent the reason for urgency must be stated on the form and the Blood Transfusion Laboratory must be phoned in advance**

**5.5.8** The microbiology request form LF-MIC-76 should also include:

- The identification of the specimen source and/or specific site is important so that proper culture media will be selected during processing in the laboratory.
- Any special requests such as Diphtheria, actinomyces, nocardia etc should be noted on the microbiology request form.

## **5.6 EXCEPTIONS FOR LABELLING REQUIREMENTS**

**5.6.1 Exceptions may be made for specimens from the following groups:**

- Trauma/unconscious or patients admitted through the Emergency Department where the identity is not yet established.
- Investigations where the delay in acquiring a new specimen might seriously prejudice a successful clinical outcome.
- Investigations where the specimen cannot be replaced, e.g. pre transfusion specimens post transfusion reaction, specimens taken at specific time periods

**5.6.2 In the above exceptions, the Patient Identifiers must include:**

- RID (RID)
- Patient Gender
- Approximate Age

**5.6.4** In the above exceptional circumstances non compliant specimens may be accepted for testing with a documented authorised concession. This concession will only be granted when the requesting clinician having verifying the patient identity completes a Specimen / Request Concession Form (laboratory specific) or on the original request form depending on the laboratory in question.

In such cases the Pathology Department will not be responsible for errors made as a result of unacceptable labelling and/or specimens issued by the requesting clinician

**5.6.5** The Pathologist 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.

## **5.7 INCORRECTLY LABELLED SPECIMENS/REQUEST FORMS AND SPECIMEN SUITABILITY**

Where the requirements with respect to labelling of the specimen bottle or the request form or specimen suitability issues are not met, the following will apply.

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## Specimen Labelling

Specimen	Action by Laboratory	Action Required by Ward / Clinician
<ul style="list-style-type: none"> <li>No specimen received</li> </ul>	Ward / Clinician will be phoned informing them of the event. This will be documented on the request form	A second specimen must be collected with a new request form.
<ul style="list-style-type: none"> <li>Specimen Unlabelled</li> </ul>	Specimens will NOT be processed This will be recorded on the request form. Ward/Clinician will be phoned requesting a second specimen	A second specimen must be collected with a new request form
<ul style="list-style-type: none"> <li>Absence of any of the mandatory patient identifiers on the specimen</li> </ul>	Ward / Clinician will be phoned informing them of the event and requesting a second specimen. This will be documented on the request form. In an acute emergency, the clinician responsible may complete a Specimen / Request Concession Form accepting responsibility for the amendments made to the inadequate/incorrect details.	A second specimen must be collected with a new request form.
<ul style="list-style-type: none"> <li>Mislabeled Specimens where there is a major conflict in any of the mandatory patient identifiers</li> </ul>	Specimens will NOT be processed This will be recorded on the request form. Ward/Clinician will be phoned requesting a second specimen	A second specimen must be collected with a new request form.
<ul style="list-style-type: none"> <li>Minor miscellaneous specimen labelling issues</li> </ul>	Dealt with on a case by case basis	
<ul style="list-style-type: none"> <li>Specimen collected but time of collection not indicated on either the request form or specimen bottle</li> </ul>	The time of collection will not be entered into the LIS system. Certain tests eg ESR, APTT must be performed within specific time post phlebotomy, if no time of phlebotomy is supplied these tests will be rejected	In the event that a sample is procured from a patient more than one on a given day and the time of procurement is not noted, the chronological numbering sequence will not be order, in this case look at specimen number and chronological sequence i.e. earlier specimen will have an earlier number
<b>Blood Transfusion specific labelling requirements</b>		
<ul style="list-style-type: none"> <li>Addressograph label on specimen</li> </ul>	Specimens will NOT be processed This will be recorded on the request form. Ward/Clinician will be phoned requesting a second specimen	A second specimen must be collected with a new request form

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<ul style="list-style-type: none"> <li>• Date/time of procurement not written on bottle or form</li> <li>• Specimen bottle not signed by person taking the specimen</li> </ul>	<p>Ward / Clinician will be phoned informing them of the event. This will be documented on the request form.</p> <p>The person who took the specimen will be requested to attend the laboratory to complete the omitted information and sign a Specimen/Request Concession Form</p>	<p>The person who took the specimen must come to the laboratory to record the omitted information on the specimen bottle. The person responsible must also sign a Specimen/Request Concession Form</p>
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### Specimen Suitability

Specimen Suitability	Action by Laboratory	Action Required by Ward/ Clinician
<ul style="list-style-type: none"> <li>• Evidence of Haemolysis</li> <li>• Inadequate Specimen volume</li> <li>• Age of Specimen</li> <li>• Specimen Integrity</li> <li>• Miscellaneous Quality Issues</li> </ul>	<p>The Laboratory will make a decision whether or not the specimen is suitable for testing.</p>	<p>A second specimen will be requested where appropriate.</p>
<ul style="list-style-type: none"> <li>• Specimen Bottle Expired</li> </ul>	<p>Specimen will not be processed</p>	<p>Second specimen will be requested</p>

### Request Form

Request Form	Action by Lab	Action Required by Ward / Clinician
<p>No request form provided with the specimen.</p>	<p>A second specimen will be requested. The original specimen will be discarded. In an acute emergency, the clinician responsible may complete a Specimen / Request Concession Form accepting responsibility for the amendments made to the inadequate/incorrect details.</p>	<p>A second specimen must be collected with a new request form.</p> <p>In an acute emergency, the clinician responsible may complete a Specimen / Request Concession Form accepting responsibility for the amendments made to the inadequate/incorrect details.</p>
<p>Inadequate or Incorrect Patient Details Recorded:</p> <ul style="list-style-type: none"> <li>• Patient Surname(incomplete / incorrect spelling)</li> <li>• Patient First Name (incomplete / incorrect spelling)</li> <li>• Gender of Patient</li> </ul>	<p>The Laboratory will make a decision whether or not the specimen is suitable for testing. If deemed acceptable the incorrect spelling will be noted on the final report.</p>	

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<p>Borderline examples:</p> <ul style="list-style-type: none"> <li>• Clinical Information (not supplied)</li> <li>• Incorrect test requested</li> <li>• No test requested</li> <li>• Address (absent/incorrect)</li> <li>• Ward or location (absent)</li> </ul>	<p>The laboratory will make a decision on whether or not the specimen is suitable for testing. Contact ward/clinician to confirm correct details.</p> <p>A second specimen may be requested. Details of information given by Clinician to be recorded on the request form.</p>	<p>Clinician who took the specimen to be contacted to confirm details.</p>
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<b>Blood Transfusion specific Request form requirements</b>		
Inadequate or Incorrect Patient Details Recorded: <ul style="list-style-type: none"> <li>• Patient Surname(incomplete / incorrect spelling)</li> <li>• Patient First Name (incomplete / incorrect spelling)</li> <li>• Gender of Patient</li> <li>• M.R.N (RID)</li> <li>• Date of Birth</li> </ul>	A second specimen will be requested.  In an acute emergency, the clinician responsible may complete a Specimen / Request Concession Form accepting responsibility for the amendments made to the inadequate/incorrect details.	A second specimen must be collected with a new request form
Declaration not signed by the person taking the specimen (blood Transfusion specific requirement)	Ward / Clinician will be phoned informing them of the event. The person who took the specimen will be requested to attend the laboratory to sign the declaration and sign a Specimen/Request Concession Form	The person who took the specimen must come to the laboratory to sign the declaration The person responsible must also sign a Specimen/Request Concession Form
Prescriber/Ordering Clinician not identified (blood Transfusion specific requirement)  Date and time of collection not indicated / not correct.  Miscellaneous form issues	The laboratory will make a decision on whether or not the specimen is suitable for testing. A second specimen may be requested Contact the ward/clinician and ask for clarification. The clinician responsible may sign a Specimen / Request Concession Form in the Pathology Department accepting responsibility for correction of the omission/ error.	A Specimen / Request Concession Form accepting responsibility for the labelling of the request form

## **6 SPECIMEN DELIVERY, PACKAGING, STORAGE AND TRANSPORT REQUIREMENTS**

### **6.1 General Information-**

As a general rule, all blood and body fluids should be handled as potentially contaminated and, therefore, hazardous. Standard Precautions must be strictly observed. Infection control guidelines for dealing with biological spills should be followed in the event of a leakage or spillage or a specimen during transport or handling.

The transport of specimens to the Laboratory must be done in such a way as to minimise the risk of infection to those who may come in contact with the specimens e.g. taxi drivers, postal workers, porters, laboratory staff etc.

Note: Routine specimens (where testing will be performed the following day) collected and delivered to the laboratory during the out of hours period will result in an increase in the turnaround time for the test.

**6.2 Internal Transport of Specimens-**The transport of specimens to the laboratory from on-site locations is by the use of the portering services or the pneumatic air tube system. The following guidelines for sending specimens internally must be followed:

- Specimens must be placed within the bag that is attached to the request form. This bag must then be sealed.
- Specimen containers that are contaminated externally must not be sent to the laboratory.
- When sending several specimens to the laboratory special sealable plastic bags should be used.
- Specimens must never be sent in paper carrier bags.

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- Blood gas specimens must never be sent to the Laboratory with the needle still attached.
- Under no circumstances should anyone transport specimen containers in their hands or pockets.

**6.3 Pneumatic Air Tube System**-Pneumatic tube transport systems can provide a safe, efficient and rapid means of sending specimens to the laboratory. Each individual packaging carrier capsules may be filled with up to four (4) individually packaged specimens. Blood culture bottles, CSFs, bone-marrow, Histology specimens are not to be sent via the pneumatic air tube system.

Sending procedure:

- Place specimens to be transported into the carrier capsule provided.
- Key in the code of destination address. A directory at each station identifies location to which carriers may be sent.
- Enter the carrier capsule into the sending funnel.
- *Caution:* Keying the correct number is crucial. If a specimen is sent to the incorrect location it may be difficult to retrieve. Do not send damaged or contaminated carriers through the system.
- Receiving procedure:
- Remove carrier from receiver bin in a timely fashion.
- Unlatch carrier and remove contents observing Standard Precautions.
- Return carrier to station indicated on carrier, using the procedure above.
- If carrier belongs to receiving station, place in carrier holder.

**Trouble Shooting: Should a problem arise with the system, Please contact the maintenance department.**

**6.4 Transport of specimens by the Postal Service**

Specimens sent to the laboratory e.g. from GP surgeries should be packaged by the sender, in appropriate specimen containers and packaging, and should be properly labelled. Any package that is not packed correctly or marked as directed may be rejected by An Post and destroyed. The following guidelines must be obeyed:

- The specimen must be enclosed in a primary receptacle. The sender must ensure that the container is the appropriate one for the purpose, that the specimen container is properly closed and that it is not externally contaminated by the contents.
- The primary receptacle must be placed in a secondary watertight receptacle.
- Absorbent material must be placed between the primary and secondary receptacle.
- An outer form of packaging such as a padded envelope (jiffy bag) must then be used to post the specimen. Ordinary envelopes must never be used.
- The package must be clearly marked “Diagnostic Specimen – Fragile with Care”. It must also show information on who to contact in case of loss, damage or leakage.
- Specimens containing hazard group 4 agents should not be sent by post (a courier should be used).
- Specimen bags must not be sealed with pins, staples, metal clips etc. and must not be used more than once.

**6.5 Transport of Specimens by courier, van or taxi (i.e. by means other than by An Post)**

Specimens sent to the laboratory must be packaged correctly according to guidelines for sending of specimens through the normal post. Alternatively, special transport boxes may be used, which conform to the following guidelines:

- The transport box must be made of smooth impervious material such as plastic or metal, which can easily be disinfected or cleaned.
- The transport box must be secured with a fastenable lid.
- The box must retain liquid in the event of leakage of a specimen.

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- The box must clearly labelled with the warning ‘Diagnostic Specimen-Fragile with Care’. The label must identify the sender of the package, including relevant telephone numbers to be contacted in case of emergency e.g. if there is leakage of specimens or if the box is found unattended. The label must clearly state that the box must not be opened or tampered with by unauthorised personnel.

## **6.6 Disposal of Waste Material Used in Specimen Collection**

All materials used in the collection of specimens should be treated as potentially hazardous and discarded according to the hospital guidelines for waste management and in compliance with relevant regulations.

## **6.7 Storage Of Examined Specimens For Archive And Look Back Purposes:**

- 6.7.1 Specimens are stored for a minimum period of week in a designated fridge/freezer. For testing on archive specimens it’s important to ring the laboratory in question to ensure specimen suitability.

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## 7.0 LABORATORY SERVICES

### 7.1 PROVISION OF SERVICE

Service Name	Service Description
<b>Provision of Diagnostic Service</b>	There is a wide range of Laboratory tests available. A general primary specimen collection manual is in place but currently uncontrolled and under review.
<b>Blood Transfusion Laboratory Service</b>	The Hospital Blood Transfusion laboratory provides routine and emergency compatibility testing for both surgical and medical patients. The laboratory provides a stock of manufactured blood products including solvent detergent plasma. The laboratory is responsible for ensuring traceability of all blood and blood components transfused and blood products administered within the MUH. For the full list of Blood Transfusion services refer to the Blood Transfusion Department Primary Specimen and User Manual LMn-BB-2.
<b>Biochemistry Laboratory Service</b>	The Biochemistry Department deals with the biochemical basis of disease and the use of biochemical tests for its diagnosis, prognosis, screening and management. The laboratory offers a diagnostic, analytical and interpretative service for a large range of analytes in body fluids. The Laboratory provides a reliable analytical service and advice on the management of patients with metabolic disturbances.
<b>Haematology Laboratory Service</b>	A diagnostic haematology service is provided. Tests provided in routine Haematology include Full Blood Count (FBC), White Blood Cell Differential (Diff), Erythrocyte Sedimentation Rate (ESR), Reticulocyte count (Retic), Bone Marrow investigation, Rheumatoid arthritis and infectious mononucleosis (monospot), Sickle screening and Malaria investigation. Tests provided in routine coagulation include Prothrombin time (PT), International Normalised Ratio (INR), Activated Prothrombin time (APTT), Fibrinogen and D-Dimer. The department is accredited by the Royal College of Pathologists and Irish Committee Hospitals Medical Training (ICHMT) for training of Specialist Registrars in Clinical and Laboratory Haematology.
<b>Microbiology Laboratory Service</b>	The Microbiology Department offers a comprehensive range of diagnostic services in routine Bacteriology, Parasitology, Serology and Virology as well as consultation in microbiology, infectious diseases and antibiotic utilisation and provision of statistical and cumulative data for infectious disease monitoring for MUH & SIVUH
<b>Consultant Service / Haematology</b>	Consultant pathology services are available in the following specialities: Biochemistry, Blood Transfusion, Haematology and Microbiology. Refer to section 10.1 advisory services for further information provided by the consultants.
<b>Haemovigilance &amp; Traceability Service</b>	The Haemovigilance & Traceability Service consists of a set of defined clinical, Blood Transfusion and nursing standard operating procedures, designed to monitor, detect and report serious adverse and unexpected events relating to blood components/products and reactions in recipients. Haemovigilance, in conjunction with blood transfusion laboratory staff, is responsible for ensuring traceability of all blood and blood components transfused and blood products administered within the MUH
<b>Phlebotomy service</b>	The phlebotomy department operates on a routine basis Monday to Friday to take blood specimens for diagnostic testing from in-patients. Outside these hours, blood specimens are taken by trained hospital personnel. Outpatient phlebotomy is from 8.am-4.30pm Monday to Friday.
<b>Point of Care testing</b>	A point of care testing service is available in the hospital. A Blood Gas analyser is available in Intensive Care & ED. Blood Glucose Meters are located throughout the hospital to monitor known Diabetics. Only trained personnel should use the equipment.

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## 7.2 ADVISORY SERVICE PROVIDED BY THE LABORATORY

The Laboratory Medical and Scientific staff provide an extensive advisory service.

- **Laboratory scientific** staff give advice in relation to timing of specimen collection, including repeat frequency of samples.
- **The Clinical Consultants** advisory service includes the following:
  - Examination of specimens, authorisation, interpretation and reporting of the results obtained and communication with relevant clinicians.
  - Ensuring that the service provided in the Department meets clinical needs.
  - Liaison with hospital doctors, other hospital staff and GPs concerning the diagnosis and management of patients.
  - Attends regular quality meetings
  - Reviews and signs off on external quality control schemes and non conformances of medical significance
  - Approves clinical procedures, Quality Manual, Primary Sample User Manual, Validation plans and reviewing and approving reference ranges
  - Participation in hospital clinical conferences
  - Advising the Hospital on relevant policies and being available to provide specialist expertise on relevant Hospital working groups and committees.
  - Advising the Hospital on matters of Health and Safety when appropriate.
  - Participation in business planning, including the introduction and assessment of new methods, evaluation and organisation of staff and equipment requirements.
  - Participation in the education and training of Pathology Laboratory Staff.

The Laboratory Clinical Consultants provide an advisory service to clinical users, and laboratory staff, twenty four hours a day, seven days a week. The service for Haematology and Blood Transfusion is available through the main switchboard (021 4271971) of the Mercy University Hospital who provide a city wide cover on a rotational basis. The advisory service for Biochemistry and Microbiology is through contacting the Clinical Chemical Pathologist and Clinical Microbiologist directly by mobile phone (available from the Laboratory).

The Medical Microbiologist provides advisory service to other health care workers including doctors, nurses and hospital managers in the MUH, SIVUH and General Practitioners in the Cork area; twenty four hours a day, seven days a week, relating to diagnosis, management and prevention and control of infectious diseases. The microbiologist also liaises with public health physicians to ensure prompt reporting of communicable diseases to the department of public health.

## 7.3 LABORATORY TESTS/PROFILE DESCRIPTION

**7.3.1 TEST PROFILE DESCRIPTION:** Refer to attachment titled 'Laboratory test/profile section for full details. This section outlines the tests that are available in the different pathology laboratories. Each Laboratory test will be described under the following headings:

- Test name
- Specimen type/site
- Specimen requirements
- Turnaround time

The test directory section is subject to change on a frequent basis, such as where the tests are carried out and the associated turnaround times or tests may be added to the directory. This change will not be reflected in the overall user manual and the current revision. Users will be notified of changes to the test directory through memos or highlighted in a specific location associated with this manual which will list any changes.

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**7.3.2 TURNAROUND TIMES** is defined as the time from specimen receipt into the LIS system or in the case of the Blood Transfusion laboratory from the time the specimen is receipted into the laboratory to the time results/services are available for issue.(See tests profiles for Exceptions. Confirmation of some reactive specimens and specimens referred to external reference laboratories may have extended turnaround times.) If turnaround time is indicated in days, this is based on routine working days and excludes weekends and Public Holidays.

**Non compliance with the turnaround times**

- Should there be a significant delay in the expected turnaround times, the requestor will be notified. In the instances where the delay could compromise patient care, the medical/ clinical personnel will be notified.
- The requestor must inform the laboratory of any change in the urgency of the test result/blood product required so that appropriate action can be taken.

**7.4 FURTHER SERVICE REQUESTS ON THE PRIMARY SPECIMEN**

Subject to individual analyte stability, further tests on a specimen that is already in the laboratory can be requested by contacting the Laboratory and/or information provided to the laboratory.

**7.5 REPEAT EXAMINATION DUE TO AN ANALYTICAL FAILURE**

In the event of an analytical failure, it is the policy of the laboratory:

- Repeat the test using the back up procedure OR
- Store the specimen in appropriate conditions until the cause of the analytical failure is identified and corrected and then repeat the test. The urgency of the outstanding specimen is reviewed by the Chief Medical Scientist or nominee.
- Where the primary specimen has been compromised due to an analytical failure, it may be necessary to request a replacement specimen for testing.
- It is the policy of the laboratory to pursue further investigation using the primary specimen, where possible.

**7.6 TESTS NOT LISTED**

If you require a diagnostic test that is not listed, please contact the pathology department who will endeavour to outsource as appropriate your test requirement.

**7.7 SPECIMEN REFERRAL TO AN EXTERNAL LABORATORY**

Where further testing is relevant to the investigation or diagnosis of the conditions of symptoms which gave rise to the original test request then it is the policy of the Pathology Department to pursue a diagnosis by performance of additional tests using the primary specimen.

Tests not done on-site are sent to outside laboratories for analysis. Tests to which are under the scope of accreditation are only sent offsite to other accredited laboratories when testing on site is not possible. Information on most of these tests is included in the test directory. In addition, the Department arranges for less usual tests to be performed by outside collaborating laboratories.

**7.8 EMERGENCY OUT OF HOURS SERVICE**

Tests provided out of hours are shown in the table below. If Any Other Tests Is Required The Person Requesting The Test Should Contact The Relevant Laboratory Medical Consultants or Chief/Senior Medical Scientist To Request The Test.

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### TESTS AVAILABLE ON-CALL

Test	Laboratory	Unrestricted	Restricted Requiring Consultation
Alanine aminotransferase (ALT)	Biochemistry	√	
Albumin	Biochemistry	√	
Alkaline phosphatase (ALP)	Biochemistry	√	
Antibiotic Assays	Microbiology		√
Amylase	Biochemistry	√	
Antibody Investigation	Blood Transfusion	√	
APTT	Haematology	√	
Aspartate aminotransferase (AST)	Biochemistry	√	
Blood Cultures	Microbiology	√	
Blood gases	Biochemistry	√	
Blood Group / Antibody Screen (Group & Hold)	Blood Transfusion	√	
Blood Group and Compatibility Testing	Blood Transfusion	√	
b-HCG (Blood) <sup>1</sup>	Biochemistry		√
Calcium	Biochemistry	√	
Carbamazepine <sup>2</sup>	Biochemistry		√
Carboxyhaemoglobin (Blood Gas)	Biochemistry	√	
Chloride	Biochemistry	√	
Clostridium difficile	Microbiology		√
Compatibility Testing (on a previous Group & Hold)	Blood Transfusion	√	
Creatine kinase (CK)	Biochemistry	√	
Creatinine	Biochemistry	√	
CSF Microscopy and Culture	Microbiology	√	
CSF Protein and Glucose	Biochemistry	√	
Digoxin <sup>2</sup>	Biochemistry		√
Direct Antiglobulin Test	Blood Transfusion	√	
ESR	Haematology	√	
Gamma glutamyltransferase (GGT)	Biochemistry	√	
Fibrinogen	Haematology	√	
Full Blood Count (FBC)	Haematology	√	
Glucose	Biochemistry	√	
Hepatitis B/C or Hep B antibodies for needlestick injuries	Microbiology	√	
INR	Haematology	√	
Iron <sup>2</sup>	Biochemistry		√
Lactate (Blood Gas ICU)	Biochemistry	√	
Lactate dehydrogenase (LDH)	Biochemistry	√	
Lithium <sup>2</sup>	Biochemistry		√
Magnesium	Biochemistry	√	
Malaria Screen	Haematology	√	
Methaemoglobin-(Blood Gas)	Biochemistry	√	
Microbiology – urgent specimens for culture	Microbiology		√

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Test	Laboratory	Unrestricted	Restricted Requiring Consultation
Mycoplasma pneumoniae	Microbiology		√
Paracetamol	Biochemistry	√	
Phenytoin <sup>2</sup>	Biochemistry		√
Phosphate	Biochemistry	√	
Pregnancy Test	Microbiology	√	
Potassium	Biochemistry	√	
Protein - Total	Biochemistry	√	
Reticulocytes	Haematology	√	
Salicylate	Biochemistry	√	
Sickle Cell Screen	Haematology	√	
Sodium	Biochemistry	√	
Theophylline <sup>2</sup>	Biochemistry		√
Total bilirubin	Biochemistry	√	
Transfusion reaction investigation	Blood Transfusion		√
Troponin I <sup>3</sup>	Biochemistry	√	
Urate	Biochemistry	√	
Urea	Biochemistry	√	
Urinary creatinine	Biochemistry	√	
Urinary electrolytes	Biochemistry	√	
Urinary urea	Biochemistry	√	
Urine Microscopy and Culture (urgent e.g. A/E) <sup>4</sup>	Microbiology		√
Valproate <sup>2</sup>	Biochemistry		√

**Notes:**

1. b-HCG requests to exclude Ectopic Pregnancy only.
2. Currently emergency analysis of these drugs is only available in an 'over-dose' situation. Routine therapeutic monitoring of the anti-epileptic drugs, digoxin and theophylline is available on Saturday morning.
3. Troponin I requests which fulfil the agreed criteria.
4. Urine Microscopy-restricted to those where phone call is made by requesting physician

## 8.0 REPORTING OF TEST RESULTS

### 8.1 REPORTING RESULTS

- 8.1.1** All results once released, are available on the hospital computer system with the exception of the Blood Transfusion Laboratory results where only printed hard copy results are made available for review.
- 8.1.2** Reports are printed with reference ranges and/or suitable comments wherever appropriate, to aid interpretation of results. Reports will only be given to the requesting doctor/RN. Private individuals will not receive reports.
- 8.1.3** Where an interim report is issued, a final report will follow.
- 8.1.4** Where a test is delayed the requestor will be notified. It is Pathology Department policy to immediately notify the referring ward / team when there are indications that the results may be delayed. A verbal report will be given as progress of the test becomes available, if



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required.

**8.1.5** Printed reports are delivered by the Secretarial Staff/porters to MUH wards every evening (morning and evening in the case of Blood Transfusion reports). Results for Generals Practitioners are printed and posted daily. Reports for South Infirmiry Victoria University Hospital SIVUH (Microbiology) are collected by SIVUH courier approximately 3 times daily. Emergency, critical and urgent positive reports are phoned directly to the wards and/or requesting doctor.

## **8.2 TELEPHONED RESULTS**

**8.2.1** It is the Pathology Department policy to issue hard copy reports. In such circumstances, the Pathology Department will provide telephoned results to the patient's clinician / or designated clinical personnel.

**8.2.2** When requesting a verbal report, the patient's personal identifiers, i.e. patient's name, DOB, and RID (RID) must be confirmed to the laboratory scientific staff. The Pathology Department will also require the details of the requestor i.e. their own name and designated responsibility, for example from a clinician or nurse. All details will be documented in a Telephone Log book or as a comment on the patients results on the LIS. A hard copy of the report will follow.

## **8.3 INSTRUCTIONS FOR USING COMPUTERISED LAB ENQUIRY**

(Not applicable to GP's or Blood Transfusion results)

There are 2 parts to the Laboratory computer system (TELEPATH)

    '**Biolab**' which includes Biochemistry/Haematology results

    '**Miclab**' which has all Microbiology results.

Double click on Lab Results icon

### **8.3.1 BIOCHEMISTRY OR HAEMATOLOGY RESULTS:**

Enter password type BIOLAB and Press enter twice

Enter User ID: ..... Press Return.

Enter Password: ..... Press Return.

In patient enquiry screen

In "Registration/Case": Type RID, Press Return

You will be asked to confirm the surname of the patient.

Surname:                   Type first 2 letters. Press Return.

                                  Can leave rest blank.

NOTE: If an RID is unavailable type "U" for unknown and press Enter. Type the patients Surname and press Enter, Forename and press Enter and Date of Birth or Age. Press Enter to go onto Subject Search.

From the Subject Search screen select patient from list using Up and Down arrows Press Enter.

You can also search by date of birth. Type "K" and it will bring you down to DOB line enter date of birth. From patient search screen select correct patient.

You will be asked for booking area B for Biochemistry, H for Haematology or press CTRL and A together for both. You will be able to view the latest results and can do E for earlier or L for later to move back to latest result. If you see items with outstanding under them it

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means they have not been released for reporting yet.

When finished Do shift key and 6 (^) at the same time then Return x2 to get back to enquiry screen.

NB. Never leave a patient's details on screen; to do so is a breach of confidentiality as others may inappropriately access them.

### 8.3.2 MICROBIOLOGY RESULTS

Enter password type MICLAB Press enter twice  
 Enter User ID: ..... Press Return.  
 Enter Password: ..... Press Return.

In patient enquiry screen

In Registration/Case: Type RID

Press Return.

You will be asked to confirm the surname of the patient.

Surname: Type first 2 letters. Press Return.

Can leave rest blank.

Press L for list and you will get a list of all specimens for the patient by date.

To move forward to next page press “+” and back press “B”

To select a specimen choose the number associated with it on the Left hand side.

Check the status of a specimen

Auth? Final Result is a final result and a printed report has been produced

In Progress Result is an interim result and is not finalised. No printed report is available

Outstanding There is no result available for this specimen.

NB Press “ X “ to access report

When finished Do shift key and 6 (^) at the same time, Return x 2 to get back to enquiry screen.

NB. Never leave a patient's details on screen; to do so is a breach of confidentiality as others may inappropriately access them.

**For a more detailed explanation on how to use Lab Enquiry see the following documents 1. Microbiology Ward Enquiry Tutorial or 2. Pathology Ward Enquiry Tutorial available in the wards and from the IT Department.**

### 8.4 ARCHIVING OF PATIENT RECORDS

It is the MUH Pathology Department policy to store copies of original request forms and the reports issued for >30 years, either by electronic or paper record systems.

### 9.0 REVIEW & ASSESSEMENT OF CUSTOMER SATISFACTION

Customer satisfaction is assessed through regular survey of users and the processing of complaints and through feedback received at hospital Meetings.

### 9.1 CUSTOMER COMPLAINTS

The Pathology Department operates within the MUH Quality Management System

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incorporating services complaint procedures.

The objectives of our complaints handling system require:

- All complaints are rapidly and effectively handled and fully investigated.
- Customer and/or patient difficulties are alleviated promptly.
- Appropriate corrective and preventative actions are taken to reduce the risk of repeated errors
- Customer confidence is maintained in our service.
- Relevant information is recorded and reported to Consultant Haematologist and Quality Manager as appropriate.

## **10 EXTERNAL AND INTERNAL QUALITY ASSESSMENT**

### **10.1 External Quality Assessment Schemes**

The Pathology Department participates in relevant available third party assessment schemes. These include schemes operated by:

- NEQAS , National External Quality Assessment Scheme
- IEQAS Irish External Quality Assessment Scheme
- Labquality (Finnish External Quality Assessment Scheme
- Randox

The Pathology Department is committed to participating in external quality assessment schemes for all accredited tests.

### **10.2 Quality Assessment Failure/Non-Conformance**

If the laboratory fails an external quality assessment scheme, or if an internal quality system fails resulting in a major non conformance, the impact of the failure will be evaluated and where appropriate the users of the service will be officially informed. Major non-conformances are managed by controlled procedures and require investigation, corrective actions, preventative actions and review of the processes as appropriate.

### **10.3 Internal Quality Assessment**

Internal controls are included in all tests. No test result can be accepted or reported unless the control results are acceptable.

The Pathology Department is subject to regular inspection by the licensing authority - INAB (Irish National Accreditation Board).

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## 11.0 BLOOD TRANSFUSION LABORATORY TESTING SCHEDULE

- 11.1 The MUH Blood Transfusion laboratory operates a batch testing system. Routine service requests are processed in the next batch. The Blood Transfusion laboratory operates a system of two batch runs daily - at 09:00 hrs and at 14:00 hrs. Samples received before these times will be processed in the next scheduled batch unless they are to be treated as an emergency.
- 11.2 For urgent requests for Blood Transfusion services, the laboratory (or Medical Scientist on call) must be contacted by phone in advance.
- 11.3 For routine surgical procedures scheduled for early in the morning, samples must be taken and sent to the Blood Transfusion Laboratory before 13.00 Hrs on the day before the scheduled surgery.
- 11.4 All samples for referral to the Blood Transfusion should be sent to the laboratory as soon as possible after collection of the sample.
- 11.5 When the Medical/Nursing staff are requesting that crossmatched blood be collected for a patient from the Blood Issue Fridge, it is imperative that instructions are given to collect the unit with the shortest expiry date first. This instruction is printed on the Blood Compatibility report.
- 11.6 Once requested, blood crossmatched for a patient will be held in the Blood Issue Fridge for **48 to 72 hours**. Crossmatched units will not be reserved for longer than 72 hours post crossmatch. Any units which have not been transfused within 72 hours which are still available in the Blood Issue fridge will be removed and returned to stock. This is to facilitate blood stock management and to prevent the outdating of units and blood wastage.
- 11.7 The Blood Transfusion Laboratory must be contacted if there is a requirement to reserve blood for a particular patient for any longer than 72 hours and this will be dependent on the individual patient's sampling requirements. Refer to section 5.4.

## 12 CONTACTING THE BLOOD TRANSFUSION LABORATORY WITH AN URGENT REQUEST FOR AN EMERGENCY SERVICE

- 12.1 For all urgent requests for an emergency Blood Transfusion service, the laboratory / Medical Scientist on-call must be contacted in advance.

### **Urgent requests during Routine Hours (09.00 to 17.00 Hrs):**

Contact Blood Transfusion Laboratory- Refer to contact details in Section 4.4.

### **Urgent requests outside routine hours (Out-of-Hours):**

The Blood Transfusion Laboratory provides an EMERGENCY ONLY Blood Group and Compatibility Service out of hours. For turnaround times for response to emergency request for compatible blood (refer to test profile description) and urgently required Platelet and Plasma products out of hours.

**To request these emergency services, contact Reception (Ext. 5201) and request to speak to the Blood Transfusion Medical Scientist on-call**

- 12.2 The Blood Transfusion Laboratory must be informed as soon as possible where the level of urgency of the request/ service status changes (including if the service is no longer required).

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#### 12.4 Procedure to be followed for Urgent Requests:

The following details will be requested, recorded and confirmed (by calling back to the person giving the information):

1. Hospital Ward
2. Name of Person making the request / medical staff and bleep number
3. Patients Name, M.R.N (R.I.D) and Date of Birth
4. The urgency of the request (date and time required) and estimated time of sample arrival

In addition the following details will be required by the medical scientist:

- Number /volume and type of component requested
- Blood Group, ABO/ Rh D, if known
- Special Requirements e.g. CMV Negative/Irradiated
- Reason for transfusion
- Transfusion history (if known)
- Relevant clinical condition

#### **NOTE RE. : Urgent Requests**

1. Where a clinical condition dictates that a transfusion is required prior to the completion of testing, the transfusion support may vary depending on the following:
  - the degree of clinical urgency
  - the availability of an emergency stock of red cells
  - the prior availability of the patient's sample and a validated blood group report at the Blood Transfusion Laboratory.
2. Where the provision of blood will be clinically required prior to completion of compatibility testing and where the presence of red cell antibodies in the patient's sample is not an issue, transfusion support will be supplied from the Blood Transfusion Laboratory.
3. Where the sample contains irregular antibodies which would put the patient at risk from a blood transfusion, the relative risks of abbreviated testing prior to emergency transfusion will need to be discussed between the medical consultant / specialist officer and the patient's clinician.

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## 13 PROVISION OF BLOOD / BLOOD COMPONENTS

### 13.1 Blood Components Provided by Blood Transfusion Laboratory

The table below outlines the blood components which may be supplied on request from the Blood Transfusion Laboratory:

Provision of Blood/Blood Components	Supplier
Red cell components	Blood Transfusion Laboratory
Platelet components (Including CMV negative /Irradiated / Washed)	Blood Transfusion Laboratory (Blood Transfusion Laboratory will order from IBTS on request)
Plasma components (e.g. SD plasma and Coagulation Factors / Albumin.)	Blood Transfusion Laboratory
Plasma products (e.g. Cryoprecipitate/FFP- NOT Routinely Issued- Available on special request by Medical Consultant)	Blood Transfusion. Laboratory
Specialised blood components Including CMV Negative, Irradiated red cells, Washed red cells	Blood Transfusion Laboratory (Blood Transfusion Laboratory will order from IBTS on request)

### 13.2 Provision of Red Cells

A whole blood sample (7.5ml, EDTA) is required for compatibility testing. A previously submitted sample for a 'Group and Hold' may be used for compatibility testing subject to the guidelines (refer to section 5.3).

#### **CMV Negative / Irradiated Red Cells:**

The Blood Transfusion Laboratory does not hold a stock of CMV Negative and Irradiated red cells. Please allow sufficient time to meet a request for CMV Negative and Irradiated components. Requests will be forwarded by the Blood Transfusion Laboratory to the IBTS (MRTC).

Where the request is urgent – the Blood Transfusion Laboratory/Medical Scientist on-call must be made aware of the urgency of the request.

### 13.3 Provision of Platelet Components

A blood sample is required for blood group investigation, where the blood group of the patient has not been previously tested in the MUH Blood Transfusion Laboratory.

The Blood Transfusion Laboratory does not currently hold a stock of platelet products. Specific platelet products are ordered on demand from the IBTS. Allow sufficient time for the Blood Transfusion Laboratory to order, receive and prepare the platelet order from the IBTS.

Please note: It is the Blood Transfusion Laboratory policy to advise that only one unit of platelets is ordered per patient at one time due to the high cost, the short shelf-life and the potential for wastage.

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### **HLA Matched Platelets/ Platelets with Special Requirements:**

- Requests for such components must be made in advance to the medical registrar at the IBTS to facilitate the call-up of a suitable donor or to allow for the database search of suitable components already bled. The hospital will be notified by the medical personnel as to the availability of the component.
- **N.B. This request can only be made in consultation with the Blood Transfusion Laboratory and the Consultant Haematologist**

#### **14.0 FURTHER SERVICE REQUESTS FOR BLOOD TRANSFUSION**

Where there is a clinical need for the provision of additional units of Red Cells then the clinician / Nurse should contact the Blood Transfusion Laboratory/ Medical Scientist on-call by phone and inform them of the request.

##### **14.1 Requesting Additional Red Cells**

Where there is a clinical need for the provision of additional units of Red Cells then the clinician / Nurse should contact the Blood Transfusion Laboratory/ Medical Scientist on-call by phone and inform them of the request.

The following details will be requested, recorded and confirmed (by calling back to the person giving the information):

1. Hospital Ward
2. Name of Person making the request / medical staff and bleep number
3. Patients Name, M.R.N (R.I.D) and Date of Birth
4. The urgency of the request (date and time required) and estimated time of sample arrival

In addition the following details will be required by the medical scientist:

- Date of the Sample on which the request is made
- Date and time of commencement of the first unit transfusion
- Number /volume and type of component requested
- Blood Group, ABO/ Rh D, if known
- Special Requirements e.g. CMV Negative/Irradiated
- Reason for transfusion
- Transfusion history (if known)

**The suitability of the current sample will be determined based on the information provided to the laboratory and the current guidelines. (Refer to section 12.1)**

##### **14.2 Requesting Additional Platelet Components**

Refer to section 7.4.1 on requesting additional red cell components. In this instance there is no requirement to take a fresh sample from the patient.

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## 15 DOCUMENT HISTORY

Revision No.	Date	Revised by	Reason for Change	Change Details	Page/s Amended	CC No.
1	28/03/13	V O'Sullivan	To comply with the EU Directive and to attain the ISO 15189 standard (Current version.)	Introduction of new document to deal with Primary Specimen Collection and Users Guideline for the pathology department	All	CC/QY12/003
2	05/06/13	V O'Sullivan	Requested during INAB audit to paginate A-Z	A-Z paginated. Updated for minor Biochemistry changes, ESR reference range updated, added in addressographs not acceptable on samples	Attachment section-all pages, p30	CC/13/65 & CC/13/40
3	01/03/14	E Carey	Complete review including :A-Z for each department. Addition of new Microbiology Consultant.	Complete review including :A-Z for each department. Addition of new Microbiology Consultant.	All	CC/13/118
4	07/01/15	E Carey	Update of Quality Policy section, and new consultant	<u>Quality</u> -Update of Quality Policy section & add reference to ethics, revision of consultants and contact numbers. Review of tests done on call <u>Haem</u> - remove LF-HAE-31, thrombin time and bleeding time. Addition of children's ref ranges for coag <u>Micro</u> -TAT changed for Hep ABC, HIV, Helicobacter breath test. Limited availability of Gent and Vanc. Addition of new tests <u>Bio</u> -review of reference ranges <u>BB</u> -addition of LF-BB-156	P.5, 7  22,23  8,19  A-Z  A-Z  8	CC/14/101
5	04/03/16	EC/AD/ CMS	Change name to 'Laboratory User Manual' and insert Blood Tube Guide and Troponin Algorithm Add table of normal CSF values.	Full review by CMS <u>Haem</u> – minor changes <u>BB</u> - minor change to 5.3.4 <u>Bio</u> – changes to troponin hs, osmolality, vit D, and minor changes. <u>Micro</u> – changes re Bartonella, Yersinia distined and H Pylori. Change comment re addressograph. Add table of normal CSF values. Include authoriser in QP	All	CC16/19 CC16/83



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## TEST DIRECTORY (A-Z) FOR BIOCHEMISTRY DEPARTMENT

<b>17-Alpha-OH-Progesterone</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours
Comment:	Specify the age, sex and phase of the cycle, for women, sample must be taken at start of follicular phase
Ref. Range:	See report form.
Turn-around time:	2 weeks
<b>5-HIAA 5 Hydroxy Indole Acetic Acid - Urine</b>	
Laboratory:	Biochemistry: Referred to Biochemistry Beaumont Hospital Dublin,
Specimen:	24-hour acidified urine sample, Received < 72 hours
Comment:	Acidified containers available in Biochemistry
Ref. Range:	See report form.
Turn-around time:	3 weeks
<b>ACE - Angiotensin converting enzyme (Serum)</b>	
Laboratory:	Biochemistry: Referred to Biochemistry CUH.
Specimen:	4.0 ml blood in plain tube (serum sample), Received < 72 hours
Ref. Range:	See Report Form.
Turn-around time:	10 days
<b>ACE - Angiotensin converting enzyme (CSF)</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	1.5 ml CSF specimen, Received and frozen < 1 hr
Ref. Range:	See report form.
Turn-around time:	3 weeks
<b>ACTH</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	4.0ml EDTA plasma, Received and frozen < 1 hr
Ref. Range:	See report form.
Turn-around time:	2 weeks
<b>Acyl Carnitine</b>	
Laboratory:	Biochemistry: Referred to Metabolic Laboratory, The Childrens University Hospital, Temple St, Dublin
Specimen:	Guthrie Card, Received < 24 hrs
Comment:	Ensure relevant clinical details are supplied
Ref. Range:	See report form
Turn-around time:	4 weeks
<b>Adalimumab (Humira)</b>	
Laboratory:	Biochemistry: Referred to Biomnis.
Specimen:	4.0 ml blood plain tube (serum sample), Received and frozen < 4 hrs.
Ref Range:	See report form.
Turn-around time:	4 weeks
<b>Adenosine Deaminase</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	Specialist collection according to local protocols. Pleural fluids, Ascitic fluids, Received < 24 hours
Ref. Range:	See report form.
Turn-around time:	3 weeks
<b>ADH-Antidiuretic hormone</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	5.0 ml lithium heparin plasma, Received and frozen < 1 hr.
Ref. Range:	See report form
Turn-around time:	2 weeks
<b>Adrenaline/ Noradrenaline</b>	
See Catecholamines	

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<b>AFP - Alpha Fetoprotein</b>			
Laboratory:	Biochemistry:		
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours		
Ref Range:	<8.8 ng/ml		
Turn-around time:	Next routine working day		
<b>Albumin (Blood)</b>			
Laboratory:	Biochemistry		
Specimen:	4.0 ml in blood plain tube (serum sample) or lithium heparin, Received < 72 hours		
Ref. Range:	0-14 years 38-54g/L, 14-60years 35-50g/ L, >60years 34-48 g/L		
Turn-around time:	<b>Urgent:</b> < 2 hrs <b>Routine:</b> Same day service		
<b>Alcohol:</b>			
See Toxicology / Drug Screen – Urine			
<b>Aldolase</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimen:	4 ml blood in plain tube (serum sample), Received < 72 hours		
Comment:	Haemolysis invalidates result.		
Ref. Range:	See report form.		
Turn-around time:	2 weeks		
<b>Aldosterone</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimen:	4.0 ml blood in plain tube (serum sample). Received and frozen <4 hrs		
Ref. Range:	See report form.		
Turn-around time:	2 weeks		
<b>Alkaline Phosphatase (Alk Phos)</b>			
Laboratory:	Biochemistry		
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received < 72 hours		
Ref. Range:	<b>M:</b> 40-150 U/L (Adult >19 yrs) <b>F:</b> 40-150 U/L (Adult >15yrs) <b>M:</b> 58-237 U/L (15-19yrs) <b>F:</b> 62-209 U/L (13-15yrs) <b>M:</b> 55-488 U/L (<15yrs) <b>F:</b> 60-425 U/L (<13yrs)		
Turn-around time:	<b>Urgent:</b> < 2 hrs <b>Routine:</b> Same day service		
<b>Alkaline phosphatase (Alk Phos) Iso enzymes</b>			
Laboratory:	Biochemistry: Referred to Biomnis.		
Specimen:	4.0 ml blood in plain tube (serum sample), Received < 72 hours		
Ref. Range:	See report form.		
Turn-around time:	2 weeks		
<b>Alpha-1-Antitrypsin</b>			
Laboratory:	Biochemistry: Referred to Biochemistry CUH.		
Specimen:	4.0 ml blood in plain tube (serum sample), Received < 72 hours		
Ref. Range:	See Report Form.		
Turn-around time:	2 weeks		
<b>Alpha Galactosidase A (Fabry's Testing)</b>			
Contact lab for instructions for sample collection and transport to reference laboratory			
<b>ALT - Alanine Aminotransferase</b>			
Laboratory:	Biochemistry		
Specimen:	4.0 ml blood plain tube (serum sample) or lithium heparin. Received < 24 hours		
Ref. Range:	Ref. Range: < 55 U/L		
Turn-around time:	Turn-around time: <b>Urgent:</b> < 2 hrs <b>Routine:</b> Same day service		
<b>Amino Acids (Plasma)</b>			
Laboratory:	Biochemistry: Referred to Metabolic Laboratory, The Children's University Hospital, Temple St, Dublin		
Specimen:	1.2 ml lithium heparin, transported to laboratory ASAP		
Comment:	Ensure relevant clinical details are supplied		
Ref. Range:	See report form.		
Turn-around time:	2 weeks		

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<b>Amino Acids (CSF)</b>			
Laboratory:	Biochemistry: Referred to Metabolic Laboratory, The Children's University Hospital, Temple St,		
Specimen:	1.5 ml CSF Specimen + 1.2 ml lithium heparin, (CSF is paired with Plasma to calculate ratios.), transported to laboratory ASAP		
Comment:	Ensure relevant clinical details are on request form		
Ref Range:	See report form.		
Turn-around time:	3 weeks		
<b>Ammonia (EDTA)</b>			
Laboratory:	Biochemistry: Referred to Biochemistry Bon Secours Hospital Cork.		
Specimen:	4.0ml EDTA sample, Received and frozen < 1 hr		
Comment:	Haemolysis invalidates result.		
Ref. Range:	<b>Children:</b> 21 - 50umol/L, <b>Adults:</b> 18 - 72umol/L		
Turn-around time:	<b>Urgent:</b> < 24 hrs <b>Routine:</b> 5 days		
<b>Amphetamine</b>			
See Toxicology / Drug Screen – Urine			
<b>Amylase (Blood)</b>			
Laboratory:	Biochemistry		
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received < 72 hours		
Ref. Range:	< 1 month 5- 65 U/L, Up to 70 years 25-125 U/L, >70years 20-160 U/L		
Turn-around time:	<b>Urgent:</b> < 2 hrs <b>Routine:</b> Same day service		
<b>Amylase (Urine)</b>			
Laboratory:	Biochemistry		
Specimen:	Spot or 24 Hr urine sample, No preservative, Received < 72 hours		
Ref. Range:	No reference range established		
Turn-around time:	Urgent: < 2 hrs Routine: Same day service		
<b>Amylase (Fluid)</b>			
See Sterile Body Fluid Biochemistry			
<b>Androgen Index</b>			
See SHBG			
<b>Androstendiones</b>			
Laboratory:	Biochemistry: Referred to Biomnis.		
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours		
Ref Range:	See report form.		
Turn-around time:	4 weeks		
<b>Anti-Acetylcholine Receptor Antibodies</b>			
Laboratory:	Biochemistry: Referred to Biomnis.		
Specimen:	4.0 ml blood plain tube (serum sample), Received and frozen < 4 hrs.		
Ref Range:	See report form.		
Turn-around time:	2 weeks		
Comment:	Haemolysis invalidates results		
<b>Anti-Adrenal Antibodies</b>			
Laboratory:	Biochemistry: Referred to Biomnis.		
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours		
Ref Range:	See report form.		
Turn-around time:	3 weeks		
<b>Anti-AMPA Receptor Antibodies (alpha-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid receptor)/ mGluR Ab Quisqualate Receptor Antibodies</b>			
Laboratory:	Biochemistry: Referred to Biomnis.		
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours		
Ref Range:	See report form.		
Turn-around time:	5 weeks		
<b>Anti-Amphipysin Antibodies</b>			
See Anti-neuronal Antibodies			

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#### Anti-Beta 2 Glycoprotein 1 Antibodies

Laboratory: Biochemistry: Referred to Biomnis.  
 Specimen: 4.0 ml blood plain tube (serum sample), Received < 72 hours  
 Ref Range: See report form.  
 Turn-around time: 2 weeks

#### Anti-Calcium Channel Antibodies

Laboratory: Biochemistry: Referred to Biomnis.  
 Specimen: 4.0 ml blood plain tube (serum sample), Received < 72 hours  
 Ref Range: See report form.  
 Turn-around time: 6 weeks

#### Anti-Carbonic Anhydrase Antibodies / Anti Lactoferrin Antibodies

Laboratory: Biochemistry: Referred to Biomnis.  
 Specimen: 4.0 ml blood plain tube (serum sample), Received < 72 hours  
 Ref Range: See report form.  
 Turn-around time: 4 weeks

#### Anti-Centromere Antibodies

See Anti ENA Antibody typing

#### Anti-Cerebellum Antibodies

See Anti-AMPA antibodies

#### Anti-CV2 Antibodies

See Anti-neuronal Antibodies

#### Anti-dsDNA Antibodies

Laboratory: Biochemistry: Referred to Biomnis.  
 Specimen: 4.0 ml blood plain tube (serum sample), Received < 72 hours  
 Ref Range: See report form.  
 Turn-around time: 2 weeks  
 Comment: Routinely performed in presence of positive ANA

#### Anti-ENA Antibodies (SSA, SSB, Sm, Rnp, Jo1, Scl-70)

Laboratory: Biochemistry: Referred to Biomnis.  
 Specimen: 4.0 ml blood plain tube (serum sample), Received < 72 hours  
 Ref Range: See report form.  
 Turn-around time: 2 weeks  
 Comment: Routinely performed in presence of positive ANA

#### Anti-Endomysial Antibodies IgA/IgG

Laboratory: Biochemistry: Referred to Biomnis.  
 Specimen: 4.0 ml blood plain tube (serum sample), Received < 72 hours  
 Ref Range: See report form.  
 Turn-around time: 2 weeks

#### Anti-GABA b ( $\gamma$ -Aminobutyric acid-B) Receptor Antibodies

See Anti-AMPA antibodies

#### Anti-Ganglioside Antibodies (Sulfatides, GM1, GM2, GM3, GM4, GD1a, GD1b, GD2, GD3, GT1a, GT1b, GQ1b)

Laboratory: Biochemistry: Referred to Biomnis.  
 Specimen: 4.0 ml blood plain tube (serum sample), Received < 72 hours  
 Ref Range: See report form.  
 Turn-around time: 4 weeks

#### Anti-GAD ( anti-glutamic acid decarboxylase ) Antibodies

Laboratory: Biochemistry: Referred to Biomnis.  
 Specimen: 4.0 ml blood plain tube (serum sample), Received and frozen < 4 hrs.  
 Ref Range: See report form.  
 Turn-around time: 2 weeks  
 Comment: Haemolysis invalidates results

#### Anti-GBM (Glomerular Basement Membrane) Antibodies

Laboratory: Biochemistry: Referred to Biomnis.  
 Specimen: 4.0 ml blood plain tube (serum sample), Received < 72 hours  
 Ref Range: See report form.  
 Turn-around time: 2 weeks

#### Anti-GD Antibodies ( GD1a, GD1b, GD2, GD3)

See Anti-Ganglioside Antibodies

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<b>Anti-GM Antibodies ( GM1, GM2, GM3, GM4,)</b>	
See Anti-Ganglioside Antibodies	
<b>Anti-Glycolipid Antibodies</b>	
Laboratory:	Biochemistry: Referred to Biomnis.
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours
Ref Range:	See report form.
Turn-around time:	2 weeks
<b>Anti-GQ1b Antibodies</b>	
See Anti-Ganglioside Antibodies	
<b>Anti-GT Antibodies ( GT1a, GT1b,)</b>	
See Anti-Ganglioside Antibodies	
<b>Anti-Hippocampus Antibodies</b>	
See Anti-AMPA antibodies	
<b>Anti-Hu Antibodies</b>	
See Anti-neuronal Antibodies	
<b>Anti-Insulin Antibodies</b>	
Laboratory:	Biochemistry: Referred to Biomnis.
Specimen:	4.0 ml blood plain tube (serum sample), Received and frozen < 4 hrs.
Ref Range:	See report form.
Turn-around time:	3 weeks
<b>Anti-Islet Cell Antibodies/ Anti-pancreatic Islet cell Antibodies</b>	
Laboratory:	Biochemistry: Referred to Biomnis.
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours
Ref Range:	See report form.
Turn-around time:	2 weeks
<b>Anti-Jo-1 Antibodies</b>	
See Anti-ENA Antibody typing	
<b>Anti-LKM Antibodies</b>	
Laboratory:	Biochemistry: Referred to Biomnis.
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours
Ref Range:	See report form.
Turn-around time:	2 weeks
<b>Anti-Ma2 Antibodies</b>	
See Anti-neuronal Antibodies	
<b>Anti-Mitochondrial Antibodies</b>	
See Anti-Neutrophil Cytoplasmic Antibodies (ANCA) screen	
<b>Anti-Myelin Associated Glycoprotein (MAG) Antibodies</b>	
Laboratory:	Biochemistry: Referred to Biomnis.
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours
Ref Range:	See report form.
Turn-around time:	6 weeks
<b>Anti-Myelin Oligodendrocyte Glycoprotein (MOG) Antibodies</b>	
Laboratory:	Biochemistry: Referred to Biomnis.
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours
Ref Range:	See report form.
Turn-around time:	6 weeks
<b>Anti-Myeloperoxidase (MPO) Antibodies</b>	
See Anti-Neutrophil Cytoplasmic Antibodies (ANCA) screen	
<b>Anti-MuSK Antibodies</b>	
Laboratory:	Biochemistry: Referred to Biomnis.
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours
Ref Range:	See report form.
Turn-around time:	6 weeks
<b>Anti-Neuromyelitis Optica (NMO) Antibodies</b>	
Laboratory:	Biochemistry: Referred to Biomnis.
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours
Ref Range:	See report form.
Turn-around time:	6 weeks

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<b>Anti-Neuronal Antibodies (Hu, Yo, Ri, CV2, Amphiphysin, Ma2)</b>			
Laboratory:	Biochemistry:	Referred to Biomnis.	
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours		
Ref Range:	See report form.		
Turn-around time:	2 weeks		
<b>Anti-Neutrophil Cytoplasmic Antibodies (ANCA)</b>			
Laboratory:	Biochemistry:	Referred to Biomnis.	
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours		
Ref Range:	See report form.		
Turn-around time:	2 weeks		
Comment:	In the case of a positive screening the anti-MPO and anti-PR3 antibody assay is performed.		
<b>Anti-N-Methyl D Aspartate (NMDA) Receptor Antibodies (SERUM or CSF)</b>			
Laboratory:	Biochemistry:	Referred to Biomnis.	
Specimen:	4.0 ml blood plain tube (serum sample) or 1 ml CSF, Received < ASAP		
Ref Range:	See report form.		
Turn-around time:	5 weeks		
<b>Anti-Nuclear Antibodies</b>			
Laboratory:	Biochemistry:	Referred to Biomnis.	
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours		
Ref Range:	See report form.		
Turn-around time:	2 weeks		
<b>Anti-Ovarian Antibodies</b>			
Laboratory:	Biochemistry:	Referred to Biomnis.	
Specimen:	4.0 ml blood plain tube (serum sample) or 1 ml CSF, Received < ASAP		
Ref Range:	See report form.		
Turn-around time:	3 weeks		
<b>Anti-Pancreatic Islet Cell Antibodies</b>			
See Anti-Islet Cell Antibodies			
<b>Anti-Parietal Cell Antibodies-stomach</b>			
Laboratory:	Biochemistry:	Referred to Biomnis.	
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours		
Ref Range:	See report form.		
Turn-around time:	2 weeks		
<b>Anti-Potassium Channel Antibodies</b>			
Laboratory:	Biochemistry:	Referred to Biomnis.	
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours		
Ref Range:	See report form.		
Turn-around time:	6 weeks		
<b>Anti- Proteinase3 (PR3) Antibodies</b>			
See Anti-Neutrophil Cytoplasmic Antibodies (ANCA) screen			
<b>Anti-Ri Antibodies</b>			
See Anti-Neuronal Antibodies			
<b>Anti Scl-70 Antibodies</b>			
See Anti ENA Antibodies			
<b>Anti Smith (SM) Antibody</b>			
See Anti ENA Antibodies			
<b>Anti-Smooth Muscle Antibodies</b>			
Laboratory:	Biochemistry:	Referred to Biomnis.	
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours		
Ref Range:	See report form.		
Turn-around time:	2 weeks		
<b>Anti SSA/RO Antibody</b>			
See Anti ENA Antibodies			
<b>Anti SSB/La Antibody</b>			
See Anti ENA Antibodies			
<b>Anti-Sulfatides Antibodies</b>			
See Anti-Ganglioside Antibodies			
<b>Anti-Thyroglobulin Antibodies</b>			

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Laboratory:	Biochemistry: Referred to Biomnis.
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours
Ref Range:	See report form.
Turn-around time:	2 weeks
<b>Anti-Thyropoxidase Antibodies</b>	
Laboratory:	Biochemistry: Referred to Biomnis.
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours
Ref Range:	See report form.
Turn-around time:	2 weeks
<b>Anti-Transglutaminase antibody IgA (IgA tTg )</b>	
Laboratory:	Biochemistry: Referred to Biomnis.
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours
Ref Range:	See report form.
Turn-around time:	2 weeks
<b>Anti TSH Receptor Antibodies</b>	
Laboratory:	Biochemistry: Referred to Biomnis.
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours
Ref Range:	See report form.
Turn-around time:	2 weeks
<b>Anti-U1 RNP Antibodies</b>	
See Anti-ENA Antibodies	
<b>Anti Voltage Gated Potassium Channel Antibodies</b>	
See potassium Channel Antibodies	
<b>Anti-Yo Antibodies</b>	
See Anti-Neuronal Antibodies	
<b>AST - Aspartate Aminotransferase</b>	
Laboratory:	Biochemistry: Referred to Biomnis.
Specimen:	4.0 ml blood plain tube (serum sample), Received < 48 hours
Ref Range:	5-34 U/L
Turn-around time:	<b>Urgent:</b> < 2 hrs <b>Routine:</b> Same day service
Comment:	Haemolysis invalidates result
<b>Barbiturates</b>	
See Toxicology / Drug Screen- Blood or Urine	
<b>Bence-Jones Protein</b>	
Laboratory:	Biochemistry
Specimen:	Preferably early morning urine (20 mls urine), Received < 72 hours
Ref. Range:	Should be NEGATIVE
Turn-around time:	3 weeks
<b>Benzodiazepines</b>	
See Toxicology / Drug Screen - Blood or Urine	
<b>Beta - hCG (human Corionic gonadatropin)</b>	
Laboratory:	Biochemistry:
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours
Ref Range:	<5 IU/L
Turn-around time:	<b>Urgent:</b> < 3 hrs <b>Routine:</b> Next routine working day
<b>Beta Hydroxybutyric Acid</b>	
Laboratory:	Biochemistry: Referred to Biomnis.
Specimen:	4.0 ml blood plain tube (serum sample), Received < 4 hrs hours
Ref Range:	See report form.
Turn-around time:	2 weeks
<b>Beta-2-Microglobulin</b>	
Laboratory:	Biochemistry: Referred to Biomnis.
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hrs hours
Ref Range:	See report form.
Turn-around time:	2 weeks
<b>Bicarbonate</b>	
See Blood gases	

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### Bilirubin- Conjugated

Laboratory: Biochemistry: Referred to Biochemistry CUH.  
Specimen: 4.0 ml blood in plain tube (serum sample) or lithium heparin. Received ASAP  
Comment: Protect sample from light with tinfoil.  
Ref. Range: See report form.  
Turn-around time: **Urgent:** < 24 hrs **Routine:** 10 days

### Bilirubin-Total

Laboratory: Biochemistry  
Specimen: 4.0 ml blood in plain tube (serum sample) or lithium heparin. Received < 48 hours  
Ref. Range: 3.4-20.5 µmol/L  
**Urgent:** < 2 hrs **Routine:** Same day service

### Blood Gases (pH, pCO<sub>2</sub>, pO<sub>2</sub>, Lactate, Calculated Bicarbonate, COHb, MetHb, O<sub>2</sub> Saturation).

Laboratory: Biochemistry  
Specimen: Heparinised Blood Gas syringe, Received < 30 mins  
Ref. Range:

PH	7.35-7.45
PCO <sub>2</sub>	4.70 - 6.00 kPa
PO <sub>2</sub>	10.360-13.30kPa
HCO <sub>3</sub> -(c)	22.00 - 26.00
Arterial Lactate	0.4-1.3 mmol/L
Venous Lactate	0.5-1.7 mmol/L
MetHb	0.4 - 1.5 %
COHb	0.5 - 2.5 %
SO <sub>2</sub>	

Turn-around time: <1 hr

### BNP - Brain Naturetic Peptide

Laboratory: Biochemistry:  
Specimen: 4.0 ml EDTA blood, Received and frozen < 4 hrs  
Ref. Range: < 100 pg/ml – Heart failure unlikely  
100 – 500 pg/ml – Greyzone  
> 500 pg/ml – High probability of heart failure  
Turn-around time: 1 week

### C1 Esterase Inhibitor

Laboratory: Biochemistry: Referred to Biomnis  
Specimen: 4.0 ml blood in a plain tube (serum sample). Received < 72 hours  
Ref. Range: See report form.  
Turn-around time: 2 weeks



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<b>C3 / C4 (Complement)</b>			
Laboratory:	Biochemistry: Referred to Biochemistry CUH		
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours		
Ref Range:	See report form.		
Turn-around time:	2 weeks		
<b>CA 125</b>			
Laboratory:	Biochemistry:		
Specimen:	4.0 ml blood plain tube (serum sample), Received < 72 hours		
Ref Range:	< 35 U/ml		
Turn-around time:	Next routine working day		
<b>CA 15-3</b>			
Laboratory:	Biochemistry: Referred to Biochemistry CUH.		
Specimen:	4.0 ml blood in a plain tube (serum sample). Received < 72 hours		
Ref. Range:	See report form.		
Turn-around time:	1 week		
<b>CA 19-9</b>			
Laboratory:	Biochemistry		
Specimen:	4.0 ml blood in a plain tube (serum sample). Received < 72 hours		
Ref. Range:	< 37 U/ml		
Turn-around time:	Next routine working day		
<b>Calcitonin</b>			
Laboratory:	Biochemistry, Referred to Biomnis		
Specimen:	4.0 ml blood in a plain tube (serum sample). Received and frozen < 4 hrs		
Ref. Range:	See report form.		
Turn-around time:	2 weeks		
<b>Calcium (Blood)</b>			
Laboratory:	Biochemistry		
Specimen:	4.0 ml blood in a plain tube (serum sample) or lithium heparin. Received < 72 hours		
Ref. Range:	2.10-2.55 mmol/L		
Turn-around time:	<b>Urgent:</b> < 2 hrs <b>Routine:</b> Same day service		
<b>Calcium (ionised)</b>			
Laboratory:	Performed on blood gas analyser in ICU		
Specimen:	Heparinised Blood Gas Syringe, Received < 30 mins		
Turn-around time:	<1 hr		
<b>Calcium (Urinary)</b>			
Laboratory:	Biochemistry		
Specimen:	24 Hr acidified urine collection, Received < 48 hours		
Ref. Range:	2.5 - 7.5 mmol/24 Hr		
Turn-around time:	Same day service		
<b>Calcium / Creatinine Ratio (Urinary)</b>			
Laboratory:	Biochemistry		
Specimen:	Fresh spot urine. Send to Biochemistry ASAP.		
Ref. Range:	<6 months - < 2.42    mmol Ca/mmol creatinine 6-12months    0.09-2.2            1-2 years –    0.07-1.5 2-3 years –    0.06-1.4            3-5 years –    0.05-1.1 5 – 7 years -    0.04-0.8            >7 years –    0.04-0.7		
Turn-around time:	Same day service		
<b>Calprotectin –Faecal</b>			
Laboratory:	Biochemistry, Referred to Biomnis		
Specimen:	20g minimum Stool sample, Received < 72 hours		
Comment:	<b>Sample should not be frozen</b>		
Ref. Range:	See report form.		
Turn-around time:	2 weeks		

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<b>Cannabis</b>			
See Toxicology / Drug Screen – Urine			
<b>Carbamazepine</b>			
Laboratory:	Biochemistry: Referred to Biochemistry CUH.		
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received <72 hours		
Comment:	Take trough sample immediately before next dose		
Ref Range:	See report form.		
Turn-around time:	<b>Urgent:</b> On request	<b>Routine:</b> 1 week	
<b>Carboxyhaemoglobin</b>			
See blood gases			
<b>Carnitine, Free &amp; Total</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimen:	4.9 ml blood in Lithium Heparin tube, Received and frozen < 1 hr		
Comment:	Phase separator tubes not suitable		
Ref Range:	See report form.		
Turn-around time:	2 weeks		
<b>Catecholamines - Plasma</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimen:	4.9 ml blood in Lithium Heparin tube, Received and frozen < 1 hr		
Comment:	Patient must be fasting and resting for 30 mins. Avoid bananas chocolate and citrus fruit and reduce tea and coffee intake for 48 hrs prior to sampling		
Ref. Range:	See report form.		
Turn-around time:	2 weeks		
<b>Catecholamines –Urine</b>			
Laboratory:	Biochemistry: Referred to Biochemistry Beaumont Hospital Dublin		
Specimen:	Adults: 24-hour acidified urine sample. Acidified containers available in Biochemistry, Received < 72 hours Children (0-15years): 20 ml Random urine sent to Biochemistry to be acidified ASAP (0.5mls of 50% HCL)		
Comment:	Avoid bananas chocolate and citrus fruit and reduce tea and coffee intake for 48 hrs prior to sampling		
Ref. Range:	See Report Form.		
Turn-around time:	3 weeks		
<b>CEA - Carcinoembryonic Antigen</b>			
Laboratory:	Biochemistry		
Specimen:	4.0 ml blood in plain tube (serum sample). Received < 72 hours		
Ref. Range:	< 5 ng/mL		
Turn-around time:	Next routine working day		
<b>Cerebrospinal Fluid (CSF)- Biochemistry Profile (Glucose and Protein)</b>			
Laboratory:	Biochemistry		
Specimen:	1.5 ml CSF specimen, Received < 1 hr		
Ref. Range:	<b>Glucose:</b> <b>Child:</b> 3.33 – 4.44 mmol/L <b>Adult:</b> 2.22 – 3.89 mmol/L <b>And/OR</b> 2/3 plasma glucose value <b>Protein:</b> 0.15-0.45 g/L		
Turn-around time:	<b>Urgent:</b> < 3 hrs <b>Routine:</b> Same day service		
<b>Cerebrospinal Fluid (CSF) –Lactate</b>			
Laboratory:	Biochemistry.		
Specimen:	1.5 ml CSF specimen in paediatric glucose bottle, Received < 24 hours		
Ref. Range:	<b>&lt;2 years:</b> <1.80 mmol/L <b>&gt; 2 years:</b> 1.88 mmol/L		
Turn-around time:	<1 hr		
<b>Ceruloplasmin</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimen:	4.0 ml blood in a plain tube (serum sample). Received < 72 hours		
Ref. Range:	See report form.		

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Turn-around time:	2 weeks
<b>Chloride (Blood)</b>	
Laboratory:	Biochemistry
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received < 24 hours
Ref. Range:	< <b>1 month:</b> 98-113mmol/L > <b>1 month:</b> 98-107 mmol/L
Turn-around time:	<b>Urgent:</b> < 2 hrs <b>Routine:</b> Same day service
<b>Cholesterol</b>	
Laboratory:	Biochemistry:
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received <72 hours
Ref Range:	<5.0mmol/L. Reference Range applies to fasting level.
Turn-around time:	Same day service
<b>Cholinesterase – Pseudo</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	4.0 ml blood in plain tube (serum sample), Received <72 hours
Ref Range:	See Report Form.
Turn-around time:	2 weeks
<b>Chromogranin A</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	4 ml blood in plain tube (serum sample). Received < 4 hours
Comment:	Phase separator tubes (gel bottles) are <b>not</b> suitable. Haemolysis invalidates results.
Ref. Range:	See Report Form.
Turn-around time:	2 weeks
<b>Citrate (Urine)</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	24 hour urine, No preservative, Received and frozen < 4 hrs post collection. Refrigerate during collection
Ref. Range:	See report form.
Turn-around time:	2 weeks
<b>Cocaine see Toxicology / Drug Screen</b>	
See Toxicology / Drug Screen – Urine	
<b>Coeliac Screen</b>	
See Anti-Transglutaminase antibody IgA (IgA tTg )	
<b>Complement</b>	
See C3/ C4	
<b>Copper (Blood)</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	4.0 ml blood in plain tube (serum sample), Received < 72
Ref. Range:	See report form.
Turn-around time:	2 weeks
<b>Copper (Urine)</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	24 hour urine collection. No preservative, Received < 72 hours
Ref. Range:	See report form.
Turn-around time:	2 weeks
<b>Cortisol</b>	
Laboratory:	Biochemistry
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received < 72 hours
Comment:	State collection time of specimen on bottle and form.
Ref. Range:	<b>8 am:</b> 171-800 nmol/L In the evaluation of adrenal failure: >550nmol/L: Highly unlikely, <138nmol/L virtually diagnostic <b>Afternoon:</b> Approximately half the 08H00 values 24H00: In the evaluation of Cushing's Syndrome: <138nmol/L: virtually excludes Cushing's, >207nmol/L: highly Suggestive of Cushing's,
Turn-around time:	Next routine working day
<b>Cortisol (Urine)</b>	
Laboratory:	Biochemistry Referred to Biomnis

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Specimen:	24 Hour urine collection. No preservative, Received < 72 hours
Ref. Range:	See report form
Turn-around time:	2 weeks

### C Peptide

Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	4.0 ml blood in plain tube (serum sample), Received < 4 hrs
Ref Range:	See Report Form.
Turn-around time:	2 weeks

### Creatine Kinase (CK)

Laboratory:	Biochemistry:
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received <72 hours
Comment:	This test is not specific for cardiac damage, Troponin I is the test of choice for cardiac damage.
Ref Range:	<b>Male:</b> 30-200 U/L <b>Female:</b> 29-168 U/L
Turn-around time:	<b>Urgent:</b> < 2 hrs <b>Routine:</b> Same day service

### Creatinine (Blood)

Laboratory:	Biochemistry
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received < 48 hours
Ref. Range:	<b>Adult Male:</b> 62-115 µmol/L. <b>Adult Female:</b> 53-97 µmol/L <b>Check with laboratory for paediatric reference range</b>
Turn-around time:	<b>Urgent:</b> < 2 hrs <b>Routine:</b> Same day service

### Creatinine (Urine)

Laboratory:	Biochemistry
Specimen:	24 hour sample. No preservative, Received < 48 hours
Ref. Range:	<b>Male:</b> 8.4-22.0 mmol/24 hr, <b>Female:</b> 6.3 14.6 mmol/24 hr.
Turn-around time:	Same day service

### Creatinine Clearance

Laboratory:	Biochemistry
Specimen:	4.0 ml blood in a plain tube (serum sample) or lithium heparin and a 24-hour urine sample with no preservative. Received < 48 hours
Ref. Range:	<b>Male:</b> 66-163 mls/min. <b>Female:</b> 66-165 mls/min
Turn-around time:	Same day service

### CRP - C- Reactive Protein

Laboratory:	Biochemistry
Specimen:	4.0 ml blood in a plain tube (serum sample) or lithium heparin, Received < 72 hours
Ref. Range:	< 5 mg/L. (Significant bacterial infection > 50mg/L)
Turn-around time:	<b>Urgent:</b> < 2 hrs <b>Routine:</b> Same day service

### Cryoglobulin

Laboratory:	Biochemistry
Specimen:	Blood must be collected into a gel-free, plain tube (serum sample) at 37 °C and sent to the lab in flask containing water heated to 37 °C immediately. (Flask will be provided by lab)
Comment:	Pre-arrange with Laboratory - Ext. 5733
Ref. Range:	Cryoglobulin should be NEGATIVE
Turn-around time:	6 days

### DHEA - Dehydroepiandrosterone

Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	4.0 ml blood in plain tube (serum sample). Received < 72 hours
Ref. Range:	See report form.
Turn-around time:	2 weeks

### DHEAS - Dehydroepiandrosterone Sulphate

Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	4.0 ml blood plain tube (serum sample). Received < 72 hours
Ref. Range:	See report form.
Turn-around time:	10 days

### Dopamine

See Catecholamine

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<b>Digoxin</b>			
Laboratory:	Biochemistry:		
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received <72 hours		
Comment:	Sample at least 6 hours post dose		
Ref Range:	Therapeutic Range 0.8 – 1.5 nmol/L.		
Turn-around time:	<b>Urgent:</b> < 3 hrs	<b>Routine:</b> Same day service	
<b>Electrophoresis (Serum)</b>			
Laboratory:	Biochemistry:		
Specimen:	4.0 ml blood in plain tube (serum sample), Received <72hrs		
Ref Range:	Should be 'Normal pattern. No pararprotein seen'		
Turn-around time:	3 weeks		
<b>Electrophoresis (Urine)</b>			
See Bence Jones Protein			
<b>Elastase - Faecal</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimen:	5g minimum Stool sample, Received < 72 hours once refrigerated		
Ref. Range:	See report form		
Turn-around time:	4 weeks		
<b>Epinephrine/ Nor epinephrine</b>			
See catecholamines			
<b>Ethosuximide</b>			
Laboratory:	Biochemistry Referred to Biomnis		
Specimen:	4 ml blood in plain tube (serum sample). Received < 72 hours		
Comment:	Always sample at the same time at trough level		
Ref. Range:	See report form		
Turn-around time:	2 weeks		
<b>Faecal Occult Blood (FOB)</b>			
Laboratory:	Biochemistry		
Specimen:	3 separate stool samples, Received < 72 hours		
Ref. Range:	Should be 'Negative'		
Turn-around time:	1 week		
<b>Fatty Acids - Free- Non Esterified</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimen:	4.0 ml blood in plain tube (serum sample). Received and frozen < 1 hr.		
Comment:	Patient must be fasting		
Ref. Range:	See report form.		
Turn-around time:	2 weeks		
<b>Fatty Acids - Long Chain -C14 - C22</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimen:	4.9 ml Lithium Heparin sample. Received and frozen < 1 hr.		
Ref. Rang	See report form.		
Turn-around time:	5 weeks		
<b>Fatty Acids - Very Long Chain - C22 - C26</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimen:	4.9 ml Lithium Heparin sample. Received and frozen < 1 hr.		
Ref. Range:	See report form.		
Turn-around time:	4 weeks		
<b>Ferritin</b>			
Laboratory:	Biochemistry.		
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received < 72 hours		
Ref. Range:	<b>Male:</b> 21.8-275 ng/ml. <b>Female:</b> 4.6-204 ng/ml.		
Turn-around time:	Next routine working day		

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<b>Folate (Folic Acid)</b>			
Laboratory:	Biochemistry:		
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received <48 hours		
Comment:	Haemolysis invalidates results.		
Ref Range:	>3.5 ng/mL		
Turn-around time:	Next routine working day		
<b>Free Light Chains (Serum)</b>			
Laboratory:	Biochemistry: Referred to Immunology St James' Hospital, Dublin		
Specimen:	4.0 ml blood in plain tube (serum sample), Received < 4 hrs		
Ref Range:	See report form		
Turn-around time:	2 weeks		
<b>Free Light Chains (Urine)</b>			
See Bence Jones Protein			
<b>FSH-Follicle - Stimulating Hormone</b>			
Laboratory:	Biochemistry		
Specimen:	4.0 ml blood in plain tube (serum sample). Received < 72 hours		
Ref. Range:	<b>Follicular phase:</b>	3.0-8.1 U/L	
	<b>Midcycle:</b>	2.6-16.7 U/L	
	<b>Luteal phase:</b>	1.4-5.5 U/L	
	<b>Post menopause:</b>	26.7-133.4 U/L	
	<b>Male:</b>	1.0-12.0 U/L	
Turn-around time:	1 week		
<b>Gallstones</b>			
See Stone			
<b>Gamma-glutamyl-transferase (γ-GT)</b>			
Laboratory:	Biochemistry		
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received < 72 hours		
Ref. Range:	<b>Male:</b> 12-64 U/L. <b>Female:</b> 9-36 U/L.		
Turn-around time:	<b>Urgent:</b> < 3 hrs	<b>Routine:</b> Same day service	
<b>Gastrin</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimen:	4.0 ml blood in a plain tube (serum sample). Received and frozen < 1 hr.		
Comment:	Patient must be fasting		
Ref. Range:	See report form.		
Turn-around time:	2 weeks		
<b>GH - Growth hormone</b>			
Laboratory:	Biochemistry: Referred to Biomnis (CUH when part of a newcastle work up)		
Specimen:	4.0 ml blood in plain tube (serum sample). Received and frozen without delay		
Ref. Range:	See report form.		
Turn-around time:	2 weeks		
<b>Glucagon</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimens:	4.0 ml EDTA + Aprotinine bottle (bottle available from biochemistry laboratory)		
Ref. Range:	See report form.		
Turn-around time:	4 weeks		
<b>Glucose</b>			
Laboratory:	Biochemistry		
Specimen:	4.0 ml Sodium fluoride EDTA blood, Received < 72 hours		
Ref. Range:	3.8-6.0 mmol/L Reference Range applies to fasting level.		
Turn-around time:	<b>Urgent:</b> < 3 hrs	<b>Routine:</b> Same day service	
<b>Haptoglobin</b>			
Laboratory:	Biochemistry: Referred to Biochemistry CUH.		
Specimen:	4.0 ml blood in plain tube (serum sample). Received < 72 hours		
Ref. Range:	See Report Form:		
Turn-around time:	2 weeks		



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### Insulin

Laboratory: Biochemistry: Referred to Biomnis.  
 Specimen: 4.0 ml blood plain tube (serum sample), Received and frozen < 30 hrs.  
 Comment: Haemolysis invalidates results  
 Ref Range: See report form.  
 Turn-around time: 2 weeks

### Iron

Laboratory: Biochemistry:  
 Specimen: 4.0 ml blood in plain tube (serum sample) or lithium heparin, Received < 72 hours  
 Ref Range: **Male:** 11.6-31.3 µmol/L **Female:** 9-30.4 µmol/L  
 Turn-around time: Same day service

### Keppra (Levetiracetam)

Laboratory: Biochemistry: Referred to Biomnis  
 Specimen: 4.0 ml blood in plain tube (serum sample), Received < 4 hrs  
 Ref Range: See Report Form.  
 Turn-around time: 2 weeks

### Lactate

Laboratory: Available on blood gas analyser in Biochemistry & ICU  
 Specimen: Heparinised blood gas syringe, Received < 30 mins  
 Ref. Range: **Arterial:** 0.4-1.3 mmol/L **Venous:** 0.5-1.7 mmol/L  
 Turn-around time: < 1 hr

### Lactate/Pyruvate Ratio

Laboratory: Biochemistry: Referred to Biomnis  
 Specimen: Special Bottles available in Biochemistry with perchloric acid added, Received and frozen < 30 mins  
 Comment: Fill bottle to marked line. Do not overfill. Invert to mix several times.  
 Ref. Range: See report form.  
 Turn-around time: 2 weeks

### Lamotrigene

Laboratory: Biochemistry: Referred to Biomnis  
 Specimen: 4.0 ml blood in a plain tube (serum sample). Received and frozen < 4 hrs  
 Ref. Range: See report form.  
 Turn-around time: 2 weeks

### LDH - Lactate dehydrogenase

Laboratory: Biochemistry 4.0 ml blood in plain tube (serum sample) or lithium heparin, Received < 6 hours  
 Specimen: Haemolysis invalidates result.  
 Ref. Range: 125-243 U/L  
 Turn-around time: Urgent: < 2 hrs Routine: Same day service

### LDL Low Density Lipoprotein

Laboratory: Biochemistry  
 Specimen: 4.0 ml blood in plain tube (serum sample) or lithium heparin, Received < 72 hours  
 Comment: Calculation. Unable to calculate if Triglyceride > 4.5 mmol/L  
 Ref. Range: <4.0 mmol/L Reference Range applies to fasting level.  
 Turn-around time: Same day service

### Lead

Laboratory: Biochemistry: Referred to Biomnis  
 Specimen: 4.9 ml Lithium Heparin sample, Received < 72 hours  
 Ref. Range: See report form.  
 Turn-around time: 2 weeks

### LH-Luteinising hormone

Laboratory: Biochemistry: Referred to Biomnis  
 Specimen: 4.0 ml blood in plain tube (serum sample). Received < 72 hours  
 Ref. Range: **Follicular phase:** 1.8-11.8 U/L  
**Midcycle:** 7.6-89.1 U/L  
**Luteal phase:** 0.6-14.0U/L  
**Post menopause:** 5.2-62.0 U/L  
**Male:** 0.6-12.1 U/L  
 Turn-around time: 1 week



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<b>Lipoprotein (a)</b>	
Laboratory:	Biochemistry: Referred to Biomnis.
Specimen:	4.0 ml blood in a plain tube (serum sample). Received < 72 hours
Comment:	Haemolysis invalidates results
Ref Range:	See report form.
Turn-around time:	2 weeks
<b>Lithium</b>	
Laboratory:	Biochemistry:
Specimen:	4.0 ml blood in a plain tube (serum sample). Received < 72 hours
Comment:	Sample 12 hours post evening dose (trough sample)
Ref Range:	0.4-1.0 mmol/L Therapeutic Range.
Turn-around time:	<b>Urgent:</b> On request <b>Routine:</b> 4 days
<b>Lysosomal Enzyme screen (Hexosaminadase A &amp; B).</b>	
Laboratory:	Biochemistry: Referred to Great Ormond St Hospital London via Biomnis Transport Dept
Specimen:	Lithium Heparin (10 ml whole blood). Received ASAP
Comment:	Phone Biochemistry ext 5733 to arrange for transport before specimen is taken. Take specimen Monday to Wednesday am only. Specimen must arrive in GOSH, London within 24 hrs of specimen being taken.
Ref. Range:	See report form.
Turn-around time:	7-8 weeks
<b>Magnesium (Blood)</b>	
Laboratory:	Biochemistry
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin. Received < 48 hours
Comment:	Haemolysis invalidates result
Ref. Range:	< 6 years 0.70 - 0.95mmol/L 6-12 yrs 0.70 - 0.86 mmol/L 12-20 yrs 0.70 - 0.91 mmol/L Adult 0.66 - 1.07 mmol/L
Turn-around time:	<b>Urgent:</b> <2 hrs <b>Routine:</b> Same day service
<b>Manganese</b>	
Laboratory:	Biochemistry: Referred to Biomnis.
Specimen:	4.0 ml blood in a plain tube (serum sample). Received < 72 hours
Ref Range:	See report form.
Turn-around time:	3weeks
<b>Mercury</b>	
Laboratory:	Biochemistry: Referred to Biomnis.
Specimen:	4.0 ml blood in a plain tube (serum sample). Received < 72 hours
Ref Range:	See report form.
Turn-around time:	4weeks
<b>Methadone</b>	
See Toxicology / Drug Screen - Urine	
<b>Methatrexate</b>	
Laboratory:	Biochemistry Referred to Biochemistry CUH
Specimen:	4.0 ml blood in plain tube (serum sample no gel) light protected, separated ASAP.
Ref Range:	See Report Form.
Turn-around time:	Same day service.
<b>Metanephrines (Urine)</b>	
Laboratory:	Biochemistry: Referred to Biochemistry, Beaumont Hospital Dublin
Specimen:	24-hour acidified urine sample, Acidified containers available in Biochemistry, Received < 72 hours
Comment:	Avoid bananas chocolate and citrus fruit and reduce tea and coffee intake for 48 hrs prior to sampling
Ref. Range:	See report form.
Turn-around time:	3 weeks
<b>Methaemoglobin</b>	
See Blood gasses	
<b>Methylmalonic Acid</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	4.0 ml blood in plain tube (serum sample). Received and frozen <1 hr
Ref. Range:	See report form.
Turn-around time:	6 weeks
<b>Microalbumin Creatinine Ratio</b>	

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Laboratory: Biochemistry:  
Specimen: Spot Urine sample, Received < 48hours  
Ref. Range: **Female** Normal Microalbumin:Creatinine Ratio:<3.5 mg/mmol.  
**Male** Normal Microalbumin:Creatinine Ratio:<2.5 mg/mmol.  
Turn-around time: 24 hrs

**Mucopolysaccharides**

See Organic Acids

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<b>Oestradiol</b>			
Laboratory:	Biochemistry: Referred to CUH		
Specimen:	4.0 ml blood in a plain tube (serum sample). Received < 72 hours		
Ref Range:	See report form.		
Turn-around time:	10 days		
<b>Oligoclonal bands and CSF IgG index</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimen:	1.5 ml CSF and 4.0 ml blood in plain tube (serum sample). Received < 24 hours		
Ref Range:	See Report Form.		
Turn-around time:	2 weeks		
<b>Opiates</b>			
See Toxicology / Drug Screen - Urine			
<b>Organic Acids - Urine</b>			
Laboratory:	Biochemistry: Referred to The Children's Hospital, Temple Street, Dublin		
Specimen:	Spot Urine, Received and frozen < 30 mins		
Comment:	Ensure relevant clinical details are supplied		
Ref. Range:	See report form		
Turn-around time:	4 weeks		
<b>Osmolality (Serum )</b>			
Laboratory:	Biochemistry		
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin,		
Ref. Range:	275-295 mOsm/kg		
Turn-around time:	<b>Urgent:</b> < 24 hrs <b>Routine:</b> 3 days		
<b>Osmolality (Urine)</b>			
Laboratory:	Biochemistry		
Specimen:	Spot urine sample		
Ref. Range:	300-900 mOsm/kg (dependant on patients state of hydration)		
Turn-around time:	<b>Urgent:</b> < 24hrs <b>Routine:</b> 3 days		
<b>Oxalate - Urine</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimens:	24 hr acidified urine (pH 2-3), Received and frozen < 4 hrs after collection , Refrigerate during collection		
Ref. Range:	See report form		
Turn-around time:	2 weeks		
<b>Pancreatic Polypeptide</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimens:	4.0 ml EDTA + Aprotinine blood, Received and frozen <1 hr		
Comment:	Aprotinine bottle available in Biochemistry		
Ref. Range:	See report form		
Turn-around time:	5 weeks		
<b>Paracetamol</b>			
Laboratory:	Biochemistry		
Specimen:	4.0 ml blood (lithium heparin /serum). Received < 72 hours		
Comment:	Sample 4-12 Hours post ingestion.		
Ref. Range:	Refer to nomogram relating concentration to ingestion time.		
Turn-around time:	<b>Urgent:</b> <3 hrs <b>Routine:</b> Same day service		
<b>Pericardial Fluid / Peritoneal Fluid / Pleural Fluid</b>			
See Sterile Body Fluid - Biochemistry.			
<b>Phenobarbitone / Phenobarbital</b>			
Laboratory:	Biochemistry: Referred to Biochemistry CUH.		
Specimen:	4.0 ml blood in plain tube (serum sample). Received < 72 hours		
Ref. Range:	See report form.		
Turn-around time:	<b>Urgent:</b> 24 hrs <b>Routine:</b> 1 week		
<b>Phenytoin</b>			
Laboratory:	Biochemistry, Referred to Biochemistry CUH.		
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received < 72 hours		
Comment:	Sample immediately before the next dose.		
Ref. Range:	See Report form		

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Turn-around time:   **Urgent:** On request    **Routine:** 4 days

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<b>Phosphate (Blood)</b>			
Laboratory:	Biochemistry		
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received < 24 hours		
Comment:	Haemolysis invalidates results.		
Ref Range:	<b>Adult Range:</b> 0.74-1.52 mmol/L (For Paediatric Reference Ranges please contact biochemistry lab.)		
Turn-around time:	<b>Urgent:</b> <2 hrs <b>Routine:</b> Same day service		
<b>Phosphate (Urine)</b>			
Laboratory:	Biochemistry		
Specimen:	24-hour acidified urine sample. Acidified containers available in Biochemistry, Received < 72 hours		
Ref. Range:	12.9 - 42.0 mmol/24 Hr		
Turn-around time:	Same day service		
<b>Phytanic Acid</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimen:	4.0 ml blood in Lithium Heparin or EDTA plasma, Received and frozen < 1 hr		
Ref. Range:	See report form.		
Turn-around time:	4 weeks		
<b>Porphyrians (Erythrocyte Porphyrians)</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimen:	10ml EDTA whole Blood, Received <24 hours, Keep Refrigerated.		
Comment:	<b>All samples must be protected from light at all times using tinfoil</b>		
Ref. Range:	See report form.		
Turn-around time:	2 weeks		
<b>Porphyrians Screen Full</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimen:	100 ml early morning urine, Stool sample, EDTA whole blood sample, Received < 24 hours		
Comment:	<b>All samples must be protected from light at all times using tinfoil</b>		
Ref. Range:	See report form.		
Turn-around time:	2 weeks		
<b>Porphyrians (Urine)</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimen:	100 ml early morning urine. Received < 24 hours		
Comment:	<b>All samples must be protected from light at all times using tinfoil</b>		
Ref. Range:	See report form.		
Turn-around time:	2 weeks		
<b>Potassium (Blood)</b>			
Laboratory:	Biochemistry		
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin. Received < 12hr.		
Comment:	Haemolysis invalidates result.		
Ref. Range:	SERUM: 3.5 - 5.1 mmol/L PLASMA: 3.5-4.9 mmol/L		
Turn-around time:	<b>Urgent:</b> <2 hrs <b>Routine:</b> Same day service		
<b>Potassium (Urine)</b>			
Laboratory:	Biochemistry		
Specimen:	Spot or 24 Hr urine collection, Received < 72 hours		
Ref. Range:	25 - 125 mmol/24 Hr,		
Comment:	No RR for spot urinary K <sup>+</sup> . Urinary K <sup>+</sup> done in conjunction with urinary Na <sup>++</sup> , Urinary Na <sup>++</sup> , normally exceeds Urinary K <sup>+</sup> , except with conditions which elevate aldosterone levels.		
Turn-around time:	<b>Urgent:</b> <2 hrs <b>Routine:</b> Same day service		
<b>Progesterone</b>			
Laboratory:	Biochemistry: Referred to Biochemistry CUH.		
Specimen:	4.0 ml blood in plain tube (serum sample). Received < 72 hours		
Ref. Range:	See report form.		
Turn-around time:	2 weeks		

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<b>Proinsulin</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	4.0 ml blood in a plain tube (serum sample). Received and frozen < 4 hrs.
Ref. Range:	See report form.
Turn-around time:	5 weeks
<b>Prolactin</b>	
Laboratory:	Biochemistry.
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received < 72 hours
Ref. Range:	<b>Male:</b> 73-407 mIU/L. <b>Female:</b> 109-557 mIU/L.
Turn-around time:	1 Week
<b>Propoxyphene</b>	
See Toxicology / Drug Screen	
<b>PSA Total</b>	
Laboratory:	Biochemistry.
Specimen:	4.0 ml blood in plain tube (serum sample). Received < 72 hours
Ref. Range:	< <b>49yrs:</b> <2.1 µg/L < <b>59yrs:</b> <3.1 µg/L < <b>69yrs:</b> <4.1µg/L > <b>69yrs:</b> <4.9µg/L
Turn-around time:	Next routine working day
<b>PTH - Parathyroidhormone</b>	
Laboratory:	Biochemistry: Referred to Biochemistry CUH.
Specimen:	4.0 ml EDTA plasma, Received and frozen < 30 mins
Ref. Range:	See report form.
Turn-around time:	4 weeks
<b>PTH - RP - Parathyroidhormone related protein</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	4.0 ml EDTA + Aprotinine blood, Received and frozen < 1 hr
Ref. Range:	See report form.
Turn-around time:	4 weeks
<b>Rast</b>	
See IgE	
<b>Renal Stone</b>	
See Stone (description and conclusion)	
<b>Renin</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	4.0 ml EDTA sample. Received and frozen < 1 hr
Comment:	State whether patient standing or lying down.
Ref. Range:	See report form.
Turn-around time:	2 weeks
<b>Salicylate</b>	
Laboratory:	Biochemistry
Specimen:	4.0 ml blood in a plain tube (serum sample) or lithium heparin, Received < 72 hours
Ref. Range:	Therapeutic Range : 1.09-2.17 mmol/L, Toxic >2.17 mmol/L, Lethal >5.07 mmol/L
Turn-around time:	<b>Urgent:</b> <3 hrs <b>Routine:</b> Same day service
<b>Selenium</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimens:	4.0 ml blood in a plain tube (serum sample). Received < 72 hours
Ref. Range:	See report form
Turn-around time:	3 weeks
<b>Serotonin</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	4.9 ml Li Hep whole blood, Received and frozen < 1 hr.
Comment:	Avoid bananas chocolate and citrus fruit and reduce tea and coffee intake for 48 hrs prior to sampling
Ref. Range:	See report form.
Turn-around time:	2 weeks

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### SHBG Sex Hormone Binding Globulins (Androgen Index)

Laboratory: Biochemistry: Referred to Biochemistry CUH.  
 Specimen: 4.0 m blood in plain tube (serum sample). Received < 72 hours  
 Comment: SHBG is analysed (females only) in conjunction with testosterone, Androgen index (AI) is then calculated.  
 Ref. Range: See report form.  
 Turn-around time: 2 weeks

### Sodium (Blood)

Laboratory: Biochemistry  
 Specimen: 4.0 ml blood in plain tube (serum sample) or lithium heparin. Received < 72 hours  
 Comment: Haemolysis invalidates the result.  
 Ref. Range: 136-145 mmol/L  
 Turn-around time: Urgent: <2 hrs Routine: Same day service

### Sodium (Urine)

Laboratory: Biochemistry  
 Specimen: Spot or 24 Hr urine collection. Received < 72 hours  
 Ref. Range: 40-220 mmol/24 Hr (reflects daily intake).  
 Comment: No RR for spot urinary Na<sup>++</sup>. Urinary Na<sup>++</sup> done in conjunction with urinary K<sup>+</sup>, Urinary Na<sup>++</sup>, normally exceeds Urinary K<sup>+</sup>, except with conditions which elevate aldosterone levels  
 Turn-around time: Urgent: <2 hrs Routine: Same day service

### Somatomedin C

See IGF-1

### Somatostatin

Laboratory: Biochemistry: Referred to Biomnis  
 Specimens: 4.0 ml EDTA + Aprotinine blood . Received and frozen < 1 hr  
 Comment: Aprotinine bottle available in Biochemistry Lab  
 Ref. Range: See report form  
 Turn-around time: 6 weeks

### Sterile Body Fluid - Biochemistry.

Laboratory: Biochemistry  
 Specimens: Specialist collection according to local protocols. Pleural fluids, Ascitic fluids, Received < 48 hrs  
 Comment: Fluid profile includes Glucose, Total protein, and LDH.  
 Ref. Range:

	<b>Trans</b>	<b>Exudate</b>
<b>Fluid Glucose.</b>	as plasma glucose.	<3.3 mmol/L
<b>Fluid LDH.</b>	<0.6 Plasma/Fluid.	>0.6 Plasma/Fluid.
<b>Fluid Total Protein.</b>	Trans <30 g/L.	>30 g/L
<b>Fluid Albumin</b>	No reference range established	
<b>Fluid Amylase</b>	No reference range established	

Turn-around time: Same day service

### Sterile Body Fluid (pH)-Biochemistry

Laboratory: Biochemistry  
 Specimens: Fluid collected in Heparinised Blood Gas Syringe. Received < 30 mins  
 Ref. Range: No Reference Range established  
 Turn-around time: < 1 hr

### Stones (Description and Conclusion)

Laboratory: Biochemistry: Referred to Biomnis  
 Specimens: Calculus, Received < 72 hours  
 Comment: State origin  
 Ref. Range: Turn-around time:  
 Turn-around time: 2 weeks

### Sweat Test

Laboratory: Biochemistry CUH  
 Specimen: Sweat, Received < 4 hours  
 Ref. Range: See report form  
 Turn-around time: Next routine working day

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<b>T3 - Triiodothyronine - Total</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimen:	4.0 ml blood in plain tube (serum sample). Received < 72 hours		
Comment:	Only done on patients who exhibit hypothyroidism ( low TSH) with a normal free T4		
Ref. Range:	See report form.		
Turn-around time:	9 days		
<b>T4 Thyroxine (Free)</b>			
Laboratory:	Biochemistry.		
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin. Received< 72 hour.		
Comment:	Will only be done on patients with TSH < 0.40 mIU/L		
Ref. Range.	9.0 - 19.0 pmol/L		
Turn-around time:	Next routine working day		
<b>Testosterone</b>			
Laboratory:	Biochemistry: Referred to Biochemistry CUH.		
Specimen:	4.0 ml blood in plain tube (serum sample). Received < 72 hours		
Ref. Range:	See report form.		
Turn-around time:	2 weeks		
<b>Theophylline</b>			
Laboratory:	Biochemistry, CUH		
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin,Received < 72 hours		
Comment:	Sample>2 hrs after dose or before next dose.		
Ref. Range:	See Report Form		
Turn-around time:	<b>Urgent:</b> On request <b>Routine:</b> 4 days		
<b>Thyroglobulin</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimen:	4.0 ml blood in plain tube (serum sample). Received < 72 hours		
Ref. Range:	See report form		
Turn-around time:	2 weeks.		
<b>Thyroid Stimulating Antibodies</b>			
Laboratory:	Biochemistry: Referred to Biomnis.		
Specimen:	4.0 ml blood plain tube (serum sample), Received < 48 hours		
Ref Range:	See report form.		
Turn-around time:	3weeks		
<b>Thyroid Stimulating Hormone (TSH)</b>			
Laboratory:	Biochemistry		
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received < 72 hours		
Ref. Range:	0.35-4.9 mIU/L.		
Turn-around time:	Next routine working day		
<b>Total Protein</b>			
Laboratory:	Biochemistry		
Specimen:	4.0ml blood in plain tube(serum sample) or lithium heparin, Received < 72 hours		
Ref. Range.	64-83 g/L		
Turn-around time:	<b>Urgent:</b> <2 hrs <b>Routine:</b> Same day service		
<b>Toxicology / Drug Screen: Blood</b>			
Laboratory:	Biochemistry: Referred to Toxicology Laboratory, Beaumont Hospital Dublin		
Specimen:	4.0 ml blood in a plain tube (serum sample). Received < 72 hours		
Comment:	Tested for Benzodiazepines, Barbiturates, Paracetamol, Salicylate Tricyclics,		
Ref. Range:	See report form		
Turn-around time:	10 days		
<b>Toxicology / Drug Screen; Urine.</b>			
Laboratory:	Biochemistry: Referred to Toxicology Laboratory, Beaumont Hospital Dublin		
Specimen:	Spot urine, Received < 72 hours		
Comment:	Tested for Benzodiazepines, Barbiturates, Opiates, Cocaine, Propoxphene, Cannabis, Amphetamine, Methadone, Alcohol		
Ref. Range:	See report form		
Turn-around time:	10 days		
<b>TPMT - Thiopurine MethylTransferase - Activity</b>			
Laboratory:	Biochemistry: Referred to Biomnis		



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Specimens: 4.0 ml EDTA whole blood, Received ASAP  
Comment: Must reach external laboratory within 24 hrs Take sample Monday to Thursday. Am preferably  
Ref. Range: See report form  
Turn-around time: 2 weeks

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<b>Tricyclics</b>			
See Toxicology / Drug screen - Blood			
<b>Transferrin</b>			
Laboratory:	Biochemistry.		
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received < 72 hours		
Ref. Range:	<b>Male</b>	<b>Female</b>	
	>60yrs	1.63-3.44 g/L	1.73-3.60 g/L
	14-60yrs	1.74-3.64 g/L	1.80-3.82 g/L
	<14yrs	1.86-3.88 g/L	1.80-3.91 g/L
Turn-around time:	Same day service		
<b>Transferrin Isoforms (Carbohydrate-deficient Transferrin)</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimens:	4.0 ml blood in a plain tube (serum sample). Received < 72 hours		
Ref. Range:	See report form		
Turn-around time:	2 weeks		
<b>Transferrin Saturation %</b>			
Laboratory:	Biochemistry.		
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received < 72 hours		
Comment:	Calculated from the Iron and Transferrin results.		
Ref. Range:	<b>Male:</b> 15-45% <b>Female:</b> 10-40%		
Turn-around time:	Same day service		
<b>Triglycerides</b>			
Laboratory:	Biochemistry		
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin. Received < 72 hours		
Ref. Range:	<1.7 mmol/L, Reference Range applies to fasting level.		
Turn-around time:	Same day service		
<b>Troponin I (High Sensitivity)</b>			
Laboratory:	Biochemistry		
Specimen:	4.0 ml blood in lithium heparin or plain tube (serum sample). Received < 8 hours		
Ref. Range:	Male Normal Upper Reference Limit : < 34 ng/L Female Normal Upper Reference Limit : < 16 ng/L Any increase after 3-6 hours above these levels or 50% increase on admission level may be considered significant. Refer to Mercy high Sensitivity Algorithm		
Turn-around time:	<b>Urgent:</b> On request <b>Routine:</b> < 6 hours		
<b>Tryptase</b>			
Laboratory:	Biochemistry: Referred to Biomnis		
Specimen:	4.0 ml blood in plain tube (serum sample). Received < 72 hours		
Comment:	Sample should be taken as soon as possible after anaphylactic shock, and then at + 2 hrs and + 8 hrs.		
Ref. Range:	See report form		
Turn-around time:	2 weeks		
<b>Urea (Blood)</b>			
Laboratory:	Biochemistry		
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin. Received < 72 hours		
Ref. Range:	<b>Male</b> < 50 yrs: 3.2-7.4 mmol/L, <b>Male</b> > 50 yrs : 3.0-9.2 mmol/L <b>Female</b> <50 yrs: 2.5-6.7 mmol/L. <b>Female</b> >50 yrs: 3.5-7.2 mmol/L		
Comment	<b><u>For paediatric references, please contact laboratory</u></b>		
Turn-around time:	<b>Urgent:</b> <2 hrs <b>Routine:</b> Same day service		
<b>Urea (Urine)</b>			
Laboratory:	Biochemistry		
Specimen:	Spot or 24 Hr urine sample, Received < 72 hours		
Ref. Range:	428 – 714 mmol/24 Hr		
Turn-around time:	Same day service		
<b>Uric Acid - (Urate) Blood</b>			
Laboratory:	Biochemistry		
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received < 48 hours		
Ref. Range:	< <b>12 years:</b> 0.12-0.32 mmol/L. <b>Male:</b> 0.21-0.42 mmol/L <b>Female:</b> 0.15-0.35 mmol/L		
Turn-around time	<b>Urgent:</b> <2 hrs <b>Routine:</b> Same day service		

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<b>Uric Acid - (Urate) Urine</b>	
Laboratory:	Biochemistry
Specimen:	24 Hour plain collection, Received < 48 hour
Ref. Range:	1.5 - 4.5 mmol/24 Hr.
Turn-around time	Same day service
<b>Urinary Protein</b>	
Laboratory:	Biochemistry
Specimen:	Spot or 24 Hr sample, Received < 72 hours
Ref. Range:	<0.3g/24 Hr
Turn-around time:	Same day service
<b>Urinary Protein/Creatinine Ratio.</b>	
Laboratory:	Biochemistry
Specimen:	Spot urine. Received < 48 hours
Ref. Range:	Normal: <0.2. Low-Moderate Proteinuria: 0.2-3.5. Nephrotic: > 3.5.
Turn-around time:	Same day service
<b>Valproate</b>	
Laboratory:	Biochemistry, Referred to Biochemistry CUH.
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received < 72 hours
Comment:	Trough sample immediately before next dose
Ref. Range:	See report form
Turn-around time:	<b>Urgent:</b> On request <b>Routine:</b> 4 days
<b>Very Long Chain Fatty acids</b>	
See Fatty Acids	
<b>VIP - Vasoactive intestinal Polypeptide</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	Aprotinine sample, Received and frozen < 1 hr
Comment:	Aprotinine Bottle available in Biochemistry
Ref. Range:	See report form.
Turn-around time:	4 weeks
<b>Vitamin A (Retinol)</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	4.0 ml blood in a plain tube (serum sample). Received and frozen <1 hr
Comment:	<b>Protect Sample from light with tinfoil</b>
Ref. Range:	See report form.
Turn-around time:	2 weeks
<b>Vitamin B1 (Thiamine)</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	4 ml EDTA whole blood. Received and frozen < 4 hrs
Comment:	<b>Protect Sample from light with tinfoil</b>
Ref. Range:	See report form.
Turn-around time:	2 weeks
<b>Vitamin B6 (Pyridoxyl Phosphate)</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	4 ml EDTA Whole blood, Received and frozen < 4 hrs
Comment:	<b>Protect Sample from light with tinfoil</b>
Ref. Range:	See report form.
Turn-around time:	2 weeks
<b>Vitamin B1 2</b>	
Laboratory:	Biochemistry.
Specimen:	4.0 ml blood in plain tube (serum sample) or lithium heparin, Received < 72 hours
Ref. Range:	187-883 pg/ml.
Comment:	Haemolysis invalidates results
Turn-around time:	Next routine working day

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<b>Vitamin C (Ascorbic Acid)</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	4.0 ml lithium heparin blood. Separate & Frozen < 1 hr
Comment:	<b>Protect Sample from light with tinfoil</b>
Ref. Range:	See report form.
Turn-around time:	2 weeks
<b>Vitamin D (1,25 Dihydroxy Vitamin D3 / Calcitrol)</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	4.0 ml blood in a plain tube (serum sample). Separate & Frozen <4 hrs
Ref. Range:	See report form.
Turn-around time:	2 weeks
<b>Vitamin D (25Hydroxy Vitamin D3 / Hydroxycholecalciferol)</b>	
Laboratory:	Biochemistry
Specimen:	4.0 ml blood in a plain tube (serum sample) or lithium heparin. Received <72 hrs
Ref. Range:	75 – 125 nmol/L Deficient - <50 nmol/L, Inadequate - 50-75 nmol/L
Turn-around time:	1 week
<b>Vitamin E (Tocopherol)</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	4.0 ml blood in a plain tube (serum sample).Received and frozen < 4hrs
Comment:	<b>Protect Sample from light with tinfoil</b>
Ref. Range:	See report form.
Turn-around time:	2 weeks
<b>VMA - Vanillylmandelic Acid</b>	
See metanephrines	
<b>Xanthochromia</b>	
Laboratory:	Biochemistry: Referred to biochemistry CUH
Specimen:	1.5 ml CSF Specimen, Received ASAP
Comment:	Spec should sampled 12+ hours post suspected SAH to allow sufficient time for red cell breakdown and bilirubin production in CSF. <b>Protect Sample from light with tinfoil</b> Relevant clinical details and suspected incident time should be supplied
Ref.Range.	See Report Form.
Turn-around Time	Routine: Next routine working day
<b>Zinc</b>	
Laboratory:	Biochemistry: Referred to Biomnis
Specimen:	4.0 ml blood in a plain tube (serum sample). Received < 72 hours
Ref. Range:	See report form.
Turn-around time:	2 weeks

### Turnaround Times

Turnaround time is defined as the time from receipt of specimen in the laboratory until the result is reported and available either on the ward computers or by phone. The Biochemistry Dept. will attempt to meet the following maximum turnaround times, subject to the availability of sufficient resources and the continued smooth functioning of the ward enquiry system. We usually turn results around much more quickly than these.

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### TEST DIRECTORY (A-Z) FOR BLOOD TRANSFUSION DEPARTMENT

<b>Blood Group / Antibody Screen(Group &amp; Hold) ROUTINE</b>	
<b>Laboratory:</b>	Blood Transfusion
<b>Specimen:</b>	3-7.5ml EDTA (whole Blood)
<b>Comment:</b>	
<b>Turnaround:</b>	Routine 2-6 hrs ♦ (Next scheduled batch)
<b>Blood Group / Antibody Screen (Group &amp; Hold) EMERGENCY</b>	
<b>Laboratory:</b>	Blood Transfusion
<b>Specimen:</b>	3-7.5ml EDTA (whole Blood)
<b>Comment:</b>	
<b>Turnaround:</b>	ASAP -Within 2 hrs of receipt of sample ♦ Contact Pathology Department in advance. Processed immediately on receipt.
<b>Blood Group and Compatibility Testing ROUTINE</b>	
<b>Laboratory:</b>	Blood Transfusion
<b>Specimen:</b>	3-7.5ml EDTA (whole Blood)
<b>Comment:</b>	
<b>Turnaround:</b>	Routine 2-6 hrs ♦ (Next scheduled batch)
<b>Blood Group and Compatibility Testing EMERGENCY</b>	
<b>Laboratory:</b>	Blood Transfusion
<b>Specimen:</b>	3-7.5ml EDTA (whole Blood)
<b>Comment:</b>	
<b>Turnaround:</b>	ASAP -Within 2 hrs of receipt of sample ♦ Contact Pathology Department in advance. Processed immediately on receipt.
<b>Blood Group and Compatibility Testing for patients who have red cell immune antibodies ROUTINE</b>	
<b>Laboratory:</b>	Blood Transfusion
<b>Specimen:</b>	3-7.5ml EDTA (whole Blood)
<b>Comment:</b>	
<b>Turnaround:</b>	1 working day. <u>Please note</u> this is dependent on the complexity of antibodies present. Progress can be discussed by telephoning the Blood Transfusion laboratory.
<b>Blood Group and Compatibility Testing for patients who have red cell immune antibodies EMERGENCY</b>	
<b>Laboratory:</b>	Blood Transfusion
<b>Specimen:</b>	3-7.5ml EDTA (whole Blood)
<b>Comment:</b>	
<b>Turnaround:</b>	2-6 hrs <u>Please note</u> this is dependent on the complexity of antibodies present ♦ Progress can be discussed by telephoning the Blood Transfusion laboratory.
<b>Antibody Investigation</b>	
<b>Laboratory:</b>	Blood Transfusion
<b>Specimen:</b>	3-7.5ml EDTA (whole Blood)
<b>Comment:</b>	
<b>Turnaround:</b>	2 working days Progress can be discussed by telephoning the Blood Transfusion laboratory.
<b>Cold Agglutinins ROUTINE</b>	
<b>Laboratory:</b>	Blood Transfusion
<b>Specimen:</b>	7.5ml EDTA (whole Blood)
<b>Comment:</b>	Contact laboratory if patient known to have CHAD. Sample for investigation to be taken @ 37°C and remain @ 37°C during transportation
<b>Turnaround:</b>	2 working days
<b>Direct Antiglobulin Test ROUTINE</b>	
<b>Laboratory:</b>	Blood Transfusion
<b>Specimen:</b>	3-7.5ml EDTA (whole Blood)
<b>Comment:</b>	
<b>Turnaround:</b>	Routine 2-6 hrs (Next scheduled batch)

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### Direct Antiglobulin Test EMERGENCY

**Laboratory:** Blood Transfusion  
**Specimen:** 3-7.5ml EDTA (whole Blood)  
**Comment:**  
**Turnaround:** ASAP -Within 2 hrs of receipt of sample ♦  
Contact Pathology Department in advance. Processed immediately on receipt.

### Transfusion reaction investigation

#### Note all transfusion reactions are treated as emergency

**Laboratory:** Sample referred to the Blood Bank Mercy University Hospital  
**Specimen:** (1) 7.5ml EDTA (Whole Blood) Post transfusion Sample.  
(2) 2-5ml Plain Clotted Sample  
The implicated unit(s) must be returned-Suitably sealed.  
**Comment:** Pathology Department/ Medical Scientist on call must be phoned in advance.  
Contact medical consultant / medical registrar on duty / on call, for direction.  
Please return the following to the laboratory:

- Implicated unit (if available)-(even an 'empty pack' may provide a sample from an attached segment)
- Part B (white section) of the traceability label (LF-BB-0002) must not be removed from the units to be returned
- The remaining un-transfused units must be also be returned to the Blood Transfusion Laboratory
- Completed Request for Transfusion Reaction Investigation Form (LF-BB-4)

**Turnaround:** ASAP 2-6 hrs on receipt of sample for serological results ♦  
Note: Where bacteriological screening of the implicated units is required, the turnaround time may be extended beyond 7 days.

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### TEST DIRECTORY (A-Z) FOR HAEMATOLOGY DEPARTMENT

#### Activated Partial Thromboplastin Time (APTT)

Laboratory:	Haematology								
Specimen:	Blood 3mL, green, S Monovette (sodium citrate 0.106M) (Specimens which are haemolysed under filled or overfilled cannot be analysed)								
Stability:	Samples must be labelled with time of phlebotomy and delivered promptly to laboratory, within 2 hours of phlebotomy. Samples received greater than 4 hours post phlebotomy cannot be processed for APTT.								
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. Test available Monday to Friday, during routine working hours, and for emergency reasons at all other times.								
Turnaround:	Emergency specimens as per arrangement. Routine specimens 4 hours.								
Ref. Range:	<table> <tr> <td>Adult</td> <td>20.5 – 28.4 seconds</td> <td>0.8 – 1.11 Ratio</td> </tr> <tr> <td>Children</td> <td>&lt; 3 months</td> <td>25 – 45 seconds</td> </tr> </table>			Adult	20.5 – 28.4 seconds	0.8 – 1.11 Ratio	Children	< 3 months	25 – 45 seconds
Adult	20.5 – 28.4 seconds	0.8 – 1.11 Ratio							
Children	< 3 months	25 – 45 seconds							

#### Alpha Thalassaemia/ High affinity haemoglobins

Laboratory:	Referred from Haematology Dept. MUH to Oxford.		
Specimen:	5 - 10mls EDTA		
Comment:	Request form attached must be completed, Patients consent form and a copy of the FBC report must also be included. Haemoglobinopathies are caused by mutations which affect the genes that direct the synthesis of haemoglobin and may result in reduced synthesis or structural changes.		
Ref. Range	Please see copy of report.		

#### Anti-cyclic citrullinated peptide

Laboratory:	Referred from Haematology Dept. MUH to Biomnis.		
Specimen:	Blood 4.9ml, S Monovette (serum)		
Comment:	Ati-cyclic citrullinated antibodies are autoantibodies frequently detected in patients with rheumatoid arthritis.		
Ref. Range:	See report		

#### Anti-Pyruvate Dehydrogenase Antibodies

Laboratory:	Sample referred from Haematology Dept MUH to Biomnis.		
Specimen:	Blood 4.9ml, S Monovette (serum gel sample/serum sample)		
Comment:	Sample must be spun and refrigerated immediately once received in Haematology		
Ref. Range :	See report		

#### Anti Thrombin

Laboratory:	Haematology		
Specimen:	Blood 3mL, green, S Monovette (sodium citrate 0.106M) (Specimens, which are haemolysed, underfilled or overfilled, cannot be analysed.)		
Stability:	24 hours		
Comment:	Forms part of a Thrombophilia Screen. Test available Mon to Fri during routine hours.		
Turnaround:	Approximately 1 month		
Ref. Range:	71 – 105 %		

#### -Factor X assay

Laboratory:	Referred from Haematology laboratory to Haematology Dept MUH		
Specimen:	Blood 3mL, green, S Monovette (sodium citrate 0.106M) (Specimens, which are haemolysed, underfilled or overfilled, cannot be analysed.) <b>Must be taken 2 hours post dosage</b>		
Comment:	Batch tested in CUH on Wednesdays , all samples need to be in lab by 11.00am		
Ref. Range:	See report		

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#### Anti – Neutrophil Antibodies

Laboratory: NHSBT Filton (Bristol) sent by DHL  
Specimen: Pediatric size EDTA sample  
Form: Histocompatibility & Immunogenetics NHS form 3E

Comment: Specimen must be delivered within 24 hrs so sample must be in Haematology lab before 1pm. Do not send on Fridays.

Ref. Range: See Report

#### Anti – pyruvate dehydrogenase antibodies

Laboratory: Referred from Haematology MUH to Biomnis  
Specimen: Serum gel sample/Serum sample  
Comment: Sample must be spun and refrigerated once delivered to laboratory  
Ref. Range: See Report

#### APC resistance

Laboratory: Haematology  
Specimen: Blood 3mL, green S Monovette (sodium citrate 0.106M)  
(Specimens which are haemolysed, underfilled or overfilled cannot be analysed)  
Stability: 24 hours  
Comment: Test available Mon to Fri, during routine working hours. This test forms part of a Thrombophilia Screen (an EDTA sample is also sent to a reference laboratory for PCR evaluation).  
Turnaround: Approx 1 month  
Ref. Range: Normal Ratio 0.7 – 1.1

#### APOE GENOTYPING

Laboratory: Referred from Haematology MUH to National Centre for Medical Genetics, Crumlin

**Specimen: 2 x Adult size EDTA samples**

**Comment: Sample to be taken only Mon to Wed. Please contact laboratory for correct form.**

**Ref> Range: See report**



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### BCRABL – Reverse transcriptase PCR for identification and quantitation (Philadelphia Chromosome)

**Laboratory:** Referred from Haematology Dept. to Cancer Molecular Genetics, St James Hospital  
**Specimen:** 5mls of venous blood in red, S Monovette (EDTA) or bone marrow in RPMI (contact Haematology for specimen containers)  
**Comment:** Not available on Fridays, SPECIMEN MUST ARRIVE IN ST JAMES ON THE SAME DAY (within 24 hrs).  
Please contact Haematology to arrange transportation  
**Turnaround:** 14-21 days  
**Ref. Range:** See report form or contact Cancer Molecular Genetics, LabMed Directorate, St James Hospital

### Beta-2-Glycoprotein Antibodies IgG and IGM and Anticardiolipin Antibody IgG

**Laboratory:** Sample referred from Haematology Laboratory to Immunology Department, St James Hospital  
**Specimen:** Blood 4.9ml, S Monovette (serum)  
**Turnaround:** 1 month  
**Ref. Range:** See report form or contact Immunology Dept., St James Hospital

### Bone Marrow Examination / Bone Marrow Biopsies (trephines)

**Laboratory:** Haematology  
**Specimen:** Fresh bone marrow films. Specimen should be sent to the Haematology Dept., as soon as possible as some staining procedures require immediate fixation.. All slides should be labelled clearly.  
Bone marrow biopsies are placed in Formal saline and are sent to Histology Dept., CUH via the Haematology laboratory, MUH. With the exception of trephine samples taken in theatre which are sent directly to CUH from Theatre.  
**Comment:** Test available Monday to Friday during routine working hours.  
**Ref. Range:** NA

### CALR/MPL

**Laboratory:** Referred from Haematology Dept MUH to Cancer Molecular Diagnostics St.James  
**Specimen:** Adult EDTA sample  
**Comment:** Sample can be stored in fridge overnight. Please contact laboratory for correct form.  
**Ref. Range:** See report

### Cationic Trypsinogen Gene

**Laboratory:** Referred from Haematology Dept MUH to Biomnis  
**Specimen:** 10mls EDTA, Order Number required from DCEO  
**Comment:** Hereditary pancreatitis is a rare, early onset genetic disorder characterised by epigastric pain and often more serious complications. An Arg-His substitution at residue 117 of the cationic trypsinogen gene is associated with the HP phenotype.  
**Ref Range:** See report.

### CD4 Count

**Laboratory:** Sample referred from Haematology Laboratory to Cork University Hospital  
**Specimen:** Blood 2.7ml, red, S Monovette (EDTA). DO NOT refrigerate specimens.  
**Comment:** A screening procedure to monitor the immune status of patients / clients. Test available Mon to Fri during routine working hours.  
**Turnaround:** 2-4 days.  
**Ref. Range:** See Report

### CD8 Count

**Laboratory:** Sample referred from Haematology Laboratory to Cork University Hospital  
**Specimen:** Blood 2.7ml, red, S Monovette (EDTA). DO NOT refrigerate specimens.  
**Comment:** A screening procedure to monitor the immune status of patients / clients. Test available Mon to Fri during routine working hours.  
**Turnaround:** 2-4 days.  
**Ref. Range:** See report

### CD4/CD8 Ratio

**Ref. Range:** See Report

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### CD3 / CD4/ CD8 / CD19 / CD56 Counts

**Laboratory:** Sample referred from Haematology Laboratory to Cork University Hospital Haematology  
**Specimen:** Blood 2.7ml, red, S Monovette (EDTA). DO NOT refrigerate specimens.  
**Comment:** A screening procedure to monitor the immune status of patients / clients. Test available Mon to Fri during routine working hours.  
**Turnaround:** 2-4 days.  
**Ref. Range:** See report

### Cerebrospinal Fluid – Haematology

**Laboratory:** Haematology  
**Specimen:** 1.5 ml CSF specimen  
**Stability:** Fresh specimen required.  
**Comment:** Haematological patients only.  
**Turnaround:** 24 hours  
**Ref. Range:** N/A

### Chromosome Analysis/Cytogenetics

**Laboratory:** Referred from Haematology Laboratory MUH.  
**Specimens:** Lithium Heparin sample X 2  
  
**Comment:** High resolution of G band chromosome analysis and molecular cytogenetics involving fluorescence in situ hybridisation (FISH) for microdeletion syndromes are utilised in the study of chromosome origin, structure and function. It is advisable to contact the Haematology Laboratory before ordering these tests to enquire about special requirement and special forms that may be needed.  
**Turnaround:** Vary according to test  
**Ref. Range:** See report

### Coagulation Factor Inhibitors - Quantitation of

**Laboratory:** Sample referred from Haematology Laboratory to Cork University Hospital  
**Specimen:** Blood 3mL x2, green, S Monovette (sodium citrate 0.106M).  
 Specimens that are haemolysed, underfilled or overfilled cannot be analysed.  
**Comment:** Test available Monday to Friday, during routine working hours. 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.  
**Turnaround:** 24 hrs  
**Ref. Range:** See Report

### Coagulation Factor Inhibitor Screen

**Laboratory:** Haematology  
**Specimen:** Blood 3mL x2, green, S Monovette (sodium citrate 0.106M)  
**Comment:** Screen for coagulation factor inhibitors. Test available Mon to Fri during routine working hours.  
**Turnaround:** 24 hours,  
**Ref. Range:** Positive/Negative

### Cologen 4 Gene Mutation (COL4A1)

**Laboratory:** Referred from Haematology MUH to National Centre for Medical genetics  
**Specimen:** 1 x Adult EDTA sample and 1 x Adult Lithium Heparin sample  
**Comment:** Samples should only be taken Monday to Thursday. Please contact Laboratory for correct form.  
**Ref. range:** See report

### Cyclosporin (Neoral)

**Laboratory:** Sample referred from Haematology Laboratory to Endocrinology Laboratory, Cork University Hospital  
**Specimen:** Trough sample required, (Blood 2.7mL, red, S Monovette). Analysed on Thursday afternoons. If sample is received on Thursday, it needs to be delivered by taxi before 11 o'clock.  
**Turnaround:** 3 hours on Thursday afternoons  
**Ref. Range:** Patient specific, see report

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### Cystic Fibrosis - Genetic Test

Laboratory: Referred from Haematology Dept. to National Centre for Medical Genetics, Our Ladies Hospital for Sick Children, Crumlin  
Specimen: EDTA sample, 5 – 10 blood  
Turnaround: Approx. one month  
Ref. Range: See report form or contact National Centre for Medical Genetics, Our Ladies Hospital for Sick Children, Crumlin

### Cytogenetics / Chromosome Analysis

Laboratory: Referred from Haematology Laboratory MUH  
Specimens: Lithium Heparin sample X 2  
Comment: High resolution of G band chromosome analysis and molecular cytogenetics involving fluorescence in situ hybridisation (FISH) for microdeletion syndromes are utilised in the study of chromosome origin, structure and function. It is advisable to contact the Haematology Laboratory before ordering these tests to enquire about special requirement and special forms that may be needed.  
Turnaround: Vary according to test  
Ref. Range: See report

### D-dimers

Laboratory: Haematology  
Specimen: Blood 3mL, green, S Monovette (sodium citrate 0.106M)  
Stability: 24 hours  
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 as per arrangement. Routine specimens 4 hours.  
Ref. Range: Cut off threshold for exclusion of PE and DVT is 0.5mg/L FEU  
Higher values– indicate significant levels of circulating fibrin derivatives

### Diamond Blackfan Syndrome

Laboratory: Referred from Haematology MUH  
Specimen: 10ml EDTA.  
Form: Haematology request form accepted  
Comment: Must be received in UK by 5.30pm the next day. Sample cannot be stored in fridge over weekend., so no samples should be taken on Friday. (Mon – Thurs only)  
Ref Range: See final report

### DNA Hypermutational Analysis

Laboratory: Referrred from Haematology Dept, MUH to Royal Marsden NHS Trust, UK.  
Specimen: 10mls EDTA  
Comment: Sample must arrive in UK the following day. Please contact Haematology Laboratory in advance. Test only available Mon – Thurs morning.  
Ref. Range: See report

### EMA Antigen (Hereditary Spherocytosis)

Laboratory: Sample referred from Haematology Laboratory to Haematology Dept., Our Ladies Hospital for Sick Children, Crumlin  
Specimen: Blood, S Monovette (EDTA) minimum 3mls  
Turnaround: 48 – 72 hours  
Ref. Range: Positive/Negative

### Erythropoietin

Laboratory: Sample referred from Haematology Laboratory to BIOMNIS Laboratories  
Specimen: Blood 2.7ml, white, S Monovette (clotted blood) must be frozen < 4 hrs.  
Turnaround: 14 days  
Ref. Range: See final report

### Everolimus

Laboratory: Referred from Haematology MUH  
Specimen: Adult EDTA sample  
Form: Haematology form  
Comment: Must be delivered to Haematology before 1PM . Must reach referral lab within 24hrs

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## ESR

Laboratory: Haematology  
Specimen: Blood 2.7ml, red, S Monovette (EDTA)  
Stability: Samples must be labelled with time of phlebotomy and delivered promptly to laboratory, within 2 hours of phlebotomy. Samples received outside this time limit may not be processed  
Comment: ESR Measurement is a non-specific test of inflammation and tissue damage. Test available Mon to Fri during routine working hours and for emergency reasons at all other times.  
Turnaround: 4 hours  
Ref. Range: Males: 0 – 14mm/ hour Females: 0 – 16mm/hour

### Exon 12/ Jak2 Mutation

Laboratory: Referred for Haematology MUH  
Specimen: 5-10mls peripeheral blood or bone marrow  
Form: Addenbrookes Hospital NHS form  
Comment: Must be delivered to haematology Lab before 1pm to ensure sample reaches referral lab on time  
Ref Range: See final report

### Fabry's Disease

Laboratory: Referred from Haematology Dept MUH to National centre for Medical Genetics, Crumlin  
Specimen: Adult EDTA FBC bottle  
Form: National Centre for Medical Genetics form (Please contact Haematology Laboratory)  
Comment: Ideally should only be taken Mon – thurs  
Ref Range: See final report

## Factor 1 (see Fibrinogen)

Laboratory: Haematology

### Factor 11

Laboratory: Sample referred from Haematology Laboratory to Cork University Hospital  
Specimen: Blood 3ml, green, S Monovette (sodium citrate 0.106M).  
Specimens which are haemolysed, underfilled or overfilled cannot be analysed.  
Stability: 4 hours  
Comment: Determines the activity of coagulation Factor 11 (Prothrombin). Test available Monday to Friday, during routine working hours.  
Turnaround: 24 hours.  
Ref. Range: See report

### Factor V

Laboratory: Sample referred from Haematology Laboratory to Cork University Hospital  
Specimen: Blood 3mL, green, S Monovette (sodium citrate 0.106M).  
Specimens that are haemolysed, underfilled or overfilled cannot be analysed.  
Stability: 4 hours  
Comment: Determines the activity of coagulation Factor V. Test available Monday to Friday, during routine working hours.  
Turnaround: 24 hours  
Ref. Range: See report

### Factor V Leiden

Laboratory: Sample referred from Haematology to Biomnis  
Specimen: Blood 2.7mL, red, S Monovette (EDTA)  
Comment: Forms part of a Thrombophilia screen.  
Turnaround: 10 to 14 days  
Ref. Range: Normal / Heterozygote / Homozygote.

### Factor V11

Laboratory: Sample referred from Haematology Laboratory to Cork University Hospital  
Specimen: Blood 3mL, green, S Monovette (sodium citrate 0.106M).  
Specimens that are haemolysed, underfilled or overfilled cannot be analysed.  
Stability: 4 hours  
Comment: Determines the activity of coagulation Factor V11. Test available Monday to Friday, during routine working hours.  
Turnaround: 24 hours.

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Ref. Range: See report

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### Factor V111

Laboratory:	Sample referred from Haematology Laboratory to Cork University Hospital
Specimen:	Blood 3mL, green, S Monovette (sodium citrate 0.106M). Specimens that are haemolysed, underfilled or overfilled cannot be analysed.
Stability:	4 hours
Comment:	Determines the activity of coagulation Factor V111. Test available Mon to Fri, during routine hours.
Turnaround:	24 hours.
Ref. Range:	See report

### Factor V111 Inhibitors

Laboratory:	Sample referred from Haematology Laboratory to Cork University Hospital
Specimen:	Blood 3mL, green, S Monovette (sodium citrate 0.106M). Specimens that are haemolysed, underfilled or overfilled cannot be analysed.
Comment:	Demonstrates the inhibitory effect of Factor V111 antibodies. Test available Monday to Friday, during routine working hours. Quantitative assays performed by reference laboratory.
Turnaround:	2-4 days
Ref. Range:	Positive / Negative

### Factor V111 Related antigen (F V111 R:Ag)

Laboratory:	Sample referred from Haematology Laboratory to Haematology Laboratory, Cork University Hospital
Specimen:	Blood 3mL, green, S Monovette (sodium citrate 0.106M). Specimens that are haemolysed, underfilled or overfilled cannot be analysed.
Comment:	The quantitative determination of Von Willebrand's factor antigen is required for differential diagnosis of coagulation disorders associated with the F V111 complex. Test available Monday to Friday, during routine working hours.
Turnaround:	2 – 3 weeks
Ref. Range:	See report

### Factor IX

Laboratory:	Sample referred from Haematology Laboratory to Cork University Hospital
Specimen:	Blood 3mL, green, S Monovette (sodium citrate 0.106M). Specimens that are haemolysed, underfilled or overfilled cannot be analysed.
Stability:	4 hours
Comment:	Determines the activity of coagulation Factor IX. Test available Mon to Fri, during routine hours.
Turnaround:	24 hours.
Ref. Range:	See report

### Factor X

Laboratory:	Sample referred from Haematology Laboratory to Cork University Hospital
Specimen:	Blood 3mL, green, S Monovette (sodium citrate 0.106M). Specimens that are haemolysed, underfilled or overfilled cannot be analysed.
Stability:	4 hours
Comment:	Determines the activity of coagulation Factor X. Test available Mon to Fri, during routine hours.
Turnaround:	24 hours.
Ref. Range:	See report

### Factor Xa (Heparin Assay)

Laboratory:	Sample referred from Haematology Laboratory to Cork University Hospital
Specimen:	Blood 3mL, green, S Monovette (sodium citrate 0.106M).
Comment:	Used to monitor the effectiveness of low molecular weight heparin therapy. Sample must be taken two hours post dosage. Batch tested on Wednesday's. If sample is taken on Wed must be received in Haematology lab before 11 o'clock.
Turnaround:	1 week.
Ref. Range:	See report

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### Factor X1

Laboratory: Sample referred from Haematology Laboratory to Cork University Hospital  
 Specimen: Blood 3mL, green, S Monovette (sodium citrate 0.106M).  
 Specimens that are haemolysed, underfilled or overfilled cannot be analysed.  
 Stability: 4 hours  
 Comment: Determines the activity of coagulation Factor X1 Test available Mon to Fri, during routine hours.  
 Turnaround: 24 hours.  
 Ref. Range: See report

### Factor X11

Laboratory: Sample referred from Haematology Laboratory to Cork University Hospital  
 Specimen: Blood 3mL, green, S Monovette (sodium citrate 0.106M).  
 Specimens that are haemolysed, underfilled or overfilled cannot be analysed.  
 Stability: 4 hours  
 Comment: Determines the activity of coagulation Factor X11. Test available Mon to Fri, during routine hours.  
 Turnaround: 24 hours.  
 Ref. Range: See report

### Factor X111

Laboratory: Haematology  
 Specimen: Blood 3mL, green, S Monovette (sodium citrate 0.106M).  
 Specimens that are haemolysed, underfilled or overfilled cannot be analysed.  
 Comment: A qualitative assay to diagnose congenital deficiency. Test available Mon - Fri, during routine hours.  
 Turnaround: 48 hours.  
 Ref. Range: Positive / Negative.

### Fanconis Anaemia

Laboratory: Referred from Haematology Dept. MUH to Bristol Genetics laboratory, UK.  
 Specimen: 1 X adult sized EDTA and 1 X adult sized Lithium Heparin  
 Comment: Fanconis anaemia occurs as a result of a genetic defect in a cluster of proteins responsible for DNA repair. Test available Mon – Thurs morning only.  
 Ref. range: See report

### Fibrinogen (factor 1)

Laboratory: Haematology  
 Specimen: Blood 3mL, green, S Monovette (sodium citrate 0.106M).  
 (Specimens which are haemolysed, underfilled or overfilled cannot be analysed)  
 Stability: 24 hours  
 Comment: Determines the concentration of plasma fibrinogen. Forms part of a Thrombophilia and/ or Lupus screen. Test available Monday to Friday, during routine working hours, and for emergency reasons at all other times.  
 Turnaround: Emergency specimens as per arrangement. Routine specimens 4 hours.  
 Ref. Range: Adults 1.7-5.4g/dl

### FISH (Fluorescence in situ Hybridization) for Microdeletion Syndromes

Laboratory: Referred from Haematology Dept. MUH to National Centre Medical genetics  
 Specimen: Lithium Heparin  
 Form: National centre for Med Genetics form (Please contact Haematology Dept)  
 Comment: Sample should only be done Mon – Thursday  
 Ref Range: See final report

### Flow Cytometry

Laboratory: Sample referred from Haematology Laboratory to Cork University Hospital  
 Specimen: Fresh Blood or Bone Marrow – 2.7mL, red, S Monovette (EDTA). DO NOT refrigerate specimens.  
 Comment: Used as a diagnostic tool in identifying leukaemias. Test available Mon to Fri, during routine hours. If required Friday please send to laboratory by 10am.  
 Turnaround: Approximately 2 days  
 Ref. Range: N/A

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### Fragile X Chromosome

Laboratory:	Referred from Haematology Dept. to National Centre for Medical Genetics, Our Ladies Hospital for Sick Children, Crumlin, Dublin
Specimen:	Blood 2.7mL, red, S Monovette (EDTA) – two EDTA samples required
Comment:	Test available Mon to Thurs morning (before 11 o'clock). Samples have to be in Crumlin within 48 hours. Patient consent form required.
Turnaround:	Approx. one month
Ref. Range:	See report form or contact National Centre for Medical Genetics, Our Ladies Hospital for Sick Children, Crumlin.

### Frataxin

Laboratory:	Referred from Haematology Dept MUH to National Centre for Medical Genetics
Specimen:	6mls EDTA
Comment:	Test only available Mon – Thurs morning. Frataxin is a protein encoded for by the FXN gene. Reduction in expression of this protein is the cause of Friedreichs ataxin, a lethal neurodegenerative disease.
Ref. Range:	See report

### Frataxin Gene (For Fredricks Ataxia)

Laboratory:	Referred from Haematology Dept MUH to National Centre for Medical Genetics
Specimen:	Lithium Heparin x 1 EDTA x 1
Form:	National centre for Med Genetics form (Please contact Haematology Dept)
Comment :	Sample should only be done Mon – Thursday
Ref Range:	See final report

### Full Blood Count

Laboratory:	Haematology
Specimen:	Blood 2.7mL, red, S Monovette (EDTA)
Stability:	24 hours
Comment:	Flow Cytometry Technology. Test available Monday to Friday, during routine working hours and for emergency reasons at all other times.
Turnaround:	Emergency specimens as per arrangement. Routine specimens 2 hours, 4 hours if manual differential required.
Ref. Range:	The FBC consists of 17 individual results, values which may depend on age and sex. Reference ranges available on Haematology report forms.

### G6PD ASSAY

Laboratory:	Sample referred from Haematology Laboratory to Cork University Hospital
Specimen:	Blood 2.7mL, red, S Monovette (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.
Turnaround:	7-10 days
Ref. Range:	See report. Note: Values for new-borns may range somewhat higher.

### Gilberts Function (UGT1A1 Mutation)

Laboratory:	Referred from Haematology Dept MUH to National Centre for Medical Genetics
Specimen:	EDTA
Form:	National centre for Med Genetics form (Please contact Haematology Dept)
Comment:	Gilberts syndrome is a genetic liver disorder which produces an elevated level of unconjugated bilirubin in the blood stream.
Ref Range:	See final report

### Haemochromatosis – Genetic Test

Laboratory:	Sample referred from Haematology Laboratory to Biomnis
Specimen:	Blood 2.7mL, red, S Monovette (EDTA)
Stability:	
Comment:	Genetic test for the C282Y and H63D mutations in the Haemochromatosis gene. PLEASE CONTACT LABORATORY FOR CORRECT FORM
Turnaround:	2-3 weeks
Ref. Range:	Positive / Negative.



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### Haemoglobin A<sub>2</sub> Electrophoresis

Laboratory: Sample referred from Haematology Laboratory to Cork University Hospital  
Specimen: Blood 2.7mL, red, S Monovette (EDTA)  
Comment: Haemoglobin A<sub>2</sub> concentration is useful for the diagnosis of the thalasseмии and related disorders.  
Test available Monday to Friday, during routine working hours.  
PLEASE STATE COUNTRY OF ORIGIN ON REQUEST FORM  
Turnaround: 1 week.  
Ref. Range: See report

### Haemoglobin A<sub>1c</sub>

Laboratory: Sample referred from Haematology Laboratory to Cork University Hospital  
Specimen: Blood 2.7mL, red, S Monovette (EDTA)  
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 A<sub>1c</sub> reflects the effectiveness of treatment in diabetes mellitus.  
Turnaround: 3 days.  
Ref. Range: See report

### Haemoglobin F

Laboratory: Sample referred from Haematology Laboratory to Cork University Hospital  
Specimen: Blood 2.7mL, red, S Monovette (EDTA)  
Comment: Determined using HPLC / Electrophoresis Technologies. Test available Monday to Friday, during routine working hours.  
PLEASE STATE COUNTRY OF ORIGIN ON REQUEST FORM  
Turnaround: 1 week.  
Ref. Range: See report.

### Haemoglobin S Electrophoresis

Laboratory: Sample referred from Haematology Laboratory to Cork University Hospital  
Specimen: Blood 2.7mL, red, S Monovette (EDTA)  
Comment: Determines the percentage of Hb S. Test available Monday to Friday, during routine working hours.  
PLEASE STATE COUNTRY OF ORIGIN ON REQUEST FORM  
Turnaround: 1 week  
Ref. Range: See report

### Haemoglobin S Sickle Screen

Laboratory: Haematology  
Specimen: Blood 2.7mL, red, S Monovette (EDTA)  
Stability: 24 hours  
Comment: Test available Monday to Friday during routine working hours, and for emergency reasons at all other times. 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 is over six months old.  
PLEASE STATE COUNTRY OF ORIGIN ON REQUEST FORM  
Turnaround: Emergency specimens as per arrangement.  
Routine specimens 4 hours.  
Ref. Range: Positive / Negative.

### Haemoglobinopathies

Laboratory: Sample referred from Haematology Laboratory to Cork University Hospital Sample and then to the National Haemoglobin Reference Laboratory, Oxford Haemophilia Centre, Churchill Hospital, Oxford OX3 7LJ  
Specimen: EDTA sample: minimum 2 mLs blood  
Comment: PLEASE STATE COUNTRY OF ORIGIN ON REQUEST FORM  
Turnaround: Approx. one month  
Ref. Range: See report form or contact National Haemoglobin Reference Laboratory.

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<b>Huntington's Disease</b>	
Laboratory:	Sample referred from Haematology Laboratory to National Centre for Medical Genetics , Our Lady's Hospital for Sick Children, Crumlin, Dublin 12.
Specimen:	Blood 2.7mL, red, S Monovette (EDTA) and Lithium Heparin, orange
Comment:	Consent form must accompany Sample Avoid Weekends due to Postal Delay PLEASE CONTACT LABORATORY FOR CORRECT FORM
Turn-around time:	3-4 months.
Ref. Range:	See report form or contact the National Genetics Centre, Our Lady's Hospital for Sick Children, Dublin
<b>Heparin Induced Thrombocytopenia (HIT)</b>	
Laboratory:	Specimen referred from Haematology Laboratory to St. James Hospital, Dublin
Specimen:	2 x 6ml serum samples . Samples must be frozen within 4 hours of phlebotomy . St James will not process the sample without the 4T scoring template filled out. Photocopies of the form are available in the haematology laboratory or can be printed on line.
Comment:	St James H.I.T. request form, available from Haematology Lab.
Turn-around time:	24 hours
Ref. Range:	Positive/Negative
<b>Hereditary Hemorrhagic Telangiectasia (HHT)</b>	
Laboratory:	Referred from Haematology Dept MUH to Molecular Genetics Laboratory, Western General Hospital Edinburg.
Specimen:	3-5mls EDTA
Form:	Genetic test request form NHS Lothian University
Comment:	HHT is a disorder that results in the development of multiple abnormalities in the blood vessels. It is Caused by mutations in the ACVRL1, ENG, and SMDA4 genes.
Ref Range:	See Final report
<b>Hereditary Spastic Paraplegia (HSP)</b>	
Laboratory:	Referred from Haematology dept MUH to Sheffield
Specimen :	2-5mls EDTA
Form:	Haematology request form accepted. Consent form required
Comment:	HSP comprises a large group of inherited neurological disorders. It is classified according to the mode Of inheritance, the HSP locus when known and whether the spastic paraplegia syndrome occurs alone or Is accompanied by additional neurologic or systemic abnormalities.
Ref Range:	See final report
<b>Hyperaldosteronism – Genetic Test</b>	
Laboratory:	Sample referred from Haematology to the Scottish Molecular Genetics Consortium, DNA Laboratory Medical School, Forrethill, Aberdeen AB25 2ZD
Specimen:	ETDA, minimum 2 mLs blood.
Turn-around time:	Approx. one month
Ref. Range:	See report form or contact Scottish Molecular Genetics Consortium
<b>Infectious Mononucleosis Antibody</b>	
Laboratory:	Haematology
Specimen:	Blood 5.5ml, white, S Monovette (serum) or Blood 2.7mL, red, S Monovette (EDTA)
Stability	24 hours
Comment:	Test available Monday – Friday. This test is available by request On-Call. Results should be assessed in conjunction with clinical and haematological findings.
Turn-around time:	Emergency specimens as per arrangement. Routine specimens 4 hours.
Ref. Range:	Negative or positive. Antibody levels may persist for 6 – 12 months post initial infection.
<b>INR Prothrombin Time</b>	
Laboratory:	Haematology
Specimen:	Blood 2.7ml, green, S Monovette (sodium citrate 0.106M)
Stability	(Specimens which are haemolysed, underfilled or overfilled cannot be analysed) 24 hours
Comment:	Test available Monday to Friday, during routine working hours. and for emergency reasons at all other

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times. Clotting is initiated via the extrinsic and common pathway in a global screening test the prothrombin time (PT). The test is used as a screen to detect single or combined deficiencies of the extrinsic system, liver disease or vitamin K deficiency. Many commonly administered drugs may affect the results. This should be kept in mind especially when unusual or unexpected results have been obtained.

Turn-around time: Emergency specimens as per arrangement. Routine specimens 2 hours.

Ref. Range: Adult 0.9 - 1.1  
Children < 3 months 0.9 – 1.6

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### Intrinsic Factor Antibodies

Laboratory:	Sample referred from Haematology Laboratory to Cork University Hospital
Specimen:	Blood 4.9ml, S Monovette (serum)
Comment:	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 B <sub>12</sub> to aid in the diagnosis of pernicious anaemia.
Turn-around time:	3 – 4 weeks.
Ref. Range:	Positive / Negative

### JAK-2 V617F Mutation (Myeloproliferative Disorders)

Laboratory:	Sample referred from Haematology Laboratory to St James Hospital
Specimen:	Peripheral Blood 3-5 ml, red, S Monovette (EDTA) or Bone Marrow in RPMI
Comment:	This assay does not distinguish between those patients with heterozygous and homozygous mutations
Turnaround :	14 to 21 days
Ref Range	See final report

### Karyotyping

Laboratory:	Referred from Haematology Dept MUH.
Specimen:	Lithium Heparin sample X 2
Comment:	All children under the age of 5 yrs – sample sent to Centre of Medical Genetics. For all other persons over the age of 5yrs it is necessary to contact the Haematology Dept before requesting the test.
Ref. Range:	See report

### Lupus Anticoagulant Screen (also includes anticardiolipin screen)

Laboratory:	Haematology
Specimen:	Blood 3mL x 3, green, S Monovette (sodium citrate 0.106M), Blood 4.9ml, S Monovette (serum)
Stability:	(Specimens which are haemolysed, underfilled or overfilled cannot be analysed) 24 hours
Comment:	Test available Monday to Friday, during routine working hours. Lupus anticoagulants are immunoglobulins that interfere with phospholipid-dependent coagulation tests. The screen includes the following tests: PT, APTT, Fibrinogen assay, AFSL, and LA. Anti-Cardiolipin and beta 2 glycoprotein antibodies
Turnaround:	Approximately 1 month
Ref. Range:	Positive/Negative

### Malaria

Laboratory:	Haematology
Specimen:	Blood 2.7mL, red, S Monovette (EDTA)
Stability:	24 hours
Comment:	CLINICAL HISTORY AND DETAILS OF TRAVEL DESTINATION OR COUNTRY OF ORIGIN NECESSARY Test available Monday to Friday during routine working hours, and for emergency reasons at all other times. A screening test is used for the detection of infection all <i>Plasmodium species</i> differentiating between <i>Plasmodium falciparum</i> and <i>Plasmodium vivax,ovale and malariae</i> in whole blood. Blood films are examined to confirm presence of same, and to identify species of Malaria and also to estimate the percentage of infestation.
Turn-around time:	Emergency specimens as per arrangement. Routine specimens 4 hours
Ref. Range:	Positive / Negative. (Positives confirmed by referral laboratory)

### Malaria – Referral Laboratory

Laboratory:	Sample referred from Haematology Laboratory to PHLS Malaria Reference Laboratory, London School of Hygiene and Tropical Medicine, Kepple St., London WC1E 7HT
Specimen:	Comment : Specific request from must be completed, forms available from Haematology 2 thin unstained methanol fixed slides, 2 thick unfixed unstained slides, 1 giemsa stained slide
Ref. Range:	See report form

### Methyl Tetra Hydro Folate Reductase (MTHFR)

Laboratory:	Sample referred from haematology Dept MUH to Biomnis
Specimen:	EDTA
Form:	Biomnis Genetic request form, Patient consent form (Contact Haematology Dept)
Ref Range:	See final report

### Micro Array

Laboratory:	Sample referred from Haematology Laboratory to National Centre for Medical Genetics, Crumlin
Specimen:	Blood 2.7mL, red, S Monovette (EDTA)

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Comment: Samples must be sent Monday to Thursday only  
 Turn-around time: 1 month  
 Ref. Range: See Report

**Molecular Genetics**

Laboratory: Sample referred from Haematology Dept. MUH  
 Specimen: Blood 2.7mL, red, S Monovette (EDTA) X 1. Lithium Heparin, Orange.  
 Clinical and family history must accompany every specimen. It is advisable to contact the Haematology Laboratory before ordering these tests to enquire about special requirement and special forms that may be needed.  
 Comment: Enzyme, electrophoresis, fluorescence and autoradiograph technologies are applied to detect changes in DNA structure and sequence that underlie specific genetic disorders. As the full human genome (the full complement of DNA) is so large and complex each test can only examine a tiny portion of a patients DNA so tests are entirely specific for a particular disorder.  
 Turn-around time: Times vary according to test complexity and specimen numbers received (Please contact laboratory)  
 Ref. Range: See report form or contact referral laboratory

**Molecular Genetic analysis for suspected Mitochondrial Disorders**

Laboratory: Referred from Haematology MUH to Newcastle University  
 Specimen: Generally blood, urine and tissue samples are sent. However it is advised that the team contact the Appropriate lab for sample details.  
 Form: Newcastle Mitochondrial NCG diagnostic Services request form  
 Comment: Samples should be in lab before 1pm. Should only be taken Mon – Wed.  
 Ref Range: See final report

**Methylene tetra hydro folate reductase (MTHFR)**

Laboratory: Sample referred from Haematology to Biomnis  
 Specimen: 4.0 mL blood in an EDTA tube  
 Comment: Biomnis genetic request form and signed patient consent required  
 Turn-around time: Approx. one month  
 Ref. Range: See report form

**Myoglobin – Urine**

Laboratory: Haematology  
 Specimen: Urine 5ml minimum (Fresh early morning sample essential)  
 Stability: 24 hours  
 Turn-around time: Emergency specimens as per arrangement. Routine specimens 4 hours  
 Ref. Range: Positive/Negative

**Nucleated Red Blood Cells (NRBCs)**

Laboratory: Haematology  
 Specimen: Blood, 2.7 mL, red, S Monovette (EDTA)  
 Stability: 24 hours.  
 Comment: Test available from Monday to Friday during routine working hours and for emergency reasons at all other times. The number of NRBCs present in blood is an index of RBC production by the bone marrow and therefore is a valuable parameter in assessing haemolytic processes. NRBCs are reported only when requested or when deemed necessary.  
 Turn-around time: Routine specimens 4 hours. Emergency specimens as per arrangement.

**Platelet Function Test includes PFA 100 and Platelet aggregation**

Laboratory: Sample referred from Haematology Laboratory to Cork University Hospital  
 Specimen: PFA 100: 3 x green sodium citrate, 1X red EDTA  
 Samples should not be sent to the Lab using the Chute system as this may cause platelet activation and interfere with test results  
 Platelet Aggregometry : 6X 3mL green, S Monovette (sodium citrate 0.106M). **NB. Must be booked in advance with CUH**  
 Specimens that are haemolysed, underfilled or overfilled cannot be analysed. Specimens with platelet counts  $<150 \times 10^9/l$  are unsuitable for testing. Patient must not be on aspirin for the past 10 days. Tests must be performed within 3 hours of venesection.  
 Testing only done on Mondays – sample should be in the lab before 10am.  
 Comment: CUH recommends that PFA 100 and vWF are performed first before full platelet aggregometry is considered. 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, ADP and epinephrine, 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

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salicylic acid.  
 Turn-around time: 24 hours,  
 Ref. Range: See report

#### **PNH ( Paroxysmal Nocturnal Haemoglobinuria)**

Laboratory: Specimen referred from MUH Haematology to NCHD Lab . St James Hospital, Dublin  
 Specimen: Blood 2.7mL, red, S Monovette (EDTA).  
 Comment: Test available Monday to Thursday, sample must be received in Haematology before 1pm to ensure delivery within 48 hours of phlebotomy.  
 PNH is the only haemolytic anaemia caused by an acquired intrinsic defect in the cell membrane. Characterised by intermittent intravascular haemolysis due to hypersensitivity of RBC'S to the haemolytic action of complement due to a deficiency of glycoposphatidylinositol leading to the absence of protective proteins on the membrane CD55 and CD59. Diagnosis is possible by flow cytometry for CD55 and CD59 on white and red blood cells  
 24 hours,  
 Ref. Range: Quantitative report of CD59 (Erythrocytes) CD16 (Granulocytes) FLAER (Granulocytes) CD24 (Granulocytes) with interpretative comment

#### **Plasma Viscosity**

Laboratory: Referred from Haematology MUH to St James  
 Specimen: EDTA  
 Form: Haematology MUH form  
 Comment: The plasma viscosity is helpful in diagnosing two specific inflammatory diseases, temporal arteritis and polymyalgia rheumatica.  
 Ref Range: 1.1 -1.41

#### **Prograf/Tacrolimus/FK506**

Laboratory: Referred from Haematology Dept, MUH to Biochemistry CUH.  
 Specimen: Blood 2.7mL, red, S Monovette (EDTA)  
 Comment: Samples batch tested only on Thursdays, if sample is taken on Thursday it needs to be received in Haematology Lab before 11am  
 Ref. Range: See report.

#### **Protein C**

Laboratory: Haematology  
 Specimen: Blood 3mL, green, S Monovette (sodium citrate 0.106M)  
 Specimens that are haemolysed, underfilled or overfilled cannot be analysed.  
 Stability: 24 hours  
 Comment: Test available Monday to Friday during routine working hours, and for emergency reasons at all other times. 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.  
 Turn-around time: Emergency specimens as per arrangement. Approximately 1 month.  
 Ref. Range: 78 – 143%

#### **Protein S**

Laboratory: Haematology  
 Specimen: Blood 3mL, green, S Monovette (sodium citrate 0.106M)  
 Specimens that are haemolysed, underfilled or overfilled cannot be analysed.  
 Stability: 24 hours  
 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.  
 Turn-around time: Approximately 1 month  
 Ref. Range: 78 – 126%

#### **Prothrombin DNA Mutation Studies (Prothrombin variant G20210A)**

Laboratory: Sample referred from Haematology to Biomnis  
 Specimen: Blood 2.7mL, red, S Monovette (EDTA)  
 Comment: Forms part of a Thrombophilia screen.  
 Turn-around time: 1-2 weeks.  
 Ref. Range: Normal / Heterozygous /Homozygous.

#### **PTEN Analysis**

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Laboratory: Referred from haematology MUH to National centre for Medical Genetics Crumlin  
Specimen: EDTA adult size - Please attach as many clinical details as possible  
Form: National Centre for Medical Genetics form (Please contact Haematology Dept)  
Comment: Germline mutations in the PTEN gene are associated with a rare collection of clinical syndromes referred to as PTEN hamartoma tumour syndrome (PHTS). Affected individuals have an increased risk of cancer, including cancers of the breast, endometrium, thyroid, colon and kidney. PHTS is an autosomal dominant disorder.  
Ref Range: See final report

#### Pyruvate Kinase

Laboratory: Sample referred from Haematology Laboratory to Kings College Hospital, London  
Specimen: Blood 3-5mls red, S Monovette (EDTA).  
Comment: Test available Mon-WED only, Please send as early as possible in the day to allow for prompt dispatch. Nonspherocytic congenital haemolytic anaemia may be the result of a deficiency of the red cell enzyme pyruvate kinase. PK deficient RBC'S can be demonstrated by failure of conversion of NADH to NAD, which can be detected by a fluorescent screening test.  
Ref. Range: See report form.

#### Red cell Enzymopathy

Laboratory: Referred From haematology MUH to Kings College Hospital, London, UK  
Specimen: 5 – 10mls EDTA  
Form: Haematology request form. Must send patient consent form  
Comment: Samples must be received in Haematology lab before 1pm Mon – Thurs. Do not take on Friday  
Ref Range: See Final report

#### Red cell membrane electrophoresis

Laboratory: Referred From haematology MUH to Dr May-Jean King, Bristol, UK  
Specimen: Adult EDTA – Sample must be collected prior to blood transfusion  
A normal patient control must be included.  
Comment: Referring clinicians must contact the laboratory in Bristol to discuss the appropriateness of the proposed investigations. Sample sent without the consent of the laboratory may not be investigated. A normal patient control must be included. Test only available Mon – Thurs morning  
Ref. Range: See report form.

#### Reticulocyte Count

Laboratory: Haematology  
Specimen: Blood 2.7mL, red, S Monovette (EDTA).  
24 hours  
Stability  
Comment: Test available Monday to Friday during routine working hours and for emergency reasons at all other times. The number of reticulocytes present in blood is an index of RBC production by the bone marrow and as such is one of the most valuable observations in diagnostic haematology. The Advia 120 analyser uses a nucleic acid dye to stain the reticulocytes, each single cell is passed through a laser beam, ensuring the accurate measurement of reticulocytes.  
Turn-around time: Routine specimens 4 hours. Emergency specimens as per arrangement.  
Ref. Range: Adults 0.4-1.6%, 20-80x10<sup>9</sup>/L

#### Rheumatoid Factor

Laboratory: Haematology  
Specimen: Blood 4.9ml, S Monovette (serum )  
Stability 24 hours  
Comment: Latex immunoassay. Results should be assessed in conjunction with clinical findings.  
Turn-around time: 1 week  
Ref. Range: Less than 10 IU/ML

#### Sirolimus

Laboratory: Referred from Haematology Dept MUH to Mater public Hospital Dublin  
Specimen: EDTA  
Form: Haematology request form  
Ref Range: See final report

#### Spinal Cerebellar Ataxia

Laboratory: Referred from Haematology Dept. MUH to National Centre for Medical Genetics  
Specimen: 6mls EDTA  
Comment: Test only available Mon – Thurs morning only.

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Ref. Range: See report form.

#### **SPINK 1 gene mutation**

Laboratory: Referred from Haematology Dept. MUH to Molecular genetic laboratory, Liverpools Women's hospital, Liverpool  
 Specimen : 5-10mls EDTA  
 Form: Molecular genetic laboratory form (please contact Haematology Dept)  
 Comment: Must be in haematology lab before 1pm  
 Ref Range: See final report

#### **Tacrolimus (FK506 / Prograf)**

Laboratory: Sample referred from Haematology Laboratory to Endocrinology Laboratory, Clinical Biochemistry, Cork University Hospital  
 Specimen: Blood 2.7ml, Red, S Monovette (EDTA)  
 Stability: 24 hours  
 Comment: Trough sample required.  
 Turn-around time: Tacrolimus assay carried out on Wednesday afternoons. Results available on Thursdays  
 Ref. Range: Patient specific

#### **T Cell Receptor Gene rearrangement for ? LGL**

Laboratory: Referred from Haematology MUH to Cancer Molecular Diagnostics Laboratory, St James.  
 Specimen : EDTA sample  
 Form: Cancer Molecular Diagnostics form (Please contact Haematology Dept MUH)  
 Comment: T-cell receptor gene rearrangement is used to help diagnose T-Cell lymphomas and to evaluate for residual or recurrent disease after treatment.  
 Ref range: See final report

#### **Thrombophilia Screen**

Laboratory: Haematology  
 Specimen: Blood 3mL, green x 4, S Monovette (sodium citrate 0.106M), Blood 2.7ml, Red, S Monovette (EDTA), Blood 4.9ml, S Monovette (serum )  
 Stability: Samples must be labelled with time of phlebotomy and delivered promptly to laboratory, within 2 hours of phlebotomy. Samples received outside this time limit may not be processed  
 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: PT, INR, APTT, FIB, Actin FSL, LA test, Antithrombin, Protein C, Activated Protein C Resistance, Protein S assays, Prothrombin variant, factor V Leiden and Anti-Cardiolipin and beta 2 glycoprotein antibodies  
 Turn-around time: 4 weeks  
 Ref. Range: See individual tests

#### **Tuberous Sclerosis**

Laboratory: Referred from Haematology, MUH to National centre for Medical Genetics, Crumlin  
 Specimen: EDTA and serum  
 Form: National Centre for Medical Genetics  
 Comment: Tuberous Sclerosis or Tuberous Sclerosis Complex (TSC) is a rare multi-system genetic disease caused by a mutation of either of two genes TSC1 and TSC2, that causes benign tumours to grow in the brain and on other vital organs such as kidney, hearts eyes lungs and skin.

#### **Von Willebrands Screen**

Laboratory: Sample referred from Haematology Laboratory to Haematology Laboratory, Cork University Hospital  
 Specimen: Blood 3mL x 3, green, S Monovette (sodium citrate 0.106M)  
 Comment: Specimens that are haemolysed, underfilled or overfilled cannot be analysed.  
 Test available Monday to Friday, during routine working hours. Screen includes Factor V111 assay, vWF:ag (FV111 Related Antigen), vWFactor Activity (Ristocetin Co-Factor)  
 Turn-around time: Approx 1 month  
 Ref. Range: vWF:ag (FV111 Related Antigen) 50-150%  
 vWF Activity (Ristocetin Co-factor) 55-156%

#### **ZAP 70**

Laboratory: Referred from Haematology Dept MUH to Royal Marsden NHS Trust, UK  
 Specimen: Blood 2.7ml, Red, S Monovette (EDTA)  
 Comment: Test only available from Mon – Thurs morning only. Zap-70 in B-cells is used as a prognostic marker in identifying different forms of chronic lymphocytes leukaemia.



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Ref. Range: See report form.

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### TEST DIRECTORY (A-Z) FOR MICROBIOLOGY DEPARTMENT

<b>Adenovirus PCR</b>	
Laboratory:	Microbiology
Specimen:	Nasal and/or throat swabs combined in viral transport fluid (Remel red-capped swabs) or Nasopharyngeal aspirate or Bronchoalveolar Lavage in universal container without additive
Comment:	Test sent to the NVRL. Suite of 8 viruses tested as part of Atypical pneumonia screen.
Turnaround:	1 week
Report:	PCR Positive or Negative
<b>Acid Fast Bacilli (AFB)</b>	
Refer to Mycobacteria Testing (TB/AFB)	
<b>Amikacin / Amikin</b>	
Specimen:	2ml clotted blood (white bottle), taken at least 18hrs post dose for once-daily dosage.
Comment:	Sent to CUH. N.B. specify whether specimen is pre or post dose. Pre specimens are most useful guide for monitoring therapy. All forms must indicate the specimen time and time of last administration of drug. Please refer to MUH Antibiotic guidelines.
Turnaround:	Results are phoned from CUH as soon as available.
Ref. Range:	Trough: <5mg/L (once-daily or x3 daily dosage)
Specimen:	2ml clotted blood (white bottle), taken at least 18hrs post dose for once-daily dosage.
<b>Arbovirus Serology</b>	
Laboratory:	Microbiology
Specimen :	4.0 mL blood in plain tube (clotted sample)
Comment:	Specimen sent to National Virus Reference Laboratory by arrangement.
Turnaround:	2-3 weeks
Ref. Range	Not applicable
<b>Anti- Streptolysin-O (ASO) Antibodies</b>	
Laboratory:	Microbiology
Specimen:	Blood 4mL clotted blood (white bottle)
Comment:	Test available Monday to Friday.
Turnaround:	24 hours
Ref. Range:	Anti- streptolysin-O (ASO) antibodies <200 IU/mL
<b>Ascitic Fluid Microbiology</b>	
See Sterile Body Fluid – Microscopy and Culture	
<b>Aspergillus Antibodies</b>	
Laboratory:	Microbiology
Specimen:	Blood 4mL clotted blood (White bottle)
Comment:	Test performed by Biomnis Laboratories
Turnaround:	2 weeks
Report:	Positive or Negative
<b>Atypical Pneumonia Screen</b>	
Laboratory:	Microbiology

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Specimen:	Blood 4mL clotted blood (White bottle)
Comment:	Test sent to Cork University Hospital. It is performed once per week. Screen is <i>Mycoplasma pneumoniae</i> and <i>Legionella pneumophila</i> . Acute and convalescent titres are essential and should be spaced 10 days apart to detect the rising antibody titre. Please label form appropriately stating whether specimen is acute or convalescent.
Turnaround:	1 – 2 weeks
Report:	IgM antibody positive or negative for the relevant organisms.

#### Avian Antibodies / Fowl Screen

Laboratory:	Microbiology
Specimen:	Blood 4mL clotted blood (white blood). Screen includes Bird Breeders Lung and Chlamydophila psittaci
Comment:	Test performed by Biomnis Laboratories
Turnaround:	2 – 3 weeks
Report:	Positive or Negative

#### Bartonella henselae Antibodies

Test discontinued by Reference laboratory

#### Bartholin's Abscess

Laboratory:	Microbiology
Specimen:	Aspirate using a syringe (ideally a minimum of 1mL) or using a sterile swab. 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 <i>N. gonorrhoeae</i> is lost over time. If processing is delayed refrigeration is preferable to storage at room temperature.
Comment:	Test performed routinely Monday–Friday 8am-5pm or by urgent request.
Turnaround:	Prelim: 24 hours; Final: 72 hours. Clinically significant isolates are telephoned when available to the requesting area.
Report Format:	Culture report: Any clinically significant isolate with the appropriate sensitivities.

#### Blood Culture

Laboratory:	Microbiology
Specimen:	Adults: 8-10mls blood per blood culture bottle, Aerobic (green) and Anaerobic (orange) Paediatric: 1-4mls blood in a single Paediatric (yellow) blood culture bottle N.B. 1. Bottles should be stored at room temperature before and after inoculation. DO NOT place in fridge. 2. Do not use unless fluid is clear and sensor at bottom of bottle is grey before inoculation. 3. Do not use after expiry date. 4. Do not cover bar code labels or grey sensor layer at bottom of bottle. Hand write details on bottles. Removable bar code labels are required in the lab for identification purposes, therefore: <b>PLEASE DO NOT REMOVE BAR CODE LABELS</b>
Comment:	1. To avoid contamination of blood culture bottles, appropriate skin disinfection should be carried out and, where blood for other tests is required, inoculation of blood culture bottles should take place first. 2. Please specify if a particular condition is suspected e.g. endocarditis or meningitis. 3. Always considered urgent and transported to lab as soon as possible. 4. Do not place in fridge.
Turnaround:	Positive: phoned as soon as available (most organisms are detected within 24-48hrs) Negative: 5 days Negative ? Endocarditis: 10 days (requires extended culture)
Report:	Negative: No growth after 5 or 10 days Positive: Organism reported with appropriate antibiotic susceptibility

#### Bordetella Species - Culture

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Laboratory:	Microbiology
Specimen:	<b>Must be received in lab by 3pm.</b> Pernasal swabs are inserted through a nostril and advanced along the floor of the nose until it reaches the nasopharynx. It has been suggested that the swab be held against the posterior nasopharynx for up to 30s or until the patient coughs. In practice, it is more likely that a patient will only be able to tolerate this for a few seconds. Note: Cough plates and throat swabs are unsatisfactory and will not be processed. <i>B. pertussis</i> is very susceptible to drying and is a very slow grower, so transport must keep the organism moist and prevent overgrowth of normal flora. Transport specimens ASAP. The laboratory must be notified in advance of taking the nasopharyngeal swab.
Comment:	Test performed by Cork University Microbiology Laboratory Monday–Friday during routine working hours.
Turnaround:	Prelim: 4 days; Final: 7 days.
Report:	“Bordetella pertussis” NOT isolated or “Bordetella pertussis / parapertussis” isolated.

#### ***Bordetella pertussis* PCR**

Laboratory	Microbiology
Specimen	Respiratory specimen, E.G. Nasopharyngeal aspirate
Comment	Test performed by Respiratory and Systemic Infection Laboratory, Collindale, UK. This test is advised for patients who have exhibited symptoms of whooping cough within the last 21 days
Turnaround:	2 weeks
Report:	Detected or not detected

#### ***Bordetella pertussis* serology**

Laboratory	Microbiology
Specimen	Serum Sample
Comment	Test performed by Respiratory and Systemic Infection Laboratory, Collindale, UK. This test is advised for patients who have experienced symptoms of whooping cough over 21 days ago. It is not for immunity. (No test available for immunity)
Turnaround	2 weeks
Report	Positive/negative

#### ***Borrelia burgdorferi* antibodies**

See “Lyme serology”

#### **Bronchoalveolar lavage fluid Culture**

Laboratory:	Microbiology
Specimen:	It is difficult to be specific on volume required; in principle as large a volume as possible is preferred. The specimen should be collected into a sterile universal. Transport specimens 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. <i>Burkholderia pseudomallei</i> and <i>Nocardia</i> sp require longer incubation of cultures. All bronchial washings are cultured for TB. Refer to Mycobacteria Testing.
Comment:	Test performed routinely Monday–Friday 8am–5pm or by urgent request. Traps containing a specimen should be properly sealed.
Turnaround:	Prelim: 24 hours; Final: 48 - 72 hours.
Report:	Aerobic culture with sensitivities, if appropriate, as well as AFB smear and culture for Mycobacteria.

#### **Brucella Serology (*Brucella abortus*)**

Laboratory:	Microbiology
Specimen:	Blood 4mL clotted sample (white bottle)
Comment:	Test performed by Biomnis Laboratories. Test detects total antibodies and IgM antibodies (acute disease)

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Turnaround: Negative: 7 days  
Positive: 14 days

Ref. Range: 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. Titres of < 1:40 in the SAT are of doubtful significance. A rising or falling titre is more significant than a single titre.

#### Bursa Fluid

See "Sterile Body Fluid – Microscopy and Culture".

#### *Candida albicans* Antibodies

Laboratory: Microbiology

Specimen: Blood 4mL clotted sample (white bottle)

Comment: Test performed by Biomnis Laboratories. This test is rarely necessary as the fungus is usually cultured in systemic infections.

Turnaround: 2 weeks

Report: Positive or Negative

#### Catheter / Intravascular Cannulae

Laboratory: Microbiology

Specimen: Disinfect the skin around the cannula entry site, remove cannula using aseptic technique, and cut off 4cm of the tip into a sterile labelled universal using sterile scissors. The sample should be transported ASAP to prevent drying. If processing is delayed, refrigeration is preferable to storage at ambient temperature.

Comment: Please send IV devices only if an infection is queried. The routine culture of devices removed for other reasons is unnecessary. Foley catheters are not cultured since growth represents distal urethral culture. A urine sample is more appropriate. Skin disinfection procedures depend on local protocols and may vary.

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

Report: Culture report: Any clinically significant isolate with the appropriate sensitivities.

#### Cat Scratch Disease Antibodies (*Bartonella henselae* Antibodies)

Test discontinued by Reference laboratory

#### Cerebrospinal Fluid - Culture/Microscopy

Laboratory: Microbiology

Specimen: Ideally, the laboratory should receive a minimum volume of 1mL. The specimen should be collected in sterile universals. 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 sample. CSF is normally collected sequentially into separate containers and should be numbered appropriately. Common practice is to send the first and last 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. Cells disintegrate and a delay may produce a cell count that does not reflect the clinical situation of the patient. If a sub-arachnoid haemorrhage is suspected bottles 1 and 3 must be sent for red cell count. In a SAH the 2 bottles will have a similar count whereas in a traumatic CSF the red cell count will decrease in bottle 3.

With a culture negative lymphocytic CSF(WBCs >10/cmm), consideration should be given to other tests such as [Viral PCR](#) and [Mycobacterial testing](#). A clearly labelled stool sample for enteroviral culture should also be considered.

CSF, EDTA blood and paired serum samples may be sent to the Meningococcal Reference Laboratory for PCR and serological examination. All isolates of *N. meningitidis* are referred for serotyping.

Do not refrigerate specimen. Do not send through the pneumatic tube.

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Turnaround: Microscopy: Within 2 hours of receipt. Urgent report telephoned when available.  
Culture: Prelim: 24 hours; Final: 48 - 72 hours.

Report Report on the gross appearance of the CSF, the presence of a clot if applicable and the presence or absence of Xanthochromia. Xanthochromia is determined by visual assessment. If quantitative xanthochromia is required, please contact Biochemistry. Microscopic report on the numbers of WBCs/cmm and RBCs/cmm. A differential leucocyte count and Gram stain is performed on all CSF specimens with raised WBC per cmm. 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 is generally regarded as not indicative of infection. Culture report: Any organism isolated with the appropriate sensitivity results.

#### Normal CSF Values:

Leucocytes	Neonates	0 - 30 cells per cmm
	1- 4yr old	0 - 20 cells per cmm
	5yr - puberty	0 – 10 cells per cmm
	Adults	0 – 5 cells per cmm
Erythrocytes	Newborn	0- 675 cells per cmm
	Adults	0 – 10 cells per cmm
Protein	Neonates ≤ 6d	0.7g/L
	Others	0.2 – 0.4g/L (<1% of serum protein concentration)
Glucose		≥60% of simultaneously determined plasma concentration (CSF: serum ratio ≥ 0.6)

These values represent the upper and lower limits of normality. Bacterial or viral infection may still need to be considered where leucocyte counts are near the upper normal limits in neonates and young children.

#### Cerebrospinal Fluid- Viral PCR

Laboratory: Microbiology  
Specimen: CSF approximately 1 ml  
Comment: Test sent to the National Viral Reference Laboratory  
Viral PCR includes Herpes Simplex 1 and 2, Varicella-Zoster and Enterovirus  
Turnaround: 1 week  
Report: Detected or not detected

#### Cerebrospinal Shunts

Laboratory: Microbiology  
Specimen: CSF is usually obtained from the shunt reservoir and sent for investigation. When a shunt is removed all three portions should be sent in separate containers of the appropriate size. This will include the proximal catheter, a valve or reservoir, and a distal catheter. The specimen should be collected into a sterile universal. Transport specimens ASAP. If processing is delayed, refrigeration is preferable to storage at ambient temperature.  
Comment: Test performed routinely Monday–Friday 8am-5pm or by urgent request.  
Turnaround: Prelim: 24 hours; Final: 48 - 72 hours.

#### Cervical swab

Refer to “Genital swab”

#### *Chlamydia pneumoniae* IgG/IgM serology

Laboratory: Microbiology  
Specimen: Blood 4mL clotted sample (white bottle)  
Comment: Test sent to the Biomnis [Laboratories](#)  
Turnaround: 1 week  
Ref. Range: *Chlamydia pneumoniae* IgG/IgM antibodies Positive or Negative.

#### *Chlamydia pneumoniae* PCR

Laboratory: Microbiology  
Specimen: Nasopharynx, bronchial secretions, BAL  
Comment: Test sent to Biomnis Laboratories  
Turnaround: 2 weeks

#### *Chlamydia psittaci* Antibodies

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Laboratory:	Microbiology
Specimen:	Blood 4mL clotted sample (white bottle)
Comment:	Test performed by Biomnis laboratories
Turnaround:	2 weeks
Ref. Range:	Positive or Negative

***Chlamydia trachomatis***

Laboratory:	Microbiology
Specimen:	Nucleic acid amplification method. Special PCR STD Specimen Collection and Transport Kits must be used (available from Micro lab). Please read the kit insert for information on specimen collection. Specimens sent to CUH
Comment:	Test sent to CUH Microbiology Laboratory. Test available Monday-Friday. Specimens must arrive at the test site within 24 hours.

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Turnaround: 48 hours

Ref. Range: PCR for detection of Chlamydia trachomatis positive or negative.

#### **Chlamydia trachomatis and Neisseria gonorrhoeae PCR**

Laboratory: Microbiology

Specimen: Fresh urine, which may be sent in a universal container or in the urine transport tube provided in the Gen-probe Aptima urine collection kit (see pack for details of specimen collection).

Comment: Test performed by National Virus Reference Laboratory. If sending urine in a universal container, please send immediately to the laboratory as it must be transferred to the transport tube within 24hrs of collection.

Turnaround: 7-10 days

Report: Detected or Not detected

#### **Clostridium difficile**

Laboratory: Microbiology

Specimen: Fresh faeces sample, liquid or semi-solid, not solid, 1-2g (1-2mL) is sufficient.

Comment: Enzyme immunoassay for the detection of *C. difficile* GDH and/or *C. difficile* Toxins A and B. These tests are batched and performed once per day, Mon to Fri at 2pm. Requests for *C. difficile* should be performed on patients with diarrhoea of unknown cause usually associated with antibiotic therapy. Samples should be tested within 24 hours of collection. If the samples cannot be tested within this time they should be stored in a refrigerator at 2-8°C, and tested within 72 hours. **NB.** Only one *C. difficile* test will be done per patient per week if negative, and one per month if positive, unless by prior arrangement with Consultant Microbiologist.

Urgent requests will only be processed following a phone call to the scientist on call.

*C. difficile* GDH is performed initially and, if negative, a final report of *C. difficile* GDH Negative is issued.

If GDH is positive, the specimen is subsequently tested for *C. difficile* Toxins A and B, and, a final report of *C. difficile* Toxin A/B Positive or Negative is issued.

Turnaround: Same day if received before 2pm. Positive reports are telephoned as soon as available to the requesting area.

Report: *C. difficile* GDH Negative or  
*C. difficile* Toxin A/B Positive or Negative

#### **Conjunctivitis**

See "Eye Swab".

#### **CNS Serology Screen**

Laboratory: Microbiology

Specimen: Blood 4mL of clotted blood (white bottle)

Comment: Test performed by National Virus Reference Laboratory. Screen includes Mumps, Measles, Herpes simplex, Varicella zoster virus and Cytomegalovirus. For patients with idiopathic encephalopathies or unusual CNS signs or symptoms consideration should be given to syphilis, Lyme and HIV serology.

Turnaround: 2 - 3 weeks

Ref. Range: IgM antibody positive or negative for the relevant organisms.

#### **Coxiella burnetii IgM Antibodies (Q fever)**

Laboratory: Microbiology

Specimen: Blood 4mL of clotted blood (white bottle)

Comment: Test sent to HPA, Bristol

Turnaround: 2 weeks

Ref. Range: *Coxiella burnetii* IgM antibodies Positive or Negative.

#### **Coxsackie virus A and B**

Laboratory: Microbiology

Specimen: Serum Sample

Comment: Test must be approved by Consultant Microbiologist. Test performed by Biomnis

Turnaround: 2 weeks

Report: Part of Enterovirus IgM (EIA) : Negative



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**Cryptococcal Antigen – Serum/CSF**

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Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle) or CSF (1 mL)  
Comment: Test performed by Mycology Reference Laboratory, Leeds.  
Turnaround: 2-3 weeks  
Ref. Range: Positive or Negative

#### **Cryptosporidium species**

Laboratory: Microbiology  
Specimen: Faeces. Performed routinely on all children <10yrs, on bloody or watery samples or where specifically requested. Other types of clinical specimen such as duodenal aspirates may also be stained for Cryptosporidia.  
Comment: Tests are batched and performed routinely Mon–Fri 8am-5pm. Diagnosis is based upon demonstration of oocysts in stools, using an auromine-phenol stain (and confirmed using a modified Ziehl-Neelsen stain).  
Turnaround: 24 hours-72 hours.  
Report: *Cryptosporidium* species seen or not seen

#### **CSF – Culture & Microscopy**

See “Cerebrospinal Fluid – Culture and Microscopy “

#### **CSU - Catheter Urine**

See “Urine Microscopy and Culture”.

#### **Cytomegalovirus (CMV) IgM or IgG Antibodies**

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle)  
Comment: Test sent to the National Virus Reference Laboratory. Two CMV antibody tests are available. The clinician must indicate the appropriate test by full history etc. The CMV scan will detect total (IgM and IgG) antibodies and provides evidence of prior exposure to the virus. The CMV IgM Test will detect IgM antibodies to CMV and can be useful in the diagnosis of current primary infection, particularly in pregnant women.  
Turnaround: 1 week  
Ref. Range: CMV Total Antibodies Positive or Negative. CMV IgM antibodies Positive or Negative. CMV PCR may also be clinically indicated using an EDTA sample of blood or a urine sample (babies).

#### **Dermatophytosis**

See “Mycology”

#### **Dengue fever Antibodies - Serum**

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle)  
Comment: Test performed by National Virus Reference Laboratory by arrangement.  
Turnaround: 2-3 weeks  
Report: Positive or Negative

#### **Duodenal Aspirate**

Laboratory: Microbiology  
Specimen: Specimens will be obtained by specialist collection according to local protocols. The sample 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 refrigeration is preferable to storage at room temperature. Delays of over 48h are undesirable.  
Comment: Test performed Mon–Fri 8am-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 and/or immunocompromised patients.  
Turnaround: 24 hours  
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**

Laboratory: Microbiology

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Specimen: Swab any pus or exudate.  
Comment: Test performed routinely Mon–Fri 8am-5pm or by urgent request. If processing is delayed, refrigeration is preferable to storage at room temp. Collect separate swab if fungal culture is desired (scrapings are preferable to swabs), see - Mycology. Tympanocentesis (needle aspiration) and Myringotomy (surgical incision of tympanic membrane), to sample middle ear effusion, is rarely justified.  
Turnaround: Prelim: 24 hours; Final: 48 - 72 hours.  
Report: Culture report: Any clinically significant isolate with the appropriate sensitivities.

#### **Ebola virus**

See Viral Haemorrhagic fever

#### ***E. coli* 0157 Serology**

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle). Note: A faeces sample sent for *E. coli* 0157 culture is the preferred method of diagnosis. Refer to “Faeces Microscopy & Culture”.  
Comment: Test performed by PHLS Collindale in London  
Turnaround: 2-3 weeks  
Ref. Range: Positive or Negative

#### **Endocervical swab**

Refer to “Genital swab”

#### ***Enterobius vermicularis* (Sellotape slide for Pinworm)**

Laboratory: Microbiology  
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 Mon–Fri 8am-5pm. Transport specimens ASAP. If processing is delayed, refrigeration is preferable to storage at ambient temperature. Occasionally, an adult worm may be collected from a patient and should be sent in saline or water in a sterile universal container for identification.  
Turnaround: 24 hours.  
Report: Ova of *Enterobius vermicularis* present” or “*Enterobius vermicularis* adult worm present”

#### **Enterovirus PCR**

Laboratory: Microbiology  
Specimen: EDTA blood /CSF  
Comment: Test performed by the National Virus reference Laboratory. EV can also be detected in stool samples, respiratory secretions and vesicular fluid.  
Turnaround: 1 week  
Report: Detected or not detected. If enterovirus is detected further subtyping is performed including Coxsackie and Echo

#### **Enterovirus Serology**

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle)  
Comment: Sent to Microbiology Dept., St.Helier Hosp., Wrythe Lane Carshalton SM5 1AA. UK  
The Enterovirus IgM result includes IgM to Coxsackie A/B and Echovirus infections and the numbered enteroviruses.  
Turnaround: 2-3 weeks  
Report: Enterovirus IgM (EIA): Negative or Positive.

#### **Epstein-Barr Virus (EBV) Antibodies**

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle)  
Comment: Test sent to the National Virus Reference Laboratory. This test individually assays for IgG and IgM antibodies.  
Turnaround: 1 week  
Report: EBV IgM antibody positive indicates acute/current infection.  
EBV IgG antibody positive indicates previous exposure (immunity).

#### **Exanthem Screen**

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle)

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Comment: Test performed by the National Virus Reference Laboratory. Screen includes Measles, Rubella, Parvovirus B19. Note: Varicella zoster and Herpes zoster have a characteristic clinical picture and serology is rarely required to confirm these. These tests are available if requested separately.

Turnaround: 2 - 3 weeks

Report: IgM antibody positive or negative for the relevant organisms.

#### Eye Swab

Laboratory: Microbiology

Specimen: Culture both eyes with separate swabs. Any available pus should be sampled as well as the area of interest. Transport specimens ASAP in swabs containing transport media. If processing is delayed, refrigeration is preferable to storage at ambient temperature. Separate special swabs are needed for the diagnosis of [viral](#) and [chlamydial](#) infections which are available from MUH stores

Comment: Test performed routinely Monday–Friday 8am–5pm or by urgent request.

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

Report: Culture report: Any clinically significant isolate with the appropriate sensitivities.

#### Faeces – Microscopy and Culture and Antigen Detection

Laboratory: Microbiology

Specimen: Liquid or semi-solid 1– 2g is sufficient for routine culture. Solid specimens will be rejected. The specimen should be collected into a sterile universal. 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 stool specimens that are not promptly delivered to the laboratory, even if refrigerated.

Comment: Rectal swabs are not suitable. Full clinical information should be provided, esp. presence and duration of symptoms, recent travel or shellfish ingestion and previous antibiotics. If required, examination for ova, cysts and parasites should be specifically requested giving full clinical details and travel history see - [Parasitology](#).

Turnaround: Prelim: 24 hours; Final: 48 - 72 hours. Clinically significant isolates are telephoned as soon as available. Confirmation of positive results from Reference labs may take considerably longer.

Report: Report presence of specific pathogen and absence of other pathogens. When routine C/S is requested, stools will be cultured on selective media for *Salmonella*, *Shigella* and *Campylobacter* sp, and (if clinically appropriate) for *Yersinia* sp, *Vibrio cholerae* and enterohaemorrhagic *E. coli* O157. Microscopy of wet film; special stains where appropriate (auramine-phenol and Modified Ziehl Neelsen for [Cryptosporidium species](#)). In all children <4 yrs and on all children from the childrens wards, EIA for detection of [Rotavirus](#) /[Adenovirus](#) antigens is performed. Testing for [Clostridium difficile](#) needs to be requested specifically. Norovirus must be approved by Consultant Microbiologist or Infection Control.

#### Farmers Lung Antibodies

Laboratory: Microbiology

Specimen: Blood 4mL of clotted blood (white blood)

Comment: Test performed by Biomnis Laboratories

Turnaround: 2 weeks

Report: Positive or Negative

#### Fungal Microscopy and Culture

See “Mycology”

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### Genital Swab

Laboratory:	Microbiology
Specimen:	Because these 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 in transport media and transported ASAP. The viability of <i>N. gonorrhoeae</i> is lost over time. If processing is delayed, refrigeration is preferable to storage at ambient temperature. Smears should be made directly on a clean glass slide; unfixed slides should be handled with care and transported to the laboratory in a suitable container. A separate special Chlamydia swab is required for the detection of <i>Chlamydia trachomatis</i> .
Comment:	Test performed routinely Mon–Fri 8am–5pm or by urgent request. Culture for <i>Neisseria gonorrhoeae</i> performed only where clinical details indicate or on request.
Turnaround:	Prelim: 24 hours; Final: 72 hours.
Report Format:	Microscopic report on the presence or absence of <i>Trichomonas vaginalis</i> , Yeast and WBCs. The presence and relative numbers of pus cells and epithelial cells influence interpretation; presence of yeasts supports a diagnosis of Candidiasis. Culture report on any clinically significant isolate with the appropriate sensitivities.

### Gentamicin

Specimen:	2ml clotted blood (white bottle) Once-daily dosage taken at least 18hrs post dose Multiple-daily dosage taken immediately before (Trough) and 1hr post dose(Peak) – usually peak not necessary.
Comment:	N.B. Fill out antibiotic request form fully, indicating time of specimen, dose given and time of last dose. Pre specimens are most useful guide for monitoring antibiotic therapy and generally post specimens are unnecessary. Please refer to MUH Antibiotic guidelines. Test available Monday to Friday between the hours of 8am and 9pm inclusive and at weekends including bank holidays between 9am and 6pm. Please ensure these times are taken into consideration when prescribing these antibiotics. When monitoring Gentamicin in patient samples, please be aware of the following limitations of the assay: Falsely elevated values for Gentamicin may be obtained from patient samples which contain cephalixin, netilmicin, sisomicin, sagamicin, kanamycin B, neomycin or tobramycin. Anomalous results for gentamicin may be obtained from specimens from patients receiving mouse monoclonal antibodies or specimens which contain heterophilic antibodies, including Rheumatoid Factor (RF). If any of the above apply, please treat results with caution and repeat assay if necessary.
Turnaround:	4 hrs
Ref. Range:	Once-daily dosage: Trough <1mg/L Multiple-daily dosage: Trough <2mg/L      Peak 5-12mg/L

### Haemophilus influenzae B Antibodies

Laboratory:	Microbiology
Specimen:	Blood 4mL of clotted blood (white blood)
Comment:	Test performed by Immunology Dept., St James' Hospital
Turnaround:	2 weeks
Report:	Positive or Negative

### Hantavirus Antibodies

Laboratory:	Microbiology
Specimen:	Blood 4mL of clotted blood (white blood)
Comment:	Test performed by National Virus Reference Laboratory by arrangement.
Turnaround:	2 weeks
Report:	Positive or Negative

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### **Helicobacter pylori Urea Breath Test**

Laboratory: Microbiology  
Specimen: Breath taken using Helicobacter diagnostic Test Kit  
Comment: Kits can be purchased from the Microbiology Secretary's office or any pharmacy. Please phone laboratory for current cost of kit. The kit contains information on how to take the samples and there is also an information sheet available from the Microbiology office. Please note, before taking specimens:  
Patient should be off antibiotics for at least 4 weeks.  
Patient should be off antacids for at least 2 weeks.  
Patient should not eat for at least 6hrs (may drink water).  
Specimens are stable at room temperature for several weeks and need not be refrigerated.  
Turnaround: 2 weeks  
Ref. Range: Positive > 1.5 Negative <1.5

### **Hepatitis A IgG (Immune Status)**

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle)  
Comment: Test sent to Cork University Hospital. It 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 or foreign travel to high risk areas. Virus specific IgM is the most reliable marker for determining the acute stage of disease – see Hepatitis A IgM.  
Turnaround: 1 week  
Report: A positive result indicates previous exposure to the Hepatitis A virus and immunity. A negative result indicates that the individual is susceptible to infection with Hepatitis A virus.

### **Hepatitis A IgM Antibody**

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white blood)  
Comment: Test available Monday-Friday. A qualitative test for detecting IgM Antibody to Hepatitis A Virus. It can be used to determine whether a patient has, or has recently had, acute or asymptomatic hepatitis A infection and is included as part of the "[Hepatitis Screen](#)". This test cannot determine immune status to hepatitis A – see Hepatitis A Total antibody. This test is a screening test and positive results are confirmed by the National Virus Reference Laboratory.  
Turnaround: Negative: Routine – 3 days, Urgent – 4 hours  
Positive: 2 weeks  
Report: Positive or Negative. IgM anti-HAV reactivity should be correlated with patient history and other hepatitis markers for diagnosis of past or present infection.

### **Hepatitis Bs Antibody (anti-HBs)**

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white blood)  
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. Test available Monday-Friday. Emergency samples from recipients of needle stick injuries are processed On-Call.  
Turnaround: Routine: Up to 1 week.  
Urgent: 4 hrs  
Ref. Range: For a needlestick injury, antibodies  $\geq 10$  mIU/mL are considered protective and gamma globulin is not necessary. However if antibodies are between 10-100IU/mL an immediate booster is recommended. For a completed course of vaccination, antibodies  $> 100$  mIU/mL are considered an adequate response and such patients do not require further boosting or testing. Further information - please discuss with the Medical Team.

### **Hepatitis B Surface Antigen**

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle)  
Comment: Test available Monday-Friday. Emergency samples are processed On-Call. A positive result indicates acute or chronic carriage of the Hepatitis B virus. This test is included as part of the "[Hepatitis Screen](#)". This test is a screening test and all Positive results are confirmed by the National Virus reference Laboratory

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Turnaround: Negative: Routine - 3 days, Urgent - 4 hours  
Positive: 2 weeks

Report: Negative samples are reported immediately. Positive samples are tested with a full "Hepatitis B Virus Marker Profile", which includes Anti-HBc (CORE), HBeAg, anti HBe and HB antibody status) in the National Virus Reference Laboratory. A repeat sample is requested on all newly diagnosed positive patients.

#### Hepatitis C Antibody

Laboratory: Microbiology

Specimen: Blood 4mL of clotted blood (white bottle)

Comment: Test available Monday-Friday. Emergency samples are processed On-Call. This test is included as part of our "Hepatitis Screen". This test is a screening test and all positives are confirmed by the National virus Reference Laboratory.

Turnaround: Negative: Routine – 3 days, Urgent - 4 hours  
Positive: 2 weeks

Report: Negative samples are reported immediately. Positive samples are considered presumptive positive only and are sent to the Viral Reference Laboratory for confirmation and if positive on repeat sent for PCR Testing. Hepatitis C PCR sample must be separated and frozen within 6 hours and sent on ice to the National Virus Reference Laboratory

#### Hepatitis Screen

Laboratory: Microbiology

Specimen: Blood 4mL of clotted blood (white bottle)

Comment: Test available Monday-Friday. Urgent sample done on request. Screen includes Hepatitis A IgM antibody, Hepatitis B surface antigen, and Hepatitis C total antibody. Components also offered individually. This test is a screening test and all positives are confirmed by the National virus Reference Laboratory. This test is a screening test and all positives are confirmed by the National virus Reference Laboratory. The liver may also be involved in a variety of infections due to other viruses, bacteria and protozoa e.g. Epstein Barr virus, CMV, Leptospira and *Toxoplasma gondii*. These should be requested separately if clinically indicated.

Turnaround: Negative: Routine – 3 days, Urgent - 4 hours.  
Positive: 2 weeks

Report: Hepatitis A, B, or C: Positive or Negative. Positive results are sent to the Viral Reference Laboratory for confirmation.

#### Herpes Simplex Virus !,2 (HSV) PCR

Laboratory: Microbiology

Specimen: EDTA samples (Serum can be accepted in some circumstances)

Comment: Test sent to the National Virus Reference Laboratory  
For culture or PCR please contact Microbiology Laboratory

Turnaround: 2 weeks

Report:

#### High Vaginal Swab (HVS)

Laboratory: Microbiology

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. Only swabs sent in suitable transport medium will be processed - swabs that are sent without transport medium may be dry and will not yield the targeted organisms. Transport specimens ASAP. If processing is delayed, refrigeration is preferable to storage at ambient temperature.

Comment: All vaginal swabs are investigated routinely for common causes of vaginal discharge i.e. Yeast, *Trichomonas vaginalis* and Bacterial Vaginosis (BV). Vaginal swabs are not recommended for gonococcal culture on adults and an **endocervical** specimen is more appropriate. A separate sample should be collected for the detection of *C. trachomatis* (see above).

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

Report format: Microscopy: WBCs, yeasts, trichomonads . Excess pus cells suggest infection; motile trichomonads indicate trichomoniasis, yeasts and hyphae suggest Candidiasis;  
Culture: Any clinically significant isolate with the appropriate sensitivities.





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#### Histoplasma Antibodies

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle)  
Comment: Test performed by PHLS Mycology Reference Lab, Bristol  
Turnaround: 2 weeks  
Ref. Range: Positive or Negative

#### HTLV-I / II Antibodies

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle)  
Comment: Test performed by National Virus Reference Laboratory  
Turnaround: 2 weeks  
Ref. Range: Positive or Negative

#### Human Immunodeficiency Virus ( HIV Ag/Ab Combo Assay)

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle)  
Comment: Test available Monday-Friday. Emergency samples can be processed On-Call. If identifying a patient by initials please state date of birth, sex and risk factors.  
**All HIV request forms must have a clearly legible doctor's signature and location.**  
This test is a screening test and all positives are confirmed by the National virus Reference Laboratory.  
Turnaround: Negative: Routine – 3 days, Urgent - 4 hours  
Positive: 2 weeks  
Ref. Range: Negative samples are reported as negative for HIV antibodies. Positive samples are referred to the National Virus Reference Laboratory, Dublin, for confirmation. A repeat sample is requested on all newly diagnosed positive patients.

#### Human Immunodeficiency Virus Viral Load

Laboratory: Microbiology  
Specimen: Blood 4mL of EDTA. Sample must be separated and frozen within 6 hours.  
Comment: This test is sent to the National Virus Reference Laboratory on ice.  
Turnaround: 1-2 weeks.  
Ref. Range: The interpretation of results depends upon the clinical circumstances.

#### Influenza A H1N1 virus PCR

Laboratory: Microbiology  
Specimen: Nasal or nasal/throat swabs combined in viral transport fluid (Remel red-capped swabs)  
Comment: Must be pre-approved for processing by Consultant Microbiologist or Infection Control  
Turnaround: Same day  
Report: Influenza A H1N1 RNA: Detected or Not detected

#### Influenza A virus PCR

Laboratory: Microbiology  
Specimen: Nasal or nasal/throat swabs combined in viral transport fluid (Remel red-capped swabs)  
Comment: Must be pre-approved for processing by Consultant Microbiologist or Infection Control  
Turnaround: Same day  
Ref. Range: Influenza A RNA: Detected or Not detected

#### Influenza B virus PCR

Laboratory: Microbiology  
Specimen: Nasal or nasal/throat swabs combined in viral transport fluid (Remel red-capped swabs)  
Comment: Must be pre-approved for processing by Consultant Microbiologist or Infection Control  
Turnaround: Same day  
Report: Influenza B RNA: Detected or Not detected

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#### Intra-Uterine Infection Screen / TORCH Screen

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle)  
(Minimum volume for baby samples: 1mL whole blood).  
Comment: Test performed by the Viral Reference Laboratory. "TORCH Screen" includes Toxoplasma gondii IgM, Rubella IgM, and CMV IgM antibodies. Parvovirus B19 IgM antibodies are also included in cases of miscarriage and stillborn babies.  
Turnaround: 1 week  
Ref. Range: IgM antibody positive or negative for the relevant organisms.

#### Intravascular Cannulae - Culture

See "Catheter / Intravascular Cannulae"

#### Intra-Uterine Contraceptive Device (IUCD)

Laboratory: Microbiology  
Specimen: Place the entire IUD, including any exudate, in a sterile universal. Transport ASAP. If processing is delayed, refrigeration is preferable to storage at room temperature.  
Comment: Test performed Mon-Fri 8am-5pm.  
Turnaround: Prelim: 24 hours; Final: 48 - 72 hours. Note: Culture for Actinomyces takes up to 7 days.  
Report Format: Any clinically significant isolate with the appropriate sensitivities. Culture for *Actinomyces* sp. proceeding which will be reported if positive.

#### JC Virus PCR

Laboratory: Microbiology  
Specimen: Serum/CSF/EDTA  
Comment: Test is sent to the NVRL  
Turnaround: 2weeks  
Report Format: Detected or not detected

#### Joint Fluid

See "Sterile Body Fluid – Microscopy and Culture".

#### Legionella pneumophila antibodies

Laboratory: Microbiology  
Specimen: 4mL of clotted blood (white bottle) - acute and convalescent samples  
Comment: Test performed at Cork University Hospital once per week and is included as part of the "Atypical Pneumonia" Screen. Test is for the detection of total antibodies against *Legionella pneumophila* serogroups 1-6. Positive results may suggest infection and are referred for confirmatory testing. Acute and convalescent titres are necessary and should be spaced two weeks apart to detect the rising antibody titre.  
Turnaround: Negative report: 1-2 weeks. Confirmed serological Positive report: 2-3 weeks.  
Report: Legionella pneumophila total antibodies: Positive or Negative

#### Legionella pneumophila urinary antigen

Laboratory: Microbiology  
Specimen: 5mls urine (may be refrigerated for up to 14 days before testing)  
Comment: Test provided on a limited basis: ICU patients or by prior approval of Consultant Microbiologist  
Turnaround: 24hrs  
Report: Legionella pneumophila urinary antigen: Positive or Negative

#### Leptospirosis serology

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle)  
Comment: Test sent to a National Virus Reference Laboratory  
Negative reports for Leptospiral antibody are reported immediately. Positive sera are sent to the Leptospirosis Reference Laboratory in Hereford for confirmation. In either case (positive or negative), a second sample is required 7 – 10 days after the first sample is taken.  
Turnaround: Negative report 2 weeks  
Positive report 2-3 weeks  
Report: Leptospiral antibody negative or positive (with titre).  
Note: Positive results are rarely obtained in the 1<sup>st</sup> 2 weeks of infection.

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#### Lyme serology / *Borrelia burgdorferi* antibodies

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle) or CSF (1 mL)  
Comment: Test performed by National Virus Reference Laboratory. Enzyme-linked immunosorbent assay (ELISA) followed by Western blot confirmation.  
Turnaround: 2 weeks. Confirmation of positive results may take longer.  
Report: Positive ELISA (confirmed / not confirmed)

#### Lymphoma granuloma

See *Chlamydia trachomatis*

#### Measles IgG antibody

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle)  
Comment: Test performed by National Virus Reference Laboratory  
Turnaround: 2 weeks  
Ref. Range: Immune or Non-immune.

#### Measles IgM antibody

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle)  
Comment: Test performed by National Virus Reference Laboratory  
Turnaround: 2 weeks  
Ref. Range: Measles IgM antibodies positive or negative.

#### Meningitis C vaccine antibodies - Serum

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle)  
Comment: Test performed by reference laboratory.  
Turnaround: 1-2 weeks  
Ref. Range: Positive or Negative

#### Meningococcal PCR

See "N. meningitidis PCR"

#### Methicillin-Resistant Staph aureus (MRSA)

Laboratory: Microbiology  
Specimen: Swabs containing transport media should be used. Transport specimens ASAP. If processing is delayed, refrigeration is preferable to storage at ambient temperature.  
Comment: Test performed Mon–Fri 8am–5pm. Label all microbiology forms with MRSA SCREEN and Indicate if the patient was previously MRSA positive. We recommend a nasal swab as an initial screen. When MRSA is detected in any microbiological sample, on completion of treatment rescreen as recommended by national and local guidelines.  
Turnaround: Prelim: 24 hours; Final: 48 - 72 hours.  
Report: "MRSA not isolated" or "MRSA isolated" with appropriate sensitivity results. Extra sensitivities are available from the Laboratory.

#### MMR (Measles, Mumps, Rubella IgG antibodies)

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle )  
Comment: Tests performed by National Virus Reference Laboratory with the exception of Rubella IgG antibody detection, which is performed in-house.  
Turnaround: 2 weeks  
Report: Immune or Non-immune

#### Mouth Swab

Laboratory: Microbiology  
Specimen: Sample pus if present otherwise sample 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. If processing is delayed, refrigeration is preferable to storage at ambient temperature.  
Comment: Test performed routinely Mon–Fri 8am–5pm. For possible herpes infection, consider a "Viral Culture". A separate viral swab is necessary.  
Turnaround: Prelim: 24 hours; Final: 48 - 72 hours.  
Ref. Range: Culture report: Any clinically significant isolate with the appropriate sensitivities.

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### MSU – Midstream Urine

See “Urine Microscopy and Culture”.

### Mumps IgG antibody

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle )  
Comment: Test performed by National Virus Reference Laboratory  
Turnaround: 2 weeks  
Report: Immune or Non-immune

### Mumps IgM antibody

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle )  
Comment: Test performed by National Virus Reference Laboratory  
Turnaround: 2 weeks  
Report: Mumps IgM antibodies positive or negative.

### Mycobacteria Testing (TB/AFB)

Laboratory: Microbiology  
Specimen: Sputum: Early morning sputum on 3 consecutive days – minimum volume 5mls. Saliva and postnasal secretions are not suitable. Only one sample per day will be processed.  
Bronchial washings: minimum volume preferably 5mls  
Urine: Early morning urine on 3 consecutive days – volume of 20mls is sufficient. MSU not suitable. Only one sample per day will be processed.  
Blood/Bone marrow: Please contact the Microbiology lab. Special bottles must be used.  
Body fluid/Aspirates/Pus: Collect aseptically as much as possible into a sterile container.  
CSF: Ideally 5-10mls in a sterile container.  
Skin/Tissue biopsy/Post mortem specimens: Collect, if possible, a caseous portion, into a sterile container, **without** preservative. As large a specimen as possible should be sent.  
Swabs: Microscopy is generally not performed on swabs unless the swab holds a copious amount of pus or material. Ideally, place material in a sterile container rather than a swab.  
Comment: Requests for AFB are initially screened microscopically and, if negative, reported without further processing. AFB culture is only performed on the following:  
    ZN stain positive specimens  
    All bronchial washings  
    Pleural fluids requested for AFB  
    Requests stating “specific need for TB culture” or “AFB culture”  
    Requests stating ?TB, Mantoux positive, consolidation or shadowing of lung.  
    Other specimens by prior arrangement with Consultant Microbiologist  
Turnaround: Microscopy: Routine 24-72hrs, Urgent: 3hrs (should reach the lab before 3pm)  
Culture: Up to 8 weeks (sent to CUH)  
Susceptibility: Up to 16 weeks  
Report: Microscopy Negative: No AFB seen  
Microscopy Positive: AFB positive, with enumerator + or ++ etc.  
Culture Negative: Culture for Mycobacterium Negative  
Culture Positive: Mycobacterium (species named), with appropriate susceptibility

### Mycology

Laboratory: Microbiology  
Specimen: Clean lesions with surgical spirit prior to collection. Collect specimens into a sterile container without fixative or a Mycological transport pack. Loose slides should not be used.  
    Scalp: Scrape with a blunt scalpel and include hair stubs, plugged follicles and skin scales. Hairs should be plucked and not cut.  
    Nail: clippings should be taken from any discoloured, dystrophic or brittle parts of the nail. Cut as far back as possible and scrapings can also be taken from beneath the nail, to supplement nail clippings.  
    Skin: Scrape with a blunt scalpel blade or the edge of a microscope slide, scraping outwards from the edges of the lesion. The use of clear sticky tape(sellotape) is not recommended. However, if taken, the sellotape strips are pressed against the lesion, peeled off and placed sticky side down onto a glass microscope slide.  
Comment: Sent to Cork University Hospital

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Turnaround: Direct smear: up to 48hrs from receipt at CUH  
Culture: 1-3 weeks

Report: Direct smear: Fungal elements seen or not seen.  
Culture: No Fungus isolated or "Named species" isolated.

#### **Mycoplasma pneumoniae IgM Antibodies**

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle )  
Comment: Test performed Mon – Fri 8am-5pm or by urgent request on children.  
Turnaround: 24- 48 hours  
Report: Mycoplasma pneumoniae IgM antibodies Positive or Negative.

#### **Neisseria gonorrhoeae and Chlamydia trachomatis PCR**

see Chlamydia trachomatis and Neisseria gonorrhoeae PCR

#### **Neisseria meningitidis PCR**

Laboratory: Microbiology  
Specimen: Blood 4 mls EDTA bottle  
Comment: Test performed by Meningococcal Reference Laboratory, Temple St Hospital  
Turnaround: All positive reports are phoned with the group available in 2-3days. Negative report: 1 week.  
Report: Positive or Negative (with group).

#### **Norovirus RNA**

Laboratory: Microbiology  
Specimen: Faeces  
Comment: Processed by arrangement only. Any requests received without prior approval are stored at -20<sup>0</sup>C for 2 weeks and reported as: 'Please contact the Consultant Microbiologist if testing is necessary'.  
Turnaround: Same day  
Result: Norovirus RNA detected or not detected

#### **Nose Swab**

Laboratory: Microbiology  
Specimen: Sample anterior nares gently rotating the swab on the surface. Transport specimens to the Laboratory as soon as possible. If processing is delayed, refrigeration is preferable to storage at ambient temperature.  
Comment: Aerobic culture - To detect nasal carriage of bacteria, especially *Staphylococcus aureus* during an outbreak of staphylococcal infection. Test performed routinely Mon–Thurs 8am-5pm  
Turnaround: Prelim: 24 hours; Final: 48 - 72 hours.  
Report: Presence of *Staphylococcus aureus* reflects carrier state.

#### **Organ Donor Screen**

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted (white bottle)  
Comment: Please specify Organ Donor on request form as the National Virus Reference Laboratory is the only approved laboratory for organ donor screening.  
A screen for a potential organ donor consists of Hepatitis B virus, Hepatitis C virus, HIV antibodies, CMV total antibodies, *Toxoplasma gondii* total antibodies, HTLV and syphilis antibodies.  
Turnaround: 1 -2 weeks  
Report: A written /printed copy of results is required in the ward before harvesting of organs can begin.

#### **Parvovirus / B 19 IgM Antibodies**

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle)  
Comment: Test performed by National Virus Reference Laboratory  
Turnaround: 2 weeks  
Ref. Range: Positive or Negative

#### **Parasitology (Ova, cysts and parasites)**

Laboratory: Microbiology  
Specimen: Collect faeces in a sterile leak-proof container. Do not refrigerate. 3 specimens spaced 2-3 days apart are recommended for best recovery of parasites. No more than one specimen per 24hrs should be examined and will be rejected if received. If *Entamoeba histolytica* or *Giardia lamblia* are suspected and the first 3 specimens are negative, ideally, 3 additional specimens should be submitted at weekly intervals.

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Comment: **Due to the very low yield in this country, specimens will only be processed on requests which state a history of foreign travel**  
All other specimens will be rejected, unless prior approval has been sought from the Consultant Microbiologist.  
Please state if specific organisms are suspected e.g. cyclospora or microsporidia.  
Transport specimens ASAP as certain parasites will not survive if specimen dries out.

Turnaround: **Routine: 3-4 days depending on staff availability**  
Urgent: 3hrs

Report: **No Ova, cysts or parasites or**  
“Named species” seen.

#### Parasitology serology

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle)  
Comment: Test performed by Dept of Clinical Parasitology, University College London Hospitals. There are many different parasites that can be tested serologically including Amoeba, Echinococcus, Filaria, Schistoma (Bilharzia), Trichenella, Trypanosoma cruzi. **Must specify parasite to be tested.**

Turnaround: 2-3 weeks  
Ref.Range: Positive or Negative

#### Penile Swab

Refer to “Genital swab”

#### Pericardial Fluid / Peritoneal Fluid / Pleural Fluid

See “Sterile Body Fluid – Microscopy and Culture”.

#### Pernasal Swab /Pertussis

See “Bordetella species – Culture”.

#### Pinworm

See “Enterobius vermicularis”.

#### Polio Antibodies - Serum

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle)  
Comment: Test performed by Polio Reference Laboratory, Colindale, London  
Turnaround: 3 weeks  
Ref.Range: Quantitative report with an interpretative comment.

#### Pregnancy Test (Urinary $\beta$ -HCG)

Laboratory: Microbiology  
Specimen: Fresh urine specimen, preferably early morning urine (EMU)  
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. Other clinical symptoms should be taken into consideration when a HCG is positive.

Turnaround: Routine specimens 24 hrs, Urgent 1hr  
Ref.Range: HCG Positive or Negative

#### Q Fever

See “*Coxiella burnetii* IgM Antibodies”

#### Quantiferon TB

Laboratory: Microbiology  
Specimen: Blood taken into 3 specific tubes, to be ordered in advance from Microbiology.  
Comment: Fill tubes to black line, being careful not to overfill, and send with a Microbiology request form and a Biomnis request form. Sample must be received in the lab ideally ASAP and not more than 16hrs after taking the sample.

Turnaround: 2 weeks  
Ref.Range: Positive, Negative or Indeterminate, with interpretive comment

#### Respiratory Syncytial Virus – Antigen Detection

Laboratory: Microbiology  
Specimen: Nasopharyngeal aspirate in sterile container. Effort should be made to collect a liquid specimen. Sputum samples and swabs are not suitable. If not tested immediately, specimens should be stored at 2 to 8°C for up to 24 hours.

Comment: Test available Mon-Fri.  
Turnaround: Same day

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Ref. Range: Positive or Negative. Positive results phoned to ward.

#### Rotavirus / Adenovirus Assay

Laboratory: Microbiology  
Specimen: Fresh faeces sample. 1-2g is sufficient.  
Comment: Immunochromatographic test using anti-Adenovirus monoclonal and anti-Rotavirus polyclonal reagents. Test performed Mon–Fri 8am-5pm. Any stool sample on children <4 yrs and all stools from childrens wards sent for routine investigation or where specifically requested.  
Turnaround: 24 – 48 hours. Positive reports are telephoned when available to the requesting area.  
Ref. Range: Positive or negative for Rotavirus and Adenovirus

#### Rubella IgG Antibody

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle)  
Comment: Test available Monday-Friday. 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: 1 week  
Ref. Range: Rubella IgG levels of 10 IU/mL or greater are considered immune.  
Rubella IgG levels less than 10 IU/mL are considered non-immune.

#### Rubella IgM Antibody

Laboratory: Microbiology  
Specimen: Blood 4mL of clotted blood (white bottle)  
Comment: Test sent to the National Virus Reference Laboratory. Patient history required.  
Turnaround: 1 week.  
Ref. Range: Rubella IgM Negative or Positive.

#### Schistosoma haematobium

Laboratory: Microbiology  
Specimen: Collection of a midday urine specimen is recommended (between 10.00h and 14.00h is the period of maximum activity). Alternatively, a collection of a 24h collection of terminal samples may be obtained (last-voided portion). Sterile containers without boric acid must be used. In patients with haematuria, eggs may be found trapped in the blood and mucus in the terminal portion of the urine specimen. Transport specimens ASAP. If processing is delayed refrigeration is preferable to storage at room temperature. Delays of over 48h are undesirable.  
Comment: Test performed Mon–Fri 8am-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: Ova of *Schistosoma haematobium* not present? or Ova of *Schistosoma haematobium* present?

#### Sputum Culture

Laboratory: Microbiology  
Specimen: Sputum from the lower respiratory tract expectorated by deep coughing. Check that specimen is of adequate quality as samples 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 sterile universal. Sputum may be refrigerated for up to 2 – 3h 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: NB. Only one sputa per patient per day is cultured and multiple samples will be rejected unless by prior arrangement. 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 sputum collection for TB culture. TB culture only processed when specifically requested.  
As sputa are cultured Mon-Fri only, please avoid taking specimens at weekends, unless unavoidable and then, only by prior arrangement with the laboratory. Sputa which have been placed in the fridge after 17.00 on Friday may be rejected on Monday morning as being unsuitable for culture due to excessive length of storage.  
Turnaround: Prelim: 24 hours; Final: 48 - 72 hours.  
Report: Culture report: Any clinically significant isolate with the appropriate sensitivities.

#### Sterile Body Fluid - Microscopy and Culture

Laboratory: Microbiology

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**Specimen:** Specialist collection according to local protocols. Ideally, a minimum volume of 1mL should be collected into a sterile universal. 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 samples must be interpreted with caution bearing in mind the difficulties in isolating anaerobes from these samples. Transport specimens ASAP. If processing is delayed, refrigeration is preferable to storage at ambient temperature.

**Comment:** Test performed routinely Mon–Fri 8am–5pm or by urgent request.

**Turnaround:** Microscopy if requested: 2 hours. Culture: Prelim: 24 hours; Final: 48 - 72 hours. Urgent report telephoned when available.

**Report Format:** If requested a white Cell Count, differential (if appropriate) and Gram Stain will be reported. Culture will be reported on all fluids and all isolates are reported with appropriate sensitivities. Total white cell counts are not performed on specimens containing a clot, which would invalidate the cell count.

#### Synovial Fluid

See “Sterile Body Fluid – Microscopy and Culture”

#### Syphilis Screen

**Laboratory:** Microbiology

**Specimen:** Blood 4mL of clotted blood (white bottle)

**Comment:** Test sent to Cork University Hospital where a screening test for total (combined IgG and IgM) antibodies is done. Positive sera are further tested by RPR (rapid plasma reagin) and TPPA (*Treponema pallidum* particle agglutination). Initial positives are sent to a reference laboratory for confirmation.

**Turnaround:** Negative: 3-4 days. Confirmed Positive: 2 weeks.

**Ref. Range:** Positive sera by the EIA method are considered provisionally positive, subject to confirmation.

#### Throat Swab

**Laboratory:** Microbiology

**Specimen:** Swab the tonsillar area and/or posterior pharynx avoiding the tongue and uvula. Transport specimens ASAP if processing is delayed, refrigeration is preferable to storage at ambient temperature. If diphtheria or gonorrhoea or pertussis is suspected special testing should be requested (per-nasal swab for pertussis). Specimens for viral isolation should be submitted in appropriate viral swabs.

**Comment:** Test performed routinely Mon–Fri 8am–5pm or by urgent request.

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

**Report:**  $\beta$ -haemolytic streptococci and other bacteria with sensitivity if appropriate.

#### TORCH

See “Intra-Uterine Infection Screen”

#### Toxocara Antibodies

**Laboratory:** Microbiology

**Specimen:** Blood 4mL of clotted blood (white bottle)

**Comment:** Test performed by Department of Clinical Parasitology, University College London Hospitals. A special request form must be filled in and is available from Microbiology.

**Turnaround:** 2 weeks

**Ref. Range:** Quantitative report with an interpretative comment.

#### Toxoplasma gondii (anti-Toxoplasma gondii total Ig) Antibodies

**Laboratory:** Microbiology

**Specimen:** Blood 4mL of clotted blood (white bottle)

**Comment:** Test sent to National Virus Reference Laboratory

**Turnaround:** 1 week

**Ref. Range:** EIA for Toxoplasma gondii total antibodies Positive indicates exposure to Toxoplasma i.e. either present infection or a past infection with immunity now.

#### Toxoplasma gondii (anti-toxoplasma IgM) Antibodies

**Laboratory:** Microbiology

**Specimen:** Blood 4mL of clotted blood (white bottle)

**Comment:** Test sent to CUH

**Turnaround:** 1 week

**Ref. Range:** EIA for Toxoplasma IgM Positive - should be interpreted with caution as positive IgM antibodies can be detected for up to 2 years after the acute infection.

#### Trichomonas vaginalis

**Laboratory:** Microbiology



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Specimen: For *Trichomonas*, the HVS sample should be taken from the posterior fornix. The swab should then be placed in transport media and transported ASAP. Delays of over 48h are undesirable.

Comment: Microscopic examination. Test performed routinely Mon–Fri 8am–5pm.

Turnaround: 24 hours.

Report: *Trichomonas* none seen or +, ++, +++

#### Tuberculosis Testing

Refer to Mycobacteria Testing (TB/AFB)

#### Ulcer Swab

See Wound Swab

#### Urethral swab

Refer to “Genital swab”

#### Urine Microscopy and Culture

Specimen: Minimum of 1ml urine collected into a sterile container.

Specimen types:

- Mid-stream urine(MSU): recommended for routine use. Clean genitalia, discard first part of voided urine, and, without interrupting the flow, collect approx 10mls into a sterile container.
- Bag urine: commonly used for infants. The sterile bag is taped over the genitalia and the collected urine transferred to a sterile container. Frequent problems of contamination with this method of collection.
- Clean catch urine(CCU): Thorough periurethral cleaning is recommended. The whole specimen is collected into a sterile container and an aliquot sent for examination.
- Suprapubic aspirate(SPA): Use of this invasive procedure is usually reserved for clarification of equivocal results from voided urine e.g. in infants.
- Catheter urine (CSU): May be collected from suprapubic or per urethral. The specimen should not be obtained from the collection bag.
- Ileal conduit-urostomy: Urine is collected via a catheter passed aseptically into the stomal opening after removal of the external appliance. Results may be difficult to interpret. Should only be performed if there is an indication for treatment such as pyrexia or constitutional upset.
- Cystoscopy: Urine is obtained directly from bladder using a cystoscope.

It is important that the type of specimen is clearly indicated to guide interpretation of results.

Comment: It is important, for accurate results to be obtained, that there is minimal delay before culture. If processing is to be delayed for more than 6hrs, refrigerate for up to 48hrs.

- Urine for casts – please indicate if casts are suspected as further processing is necessary. A fresh specimen is essential for casts.
- Urine for AFB – see Mycobacteria
- Urine for *Scistosoma haematobium* – see *Scistosoma haematobium*

Turnaround: Microscopy: Routine – 24hrs, Urgent – 2hrs  
Culture: Negative – 24hrs  
Positive – Preliminary 24hrs, Final 24-72hrs

Report: Microscopy: Quantity of WBC and RBC per cmm, as well as presence of bacteria, yeasts, *Trichomonas vaginalis* and casts, if present.  
Culture: Bacterial growth in orgs/ml, with antibiotic susceptibilities and comment if appropriate.

#### Urinary schistosomiasis

See “*Schistosoma haematobium*”

#### Vancomycin

Laboratory: Microbiology

Specimen: 2ml clotted blood (white bottle)  
Once-daily dosage taken at least 18hrs post dose  
Multiple-daily dosage taken immediately before(Trough) and 1hr post dose(Peak) – usually peak not necessary.

Comment: N.B. Fill out antibiotic request form fully, indicating time of specimen, dose given and time of last dose. Pre specimens are most useful guide for monitoring antibiotic therapy. Please refer to MUH Antibiotic guidelines.  
Test available Monday to Friday between the hours of 8am and 9pm inclusive and at weekends including bank holidays between 9am and 6pm. Please ensure these times are taken into consideration when prescribing these antibiotics.

Turnaround: 4 hrs

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Ref. Range:           Once-daily dosage:           Trough 10-20mg/L  
                          Multiple-daily dosage:       Trough 10-20mg/L           Peak 20-40/L

#### Vancomycin Resistant Enterococci (VRE)

Laboratory:           Microbiology  
Specimen:            VRE may be isolated from any specimen, but a common site cultured for colonisation is a rectal swab, sent in transport medium.  
Comment:            Test performed Monday – Friday 8am-5pm.  
                          **VRE are NOT a recognised cause of diarrhoea** and should not be requested on stool specimens. If colonisation is suspected, please send a rectal swab and state 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:         48 - 72 hours.  
Report Format:       “VRE not detected”, “Vancomycin-Resistant *Enterococcus faecium* detected” or “Vancomycin-Resistant *Enterococcus faecalis* detected”

#### Varicella-Zoster Virus IgG Antibody

Laboratory:           Microbiology  
Specimen:            Blood 4mL of clotted blood (white bottle) or CSF sample.  
Comment:            Test performed by the National Virus Reference Laboratory. A STAT test (VZV scan) is also available for urgent samples in Microbiology Laboratory, CUH. Prior arrangement with the laboratory is required.  
Turnaround:         Routine: 48 hours. Urgent: within 3-4 hours of receipt by CUH  
Report:               VZV IgG Antibodies Positive or Negative. VZV IgG Antibody positive indicates previous exposure, and immunity to chicken pox.

#### Viral Screen

Laboratory:           Microbiology  
Specimen:            Blood 4mL of clotted blood (white bottle)

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Comment:

Viral screen is a very broad term and difficult for laboratory staff to interpret. Do not send requests for viral screen. **Always specify virus to be tested.**

The following table is a guide to identifying possible causative viruses/agents:

<b>Provisional Diagnosis/Symptoms</b>	<b>Possible Virus/Agent</b>
Respiratory infection	<i>Mycoplasma pneumoniae</i> <i>Chlamydia pneumoniae</i> <i>Coxiella burnetti</i> (Q fever) Adenovirus <i>Legionella pneumophila</i> Influenza A/B Respiratory Syncytial virus (RSV)
Arthralgia	Rubella Parvovirus B19 <i>Mycoplasma pneumoniae</i> <i>Borrelia burgdorferi</i> (Lyme)
Exanthem	Measles Rubella Parvovirus B19
Central Nervous system infection	Measles Mumps Herpes simplex Varicella Zoster Virus (VZV) Cytomegalovirus (CMV) Enterovirus (Coxsackie, Echo)
Hepatitis	Hepatitis A IgM Hepatitis B surface antigen Hepatitis C antibody Epstein Barr virus (EBV) Cytomegalovirus (CMV)
Intra-uterine infection/ TORCH screen	Toxoplasmosis Rubella Cytomegalovirus (CMV) Parvovirus B19 IgM
Organ Donor	Syphilis CMV Toxoplasmosis (total) Hepatitis B surface antigen and core antibodies Hepatitis C HIV
Antenatal	Rubella IgG Hepatitis B surface antigen Syphilis VZV
Pericarditis/Myocarditis	<i>Coxiella burnetti</i> (Q fever) Chlamydia group <i>Mycoplasma pneumoniae</i> Coxsackie B virus
Lymphadenopathy and Granular fever	Epstein Barr virus (EBV) CMV Toxoplasma IgM

Turnaround:

2-3 weeks

Report:

IgM antibody positive indicates recent infection with the relevant virus.

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### Viral Culture

Laboratory: Microbiology  
Specimen: Special Virology swabs (available from Microbiology laboratory)  
Comment: Test performed by National Virus Reference Laboratory. Please state which virus or viruses required  
Turnaround: 1 week  
Report: Specific virus detected

### Viral Haemorrhagic fevers

Laboratory: Microbiology  
Specimen: EDTA Whole Blood (2-5 mls)  
Comment: Test performed by National Virus Reference Laboratory  
Specimen must arrive to the NVRL in Dublin within 12 hours of venepuncture  
N.B. Microbiology to be notified in advance so that transport can be organized.  
Turnaround: By arrangement  
Report: Detected or not detected

### Whooping Cough

See "*Bordetella* species – Culture".

### Wound Swab (skin/abscess/decubitus ulcer/bite/burn etc.)

Specimen: Specimens of pus, if present, placed in a sterile universal container, are preferable to swabs.  
Swabs should be soaked in exudates where possible. Sample the deepest part of the wound, avoiding superficial microflora.  
Always use swabs with transport medium.  
Large volumes of purulent material maintain the viability of anaerobes for longer.  
The recovery of anaerobes is compromised by delays in transport. Results of delayed samples (>3hrs) must be interpreted with caution, bearing in mind the difficulty in isolating anaerobes from these samples.  
Processing of superficial swabs of ulcers should be discouraged.

Comment: Always state site and type of wound on the request form as appropriate culture can only be performed with this information. Unspecified swabs will be rejected.

Turnaround: Urgent microscopy: 2hrs  
Culture: Preliminary 24hrs, Final 24-72hrs

Report: Microscopy: Report on the numbers of WBC/cmm and the presence of organisms.  
Culture: "No Growth" or "Normal Flora" or a report of any clinically significant organism isolated with appropriate susceptibility.






Specimen: Specimens of pus, if present, placed in a sterile universal container, are preferable to swabs.  
Swabs should be soaked in exudates where possible. Sample the deepest part of the wound, avoiding superficial microflora.  
Always use swabs with transport medium.  
Large volumes of purulent material maintain the viability of anaerobes for longer.  
The recovery of anaerobes is compromised by delays in transport. Results of delayed samples (>3hrs) must be interpreted with caution, bearing in mind the difficulty in isolating anaerobes from these samples.  
Processing of superficial swabs of ulcers should be discouraged.

### Yersinia Antibodies

Test discontinued by Reference laboratory

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## Blood Tube Guide MUH Pathology Department

CAP COLOUR	APPLICATION
 White (No Anticoagulant)	<ul style="list-style-type: none"> <li>✓ Microbiology *</li> <li>✓ Methotrexate Levels</li> </ul>
 Brown (No Anticoagulant)	<ul style="list-style-type: none"> <li>✓ Clinical Chemistry inc. Immunology</li> <li>✓ Microbiology* (Preferable to white)</li> </ul>
 Orange (Lithium Heparin)	<ul style="list-style-type: none"> <li>✓ Troponin</li> <li>✓ Amino Acids</li> <li>✓ Homocysteine</li> </ul>
 Red/Pink (EDTA)	<ul style="list-style-type: none"> <li>✓ F.B.C</li> <li>✓ ESR <b>please record time taken (2.7ml)</b></li> <li>✓ Blood Transfusion</li> <li>✓ HIV Viral Load</li> <li>✓ Meningococcal PCR</li> <li>✓ BNP</li> <li>✓ Ammonia</li> <li>✓ PTH</li> <li>✓ TPMT</li> </ul>
 Yellow (Fluoride)	<ul style="list-style-type: none"> <li>✓ Glucose</li> </ul>
 Green (Trisodium Citrate 1:9)	<ul style="list-style-type: none"> <li>✓ Coagulation - <b>please record time taken; fill to line, under filled will be rejected</b></li> </ul>

\*Exceptions: certain PCR tests & viral loads require EDTA. Contact Microbiology Dept.

Note: See Laboratory User Manual for full details.

**Where multiple blood samples are to be drawn, the samples should be taken in the following sequence:**

1 <sup>st</sup>	Blood Cultures
2 <sup>nd</sup>	Clotted
3 <sup>rd</sup>	Citrate
4 <sup>th</sup>	Lithium Heparin
5 <sup>th</sup>	EDTA
6 <sup>th</sup>	Flouride

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Mercy University Hospital  
A High Sensitivity Troponin Algorithm to be used as a **guideline** for  
patients with suspected Non-STEMI- Acute Coronary Syndrome

