Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

MIDLAND REGIONAL HOSPITAL TULLAMORE

PATHOLOGY DEPARTMENT USER MANUAL

Department of Pathology
HSE Dublin Mid-Leinster
Midland Regional Hospital
Tullamore
Co Offaly

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Disclaimer

The information provided in this user manual is correct at the time of writing and is a broad guideline to the use of the most common laboratory requests. Medical and scientific staff in each speciality are available to discuss any aspect of the service in more detail.

Feedback

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Updates of User Manual

The Pathology Department User Manual will be reviewed on a yearly basis and only the current version is valid for use. The latest electronic version is available on the HSE website Pathology Department homepage which can be found by logging on to:
Link:https://www.hse.ie/eng/about/who/acute-hospitals-division/hospital-groups/dublin-midlands-hospital-group/our-hospitals/mrht and then selecting Pathology Department User Manual

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Changes since last revision:	
Section	**Details of change**
General Information Section	**Page 2:** • Updated Quality Manager details (Michelle Dunne). **Section1** • Added the Mortuary Department. **Section 3.1:** • Updated Hours of Operation to reflect current arrangements **Section 3.2:** • Replaced Ms Rose McNerney with Mr Ultan Smith as A/Chief Medical Scientist, Microbiology. • Replaced Ms Orlaith McDonnell with Ms Michelle Dunne as A/Laboratory Quality Manager. • Added Ms Hannora Martyn, Point of Care Testing to "Other Staff". • Added Mortuary Senior Pathology Technician Mr Emmet Lennon to "Other staff" **Section 3.3:** • Updated to reflect current Out of Hours/On-Call arrangements • Lab test available on-call: Calcium and Albumin replaced with Bone Profile. List updated to include NTproBNP for ED and Uric acid for oncology patients. • Line deleted (strikethrough) ESR (only with relevant clinical details ~~and signature of requesting doctor)~~ • Added "(only if clinical indicated)" to Infectious Mononucleosis Screen • Added "Fibrinogen" • Added "and therefore the TAT of film review cannot be guaranteed. Additional Malaria request form (T/HAE/LP/017-04) must be sent to the lab with these requests" to line "Malaria- experienced staff may need to be called in to screen blood films" **Section 11.1** • Point of Care services amended to the following: "The Laboratory supports some Point of Care (POC) instruments in the hospital e.g. Blood Gas analysers (ICU, ED, ED19 and CCU) and glucometers on wards".
Biochemistry section	**Section 2.0:** • Biochemistry Test List: Lactate removed from Biochemistry test list Removed * from NTproBNP Added * to Troponin-T. Added Corrected Calcium • Biochemistry Profiles: Corrected calcium added to Bone profile

	Section 3.0: • Updated hours of operation. **Section 4.3**: • Added Corrected. Calcium • Removed Lactate • NTproBNP updated **Section 5:** • Availability of GP samples, tumour markers and HbA1c changed from 9.00-20.00 (Mon-Fri) to 9.00-17.00 (Mon-Fri)
Blood Bank Section	**Section 3:** • Updated hours of operation **Section 4.2:** • Added lines "Small 1.3ml paediatric bottles will only be accepted when labelled using the BloodTrack PDA label" and "Handwritten 1.3ml paediatric bottles *will not be accepted* as there is insufficient space on the sample bottles for the details required". **Section 5.1:** • Updated image of Blood Transfusion request form. • Added line "The only form of labelling on the Blood Transfusion Request Form that will be accepted is HANDWRITTEN or ADDRESSOGRAPH LABEL. The BloodTrack PDA label must only be used on the request form as a Digital Signature for confirmation of positive patient identification at the bedside when sampling – this should only be placed on the signature lines on the form. No other forms of labelling on the request form will be accepted". **Section 5.6:** • Added "PDA label or other sample labels used as identifiers on the request form in place of addressograph label or handwritten details" to list. **Section 6.5** • Added line under Additional Tests/Additional Component Orders Form "The above request form is document controlled and subject to change".
External Tests	**No changes required.**
Haematology section	**Section 2.1:** • Updated test index to include "automated reticulocyte count", Manual WBC Differential, and added "*Additional 'Malaria Request Form' T/HAE/LP/017-04 must be completed and sent to the haematology lab with* ***all Malaria screen requests"*** to Malaria Rapid Diagnostic Test/Blood Smear for parasites. **Section 3.0:** • Updated hours of operation. • Added Ms. Marie Dooley as Senior Medical Scientist **Section 4.1** • Added line "An additional 'Malaria Request Form' T/HAE/LP/017-04 must be completed and sent to the haematology lab with all Malaria screen requests".

	Section 4.2 • Added line "An additional 'Malaria Request Form' T/HAE/LP/017-04 must be completed and sent to the haematology lab with all Malaria screen requests". • Clarified line **"**Non-urgent samples arriving after routine hours may be analysed on the next routine working day". **Section 4.3:** • Updated routine hours. • Updated Table 1, ESR Reporting time, Reticulocyte count special conditions, Malaria reporting time. • Updated Table 2 – removed line (strikethrough) "Sample **must** be filled to the correct level. ~~**Clinical details must accompany test request.**~~ **Max delivery time from Phlebotomy<8hrs".** • Table 3 updated; - Points added to Notes - Priority/Critical columns merged into one - TAT updated for IM Screen GP and routine - TAT updated for Malaria films routine and priority/critical - TAT updated for ESR GP and Routine
Histology Section	• Information relating to Post Mortem/Autopsy services moved to the new Mortuary Service Section
Microbiology section	**Section 3.0:** • Updated hours of operation. • Replaced Ms Rose McNerney with Mr Ultan Smith as A/Chief Medical Scientist, Microbiology. • Removed Mr Ultan Smith as Senior Medical Scientist.
Mortuary Service	• New Mortuary Service Section added detailing the contact points and service information
Test Index	**Test Index Table Modifications** • Updated index to reflect current test catalogue

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1. INTRODUCTION

The Pathology Department at the Midland Regional Hospital, Tullamore (MRHT) is comprised of the following key disciplines: Biochemistry, Blood Bank, Haematology, Histopathology and Microbiology. The Mortuary Department is located adjacent to the Laboratory on the ground floor of the hospital.

The Pathology Department is committed to providing a service of the highest quality and shall be aware of and take into consideration the needs and requirements of its users. The purpose of this User Manual is to act as a reference guide for all users of the Pathology Service at MRHT. This User Manual has been prepared to enhance communication with users and to assist them in their dealings with the Pathology Department.

The Pathology Department agrees to comply with Data Protection and General Data Protection Regulation (GDPR) laws 1988 – 2018 with regard to processing personal data. All staff who receive patient personal information are bound by confidentiality and data protection requirements.

The Pathology Department is committed to providing the best possible service, and would appreciate any comments or suggestions, which would improve our service to you.

Aidan Fallon
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2. QUALITY MANAGEMENT SYSTEM AND QUALITY POLICY OF THE PATHOLOGY DEPARTMENT

The Pathology Department, MRHT, is committed to providing a high quality, efficient and comprehensive service to its users. The Pathology Department participates in external quality accreditation schemes, such as ISO 15189 which is monitored by the Irish National Accreditation Board [INAB]. MRHT Laboratory is an accredited testing lab: Registration No 221MT. INAB monitors total quality performance and also checks for compliance with the EU Blood directive 2002/98/EC. The quality of results is of fundamental importance and the Pathology Department operates to strict scientific and management standards. Results are authorised within a framework of comprehensive internal and external quality control and assurance. The Pathology Department Quality Policy is included below and may also be viewed wall mounted in the department.

The Pathology Department at MRHT comprising of Microbiology, Haematology, Histology, Blood Transfusion and Biochemistry disciplines, is committed to providing a service of the highest quality and shall be aware and take into consideration the needs and requirements of the users.

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

- Operate a quality management system to integrate the organisation, processes and resources of the Department.
- Set quality objectives and plans to implement this quality policy.
- Ensure that all personnel are familiar with this quality policy to ensure user satisfaction.
- Commit to the health, safety and welfare of its entire staff.
- Ensure visitors to the department will be treated with respect and due consideration will be given to their safety while on site.
- Uphold professional values and be committed to good professional practice and conduct.
- Commit to comply with relevant environmental legislation.
- Commit to comply with Data Protection and General Data Protection Regulation (GDPR) laws 1988 – 2018.

The Pathology Department will comply with the Irish National Accreditation Board Regulations, International standard ISO 15189, current version and Minimum Requirements for Blood Bank Compliance with Article 14 (Traceability) and Article 15 (Notification of Serious Adverse Reactions and Events) of EU Directive 2002/98/EC (AML-BB) where applicable, and 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 and maintenance of equipment and other resources that are needed for the provision of the service.
- The collection, transport and handling of all specimens in such a way as to ensure the correct performance of laboratory examinations.
- The use of examination procedures 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 produce continual quality improvement.
- The safe testing, storage, distribution and transfusion of Blood and Blood Components/Products.
- The investigation and reporting of Serious Adverse Events and Serious Adverse Reactions to the National Haemovigilance Office.
- Provision of Clinical Advisory Services

3. HOURS OF OPERATION AND CONTACT DETAILS

3.1. Hours of Operation of Laboratory Services

3.1.1 Weekday Services (Monday – Friday)

Department	Routine hours
Blood Transfusion, Biochemistry, Haematology, & Microbiology	**Core Hours** 09:00-17:00hrs (Full Operational Service)
	Extended Working day 08:00 - 20:00hrs (Reduced Services outside of Core Hours)
Histology	08:00–18:00hrs
Specimen reception	08:30– 17:45hrs*

***Routine Workload Cut-off:**

- All GP and in-house/OPD routine samples must be received in specimen reception by 4pm.
- Routine samples arriving after the stated deadlines may not be processed until the next routine working day.

3.1.2 Out of Hours /Weekend Pathology Services

Monday-Friday

Service	Arrangements
Blood Transfusion, Biochemistry, Haematology, & Microbiology	Emergency On-Call Service provided from 20:00hrs until 08:00hrs* the following day. *Note: 09:00hrs if the following day is a weekend/public holiday

Saturdays, Sundays and Public Holidays

Service	Arrangements
Blood Transfusion, Biochemistry, Haematology, & Microbiology	09:00 – 14:00 hrs Sessional Service (Enhanced on -call service to facilitate essential hospital weekend services) Emergency On-Call Service provided from 14:00 until 08:00hrs* the following day. *Note: 09:00hrs if the following day is a weekend/public holiday

3.2. CONTACT DETAILS OF KEY MEMBERS OF PATHOLOGY

CONSULTANT STAFF		
Consultant Haematologist	Dr Gerard Crotty	057-93**58352** (Secretary) (Consultant Haematologist on call can be contacted through reception Ext. 3000) Gerard.crotty@hse.ie
Consultant Haematologist	Dr Kanthi Perera	057 93**59250** (Secretary) (Consultant Haematologist on call can be contacted through reception Ext. 3000) Meegahage.Perera@hse.ie
Consultant Histopathologist	Dr Charles d'Adhemar	057 93**59377** Charlesj.DAdhemar@hse.ie
Consultant Histopathologist	Dr Margaret Lynch	057 93**58383** Margaret.Lynch@hse.ie
Consultant Histopathologist	Dr Nurul Nor	057 93**58279** Nurul.Nor1@hse.ie
Consultant Histopathologist	Dr Miriam Walsh	057 93**58278** Miriam.Walsh@hse.ie
Consultant Histopathologist	Dr Nazia Faheem	057 93**57763** Nazia.faheem@hse.ie
Consultant Microbiologist	Locum Consultant Microbiologist	Can be contacted through reception ((057) 932 1501 Internal Ext. 3000)
Consultant Chemical Pathologist	Dr Vivion Crowley	Contactable via the Biochemistry Laboratory at 057 93**58504**

(All Consultant Staff can be contacted directly through Hospital Reception 057 932 1501 or Internal *Ext. 3000)*

SCIENTIFIC STAFF		
Laboratory Manager	Mr Aidan Fallon	057 93**59400** aidan.fallon@hse.ie
Chief Medical Scientist Biochemistry	Ms Margaret Martin	057 93**57778** Margareta.martin@hse.ie
Chief Medical Scientist Blood Bank	Ms Bernie Weston	057 93**58384** Bernie.weston@hse.ie
Chief Medical Scientist Haematology	Ms Áine Ryan	057 93**58309** Aine.gorman@hse.ie
Chief Medical Scientist Histology	Ms Naomi Cronin	057 93**58389** Naomi.cronin@hse.ie
A/Chief Medical Scientist Microbiology	Mr Ultan Smith	057 93**58390** ultanf.smith@hse.ie

OTHER STAFF		
Haemovigilance Officer	Ms Denise Murphy	057 93**58350** denisej.murphy@hse.ie
Medical Scientist with Responsibility for IT	Mr Andrew Byrne	057 93**58312** andrew.byrne@hse.ie
A/Laboratory Quality Manager	Ms Michelle Dunne	057 93**57752** Orlaith.mcdonnell@hse.ie
Microbiology Surveillance Scientist	Ms Breda Duffy Ms Michelle Maher	057 93**57774** breda.duffy@hse.ie michelle.maher@hse.ie
Point of Care Testing	Ms Hannora Martyn	057 93**57794** hannora.martyn@hse.ie
Mortuary Senior Pathology Technician	Mr Emmet Lennon	057 93**58461** emmet.lennon@hse.ie

GENERAL ENQUIRIES: LABORATORY SECTION	
Blood Transfusion	057 93**58385**
Biochemistry	057 93**58504**
Haematology	057 93**58351**
Histopathology	057 93**58338**
Microbiology	057 93**58371**
Pathology Office	057 93**58342** Histology Secretary 057 93**58379** Laboratory accounts 057 93**59396** Demographics
Specimen Reception and External Test Enquires	057 93**58354**

3.3. OUT OF HOURS/ON-CALL SERVICE

3.3.1 Contact Numbers

Service	On call disciplines	Contact
Blood Transfusion, Biochemistry, Haematology, & Microbiology	Medical Scientist cover for **Blood Transfusion** and **Haematology**	Can be contacted through reception (057) 932 1501 Internal Ext. 3000) or Lab On Call Mobile 086 0482356.
	Medical Scientist cover for **Microbiology** and **Biochemistry**	Can be contacted through reception (057) 932 1501 Internal Ext. 3000) or Lab On Call Mobile • 9-2pm Biochemistry 0867742465 • 9-2pm Microbiology 0867777347 • After 2pm on 0867742465

Laboratory Consultant Outside of Hours Emergency Contact	Haematology, Histopathology, Microbiology	Consultant on Call Can be contacted through reception (057) 932 1501 Internal Ext. 3000) or Lab On Call Staff
Mortuary	Out of Hours Mortuary Services	Can be contacted via Nursing Administration through reception (057) 932 1501 Ext 58489/8490

3.3.2 On- Call Service Provision

The Pathology Department's On-Call service is for genuine medical emergencies only, where the results are likely to influence immediate management of the patient.

- Call out after 12 midnight should be curtailed as much as possible.
- On-Call Medical Scientists should be contacted by the requesting clinician when an urgent on call test request is required.
- Non urgent tests will be deferred until the next routine day.

An enhanced on-call service is provided at weekends and public holidays up until 2pm.

Note: this is not a routine service. This service is provided to facilitate essential hospital services at the weekend. A reduced test catalogue is in operation and turnaround times will not be the same as for routine Monday-Friday services.

The request form accompanying the emergency sample must be fully completed as per **Section 7** "Pathology Policy on Request Form Completion and Specimen Labelling". **Please ensure that the green on call Biochemistry and pink Haematology request forms are completed individually for on call Biochemistry and Haematology tests. The regular Microbiology specimen request form is also used for on call test requests.**

Written reports issued during emergency service hours are returned to the location stated on the request form on the next routine day.
Results are available on the Ward Inquiry System where applicable.

3.3.3 On-Call Test Catalogue*

On-Call test Catalogue (Laboratory Tests Routinely Available On-Call)	
Biochemistry	Glucose U/E and Creatinine Cardiac Enzymes / CKMB HsTroponin-T NTproBNP (ED) CRP Amylase Bone profile LFTs Uric Acid (Oncology patients) CSF glucose and protein

	Alcohol / Paracetemol / Salicylate Vancomycin / Gentamicin Urine 'drugs of abuse screen' for ED All other Biochemistry tests will be deferred until the next routine working day.
Haematology/ Coagulation	FBC ESR (only with relevant clinical details) Infectious Mononucleosis Screen (only if clinically indicated Coagulation Screen (PT/APTT) D-Dimers Fibrinogen Malaria- experienced staff may need to be called in to screen blood films and therefore the TAT of film review cannot be guaranteed. Additional Malaria request form (T/HAE/LP/017-04) must be sent to the lab with these requests Sickle Cell Screen – Contact Laboratory to notify them when sample is sent
Blood Transfusion	Blood Group and Antibody Screen / Crossmatch / Urgent blood components as required
Microbiology	CSF Blood Cultures Urines from ED and Children's Ward (with relevant clinical details) Pregnancy tests Urgent swabs, fluids, tissues (Contact on call MS to confirm)

For requests for tests not listed above – the requesting doctor must contact the Laboratory regarding tests outside the on call test catalogue

The relevant Laboratory Consultant may be contacted to authorise processing of non-standard requests

***The On-Call test catalogue is subject to change and denotes the profile of tests available at this point in time**

3.4. LOCATION AND ACCESS TO THE PATHOLOGY DEPARTMENT

The Laboratory is situated at the end of the new hospital main concourse, between the Pharmacy Department and the Mortuary. Access to the Pathology Laboratory is restricted to hospital personnel at all times.

- Specimens being delivered by non-hospital staff can be placed in the designated fridge for pathology samples situated near Hospital Reception or dropped directly into the Laboratory Specimen Reception area.
- Out of hours access to the Pathology Department is restricted to Hospital Portering staff and other authorised staff for delivery of urgent specimens, *etc*. Staff trained to collect blood products can access the Blood Issue Room using their swipe card.
- Additional access can be arranged via the hospital switch or the on-call medical scientist.

3.5. SPECIMEN DELIVERY FROM WITHIN THE HOSPITAL

- During routine Pathology opening times, samples are collected from designated collection points throughout the hospital by the laboratory attendant. Scheduled times for collection are detailed at each collection point. Collection at each point is signed off when it occurs.
- Samples are also delivered to the laboratory by hospital porters.
- Histology samples are delivered directly to the Histology Laboratory.
- Samples are sent to the Pathology Department via the Pneumatic chute system. Only red carriers are to be used to send specimens to the Pathology Department. Only permitted samples may be sent via the chute. See tables below for a list of specimens/products that cannot be delivered via the chute system and also the relevant laboratory pneumatic chute station numbers for routine and on call hours.

3.5.1 List of Samples/Products that must not be delivered via the Chute

Sample Type	Comment
Albumin for infusion	
Bone marrow biopsies	Bottles available in the Histology Laboratory. Hand deliver.
Coagulation products	
CSF samples	Hand deliver; phone laboratory in advance
Cytology samples	
Factor assays	Hand deliver to Specimen Reception
Specialist coagulation tests	Thrombophillia screen, Factor assays, VWF
Glass bone marrow blood culture bottles for TB	Bottles available from Specimen Reception. Hand deliver
Histology samples	
Schilling test samples	
Thrombophilia Screens	Hand deliver to Specimen Reception
Blood Components for transfusion	i.e. Red Cell Concentrate and Platelets
Blood Products or Factor Concentrates	i.e. SD Plasma, Prothrombin Complex Concentrate(Octoplex), Fibrinogen
24Hr Urine Containers	
Items >1 kg in weight	

3.5.2 Delivery of specimens via the Pneumatic Chute during Hours: 08:00 – 17:45 Monday–Friday

Specimen type	Send to Laboratory Station
Samples for Biochemistry, Haematology, Coagulation and External tests	**Specimen Reception** - **8354**
Blood group / cross-match samples	**Blood Transfusion - 8385**
All Microbiology samples should be sent directly to the Microbiology Laboratory.	**Microbiology - 8371**

3.5.3 Delivery of specimens via the Pneumatic Chute Out of Hours: 17.45 – 08:00 Monday–Friday, and all day Saturday, Sunday and Public Holidays.

Specimen type	Send to Laboratory Station
Biochemistry	**Biochemistry - 8504**
Blood group / Cross-match samples Haematology / Coagulation samples	**Haematology - 8351**
All Microbiology samples should be sent directly to the Microbiology Laboratory	**Microbiology - 8371**

3.6. SPECIMEN DELIVERY FROM OUTSIDE THE HOSPITAL

- Samples are delivered by GPs, couriers and taxi directly to the laboratory specimen reception area.
- Samples may be delivered by patients or GPs to a designated fridge for pathology samples situated near Hospital Reception or directly to the laboratory specimen reception area.
- Samples are delivered by taxi from Kilbeggan, Tyrellspass, Edenderry, Rhode, Daingean, Birr, Banagher and Kilcormac.
- There is a taxi service for specimen delivery from Portlaoise and Mullingar laboratories daily.
- Additional access can be arranged via the hospital switch or the on call medical scientist

4. DEFINITIONS

Emergency On-Call Service: On-Call Service provided for emergency specimens.
ED: Emergency Department.
External Laboratory: An external laboratory is a laboratory which performs tests on specimens not processed in the laboratory at MRHT.
LIS: Laboratory Information System.
MRHT: Midland Regional Hospital @ Tullamore.
OPD: Out Patients' Department.
Referral Laboratory: A referral laboratory is an external laboratory to which a specimen is submitted for a supplementary or confirmatory examination procedure and report.
Turnaround Time (TAT): Time of arrival of specimen in the laboratory to the time of authorisation of results. This refers to specimens processed in the laboratory at MRHT only. It does not refer to specimens sent to external laboratories for analysis.
Urgent: Specimens labelled **'Urgent'** will be prioritised in the laboratory process.

5. HEALTH AND SAFETY

All biological specimens should be considered as potentially hazardous and handled accordingly.

General Safety Guidelines

❖ Always use approved sample collection containers and ensure lids are securely closed.

❖ Observe Standard Health and Safety Precautions when taking patient samples.

❖ Always dispose of sharps appropriately and according to the MRHT waste disposal policy given in the Infection Control Guidelines which are located in Microbiology.

❖ Samples (except 24h urines) must be placed in approved biohazard bags with request form placed separately in the sleeve provided or in specibags with the form attached. DO NOT PLACE SAMPLE AND FORM TOGETHER IN SAME BAG.

❖ Always supply clinical information including known infection risk with each request.

❖ Any spills must be dealt with in accordance with MRHT spill procedure as given in the hospital Infection Control Guidelines which are located in all clinical areas.

6. SPECIMEN COLLECTION AND TRANSPORTATION

6.1 Patient Preparation for Laboratory Tests

PATIENT PREPARATION FOR LABORATORY TESTS

For most routine laboratory tests; no special patient preparation is required. Where given, special instructions should be strictly adhered to, to avoid misinterpretation of test results. Refer to individual test information for details.

6.1.1 Fasting Samples: When fasting samples are required, the patient must abstain from all food or drink (except water) for 12 hours (unless otherwise stated e.g. 8 hours for fasting glucose -refer to individual test information for details).

6.1.2 24 Hour Urine Samples

Refer to individual test information for details regarding required preservative or special instructions.

It is very important that all urine passed in an exact 24 hour period is collected. Loss of any urine or a collection made for either more or less than 24 hours will invalidate the tests and might lead to an incorrect diagnosis.

Urine should not be passed directly into the 24-hour container, but into a suitable clean detergent-free jug and then poured into the 24-hour container.

If the container contains acid (used as a preservative) or has a warning label, then care needs to be exercised when adding urine from the collection vessel. Hydrochloric acid causes burns and is irritating to eyes, skin and respiratory system. If it comes in contact with skin, the affected area should be washed immediately with plenty of water and medical advice should be sought. Containers should be kept out of reach of children. Acid preservative is not to be taken internally.

The laboratory provides an information leaflet when containers are provided. This should be read carefully.

Ensure that the request form and sample container are labelled as instructed in section 7.

Instructions for sample collection

• Empty your bladder at 7am on rising (or at a more convenient time) and **discard** the sample. The collection is started after this sample has been passed. Write the start time on the specimen container label.
• Collect all urine in the container provided on **every** occasion that it is passed during the following 24 hours and store refrigerated if possible (except for uric acid – room temperature storage required).
• Empty the bladder at 7am on rising the next morning (or at the more convenient time chosen) and add this sample to the collection.
• Write the finish time on the container label.
• Bring the container to the laboratory on the day of completion.

Incomplete collections

• If a sample is forgotten or lost down the toilet, then all the urine collected to this point should be thrown away and the collection re-started the following morning.
• If the incomplete sample is an acid collection, the original container should be returned to the laboratory and a new one requested.

CONTAINERS:

24 hr urine containers are available for collection from the laboratory during routine hours (refer to section 3.1).

6.1.3 Urine for Chlamydia and Neisseria gonorrhoea PCR

- Specimen collection and handling instructions should be carried out **as per collection kit**.
- **Patient forename, surname and DOB** are essential for processing. Please note the specimen container label has a designated area for patient name and ID only; however patient DOB is essential and should **also** be wrote on the container.
- Fill urine container to between the two lines of the 'Fill Area' as indicated on side of container.
- Wipe any remaining urine from container with tissue.
- Wash you hands thoroughly with soap and water.
- Label the specimen with **patient forename, surname and DOB**.
- Please state the time taken on the request form.
- Check that the request form details the full name and date of birth of the person providing the sample and add the date and time of the sample collection.
- The sample should be brought promptly to the laboratory for analysis.
- A report will be sent to the requesting doctor, usually within 2-3 working days.

6.1.4 Urine for Pregnancy test

- Early morning urine is recommended for pregnancy test.
- Use a sterile universal container to catch mid stream urine.

- There is no need to fill the container. Screw the lid firmly back on the container.
- Wipe any remaining urine from container with tissue.
- Wash your hands thoroughly with soap and water.
- Label the specimen with **patient forename, surname and DOB**.
- Please state the time taken on the request form.
- Check that the request form details the full name and date of birth of the patient providing the sample and add the date and time of the sample collection. Ensure to add the test requested.
- The sample should be brought promptly to the laboratory for analysis.
- A report will be sent to the requesting doctor, usually within 2-3 working days.

6.1.5 Urine for Urine Microscopy/Culture/Sensitivity

- Use a sterile universal container to catch mid stream urine
- There is no need to fill the container. Screw the lid firmly back on the container.
- Wipe any remaining urine from container with tissue.
- Wash your hands thoroughly with soap and water.
- Label the specimen with **patient forename, surname and DOB**.
- Please state the time taken on the request form.
- Check that the request form details the full name and date of birth of the patient providing the sample and add the date and time of the sample collection. Ensure to add the test requested.
- The sample should be brought promptly to the laboratory for analysis.
- A report will be sent to the requesting doctor, usually within 2-3 working days

6.1.6 Urine for Urine Legionella/Streptococcus pneumoniae Antigen Test

- Reserved for ICU patients only. Clinician must contact the Consultant Microbiologist if they require urine Streptococcus pneumonia/Legionella antigen testing on non-ICU patients.
- Use a sterile universal container to catch mid stream urine
- There is no need to fill the container. Screw the lid firmly back on the container.
- Wipe any remaining urine from container with tissue.
- Wash your hands thoroughly with soap and water.
- Label the specimen with **patient forename, surname and DOB**.
- Please state the time taken on the request form.
- Check that the request form details the full name and date of birth of the person providing the sample and add the date and time of the sample collection.
- The sample should be brought promptly to the laboratory for analysis.
- A report will be sent to the requesting doctor, usually within 2-3 working days.

6.1.7 STOOL SPECIMEN COLLECTIONS

General Patient Instructions for Stool collection:

- Label the specimen with **patient forename, surname and DOB**.
- Place plenty of toilet paper in the toilet bowl.

- Make sure there is no trace of disinfectant or bleach present, as this will interfere with the test.
- Faeces (a bowel movement) should then be passed onto the toilet paper.
- Open the specimen container. Place a sample of the faeces in the specimen container. There is no need to fill the container. Screw the lid firmly back on the container.
- DO NOT ALLOW URINE OR TOILET WATER INTO THE CONTAINER.
- **Note:** If you have severe diarrhoea or a watery stool, a potty may be needed to collect the initial sample.
- Place the container in the plastic bag attached to the form and seal the bag.
- Flush away the remaining paper and faeces.
- Wash hands thoroughly with soap and water.
- Check that the request form details the full name and date of birth of the person providing the sample and add the date and time of the sample collection.
- The sample should be brought promptly to the laboratory for analysis.
- A report will be sent to the requesting doctor, usually within 3 working days.
- **Note:** Avoid consuming the following as these products can interfere with Test Results**:**
    - Antacids
    - Anti diarrheal Medications
    - Oily Laxatives
    - Barium or Bismuth

6.1.8 Stool for Occult Blood

Diet and drugs may affect results of occult blood testing. Please talk to your physician before making any changes in diet or medications prescribed for you. One stool specimen should be collected into a clean container and should not be contaminated with urine or water.

6.1.9 SPUTUM FOR CULTURE AND ACID FAST MYCOBACTERIUM (AFB)

- Patient should rinse mouth and gargle with water immediately prior to collection
- Collect specimen from deep cough into a sterile container. Patient should avoid any contamination with saliva.
- Label the specimen with **patient forename, surname and DOB.**
- Check that the request form details the full name and date of birth of the person providing the sample and add the date and time of the sample collection. Ensure to add the test requested.
- Return specimen as soon as possible (preferably within half an hour of collection). If there is a delay, specimen should be refrigerated. Please label the specimen container with patient's name, date and time

6.2 Specimen Collection

It is the responsibility of the doctor, nurse or phlebotomist taking the sample to:

- ❖ Ensure that all appropriate sterile equipment is within date and all packaging is intact.
- ❖ Explain the procedure and rationale to the patient, answering any questions, thus ensuring an informed verbal consent is obtained.

- Check the patient identification.
- Ensure the patient is fasting, if required.
- Take the sample(s) into the appropriate specimen container(s) for the tests required and ensure blood tubes are used according to the recommended draw order.
- **Label the specimen container(s) correctly.**
- **Ensure the request form is properly completed. Ensure to add the test requested.**
- Dispose of all needles into a sharps bin when finished sampling.
- Dispose of all contaminated materials into a biohazard bin.

Please follow these guidelines

- Transport specimens at room temperature unless otherwise stated.
- Use approved sample collection containers.
- Use approved sample collection biohazard bags which can contain any spills or leaks within the bag.
- Use the Pneumatic Chute System if in-house and appropriate to sample type.
- Do not try to carry multiple specimens by hand.
- Do not leave samples in other locations en route to the laboratory.
- Do not transport broken or leaking samples from their source- report to relevant supervisor.
- If required follow appropriate spill procedures as given in the MRHT Infection Control Guidelines.

During the process of transporting patient samples to the laboratory it is essential that samples are transported safely and efficiently in order to:

- Ensure safe custody and integrity of the sample which must reach the laboratory in proper condition and in a timely manner.
- Ensure the safety of staff transporting samples.
- Ensure the safety of other staff, patients and members of the public.

Please Note: THE PNEUMATIC CHUTE SYSTEM - IF APPROPRIATE TO THE SAMPLE TYPE- IS THE PREFERRED METHOD OF DELIVERY OF SAMPLES TO THE LABORATORY (Restrict non-urgent Microbiology specimens to ward collections)

Please refer to specific instructions in the relevant laboratory sections of this user manual for transport of samples which require special conditions or handling. If in any doubt please contact the relevant laboratory discipline by telephone.

6.3 Packaging of diagnostic specimens from GP surgeries

It is the responsibility of all persons sending samples to the laboratory to adhere to national and international regulations ensuring that specimens sent to the laboratory do not present a risk to anyone coming in contact with them during transportation or on receipt in the laboratory. Carriage of goods by road must comply with the European Agreement Concerning the International Carriage of Dangerous Goods by Road regulations, current version.

Instructions:

1. The packaging must be of good quality, strong enough to withstand the shocks and loadings normally encountered during carriage.
2. The packaging must consist of at least three components:

a. A leakproof primary receptacle e.g. blood collection tube, MSU container;
b. A secondary sealable package to enclose and protect the primary container(s), e.g. plastic specimen bag.
c. Outer package: the secondary package is placed in an outer transport container with suitable cushioning that protects it and its contents from external influences such as physical damage and water while in transit.

3. Samples should be transported to the Laboratory as soon as possible after collection. **Samples should not be stored in ward areas or in GP practices overnight or over the weekend.** Samples that are not transported in a timely manner to the laboratory may be rejected if there is any doubt about the sample integrity

6.4 Guidance on the Storage and Transport of Specimens to the Laboratory for Patients delivering specimens themselves.

Specimen Storage Conditions
In the event where patient specimens cannot be delivered to the laboratory on the same day, they should be packaged securely by the GP/Practice Nurse and patients should **refrigerate them** as soon as possible and overnight if necessary in a domestic fridge (temperature between 2-8°Celcius).

Transport of Patient Specimens
All specimens should be brought to the Hospital as soon as possible and placed in the secure fridge at the main Hospital Reception. Specimens **must not** be placed in direct sunlight or beside radiators or windows while being transported to the laboratory.
It is the responsibility of the GP/Practice Nurse to inform patients of the storage and transport conditions of samples in the event of patients delivering samples to the laboratory themselves. Adhering to these storage and transport conditions will ensure sample integrity is preserved.

6.5 Key Factors that may affect test performance or interpretation of results

The following key factors are essential to ensure correct test performance or interpretation of results when taking samples and filling in request forms:

- Patient details must be correct on the request form and specimen
- Relevant clinical details must be on the request form
- Correct identification of the patient
- Samples must be taken in the appropriate manner, order of draw and correct volumes
- Samples must be placed in appropriate containers/blood tubes
- Samples must be appropriately labelled (see Blood Transfusion for specific labelling requirements)
- Samples must not be poured from one blood tube into another (e.g. anticoagulant, cross-contamination)
- Coagulation samples must not be contaminated with heparin from extraneous sources such as flushing a line
- Samples must not be taken from an arm with a running I.V.

- Clotted plasma/FBC/coagulation samples or samples containing fibrin strands will affect results
- High lipid levels in the plasma of samples will adversely affect Haematological investigations and some Biochemistry analytes
- Samples will be adversely affected by delay in receipt to the laboratory (date and time of sample collection should be indicated on the sample/form)
- Samples will be adversely affected by heat/cold degradation

7. PATHOLOGY POLICY ON REQUEST FORM COMPLETION AND SPECIMEN LABELLING

This Policy applies to specimens being submitted for analysis across all laboratory disciplines at the MRHT. The purpose of this Policy is to ensure

- Uniformity of requirements across the various Laboratory Disciplines in line with INAB and ISO15189 Standards.
- Information on both the laboratory specimen request form and the corresponding clinical specimen is sufficient to unambiguously link the two together to ensure the correct results/products are issued for the correct patient.
- The Laboratory receives adequate information on the specimen request form to permit correct analysis and interpretation of results.
- The Laboratory records accurate and complete patient and specimen identification for each request received.

Pathology specimen request forms and specimen containers are provided by the Pathology Department at the MRHT to meet minimum Health & Safety requirements for labelling and transport of biological specimens.

7.1. SELECTING THE REQUEST FORM

It is important that the correct form is supplied for a particular test request. Details of the correct request form and the type and volume of sample required for a particular assay are given in the relevant laboratory sections in this manual.

The Blood Transfusion Request Form is used to request:

a. Group and Antibody Screen i.e. Group & Hold
b. Cross-match number units of RCC.
c. Issue of Plasma, Platelets, Coagulation Factors and other laboratory based blood products.
d. Direct Antiglobulin Test (DAT)/Direct Coombs Test (DCT).

The General Biochemistry/Haematology Request Form is used to request the following tests during routine hours:

a. Haematology and Coagulation tests: FBC, PT, *etc.* An additional 'Malaria Request Form' T/HAE/LP/017-04 must be completed and sent to the haematology lab with **all Malaria screen requests**.
b. Biochemistry tests: all general biochemistry tests, tumour markers, HbA1c, and urine biochemistry tests.
c. External tests: all tests sent to external laboratories.

(Use the relevant pink Haematology Request Form or green Biochemistry Request Form during on call hours)

The Histopathology Request Form is used to accompany all specimens sent to the Histopathology Laboratory for analysis, including Cytology samples.

The Microbiology Request Form is used to accompany all specimens sent to the Microbiology Laboratory.

7.2. COMPLETING THE REQUEST FORM

The following outlines the procedure for completion of laboratory request forms with the exception of the form for Blood Transfusion which is dealt with in the Blood Transfusion section of this manual.

It is the responsibility of the Requester/Person taking the specimen to ensure the laboratory is provided with complete and accurate patient identification details on both the request form and specimen container.

All requests should be submitted by completing the relevant request form and inserting the labelled specimen into the attached plastic bag or a biohazard bag, where appropriate. (May not apply to some specimens *e.g.* 24 hr urines and specimens for Histology).

Computer generated labels should be used on the request forms for hospital patients or those attending ED or OPD – **one label required for each sheet on the request form.**

Hand-written forms for hospital patients will be accepted in an emergency. Hand-written forms will also be accepted from General Practitioners. All writing on the request form must be clearly legible (block capitals preferred) so that the information provided is legible, thus ensuring proper identification of the patient and all tests requests. Writing should be in ballpoint pen (not marker) to ensure the information is copied through to each sheet of the request form.

Information Required on the Request Form

a) **Patient Surname and First Name/s (unabbreviated).**
b) **Patient date of birth.**
c) **Patient's address.**
d) **Patient hospital ID (Chart Number)** for patient in hospital, if available.
e) **Ward/GP Location.**
f) **Requesting Doctor/GP Name.**
g) **Requesting Doctor bleep** where applicable.
h) **Patient Gender.** This information is required for the selection of appropriate reference values.
i) **Test request(s).**
j) **Date and time of specimen collection.**
k) **Name of person collecting the specimen.**
l) **Fasting status**, if relevant.
m) **Specimen type and anatomical site of origin**, where applicable.
n) **Clinical details/Medications/Recent antibiotic history/Recent foreign travel,** where applicable.

7.3. SPECIMEN LABELLING

The following outlines the procedure for labelling specimens for the Laboratory. Additional information required for labelling of Blood Transfusion and Microbiology specimens is dealt with in the Blood Transfusion and Microbiology sections of this manual.

Correct identification of the patient before collection of the sample is essential.

Specimens are to be labelled using legible handwriting (ballpoint pen) or using a small computer generated label or using the BloodTrack label. Blood Transfusion samples can only be accepted if they are legibly hand written or labelled with a BloodTrack label. Current Hospital Addressograph labels are not suitable for blood samples as they overlap the specimen container.

For instructions on the use of the BloodTrack system see T/HVBT/GL/001 "Guideline for Sample Labelling and Completion of the request Form for Blood Transfusion" (available on Q-Pulse). For training and access to the BloodTrack system, contact the Haemovigilance Officer Bleep 290 or Blood Bank, Ext. 58385

Information Required On the Specimen

a) **Patient surname and first name/s, (unabbreviated).**
b) **Patient date of birth.**
c) **Patient hospital ID (Chart Number)** for patient in hospital, if available.
d) **Date and time of specimen collection.**
e) **Name of person who took the specimen,** where applicable.
f) **Ward/GP Location.**
g) **Specimen type and anatomical site of origin** for Histopathology and Microbiology specimens, where applicable.

Note: it is mandatory to have a) and b) identical on both the sample and the request form for sample acceptance.

7.4. SPECIMEN REJECTION

The labelling requirements outlined above are both for the safety of the patients and for medico-legal protection of hospital staff.

Requests for laboratory investigations will be checked by laboratory staff for adequate patient identification on the form and specimen and suitability of samples for the tests requested. Specimens not meeting with the above labelling criteria, or where there is ambiguity between the request form and the specimen, will be rejected by Laboratory personnel.

Exclusions to the acceptance/rejection criteria exist for irretrievable primary samples and depending on the type of discrepancy, Laboratory personnel may contact the requesting doctor for clarification of the specimen.

Specimens that are not processed and rejected include:

- Non urgent specimens that do not have the full name and DOB on both specimen and request form.

- Unlabelled repeatable specimens.
- Leaking specimens that would pose a health and safety risk to staff.
- Expired bottles.
- Incorrect/insufficient/overfilled/clotted specimens unsuitable for analysis.

In the case of sample rejection, the reason for rejection will be recorded on the Laboratory Information System. The patient's report will state that the sample was rejected and notify clinical staff of the request for a new specimen. In the case of rejected samples, the doctor/phlebotomist/ward will be informed by telephone and a new specimen will be requested.

Note: For Blood Transfusion Specimen Rejection Criteria refer to the Blood Transfusion section of this manual for further details.

Disputes:
Where a dispute arises in relation to a sample, the final decision on suitability for testing will lie with the Chief Medical Scientist (Deputy) in the relevant Laboratory discipline.

7.5. REQUESTING ADDITIONAL TESTING

If on sending a specimen for testing, further additional tests are required, please contact the relevant laboratory discipline to check the feasibility of using the initial specimen for analysis as the age of the specimen may impact on the validity of test results. Laboratory staff will advise if the initial sample is still valid and will require the test request to be sent in written format on another patient request form or Additional Tests Form for Blood Transfusion.

8. FREQUENCY OF TESTING

- The frequencies stated in this handbook refer to normal working days.
- The frequencies do not take into account cases where testing of samples need to be repeated for scientific or quality control reasons.
- The days quoted are 'averages' and the Laboratory at MRHT will do its utmost to achieve them, circumstances permitting.

9. RESULT REPORTING

- Biochemistry, Haematology, Microbiology and Coagulation results are available on the Ward Enquiry screen (where applicable) and via Healthlink to participating GPs as soon as tests are authorised by scientific staff.
  Note: Contact the Medical Scientist with responsibility for IT for Ward Enquiry User access requests, Healthlink and general IT enquiries. Refer to 3.2 for contact detail information.
- Written reports are issued to the wards twice daily, Monday to Friday, via the laboratory attendant at 14:00 and via the pneumatic chute at 17:30.
- Reports are posted to GPs each evening.
- Histopathology reports are available in hardcopy only.

- Written reports issued during emergency service hours are returned to the location stated on the request form on the next routine day.
- Requests from other hospitals/consultants for copies of laboratory reports will be addressed to the original requesting Clinician. While the Laboratory will try to facilitate requests for copies of reports; the turnaround times of these cannot be guaranteed.

9.1. WARD ENQUIRY LOOKUP INSTRUCTIONS

Ward Enquiry is designed to enable staff on the wards throughout the hospital to have access to laboratory results as soon as they have been validated. Ward Enquiry is refreshed every 25 seconds and staff have access to the previous 9 months of results on a patient. The IT Senior Medical Scientist in the laboratory will provide a password for use of Ward Enquiry on completion of training. Each user must be familiar with the HSE Information Technology Acceptable Usage Policy.

9.1.1 Logging In

1. Double-click on the Ward Enquiry Icon as shown below.

Ward Enquiry Icon

1. Double-click on the Ward Enquiry Icon as shown below.
2. A Security Warning will appear, please select "Run".
3. This will activate the Lab Result Look-up screen. Click on the "Click to Log On Button".

4. Enter your username as follows: First Name followed by Surname.
5. Enter your 6-10 digit password. This gives access to the search screen.

9.1.2 Searching for a Patient

1. Search for a patient's results using chart number, name or date of birth using the Search screen.
2. Enter the patient's surname followed by the first name and click search.

OR

3. Enter the patient's date of birth as dd/mm/yy or ddmmyy and click search.

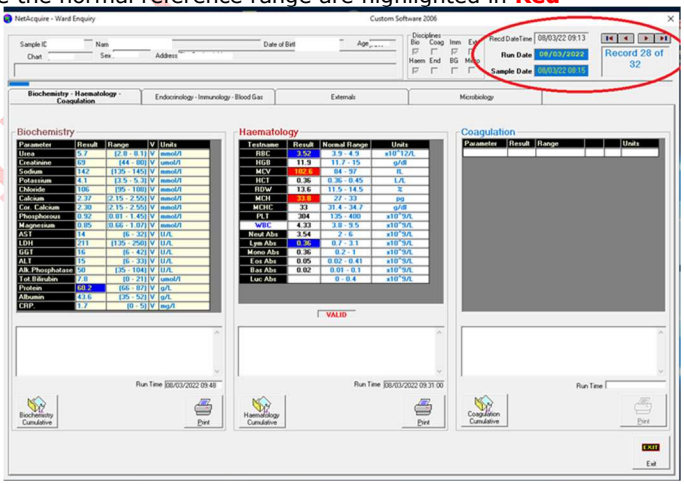
OR

4. Enter the patient's chart number and click search.
5. The above searches will present you with a list of patients to choose.
6. The patient with the most recent lab results is always displayed at the top of the list. Highlight the patient required and select OK to return the results.
7. If the patient required is not on the list, select 'None of the Above' to start again.
8. **If you cannot find patient results, check each of the search modes i.e. Name, DOB and Chart Number.**

9.1.3 Viewing Results

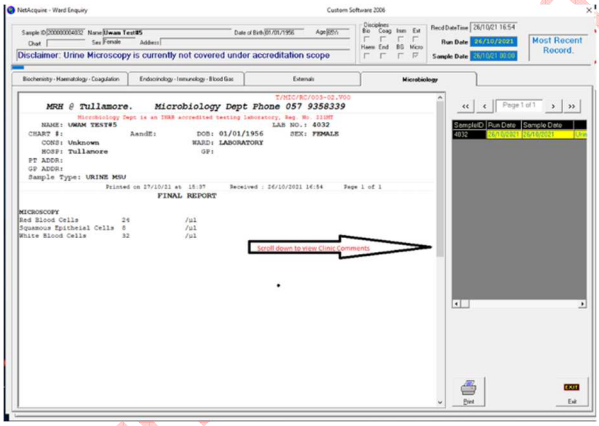
The View Result screen shown below displays the results for the selected patient.

1. Run Date, Sample Date and Record Number are highlighted in the top right-hand column.
2. The arrow keys on the right-hand side (beside the sample date) allow movement through the records in increments of one.
3. The top right-hand indicator check boxes inform you of the departments with results.
4. Clicking on the Tabs above the results moves between the departments.
5. The Print icon allows printing of the result displayed on the screen.
6. Cumulative Icon allows viewing of cumulative results. Cumulative results can be printed by clicking on the Print Icon.
7. Results below the normal reference range are highlighted in **Blue**. Results above the normal reference range are highlighted in **Red**



9.1.4 Viewing Microbiology Results

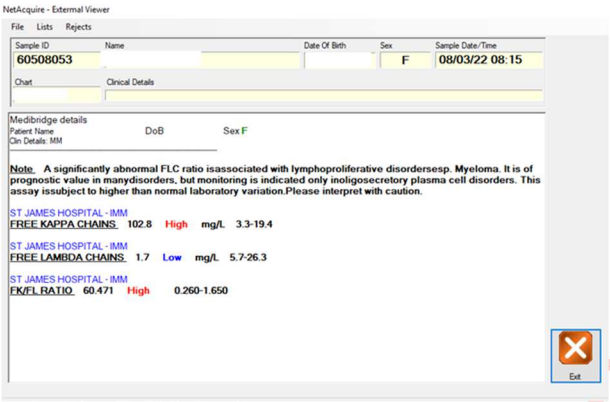
1. Search for patient results as per Section 9.1.3 above.
2. Highlight the patient required and select OK to return the results.
3. Click on the Microbiology tab. The most recent microbiology sample received and sample type for this patient are displayed in the right-hand column. If there are any previous samples on this patient, they will also be displayed.
4. Highlight the most recent sample date or if previous results are required, highlight the relevant sample date. Once the relevant sample date and the relevant sample type are highlighted, the results are displayed on the screen.
5. Check the patient details and then click on the Print icon on the bottom right of the screen to print the Microbiology results.
6. To return to the main results screen, click on the Biochemistry-Haematology-Coagulation tab.
7. To search for another patient, click on the exit icon on the bottom right of the screen.



9.1.5 Viewing External Results in Ward Enquiry

Some results from the National Virus Reference Laboratory and St. James' can be viewed via through the "External" Tab on Ward Enquiry.

1. Search for the patient as per Section 9.1.3 above.
2. Select the correct patient from the list of patients returned and click OK.
3. The Results Overview Screen opens, select the 'Externals Tab'.
4. If results are available from the NVRL or St. James' the 'Medibridge Results' button will be highlighted in yellow. You may need to scroll through previous lab encounters using the arrows on the top right-hand side of the screen to find the returned result.
5. Click 'Medibridge Results'.
6. A new window opens displaying the NVRL results.



Notes

- **Please do not transcribe the results to paper**. Medibridge is a viewing system **ONLY.**
- User passwords expire every 90 days. The system will prompt for a new 6-10 digit password to be entered.
- Remember your password and don't give it to others.
- If you believe your password is compromised, contact IT Senior Medical Scientist for a new one (Ext 58312).
- Only validated results are available for viewing.
- An audit of all look-ups is maintained by the system.

10. LABORATORY SUPPLIES

10.1. ORDERING OF LABORATORY SUPPLIES

The Laboratory Attendant processes all requests for sample containers and request forms.

10.1.1 Supplies for Wards/Departments in the Hospital

Wards and Departments of MRHT are supplied with laboratory supplies either via the Kan Ban system or directly from the Pathology Department.
Where the Kan Ban system is in place, supplies are topped up by a Supplies Officer from Central Stores on an ongoing basis.

Where supplies need to be collected from the Pathology Department,
the Ward/Department must fill in the "Laboratory Supplies Order Form" listing the items required and send it to the Pathology Department on Monday or Thursday. The Laboratory Attendant will complete the orders and have them ready for collection between 11.00 and 13.00 on Tuesday and Friday.

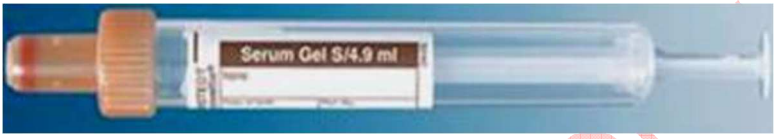
10.1.2 Supplies for GP's, Community Hospitals and Other Users

A minimum of 2 working days notice is required to fulfil an order.
GPs or community hospitals must fill in the "Laboratory Supplies Order Form" and fax it to the laboratory at 057 9358363 before Tuesday at 12:00. In exceptional circumstances, orders may be telephoned to 057 9358347.

Completed orders will be left for collection on Thursdays and Fridays during routine working hours in the designated area of the Pathology Department.
The Pathology Department requests that users of the service do not arrive with requests to be filled while they wait. Your co-operation will ensure a fast and efficient service.
Note: Please do not ask for supplies during on-call hours. Supplies are never available from on-call staff.

10.2. SPECIMEN TUBES FOR BLOOD COLLECTION

Acknowledgement: Mr Jim Chapman, Sarstedt Ireland Ltd, for his kind permission to reproduce the images of Sarstedt tubes and needles.



Serum Gel: Amber 4.9 ml **Product No: 04.1935.001**
Most routine tests for Biochemistry, Immunology, Endocrinology.

Flouride: Yellow 2.7 ml **Product No: 05.1073.001**
Glucose test. Please ensure that the bottle is filled to the correct mark and mixed well by gently inverting the sample 4-5 times.

EDTA: Pink 2.7 ml **Product No. 05.1167.001**
FBC (Full Blood Count)& ESR, HbA1c, PTH. Blood Transfusion Group Confirm and Paediatric sample. Separate bottle required for each. Please ensure that the bottle is filled to the correct mark and mixed well by gently inverting the sample 4-5 times.

EDTA as above but: Pink 7.5 ml **Product No: 01.1605.006**
Blood Transfusion tests only. Please ensure that the bottle is filled to the correct mark and mixed well by gently inverting the sample 4-5 times.

ThromboExact: Fuchsia Pink 3 ml **Product No: 05.1168.001**
Platelet count: For suspected or known cases of pseudothrombocytopenia (platelet clumping or platelet satellitism). This sample is only available upon request from the Haematology laboratory and should always be received with an EDTA 2.7ml sample. Please ensure that the bottle is filled to the correct mark and mixed well by gently inverting the sample 4-5 times.

Sodium Citrate: Green 3 ml **Product No: 05.1165.001**
Coagulation tests: Please ensure that the bottle is filled to the correct mark and mixed well by gently inverting the sample 4-5 times. Overfilled or under-filled bottles **cannot** be processed.

Lithium Heparin: Orange 2.7 ml **Product No: 05.1553.001**
Renal Dialysis Patients and some Oncology patients: Most routine tests for Biochemistry, Immunology, Endocrinology. Please ensure that the bottle is filled to the correct mark and mixed well by gently inverting the sample 4-5 times.

Lithium Heparin: Orange 7.5 ml **Product No: 01.1604.400**
Used for trace metal tests. Please ensure that the bottle is filled to the correct mark and mixed well by gently inverting the sample 4-5 times. Use with metal free needle (85.1162.400) only.

Paediatric: Serum tube 1.2 ml . **Product No: 06.1663.001**

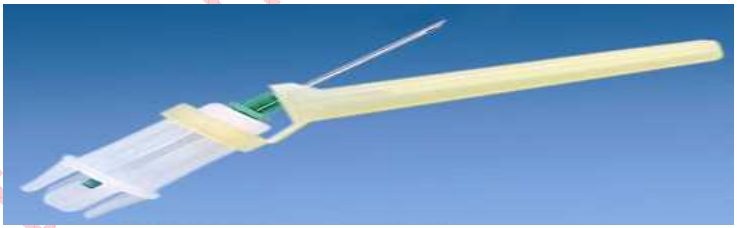
Most routine tests for Biochemistry, Immunology, Endocrinology.

EDTA: Pink 1.2ml **Product No: 06.1664.001**

Paediatric - FBC (Full Blood Count) & ESR. Please ensure that the bottle is filled to the correct mark and mixed well by gently inverting the sample 4-5 times.

Flouride: Yellow 1.2ml. **Product No: 06.1665.001**

Paediatric - Glucose test. Please ensure that the bottle is filled to the correct mark and mixed well by gently inverting the sample 4-5 times.



Safety Needle. **Product No: 85.1162.200**
Needle 21G x 1.5''

10.3. ORDER OF DRAW WHEN SAMPLING USING THE MONOVETTE SYSTEM

If the Monovette system is used as designed, cross-contamination should not occur, as the caps are not removed from the tubes. Due to the vacuum the tubes will also automatically fill with blood to the appropriate fill-line. The tubes are siliconised to reduce adhesion of clots to tube walls and cap, and to reduce risk of haemolysis. **The CLSI guidelines for order of sampling are as follows:**

Order	Tube	Colour
1.	Take blood cultures first (if required)	
2.	Citrate	Green*
3.	Serum (with gel)	Amber
4.	Heparin	Orange
5.	EDTA	Pink
6.	Fluoride-Oxalate	Yellow

***It is recommended to draw a discard tube first when a coagulation (green citrate) tube is the first tube needed.**

11. PATHOLOGY SERVICES AVAILABLE

11.1. Other Pathology services available

Service	Description
Advisory Services	• The Laboratory Consultants and Senior Scientific staff provide an extensive advisory service to all users of our service. • Pathology staff have representatives on a number of Hospital and Regional committees *e.g.* Hospital Transfusion Committee, Regional Transfusion Committee, Partnership Committee, National LIS committee. • Feedback is given to the nursing staff from the Transfusion committee by the Haemovigilance Officer at CNM meetings. • Feedback from all other meetings is given to Laboratory staff Quality/Management/Staff meetings.
Autopsies	Please inform Nursing Administration as soon as an autopsy (either consented or Coroners) is required.
Complaints	The Laboratory documents all grievances from Clinicians, Patients or other related parties and investigates these as formal complaints in accordance with the Pathology

	Department complaint procedure. In order to make a complaint please contact the appropriate Department, the Laboratory Manager or the Quality Manager (refer to 3.2 for contact details)
Haemovigilance Service	The Haemovigilance service in the MRHT is part of the Midland Regional Hospitals joint Haemovigilance service. This is a Consultant led service with a Haemovigilance Officer (HVO) based at each site. The National Haemovigilance scheme is dedicated to the achievement of a national standard practice and quality of care for all patients, before, during and following completion of transfusion. Further information can be obtained from the Haemovigilance Officer (Ext. 58350.)
Point of Care Support	The Laboratory supports some Point of Care (POC) instruments in the hospital e.g. Blood Gas analysers (ICU, ED, ED19 and CCU) and glucometers on wards.
Warfarin Clinic	An outpatient Warfarin clinic is available. This clinic operates on a daily basis (Mon-Fri) 08:30 to 10:45. Contact anticoagulation Clinical Nurse Specialists at 58601/58641.

11.2. Policy on protection of personal information

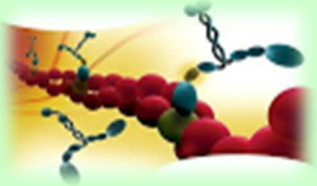
The Pathology Department is committed to complying with Data Protection and General Data Protection Regulation (GDPR) laws 1988 – 2018 and is committed to protecting the privacy of personal information of its service users and patients. In the course of their work, health service staff are required to collect and use certain types of information about people, including 'personal data' as defined by the Data Protection Acts.

The HSE has a responsibility to ensure that this personal data is;
- obtained fairly
- recorded correctly, kept accurate and up to date
- used and shared both appropriately and legally
- stored securely
- not disclosed to unauthorised third parties
- disposed of appropriately when no longer required

All staff working in the HSE are legally required under the Data Protection Acts to ensure the security and confidentiality of all personal data they collect and process on behalf of service users and employees.

Data Protection rights apply whether the personal data is held in electronic format or in a manual or paper based form. HSE policy and procedures with regards to Data Protection can be obtained on the HSE website.

BIOCHEMISTRY LABORATORY



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7. QUALITY ASSURANCE

1. INTRODUCTION

The Biochemistry Laboratory at Midland Regional Hospital, Tullamore provides a routine biochemistry service to the hospital and to general practitioners in the local area. In addition, a referral service for more specialised biochemistry tests is provided.

An on-call service is provided to the hospital only for processing of non-deferrable/urgent test requests.

2. BIOCHEMISTRY TEST INDEX

For details of tests accredited to the ISO: 15189 Standard, refer to the Irish National Accreditation Board (INAB) Website www.inab.ie. Tests currently accredited to this standard are listed on the Scope of Accreditation for Midland Regional Hospital Tullamore - Registration No. 221MT.
Tests that are not currently accredited but that are processed internally in the Biochemistry Laboratory will NOT be listed on this scope.

Tests marked with a single asterix* are only available as 'in-house' tests and some are restricted to particular consultants.

Whole Blood / Serum / Plasma:
ABG* (Arterial Blood Gas)
Acetaminophen* (Paracetamol)
AFP (Alpha-fetoprotein)
Albumin
Alcohol* (see Ethanol)
ALP (Alkaline Phosphatase)
ALT (Alanine aminotransferase)
Amylase
ASOT (Anti Streptolysin-O Titre)
AST (Aspartate aminotransferase)
Beta Crosslaps* (CTx)
Bicarbonate
Bilirubin - Total
Bilirubin – Direct (Conjugated Bilirubin)
CA 125
CA 15.3
CA 19.9
Calcium
Cardiac enzymes (CE)
CEA (Carcinoembryonic antigen)
Chloride
Cholesterol
Corrected Calcium
Creatine Kinase (CK)
Creatine Kinase MB isoenzyme (CKMB)
Creatinine
Creatinine - enzymatic
C-Reactive Protein (CRP)
CTx (see Beta Crosslaps)
eGFR

Electrolytes (Sodium, Potassium, Chloride)
Ethanol* (Ethyl Alcohol)
Gamma-GT (Gamma glutamyl transferase)
Gentamicin*
Glucose
HbA1c
HCG
HDL-Cholesterol (HDL)
Lactate dehydrogenase (LDH)
Lipid profile - random
Lipid profile - fasting
Liver function tests (LFTs)
LDL-Cholesterol (LDL)
Magnesium
NTproBNP* (N-terminal pro B-type natriuretic peptide)
Paracetamol* (see Acetaminophen)
Phosphorous
Potassium
Procollagen Type-1 N-terminal Propeptide* (P1NP)
Protein
PTH*
PSA
RF (Rheumatoid Factor)
Salicylate*
Sodium
Triglycerides
Troponin-T (Tn-T)*
Urea
Uric acid
Vancomycin*

Urine Test List:
ACR (Albumin:Creatinine Ratio)
Urinary Amylase
Urinary Calcium
Urinary Creatinine
Urinary Creatinine Clearance (see also serum eGFR)
Urinary Drugs of abuse*
Urinary Electrolytes
Urinary Magnesium
Urinary Microalbumin
Urinary Phosphorous
Urinary Protein
Urinary Urea
Urinary Uric Acid

CSF:
CSF glucose*
CSF Protein*

Fluids:

Tests are fluid dependant; contact Biochemistry laboratory for appropriate tests.

Profiles:

The following test profiles are available to requesting doctors.
A limited number of additional profiles (not listed) have been set up for individual consultants for specific investigations within their area of specialisation.

Profile name	Assays included in profile
Bone	Calcium, Corrected Calcium, Phosphorous, Alkaline Phosphatase, Albumin, Magnesium
Cardiac	AST, CK
Lipid	Cholesterol, Triglycerides, HDL, LDL
Liver	LDH, Gamma-GT, AST, ALT, ALP, Total Bilirubin, Albumin
Proteins	Total Protein, Albumin
Renal (U+E)	Urea, Creatinine and Electrolytes (Na, K, Cl)

3. HOURS OF OPERATION AND CONTACT DETAILS

Postal Address	Hours of Operation	Phone (internal EXT in bold)
Biochemistry Laboratory MRHT Tullamore Co. Offaly Ireland	**Weekday Core Hours** 09:00-17:00hrs (Full Operational Service) **Extended Working day** 08:00 - 20:00hrs (Reduced Services outside of Core Hours) **On-Call/Weekend/Public Holidays** For details relating to on-call and weekend arrangements refer to the General Information Section 3.1.2 Out of Hours /Weekend Pathology Services	**Routine hours** 057 93**58504** **On Call and Weekends via the Hospital switch** **Internal Ext 3000** **External (057) 932 1501**

***Weekday Service: Routine Workload Cut-off:**

- All GP and in-house routine samples must be received in specimen reception by 4pm.
- Routine samples arriving after the stated deadlines may not be processed until the next routine working day.

Biochemistry Personnel	Name	Contact Details
Chemical Pathologist	Dr Vivion Crowley	Contactable via the Biochemistry Laboratory
Chief Medical Scientist	Ms. Margaret Martin	057 93**57778** Margareta.martin@hse.ie
Senior Medical Scientist	Ms. Karena McRedmond	057 93**58504** Karena.mcredmond@hse.ie
Senior Medical Scientist	Ms. Joan Martyn	057 93**58504** Joan.martyn@hse.ie

4. PRE-TESTING INFORMATION

4.1 HANDLING AND TRANSPORT OF SAMPLES

All samples are to be taken into the correct sample containers and transported to the laboratory in the Biochemistry/Haematology Request form specibag during routine hours and in the Biochemistry On-call Request form specibag during on-call hours.

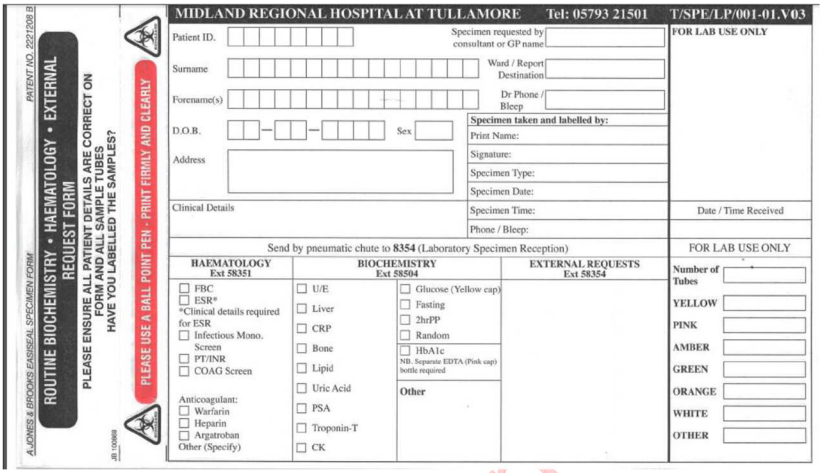
To protect the safety of all healthcare staff, the following precautions for the transportation of samples must be followed:

- The outside of the sample tube must not be contaminated with blood/body fluids.
- Blood or body fluid-stained laboratory request forms must not be submitted.
- Samples must be placed in the plastic bag that is attached to the request form.
- Samples can be transported to the laboratory at room temperature unless otherwise stated in the sample requirements section.

4.2 FORM AND SAMPLE LABELLING REQUIREMENTS

All parts of the General Biochemistry/Haematology Request form or Biochemistry On-call Request form are to be completed in full as per the labelling requirements stated in **Section 7** of the **General Information section** of this manual.

a) Biochemistry/Haematology Request Form (Front of form)



MIDLAND REGIONAL HOSPITAL AT TULLAMORE Tel: 05793 21501 T/SPE/LP/001-01.V03

ROUTINE BIOCHEMISTRY • HAEMATOLOGY • EXTERNAL REQUEST FORM

PLEASE ENSURE ALL PATIENT DETAILS ARE CORRECT ON FORM AND ALL SAMPLE TUBES HAVE YOU LABELLED THE SAMPLES?

PLEASE USE A BALL POINT PEN - PRINT FIRMLY AND CLEARLY

A.JONES & BROOM'S EASISEAL SPECIMEN FORM PATENT NO. 2221208 B

JB 100869

Patient ID.

Surname

Forename(s)

D.O.B. Sex

Address

Clinical Details

Specimen requested by consultant or GP name

Ward / Report Destination

Dr Phone / Bleep

Specimen taken and labelled by:

Print Name:

Signature:

Specimen Type:

Specimen Date:

Specimen Time:

Phone / Bleep:

FOR LAB USE ONLY

Date / Time Received

Send by pneumatic chute to 8354 (Laboratory Specimen Reception)

FOR LAB USE ONLY

HAEMATOLOGY Ext 58351

- ☐ FBC
- ☐ ESR*

*Clinical details required for ESR

- ☐ Infectious Mono. Screen
- ☐ PT/INR
- ☐ COAG Screen

Anticoagulant:

- ☐ Warfarin
- ☐ Heparin
- ☐ Argatroban

Other (Specify)

BIOCHEMISTRY Ext 58504

- ☐ U/E
- ☐ Liver
- ☐ CRP
- ☐ Bone
- ☐ Lipid
- ☐ Uric Acid
- ☐ PSA
- ☐ Troponin-T
- ☐ CK
- ☐ Glucose (Yellow cap)
- ☐ Fasting
- ☐ 2hrPP
- ☐ Random
- ☐ HbA1c

NB. Separate EDTA (Pink cap) bottle required

Other

EXTERNAL REQUESTS Ext 58354

Number of Tubes

YELLOW

PINK

AMBER

GREEN

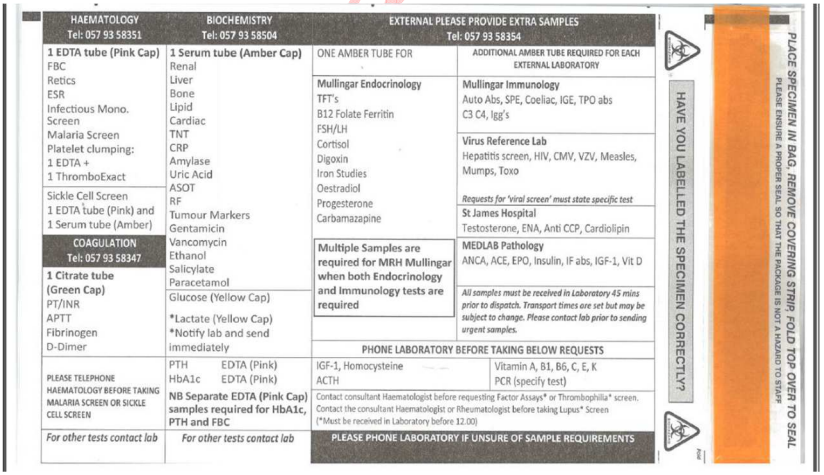
ORANGE

WHITE

OTHER

b) Biochemistry/Haematology Request Form (Back of form)

General test guidelines are given on the back of the General Biochemistry/ Haematology request form.



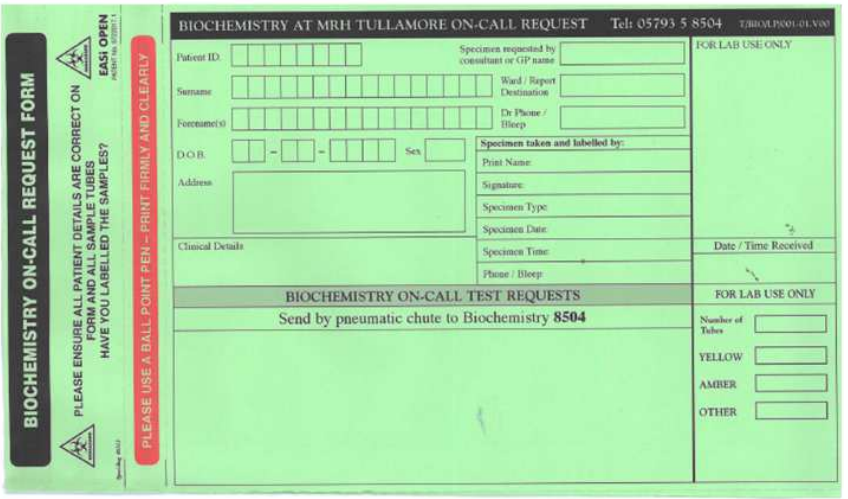
HAEMATOLOGY Tel: 057 93 58351	BIOCHEMISTRY Tel: 057 93 58504	EXTERNAL PLEASE PROVIDE EXTRA SAMPLES Tel: 057 93 58354	
1 EDTA tube (Pink Cap) FBC Retics ESR Infectious Mono. Screen Malaria Screen Platelet clumping: 1 EDTA + 1 ThromboExact	**1 Serum tube (Amber Cap)** Renal Liver Bone Lipid Cardiac TNT CRP Amylase Uric Acid ASOT RF Tumour Markers Gentamicin Vancomycin Ethanol Salicylate Paracetamol	ONE AMBER TUBE FOR	ADDITIONAL AMBER TUBE REQUIRED FOR EACH EXTERNAL LABORATORY
Sickle Cell Screen 1 EDTA tube (Pink) and 1 Serum tube (Amber)		**Mullingar Endocrinology** TFT's B12 Folate Ferritin FSH/LH Cortisol Digoxin Iron Studies Oestradiol Progesterone Carbamazapine	**Mullingar Immunology** Auto Abs, SPE, Coeliac, IGE, TPO abs C3 C4, Igg's **Virus Reference Lab** Hepatitis screen, HIV, CMV, VZV, Measles, Mumps, Toxo *Requests for 'viral screen' must state specific test* **St James Hospital** Testosterone, ENA, Anti CCP, Cardiolipin
COAGULATION Tel: 057 93 58347		**Multiple Samples are required for MRH Mullingar when both Endocrinology and Immunology tests are required**	**MEDLAB Pathology** ANCA, ACE, EPO, Insulin, IF abs, IGF-1, Vit D
1 Citrate tube (Green Cap) PT/INR APTT Fibrinogen D-Dimer	Glucose (Yellow Cap) *Lactate (Yellow Cap) *Notify lab and send immediately		*All samples must be received in Laboratory 45 mins prior to dispatch. Transport times are set but may be subject to change. Please contact lab prior to sending urgent samples.*
		PHONE LABORATORY BEFORE TAKING BELOW REQUESTS	
PLEASE TELEPHONE HAEMATOLOGY BEFORE TAKING MALARIA SCREEN OR SICKLE CELL SCREEN	PTH EDTA (Pink) HbA1c EDTA (Pink) **NB Separate EDTA (Pink Cap) samples required for HbA1c, PTH and FBC**	IGF-1, Homocysteine ACTH	Vitamin A, B1, B6, C, E, K PCR (specify test)
		Contact consultant Haematologist before requesting Factor Assays* or Thrombophilia* screen. Contact the consultant Haematologist or Rheumatologist before taking Lupus* Screen (*Must be received in Laboratory before 12.00)	
For other tests contact lab	*For other tests contact lab*	PLEASE PHONE LABORATORY IF UNSURE OF SAMPLE REQUIREMENTS	

HAVE YOU LABELLED THE SPECIMEN CORRECTLY?

PLACE SPECIMEN IN BAG. REMOVE COVERING STRIP. FOLD TOP OVER TO SEAL

PLEASE ENSURE A PROPER SEAL SO THAT THE PACKAGE IS NOT A HAZARD TO STAFF

c) Biochemistry On-Call Request Form (Green Form)


BIOCHEMISTRY ON-CALL REQUEST FORM

PLEASE ENSURE ALL PATIENT DETAILS ARE CORRECT ON FORM AND ALL SAMPLE TUBES HAVE YOU LABELLED THE SAMPLES?

EASI OPEN

PLEASE USE A BALL POINT PEN – PRINT FIRMLY AND CLEARLY

BIOCHEMISTRY AT MRH TULLAMORE ON-CALL REQUEST Tel: 05793 5 8504

Patient ID:

Surname:

Forename(s):

D.O.B. Sex:

Address:

Clinical Details:

Specimen requested by consultant or GP name:

Ward / Report Destination:

Dr Phone / Bleep:

Specimen taken and labelled by:

Print Name:

Signature:

Specimen Type:

Specimen Date:

Specimen Time:

Phone / Bleep:

BIOCHEMISTRY ON-CALL TEST REQUESTS

Send by pneumatic chute to Biochemistry **8504**

FOR LAB USE ONLY

Date / Time Received

FOR LAB USE ONLY

Number of Tubes

YELLOW

AMBER

OTHER

All writing on the request form must be clearly legible (block capitals preferred) so that the information provided is legible, thus ensuring proper identification of the patient and all test requests. Writing should be in ballpoint pen (not marker) to ensure the information is copied through to each sheet of the request form. **Ideally Computer generated labels should be used on the request form (NB. one label is required on each sheet of the request form).**

4.3 SAMPLE REQUIREMENTS FOR ROUTINE BIOCHEMISTRY TESTS

ABG (ARTERIAL BLOOD GAS)

Arterial blood taken into an ABG pre-heparinised syringe. These are available on the wards.

- Marquest™ Quick ABG ™ sampler – 3ml.
- A second type of sampler, the Westmed Blood Gas sampler – 1mL, is also available in the Intensive Care Unit (ICU).

Special requirements:
The specimen should be air-free and should be analyzed immediately.

Notes / comments:
Blood gas analysers are sited in the Emergency Department, ED19, ICU and CCU

Availability of assay: Daily (24 hours for in-house patients).

Reference range (arterial):

pH		7.35 – 7.45	
pCO_2	(male)	4.7 – 6.4	kPa
	(female)	4.3 – 6.0	kPa
pO_2		11 – 14	kPa
Ca (Ionised)		1.15 – 1.27	mmol/L
Anion Gap		10 – 20	mmol/L
Lactate		0.5 – 1.3	mmol/L
Base Excess (BEact)		-2.0 - +3.0	
Total CO_2 (t CO_2)		19 – 24	mmol/L
Bicarb (HCO_3 act)		21 – 28	mmol/L
Bicarb (HCO_3 std)		21– 26	mmol/L
Oxygen saturation		95 – 99	%

Co-oximetry Values:

tHb (male)	13.5 – 17.5	g/dL
tHb (female)	12.0 – 16.0	g/dL
OxyHb (FO_2Hb):	94 – 98	%
CarboxyHb: (FCOHb):	<3	% (non smokers)
	<10	% (smokers)
MetHb (FMetHb):	0.0 – 1.5	%
DeoxyHb (FHHb):	1.0 – 5.0	%

ACETAMINOPHEN (PARACETAMOL)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements:
Samples should ideally be taken at 4 hours post overdose and preferably not later than 16 hours. Serum values taken at less than 4 hours are difficult to interpret due to the possibility of continuing absorption and distribution of the drug and may not represent the peak level.

Notes / comments:
Early diagnosis of acetaminophen induced toxicity is important since initiation of therapy within 16 hours of ingestion lessens the potential for hepatic damage and decreases the mortality rate.

Availability of assay: Daily (24 hours for in-house patients).

Reference range:
Therapeutic range: 10 – 30 mg/L
Toxic range depends on the time of sample post ingestion. Refer to pharmacy guidelines for treatment nomogram in cases of suspected acetaminophen toxicity.

AFP

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: Include appropriate clinical details with the request.

Malignancies with elevated levels:
1. Non-seminomatous germ cell tumours (NSGCT) of testis, ovary and other sites.
2. Hepatocellular carcinoma
3. Hepatoblastoma (in children, extremely rare in adults)
4. AFP may be occasionally elevated in patients with othertypes of advanced adenocarcinomas.

Benign conditions which may have elevated levels include hepatitis, cirrhosis, biliary tract obstruction, alcoholic liver disease, ataxia telangiectasia and hereditary tyrosinaemia. Physiological conditions with elevated levels: pregnancy and the first year of life.

Availability of assay: Monday to Friday 9.00 to 20.00 (Excluding bankholidays).

Reference range: 0 – 5.8 U/mL

ALBUMIN

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Notes / comments: Albumin is included in the Liver and Bone test profiles

Availability of assay: Daily, (24 hours for in-house patients).

Reference range: 35 – 52 g/L

ALKALINE PHOSPHATASE (ALP)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Notes / comments:
Alkaline Phosphatase refers to a group of phosphatases found in almost every tissue of the body. There are four genotypes: the liver-kidney-bone type, the intestinal type, the placental type and the germ cell variant. Most ALP found in normal adult serum is derived from the liver or biliary tract. Levels are age

dependent, with young children and adolescents having much higher levels than adults, due to active bone growth.

Availability of assay: Daily (24 hours for in-house patients).

Reference range: U/L

Age	Males	Females
0 – 5 days	< 231	< 231
6 days – 6 months	< 450	< 450
7 months – 1 year	< 462	< 462
1 – 3 years	< 281	< 281
4 – 6 years	< 261	< 261
7 – 12 years	< 300	< 300
12 – 17 years	40 – 390	35 - 187
Adult	**40 – 129**	**35 - 104**

ALT (ALANINE AMINOTRANSFERASE)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Notes / comments:
Most ALT activity is found in the liver, but significant amounts are found in the kidneys, heart, skeletal muscle, pancreas, spleen and lung.

Availability of assay: Daily (24 hours for in-house patients).
ALT is included in the Liver test profile.

Reference range:
Male: < 41 U/L
Female: < 33 U/L

AMYLASE

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Notes / comments: None.

Availability of assay: Daily (24 hours for in-house patients).

Reference range: 28 - 100 U/L

ASOT

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Notes / comments:
The presence of antibodies to Streptolysin O, an enzyme produced by Lancefield group A beta-haemolytic streptococci, indicates previous infection. Determination is of most use in rheumatic fever and in post-streptococcal acute glomerulonephritis.

Availability of assay: Monday to Friday 9.00 to 20.00 (Excluding bank holidays)

Reference range:

Age	U/mL
<6 years	< 150
6 - 18 years	< 240
Adult	< 200

AST (ASPARTATE AMINOTRANSFERASE)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Notes / comments:
AST is commonly found in many tissue types – heart, liver, skeletal muscle, kidney, brain and red blood cells. Damage to any of these will give rise to elevated AST levels, thus clinical details are important.

Availability of assay: Daily (24 hours for in-house patients).

AST is included in both the Cardiac and the Liver test profiles.

Reference range:
Male: < 40 U/L
Female: < 32 U/L

BETA CROSSLAPS (CTx)

Specimen type / tube:
Plasma / Pink top Sarstedt Monovette (EDTA)

Special requirements:
See Protocol for Testing below.

Protocol for Bone Marker Testing:
- Patients should refrain from exercise for 24hrs
- Patients should fast from midnight
- Patient should relax after arriving for about 30 minutes
- A history of fracture within the last year will affect bone marker levels
- Blood should be drawn between 07:00 and 010:00
- Take one EDTA tube (Pink top)
- Note date and time on sample and form
- Clinical details to include whether pre-therapy (baseline level)
- Beta Crosslaps (bone resorption marker) is repeated at six months post treatment

Notes / comments:
Beta Crosslaps is recommended for monitoring the efficacy of anti-resorptive therapy (e.g. bisphosphonates or HRT) in treatment of osteoporosis, but may be of clinical value in the evaluation of other bone related diseases.

Availability of assay:
The assay has only been sanctioned for patients attending the Osteoporosis clinic. Samples are frozen for batch analysis.

Reference range:

Males:	30 – 50 years	0.02 – 0.58	ng/mL
	51 – 70 years	0.10 - 0.70	ng/mL
	> 70 years	0.40 – 0.85	ng/mL
Females:	Pre menopausal	0.03 – 0.57	ng/mL
	Post menopausal	0.31 – 1.00	ng/mL

BICARBONATE

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Notes / comments: This assay is also available as part of Blood Gas Analysis.

Availability of assay: Daily (24 hours for in-house patients).

Reference range: 22 – 29 mmol/L

BILIRUBIN- TOTAL

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: Protect sample from sunlight.

Notes / comments:
Total Bilirubin is included in the Liver profile.
Direct Bilirubin is assayed and reported when the Total Bilirubin is > 28 umol/L

Availability of assay: Daily (24 hours for in-house patients).

Reference range:

Age	umol/L
0 – 2 days	< 137
2 – 4 days	<222
4 – 7 days	<290
> 7 days-17yrs	< 17.0
Adult	<21

BILIRUBIN DIRECT

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: Protect sample from sunlight.
Notes / comments: Direct Bilirubin is assayed and reported when the total Bilirubin is > 28 umol/L

Availability of assay: Daily (24 hours for in-house patients).

Reference range: < 5.1 umol/L

CA 125

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: Include appropriate clinical details with the request.

Notes / comments:
CA 125 is elevated in 80-85% of cases of epithelial ovarian cancer, but is increased in only half of early (stage 1) cancer. It may be elevated in any adenocarcinoma with advanced disease.
Benign conditions which may have elevated levels include endometriosis, acute pancreatitis, cirrhosis, peritonitis, inflammatory pelvic disease. The presence of benign ascites can also give rise to elevated serum levels of CA 125. Physiological conditions with elevated levels include menstruation. Pregnancy may be associated with moderately elevated serum CA 125 (usually not more than 100 U/L). Levels are higher in pre-menopausal women than post-menopausal women.

Main Applications
1. CA 125 should not be used in screening asymptomatic women for sporadic ovarian cancer, but may help differentiate malignant from benign lesions in post-menopausal patients with pelvic masses.
2. The rate of decline during initial therapy is an independent prognostic indicator in ovarian cancer.
3. Monitoring treatment with chemotherapy.

Availability of assay: Monday to Friday 9.00 to 20.00 (Excluding bank holidays)

Reference range: < 35 U/mL

CA 15.3

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: Include appropriate clinical details with the request.

Notes / comments:
CA 15.3 is elevated in breast and other adenocarcinomas, especially with distant metastases. It is rarely elevated in patients with local breast cancer. It may be elevated in benign liver disease.
The main application of CA 15.3 is for monitoring the treatment of patients with advanced breast cancer.

Availability of assay: Monday to Friday 9.00 to 20.00 (Excluding bank holidays)

Reference range: < 25 U/mL

CA 19.9

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: Include appropriate clinical details with the request.

Notes / comments:
The main clinical application is as a diagnostic aid for pancreatic carcinoma, however inadequate sensitivity and specificity limit it's use in early diagnosis of pancreatic cancer. Also used in monitoring patients with pancreatic adenocarcinoma.
Benign conditions which may have elevated levels include acute and chronic pancreatitis, hepatocellular jaundice, cirrhosis, acute cholangitis and cystic fibrosis.

Availability of assay: Monday to Friday 9.00 to 20.00 (Excluding bank holidays)

Reference range: < 35 U/mL

CALCIUM

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements:
Prolonged venous compression during sampling will increase the calcium result.

Availability of assay: Daily (24 hours for in-house patients).

Reference range: 2.15 – 2.55 mmol/L

CARDIAC ENZYMES (CE)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Notes / comments:
The CE profile includes AST and CK.

Availability of assay: Daily (24 hours for in-house patients).

Reference range: Refer to reference ranges for individual tests

CEA (CARCINOEMBRYONIC ANTIGEN)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: Include appropriate clinical details with the request.

Notes / comments:
Can be elevated in almost any advanced adenocarcinoma, but is almost never elevated in early malignancy.
Benign conditions which may have elevated levels include hepatitis, cirrhosis, alcoholic liver disease, obstructive jaundice, ulcerative colitis, Crohn's disease, pancreatitis, bronchitis, emphysema and renal disease. Levels may also be elevated in apparently healthy individuals who smoke.

Main Clinical Application: In surveillance following curative resection of colorectal cancer and in monitoring therapy in advanced colorectal cancer.

Availability of assay: Monday to Friday 9.00 to 20.00 (Excluding bank holidays)

Reference range: <3.8 ng/mL (non-smokers)

CHLORIDE

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Notes / comments: Chloride is also available as part of the Renal profile.

Availability of assay: Daily (24 hours for in-house patients).

Reference range: 95 – 108 mmol/L

CHOLESTEROL

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements:
Fasting or non-fasting samples can be used.

Notes / comments: Prolonged venous compression during sampling will increase the cholesterol result.

Availability of assay: Monday to Friday 9.00 to 20.00 (Excluding bank holidays)

Reference range: < 5. 0 mmol/L (Random or Fasting)

CORRECTED CALCIUM

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements:
Prolonged venous compression during sampling will increase the calcium result.

Availability of assay: Daily (24 hours for in-house patients).

Reference range: 2.15 – 2.55 mmol/L

Corrected (adjusted) calcium is a calculated parameter determined from measured calcium and albumin using the following formula:
{(40-Albumin) x 0.02} + Calcium.

Note: Corrected calcium is reported as Cor. Calcium.

CREATINE KINASE (CK)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Notes / comments:
Haemolysis interferes with the assay, resulting in falsely raised values. CK may be elevated by exercise, intramuscular injections and bruising.

Availability of assay: Daily (24 hours for in-house patients).

Reference range:
Male: <190 U/L
Female: <170 U/L

CREATINE KINASE MB (CKMB) AND CKMB%

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Notes / comments:
Haemolysis interferes with the assay, resulting in falsely raised values. CKMB is composed of two subunits: CK-M and CK-B. This assay is based on immumo-inhibition of the M subunit, and measurement of activity due to the B subunit. As

CKBB is only rarely present in serum, measured B activity is assumed to arise from CKMB. Presence of CKBB in serum will cause a false positive result.

Availability of assay: Daily (24 hours for in-house patients).

Reference range: 7 – 25 U/L and < 6% of the total CK

CREATININE

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Notes / comments:
Creatinine method: Jaffe alkaline/picrate method.
For icteric samples (when Bilirubin > 170 umol/L) an enzymatic Creatinine assay is performed. Enzymatic Creatinine is also performed on all Creatinine results < 18 umol/L.

Availability of assay: Daily (24 hours for in-house patients).

Reference range (age related):

Age	umol/L
0 – 2 months	21 - 75
2 months – 1 year	15 - 37
1 – 3 years	21 - 36
3 – 5 years	27 - 42
5 – 7 years	28 – 52
7 – 9 years	35 - 53
9 – 11 years	34 – 65
11 – 13 years	46 - 70
13 – 15 years	50 – 77
Adult male	62 - 106
Adult female	44 - 80

CREATININE - ENZYMATIC

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Notes / comments:

For icteric samples (when Bilirubin > 170 umol/L) an enzymatic Creatinine assay is performed. Enzymatic Creatinine is also performed on all Creatinine results < 18 umol/L.

Availability of assay: Daily (24 hours for in-house patients).

Reference range (age related):

Age	umol/L
0 – 2 months	<77
2 months – 1 year	<34
1 – 2 years	<31
3 – 4 years	<37
5 – 6 years	<42
7 – 8 years	<47
9 – 10 years	<56
11 – 12 years	<60
13 – 14 years	<68
Adult male	59 - 104
Adult female	45 - 84

C - REACTIVE PROTEIN (CRP)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Notes / comments:
CRP is an acute phase protein to inflammatory reactions. It is also elevated in the presence of infection, infarction and in neoplastic conditions.

Availability of assay: Daily (24 hours for in-house patients).

Reference range: < 5 mg/L

eGFR (ESTIMATED GLOMERULAR FILTRATION RATE)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements:
It should be noted that the equation is only an estimate and **is not validated for use in:**

- Children
- Acute renal failure
- Pregnancy

- Oedematous states
- Muscle wasting diseases
- Amputees
- Malnourished patients

Notes / comments:
An estimated GFR from serum Creatinine is a practical way to identify people with chronic kidney disease (CKD) who might otherwise go untreated, and to monitor those with risk factors for CKD - i.e., diabetes, hypertension, cardiovascular disease, or family history of kidney disease.

eGFR = 175 x [((serum creatinine-3.08)/1.004)) x 0.011312]$^{-1.154}$ x [age]$^{-0.203}$ x [0.742 if female]

This formula assumes Caucasian ethnicity. **For African - Caribbean patients the eGFR reported by the laboratory should be multiplied by 1.21.** Although the MDRD formula has not been well validated in other racial groups, for example Chinese and other Asian groups, at present there is no evidence to suggest that they are invalid in such groups.

Availability of assay: Daily (24 hours for in-house patients).

Reference range: >90ml/min/1.73m^2
Note:The precision and accuracy of eGFR decreases as GFR increases. Therefore, as recommended in the CREST guidelines, eGFR which exceed 60ml/min/1.73m^2 will be reported as >60ml/min/1.73m^2.*

Use of eGFR for staging Chronic Kidney Disease:

Stage	eGFR	Description
1	>90	Normal kidney function
2	60-89	Mildly reduced kidney function / another abnormality
3	30-59	Moderately reduced kidney function
4	15-29	Severely reduced kidney function
5	<15	Established renal failure or end stage kidney disease

ELECTROLYTES (SODIUM, POTASSIUM, CHLORIDE)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Notes / comments: Electrolytes (Sodium, Potassium, Chloride) are included in the Renal test profile.

Availability of assay: Daily (24 hours for in-house patients).

Reference range (Adult): Refer to individual test for reference ranges.

ETHANOL (ETHYL ALCOHOL)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette or
Plasma / Tube: Yellow top Sarstedt Monovette (Fluoride/oxalate)

Special requirements: None

Notes / comments:
This assay is intended to assist in the clinical management of the patient and is not provided for medico-legal or any other purpose.

Availability of assay: Daily (24 hours for in-house patients).

Reference range:

Serum / Plasma:	< 10 mg/dL
Signs of intoxication:	50 – 100 mg/dL
Depression of the CNS:	> 100 mg/dL
Fatalities reported:	> 400 mg/dL

GAMMA-GT (GAMMA GLUTAMYLTRANSFERASE)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Notes / comments: GGT is included in the Liver profile.

Availability of assay: Daily (24 hours for in-house patients).

Reference range:
Male: 10- 71 U/L Female: 6 – 42 U/L

GENTAMICIN

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements:
A guideline for prescribing and administration of once daily Gentamicin has been drawn up by the antibiotic pharmacist. This is available on all wards. Only a pre-

dose (trough) level is required. Wait for the result of the trough level before administering the next dose.
The pre-dose level should be taken at 10:00 on the morning after the first full dose has been administered. Note the time of sample on both the sample and form.

Availability of assay: Daily 9.00- 20.00.

Therapeutic Range for pre-dose level: <1 ug/mL
For information / advice on administration, contact the Antibiotic Pharmacist.

GLUCOSE

Specimen type / tube:
Plasma / Tube: Yellow top Sarstedt Monovette (Fluoride/oxalate)

Special requirements:
Fasting: The patient must abstain from all food or drink (except water) for 8 hours.
2 hour post prandial: Sample must be taken 2 hours after a glucose load.

Oral Glucose Tolerance Test (Non-pregnant):
The patient should be fasting for 8 hours (no food or drink, except for water).
Administer the equivalent of 75 g anhydrous glucose dissolved in water (410 mls of Lucozade may be given).
A fasting sample should be taken immediately prior to administration of glucose load.
A 2-hour postprandial glucose should be taken exactly 2 hours after administration of glucose load.

Record specimen time and state whether fasting, random, post prandial or part of a glucose tolerance test.

Notes / comments:
Glucose will only be reported on serum if the sample is centrifuged and analysed within one hour of phlebotomy.

Availability of assay: Daily (24 hours for in-house patients).

Reference range:

ADA Recommendations	Fasting	2 hour post prandial	units
Normal	3.5-5.6	3.5-7.7	mmol/L
Impaired fasting glucose	5.6 – 6.9	N/A	mmol/L
Impaired glucose tolerance	N/A	7.8 – 11.0	mmol/L
Diabetes mellitus	>/ = 7.0	>/= 11.1	mmol/L

HbA1c

Specimen type / tube:
Whole blood / Tube: Pink top Sarstedt Monovette (ETDA)

Notes / comments: The assay is IFCC calibrated.

Availability of assay: Monday to Friday 9.00 to 20.00.

Reference range:
IFCC reference range: 20-42 mmol/mol

HCG+β (HUMAN CHORIONIC GONADOTROPIN+β subunit)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: Include appropriate clinical details with the request. The assay is available as a tumour marker and not to establish pregnancy.

Main Applications:
1. For monitoring patients with gestational trophoblastic disease (GTD).
2. In conjunction with AFP for determining prognosis and monitoring patients with non-seminomatous germ cell tumours (NSGCT) of testis, ovary and other sites.

Notes / comments: None

Availability of assay: Monday to Friday 9.00 to 20.00 (Excluding bank holidays)

Reference range:
Male : 0 – 2.6 mIU/mL
Female:0 – 5.3 mIU/mL (non-pregnant pre-menopausal)

HDL-CHOLESTEROL (HDL)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: Fasting or non-fasting samples can be used.

Notes / comments:
Abnormal liver function affects lipid metabolism and in some such cases the HDL may be significantly negatively biased. HDL-cholesterol is affected by smoking, exercise, hormones, sex and age.

Availability of assay: Monday to Friday 9.00 to 20.00 (Excluding bank holidays)

Reference range:
Male: >1.45 mmol/L
Female: >1.68 mmol/L

Risk factor for CHD

Sex	No risk	Moderate risk	High risk	Units
Male	> 1.45	0.90 – 1.45	< 0.90	mmol/L
Female	> 1.68	1.15 – 1.68	< 1.15	mmol/L

LACTATE DEHYDROGENASE (LDH)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Notes / comments: LDH is available as part of the Liver profile.
Haemolysis interferes due to release of LDH from erythrocytes.

Availability of assay: Daily (24 hours for in-house patients).

LDH Reference range (age related):
<20 days 225-600 U/L
21 days -15 years 120-300 U/L
>15 yrs 135-250 U/L

LDL-CHOLESTEROL (LDL)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: Fasting or non-fasting samples can be used.

Notes / comments:
For diagnostic purposes LDL-cholesterol levels should always be assessed in conjunction with patient's medical history, clinical examination and other findings.

Availability of assay: Monday to Friday 9.00 to 20.00 (Excluding bank holidays)

Reference range: < 3.0 mmol/L

LDL-cholesterol as a risk factor for CHD:

	LDL	Units
Desirable	< 3.0	mmol/L
Moderate risk	3.0 – 4.0	mmol/L
High risk	> 4.1	mmol/L

LIPID PROFILE

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Notes / comments: The profile includes the following tests: Cholesterol, Triglycerides, HDL, and LDL.

Availability of assay: Monday to Friday 9.00 to 20.00 (Excluding bank holidays)

Reference range: Refer to individual tests for reference ranges.

LIVER FUNCTION TESTS (LFTS)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Notes / comments:
The profile includes the following tests:
AST, ALT, GammaGT, LDH, Total Bilirubin, Albumin.
AST and LDH will not be reported on samples > 1 day old.

Availability of assay: Daily (24 hours for in-house patients).
Reference range: Refer to individual tests for reference ranges.

MAGNESIUM

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Availability of assay: Daily (24 hours for in-house patients).

Reference range: 0.66 – 1.07 mmol/L

NTproBNP (N-terminal pro B-type natriuretic peptide)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube)

Special requirements:
Appropriate clinical details required

Notes / comments: None.

Availability of assay:
Monday to Friday 9.00 to 20.00 (Excluding bank holidays) for in-house/OPD patients (except ED - available 24 hours).
09.00-15.00 Mon-Fri for specific GP patients based on referral criteria covered under the Chronic Disease Management Programme.

Reference range: Recommended natriuretic peptide cut-off values (pg/mL) for acute heart failure diagnosis

	NT-Pro-BNP		
Age	<50 yrs	50-75 yrs	>75 yrs
Acute setting, patient with acute dyspnoea			
HF unlikely	<300	<300	<300
'Grey zone'	300-450	300-900	300-1800
HF Likely	>450	>900	>1800
Non-acute setting			
HF unlikely	<400		
HF Likely	>2000		

PARACETAMOL

Refer to Acetaminophen

PHOSPHOROUS

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Availability of assay: Daily (24 hours for in-house patients).

Reference range:

Age	Male mmol/L	Female mmol/L
1-30 d	1.25-2.25	1.40-2.50
1-12 months	1.15-2.15	1.20-2.10
1 – 3 years	1.00-1.95	1.10-1.95
4 - 6 years	1.05-1.80	1.05-1.80
7 – 9 years	0.95-1.75	1.00-1.80
10 –12 years	1.05-1.85	1.05-1.70
13 – 15 years	0.95-1.65	0.90-1.55
16 – 18 years	0.85-1.60	0.80-1.55
Adult	0.81-1.45	0.81-1.45

POTASSIUM

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements:
Serum /plasma must be separated from the red cells as soon as possible. Potassium will not be reported on samples > 1day old.

Notes / comments:5
Haemolysis interferes due to potassium release from the erythrocytes. Potassium is available as part of the Renal profile.

Availability of assay: Daily (24 hours for in-house patients).

Reference range:
Serum: 3.5 - 5.3 mmol/L
Plasma: 3.5 - 5.0 mmol/L

PROCOLLAGEN TYPE-1 N-TERMINAL PROPEPTIDE (P1NP)

Specimen type / tube:
Plasma / Tube: Pink top Sarstedt Monovette (ETDA)

Special requirements: See following Protocol for Testing.
Protocol for Bone Marker Testing:

1. Patients should refrain from exercise for 24hrs
2. Patients should fast from midnight
3. Patient should relax after arriving for about 30 minutes
4. A history of fracture within the last year will affect bone marker levels
5. Blood should be drawn between 07:00 and 10:00
6. Take one EDTA tube (Pink top)
7. Note date and time on sample and form
8. Clinical details to include whether pre-therapy (baseline level)
9. P1NP (bone formation marker) is repeated at six months post treatment

Notes / comments:
P1NP is a specific indicator of type 1 collagen deposition, and is therefore considered a true marker of bone formation. It is not only used in the assessment of osteoporosis but may be of clinical value in the evaluation of other bone related diseases.

Availability of assay:
The assay has only been sanctioned for patients attending the Osteoporosis clinic.

Reference range:

Males:	Age 51 - 70 years	< 70	ng/mL
Females:	Pre menopausal	< 60	ng/mL
	Post menopausal (on HRT)	< 60	ng/mL
	Post menopausal (no HRT)	< 76	ng/mL

PROTEIN

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements:
Prolonged venous stasis during sample collection will increase the serum protein.

Notes / comments: None.

Availability of assay: Daily (24 hours for in-house patients).

Reference range: 66 – 87 g/L

PTH (PARATHYROID HORMONE)

Specimen type / tube:
Plasma / Tube: Pink top Sarstedt Monovette (ETDA)

Special requirements: None.

Notes / comments: None.

Availability of assay: Monday to Friday 9.00 to 20.00 (Excluding bank holidays)
Reference range: 16 – 65 pg/mL

PSA (PROSTATE SPECIFIC ANTIGEN)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube)

Special requirements: None

Notes / comments:
The test is used in conjunction with digital rectal examination as an aid in the detection of prostate cancer. It is also used for monitoring therapy in patients with diagnosed prostatic cancer.

Availability of assay: Monday to Friday 9.00 to 20.00 (Excluding bank holidays)

Reference range (age related):

NCCP Guidelines (Caucasian Men)

Age (years)	PSA (ng/mL)
40 – 49	<2 ng/ml
50 – 59	<3 ng/ml
60 – 69	<4 ng/ml
>70	<5 ng/ml

RF (RHEUMATOID FACTOR)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None.

Notes / comments:
The RF results should always be assessed in conjunction with patient's medical history, clinical examination and other findings.
Availability of assay: Monday to Friday 9.00 to 20.00 (Excluding bank holidays)

Reference range: < 20 IU/mL

SALICYLATE

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Notes / comments: Peak serum level is achieved 1 – 2 hours post oral administration for therapeutic doses. Salicylate absorption may be delayed when overdose quantities are consumed, especially for enteric coated or slow release preparations. This must be considered when interpreting values for samples obtained earlier than 6 hours after ingestion. Repeat testing is recommended within 2-3 hours to ensure that absorption is complete.
For diagnostic purposes salicylate levels should always be assessed in conjunction with patient's medical history, clinical examination and other findings.

Availability of assay: Daily, (24 hours for in-house patients).

Reference range:
Persons not on salicylate therapy will have no salicylate in their serum.
The therapeutic and toxic ranges are as follows:
Therapeutic range: < 30 mg/dL
Toxic range: > 35 mg/dL adults

SODIUM

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None

Notes / comments: Sodium is available as part of the Renal profile.
Availability of assay: Daily (24 hours for in-house patients).

Reference range: 135 – 145 mmol/L

TRIGLYCERIDE

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: 12 hour fast if fasting triglyceride is required

Notes / comments: None

Availability of assay: Monday to Friday 9.00 to 20.00 (Excluding bank holidays)
Reference range:
Fasting: < 1.7 mmol/L
Random: < 2.3 mmol/L

TROPONIN T High sensitivity (hs TNT)

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: Two samples are required in order to rule in / out a myocardial infarction. One sample on admission and a second 6 hours post admission. The date and time of the suspected cardiac event should accompany the request.

Notes / comments: None.

Availability of assay: Daily (24 hours for in-house patients).

Reference range: < 14 ng/L

UREA

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None.

Notes / comments: Urea is available as part of the renal profile.

Availability of assay: Daily (24 hours for in-house patients).

Reference range: 2.8 – 8.1 mmol/L

URIC ACID

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: None.
Notes / comments: None.

Availability of assay: Monday to Friday 9.00 to 20.00 (Excluding bank holidays)
Reference range:
Male: 202 – 417 umol/L Female: 143 – 339 umol/L

VANCOMYCIN

Specimen type / tube:
Serum / Tube: Amber top Sarstedt Monovette (Serum gel tube) or
Plasma / Lithium Heparin / Orange top Sarstedt Monovette

Special requirements: A guideline for prescribing and administration of twice daily Vancomycin has been drawn up by the antibiotic pharmacist. This is available on all wards. Only pre-dose (trough) levels are required. Do not delay or omit a dose while waiting for the result of the level.

A pre- dose level should be taken immediately prior to the 10:00 dose on the morning after the third or fourth dose has been administered. Note time of sample on both the sample and the form.

Availability of assay: Daily 9.00 to 20.00.

Therapeutic Range for pre-dose level: 10-20 ug/mL
For information / advice on administration, contact the Antibiotic Pharmacist.

4.4 SAMPLE REQUIREMENTS FOR URINE BIOCHEMISTRY TESTS

ACR (ALBUMIN: CREATININE RATIO)

Specimen type / container: MSU

Special requirements: An early morning urine sample is recommended.

Notes / comments: Urinary Microalbumin and Urinary Creatinine values will also be reported.

Availability of assay: Monday to Friday 9.00 to 20.00.

Reference Range:
< 2.5 mg/mmol

URINARY AMYLASE

Specimen type / container: MSU

Special requirements: None.

Notes / comments: None.

Availability of assay: Daily (24 hours for in-house patients).

Reference Range:
Male**:** 16-491 U/L, Female: 21-447 U/L

URINARY CALCIUM

Specimen type / container: 24 hr urine collection in container with acid.

Special requirements: A 24 hr urine container with acid is required.

Availability of assay: Monday to Friday 9.00 to 20.00.

Reference Range: 2.5 – 7.5 mmol/24 hours

URINARY CREATININE

Specimen type / container: 24 hr urine collection in container without acid.

Special requirements: None.

Notes / comments: None.

Availability of assay: Available Monday to Friday 9.00 to 20.00.
Reference Range:
Male: 9 – 21 mmol/24 hours, Female: 7 – 14 mmol/24 hours

URINARY CREATININE CLEARANCE

Specimen type / container:
24 hr urine collection in container without acid
Serum from a Sarstedt Monovette® Amber Tube taken during the urine collection period.

Special requirements: Both a serum sample and a 24 hour urine collection are required to calculate the Creatinine Clearance.

Notes / comments: None.

Availability of assay: Monday to Friday 9.00 to 20.00.

Reference Range: 71 – 151 ml/min

URINARY DRUGS OF ABUSE*

Specimen type / container: MSU

Special requirements: Urine Drugs of Abuse testing is only available as an in-house assay.

Notes / comments:
This screening test is intended to assist in the clinical management of the patient and is not provided for medico-legal or any other purpose. The kit insert outlining the urinary metabolites measured will be attached to each report.

Availability of assay: Daily (24 hours for in-house patients).

Reference Range: Negative.

URINARY ELECTROLYTES (Sodium, Potassium, Chloride)

Specimen type / container: 24 hr urine collection in container without acid.

Special requirements: None.

Notes / comments: None.

Availability of assay: Monday to Friday 9.00 to 20.00.

Reference Range:

Urinary Sodium	Male:	40 – 220	mmol/24 hrs
	Female:	27 – 287	mmol/24hrs
Urinary Potassium:		25 – 125	mmol/24 hrs
Urinary Chloride:		110 – 250	mmol/24 hrs

URINARY MAGNESIUM

Specimen type / container: 24 hr urine collection in container without acid.

Special requirements: None.

Notes / comments: None

Availability of assay: Monday to Friday 9.00 to 20.00.

Reference Range: 3.0 – 5.0 mmol/24 hours

URINARY MICROALBUMIN

Specimen type / container: MSU

Special requirements: An early morning urine sample is recommended.

Notes / comments: An ACR will also be reported.

Availability of assay: Monday to Friday 9.00 to 20.00.

Reference Range: < 20 mg/L

URINARY PHOSPHOROUS

Specimen type / container: 24 hr urine collection in container with acid.

Special requirements: A 24 hr urine collection in container with acid is required.

Notes / comments: None.

Availability of assay: Monday to Friday 9.00 to 20.00.

Reference Range: 13 – 42 mmol/24 hours

URINARY PROTEIN

Specimen type / container: MSU or 24 hr urine collection in container without acid.

Special requirements: None.

Notes / comments: None.

Availability of assay: Monday to Friday 9.00 to 20.00.

Reference Range: <0.14 g/24 hours); MSU: < 0.15 g/L

URINARY UREA

Specimen type / container: 24 hr urine collection in container without acid

Special requirements: None.

Notes / comments: None.

Availability of assay: Monday to Friday 9.00 to 20.00.

Reference Range: 428 – 714 mmol/24 hours

URINARY URIC ACID

Specimen type / container: 24 hr urine collection in container without acid

Special requirements: Do not refrigerate.

Notes / comments: None.

Availability of assay: Monday to Friday 9.00 to 20.00.

Reference Range: 1200 – 5900 umol/24 hours

4.5 SAMPLE REQUIREMENTS FOR CSF BIOCHEMISTRY TESTS

CSF GLUCOSE

Specimen type / container: CSF containers are available from the Microbiology Department.

Special requirements: All CSF samples are sent to the Microbiology Department for initial examination. Aliquots are then sent to the Biochemistry Department by Microbiology staff for analysis of CSF glucose and protein.

Notes / comments: Appropriate clinical details are required.

Availability of assay: Daily (24 hours for in-house patients).

Reference Range:
Adult: 2.2 – 3.9 mmol/L (Fasting)
Infant/Child: 3.3 – 4.4 mmol/L

Results should be interpreted in conjunction with the plasma glucose. CSF glucose should be 60 – 70% of the plasma glucose.

CSF PROTEIN

Specimen type / container: CSF containers are available from the Microbiology Department.

Special requirements:
All CSF samples are sent to the Microbiology Department for initial examination. Aliquots are then sent to the Biochemistry Department by Microbiology staff for analysis of CSF glucose and protein.

Notes / comments: Appropriate clinical details are required.

Availability of assay: Daily (24 hours for in-house patients).

Reference Range: 15 – 45 mg/dL

5. BIOCHEMISTRY TEST TURNAROUND TIMES

Time indicated is from receipt in the laboratory to result reporting and are average turnaround times. The times indicated do not take into account cases where testing of samples needs to be repeated for technical or quality control reasons.

Test Name/Profile	Routine	Priority	Critical
Routine Biochemistry (in-house patients) e.g. Renal/Liver/Bone	3 hrs	2 hrs	1 hr
Troponin T	3 hrs	2 hrs	1 hr
Gentamicin/Vancomycin	3 hrs	2 hrs	N/A
GP Samples*	6 hrs	3 hrs	N/A
Tumour Markers*	6 hrs	N/A	N/A
HbA1c*	6 hrs	N/A	N/A

* available Monday to Friday 9.00- 17.00 (excluding bank holidays)

6. SAMPLE RETENTION

Sample	Retention Time
Serum/Plasma/EDTA/Urine Sample Bottles	3 days

7. QUALITY ASSURANCE

The Biochemistry Laboratory Participates in the following External Quality Assurance Schemes.

Distributor	QA Programme
UKNEQAS	1. HbA1C 2. Cardiac 3. CSF Glucose and protein
BIO-RAD	1. Immunoassay EQAS 2. Clinical Chemistry EQAS
RIQAS	1. Human Urine Programme 2. Specific Proteins Programme 3. Clinical Chemistry Programme 4. Therapeutic Drugs Programme 5. Blood Gas Programme 6. Ethanol Programme 7. Cardiac Programme 8. Co-Oximetry Programme
IEQAS (Labquality)	1. Urine Drugs of Abuse

BLOOD BANK

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7. SAMPLE RETENTION

8. QUALITY ASSURANCE

1. INTRODUCTION

- The Blood Bank at Midland Regional Hospital, Tullamore provides a routine Blood Transfusion Service to the hospital and to general practitioners in the local area (special circumstances only).
- An Emergency out-of-routine-hours On-Call Service is also provided by the Blood Bank.
- Errors in transfusion are well documented in literature and are preventable, provided they are reported and properly analysed at the earliest. Haemovigilance programs from around the world document that the greatest risk to recipients of blood transfusion is human error, resulting in transfusion of the incorrect blood component. Inadequate patient identification or sample labelling can result in mismatch transfusions (ABO-incompatible transfusions). Errors made in the collection of the patient sample for pre-transfusion compatibility testing are serious, because they are at the beginning of a complex chain of events in the process of clinical transfusion. Therefore, strict adherence to sample collection and labelling criteria for transfusion is essential.
- The Quality and Traceability of Blood and Blood Transfusion Practice is governed by EU Blood Directives (2002/98/EC), (2004/33/EC) and (2005/61/EC) which have been enacted into Irish Legislation (SI 360/2005 and SI 547/2006). The Blood Transfusion Laboratory is also committed to the safe supply of medicines to patients which is governed by the EU Falsified Medicines Directive (2011/62/EU).
- The Blood Bank at MRHT is accredited to ISO 15189

Blood Transfusion/Haemovigilance Guidelines are available in the relevant clinical areas on Q-Pulse.

We advocate the use of the Electronic BloodTrack System (EBTS) for labelling BT samples.

2. BLOOD BANK TEST INDEX

For details of tests accredited to the ISO: 15189 Standard, refer to the Irish National Accreditation Board (INAB) Website www.inab.ie. Tests currently accredited to this standard are listed on the Scope of Accreditation for Midland Regional Hospital Tullamore - Registration No. 221MT.

- Blood Group
- Antibody Screen
- Crossmatch
- Direct Antiglobulin Test (DAT)/Direct Coombs Test (DCT)
- Antibody Identification
- Transfusion Reaction Investigation
- Patient and Donor Unit Phenotyping

Other tests sent to National Blood Centre (NBC) - Irish Blood Transfusion Service (IBTS) include

- Investigation of rare blood groups/subgroups
- Investigation of Allo and Auto antibodies
- Investigation of Cold antibodies
- Compatibility testing for patient with allo/auto/cold antibodies and provision of antigen negative blood
- Molecular genotyping for pre-transfusion work-up of patients commencing Daratumumab treatment
- Compatibility testing for patients on Daratumumab
- Elution studies for Positive DAT Post Transfusion Reaction Sample
- Culture of blood bags post suspected Bacterial Transfusion Reactions
- HLA typing for potential transplant patients
- Disease association tissue typing
- Leucocyte antibodies
- Platelet antibodies
- Weak D Genotyping
- Extended RBC Genotyping
- Molecular Investigation for other Blood Groups

Refer to External Tests Section for more information

3. HOURS OF OPERATION AND CONTACT DETAILS

Postal Address	Hours of Operation	Phone (internal EXT in bold)	Fax
Blood Bank MRHT Tullamore Co Offaly Ireland	**Weekday** **Core Hours** 09:00-17:00hrs (Full Operational Service) **Extended Working day** 08:00 - 20:00hrs (Reduced Services outside of Core Hours) **On-Call/Weekend/Public Holidays** For details relating to on-call and weekend arrangements refer to the General Information Section 3.1.2 Out of Hours /Weekend Pathology Services	057-93**58385** **or** 057-93**58387** **Contact via switchboard** **Internal Ext 3000** **External (057) 932 1501**	057-9359395

Blood Bank Personnel	Name	Contact Details
Consultant Haematologist	**Dr. Gerard Crotty**	057-93**58352 (Secretary)** or via switchboard Ext. **3000** Gerard.crotty@hse.ie
Consultant Haematologist	**Dr. Kanthi Perera**	057-93**59250 (Secretary)** or via switchboard Ext. **3000** Meegahage.perera@hse.ie
	Haematology Medical team	Contact via switchboard Ext.**3000**
Chief Medical Scientist	**Ms. Bernie Weston**	057-93**58384/58385**
Senior Medical Scientist	**Ms. Suzanne Barrow**	057-93**58385**
Haemovigilance Officer	**Ms. Denise Murphy**	057-93**58350** or Bleep 290
General Enquires		
Blood Bank Staff	Blood Bank Requests	057-93**58385/** 057-93**58387**
On Call staff	For Haematology and Blood Bank requests on-call	Contact via switchboard Ext.**3000**

4. GENERAL INFORMATION

4.1 PREFERRED SAMPLE

- The preferred sample for Blood Transfusion testing is whole blood collected in a 7.5ml EDTA sample tube (pink cap).
- Confirm Group samples should be taken into the specially labelled 2.7ml EDTA sample tube.
- Clotted samples may be acceptable for some testing e.g. post transfusion reaction sample to aide in the identification of weak antibodies and will be considered on a case by case basis.
- Samples should be sent to the laboratory as soon as possible and never refrigerated in the clinical area.
- Samples taken >24 hours before receipt in the BT Lab will be rejected.

4.2 SAMPLE VOLUME

For optimal sample volumes refer to the following table. These volumes should be adhered to where possible, but if collection is particularly difficult, contact the Blood Bank for advice on the minimum volumes required.

Test Name	Short name	Sample type	Sample volume(ml)	Turn Around Time
Blood Group/Antibody screen or Cross match	G/S or X/M	EDTA	7.5	8 hours
Confirm Blood Group		EDTA	2.7	8 hours
Direct Antiglobulin Test/Direct Coombs Test	DAT/DCT	EDTA	2.7/7.5	8 hours
Antibody Identification	Ab Id	EDTA	2x 7.5	24hrs or sent to NBC - IBTS
Request for Platelets/Other products ordered from IBTS		EDTA	7.5	Min 3 hours
Transfusion Reaction Investigation	Tx Rxn	EDTA And/or Clotted	7.5 7.5	8 hours
Auto immune Haemolytic Anaemia	AIHA	EDTA	2X7.5	24hrs or sent to NBC - IBTS
Weak D Genotyping Extended RBC Genotyping Molecular Investigation for other Blood Groups		EDTA	≥ 3ml (Note samples MUST be stored at Room Temperature)	2 weeks Sent to IBTS

Note: Group & Hold = Group & Antibody Screen

Paediatric samples for Blood Transfusion testing:

- At least 2ml of blood in a 2.7ml EDTA bottle is required.
- Small 1.3ml paediatric bottles will only be accepted when labelled using the BloodTrack PDA label.
- Handwritten 1.3ml paediatric bottles *will not be accepted* as there is insufficient space on the sample bottles for the details required.

4.3 TURN AROUND-TIME (TAT)

- **Cut-off time for same day reporting:**
  Arrival in the Blood Bank before 16:30.
- **Patient samples with complex antibodies may not be completed on the same day.**
- Estimated turn-around-times for testing are recorded in Section 4.2. See Section 5.7 for emergency situations.
- Testing may be completed earlier than the times stated. On some occasions however, it could take longer, depending on the complexity of the work undertaken.
- The Blood Bank at MRHT and the IBTS Diagnostic Laboratory may perform extra testing as a follow-up to preliminary results *e.g.* positive DAT, antibody identification on samples with positive antibody screen.

4.4 VALIDITY OF TRANSFUSION SAMPLES

- All BT samples are valid for **72 hours** from the time the sample was taken.
- All blood crossmatched using this sample must have the transfusion completed within 72 hours of the sample being taken.
- After this time if the patient has not commenced transfusion or if additional test/transfusion is requested then a new sample will be required.

4.5 ADDITIONAL TESTING

- All BT samples are valid for 72hours from the time the sample was taken *e.g.* group and screen.
- The original samples are held by the Blood Bank for 72 hours during which they are available for any additional patient requirements *e.g.* add crossmatched red cells request to sample previously sent for group and screen only.

- Platelets and other products may by requested during this 72-hour period also.
- DATs may be performed on samples <24 hours old.
- Additional test requests should be made using the "Additional Test/Additional Component Orders Form" (T/BTL/RC/009-03) found at the Nurses Station in the Clinical Area
- PLEASE PHONE THE BLOOD BANK TO DETERMINE SAMPLE VALIDITY IF NECESSARY.

4.6 Confirm Group Requirements

- Confirm Group Sample will be required for all patients requiring blood/blood products who present with no previous Blood Transfusion history in this hospital and their sample is handwritten.
- The confirm sample must be taken from the patient in a separate draw. This is to prevent an incompatible transfusion due to a wrong blood in tube error.
- If the sample was collected using the Personal Digital Assistant (PDA) BloodTrack System, then a confirm group will **NOT** be required.
- Where a confirm group sample is required a specific Confirm Sample Pack will be sent by the Blood Transfusion laboratory staff to the clinical area if blood/blood products are required. On receipt of the confirm sample, the blood/blood products can be released providing the patient's blood group is confirmed as being the same as the initial sample.
- In an emergency situation where transfusion is required before the confirm sample is received or there is insufficient time to collect a confirm sample, the laboratory will issue uncrossmatched group O red cells, group A/B platelets and group AB Plasma.
- Please note that the use of Uncrossmatched Group O red cells does not replace the requirement for crossmatched red cells. Group O red cells may not be the most suitable product for patients with clinically significant antibodies, therefore it is imperative to return the confirm sample to the BT laboratory promptly following receipt.

4.7 PATIENTS PRESENTING WITH ANTIBODIES FOR ELECTIVE PROCEDURES

- For all patients presenting with antibodies for surgery the blood bank will endeavour to have 2 units of blood (antigen negative or considered suitable) on stand-by for the patient. A written request for crossmatched blood will be required by the Blood Transfusion Laboratory in order to release these units.
- Patient samples with antibodies identified at pre-op assessment will have a Blood Transfusion alert label placed on their report form. Pre op assessment staff are responsible for liaising with admissions re these alerts and informing laboratory staff of admissions to prevent possible delays in transfusion.
- Patient samples with antibodies will require extra testing by the laboratory (1 working day). For patient samples with complex antibodies referral to the reference laboratory – NBC (IBTS), for further investigation (1 to 3 working days) may be required. This may involve additional testing of donor units, call up of specialist donors or sourcing of blood from international stocks at the IBTS.

Important

1. **Patients with known antibodies:** should have a blood transfusion sample sent the day prior to surgery and should be placed at the end of the theatre list to allow for adequate time to resolve antibody identification and the provision of the relevant antigen negative blood.
2. **Patients with complex antibodies requiring referral to external laboratory:** the relevant team should contact the laboratory at least one week prior to surgery to organise for samples to be sent to the referral laboratory NBC (IBTS) in order to have adequate antigen negative blood available prior to surgery.

- Please be aware that Emergency O Neg is suitable for an emergency situation where the antibody status is unknown, but should not be considered a universal donor for patients with antibodies.
- If the Blood Bank is unable to provide compatible/suitable blood for a patient with an antibody, this will be communicated to the patients care team.
- If a patient with an antibody has no blood available and is taken to theatre for an elective procedure following communication from the Blood Bank, any unexpected event will be the responsibility of the patient care team.

4.8 CLINICAL ADVICE

- Advice on transfusion support and management of patients or interpretation of test results can be obtained from the Consultant Haematologist. Refer to Section 3 for contact details.
- Clinical information on blood transfusion is available in the clinical areas in relevant guidelines.

4.9 TECHNICAL ADVICE

- Advice on sample requirements and test procedures can be obtained from the Blood Bank.
- Senior Medical Scientific staff in Blood Bank are authorised to give advice on scientific information such as the use of laboratory results or data. Refer to Section 3 for contact details.

4.10 TRANSFUSION SURVEILLANCE/HAEMOVIGILANCE

- It is the responsibility of the Haemovigilance Officer (HVO)/deputy to investigate unexpected or undesirable effects of transfusion of blood components/products and report them to relevant personnel and authorities in a timely manner. This includes investigation of Wrong Blood in Tube events.
- The HVO is also responsible for the development of guidelines for transfusion practise and provision of education for portering, medical and nursing staff relating to current transfusion practice. This includes training for use of BloodTrack devices and provision of access to the system.
- Other functions of haemovigilance include traceability of blood components, auditing transfusion practice, transfusion look back and recalls as requested by the IBTS. The HVO provides clinical advice under the direction of the Consultant Haematologist.
- Refer to section 3.0 for contact details.

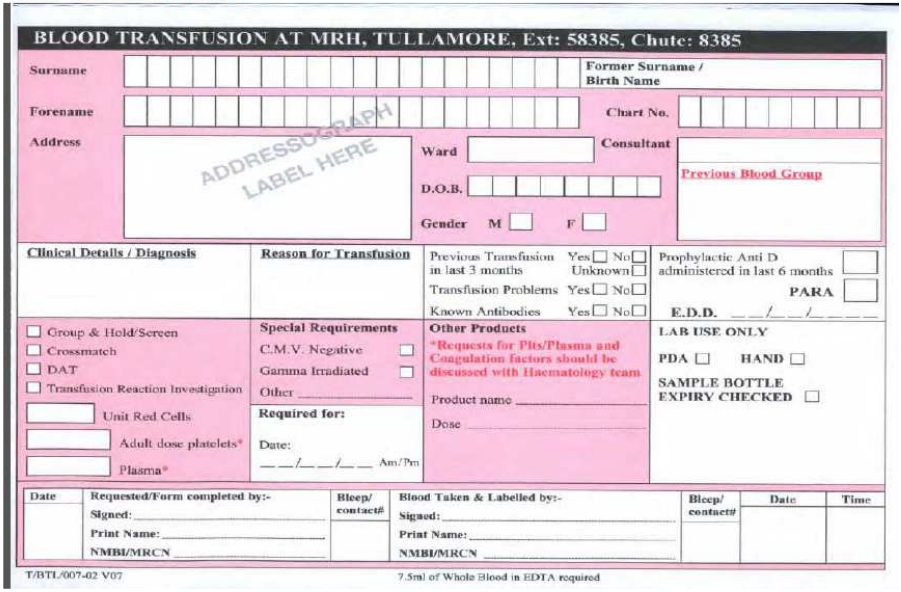
5.0 PRE TRANSFUSION TESTING INFORMATION

- **IMPORTANT:** It is not possible to over-emphasise the importance of proper patient identification. Most errors relating to transfusion practice arise from administrative and clerical error. These errors can have serious consequences for patients and are sometimes fatal.
- DAT requests/Samples received with the General Haematology/ Coagulation/ Biochemistry/ External Request Form will not be accepted in Blood Transfusion. An appropriately labelled 2.7ml/7.5ml EDTA sample with an appropriately labelled BT request form is required.

5.1 COMPLETION OF THE REQUEST FORM

The MRHT "Blood Transfusion Request Form" is used for ordering tests, blood components and factor concentrates. See T/HVBT/GL/001 "Guideline for Sample Labelling and Completion of the Request Form for Blood Transfusion" for further information.

Front of request form



BLOOD TRANSFUSION AT MRH, TULLAMORE, Ext: 58385, Chute: 8385

Surname | Former Surname / Birth Name

Forename | Chart No.

Address | Ward | Consultant

ADDRESSOGRAPH LABEL HERE

D.O.B.

Gender M F

Previous Blood Group

Clinical Details / Diagnosis | Reason for Transfusion

Previous Transfusion in last 3 months Yes No Unknown

Transfusion Problems Yes No

Known Antibodies Yes No

Prophylactic Anti D administered in last 6 months

PARA

E.D.D. __/__/____

Group & Hold/Screen

Crossmatch

DAT

Transfusion Reaction Investigation

Unit Red Cells

Adult dose platelets*

Plasma*

Special Requirements

C.M.V. Negative

Gamma Irradiated

Other

Required for:

Date: __/__/__ Am/Pm

Other Products

*Requests for Plts/Plasma and Coagulation factors should be discussed with Haematology team

Product name

Dose

LAB USE ONLY

PDA HAND

SAMPLE BOTTLE EXPIRY CHECKED

Date	Requested/Form completed by:-	Bleep/ contact#	Blood Taken & Labelled by:-	Bleep/ contact#	Date	Time
	Signed:		Signed:			
	Print Name:		Print Name:			
	NMBI/MRCN		NMBI/MRCN			

T/BTL/007-02 V07 7.5ml of Whole Blood in EDTA required

The above request form is document controlled and subject to change.

- Full and accurate completion of the request form is essential for ensuring that the right test or quantity of blood component or product is available at the right place at the right time.
- Patient details are to be recorded on the form using legible handwriting or a large computer generated addressograph label.
- The only form of labelling on the **Blood Transfusion Request Form** that will be accepted is **HANDWRITTEN** or **ADDRESSOGRAPH LABEL**. The BloodTrack PDA label must only be used on the request form as a **Digital Signature** for confirmation of positive patient identification at the bedside when sampling – this should only be placed on the signature lines on the form. **No other forms of labelling on the request form will be accepted**.

The request form **MUST** contain the following patient information

1. Patient Identification Number (chart number)
2. Patient's surname and First name/s (unabbreviated)
3. Date of birth
4. Gender
5. Date test result/blood required for (Mandatory for Elective Surgery)

AND SHOULD CONTAIN

6. Patient address
7. Ward
8. Consultants Name
9. Clinical details
10. Reason for Transfusion
11. Previous Blood Group (if known)
12. Previous transfusion history (NB for transfused or pregnant in the last 3 months)
13. Test required
14. The number and type of blood products required
15. Special Requirements (*e.g.* CMV negative, irradiated) requests are the responsibility of person requesting the test. (see point 5.2)
16. Time/Date test is required

IN ADDITION

17. The form must be signed and dated by the person requesting the test (include bleep number) and should contain their MRCN/NMBI.
18. The form must be signed and dated by the person who took the sample (include bleep number) and should contain their MRCN/NMBI, this can be done in written format (legible) or by using a BloodTrack PDA label. Where the PDA is used for sample labelling the MCRN/NMBI is not required as the user is identifiable on the PDA label generated by the BloodTrack system.

5.2 SPECIAL REQUIREMENTS (CMV Negative & Irradiated)

The following is the current guideline at time of release but is subject to change - See T/HVBT/GL/011 "Guideline for the use of Cytomegalovirus (CMV) Negative and Irradiated Blood Components" for the latest information.

Special requirements are defined here as **Cytomegalovirus (CMV) negative** and/ or gamma irradiated blood components.

Note: **In emergency situations** where the risk of withholding a transfusion would adversely affect the outcome for the patient, special transfusion requirements may need to be overridden ideally following discussion with a Haematologist.

CMV is only transmitted by cellular components i.e. RCC or platelet transfusions and CMV negative components is recommended as outlined in Table below.

NOTE WHERE CMV STATUS IS UNKNOWN; ASSUME THE PATIENT IS CMV NEGATIVE

INDICATIONS FOR CYTOMEGALOVIRUS (CMV) NEGATIVE BLOOD COMPONENTS
NEWLY DIAGNOSED PATIENTS WHO ARE POSSIBLE CANDIDATES FOR HCST REQUIRE A CMV SCREEN AT PRESENTATION TO MRHT PRIOR TO TRANSFUSION.
➢ In **Pregnancy** (Antenatally) NOT required during labour, delivery or thereafter
➢ **Granulocyte transfusions** - required if recipient is CMV seronegative ➢ **Paediatrics up to 6 months of age** ➢ **Haematology / Oncology children** (shared care with Our Lady's Children Hospital Crumlin) not usually required if >6 months old but check individual requirements with CHI.

Gamma Irradiated blood components

- Certain groups of patients are at risk of developing Transfusion Associated Graft-versus-Host Disease (TA-GVHD) if given red cells or platelets. Treatment of blood components with 30Gy gamma irradiation kills any remaining lymphocytes in these products, which might otherwise cause TA-GVHD in susceptible patients.
- Gamma Irradiated blood components are recommended for specific patient groups as outlined in table below.

INDICATIONS FOR IRRADIATED BLOOD COMPONENTS
ALLOGENEIC HSCT recipients (Adult and Paediatrics) require irradiated components from the time of initiation of conditioning chemo/radiotherapy and should be continued ▪ Until **> six months** have elapsed since the transplant date ▪ The patient is free of GvHD (Not on GvHD prophylaxis or treatment) ▪ Lymphocyte count is >1.0 x 10^9/L ▪ The patient is off all immunosuppression Unless conditioning, disease or previous treatment determine longer/indefinite duration
AUTOLOGOUS HSCT recipients require irradiated components from initiation of conditioning chemotherapy/radiation therapy to **three months post-transplant** (6 months if Total Body Irradiation used in conditioning) unless conditioning, disease or previous treatment determine longer/indefinite duration
POTENTIAL RECIPIENTS OF ALLOGENEIC HSCT from Day 1 of conditioning.
Patients with **HODGKIN'S DISEASE** - ***lifelong requirement***
SPECIFIC CHEMOTHERAPY ➢ All patients receiving immunosuppressive therapy with **anti-thymocyte globulin (ATG)** e.g. Aplastic Anaemia – usually for **6 months** post treatment or until CD4 count >200x10^9/l ➢ Patients who received specific **purine analogue therapies** that profoundly suppress T4 cells - ***lifelong requirement*** e.g. Fludarabine, Pentostatin (Deoxycoformicin), Cladribine, Clofarabine, Bendamustine. *This list is subject to change and is not exhaustive*. **For additional clarification contact Haematology team**.

➢ Haematology patients receiving **Alemtuzumab** (e.g. Campath) usually **six months** post treatment or until CD4 count >200x10^9/l whichever is first. Note - not required for rituximab
Chimeric antigen receptor T-Cell (CAR-T) therapy - for **three months** after infusion unless conditioning, disease or previous treatment determine longer / indefinite duration. *Contact Consultant Haematologist for advice.*
DONORS HSCT 7 days prior to & during harvest
DONORS undergoing harvesting of peripheral blood lymphocytes 7 days prior to & during harvest
All Granulocyte transfusions
HLA matched donations - (sharing of HLA haplotype)
All adults & children who are to receive **blood donations from** first and second degree **relatives**
Intra-uterine & subsequent transfusions up to 6 months after expected delivery date (40 weeks gestation). Transfuse red cells within 24 hours of irradiation.
Exchange transfusions of the newborn for up to 6 months after expected delivery date. Transfuse red cells within 24 hours of irradiation.
All Suspected and confirmed severe **T Lymphocyte immunodeficiency syndromes.**
All Haematology /Oncology children (shared care with Our Lady's Children Hospital Crumlin) unless otherwise specified.

5.3 SAMPLE COLLECTION

- **Only one patient is bled at a time to minimize the risk of error.**
- If the patient is not wearing a hospital identity band (ID band), blood must not be taken until one is applied. This is not required if sample is for group and screen of an outpatient e.g. maternity outpatient instead the patient should be asked to state and spell (if able) their surname, first name(s) and date of birth.
- If at any stage the ID band is removed *e.g.* for cannulation, then it is the responsibility of the person who removed it to re-apply a new ID band immediately.
- **ENSURE PATIENT IS WEARING THE CORRECT ID BAND - CHECK PATIENT IDENTIFICATION NUMBER (CHART NUMBER) IN CASE OF TRANSFER FROM ANOTHER HOSPITAL**
- Check expiry date of sample bottle before collecting the sample.
- The patient's identity must be re-established if the collector leaves the patient's location prior to initiating the sample collection procedure.
- It is recommended where possible to take the sample from an alternative limb to the one where fluids are infusing. Where the sample must be taken from the same limb, stopping the infusion before taking the sample and choosing a vein distal to the infusion is recommended.
- Blood samples must not be obtained from the tubing of an intravenous set or drawn from a vein in which an intravenous solution is being infused.

Blood Collection Using the BloodTrack System

- BloodTrack is fully integrated with the blood transfusion laboratory's electronic transfusion management system.
- The *collect samples* module is used when collecting a BT blood sample.
- **To use the system, the patient must be wearing an electronic wristband with name, date of birth and chart number recorded in both a 2D barcode and eye readable format.** This provides positive patient identification by reading directly from the 2D barcode on the patient's wristband every time a blood sample is taken.

- The ID cards of staff members trained in sample collection contain their user ID (electronic signature) - **hence ID cards MUST never be loaned to another person.**
- For further details on Patient Identification and Specimen Collection for Blood Transfusion refer to: **T/HVBT/GL/001** *"Guideline for Sample Labelling and Completion of the Request form for Blood Transfusion"* **(available in the clinical areas on Q-Pulse)**.
- For training on BT sampling or access to use BloodTrack contact the Haemovigilance Officer or Blood Bank refer to section 3.0 for contact details.

5.4 SAMPLE LABELLING

IMPORTANT:

- Sample tubes must not be labelled in advance of sample collection and must be accurately labelled BEFORE leaving the patient.
- DO NOT copy patient details from the patient's notes or charts, copy from the patient ID band once verified that it is correct.
- DO NOT apply a computer generated label/addressograph label to the sample.
- Check the expiry date of the sample tube.
- **NOTE- IF SAMPLE IS TAKEN USING THE PDA SYSTEM- DO NOT ADD ANY OTHER ADDRESSOGRAPH LABEL TO THE SAMPLE BOTTLE**
- **Evidence of any other type of labelling or interference with the sample label will result in REJECTION of the sample.**

Either a BloodTrack PDA generated label or legible hand written sample are acceptable.

Details **must** include:

- Patient Identification Number (chart number)
- Patient's surname and first name/s (unabbreviated)
- Date of Birth
- Signature or initials of the collector

In addition, date and time of collection should be included where possible.

Following sample labelling, ensure that the request form and the sample tube have identical patient information.

5.5 HANDLING AND TRANSPORT OF SAMPLES

To protect the safety of all healthcare staff the following precautions for the transportation of samples must be followed:

- The outside of the sample tube must not be contaminated with blood.
- Blood-stained laboratory request forms must not be submitted.
- Samples must be placed in the plastic bag that is attached to the request form.
- Samples can be transported to the laboratory at room temperature.
- Samples can be transported in a red carrier in the hospital chute system to Blood Transfusion. Destination number- (8385 routine hours and 8351 on call hours)

5.6 SAMPLE REJECTION/SAMPLE AMENDMENTS

TO PREVENT SAMPLE REJECTION, WE ENCOURAGE THE USE OF BLOODTRACK TX

Blood Bank staff are only authorised to accept samples which meet the required standard.

If labelling requirements are not met, the Blood Bank will do the following:

- In the case of minor discrepancies, Blood Bank staff may contact the person who collected the blood sample and request that they correct the error.
- If the collector is unavailable, or in the case of major discrepancies, Blood Bank staff will request a new sample and request form. The original sample will be discarded.

Samples **will** be rejected in the following circumstances and new request forms and samples will be requested:

1. Unlabelled request form
2. PDA label or other sample labels used as identifiers on the request form in place of addressograph label or handwritten details.
3. Unlabelled sample
4. No/Incorrect Patient Identification Number (chart number) on sample/form
5. Sample labelled with computer generated label (Blood Track PDA generated label is the only label accepted on BT samples)
6. No forename on the sample/form

7. No surname on the sample/form
8. Incorrect spelling or very misspelled surname on the sample/form
9. No DOB on the sample/form
10. Incorrect DOB, more than one date
11. No signature on the sample of the person who took the sample
12. Sample unsuitable *e.g.* gross haemolysis
13. Sample showing evidence of breakage or leaking
14. Sample insufficient volume (dependent on test requests)
15. Sample greater than 24 hours' old
16. Incorrect sample type
17. Expired sample bottle
18. Evidence of non-PDA label on sample bottle/other labelling/interference with label.

The patient care area will be informed if the sample is rejected. If the request is urgent the requesting practitioner will be informed directly. A report form, informing of the sample rejection will also be sent to the requesting area.

In a critical situation, emergency group O Rh (D) negative red cells can be issued until a new sample is received, testing is complete and compatible blood can be provided.

Where a dispute arises in relation to a sample, the final decision on suitability for testing will lie with the Consultant Haematologist or Chief Medical Scientist.

5.7 EMERGENCY SITUATIONS INCLUDING SAMPLING

Critical Samples (life or death situation)

- For all critical samples the ward must phone the laboratory in advance to inform them that a critical sample is being sent and must be processed immediately.
- The person requesting the test may write "critical" on the request form if they wish. The sample can be delivered by chute or by hand.

Urgent Blood Transfusion specimens during routine hours:

- During routine laboratory hours please telephone urgent requests to ensure priority processing and to ensure Group & Screen results are available for patients going to theatre.

Urgent Blood Transfusion specimens out of hours:

- The Medical Scientist on call MUST be contacted for **all Blood Transfusion specimens out of normal working hours.** The Medical Scientist on call can be contacted through the switch board (**Ext.** 3000).

Sample labelling for unidentifiable patients:

- For an unidentifiable/unconscious patient, whose identity cannot be established, two identifiers are mandatory for completion of the Blood Transfusion Request Form and labelling of the sample tube.
- These are
  a) Patient Identification Number (chart number)
  b) Patient Gender (*e.g.* unknown male or unknown female).
- The sample is labelled with date, time sample taken, signature of the sample collector and bleep number if applicable.
- **Where possible, every effort should be made to take a sample from the patient prior to transfusion of any emergency O Rh (D) Negative blood.**
- As more information regarding patient identity becomes available, the Blood Bank must be informed and a new sample, fully labelled, should be sent to the Blood Bank for retrospective checks, once the patient is stabilised.

Urgent Requirement for Blood Components.

- If the need for blood components is urgent, notify the Blood Bank by telephone.
- The following information will be required:
  - Patient's identification number (chart number) the same as supplied on the sample and form.
  - Patient's location.
  - Number and type of components/products required.
  - Name of person requesting the components/products
- In emergency situations a Telephone Request is acceptable but should be followed up with an Additional Test/Additional Component Orders Form when time permits.
- In an emergency, full compatibility testing may not be able to be performed before the issue of blood. Two Group O Rh (D) negative red cell units are available for immediate issue in the blood issue fridge.
- There is still a **requirement** to submit **a sample for testing** as soon as possible.

- ***As a guide*** the following timescale applies – for one patient only assuming a confirm sample is NOT required.

Time interval (guide)	Tests Completed	Units Supplied (2- 6 units max)
0 – 10 mins	None	Emergency O Rh (D) Negative blood
10 –30 mins	Blood Grouping only	ABO and Rh (D) Group compatible uncrossmatched blood.
45 mins	Blood Group and Antibody Screen -Antibody screen negative	ABO and Rh (D) group compatible crossmatched blood.
>45 mins	Blood Group and Antibody Screen - Antibody screen positive	ABO and Rh (D) group compatible crossmatched. This will depend on the antibody identified and the availability of compatible units.
40 mins	Issue of Plasma	Issue of max 4 Group compatible LG-Octaplas Units.
2-3 hours	Issue of Platelets	Order, delivery and issue of platelets from IBTS.
0-10 min	Issue of coagulation factors e.g. Fibrinogen	Issue of the required dose of coagulation factors requested.

Emergency O Rh (D) Negative units will be issued with compatibility labels and compatibility reports stating **"Uncrossmatched blood, Group, Rh and Kell checked. Note: O Positive RCC and other Blood Products can be issued on this number as required" .**

Emergency O Rh (D) negative blood *should not* be used for elective and/or non-critical patients with red cell antibodies, as these units are not typed for all antigens.

5.8 GP REQUESTS FOR BLOOD GROUPS

- The Blood Bank routinely processes hospital transfusion samples only.
- The Blood Bank is unable to process samples from GP surgeries, except for urgent medical reasons. Contact the Blood Bank in advance.
- A hard copy of the report will be sent to the GP only.
- Please note: Blood groups are not reported over the phone or reports are not faxed.
- Blood group reports are also not available on Healthlink.

5.9 ANTENATAL SAMPLES

- All antenatal samples for blood grouping are sent to MRH @ Mullingar using the Mullingar Ante-natal Blood Transfusion Form.
- Samples from antenatal patients will only be tested in the Blood Bank in MRHT if there is a medical emergency where the patient must be treated in MRHT. Normal MRHT collection and labelling procedures must be followed.

MRH @ Mullingar provides the service for termination of pregnancy. This service is inclusive of the provision of prophylactic Anti-D for Rh-D negative persons.

5.10 CONCESSIONARY RELEASE OF BLOOD AND BLOOD PRODUCTS

- Concessionary release of blood components or blood products, or acting contrary to a Standard Operating Procedure (SOP) is sometimes the necessary and appropriate course of action in the best interest of the patient.
- To act contrary to an SOP requires prior authorisation or justifiable authorisation as soon after as is practical, by the Consultant Haematologist or other suitably competent person who should discuss the clinical consequence with the clinicians in charge of the patient.

- Conditions that require concessionary release:
    - Use of RhD Positive blood for a RhD Negative patient who would normally be excluded from receiving RhD Positive units (excluding group changes in Massive Transfusion situations, as this is pre-approved).
    - Use of antigen positive or un-typed red cells in patients with atypical red cell antibodies
    - Issue of red cells to patients with AHIA without the necessary exclusion of underlying antibodies. This is the only circumstance where "least incompatible" red cells might be the best option.
    - Issue of components that do not meet known special requirements e.g. CMV negative, Irradiated or platelets in "PAS".
    - Where it is necessary to act contrary to an SOP in the best interest of the patient.

6. INFORMATION ON COMPONENTS AND PRODUCTS

6.1 CONSENT AND PATIENT INFORMATION LEAFLETS

- In a situation where a patient requires a blood transfusion as part of medical treatment, the doctor should explain to the patient the proposed transfusion treatment and obtain **verbal consent**. This should then be documented on the patient's Blood Transfusion Prescription Record Sheet (BTPRS) and/or chart. Tick boxes are located on the BTPRS for documenting provision of an information leaflet and gaining of verbal consent.

- Patients have a fundamental legal and ethical right to consent to or refuse treatment. For guidance healthcare workers must refer to the hospital consent guidelines for direction in relation to consent or refusal of treatment.

- Blood Transfusion Information Leaflets are available in each clinical area. (Please inform the HVO or BT laboratory if your clinical department requires additional leaflets)

- There are circumstances where obtaining verbal consent and issuing a patient information leaflet may not be practicable/necessary e.g.;
  - Unconscious/impaired patients are unable to be consented but where possible relatives in attendance should be advised of the immediate plan of care.
  - Patients who are regular transfusion recipients and receive blood components/products as part of their maintenance therapy do not require to be re-issued with a Patient Information leaflet on every transfusion episode but verbal consent from these patients should be obtained and recorded on the BTPRS e.g. patient(s) who have been diagnosed with chronic Haematological disorders or Oncology/ Haematology patients who require 'top up transfusion therapy'. In these instances, the patient's management plan should be readily accessible in the patient health care record.

- If the patient is unable to understand the leaflet (e.g. child or language barrier) then the information should be related to them in a language they understand. This may necessitate requesting an interpreter.

- **Day Patients** discharged from hospital following the transfusion should be supplied with the current Blood Transfusion information leaflet and relevant hospital contact numbers. This leaflet lists the signs and symptoms of transfusion reactions.

6.2 PRESCRIPTION OF BLOOD COMPONENTS AND PRODUCTS

1. Blood components and blood products must be prescribed by a medical practitioner.
2. The BTPRS is used for the prescription and administration of Red Cells, Plasma, Platelets and Factor Concentrates only. All other blood based products, for example Albumin and Anti D should be prescribed on the Drug Prescription Sheet.
3. Each unit must be prescribed individually with exception of a **massive transfusion** (The back page of the BTPRS allows for documentation of units in the case of a massive transfusion or an emergency)**.**
4. Each section of the prescription must be written in clear, legible writing stating:
    - Date of transfusion.
    - Component/Product type (State actual volume for paediatrics)
    - Indicate if any special requirements are needed for this patient. See section 5.2 (CMV Neg & Irradiated)
    - Rate of transfusion of component/product
    - Pre transfusion haematology value
    - Reason for transfusion
    - If any specific drugs are to be administered pre, post or with the transfusion they must be prescribed on the patient's Drug Prescription and Administration Record. Enter a tick in the box provided if transfusion related medication is required
    - The Doctor must sign **and** print their name and include their medical council number in the space provided.

5. A transfusion prescription is valid for two days (exception is the standing order in place within the Haematology Service).
6. A transfusion prescription is cancelled by a medical practitioner by drawing a line through the prescription. Date and sign to show when cancelled and by whom.

6.3 MAXIMUM BLOOD ORDERING SCHEDULE (MSBOS) AND BLOOD STOCK MANAGEMENT

- The MSBOS for the hospital are currently available for
  a) General Surgical
  b) Orthopaedics
  c) Ear Nose and Throat (ENT).
- Check Q-Pulse for the current version.
- Single unit transfusions in the non-bleeding patient followed by reassessment of the patient clinically with a post transfusion FBC is advised to determine if further transfusion is required.
- Crossmatched blood is routinely held for approximately 48 hours from issue. The Blood Bank must be notified if the surgery date or blood requirement is changed as crossmatched blood will be returned to stock after 48 hours and can be made available for another patient.
- The Blood Bank requests that inappropriate/unnecessary requests for blood are avoided as this places a burden on a very limited and precious resource of blood.

6.4 BLOOD TRANSFUSION REPORTS

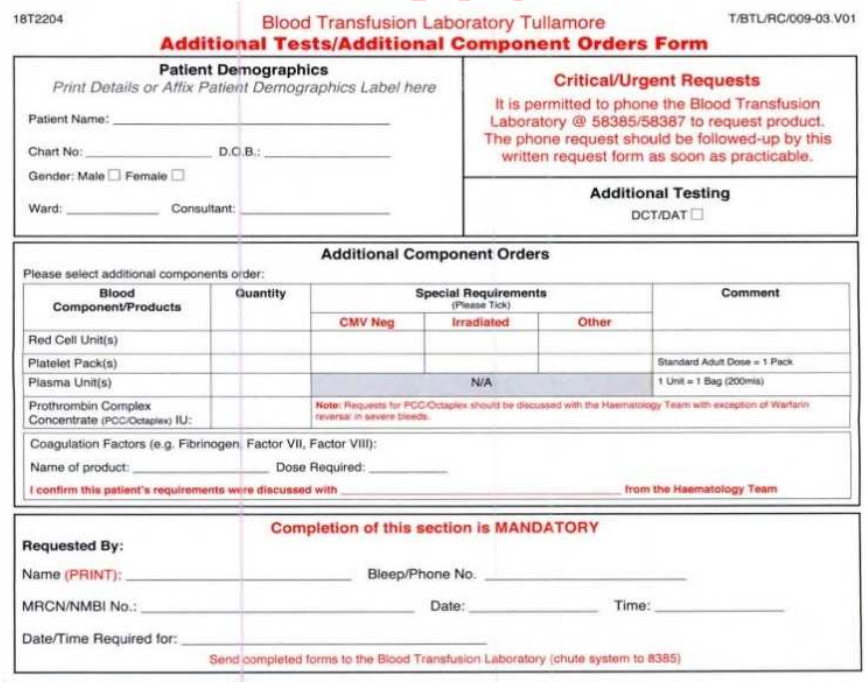
Blood Bank reports are delivered to the wards via the hospital chute system once they are authorised. The reports can be collected from the laboratory if available earlier.

It is the responsibility of the ward staff/doctor to ensure the Blood Transfusion report is available prior to theatre.

Blood Bank staff will never give verbal reports of blood groups over the phone.

6.5 ADDITIONAL TEST REQUESTS

- **Additional requests for blood** components/products **post reservation of the initial pre transfusion sample** (*e.g.* add crossmatch request) are made by sending an "Additional Test/Additional Component Orders Form" (T/BTL/RC/009-03).
- Complete all required sections of this form and sent it to the BT laboratory via the chute system.
- Blood Products will not be released until the Additional Test request has been received in the Blood Bank.
- Where this request is urgent - notify the Blood Bank by telephone when the Additional Test/Additional Component Orders Form has been sent.
- In emergency situations a Telephone Request is acceptable but should be followed up with an Additional Test/Additional Component Orders Form when time permits.



18T2204 — Blood Transfusion Laboratory Tullamore — T/BTL/RC/009-03.V01

Additional Tests/Additional Component Orders Form

Patient Demographics

Print Details or Affix Patient Demographics Label here

Patient Name: _____

Chart No: _____ D.O.B.: _____

Gender: Male ☐ Female ☐

Ward: _____ Consultant: _____

Critical/Urgent Requests

It is permitted to phone the Blood Transfusion Laboratory @ 58385/58387 to request product. The phone request should be followed-up by this written request form as soon as practicable.

Additional Testing

DCT/DAT ☐

Additional Component Orders

Please select additional components order:

Blood Component/Products	Quantity	Special Requirements (Please Tick)			Comment
		CMV Neg	Irradiated	Other	
Red Cell Unit(s)					
Platelet Pack(s)					Standard Adult Dose = 1 Pack
Plasma Unit(s)		N/A			1 Unit = 1 Bag (200mls)
Prothrombin Complex Concentrate (PCC/Octaplex) IU:		Note: Requests for PCC/Octaplex should be discussed with the Haematology Team with exception of Warfarin reversal in severe bleeds.			

Coagulation Factors (e.g. Fibrinogen, Factor VII, Factor VIII):

Name of product: _____ Dose Required: _____

I confirm this patient's requirements were discussed with _____ from the Haematology Team

Completion of this section is MANDATORY

Requested By:

Name (PRINT): _____ Bleep/Phone No. _____

MRCN/NMBI No.: _____ Date: _____ Time: _____

Date/Time Required for: _____

Send completed forms to the Blood Transfusion Laboratory (chute system to 8385)

The above request form is document controlled and subject to change.

6.6 COLLECTION OF BLOOD COMPONENTS AND PRODUCTS

Only trained collectors (specified multi task attendants e.g. house porters and health care assistants) can collect the blood products from the fridge in the blood issue room or the Blood Transfusion Laboratory. Blood or blood components can never be transported to the ward in the hospital chute system. If a trained collector is not available, contact the medical scientist on duty.

6.7 TRACEABILITY OF BLOOD COMPONENTS AND PRODUCTS

It is a **legal requirement**, that all blood components/products dispatched from a transfusion laboratory are 100% traceable as required by the EU Blood Directive 2002/98/EC.

When BloodTrack Tx has been used there is no requirement to complete the traceability label (automatic fating).

Where the transfusion is recorded manually (e.g. Octaplex or O Negative Emergency Red Cells) the traceability label must be detached from the unit, once the first few millilitres have been infused and completed by either of the administrators: - Signature, Printed name, the date and time commenced. Place completed label in an envelope marked ***Blood Transfusion Lab*** and return to the transfusion laboratory.

6.8 RED CELL CONCENTRATE (RCC) - INFORMATION

Indication for RCC is to increase the oxygen carrying capacity so as to improve tissue oxygen delivery.

RCC is ordered from the BT laboratory by completing in full a BT request form and providing a correctly filled and labeled sample.

If a previous G&S was taken within the last 72 hours you may send an Additional Tests Additional Component Orders Form (T/BTL/RC/009-03). Please phone the Blood Bank to check sample validity, if unsure, before taking a sample from the patient.

The Volume of RCC is stated on each pack and is approximately 285 mls.

A guideline T/HVBT/GL/009 - Guideline for Prescribing Red Cells in Midland Regional Hospital Tullamore is available on Q-Pulse. The purpose of this document is to provide guidance for decision making in regard to Red Cell prescribing. Its purpose is not prescriptive or to replace clinical judgement. However, the guideline is aiming for more restrictive thresholds for patients who need Red Cell transfusion but do not have Major Haemorrhage or Acute Coronary Syndrome. This guideline provides information on preventing Transfusion Associated Circulatory Overload.

Transfusion Rate

- Except in the massive transfusion setting, transfusion rates for blood should not exceed 2-4 mls/kg per hour.
- **For routine administration there is extensive experience of safely administering a unit of RCC over 90 to 120 minutes** (BSH 2017).
- Note however from starting the infusion of **RCC** (i.e. puncturing the blood pack with infusion set) to completion of the RCC transfusion, *a maximum of four hours must not be exceeded*.
- If the IV cannula, tissues while a blood component/ product is in progress, the cannula must be re-sited within **thirty minutes** otherwise the blood component/product must be discarded.

Blood Administration sets

- Blood administration sets must be changed after every two units of RCC/platelets or six hourly whichever comes first.
- A new blood administration set must be used if changing to a different blood component/ blood product type.
- Multiple blood components administered sequentially through the same set should be ABO compatible.
- In the **massive transfusion** setting the blood administration set may be changed as frequently as practical while observing the previous two points.

Patients at risk of cardiac failure

- Clinical assessment of patients at risk of cardiac failure should include an evaluation of the patient's age, body weight and concomitant medical conditions that predispose to Transfusion Associated Circulatory Overload (TACO): cardiac failure, renal impairment, hypoalbuminaemia and fluid overload. These factors should be considered when prescribing the volume and rate of the transfusion, and in deciding whether diuretics should be prescribed (BCSH 2012).
- A pre-transfusion Risk assessment for TACO should be performed wherever possible as TACO is the most commonly reported cause of death and major morbidity (SHOT 2017 Bolton-Maggs) see T/HVBT/GL/009 – Guideline for Prescribing Red Cells in Midland Regional Hospital Tullamore.
- Single unit red cell transfusions are recommended where possible, especially in non-bleeding patients (BSH 2017).
- In very low weight/at risk patients, it may be advisable to transfuse units with an interval of 24 hours between each unit, in combination with pre-transfusion diuretics (NHO 2012). Paediatric transfusions should be prescribed in mls.
- Consider rate of 1ml/kg per hour (NHO 2010).

6.9 PLATELETS - INFORMATION

- For clinical advice contact the Consultant Haematologist(s). Indications for use are detailed in Guideline T/HVBT/GL/006 "The Administration of Blood Components and Products", current revision.
- Platelets are usually not kept in stock and may need to be ordered from IBTS, on a named patient basis.
- If there is no previous sample- Platelets are ordered by completing a BT request form and providing a correctly filled and labeled sample. Refer to Section 4.6 Confirm sample requirements.
- If a previous G&S was sent, then you may send an Additional Tests Additional Component Orders Form (T/BTL/RC/009-03) to order platelets.

- Note: Only one bag of platelets may be ordered at a time for adults, paediatrics and neonates unless there is a strong indication for more than one bag. The Consultant Haematologist will advise.
- Standard dose is 1 bag. Should raise the count by approx **20 x10^9/L** but more may be required for active bleeding.
- Children < 20 kgs dose = (10-20 mls/kg).
- Platelets are either pooled (4 to 5 donors), apheresis (single donor) and in some cases HLA matched (usually for patient's refractory to regular Platelets)
- Failure of the platelet count to rise to/above the target should be discussed with the Consultant Haematologist.
- In the event of a massive haemorrhage, you may need to order platelets before laboratory results are available. However, it is important to take the FBC beforehand as this will serve as a baseline.
- Allow a minimum of 3 hours for transportation and issue.
- Platelets can be stored in the Platelet Agitator until expiry.
- Each dose of platelets should be transfused over a period of 30–60 minutes. Must be completed within 4 hours.
- **A 30 to 60-minute platelet count post infusion to assess the effectiveness of the treatment is recommended, especially if the patient's responsiveness is unknown.**

6.10 PLASMA (LG OCTAPLAS) - INFORMATION

- Plasma is available as LG Octaplas for group A, B, AB and O. The objective of a plasma transfusion is to replace clotting factors where there is evidence of critical deficiencies.
- For clinical advice contact the Consultant Haematologist(s).
- Indications for use are detailed in Guideline T/HVBT/GL/006 "The Administration of Blood Components and Products," current revision.

Dosage:

- The **Dosage** of plasma is determined by the clinical condition of the patient and the underlying disease.
    - The **volume** per unit is 200mls.

- Dose 12-15mls/kg is a generally accepted starting dose e.g. 70 Kg adult = 840mls-1050mls/70kg = 4 - 5 units/bags.
- In patients with widespread microvascular oozing, plasma dosage may need to be given up to 30mls/kg.

- The laboratory should be notified at least 40 minutes in advance as these units must be thawed and issued.
- If no previous sample - Plasma is ordered by completing a BT request form and providing a correctly filled and labeled sample. Refer to Section 4.6 Confirm sample requirements.
- If a previous G&S was sent then you may send an Additional Tests Additional Component Orders Form (T/BTL/RC/009-03).
- **LG Plasma – Octaplas (O, A, B or AB)** must be used within 8 hours of thawing when stored at room temperature and within 24 hours if stored at 4ºC in laboratory controlled fridge.
- It is advisable to repeat the Coagulation screen post infusion of plasma products.

6.11 FIBRINOGEN

Fibrinogen concentrate (e.g. Riastap) is available from the blood bank for the treatment of patients with acquired hypofibrinogenaemia, for example in patients with disseminated intravascular coagulation, severe blood loss, or failure of hepatic synthesis.

Dosing – For information on Fibrinogen Concentrate see T/HVBT/GL/007 "The use of Factor Concentrates" and the product information leaflet with the fibrinogen concentrate.

- 1 g of Fibrinogen concentrate will raise plasma fibrinogen by .25g/L.
- Where possible a coagulation sample requesting fibrinogen level should be taken prior to requesting Fibrinogen Concentrate.
- If plasma fibrinogen level is <1.5g/L, the usual dose is 2-4g.

For clinical advice contact the Consultant Haematologist(s).

6.12 COAGULATION FACTORS - INFORMATION

For clinical advice contact the Consultant Haematologist(s).

Guideline T/HVBT/GL/007 "*The use of Factor Concentrates*" is available on Q-Pulse.

A BT request form or Additional Tests Additional Component Orders Form (T/BTL/RC/009-03) must be sent to the Blood Bank, stating the dose and name of the required product and time required.

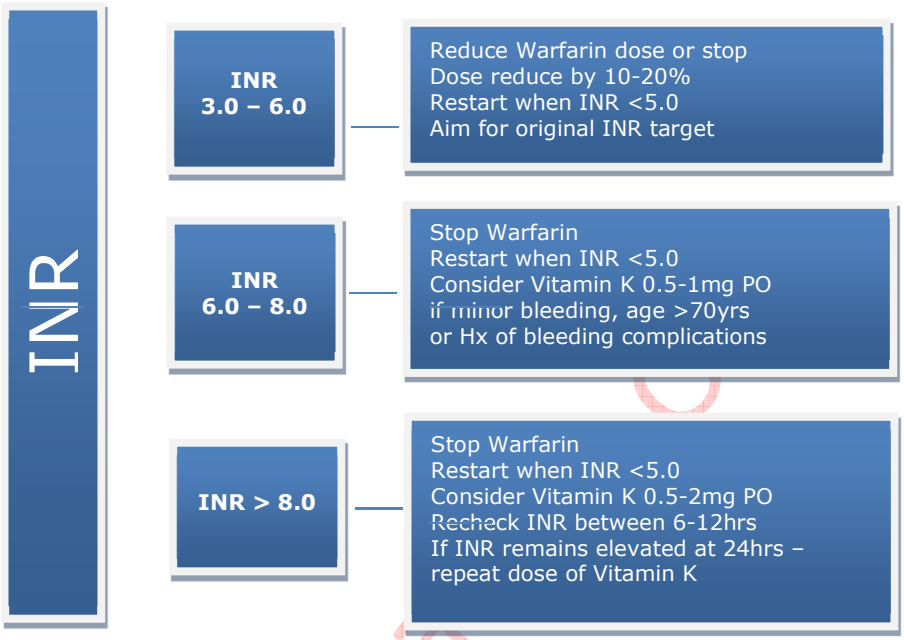
The Coagulation Factors that are currently in stock and proposed uses are listed below. Note coagulation products are sourced nationally hence product names may change from those listed.

Coagulation Factor	Proposed Use
Prothrombin Complex Concentrate (e.g. Octaplex) *	➢ Warfarin overdose with bleeding ➢ Peri operative prophylaxis
Fibrinogen Concentrate (e.g. Riastap)	➢ For correction of fibrinogen deficiency (e.g. acquired due to DIC) in patients who are bleeding or require procedures.
Recombinant Activated Factor VII (e.g. NovoSeven)	➢ Haemophilia with inhibitors. ➢ FVII deficiency. ➢ Glanzmann's Thrombasthenia. ➢ May also have a role in the correction of coagulopathy associated with severe bleeding where other treatments have failed.
Human Coagulation Factor VIII (e.g. Wilate)	➢ Severe Von Willebrand's Disease
Recombinant Coagulation Factor VIII (e.g. Elocta)	➢ Treatment of Haemophilia A
Recombinant Factor IX (e.g. Alprolix)	➢ Treatment of Haemophilia B

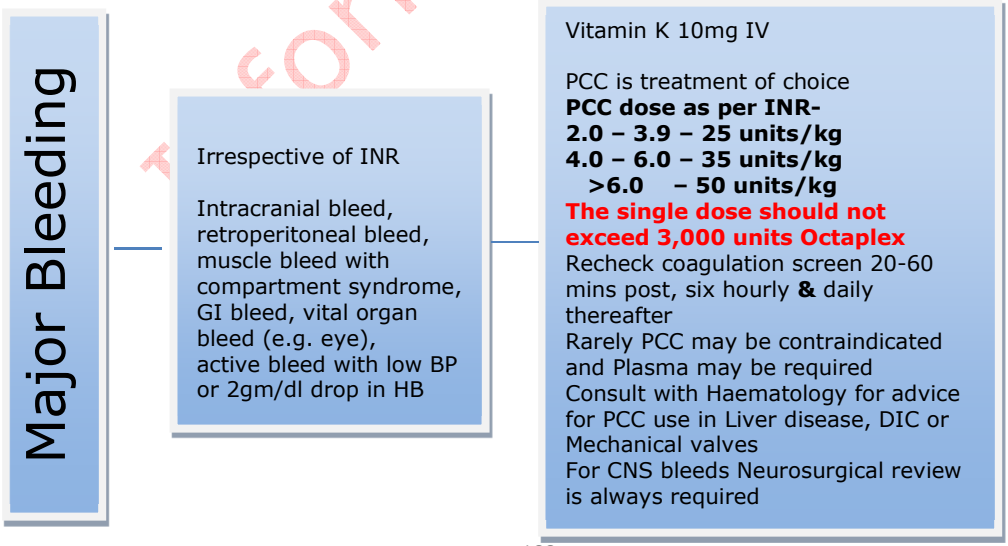
*Prothrombin Complex Concentrate (Octaplex) is currently the product of choice for the reversal of the effects of Warfarin. Off licence use of PCC may be recommended for major haemorrhage secondary to a Direct Oral Anticoagulant (i.e. Anti Xa inhibitor only) in life threatening/major bleed but seek Haematology advice.

6.13 REVERSAL OF WARFARIN

ELEVATED INR – NONE or MINOR BLEEDING



ELEVATED INR – MAJOR BLEEDING



PLANNED SURGICAL PROCEDURES

Planned Surgery

All patients should have their anticoagulation reviewed in advance
Stop Warfarin 5 days in advance of surgery
Check INR day before surgery
If INR not fallen sufficiently consider Vitamin K 5mg

Risk of VTE with interruption of anticoagulation varies according to indication and co-morbidities
All patients should be stratified according to their risk for VTE and risk for bleeding
If high risk of Thrombosis contact Haematologist for advice on bridging anticoagulation
Inappropriate use of PCC for planned surgical procedures is costly and may expose patients unnecessarily to blood products

EMERGENCY/URGENT SURGERY OR PROCEDURE

Emergency Surgery

If surgery can be delayed (but necessary within 3 days) reverse anticoagulation with Vitamin K 2mg – 5mg IV or PO to reduce INR to <1.5

If immediate surgery required, Vitamin K 5mg -10mg +/- PCC or Plasma may be required

Discuss with Haematology

Repeat Coag screen pre surgical intervention (as per guidelines)

6.14 REQUESTS FOR ALBUMIN

- Indications for Albumin use are detailed in Guideline T/HVBT/GL/006 "The Administration of Blood Components and Products," current revision.
- I**ndications for Human Albumin Solutions:** There are no absolute indications for the use of Human Albumin Solution (see product insert).
- **Availability:** Available from the Blood Issue Room (in Pathology Dept)
  - 20% human albumin (100mls) and 5% albumin (500mls) are available.
  - A Blood Transfusion collection slip is completed and the product collected by a porter (multitask attendant) or Health Care Assistant.
- Note albumin products are sourced nationally hence product names and volumes may change.
- **Prescription and Administration of Albumin**
  - Albumin is prescribed on the drug Prescription Record sheet.
  - The batch number of the product is recorded on this form.
  - Albumin solutions are administered using a standard intravenous administration set.

6.15 UNUSED BLOOD PRODUCTS/COAGULATION FACTORS

- Any blood products taken by the clinical area and unused must be returned to the Blood Bank.
- Unused units of Red Cells that have been out of Blood Bank fridge for **more than 30 minutes** must be returned to the Blood Bank Medical Scientist (not fridge) if not being used. However, these units may be transfused **within 4.5 hours** to that particular patient from the time they were originally removed from the fridge.

6.16 TRANSFER OF BLOOD TO OTHER HOSPITALS

- Transportation procedures for blood to other hospitals are strictly controlled. Where blood needs to be transferred with the patient, **contact the Blood Bank** so that blood can be appropriately packed in a BC15 cooler and the documentation prepared.
- At least ***15 minutes' notice*** is required for blood which has already been prepared/crossmatched.

- **Please note** all unused units of blood should be returned to the Blood Bank at MRHT in the BC15 cooler, unless the hospital receiving the patient specifically asks to retain it.
- Guideline **T/HVBT/GL/017** "Internal Transport of Blood Components/Products in MRHT and the Transport of Blood Components/Products externally with a patient" is available in the clinical areas.

6.17 MASSIVE TRANSFUSION (MAJOR HAEMORRHAGE)

Definition of a Massive Haemorrhage:

A massive/major haemorrhage may result in significant patient morbidity or mortality and hence early recognition and commencing appropriate management as soon as possible is the goal.

There are many **definitions of "Massive Haemorrhage**" usually based on volume of blood loss or volume of blood transfused.

a) The most widely used definition proposes the loss or transfusion of one blood volume (about 7% of body weight in adults – adult blood volume is approximately 70ml/kg) over 24 hours; or approximately 10 units of red blood cells (NBAA 2011).

b) An ongoing transfusion requirement in an adult of >150mls per minute.

c) Replacement of > than 50% of blood volume in $\leq$ 3 hours.

A Major Haemorrhage may be described as bleeding which leads to a heart rate more than 110 beats/min and/or systolic blood pressure less than 90 mmHg (Hunt et al 2015).

Guideline **T/HVBT/GL/014** "A guideline for the use of Blood in the Management of a Massive/Major Haemorrhage" is available on Q-Pulse. The poster for Acute Massive/Major Blood Loss Template is displayed in the relevant clinical areas.

In addition a **Massive Transfusion Protocol is in place in the Emergency Department**. All staff to which this is applicable should be aware of how to activate and use this protocol.

In the event of a Massive or Major Haemorrhage **contact key personnel** and inform them that a "Massive Haemorrhage" is in progress. This is done directly by phone / pager / or via switchboard by stating clearly the personnel you want contacted.

6.18 TRANSFUSION REACTION INVESTIGATION

In the case of a **suspected Blood Transfusion reaction** clinical staff should refer to the Guideline **T/HVBT/GL/005** *"Management of Adverse Transfusion Reactions and Events"* available on Q-Pulse which lists Signs and Symptoms, Causes, Management and Investigations required for Acute and Delayed Transfusion Reactions. If further advice required contact the Consultant Haematologist(s)/Registrar for advice (via the switch board).

Depending on the type of reaction - Samples required may include

- Returning blood pack with giving set attached and spigotted
- Repeat CXM sample to include Direct Coombs Test (EDTA sample)
- **Cultures:** - If patient is febrile blood cultures (peripheral and in dwelling lines)
- FBC with reticulocyte count and blood film
- Coagulation Screen
- U/E to include renal profile, LDH and serum bilirubin
- Urine sample for haemoglobinuria and urobilinogen
- Further investigations as per Haematologist and Transfusion Medical Scientist's instruction.

7. SAMPLE RETENTION

Primary samples are stored for 72hrs during which they are available for any additional patient requirements.

After the 72hrs have elapsed samples are retained for an additional 11 days in case any further investigations i.e. Delayed Serological Reaction need to be carried out.

8. QUALITY ASSURANCE

The Blood Bank participates in the following Quality Assurance Schemes

Distributor	QA Programme
UK National External Quality Assessment Scheme (UK NEQAS) Irish External Quality Assessment Scheme (IEQAS) Welsh Assessment of Serological Proficiency Scheme (WASPS)	1. ABO and RhD grouping 2. Antibody Detection 3. Antibody Identification 4. Antigen-typing 5. DAT 6. Crossmatching

EXTERNAL TESTS

CONTENTS

1. INTRODUCTION

1.1 HANDLING AND TRANSPORT OF SAMPLES

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1. INTRODUCTION

An extensive range of tests are referred to a large number of external/reference laboratories. These tests and laboratory location are listed in the Test Index of this User Manual. For information regarding the accreditation status of individual tests, please contact the external laboratory directly. Alternatively, please contact the Specimen Reception Department of MRHT Laboratory at Ext 58354 (057-9358354) for any further information required

1.1 HANDLING AND TRANSPORT OF SAMPLES

To protect the safety of all healthcare staff, the following precautions for the transportation of samples must be followed:

- All samples are to be taken into the correct sample containers and placed in approved biohazard bags with request form placed separately in the sleeve provided or in specibags with the form attached.
- The outside of the sample tube must not be contaminated with blood/body fluids.
- Blood or body fluid-stained laboratory request forms must not be submitted.
- Samples can be transported to the laboratory at room temperature unless otherwise stated in the sample requirements section.

1.2 FORM AND SAMPLE LABELLING REQUIREMENTS

The General Biochemistry/Haematology Request form is used for requests for external tests. All parts of the form are to be completed in full. General test guidelines are given on the back of the request form.

All writing on the request form must be clearly legible (block capitals preferred) so that the information provided is legible, thus ensuring proper identification of the patient and all tests requests. Writing should be in ballpoint pen (not marker) to ensure the information is copied through to each sheet of the request form. Refer to section 7.2 and 7.3 in the **General Information** section of this manual for further details on form and specimen labelling.

Request form must contain requesters name and location so that results can be returned in a timely manner.

Note: Computer generated labels may be used on the request form (**one label required on each sheet of the request form**).

1.3. SPECIMEN REQUIREMENTS/ADDITIONAL TESTING

Each test request requires a separate specimen. This is most important for multiple test requests which may be sent to different laboratories.
There may be some exceptions to this *e.g.* B_{12}, Folate and Ferritin requests need one specimen only for all three tests when requested together.

It is not possible to add an additional test request to a specimen which has been sent for an external test unless a spare specimen has been received. Each new request requires a new specimen to be taken and a new request form to be sent. Refer to the table in **Section 2** for individual test requirements.

Refer to **Section 7** of the **General Information Section** of this Manual for the Labelling Criteria for both request form and specimens.

Note: The External Tests referral area does not share specimens with the Biochemistry laboratory. It is not safe practice to split specimens from the original specimen container.

In exceptional circumstances *e.g.* neonatal specimen, it may be possible to allow additional testing on an original sample. Contact the External Tests Department at extension **8354** (057-9358354) to discuss each individual case.

Note: Some tests are **restricted** to Consultants' consent and may require consent forms to be filled out. Restricted tests are indicated in the following tables.

1.4. SAMPLE REJECTION

Laboratory staff are only authorised to accept samples which meet with the required labelling criteria. Please refer to **Section 7** of the **General Information Section** of this manual for further information.

2. TESTS SENT TO EXTERNAL LABORATORIES

The following tables list tests which are sent to external laboratories, sample and special requirements and restricted tests.

Note: New tests and modifications of existing sample requirements may come on line during the life span of this document. This list is valid as of the approval date of this document. Recent amendments may not be reflected in the following table.

For information and contact details of external referral laboratories please contact Specimen Reception on 05793 58354

Referred Test	Sample	Special Requirements	Test Restricted to:
ACE (angiotensin converting enzyme)	1xSerum: amber 4.9ml	None	N/A
Acetylcholine receptor antibodies	1xSerum: amber 4.9ml	None	N/A
ACTH (adrinocorticotrophic hormone)	2xEDTA: pink 2.7ml	Patient fasting. Bring samples to lab on ice. Spin, separate & freeze.	N/A
ADAMTS 13 /Anti ADAMTS antibodies (inhibitory activity)	2xCitrate: green 3ml	Spin spec at 2000rpm / 10mins. Separate and spin again at 2000rpm /15mins. Separate avoiding buffy coat and put into 3 x 0.5ml aliquots and freeze. Arrange dry ice with Biomnis. Removed 'consent form needed'	Consultant
ADH (anti diuretic hormone)	5ml EDTA + Aprotinin	Order Tube from Biomnis. Spin at 4C, separate & freeze.<1hr	N/A
Adrenal cortex antibodies	1xSerum: amber 4.9ml	None	N/A
Adrinocorticotrophic hormone (ACTH)	2xEDTA: pink 2.7ml	Patient fasting. Bring samples to lab on ice. Spin, separate & freeze.	N/A
Aldolase	1 x Serum: amber 4.9ml	Refrigerated	N/A
Aldosterone (recumbant & standing)	2xEDTA: pink 2.7ml	Patient 45 min recumbant, take bloods. Patient 20 min standing, take 2nd set of bloods. Send bloods to lab immediately after being taken at each step. Spin immediately, separate & freeze.	Consultant
Aldosterone and renin (recumbant & standing)	4xEDTA: pink 2.7ml	Patient 45 min recumbant, take bloods. Patient 20 min standing, take 2nd set of bloods.Send bloods to lab immediately after being taken at each step. Spin immediately, separate & freeze.	Consultant
Aldosterone and renin (Random)	1xSerum 4.9ml or 1xLithium Heparin 2.7ml. + 2xEDTA:pink 2.7ml	Highlight 'random' on request form	N/A
Allergy tests (must specify allergy)	1xSerum: amber 4.9ml	None	N/A
Alpha 1 anti-trypsin	1xSerum: amber 4.9ml	None	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Alpha 1 anti-trypsin phenotype	2 X EDTA: Pink 2.7ml	previous anti-trypsin result required and noted on request form	N/A
Alpha gliadin antibodies (tTG/tissue transglutaminase antibodies)	1xSerum: amber 4.9ml	None	N/A
Aluminium level	Trace Metal bottle kept in Renal Dialysis	Special bottle kept in Renal Dialysis	N/A
AMH (anti Mullerin hormone)	1 X Serum: amber 4.9ml	Must specify if test was performed/not performed previously.	N/A
Aminophylline level	1xSerum: amber 4.9ml	None	N/A
Amiodarone (cordarone)	1 X EDTA: Pink 2.7m	None	N/A
AML/APL transcripts (PML RARA)	2xEDTA: pink 2.7ml	Take sample before patient given medication	Consultant
Ammonia level	1xEDTA: Pink 2.7ml	Pre arrange with Mullingar, must go in Taxi. Spin separate and freeze.	N/A
Ampicillin allergy	1xSerum: amber 4.9ml	None	N/A
ANA (anti nuclear antibody/antibody screen)	1xSerum: amber 4.9ml	None	N/A
ANCA antibody titre & ANCA-C/P (proteinase 3 – Anti-neutrophil cytoplasmic antibodies)	1xSerum: amber 4.9ml	None	N/A
Androstenedione levels	1xSerum: amber 4.9ml	None	N/A
ANF (anti nuclear factor)	1xSerum: amber 4.9ml	None	N/A
Angiotensin converting enzyme (ACE)	1xSerum: amber 4.9ml	None	N/A
Antenatal blood group	1xEDTA: red 7.5ml	None	N/A
Anti B19 (Parvovirus)	1xSerum: amber 4.9ml	None	N/A
Anti Cardiolipin antibodies	1xSerum: amber 4.9ml	None	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Anti CCP (anti cyclic citrullinated peptide)	1xSerum: amber 4.9ml	None	N/A
Anti diuretic hormone (ADH)	5ml EDTA + Aprotinin	Order Tube from Biomnis. Spin at 4C, separate & freeze.<1hr	N/A
Anti gliadin antibodies (tTG/tissue transglutaminase antibodies).	1xSerum: amber 4.9ml	None	N/A
Anti glomerular basement antibodies	1xSerum: amber 4.9ml	None	N/A
Anti Mullerin hormone (AMH)	1xSerum: amber 4.9ml	Must specify if test was performed/not performed previously.	N/A
Anti phospolipid antibodies	1xSerum: amber 4.9ml	None	N/A
Anti proteinase 3	1xSerum: amber 4.9ml	None	N/A
Anti smooth muscle Antibodies	1xSerum: amber 4.9ml	None	N/A
Anti thrombin level	4xCitrate: green 3ml	Must be sent by taxi same day. Taxi @ 13.00hrs	N/A
Anti trypsin level	1xSerum: amber 4.9ml	None	N/A
Referred Test	Sample	Special Requirements	Test
Anti-Xa (factor 10)	2xCitrate: green 3ml or Bone marrow aspirate in RPMI	Take sample 2-4 hrs post dose of heparin. Send to Dublin by taxi. Or spin & freeze serum. Send up frozen serum and remaining sample.	Consultant Haematologist
APCR (Activated protein C resistance). See thrombophilia screen.	2xEDTA: pink 2.7ml 6xCitrate: green 3ml 1xSerum: amber 4.9ml	Must reach St James same day.	Consultant Haematologist
Aspergillus antibodies	1 x Serum:amber 4.9ml	Refrigerated.	N/A
Atypical pneumonia screen	1 x Serum:amber 4.9ml	Refrigerated	N/A
B12 level	1xSerum: amber 4.9ml	None	N/A
B2 Microglobulin	1xSerum: amber 4.9ml	None	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
B2-Glycoprotein I	1xSerum: amber 4.9ml	None	N/A
Bartonella (cat scratch) antibodies	1 x Serum:amber 4.9ml	Refrigerated	N/A
BCR ABL	5xEDTA: pink 2.7ml	Sample must reach St James' inside 24 hours.	Consultant Haematologist
Beta HCG (serum)	1xSerum: amber 4.9ml	None	N/A
BK virus (polyoma)	1xSerum: amber 4.9ml 1xUrine MSU	Spin, separate, freeze serum.Freeze urine.	N/A
Blood transfusion investigation	2xEDTA: white/red7.5 ml		Blood Transfusion Lab
Bone marrow & blood flow cytometry	Bone marrow aspirate in RPMI Peripheral blood 2xEDTA:pink 2.7ml	Blood film/Bone marrow aspirate slides.Send FBC results.	Consultant Haematologist
Bone Marrow Failure	2 x Blood Transfusion EDTA 7.5 ml	Minimum 4ml Blood Volume in Both Samples Must have completed Molecular Diagnostics Referral Form and Patient consent form Send FBC result and a blood film It is important to send an FBC sample and request and blood film for referral.	Consultant Haematologist
Bone marrow immunophenotyping	Bone marrow aspirate slides	Send FBC result.	Consultant Haematologist
Bordetella pertussis antibody	1 x Serum:amber 4.9ml	Refrigerated	N/A
Borrelia burgdorferi antibodies (Lyme disease)	1xSerum: amber 4.9ml	None	N/A
Brucella antibodies	1xSerum: amber 4.9ml	Refrigerated	N/A
Budgerigar feathers allergy	1xSerum: amber 4.9ml	None	N/A
C – Peptide levels	1xSerum: amber 4.9ml	None	N/A
C1 Esterase inhibitor	1xSerum: amber 4.9ml	None	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
C3 & C4 Complement	1xSerum: amber 4.9ml	None	N/A
Calcitonin	1xSerum: amber 4.9ml	Spin,seperate and freeze	N/A
Calprotectin	Random faeces	Please include Date sample produced	N/A
Carbamazepine level	1xSerum: amber 4.9ml	None	N/A
Cardiolipin antibodies	1xSerum: amber 4.9ml	None	N/A
Carnitine (free and total)	2xLith Heparin: orange 2.7ml	Spin,seperate and freeze	N/A
Cat allergy	1xSerum: amber 4.9ml	None	N/A
Catch scratch (Bartonella antibodies)	1 x Serum:amber 4.9ml	Refrigerated	N/A
Catecholamines	24 hr Urine – with HCl (10ml of 0.1NHCL added.)	pH & volume noted. 3x10ml sent for test	N/A
CCP antibodies (cyclic citrullinated peptide)	1xSerum: amber 4.9ml	None	N/A
CD4/8 T cell subsets	2xEDTA: pink 2.7ml	None	Consultant
Ceruoplasmin	1xSerum: amber 4.9ml	None	All
CF common mutations	2x EDTA:Pink 2.7 ml	Consent form needed	All
CFTR mutation (sent to cytogenetics in Crumlin as part of acute pancreatitis screen)	2xEDTA: pink 2.7 ml	Consent form needed.	Consultant
CH100	1xSerum: amber 4.9ml	Spin, separate and freeze. State time and dose of last drug intake.	Consultant Haematologist
Chitotriosidase level	2xEDTA: pink 2.7ml	None	N/A
Chlamydia	Swab (except eye swab goes to NVRL) or Urine	Swab: Special swab kept in Microbiology Laboratory	N/A
Chloroquine level	1 x Serum:white 7.5ml	Spin & freeze<4hrs State time and strength of last dose. Do not use phase separator in tubes.	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Chlorpromazine (Largactil)	1 x Serum:white 7.5ml	Spin & freeze<4hrs State time and strength of last dose. Do not use phase separator in tubes.	N/A
Cholinesterase	1xSerum: amber 4.9ml	Refrigerated	N/A
Chromium	2xTrace Metal Bottles: orange 7.5ml (kept in Renal Dialysis)	Draw sample into first bottle and discard that sample, use second sample.	N/A
Chromogranin A	1xSerum: amber 4.9ml	None	
Chromosomal Analysis	1xLithium heparin: orange 2.7ml	Send Ambient	N/A
Chromosome studies	Depend on test specified	Please specify test	N/A
Citrate (Urinary)	24 hr Urine	Volume noted. 3x10ml sent for test Freeze	N/A
CLL (FISH)	2 x EDTA: pink 2.7ml + 1 x Lith Hep: Orange 2.7 ml		Consultant
CMV PCR (Cytomegalovirus)	2xEDTA: pink 2.7ml	Spin, separate & freeze plasma + cells immediately.	N/A
CMV antibodies (Cytomegalovirus)	1xSerum: amber 4.9ml	None	N/A
Cobalt level	2xTrace Metal Bottles: orange 7.5ml (kept in Renal Dialysis)	Draw sample into first bottle and discard that sample, use second sample.	N/A
Coeliac antibodies (tTG/tissue glutaminase antibodies /Alpha gliadin)	1xSerum: amber 4.9ml	None	N/A
Collagen Screen	1xSerum: amber 4.9ml	None	N/A
Copper level	1xSerum: amber 4.9ml 24 hr urine(acid washed bottle)	Decant urine into Trace Metal bottles before sending	N/A
Cordarone (amiodarone)	2xEDTA: pink 2.7ml	None	N/A
Cortisol 24hr urinary	24 hr Urine(non acidified)	Refrigerated	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Cortisol level	1xSerum: amber 4.9ml	None	N/A
Coxiella burnetii antibodies	1xSerum: amber 4.9ml	Refrigerated	N/A
Coxsackie virus culture	Faeces or skin swab or throat swab or CSF.	Take sample depending on condition of patient. CSF done by PCR – send sample immediately. Other samples cultured - next day receipt is satisfactory.	N/A
CRE Typing (carbapenemase resistant Enterobaecteriaceae)	Nutrient agar slope with inoculated organism	Adhere to transport regulations for packaging. Refer to Consultant Microbiologist.	Microbiology Laboratory
Crithidia	1xSerum: amber 4.9ml	None	N/A
Cryptococcus neoformans	1xSerum: amber 4.9ml or CSF	Send same day (check with Consultant Microbiologist)	N/A
CSF for Oligoclonal Bands	1xSerum: amber 4.9ml and CSF	None	N/A
CSF for viral studies	CSF	>300µl neat CSF-unspun	N/A
Cyclic citrullinated peptide (CCP) antibodies.	1xSerum: amber 4.9ml	None	N/A
Cyclosporin	2xEDTA: pink 2.7ml	None	Consultant
Cystic Fibrosis screen - 108 common mutations	2xEDTA: pink 2.7ml	Consent form from Specimen Reception.	N/A
Cytogenetics on tissue/bone marrow	2xEDTA: pink 2.7 ml	Consent form needed.	Consultant
Cytogenitics FISH (EDTA)	2xEDTA: pink 2.7 ml 1XLithium Heparin: orange 2.7ml	Consent form needed.	Consultant
Cytomegalovirus antibodies (CMV)	1xSerum: amber 4.9ml	None	N/A
Cytomegalovirus PCR (CMV)	2xEDTA: pink 2.7 ml	Spin separate & freeze plasma and cells immediately.	N/A
Cytotoxic antibodies	1xSerum: white 7.5ml	None	N/A
Dengue virus antibodies	1xSerum: amber 4.9ml	Check with Consultant Microbiologist	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
DHEAS (dehydroepiandrosterone sulfate)	1xSerum: amber 4.9ml	None	N/A
Digoxin levels	1xSerum: amber 4.9ml	None	N/A
DNA double strand (dsDNA) antibodies	1xSerum: amber 4.9ml	None	N/A
Dog allergy	1xSerum: amber 4.9ml	None	N/A
E. coli typing	Nutrient agar slope of organism	Adhere to transport regulations for packaging.	Microbiology Laboratory
EBV (Epstein Barr Virus) antibodies	1xSerum: amber 4.9ml	None	N/A
EBV (Epstein Barr Virus) PCR	2xEDTA: pink 2.7ml	Spin, separate and freeze both plasma and cells.	N/A
EMA (Eosin 5 Melemide for flow cytometry)	2xEDTA: pink 2.7ml	Send FBC result.	Consultant
ENA ELISA (extractable nuclear antigens)	1xSerum: amber 4.9ml	None	N/A
Endomysial antibodies	1xSerum: amber 4.9ml	None	N/A
Eosin 5 Melemide (EMA for flow cytometry)	2xEDTA: pink 2.7ml	Send FBC result.	Consultant
Epanutin (Phenytoin)	1xSerum: amber 4.9ml	None	N/A
EPO (erythropoietin) level	1xSerum: amber 4.9ml	None	N/A
EPO (erythropoietin) receptor antibodies	4xEDTA: pink 2.7ml	None	N/A
Erythrocyte pyruvate kinase	2xEDTA: pink 2.7ml	Refrigerated	N/A
Extrinsic factor antibodies	1xSerum: amber 4.9ml	Send to Crumlin for Peadiatric patients.	N/A
Extrinsic Factor assay screen: must state required factors (see individual factors)	6xCitrate: green 3ml	Sample must be taken after 11.00am and Hand delivered to Lab before 12pm	Consultant Haematologist
Factor IX	3xCitrate: green 3ml	Sample must be taken after 11.00am and Hand delivered to Lab before 12	Consultant Haematologist

Referred Test	Sample	Special Requirements	Test Restricted to:
Factor V (Leiden)	2xCitrate: green 3ml + 2 X EDTA: pink 2.7ml	Sample must be taken after 11.00am and Hand delivered to Lab before 12	Consultant Haematologist
Factor VII assay	2xCitrate: green 3ml	Sample must be taken after 11.00am and Hand delivered to Lab before 12	Consultant Haematologist
Factor VIII assay	2xCitrate: green 3ml	Sample must be taken after 11.00am and Hand delivered to Lab before 12	Consultant Haematologist
Factor XI assay	2xCitrate: green 3ml	Sample must be taken after 11.00am and Hand delivered to Lab before 12.	Consultant Haematologist
Factor XII assay	2xCitrate: green 3ml	Sample must be taken after 11.00am and Hand delivered to Lab before 12	Consultant Haematologist
Factor XIII	2xCitrate: green 3ml	Sample must be taken after 11.00am and Hand delivered to Lab before 12	Consultant Haematologist
Fanconi Chromosomal Breakage Testing	2xEDTA: pink 2.7ml	None	Consultant Haematologist
Farmers lung antibodies (Microspora faenii)	1xSerum: amber 4.9ml	None	N/A
Ferritin levels	1xSerum: amber 4.9ml	None	N/A
FIP1L1 PDGFRA studies	2xLithium heparin: orange 2.7ml	None	Consultant Haematologist
FISH (CLL)	2 x EDTA: pink 2.7ml + 1 x Lith Hep: Orange 2.7 ml		Consultant
	1 x Lithium Heparin: orange 2.7ml		
FISH (multiple myeloma)	Bone marrow aspirate slides	3 unstained unfixed smears	Consultant
Fish allergy	1xSerum: amber 4.9ml	None	N/A
Flecanide (Tambacor)	1xEDTA: pink 2.7ml	Sample must be kept at 4C	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Flow cytometry – Bone marrow & blood	Bone marrow aspirate in RPMI Peripheral blood 2xEDTA:pink 2.7ml	Blood film/Bone marrow aspirate slides.	Consultant
Folate & Vitamin B12	1xSerum: amber 4.9ml	None	N/A
Folicule Stimulating Hormone (FSH)	1xSerum: amber 4.9ml	None	N/A
Fragile X screen	4xEDTA: pink 2.7ml	Consent form from Specimen Reception.	N/A
Free light chain assay	1xSerum: amber 4.9ml	None	N/A
Free T3	1xSerum: amber 4.9ml	None	N/A
Free T4 (See TFTs)	1xSerum: amber 4.9ml	None	N/A
Fructosamine	1xSerum: amber 4.9ml	None	N/A
FSH (follicle stimulating hormone)	1xSerum: amber 4.9ml	None	N/A
Full virology screen (Renal Dialysis Unit)	1xSerum: amber 4.9ml	None	N/A
G6PD (Glucose 6 phosphate dehydrogenase)	1xEDTA: pink 2.7 ml	None	N/A
GAD (Glutamic Acid Decarboxylase) autoantibodies	1xSerum: amber 4.9ml	None	N/A
Galactomannan	1xSerum: amber 4.9ml	None	N/A
Ganglioside antibodies	1xSerum: amber 4.9ml	Refrigerated	N/A
Gastrin	1xSerum: amber 4.9ml	Spin, separate and freeze inside 4 hours.	N/A
Genetic cationic trypsinogen SPINK-1 mutation	2xEDTA: pink 2.7 ml	Consent form needed.	Consultant
Globulin level	1xSerum: amber 4.9ml	None	N/A
Glomular basement membrane	1xSerum: amber 4.9ml	None	N/A
Glucagon	1xEDTA pink 2.7 ml +Aportinine	Spin at 4C. Sepatare and freeze<1hr	N/A
Glucose 6 phosphate dehydrogenase (G6DP)	1xEDTA: pink 2.7 ml	None	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Glutamic acid decarboxylase (GAD) autoantibodies	1xSerum: amber 4.9ml	None	N/A
Glycoprotein I (B2)	1xSerum: amber 4.9ml	None	N/A
Grass pollen allergy	1xSerum: amber 4.9ml	None	N/A
Growth hormone (somatrophin)	1xSerum: amber 4.9ml	None	N/A
H1N1 Sputum or Swab (Confirmation)	Sputum or Swab	Refer to Consultant Microbiologist. Send in KPA bag	N/A
Haemochromatosis mutations	2xEDTA: pink 2.7 ml 1xFasting Serum: amber 7.5 ml	Consent form needed.	N/A
Haemoglobinopathy screen	1xSerum: amber 4.9ml 1xEDTA: pink 2.7ml	None	Consultant Haematologist
Haemophilia screen	4xCitrate: green 3ml	Must reach St James same day.	Consultant Haematologist
Haemophilus influenzae PCR	CSF/Blood	>200µl neat CSF-unspun	N/A
Haemosiderin	MSU OR 24 hr Urine - no acid	2x10ml sent for test	N/A
Haptogloblin	1xSerum: amber 4.9ml	None	N/A
Hb A2 (see Thalassaemia)	2xEDTA: pink 2.7ml 1xSerum: amber 4.9ml	Copy of FBC results must be enclosed.	N/A
Hb electrophoresis (Thalassaemia)	2xEDTA: pink 2.7ml 1xSerum: amber 4.9ml	Copy of FBC results must be enclosed.	Consultant Haematologist
HCG (Human chorionic gonadotrophin)	1xSerum: amber 4.9ml	None	N/A
Hepatitis A antibodies	1xSerum: amber 4.9ml	None	N/A
Hepatitis B antibodies	1xSerum: amber 4.9ml	None	N/A
Hepatitis B Core antibodies	1xSerum: amber 4.9ml	None	N/A
Hepatitis B HBsAg (antigen)	1xSerum: amber 4.9ml	None	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Hepatitis B PCR (DNA viral load)	1xSerum: white 7.5ml or 2 EDTA: pink 2.7 ml	Spin, separate and freeze serum/plasma and cells	N/A
Hepatitis B total Core antibodies	1xSerum: amber 4.9ml	None	N/A
Hepatitis C antibodies	1xSerum: amber 4.9ml	None	N/A
Hepatitis C antigen	1xSerum: amber 4.9ml	None	N/A
Hepatitis C PCR (RNA viral load)	1xSerum: amber 4.9ml or 2 EDTA: pink 2.7 ml	Spin, separate and freeze	N/A
Hepatitis E antibodies	1xSerum: amber 4.9ml	None	N/A
Hepatitis screen (Hep A, HBsAg & Hep C)	1xSerum: amber 4.9ml	None	N/A
Her2Neu	FFPP Block	To be accompanied by Histology report	Consultant Pathologist
Herpes simplex virus	1xSerum: amber 4.9ml	None	N/A
HIAA – 5 (5-hydroxyindoleacetic acid)	24 hr Urine – with HCl	pH & volume noted. 2x10ml sent for test	N/A
High affinity Hb	1xEDTA: pink 2.7ml	None	N/A
Histoplasmosis	1xSerum: amber 4.9ml or Biopsy	Refrigerated	N/A
HIV antibodies	1xSerum: amber 4.9ml	None	N/A
HIV viral load (PCR)	2xEDTA: pink 2.7ml	Spin, separate and freeze plasma immediately.	N/A
HLA Typing (Oncology)	4xEDTA: pink 2.7ml	None	Consultant Haematologist
HLA B27 (Tissue typing)	4xEDTA: pink 2.7 ml	None	Consultant Haematologist
HLA Class I typing for HLA matched platelets	2xEDTA: red7.5 ml + serum: amber 4.9ml	Clinical details and platelet count required	Consultant Haematologist
HLA tissue typing for potential transplant patients/family	2xEDTA: white/red7.5 ml	None	Consultant
Homocysteine	1 x Lithium Heparin :orange 2.7ml	Fasting state. Ice immediately after sampling.Spin, separate and freeze <1 hr	N/A
House dust mite allergy	1xSerum: amber 4.9ml	None	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
HPA (Human platelet antigen typing)	2xEDTA: white/red 7.5 ml	None	Consultant Haematologist
Human chorionic gonadotrophin (HCG)	1xSerum: amber 4.9ml	None	N/A
Human platelet antigen typing (HPA)	4xEDTA: pink 2.7 ml	None	Consultant Haematologist
Hydroxyindoleacetic acid – 5 (5-HIAA)	24 hr Urine - with HCl	pH & volume noted. 2x10 sent for test	N/A
Hydroxy-Progesterone-17 (progesterone)	1xSerum: amber 4.9ml	None	N/A
Hydroxyproline	24hr urine(no preservative)	Avoid collagen rich foods for 48hrs prior, meat jelly, gelatine, ice-cream, confectionary etc	N/A
IgE (Immunoglobulin E)	1xSerum: amber 4.9ml	None	N/A
IGF-1 (insulin like growth factor 1)	1xSerum: amber 4.9ml	Spin, separate and freeze <4hrs	N/A
IgG 4 (IgG Sub-classes)	1xSerum: amber 4.9ml	Refrigerated	Consultant
IgG Subclasses Profile	1xSerum: amber 4.9ml	Refrigerated	Consultant
Immunoglobulin A (IgA)	1xSerum: amber 4.9ml	None	N/A
Immunoglobulin E (IgE)	1xSerum: amber 4.9ml	None	N/A
Immunoglobulin G (IgG)	1xSerum: amber 4.9ml	None	N/A
Immunoglobulin gene rearrangement studies (PCR)	Bone marrow/Fresh biopsy /paraffin section Peripheral blood 2xEDTA: pink 2.7ml	Slides and immunophenotyping/ histology required.	Consultant
Immunoglobulin M (IgM)	1xSerum: amber 4.9ml	None	N/A
Immunohistochemistry	FFPP slides on Superfrost plus slides	Telephone contact to St James to request permission to send	Consultant Pathologist
Immunophenotyping (peripheral blood)	5xEDTA: pink 2.7ml	None	Consultant Haematologist
Influenza A & B and RSV detection	Nasal or throat swab or Sputum	Use special viral transport swab from Microbiology lab.	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Influenza A or B antibodies	1xSerum: amber 4.9ml	None	N/A
Insulin level	1xSerum: amber 4.9ml	None	N/A
Intrinsic factor antibodies	1xSerum: amber 4.9ml	None	N/A
Intrinsic pathway screen	2xEDTA: pink 2.7ml 6xCitrate: green 3ml	Must reach St James same day. Sample must be taken after 11.00am and Hand delivered to Lab before 12	Consultant Haematologist
Iron Latent Cap (see iron studies)	1xSerum: amber 4.9ml	None	N/A
Iron levels (see iron studies)	1xSerum: amber 4.9ml	None	N/A
Iron Overdose	1xSerum: amber 4.9ml	None	N/A
Iron studies (TIBC, UIBC, transferrin saturation)	1xSerum: amber 4.9ml	None	N/A
Islet antibodies	1xSerum: amber 4.9ml	None	N/A
JAK2 - Exon 12 mutation analysis	2xEDTA: pink 2.7ml	None	Consultant Haematologist
JAK2 - V617F mutation analysis: PCR test	2xEDTA: pink 2.7ml	None	Consultant Haematologist
JCV (JC virus)	Urine	Urine sample frozen immediately.	N/A
Karyotyping	2xLithium Heparin:orange 2.7ml	Consent form required	N/A
Keppra (levetiracetam)	1 x Serum:amber 4.9ml	Serum must be removed from gel	N/A
KRAS protein (V-Ki-ras2 Kirsten rat sarcoma viral oncogene homolog)	FFPP Block	Accompanying documentation	Consultant
La (& Ro) antibodies	1xSerum: amber 4.9ml	None	Consultant
Lamotrigine (lamictal)	1xSerum: amber7.5ml	Serum must be removed from gel	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Largactil (Chlorpromazine)	1 x Serum : white 7.5ml	Spin and freeze <4hrs. State time and strength of last dose. Do not use phase separator in tubes.	N/A
Lead levels	2xEDTA: pink 2.7ml	None	N/A
Leptospira antibodies	1xSerum: amber 4.9ml	None	N/A
Leucocyte / HLA antibodies	2xEDTA: white/red7.5 ml	None	N/A
Leutenising hormone (LH)	1xSerum: amber 4.9ml	None	N/A
Levetiracetam (keppra)	1xSerum: amber 4.9ml	Serum must be removed from gel	N/A
LH (Leutenising hormone)	1xSerum: amber 4.9ml	None	N/A
Lipase	1xSerum: amber 4.9ml	None	N/A
Lipoprotein A	1xSerum: amber 4.9ml	None	N/A
Lithium level	1xSerum: amber 4.9ml	None	N/A
Liver-Kidney microsomal antibody	1xSerum: amber 4.9ml	None	N/A
Lupus anticoagulant	4xCitrate: green 3ml	Send to St James inside 4 hours of being taken. Sample must be taken after 11.00am and Hand delivered to Lab before 12	N/A
Lyme disease (Borrelia burgdorferi)	1xSerum: amber 4.9ml	None	N/A
Lymphocyte immunophenotyping	5xEDTA: pink 2.7ml	None	Consultant
Lymphocyte subsets	2xEDTA: pink 2.7ml	Must arrive in lab on the same day.	Consultant
Malaria verification	1xEDTA: pink 2.7ml 2 unstained slides	None	Haematology Laboratory
Manganese level	1xSerum: amber 4.9ml	Serum must be removed from gel	N/A
Measles antibodies	1xSerum: amber 4.9ml	None	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Meningitis screen on child (Haemophilus influenza PCR, Neisseria meningitidis PCR & Streptococcus pneumonia PCR)	1xEDTA: pink 2.7ml	Must reach Temple St. before 11.00hrs.	N/A
Meningococcal PCR (Neisseria meningitidis PCR)	1xEDTA: pink 2.7ml	Must reach Temple St. before 11.00hrs.	N/A
Mercury	1xLithium heparin: orange 2.7ml or Urine x 20mls in acid washed container	None	N/A
Metabolic screen	MSU fresh specimen, frozen immediately.	Fresh urine specimen, PH urine before freezing, freeze immediately. Urine divided into plain conical tubes. Must give clinical details or not accepted.	N/A
Metanephrines 24 hr. urine	24 hr urine	acidified container, pH and volume. Decant 2x10mls MSU	N/A
Methotrexate	1xSerum: amber 4.9ml	None	N/A
Micro Array	1xLithium heparin orange 2.7 ml 1xEDTA pink 2.7 ml	Send Ambient, Medical history required, Request form required	N/A
Microspora faenii (farmers' lung)	1xSerum: amber 4.9ml	None	
Milk allergy	1xSerum: amber 4.9ml	None	N/A
Mitochondrial antibodies.	1xSerum: amber 4.9ml	None	N/A
MPO antibodies. (myeloperoxidase antibodies)	1xSerum: amber 4.9ml	None	N/A
MRD studies (minimum residual disease)	2xEDTA: pink 2.7ml	None	Consultant Haematologist
MRSA Typing	Nutrient agar slope of organism	Refer to Consultant Microbiologist. Adhere to transport regulations for packaging.	Consultant Microbiologist
Multiple myeloma (FISH)	Bone marrow aspirate slides	3 unstained unfixed smears	Consultant

Referred Test	Sample	Special Requirements	Test Restricted to:
Mumps antibodies	1xSerum: amber 4.9ml	None	N/A
Muscle pathology	On saline moistened gauze in dry container	Contact Histology MRHT Laboratory.	Consultant
Muscular dystrophy-1 (muscular genetics /DNA analysis)	2xEDTA: pink 2.7 ml	Consent form needed.	Consultant
Mycoplasma pneumoniae antibodies	1 x serum amber 4.9ml	None	N/A
MYD88	1x Blood Transfusion EDTA 7.5 ml	Must have completed HMDC Referral Form Minimum 5ml Blood Volume in Sample	
Myeloid Gene Panel	1x Blood Transfusion EDTA 7.5 ml	Must have completed HMDC Referral Form Minimum 5ml Blood Volume in Sample	
Myeloperoxidase antibodies. (MPO antibodies.)	1xSerum: amber 4.9ml	None	N/A
Myoglobin	1xSerum: amber 4.9ml	None	N/A
Myositis Abtibodies/Markers	1xSerum: amber 4.9ml	None	N/A
Nail cuttings for fungal culture	Nail cuttings	None	N/A
nDNA antibodies (DNA)	1xSerum: amber 4.9ml	None	N/A
Neisseria meningitides PCR (meningococcal PCR)	CSF >200µl CSF-unspun Blood 1xEDTA: pink 2.7	Must reach Temple St. before 11.00hrs.	N/A
Neuro Pathology	Organ removed at Autopsy	On Formalin moistened gauze. Follow organ retention tracking protocol	Consultant
NEURONAL ANTIBODY (HU, RI, YO, CV2, MA2)	1xSerum: amber 4.9ml	None	Consultant
Neurontin (Gabapentin)	1xSerum: amber 4.9ml	Spin,separate and Freeze inside 4 hrs	N/A
Neutrophil cytoplasmic antibodies	1xSerum: amber 4.9ml	None	Consultant
Neutrophil elastase mutation	2xLithium heparin orange 2.7 ml 2xEDTA pink 2.7 ml	None	Hospital Consultant

Referred Test	Sample	Special Requirements	Test Restricted to:
Norovirus (SRSV)	Stool	Contact Microbiology	N/A
Oestradiol level	1xSerum: amber 4.9ml	None	N/A
Olanzapine level	2xEDTA pink 2.7 ml	Send same day	N/A
Oligoclonal bands	2xCSF tubes, 1xserum: amber 4.9ml	300µl unspun CSF and 5ml of amber tube blood	N/A
Organic acids	MSU	Fresh urine specimen, put in plain conical tubes and frozen immediately. Must have relevant clinical details or not accepted.	N/A
Osmolality	1xSerum: amber 4.9ml or 1 x MSU	None	N/A
Oxalate (urinary)	24hr urine	acidified container, pH and volume. Decant 2x10mls MSU	N/A
Pancreatic polypeptide	1ml ETDA plasma+Aprotinin e	Non haemolysed.Spin, separate and freeze <1 hr	N/A
Pancreatitis (acute): Carbonic Anhydrase 1 & 2 (Anti Carbonic Anhydrase antibodies & Anti Lactoferrin antibodies) Genetic cationic trypsinogen SPINK-1 mutation CFTR mutation (sent ot cytogenetics in Crumlin as part of acute pancreatitis screen)	1xSerum: amber 4.9ml 2xEDTA: pink 2.7ml 2xEDTA: pink 2.7m	None Consent form needed. Consent form needed.	Consultant
Parainfluenza virus 1,2,3 antibodies	1 x Serum amber 4.9ml	Refrigerated	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Paraquat level	2xSerum: amber 4.9ml20ml urine in a sterile container	One serum on admission.Second serum taken just before sending samples to Beaumont. Ring ahead if required urgently. Qualitative test on urine takes 2/3 hrs. Quantitative test on blood takes 4 hrs. Random urine sample.	N/A
Parietal cell antibodies	1xSerum: amber 4.9ml	None	N/A
Parvovirus anti B19	1xSerum: amber 4.9ml	None	N/A
PB (peripheral blood) immunophenotyping	5xEDTA: pink 2.7ml	None	Consultant
Penicillin G Allergy	1xSerum: amber 4.9ml	None	N/A
Penicillin V Allergy	1xSerum: amber 4.9ml	None	N/A
Pertussis antibodies (Bordatella pertussis)	1xSerum: amber 4.9ml	Refrigerated	N/A
Phenobarbatone levels	1xSerum: amber 4.9ml	None	N/A
Phenytoin (Epanutin)	1xSerum: amber 4.9ml	None	N/A
Phospholipid antibodies (B2-glycoprotein and cardiolipin antibodies.)	1xSerum: amber 4.9ml	None	N/A
Plasma viscosity	2xEDTA: pink 2.7ml	Must arrive in St James' on the same day. Send ambient	N/A
Platelet antibodies	1 Serum:white 7.5 ml	None	Consultant Haematologist
Platelet refractoriness	4xEDTA: pink 2.7 ml or 2 x Serum: white 7.5ml	None	Consultant Haematologist
PML RARA (AML/APL transcripts)	2xEDTA: pink 2.7ml	Send within 24 hrs.	Consultant Haematologist
Pneumococcol antibody titre	1xSerum: amber 4.9ml	None	N/A
Pneumococcol antibody titre for PCR	1xEDTA: pink 2.7ml	None	N/A
PNH (paroxysmal nocturnal haemoglobinuria)	2xEDTA: pink 2.7ml	None	N/A
Polyoma (BK virus)	1xSerum: amber 4.9ml 1xUrine MSU	Spin, separate, freeze serum immediately. Freeze urine immediately.	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Porphyrins	2xEDTA: pink 2.7ml, 2xFaeces, 24hr Urine 2xLithium heparin	Cover sample containers with tinfoil before taking samples.	N/A
Post transfusion purpura (PTP)	5-10ml clotted +5ml EDTA	Discuss with IBTS consultant/Haemovigilance	Consultant Haematologist
Preader Willi	2x EDTA pink 2.7ml	Consent form required	Consultant
Pro collagen III antibodies	1xSerum: amber 4.9ml	Spin and Freeze <4 hrs	N/A
Pro insulin level	1xSerum: amber 4.9ml	Spin, separate & freeze <4hrs	N/A
Progesterone (Hydroxy-progesterone-17)	1xSerum: amber 4.9ml or 1xEDTA: pink 2.7ml or 1xLith Heparin: orange 2.7ml	Send refrigerated	N/A
Prograf (Tacrolimus)	2xEDTA: pink 2.7ml	State date/time and strength of last dose	N/A
Prolactin level	1xSerum: amber 4.9ml	None	N/A
Protein C & Protein S	2xCitrate: green 3ml	Must reach St James same day. Sample must be taken after 11.00am and Hand delivered to Lab before 12	Consultant Haematologist
Protein electrophoresis (total protein, albumin, immunoglobulins, B-2 microglobulin)	1xSerum: amber 4.9ml	None	N/A
Proteinase 3 ANCA (Proteinase 3 – Anti-neutrophil cytoplasmic antibodies)	1xSerum: amber 4.9ml	None	N/A
Prothrombin mutation	2xEDTA: pink 2.7ml	None	Consultant Haematologist
Pyruvate dehydrogenase	1xSerum: amber 4.9ml	None	N/A
Pyruvate kinase	1xEDTA: pink 2.7ml	None	N/A
Q Fever (Coxiella burnetti) antibodies	1xSerum: amber 4.9ml	Refrigerated	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Quantiferon (TB)	Special bottles available from OPD ordered from MedLab Pathology.	Refer to Consultant Microbiologist.Must arrive in MedLab within 16 hours. Do not request after 10am on Fridays	Consultant
Red cell folate	2xEDTA: pink 2.7ml +	Samples must not be used previously by other departments. Deliver within 24 hrs. Medlab Pathology	Consultant
Reducing substances	Faeces sample	Store in fridge. Freeze if not sending same day.	N/A
Renal pathology	1xFormalin 1xZeus medium	Contact Histology MRHT Laboratory.	Hospital Consultant
Renin (& aldosterone if required) recumbent and standing	4xEDTA: pink 2.7ml	Patient 45 min recumbant, take bloods. Patient 20mins standing, take 2nd set of bloods. Send bloods to lab as soon as they are taken after each step. Spin, separate and freeze	Consultant
Renin (active) - random sample	2xEDTA: pink 2.7ml	Freeze within 4 hours.	Consultant
Risperidone level	1xSerum: amber 4.9ml	Spin and freeze <4 hrs. State time and strength of last dose. Do not use phase separator in tubes.	N/A
Ristocetin co-factor (RiCOF)	4xCitrate: green 3ml	Must reach St James same day. Sample must be taken after 11.00am and Hand delivered to Lab before 12	Consultant Haematologist
Ro (& La) antibodies	1xSerum: amber 4.9ml	None	Consultant
Rubella antibodies (antenatal)	1xSerum: amber 4.9ml	None	N/A
Rubella antibodies (non-antenatal)	1xSerum: amber 4.9ml	None	N/A
Salmonella/Shigella typing	Nutrient agar slope of organism	Adhere to transport regulations for packaging. Refer to Consultant Microbiologist.	Microbiology Laboratory
SARS (Severe acute respiratory syncrome causing virus)	Nasopharangeal aspirate, sputum, stool, throat swab.	Refer to Consultant Microbiologist. By arrangement with NVRL.	N/A
Selenium level	1xSerum: amber 4.9ml	Remove from gel	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Sex hormone binding globulin	1xSerum: amber 4.9ml	None	N/A
Sickle cell (see Thalassaemia)	1xEDTA: pink 2.7ml 1xSerum: amber 4.9ml	Send FBC Result.	Consultant Haematologist
Sirolimus level	2 x EDTA:pink 2.7ML	None	N/A
Skin IF	On saline moistened gauze in dry container	Must receive before 11 am and send by immediate transport	Consultant
Skin scrapings for fungal culture	Skin Scrapings	None	N/A
Smooth muscle antibodies	1xSerum: amber 4.9ml	None	N/A
Sodium valporate	1xSerum: amber 4.9ml	None	N/A
Somatomedin-C (IgF-1)	1xSerum: amber 4.9ml	Spin, separate and freeze	N/A
Somatrophin (growth hormone)	1xSerum: amber 4.9ml	None	N/A
SRSV (small round structured virus or Norovirus)	Fresh faeces	Refer to Consultant Microbiologist. By arrangement with NVRL.	N/A
STFR - (soluble transferring receptor)	1xSerum: amber 4.9ml	None	N/A
Synacthen test	1xSerum: amber 4.9ml	None	N/A
Syphillis -VDRL - antenatal	1xSerum: amber 4.9ml	None	N/A
Syphillis -VDRL - non-antenatal	1xSerum: amber 4.9ml	None	N/A
T3 or T4 (Free)	1xSerum: amber 4.9ml	None	N/A
Tacrolimus (Prograf)	2xEDTA: pink 2.7ml	None	N/A
Tambacor (Flecanide)	1xSerum: amber 4.9ml		N/A
TB culture	Sputum, CSF, Bone marrow or tissue	Sent untreated.	N/A
TB QUANTIFERON	Special bottles available from OPD ordered from MedLab Pathology.	Refer to Consultant Microbiologist. Must arrive in MedLab within 16 hours. Do not request after 10am on Fridays	Consultant

Referred Test	Sample	Special Requirements	Test Restricted to:
TBII (thyroid binding inhibitor immunoglobulin)	1xSerum: amber 4.9ml	Spin & freeze <4hrs	N/A
T-cell receptor (TCR) gene rearrangement studies: PCR test	4xEDTA: pink 2.7ml / Fresh biopsy / Paraffin sections	Slides and immunophenotyping / histology report required.	Consultant Haematologist
T-cell subsets -CD4/8	2xEDTA pink 2.7ml	Send within 24 hours.	Consultant
Tegretol level	1xSerum: amber 4.9ml	None	N/A
Testosterone - free index	1xSerum: amber 4.9ml	None	N/A
Testosterone level - male/ female/child	1xSerum: amber 4.9ml	None	N/A
Tetanus antibodies	1xSerum: amber 4.9ml	None	N/A
TFTs (TSH & Free T4 thyroid function test)	1xSerum: amber 4.9ml	None	N/A
Thalassaemia (Hb electrophoresis for HbA2 or HbF)	2xEDTA: pink 2.7ml 1xSerum: amber 4.9ml	Copy of FBC results must be enclosed.	Consultant Haematologist
Thalassaemia (α or β genotype)	2xEDTA: pink 2.7ml	None	Consultant Haematologist
Theophylline level	1xSerum: amber 4.9ml	None	N/A
Thiamine (see vitamin B1)	2xEDTA: pink 2.7ml	Must be protected from light	N/A
Thiopurine methyl transferase (Haem TPMT)	2xEDTA: pink 2.7ml	None	N/A
Thrombin antibody	1xCitrate: green 3ml	Must reach St James same day. Sample must be taken after 11.00am and Hand delivered to Lab before 12	Consultant
Thrombophilia screen (Protein C & S, cardiolipin antibodies, prothrombin, lupus anticoagulant, homocysteine, antithrombin activity, factor V Leiden, factor VIII, fibrinogen)	2xEDTA: pink 2.7ml 6xCitrate: green 3ml 1xSerum: amber 4.9ml	Must reach St James same day. Sample must be taken after 11.00am and Hand delivered to Lab before 12. Request form necessary. Paediatric bottles not sufficient.	Consultant Haematologist
Thyroglobulin levels	1xSerum: amber 4.9ml	Specify if antibodies or levels required	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Thyroid binding inhibitor immunoglobin (TBII)	1xSerum: amber 4.9ml	Spin, separate & freeze<4hrs	N/A
Thyroid peroxidise antibodies (TPO)	1xSerum: amber 4.9ml	None	N/A
Thyroid receptor antibodies	1xSerum: amber 4.9ml	Must arrive in St James' on the same day.	N/A
Thyroid stimulating hormone (TSH)	1xSerum: amber 4.9ml	None	N/A
TIBC (see iron studies)	1xSerum: amber 4.9ml	None	N/A
Tobramycin level (pre)	1xSerum: amber 4.9ml	Spin, separate & freeze.	N/A
Topiramate (topamax)	1xSerum: amber 4.9ml	None	N/A
Torch screen (CMV, Toxoplasma, Rubella, Herpes simplex)	1xSerum: amber 4.9ml	None	N/A
Total Iron Binding Cap (see iron studies)	1xSerum: amber 4.9ml	None	N/A
Toxacara antibodies	1xSerum: amber 4.9ml	None	N/A
Toxicology for drugs of abuse	MSU or 1xserum: amber 4.9ml	None	N/A
Toxoplasma antibodies.	1xSerum: amber 4.9ml	None	N/A
Tpha (antenatal)	1xSerum: amber 4.9ml	None	N/A
Tpha (non-antenatal)	1xSerum: amber 4.9ml	None	N/A
TPMT (thiopurine methyl transferase)	2xEDTA: pink 2.7ml	None	N/A
TPO (Thyroid peroxidase) antibodies	1xSerum: amber 4.9ml	None	N/A
Transferrin receptor (STFR-soluble transferring receptor)	1xSerum: amber 4.9ml	None	N/A
Transferrin saturation (see iron studies)	1xSerum: amber 4.9ml	None	N/A
Transfusion related acute lung injury-TRALI	2xEDTA: white/red7.5 ml	Discuss with IBTS Consultant/Haemovigilance. Forward to QC Lab	N/A
Treponema pallidum (tpha) antenatal	1xSerum: amber 4.9ml	None	N/A
Treponema pallidum (tpha) non antenatal	1xSerum: amber 4.9ml	None	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Trileptal levels	1xSerum: amber 4.9ml	Spin and freeze <4 hr	N/A
Tryptase	1xSerum: amber 4.9ml	None	N/A
TSH (thyroid function tests–TSH & Free T4)	1xSerum: amber 4.9ml	None	N/A
TSH receptor antibodies	1xSerum: amber 4.9ml	None	N/A
tTG antibodies (tissue transglutaminase antibodies/alpha gliadin antibodies)	1xSerum: amber 4.9ml	None	N/A
UIBC (see iron studies)	1xSerum: amber 4.9ml	None	N/A
Urinary Citrate	24 hr Urine (non acidified)	Volume noted. 3x10ml sent for test Freeze	N/A
Urinary Cortisol	24 hr Urine (non acidified)	Volume noted. 2 X MSU sent for test.	N/A
Urinary osmolality	MSU - random MSU 1x10mls	None	N/A
Urine 24h Electrophoresis	24 hr Urine (non acidified)	None	N/A
Urine SPE (electrophoresis)	Urine MSU	None	N/A
Valporate	1xSerum: amber 4.9ml	None	N/A
Vanillylmandelic acid (VMA)	24 hr Urine - with HCl	pH & volume noted. 2x10mls sent for test	N/A
Varicella antibodies	1xSerum: amber 4.9ml	None	N/A
VDRL (antenatal)	1xSerum: amber 4.9ml	None	N/A
VDRL (non-antenatal)	1xSerum: amber 4.9ml	None	N/A
Venlafaxine	1xSerum: amber 4.9ml	Spin and freeze <4 hrs	N/A
VIP (vasoactive intestinal polypeptide)	1 mL EDTA plasma + Aprotinine	Non haemolysed. Spin, separate and freeze <1 hr	N/A
Viral Screen (must specify tests)	1xSerum: amber 4.9ml	Doctor must specify test required	N/A
Vitamin A	1xSerum: amber 4.9ml	Cover tube in tinfoil. Spin & freeze within 4 hr	N/A
Vitamin B1 (thiamine)	2xEDTA: pink 2.7ml	Protect from light	N/A
Vitamin B12 & Folic acid	1xSerum: amber 4.9ml	None	N/A
Vitamin B6	2xEDTA: pink 2.7ml	Protect from light	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Vitamin C	2 X Lithium Heparin	Cover tube in tinfoil. Spin, separate + freeze within 1 hour	N/A
Vitamin D (25-OH)	1xSerum: amber 4.9ml	No need to cover with tinfoil	N/A
Vitamin E	1xSerum: amber 4.9ml	Cover tube in tinfoil. Spin, separate & freeze within 1 hr	N/A
Vitamin K	1xSerum: amber 4.9ml	Protect from Light, no need to freeze	N/A
VMA (vanillylmandelic acid)	24 hr Urine - with HCl	pH & volume noted. 2x10mls sent for test	N/A
Von Williebrand factor (vWF:Ag)	2xEDTA: pink 2.7ml 6xCitrate: green 3ml 1xSerum: amber 4.9ml	Sample must be taken after 11.00am and Hand delivered to Lab before 12	Consultant Haematologist
Xanthochromia	CSF supernatant	>1ml of CSF supernatent and amber tube blood. Refer to Consultant Microbiologist	Hospital Consultant
Yersinia	1xSerum: amber 4.9ml	None	N/A
YO antibodies (HU, RI, YO, CV2, MA2)	1xSerum: amber 4.9ml	None	Consultant
Zinc	1xSerum: amber 4.9ml	Remove serum from gel	N/A

3. REPORTS ISSUED BY EXTERNAL LABORATORIES

Hard Copy Resulting

External reports produced by referral labs are returned by hard copy report to the External test Department for sorting and return to the test requestor. The category under which each test result should be filed in the patient's chart is indicated in the index at the back of this manual. A scanned copy of the report is retained on the Laboratory DART system for archive purposes.

Electronic Resulting

In addition to hard copy reports, IT links exist with the sites listed below to improve access to external reports for our service users.

- The MRHT Laboratory Information system (LIS) is linked with the Regional Hospital Mullingar (RHM) Laboratory via an IT interface that transmits request and result messages between the sites. Results for external requests sent to RHM Laboratory are accessible from MRHT LIS and Ward Enquiry systems

- The MRHT LIS is also linked with St James Laboratory (SJH) and the National Virus Reference Laboratory (NVRL) via an IT messaging system. This system transmits request and result messages between the sites. Results for external requests sent to SJH* and NVRL are accessible from MRHT LIS and Ward Enquiry systems.

  Note: Not all SJH tests are transmissible electronically. Some text based and molecular tests reports are returned via hard copy only.

HAEMATOLOGY LABORATORY

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1. INTRODUCTION

The Haematology Laboratory at Midland Regional Hospital, Tullamore provides a routine haematology service to the hospital and to general practitioners in the local area. In addition, a referral service for more specialised haematological tests is provided.

An on-call service is provided to the hospital only for processing of non-deferrable/urgent test requests. Routine test requests should not be forwarded to the laboratory during on-call hours.

2. HAEMATOLOGY & COAGULATION TEST INDEXES

For details of tests accredited to the ISO: 15189 Standard, refer to the Irish National Accreditation Board (INAB) Website www.inab.ie. Tests currently accredited to this standard are listed on the Scope of Accreditation for Midland Regional Hospital Tullamore - Registration No. 221MT.

Tests that are not currently accredited that are processed internally in the Haematology Laboratory will NOT be listed on this scope.

2.1 HAEMATOLOGY TEST INDEX

HAEMATOLOGY:
Full Blood Count (FBC)
Automated Differential White Cell Count
Automated Reticulocyte Count
Blood Film Examination
Manual WBC Differential
Erythrocyte Sedimentation Rate (ESR)
Infectious Mononucleosis Screen
Sickle Cell Screen
Malaria Rapid Diagnostic Test/Blood Smear for parasites. *Additional 'Malaria Request Form' T/HAE/LP/017-04 must be completed and sent to the haematology lab with* ***all Malaria screen requests***

2.2 COAGULATION TEST INDEX

COAGULATION:
Prothrombin Time (PT)
International Normalised ratio (INR)
Activated Partial Thromboplastin time (APTT)
Activated Partial Thromboplastin time Ratio (APTT Ratio)
Coagulation Screen (PT and APTT)
D-Dimers
Fibrinogen
Mixing Studies (only at the request of Consultant Haematologists)

3. HOURS OF OPERATION AND CONTACT DETAILS

Postal Address	Hours of Operation	Phone (internal EXT in bold)
Haematology Laboratory MRHT Tullamore Co Offaly Ireland	**Weekday** **Core Hours** 09:00-17:00hrs (Full Operational Service) **Extended Working day** 08:00 - 20:00hrs (Reduced Services outside of Core Hours) **On-Call/Weekend/Public Holidays** For details relating to on-call and weekend arrangements refer to the General Information Section 3.1.2 Out of Hours /Weekend Pathology Services	**Routine hours** 057-93**58351** 057-93**58347** **On Call and Weekends via the Hospital switch** **Internal Ext 3000** **External (057) 932 1501**

***Weekday Service: Routine Workload Cut-off:**

- All GP and in-house routine samples must be received in specimen reception by 4pm.
- Routine samples arriving after the stated deadlines may not be processed until the next routine working day.

Haematology Personnel	Name	Contact Details
Consultant Haematologist	Dr. Gerard Crotty	057 93**58352** Gerard.crotty@hse.ie (Consultant Haematologist on call can be contacted through switchboard Ext. **3000**)
Consultant Haematologist	Dr. Kanthi Perera	057 93**58276** Meegahage.perera@hse.ie (Consultant Haematologist on call can be contacted through switchboard Ext**. 3000**)
Haematology Team		Contact via switchboard Ext. **3000**
Chief Medical Scientist	Mrs. Áine Ryan	057-93**58309** Aine.gorman@hse.ie
Senior Medical Scientist	Ms. Helena Martin	057-93**58351** HelenaT.martin@hse.ie
Senior Medical Scientist	Ms. Marie Dooley	057-93**58351** Marie.dooley1@hse.ie

General Enquiries	
Haematology	057-93**58351**
Coagulation	057-93**58347**

4. PRE-TESTING INFORMATION

4.1 HANDLING AND TRANSPORT OF SAMPLES

All samples are to be taken into the correct specimen tubes and transported to the laboratory in the Biochemistry/Haematology Request Form specibag during routine hours and in the Haematology On-call Request Form specibag during on-call hours.

An additional 'Malaria Request Form' T/HAE/LP/017-04 must be completed and sent to the haematology lab with **all Malaria screen requests.**

All routine haematology/coagulation tests can be stored at room temperature provided that they are delivered within the detailed times in section 4.3 Tables 1and 2.

To protect the safety of all healthcare staff, the following precautions for the transportation of samples must be followed:

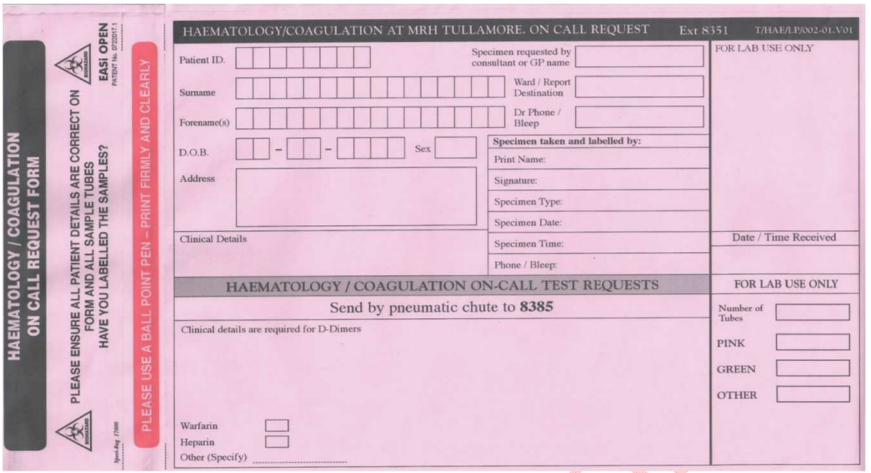
- The outside of the sample tube must not be contaminated with blood/body fluids.
- Blood or body fluid-stained laboratory request forms must not be submitted.
- Samples must be placed in the plastic bag that is attached to the request form.
- Samples can be transported to the laboratory at room temperature unless otherwise stated in the sample requirements section.
- High risk/ known infectious patients should be clearly indicated on the request form.

4.2 FORM AND SAMPLE LABELLING REQUIREMENTS

All parts of the General Biochemistry/Haematology Request form or Haematology On-call Request form and specimens are to be completed in full as per the labelling requirements stated in **Section 7** of the **General Information Section** at the beginning of this manual.

Please reference the Biochemistry section for the General Biochemistry/ Haematology Request Form.

See next page for the Haematology On-call Request form:



HAEMATOLOGY / COAGULATION ON CALL REQUEST FORM

PLEASE ENSURE ALL PATIENT DETAILS ARE CORRECT ON FORM AND ALL SAMPLE TUBES HAVE YOU LABELLED THE SAMPLES?

EASI OPEN

PLEASE USE A BALL POINT PEN - PRINT FIRMLY AND CLEARLY

HAEMATOLOGY/COAGULATION AT MRH TULLAMORE. ON CALL REQUEST Ext 8351 T/HAE/LP/002-01.V01

Patient ID.

Surname

Forename(s)

D.O.B. Sex

Address

Clinical Details

Specimen requested by consultant or GP name

Ward / Report Destination

Dr Phone / Bleep

Specimen taken and labelled by:

Print Name:

Signature:

Specimen Type:

Specimen Date:

Specimen Time:

Phone / Bleep:

FOR LAB USE ONLY

Date / Time Received

HAEMATOLOGY / COAGULATION ON-CALL TEST REQUESTS

Send by pneumatic chute to **8385**

Clinical details are required for D-Dimers

Warfarin

Heparin

Other (Specify)

FOR LAB USE ONLY

Number of Tubes

PINK

GREEN

OTHER

4.3 SAMPLE REQUIREMENTS FOR ROUTINE HAEMATOLOGY AND COAGULATION TESTS

As per section 3.1 of the General Information, the routine hours are 09:00 – 17:00 hrs Monday to Friday with emergency on-call service provided outside of these hours and Saturdays, Sundays and Public Holidays. Please note Specimen Reception closes at 17:45 during routine days.

Please refer to the following tables for the Haematology sample requirements.

Table1: Routine Haematology Tests

Test Name	Sample type & volume	Special Conditions	Reporting Timeframe (Routine hrs)
Full Blood Count (FBC)	EDTA (pink) 2.7 ml	72 hours maximum from sample collection	Daily
Automated Differential White Cell	EDTA (pink) 2.7 ml	72 hours maximum from sample collection	Daily
Blood Film Examination	EDTA (pink) 2.7 ml	EDTA sample must be <24 hrs old. Reason for request must be provided	72hrs
Erythrocyte Sedimentation Rate (ESR)	EDTA (pink) 2.7 ml	One sample only required for FBC & ESR but must be filled to the correct level. 24 hours maximum from sample collection	Up to 16:00 daily
Reticulocyte Count	EDTA (pink) 2.7 ml	12 hours maximum from sample collection	Daily
Infectious Mononucleosis Screen (I.M.)	EDTA (pink) 2.7 ml	One sample only required for FBC and I.M.	Up to 16:00 daily
Malaria Rapid Diagnostic Test /Blood Smear for parasites	EDTA (pink) 2.7 ml	Sample to be taken during fever spike. Haematology laboratory must be contacted in advance.*	Daily (only as a diagnostic test/ pre travel assessment not provided)
Sickle Cell Screen	EDTA (pink) 2.7 ml	Haematology laboratory must be contacted in advance.	Daily (for in house patients only)

Notes: Most samples are processed as they arrive in the laboratory.
Infectious Mononucleosis tests are processed twice daily in the morning and evening.
Non-urgent samples arriving after routine hours may be analysed on the next routine working day.
*Malaria Request Form T/HAE/LP/017-04 must be completed and sent to the haematology lab with all Malaria screen requests.

Table 2:Routine Coagulation Tests

Test Name	Sample type & volume	Special Conditions & Clinical Details	Reporting Timeframe (Routine hrs)
Prothrombin time (PT)/INR	Sodium Citrate (green) 3ml	Sample **must** be filled to the correct level. **State if patient is on Warfarin. Max delivery time from Phlebotomy<24hrs**	Daily
Activated Partial Thromboplastin time (APTT) / APTT Ratio	Sodium Citrate (green) 3ml	Sample **must** be filled to the correct level. **State if patient is on Heparin. Max delivery time for non heparin from Phlebotomy<24hrs and heparinised <2hrs**	Daily
Coagulation Screen (PT and APTT)	Sodium Citrate (green)3ml	Sample **must** be filled to the correct level. **State if any anticoagulant therapy**	Daily
D-Dimers	Sodium Citrate (green) 3ml	Sample **must** be filled to the correct level. **Max delivery time from Phlebotomy<8hrs.**	Daily
Fibrinogen	Sodium Citrate (green) 3 ml	Sample **must** be filled to the correct level**. State relevant reason for test request. Max delivery time from Phlebotomy <8hrs**	Daily
Mixing Studies	Sodium Citrate (green) 3 ml	Sample **must** be filled to the correct level. Only processed at the request of Consultant Haematologist Teams. **Max delivery time from phlebotomy<24hrs.**	Daily

Other non routine Haematology associated tests such as B12/Folate/Ferritin and non routine coagulation tests are referred to an external laboratory. Details of external request procedures are provided in the relevant area of this handbook.

Table 3: Turnaround Times for Haematology Tests

Notes

- All times from receipt of sample / not time of venepuncture.
- The laboratory must be contacted directly for all Critical samples
- Non-priority/critical samples arriving after routine hours may be analysed on the next routine working day

Test Name	Routine (GP)	Routine (in-house)	Priority / Critical*
FBC	Same Day	6 hrs	1 hr
Auto WBC Diff	Same Day	6 hrs	1 hr
Reticulocyte	Same Day	6 hrs	1 hr
Blood Film	72 hrs	72 hrs	*
Infectious Mononucleosis Screen	24 hrs	24 hrs	n/a
Malaria Rapid Diagnostic Test	n/a	4 hrs	2 hrs
Malaria films	n/a	6 hrs	6 hrs
Sickle Cell Screen	n/a	4 hrs	2 hrs
ESR	24 hrs	24 hrs	2 hrs
PT/INR	Same Day	6 hrs	1 hr
APTT/ APTT Ratio	Same Day	6 hrs	1 hr
Fibrinogen	Same Day	6 hrs	1 hr
D-Dimer	Same Day	6 hrs	1 hr
Mixing Studies	n/a	6 hrs	1 hr

**** Please note that the laboratory must be contacted directly for all Critical samples and priority & critical blood film requests***

4.4 REQUESTING SPECIAL HAEMATOLOGY AND COAGULATION TESTS

All special haematology requests should be made in consultation with the Haematology Consultant(s). Please contact a member of the Haematology team in advance of requesting special Haematology tests.

For management of bleeding and excessive anticoagulation see Blood Bank section of this manual.

4.5 REQUESTING BONE MARROW INVESTIGATIONS

All bone marrow investigations are performed by the Haematology Team only. A member of the Haematology Team should be contacted for referral of the patient. Bone Marrow trephines should be collected into 10% formalin which is available from the Histology Laboratory.

For cytogenetic testing, please ensure that the relevant form 'Request for Haematology/ Oncology Cytogenetic Analysis' accompanies the Histology request form. These are available from the laboratory or can be downloaded from www.genetics.ie

Or alternatively see:
For Cancer Molecular Diagnostics (CMD) please ensure that the relevant form accompanies the Histology request form. These are available to download from http://www.stjames.ie/media/Cancer%20Molecular%20Diagnostics%20request%20form.pdf

FISH for Multiple Myeloma patients are referred to Sheffield Children's NHS Foundation Trust. Please ensure at least 2 – 3 ml of bone marrow aspirate is collected into a 7.5ml EDTA (blood transfusion) tube. Samples can only be taken Monday to Wednesday, please ensure specimen reception is contacted before 12pm to organise transport. The optimal time to take these samples is between 11:30am-12:30pm to ensure they are received at the referral site within 24hours.The plasma cell count must be reported to Sheffield before analysis will commence. Please complete the "Sheffield Diagnostics Genetics Service" referral form. These are available onhttps://www.sheffieldchildrens.nhs.uk/refer-to-us/

5. SAMPLE RETENTION

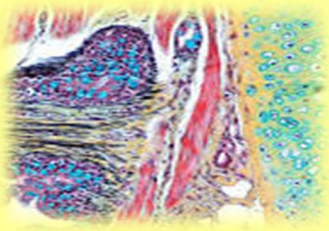
Sample	Retention Time
FBC Samples	Min 5 days
Coagulation Samples	Min 5 days
ESR Samples	Min 5 days
Blood Films	Min 1 month
Bone Marrow Aspirate slides	Minimum 30yrs

6. QUALITY ASSURANCE

The Haematology Laboratory participates in the following Quality Assurance Schemes

Distributor	QA Programme
UK National External Quality Assessment Scheme (NEQAS) Irish External Quality Assessment Scheme (IEQAS) LabQuality External Quality Assessment Scheme Randox International Quality Assessement Scheme (RIQAS)	1. Full Blood Count 2. Reticulocytes 3. Automated WBC Differential 4. Blood Films 5. ESR 6. Infectious Mononucleosis 7. Blood Films for Blood Parasites 8. Sickle Cell 9. Coagulation: PT / INR / APTT Fibrinogen / D-Dimers

HISTOPATHOLOGY LABORATORY



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2. INTRODUCTION

3. HOURS OF OPERATION AND CONTACT DETAILS

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4.1 HANDLING AND TRANSPORT OF SAMPLES

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4.3 SAMPLE REQUIREMENTS FOR HISTOLOGY TESTS

5. SAMPLE REJECTION

6. SAMPLE RETENTION

7. QUALITY ASSURANCE

1. INTRODUCTION

The Histopathology Laboratory located at Midland Regional Hospital, Tullamore is the central Histopathology Laboratory servicing the HSE Mid Leinster area. In addition, a referral service for more specialised histopathology tests is provided. For reasons of patient safety, compliance with sample and form labelling requirements as described in section 4 is strongly recommended.

2. HISTOPATHOLOGY TEST INDEX

For details of tests accredited to the ISO: 15189 Standard, refer to the Irish National Accreditation Board (INAB) Website www.inab.ie. Tests currently accredited to this standard are listed on the Scope of Accreditation for Midland Regional Hospital Tullamore - Registration No. 221MT.
Tests that are not currently accredited that are processed internally in the Microbiology Laboratory will NOT be listed on this scope.

Frozen Sections
Immunohistochemistry
Non Gynae Cytology
Post Mortem Histology
Routine Surgical Histology
Special Stains
Referral Tests: Immunofluorescence
Muscle Biopsies
Renal biopsies

3. HOURS OF OPERATION AND CONTACT DETAILS

Postal Address	Hours of Operation	Phone (internal EXT in bold)	Fax
Histology Laboratory MRHT Tullamore Co Offaly	**Weekday Core Hours** 09:00-17:00hrs (Full Operational Service) **Extended Working day** 08:00 - 18:00hrs (Reduced Services outside of Core Hours) **On-call/Weekend/Public Holidays** No on call service provided	057-93**58338**	057-93**59394**

Histopathology Personnel	Name	Contact Details(Consultant Histopathologist on call can be contacted through switch 0579321501 or 3000)
Consultant Histopathologist Staff	Dr. Margaret Lynch	057 93**58383** Margaret.lynch@hse.ie
	Dr. Nurul Nor	057 93**58279** Nurul.norr@hse.ie
	Dr Charles d'Adhemar	057 93**59377** Charlesj.dadhemar@hse.ie
	Dr. Miriam Walsh	057 93**58278** Miriam.walsh@hse.ie
	Dr Nazia Faheem	057 93**57763** Nazia.faheem@hse.ie
Chief Medical Scientist	Ms. Naomi Cronin	057-93**58389** Naomi.cronin@hse.ie
Senior Medical Scientist	Ms Margaret Kelly	057-9358338 Margaret.kelly8@hse.ie
Senior Medical Scientist	Ms. Brid Maher	057-93**58338** Brid.maher@hse.ie
Senior Medical Scientist	Ms Fiona Murtagh	057-93**58338** Fiona.murtagh@hse.ie
General Enquires		
Histopathology Office	057-935**8342 /** 057-935**9393**	

4. PRE-TESTING INFORMATION

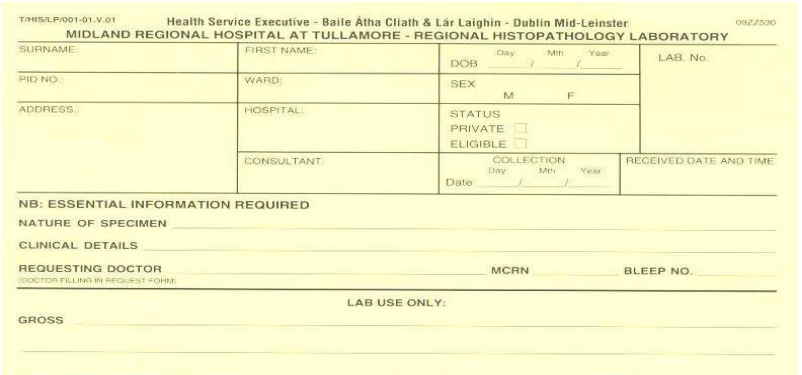
4.1 HANDLING AND TRANSPORT OF SAMPLES

To protect the safety of healthcare staff, the following precautions for the transportation of samples must be followed:

1. Sample containers must be sealed correctly. Ensure that screw caps are fully closed. Formalin is a chemical preservative that presents a number of hazards. In case of a spillage please follow chemical spill guidelines. If no guidelines are available please contact the laboratory for instructions.
2. Samples must be placed in a biohazard bag (where size allows) and the accompanying form placed in the designated pouch.
3. Samples can be transported to the laboratory at room temperature.

4.2 FORM AND SAMPLE LABELLING REQUIREMENTS

All parts of the Histopathology request form are to be completed in full. Failure to comply with this requirement will result in sample processing being delayed while a member of the relevant team comes to the laboratory to complete the request form.



T/HIS/LP/001-01.V.01 Health Service Executive - Baile Átha Cliath & Lár Laighin - Dublin Mid-Leinster 09ZZ530

MIDLAND REGIONAL HOSPITAL AT TULLAMORE - REGIONAL HISTOPATHOLOGY LABORATORY

SURNAME:	FIRST NAME:	DOB Day / Mth / Year	LAB. No.
PID NO.:	WARD:	SEX M F	
ADDRESS.:	HOSPITAL:	STATUS PRIVATE ☐ ELIGIBLE ☐	
	CONSULTANT:	COLLECTION Date Day / Mth / Year	RECEIVED DATE AND TIME

NB: ESSENTIAL INFORMATION REQUIRED

NATURE OF SPECIMEN

CLINICAL DETAILS

REQUESTING DOCTOR (DOCTOR FILLING IN REQUEST FORM) MCRN BLEEP NO.

LAB USE ONLY:

GROSS

All writing on the request form must be clearly legible (block capitals preferred) so that the information provided is legible, thus ensuring proper identification of the patient and all tests requests. Writing should be in ballpoint pen (not marker) to ensure the information is copied through to each sheet of the request form.

Note: Computer generated labels may be used on the request form (**one label required on each sheet of the request form**). **Do not use the pre-printed specimen/tube label for the request form as this does not have all of the information required for registration on the Laboratory Computer System.**

Information Required on the Request Form

a) **Patient Surname and First Name/s (unabbreviated).**
b) **Patient date of birth.**
c) **Patient hospital ID (Chart Number)** for patient in hospital, if available.
d) **Ward/GP Location.**
e) **Consultant/GP Name.**
f) **Patient Gender.**
g) **Date of Specimen.**
h) **Time of Specimen, if appropriate.**
k) **Specimen type and anatomical site of origin.** Required for all specimens sent to the Histopathology laboratory.
l) **Patient full address. NB for GP samples especially**
m) **Clinical details/Medications.**
n) **Doctor's signature and bleep number**

Correct identification of the patient before collection of the sample is essential.

Samples are to be labelled as per the labelling requirements stated in **Section 7** of the **General Information section** of this manual.

Note: A computer generated label is only to be used on the sample if it can be applied without overlap to the specimen container. Current Hospital Addressograph labels are acceptable

Information Required On the Specimen

a) **Patient surname and first name/s, (first name unabbreviated, if possible).**
b) **Patient date of birth**.
c) **Patient hospital ID (Chart Number)** for patient in hospital
d) **Date of specimen collection.**
e) **Time of specimen collection.**
f) **Ward/GP Location.**
g) **Specimen type and anatomical site of origin.**

4.3 SAMPLE REQUIREMENTS FOR HISTOLOGY TESTS

FROZEN SECTIONS

- **Frozen sections must be pre-booked with the Histopathology Laboratory.** Contact the laboratory directly at 05793 58338.
- The scientific staff answering the call will ask specific questions relating to the sample and will check that a Histopathologist is available at the stated time before confirming the booking.
- Please contact the Histopathology Laboratory again on the day of the surgery to confirm that the frozen section is going ahead.

Sample Requirements
- Samples must be sent in a dry container (no fixative) via a porter to the Histopathology laboratory and handed to technical staff.
- Please write a contact number on the request form for telephoned report.

Turnaround Time
- Frozen Sections are regarded as critical samples and normal turnaround time for frozen sections is 30 min after arrival in the laboratory. Occasionally samples where interpretation is difficult may take longer. Where multiple samples are received the turnaround time will be a multiple of this time as only one frozen section can be handled at any one time

Cancellation or postponement
- It is important to contact the Histopathology laboratory if the frozen section is no longer required, is being postponed or is delayed, as laboratory staff will be on hold waiting for its arrival.

ROUTINE HISTOLOGY

Specimen Requirements
- Samples for routine Histopathology must be fixed in formalin
- Pre-filled pots are available from the laboratory for smaller biopsies
- Large specimens and organs should be sent in large containers with added 10% formalin
- For very large containers, contact the Laboratory directly and larger containers will be provided.

- Ensure that the containers used for larger samples are sufficient for the sample and have twice the volume of formalin to sample
- Samples should be clearly labelled with patient and specimen details.
- **For larger containers this information should be on both the lid and the side of the container. Please note it is <u>not</u> sufficient to attach the request form to the specimen bucket**

Urgent Samples

- Urgent samples should be clearly marked on the request form
- A telephone call to the laboratory alerting staff to the urgency of the sample is appreciated.

Turnaround Time

Urgent samples:

- Turnaround time for urgent processing is **3-5** working days after sample receipt but is dependent on the complexity of the case. A preliminary report is usually telephoned within 2 days.

Non urgent samples:

- Specimen turnaround time follows the categories used in the National Histopathology Quality Assurance Programme as follows:

Category	Example Sample types	Turnaround Time / working days
P01:	Small biopsies such as skin punch biopsies, vocal cord bx's Needle biopsies, Pipelle biopsies, lung biopsies Prostate needle biopsies	5-7
P02:	Endoscopy samples only	5-7
P03:	Cancer Resections including GI, Thyroid, Gynae etc	7-10
P04:	All Other samples including skin biopsies, currettings Products of conception non cancer GI resections, Non cancer Gynae resections, appendix Gallbladder	7-10
P04	Placenta	21

FRESH LYMPH NODES (PLEASE PRE-BOOK)

- **Lymph Nodes must be pre-booked with the Histopathology Laboratory**. Contact the laboratory directly at 05793 5**8338**
- The scientific staff answering the call will ask specific questions relating to the sample and will check that a Histopathologist is available at the stated time before confirming the booking
- Contact the laboratory again when sending down the sample.
- For samples from Portlaoise and Mullingar the samples must be sent directly to the laboratory without delay to prevent sample deterioration.

- **This service only applies in routine working hours**. If the lymph node tissue is taken out of hours, bisect it and place it in 10% formalin and send it to the lab as with all other histology samples.
- **NB: Suspected TB/HIV samples** Fresh lymph node is not acceptable in the histology laboratory if it is likely to be infectious e.g. if taken from a patient who is probably TB or HIV positive. If this patient status is known or suspected, then bisect the lymph node and place it in 10% formalin. Write the relevant clinical details on the form and send the sample to the histology lab.

Specimen Requirements

- The specimen must be sent to the laboratory in a dry container (no fixative)
- The lymph node will be examined, described and impression smears made before the specimen is processed for routine Histopathology.

Turnaround Time

- A preliminary report may be telephoned to the clinical team on the day of biopsy
- The turnaround time for full report on lymph node is the same as routine biopsy

FLUID CYTOLOGY INCLUDING TBNA, SPUTA AND BRUSHINGS

Specimen Requirements

- Fluid Cytology samples should be sent to the laboratory without any fixative being added
- Separate samples must be submitted if Biochemistry and Microbiology is also required.
- Large aspirates must be aliquoted into representative samples comprising not more than 2 universal containers
- Outside of normal laboratory working hours samples should left in the laboratory fridge

Turnaround Time

- Turnaround time for cytology varies with sample.
- Reporting of routine samples **may take 5-7** working days.
- Reporting may take additional time (up to **12** working days) if Immunohistochemistry or special stains are required.
- Occasionally a case may require referral for second opinion in which case further time will be needed
- Should the report take longer than the routine turnaround time the reporting Histopathologist will be happy to discuss the progress of the report at any stage

FINE NEEDLE ASPIRATION (FNA) CYTOLOGY

Fine needle aspiration is a form of diagnostic biopsy that uses fine needles to obtain cellular samples. Upon examination of the patient in the clinic and identification of a lesion, the ENT Consultant will phone the laboratory to request a Medical Scientist to attend for FNA.

Specimen Requirements

- It's important that the correct needle size is used, preferably 23 to 25 gauge (no larger) with suction and movement back and forth within the lesion, preferably with a 10 ml syringe, with release of negative pressure prior to exiting the lesion. It is advisable to do three separate passes.
- At the clinic, the Consultant should inform the Medical Scientist of the number of sites to be sampled
- The lesion is aspirated two to three times depending on the cell yield from each pass
- The Consultant passes the syringe to the Medical Scientist
- The Medical Scientist is responsible for preparing the slides at the clinic once the site has been sampled
- If the cell yield is low, the medical scientist will request that the lesion is sampled again until there is adequate material for diagnosis
- A new needle is used for each pass

Turnaround time

- For urgent samples at least a provisional verbal report is available on the day following receipt provided that the sample is received prior to 3 pm. Reporting of routine samples takes approximately **7-10** working days.
- Reporting may take additional time (up to **12** working days) if Immunohistochemistry or special stains are required.
- Occasionally a case may require referral for second opinion in which case further time will be needed
- Should the report take longer than the routine turnaround time the reporting Histopathologist will be happy to discuss the progress of the report at any stage

GYNAECOLOGICAL CYTOLOGY

Gynaecological cytology samples are referred to the laboratory in the Rotunda Hospital. The samples are referred as follows depending on the hospital from which they originate.

- **MRH @ Tullamore:** Samples are sent by the wards involved to the referral laboratory (Rotunda Hospital) and are not sent to the Tullamore laboratory for dispatch.

- **MRH @ Mullingar:** Samples are sent to the Mullingar laboratory. The details are recorded and the samples forwarded to the Rotunda Hospital for reporting. Reports are issued directly from the Rotunda Hospital to the requesting clinician. No reports are available from the pathology laboratory MRH @ Mullingar. For copies of reports please contact the cytology laboratory in the Rotunda Hospital directly.

- **MRH @ Portlaoise:** Samples are sent to the Portlaoise Laboratory. The details are recorded and the samples forwarded to the Rotunda Hospital for reporting. Reports are issued directly from the Rotunda Hospital to the requesting clinician. No reports are available from the pathology laboratory MRH @ Portlaoise. For copies of reports please contact the cytology laboratory in the Rotunda Hospital directly.

Specimen Requirements

Cervical Smears- Obtain an adequate sample from the cervix using ThinPrep kit provided. Kits and instructions for sampling are available on the relevant wards. If specimens are to be posted follow the guidelines given on the kit.

Turnaround Times

- 2-4 weeks depending whether the smear is routine, is based on suspicious clinical findings or if the patient has previous positive history.
- Turnaround time for routine smears is shorter, while turnaround time for other smears is longer.

GP samples:

Gynaecological cytology samples from women aged 25-60 should be sent directly to Cervical Check. Information on the referral address is available from Cervical Check. Samples from women outside this age group and who are not previously registered with the Cervical Screening Program should be referred directly to the Rotunda Hospital.

MUSCLE BIOPSIES (PLEASE PRE-BOOK)

Specimen Requirements

- **As this is a referral test requiring special transport, the Histopathology Laboratory (05793 58338) must be contacted to book the muscle biopsy at least 24 hours in advance.**
- The person contacting the laboratory must give their own name and bleep number, the patient name, date of birth and the name of the consultant.
- The biopsy must be arranged in time to allow the sample to get to the laboratory before 11:00 hours. This is necessary to meet transport requirements.
- The biopsy must be placed on saline-moistened gauze and placed in a dry universal container (Do not use too much saline).
- Never squeeze a biopsy into a tight or narrow necked specimen container
- Please contact the laboratory promptly if the procedure has been cancelled.

Reports

- Muscle biopsies are referred to the Neuropathology Laboratory, Beaumont Hospital, Dublin.
- Reports when issued by the referral laboratory are sent to the MRHT laboratory office. Reports are then forwarded to the referring Consultant's secretary.
- Additional copies of reports are available from the referral laboratory only (01-8093134)

Turnaround Times

- Turnaround time for muscle biopsies is one week *(information provided by Beaumont Hospital)*

RENAL BIOPSIES (PLEASE PRE-BOOK)

Specimen Requirements

- **As this is a referral test requiring special transport, the Histopathology Laboratory (05793 58338) must be contacted to book the renal biopsy at least 24 hours in advance**
- The person contacting the lab must give their own name and bleep number , the patient name and date of birth and the name of the consultant
- Biopsies must be scheduled as early as possible preferably in the morning to allow sufficient time for the sample to be sent by courier to the referral laboratory in the afternoon.
- 3 cores of tissue should be taken to ensure that there are sufficient numbers of glomeruli for examination- not less than 10 for light microscopy and immunofluorescence. This applies to native and allograft kidneys.
- Place one core into the pots in the following order
    - 1 biopsy into the Zeus pot supplied
    - The other two biopsies into the Formalin pot supplied.
- The biopsies must be put into the containers in the above order to prevent contamination of the Zeus solution by the forceps
- Make sure the cap is fastened tightly on the containers.
- The container must be labelled with patient name, DOB, Chart number (if available), and nature of specimen.
- It must be accompanied by a histology form with full patient details (Full name, DOB, MRN, Address, Consultant Name, Ward, and sample date) and including comprehensive clinical details. Make a note on the form of the time the specimen was taken.
- The form and specimen must be sent immediately to the histology laboratory.

Reports

- Renal Biopsies are referred to the Histopathology Laboratory, Beaumont Hospital
- Reports when issued by the referral laboratory are sent to the MRHT laboratory office. Reports are then forwarded to the referring consultant's secretary.
- Additional copies of reports are available from the referral laboratory only 01-8092630/ 2008

Turnaround Times:

- Turnaround time for renal biopsies varies depending on the complexity of the investigations required. 6-8 days immunoflourescence, 2-3 weeks Light Microscopy and 4-6 weeks Electron Microscopy.*(Information provided by Beaumont Hospital)*

SKIN BIOPSIES FOR IF (PLEASE PRE-BOOK)

Specimen Requirements

- As this is a referral request, the Histopathology Laboratory (05793 5**8338**) must be contacted to book the test at least 24 hours in advance
- The biopsy must be arranged in time to allow the sample to get to the laboratory before 11:00. This is necessary to meet transport requirements.
- Take two 4mm skin biopsies from normal skin adjacent to the lesion
- Place one in 10% formalin for routine Histopathology
- Place the other on saline moistened gauze and place this in a dry universal container for immunoflourescence
- Please ensure that the cap is securely tightened
- Both containers must be labelled with the patient name, DOB and nature of specimen.
- They must be accompanied by a Histopathology form with full patient details including comprehensive clinical details and the time the specimen was taken.
- The specimen must be sent directly to the laboratory by porter
- Please contact the laboratory promptly if the procedure is cancelled.

Reports

- Skin biopsies for IF are referred to the Immunology Laboratory, St James' Hospital, Dublin.
- Reports when issued by the referral laboratory are sent to the MRHT laboratory office. Reports are then forwarded to the referring Consultant's secretary.
- Additional copies of reports are available from the referral laboratory only (01-4162928)

Turnaround Times

Turnaround time for Immunofluorescence is 15 days. *(Information provided by St James Hospital)*

CYTOGENETICS/CHROMOSOMAL ANALYSIS

Tissue for cytogenetics/ chromosomal analysis is **NOT** processed by the Histopathology Department. There are procedures in place in the Maternity Units at MRH Mullingar and MRH Portlaoise for transport of these samples directly to the relevant referral centre. Please note that formalin fixed samples are **NOT** suitable for cytogenetics.

REFERRALS FOR MULTIDISCIPLINARY TEAM REVIEW (MDT)/ TUMOUR BOARD

Surgical Teams /Oncology Team

- Each surgical team generates a list of patients who need to be discussed at MDT
- The surgical team brings the list to the oncology CNS who is the gatekeeper for the tumour board meetings
- The oncology CNS adds the cases to the oncology list which has already been generated by the Oncology CNS
- The amalgamated list is forwarded to the oncology secretary who in turn forwards it to the Histopathology Team
- The request should be received in the laboratory before 4 pm on Monday to allow the report to be finalised ,the slides and blocks to be retrieved and the case to be reviewed by the presenting Histopathologist

GI MDT

MRH Tullamore:

- The GI MDT is held once per month
- All requests of GI MDT review are forwarded by Dr Geraldine McCormack to Dr Nurul Nor, Consultant Histopathologist.
- The GI MDT List should be received in the laboratory before 4 pm on the Friday before the meeting to allow the reports to be finalised ,the slides and blocks to be retrieved and the case to be reviewed by the presenting Histopathologist

MRH Mullingar:

- The Mullingar GI MDT is generated by Dr Kirca's registrar/ secretary who forwards it to Dr Charles d'Adhemar and Dr Miriam Walsh Consultant Histopathologist
- The GI MDT List should be received in the laboratory before 4 pm on the Monday of the week before the meeting to allow the reports to be finalised ,the slides and blocks to be retrieved and the case to be reviewed by the presenting Histopathologist

5. SAMPLE REJECTION

Laboratory staff are only authorised to accept samples which meet the required standard. Please refer to section 8.6 Sample Rejection, in the Introduction section of this manual for further information. Adherence to specimen labelling requirements is of particular importance for Histopathology specimens as in general, it is not possible to obtain a repeat specimen.

Specimens and forms with discrepancies may be corrected by **the person who took the sample.** He/She will be requested to attend the laboratory to correct the error and sign and date the correction. Processing of the specimen will not proceed until the correction has taken place.

Rejected specimens from locations external to the hospital will be returned to that location for correction by **the person who took the sample.**
In exceptional cases where the delay in processing will have a direct clinical impact on the sample quality or on the patient, the Medical team involved may be allowed to clarify discrepancies using an 'Acceptance of Responsibility Form' while the specimen remains in quarantine.

Discrepancy and correction will be recorded.
The final report of the patient's test result(s) will contain details of the correction made.

Where a dispute arises in relation to a sample, the final decision on suitability for testing will lie with the Consultant Histopathologist or Chief Medical Scientist.

6. SAMPLE RETENTION

Sample	Retention Times
Routine Histopathology Specimens	5 Weeks (a minimum of 4 weeks after reporting)
Cytology Specimens	4 Weeks
Autopsy/Post Mortem Samples	1 year

Some samples may be retained for longer periods at the request of the reporting Histopathologist and with the consent of the patient/next of kin where required.

7. QUALITY ASSURANCE

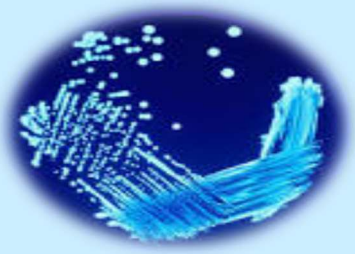
The Histology Laboratory participates in the following Quality Assurance Programmes;

Distributor	QA Programme
UK National External Quality Assessment Service (UKNEQAS)	1. Cellular Pathology 2. Immunohistochemistry 3. Non Gynae Cytopathology diagnostic Module 4. Bone Marrow 5. Frozen Section 6. Tissue Block
NordiQC External Quality Assessment Service	Immunohistochemistry
Dept. Histopathology, Leicester Royal Infirmary, Leicester LE1 5WW	National Specialist Dermatopathology External Quality Assurance Scheme UK and ROI

UK GI EQA Scheme	GI Pathology EQA Scheme
IEQAS	Irish EQA Scheme in General Histopathology
College of American Pathologists Proficiency testing	Cytology EQA Histology EQA

The Histology Laboratory also participates in voluntary Inter-Laboratory assessment for some special stains and Immunohistochemistry.

MICROBIOLOGY LABORATORY



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6. SAMPLE RETENTION

7. QUALITY ASSURANCE

1. INTRODUCTION

The Microbiology Laboratory at Midland Regional Hospital, Tullamore provides a routine microbiology service to the hospital and to general practitioners in the local area. In addition, a referral service for more specialised microbiology tests is provided.

An on-call service is provided to the hospital only for processing of non-deferrable/urgent test requests. Routine test requests and specimens should not be forwarded to the laboratory by the pneumatic chute during on-call hours.

2. MICROBIOLOGY TEST INDEX

For details of tests accredited to the ISO: 15189 Standard, refer to the Irish National Accreditation Board (INAB) Website www.inab.ie. Tests currently accredited to this standard are listed on the Scope of Accreditation for Midland Regional Hospital Tullamore - Registration No. 221MT.
Tests that are not currently accredited that are processed internally in the Microbiology Laboratory will NOT be listed on this scope.

Blood culture
Bone allograft culture
Cannulae culture
CAPD Fluid (Continuous Ambulatory Peritoneal Dialysis Fluid)
COVID-19 (SARS-CoV-2)
CPE Screening (Culture Method)
CPE Screening (PCR Method)
CSF
Ear Swabs
Eye Swabs
Faeces
Fluids
Fungal Culture and Microscopy
Genital Tract and Associated Specimens
Hepatitis and HIV viral screen
Influenza Screening (PCR Method)
Meningococcal PCR
Mouth Swabs
MRSA Screening (Culture Method)
MRSA Screening (PCR Method)
Nasal Swabs
Norovirus Screening (PCR Method)
Pregnancy Tests
Sinus Aspirate
Sputum
Throat Swabs
Tissues and Biopsies
Tuberculosis
Urine culture, Legionella and Pneumococcal antigen testing.
VRE Screening (PCR Method)
Wound swabs

3. HOURS OF OPERATION AND CONTACT DETAILS

Postal Address	Hours of Operation	Phone (internal EXT in bold)
Microbiology Laboratory MRHT Tullamore Co. Offaly Ireland	Opening hours Monday – Friday: 08:00 - 20:00* Routine service: 09:00-17:00* * All GP and in-house routine samples must be received in specimen reception by 4pm. The TAT of samples outside these hours cannot be guaranteed. Only samples presented to the Microbiology Laboratory before 4pm will be assayed. Routine samples arriving after the 4pm cut off will be analysed during the next working day. On call service from 20:00 to 08:00 the following day. Sat/Sun/Public Holidays On call service provided over 24 hours It is essential to inform the Microbiology Laboratory of the impending arrival of an urgent specimen. It is not sufficient to mark the sample 'urgent'.	05793**58371** **On Call hours via switch EXT 3000**

Enquiries		
Microbiology	General Enquiries Sputum, pleural fluids and faeces enquiries Batch Molecular Testing – SCV-2	057 93**58371** 057 93**58508** 057 93**58372**
Test Results	**Ward Lookup is available for Microbiology test results.** Please restrict phone calls for routine test results to between the hours 11.30 and 12.30 and 16.00 and 16.30 on routine working days. During Out of Hours, only emergency results are available	Urine 05793**58375** Swabs 05793**57791** Blood Cultures 05793**57788**
On Call staff	Microbiology requests on call	Contact via switchboard Ext.**3000**

Microbiology Personnel	Name	Contact Details
Consultant Microbiologist	Locum Consultant Microbiologist	Can be contacted through reception ((057) 932 1501 Internal Ext. 3000)
A/Chief Medical Scientist	Mr Ultan Smith	057-93**58390** ultanf.smith@hse.ie
Senior Medical Scientist (s)	Ms. Anne Dolan Ms. Fiona Hanlon	057-93**58371** Anne.dolan3@hse.ie Fiona.hanlon@hse.ie
Specialist Medical Scientist (Molecular Microbiology)	Mr Oliver Cleary	Oliver.Cleary@hse.ie 057-93**58382**

4. PRE-TESTING INFORMATION

4.1 HANDLING AND TRANSPORT OF SAMPLES

All samples are to be taken into the correct sample containers and transported to the laboratory in the request form bag or a biohazard bag. The pneumatic chute may be used to transport all Microbiology samples except CSF's and Bone Marrow Aspirates for TB investigation.

To protect the safety of all healthcare staff the following precautions for the transportation of samples must be followed:

1. Specimen containers should be securely closed.
2. The outside of the sample container must not be contaminated with blood/body fluids.
3. Blood or body fluid-stained request forms must not be submitted.
4. All urine samples should be placed in the plastic bag that is attached to the microbiology specimen request form.
5. Samples should be transported to the laboratory as soon as possible. If there is a delay, specimens should be refrigerated with the exception of Blood Cultures and CSF's, which should always be brought immediately to the laboratory.
6. During Out of Hours, do not send **routine** Microbiology samples via the pneumatic chute, refrigerate and send during the next available routine opening hours

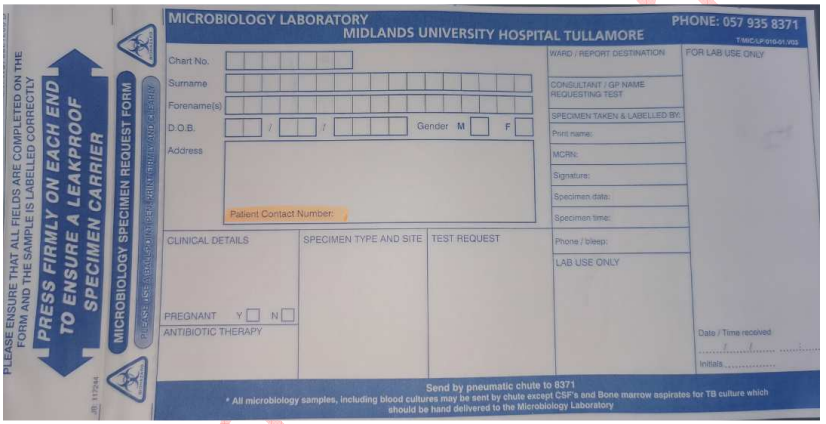
4.2 FORM AND SAMPLE LABELLING REQUIREMENTS

FORM LABELLING

All parts of the Microbiology Specimen request form are to be completed in full as per the labelling requirements stated in **Section 7** of the **General Information Section** of this manual. Patient details are to be recorded in block capitals on the form using legible handwriting with a ballpoint pen (not marker)

Note: Computer generated labels may be used on the request form (please ensure that **one label is attached to each sheet of the request form**).

The Microbiology Specimen Request Form is used to request culture and susceptibilities / PCR screening on all samples for Microbiological testing



SPECIMEN LABELLING

Correct identification of the patient before collection of the sample is essential.
Samples are to be labelled as per the labelling requirements stated in **Section 7** of the **General Information section** of this manual.

Information Required On the Specimen- items **a** and **b** are essential for sample acceptance, items c to g are desirable when space allows.

a) **Patient surname and first name/s (unabbreviated).**
b) **Patient date of birth.**
c) Specimen type and anatomical site of origin for Histopathology and Microbiology specimens, where applicable.
d) Date and time of specimen collection.
e) Ward/GP Location.
f) Patient hospital ID (Chart Number) for patient in hospital, if available.
g) Name of person who took the specimen**,** where applicable.

4.3 SAMPLE REQUIREMENTS FOR ROUTINE MICROBIOLOGY TESTS

BLOOD CULTURES	
Specimen Requirements	Aerobic bottle - Blue Anaerobic bottle – Pink
Sample Volume	5 ml per bottle
Special Precautions	**Do not remove the barcode label.** Do not cover bottle barcode as this is scanned as part of the analytical process. Blood culture bottles must be transported to the laboratory immediately. The pneumatic chute may be used to transport blood culture bottles. Sample should be taken preferably before antimicrobial treatment is started. Do not refrigerate.
Turnaround Time	Blood cultures are monitored continuously. Positive results are telephoned as soon as available to the requesting source and a preliminary report is issued. (Microscopy Report (Gram stain) issued <2hrs of bottle flagging positive on analyser. An Interim culture report is issued at 24-48 hrs for positive blood cultures. A final culture report should be issued at 48-72 hrs for positive blood cultures. Reports are also released on Ward Enquiry. For negative cultures a report is issued after 5 days or (14 days if endocarditis is suspected).

BONE ALLOGRAFT CULTURE	
Specimen Requirements	Two swabs from the graft (*e.g.* piece of bone for insertion)
Sample Volume	N/A
Special Requirements	Deliver to the laboratory immediately.
Turnaround Time	Final report: 7 – 9 days. Interim Report released earlier if significant growth.

CANNULAE CULTURE	
Specimen Types	Line tips *e.g.* CVP of Hickman lines
Specimen Requirements	Cannulae – Sterile universal container
Sample Volume	N/A
Turnaround Time	Final report: 2-3 working days.

CAPD FLUID (CONTINUOUS AMBULATORY PERITONEAL DIALYSIS FLUID)	
Specimen Type	Dialysis Fluid
Specimen Requirements	50 ml in sterile, leak proof container. Dialysis bags not suitable. EDTA sample of fluid may also be sent for cell count.
Sample Volume	50 ml.
Special Requirements	Deliver to laboratory immediately.
Turnaround Time	Gram stain and cell count – Same day Final Report 7-9 days. Interim Report released earlier if significant growth.

COVID-19 (SARS-CoV-2) PCR Testing	
Specimen Type	Nasopharyngeal swab
Specimen Requirements	Nasopharyngeal collection kit
Special Requirements	Deliver to laboratory immediately. Samples must be received before cut-off of 10 a.m weekdays (Mon-Fri). Testing at Weekends/Bank Holidays is available up to 11am.
Turnaround Time	Final Report: Urgent < 24 hours, Non-urgent 48-72 hrs
Additional Information	Please indicate clearly on request form that the test is (i) For a patient being admitted (ii) Surveillance (iii) HCW Surveillance (iv) LTCF screen (v) Required by another healthcare facility (vi) Query COVID-19/Symptomatic (vii) Day 3 Surveillance. **Please anticipate transfers to other hospitals and scheduled procedures in advance so testing can be carried out in a timely manner. Contact the Microbiology Laboratory if further guidance is required.**

CSF (CEREBROSPINAL FLUID)	
Specimen Requirements	Contact Microbiology Laboratory for collection containers. 3 sterile conical bottomed red capped containers of CSF fluid. Special sterile specimen collection packs are available in the Microbiology Laboratory. (**Additional tests require 4-5 samples-discuss with lab**) DO NOT USE URINE CONTAINERS **DO NOT USE SMALL UNIVERSAL CONTAINERS INCLUDED IN CSF PACKS ON WARDS.** **IF Xanthachromia testing is required please use a Brown Tube to collect sample for this. Please phone Microbiology in advance to request tube.** Label each container with patient's name *etc.* Label each container sequentially 1, 2, 3 *etc.* Deliver all specimens to the microbiology department immediately by hand. **Do not use pneumatic chute to transport CSF samples.**
Sample Volume	A minimum volume of 1ml of sample in each container. For Mycobacterium testing, send as large a volume as possible (5ml). (Sent to reference lab).
Special Requirements	Please alert the Microbiology laboratory by telephone to the impending arrival of the sample and to discuss clinical and treatment history of the patient. Ensure recent antibiotic history is on the request form. **All tests requested MUST be clearly stated.**
Turnaround Time	Processed on receipt. Microscopy report: < 2 hours Final negative culture report: 48 hours Final positive culture report: Available on completion of organism identification and antibiotic susceptibility testing.
Biological Reference Ranges	Patient — Normal Leucocyte Count Neonates (<28 days) — 0-30 cells x 10^6/L Infants (1-12 months) — 0-15 cells x 10^6/L Children/Adults (1 year +) — 0-5 cells cells x 10^6/L No RBCs should be present in normal CSF
Additional Information	For guidelines on PCR testing see Meningococcal PCR testing. Samples will be forwarded to appropriate external lab for additional testing such as virology, TB and oligoclonal bands where requested.

CPE Screening (PCR Method)	
Specimen Requirements	Rectal Swab
Special Requirements	Red Copan double swabs available from the Microbiology Laboratory must be used.
Test Availability	Testing available only up to 18.00 weekdays and 11.00am weekends.
Turnaround Time	Final report: <24 hours

CPE Screening (Culture Method)	
Specimen Requirements	Rectal Swab
Special Requirements	Black Charcoal swabs available from the Microbiology Laboratory must be used.
Test Availability	Testing available only up to 18.00 weekdays and 11.00am weekends.
Turnaround Time	Final report: 24 hrs (Negative Screens) 48-72 hours (Positive Screens)

EAR SWAB	
Specimen Requirements	ENT thin wire swab available from Microbiology or Charcoal swab.
Special Requirements	Specify on request form if fungal investigations required.
Turnaround Time	Final bacterial report: 2-3 working days. TAT may be longer if organism susceptibilities required. Interim Report released earlier if significant growth.

EYE SWAB	
Specimen Type	Routine – Charcoal swab
Specimen Requirements	NA
Turnaround Time	Routine: Final report 2-3 working days. TAT may be longer if organism susceptibilities required. Interim Report released if significant growth.

FAECES	
Available Test Requests	**C/S:** Routine culture for Salmonella, Shigella, Campylobacter and E. coli 0157 species. (Sample will be cultured for Yersinia and Vibrio species if clinically indicated). Rotavirus and Adenovirus: will be tested on faeces from children ≤ 5 yrs. Norovirus testing is carried out in line with national guidelines. Cryptosporidium and Giardia: will be tested on all faeces for C/S Additional available tests include: **Occult blood (1 sample only required), Ova and Parasites (Tested Externally, Hx. Of foreign travel only), Clostridium difficile** and **Helicobacter pylori-antigen testing**
Specimen Requirements	Fresh sample in clean faecal, leak proof container with spoon.
Sample Volume	Minimum volume: 1 – 2 g per test required. Please do not overfill container.
Turnaround Time	Final Report: Negative culture: 2-3 working days Positive culture: 2-3 working days Ova, Cysts and Parasites: Tested Externally Clostridium difficile toxin: 24 hours. Rota /Adenovirus and Cryptosporidium/Giardia: Result available within 1 working day (Not done weekends or bank holidays) Norovirus:24 hours Occult blood: Result available within 1 working day (Not done weekends or bank holidays) Helicobacter pylori-antigen testing: Result available within 1 working day (Not done weekends or bank holidays)
Additional Information	It is most important to provide details of clinical symptoms and epidemiological settings on all request forms, especially the presence and duration of symptoms, recent travel, shellfish ingestion and previous antibiotic therapy. **Clostridium difficile testing**: Retesting of patients with confirmed CDAD is not advised for 4 weeks after initial laboratory diagnosis **Ova, Cysts and Parasites investigation**: Only done on patients with history of foreign travel or on the advice of the Consultant Microbiologist. (Sent Externally for testing) Samples for virology other than above are sent to the NVRL.

FLUIDS	
Specimen Type	Joint fluid, synovial fluid, peritoneal fluid, ascitic fluid, pleural fluid.
Specimen Requirements	Clean sterile, leakproof, universal container.
Sample Volume	A minimum volume of 5 ml
Special Requirements	Deliver immediately to the laboratory.
Test Method	Samples are analysed for total white cell count, differential leucocytes count if appropriate. Uric acid crystals (joint fluids only) Gram stain Culture for pathogenic organisms.
Turnaround Time	Cell count/Uric acid Crystals: < 24 hours Final report: 7-9 days. Interim Report released earlier if significant growth.

FUNGAL MICROSCOPY AND CULTURE		
Specimen Type	**Non Systemic Infection**	Skin/Scalp scrapings Nail scrapings Hair
	Systemic Infection	All specimens
Specimen Requirements	Scrapings/Hair should be placed in DERMAPAK Envelopes or sterile universal containers.	
Sample Volume	N/A	
Special Requirements	Loose slides should not be used. Do not use fixatives.	
Turnaround Time	Microscopy – 48 hours to 1 week Culture – Final report: 28 days Positive microscopy and positive cultures are telephoned to the requesting source. NOTE: Specimens for Fungal C/S are referred externally to the Microbiology Laboratory in MRHM for testing.	
Additional Information	It is often helpful to clean the lesions of the skin or scalp (and sometime nail) with surgical spirit or 70% alcohol prior to collection of samples as this improves the chances of detecting the fungus by microscopy and also reduces the likelihood of contamination of subsequent cultures. Prior cleaning is essential if greasy ointments or powders have been applied to the region.	
	Scalp - Specimens from the scalp are best obtained by scraping with a blunt scalpel. The contents should include hair stubs, the contents of plugged follicles and skin scales. Hair may also be plucked from the scalp with forceps (infected hairs are usually easy to remove in this way). Cut hairs are unsatisfactory as the focus of infection is usually below or near the surface of the scalp. **Nail clippings -** Nail clippings should be taken from any discoloured, dystrophic or brittle parts of the nail. These should be cut as far back as possible from the free edge of the nail and	

	include its full thickness, scrapings can also be taken from beneath the nail to supplement the clipping sample.
	Skin - Skin samples should be collected by scraping outwards from the edges of the lesions, with either a blunt scalpel blade or with the edge of a glass microscope slide. The edge of the lesion is where there is likely to be the most fungus.
NOTE	Specimens for fungal studies are sent out externally for testing

GENITAL TRACT AND ASSOCIATED SPECIMENS	
Specimen Type	High Vaginal Cervical Urethral Pus
Specimen Requirements	High Vaginal: Charcoal Swab Cervical: Charcoal Swab Urethral: Charcoal Swab Pus, Fluids: Sterile universal container. Specific Chlamydia/Gonorrhoea Investigation: Use Chlamydia Collection Kit (Male/Female). (Available from the Microbiology Laboratory).
Sample Volume	N/A
Special Requirements	Please provide relevant patient clinical details. Low vaginal swabs are discouraged because the presence of a high number 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. Specimens should be transported as soon as possible in charcoal containing transport media. If processing is delayed, refrigeration is preferable to storage at ambient temperature. For urethral specimens, patient should not have passed urine for at least one hour.
Investigations	**Sexually Transmissible Infections(STI) investigations:** Refer person to STI clinic. **Infections (other than STI) of the female genital tract such as:** Vaginal candidosis; Vaginitis; Vulvovaginitis; Bacterial vaginosis (BV), Toxic Shock Syndrome (TSS); Septic abortion **Type of sample required:** HVS, Endocervical swab or urethral swab. **Other infections of the female genital tract such as:** Bartolinitis; Mucopurulent cervicitis,; Postpartum endometritis; Salpingitis; Pelvic inflammatory disease (PID). **Type of sample required:** Refer to Consultant Microbiologist. **Infections (other than STI) of the male genital tract such as:** Prostatitis; Epididymitis; Orchitis; Balanitis; Balanoposthitis. **Type of sample required:** Consult the Microbiology Laboratory.
Turnaround Time	HVS/Endocervical/penile: 2-3 working days

HEPATITIS AND HIV VIRAL SCREEN	
Specimen type:	Clotted blood sample in amber capped tube.
Sample Volume	5 ml
Test Method	Hepatitis B surface antigen Hepatitis B surface antibody Hepatitis B core antibody Hepatitis C antibody HIV antibody.
Turnaround Time	Samples are assayed in-house for Renal Dialysis patients if samples are received before 15:00. Special arrangements can be made for the NVRL to process urgent screens for RD patients out of hours. All other patient samples are assayed in the NVRL. In-house: <24 hrs (Mon – Fri Only) Note: Both in-house and VRL positive results will be telephoned.
Additional Information	Positive samples are referred to NVRL for confirmation.

Influenza and RSV Screening	
Specimen Requirements	Nasopharyngeal swab
Test availability	Testing available only up to 18.00 weekdays and 11.00am weekends during Flu season.
Turnaround Time	Result: <24 hours

MRSA SCREENING (Culture Method)	
Specimen Type	MRSA screens are performed from the following sites: Anterior Nares (both sides, using one swab only) Groin or Perineum (not both) Wounds – any skin break wound e.g. Eczema Sputum (if requested) CSU (if catheterised) Refer to Infection Control Guidelines for any further information required on the management of patients with MRSA
Specimen Requirements	Charcoal swab
Sample Volume	Urine: Minimum volume: 1 ml
Special Requirements	N/A
Turnaround time	Negative result: Final 1-2 working days Positive results: Final report 2-3 working days

MRSA SCREENING (PCR Method)	
Specimen Type	MRSA screens are performed from the following sites: Anterior Nares (both sides, using one swab only) Groin or Perineum (not both) Wounds – any skin break wound e.g. Eczema Refer to Infection Control Guidelines for any further information required on the management of patients with MRSA
Specimen Requirements	Red capped Copan double swab.
Test availability	Testing available only up to 18.00 weekdays and 11.00am weekends.
Additional Information	Please note : This is not a substitution for standard routine MRSA screening. It's use is restricted to the following 3 groups as outlined below. **The three settings in which the test is indicated are as follows;** **1. When the patient is admitted urgently and surgery involving the insertion of prosthetic material, e.g. hip prosthesis, is planned imminently** **2. When an orthopaedic day case patient requires overnight admission and has not been recently screened for MRSA colonisation and** **3. Those elective, non-prosthetic joint, patients who are currently not being screened due to staffing issues**
Turnaround time	Result: <24 hours

MENINGOCOCCAL PCR	
Specimen Type	CSF EDTA Blood sample
Specimen Requirements	Initial EDTA Blood taken on admission. CSF: Neat sample
Sample Volume	Blood: Minimum volume 2.5 ml CSF: Minimum volume 1 ml
Special Requirements	Deliver immediately to Laboratory.
Turnaround time	Meningococcal PCR results available after 24 hours Specific meningococcal group available after 48 hours On receipt of the result the Microbiology Laboratory will telephone all positive results to the requesting source. Final written report: 7 days
Additional Information	Specimens are referred to the Irish Meningitis and Sepsis Reference Laboratory (IMSRL) for meningococcal PCR testing. Paired acute and convalescent sera may be submitted to the IMSRL for meningococcal antibody detection.

MOUTH SWAB	
Specimen Type	Mouth Swab
Specimen Requirements	Charcoal swab
Special Requirements	N/A
Turnaround time	Final Report: 2-3 working days.
Test Method	Routine swab: Cultured for B-haemolytic strep, Staphylococcus aureus, Yeasts.

PREGNANCY TEST	
Specimen Requirements	Sterile universal container
Sample Volume	Urine: Minimum volume 3 mls
Special Requirements	Early morning urine recommended
Turnaround Time	Urgent samples: <30 mins Routine samples: Same Day.

SINUS ASPIRATE	
Specimen Requirements	Sterile universal container
Sample Volume	Minimum volume: 1 ml
Special Requirements	The recovery of more fastidious organisms and anaerobes is compromised if sample culturing is delayed. Transport sample to the Microbiology Laboratory as soon as possible.
Test Method	Routine: Gram Stain Culture for pathogenic organisms
Turnaround Time	Final report: 7-9 days. Interim Report released earlier if significant growth.

SPUTUM	
Specimen type:	Sputum – expectorated. Endotracheal tube specimen
Specimen Requirements	Sterile universal container
Sample Volume	A minimum volume of 1 ml
Special Requirements	Early morning freshly expectorated sputum is recommended for Mycobacterium species (sent to reference laboratory). Saliva and postnasal secretions are not suitable. Please state on the request form if the patient is a Cystic fibrosis patient.
Turnaround Time	Routine: Final report 2-3 working days. TAT may be longer if organism susceptibilities required.
Additional Information	Sample should reach the laboratory within 4 hours. Any delay beyond this time may allow overgrowth of Gram-negative bacilli; additionally Haemophilus species and Streptococcus pneumonia may not survive. If specimens are not processed on the same day as they are collected, interpretation of results should be made with care.

THROAT SWABS	
Specimen Type	Charcoal transport swab for C+S
Special Requirements	None
Turnaround Time	Final report 2-3 working days

TISSUE AND BIOPSIES	
Specimen type:	Tissue Biopsy
Specimen Requirements	Sterile universal container Deliver sample to the Microbiology Laboratory immediately.
Special Requirements	If specimen is small, place it in sterile water to prevent desiccation. Tissue samples for microbiology must not be placed in formalin.
Turnaround Time	Microscopy: <24 hours Final report: 7-9 days. Interim Report released earlier if significant growth. TAT may be longer if organism susceptibilities required

TUBERCULOSIS (TB) CULTURE	
Specimen Type	Bone Marrow, CSF, Body Fluids, Blood Sputum, Aspirated Pus, Urine(*).
Specimen Requirements	Sterile universal container. Specific bottles are available in the Microbiology Laboratory for bone marrow aspirates.
Sample Volume and Special Requirements	Bone marrow: Inoculate Bactec MycoF/Lytic blood culture bottle with as large a sample as possible (>1ml). CSF: Minimum 0.5ml collected aseptically into a sterile container. Pus: Aspirated into sterile container (as much as possible). Blood: Inoculate 1-5ml (optimum 3mls) directly into BACTEC MycoF/Lytic blood culture bottle. Sputum: Collect early in the morning on at least 3 consecutive days. A minimum of 5ml per sample. Saliva and postnasal secretions are not suitable. * Urine: Only processed by TB laboratory when the following is stated on the request form: - A diagnosis of renal or miliary tuberculosis is suspected.- - Relevant clinical details are provided, e.g. "Sterile pyuria" "Haematuria" - The patient is immunocompromised. - The patient is under the care of a Nephrologist or Urologist - Following prior discussion with the laboratory director Collect the entire early morning urine on 3 consecutive days. Refer 25ml of each collection to the Microbiology Laboratory.

Test Method	TB microscopy and culture is carried out in the Irish Mycobacteria Reference Laboratory (IMRL), St James Hospital 01 4284211 or 01 4162980
Turnaround Time	Microscopy: TB stain within 24-48 hours of receipt of the sample. Culture: 6 weeks. Positive microscopy and positive cultures are telephoned to the requesting source immediately.
Additional Information	Following a positive microscopy/culture, a repeat sample is recommended. **NOTE:** An IMRL specimen request form must be completed to accompany specimens before they are sent to the IMRL. This form may be downloaded from the IMRL User Manual on the SJH website.

URINE CULTURE	
Specimen Type	MSU, CSU, Bag Specimen
Specimen Requirements	Sterile universal container. Place container in plastic bag attached to microbiology specimen request form.
Sample Volume	Minimum volume: 5 mls
Special Requirements	Specimens should be transported and processed within 4 hours if possible. Please state if patient is pregnant or neutropaenic on the request form.
Test Method	Automated analyser/Manual Microscopy Only samples with raised WBC's, urines from pregnant women, neutropenic patients or paediatric patients will be routinely cultured. Semi-quantitative culture. Identification of significant isolates. Antibiotic susceptibility testing.
Turnaround Time	Negative culture: 1-2 working days. Positive culture 2-3 working days.

Urinary Antigens – Strep. Pneumonia Ag/Legionella peumophilia Ag	
Specimen Type	Urine
Specimen Requirements	None
Sample Volume	Urine: Minimum volume 5 ml
Special Requirements	Deliver immediately to Laboratory.
Turnaround time	24 hrs
Additional Information	Reserved for ICU Patients only. If testing is required on a non-ICU patient the test request MUST first be approved by the Consultant Microbiologist.

VRE Screening (PCR Method)	
Specimen Requirements	Rectal Swab
Special Requirements	Red Copan double swabs available from the Microbiology Laboratory must be used. Reserved for ICU patients only. Also processed if specifically requested by IPCN or if patient is being transferred to another hospital that requires a VRE screen. This must be clearly stated on the specimen request form.
Test availability	Testing available only up to 18.00 weekdays and 11.00am weekends.
Additional Information	Processed by PCR method on the GeneXpert Platform. Patients previously positive for VRE should not be rescreened.
Turnaround Time	Result: <24 hours

WOUND SWAB	
Specimen type:	Skin/Superficial wound Abscesses Post operative Deep wound
Specimen Requirements	Charcoal swab of pus or exudate. Samples of pus in a sterile universal container preferred.
Sample Volume if sending pus	1 ml of pus in a sterile universal container.
Special Requirements	Specimens should be transported and processed as soon as possible.
Turnaround Time	Final report: 7-9 days. Interim Report released earlier if significant growth.
Additional Information	Swabbing dry crusted areas are unlikely to be helpful.

5. SAMPLE REJECTION

Laboratory staff are only authorised to accept samples which meet the required labelling criteria as described in **Section 4.2** above.

6. SAMPLE RETENTION

Swabs, sputa, fluids, faeces, urines	One week
CSF	One month
Blood cultures	14 days
Serum for virology	Six months
COVID-19 Swabs	One week
Urines for pregnancy test	One week

7. QUALITY ASSURANCE

The Microbiology Laboratory participates in the following Quality Assurance Programmes;

Distributor	**QA Programme**
UK National External Quality Assessment Service	1. General Bacteriology 2. Antimicrobial Susceptibility 3. MRSA 4. Clostridium difficile 5. Genital Pathogens 6. Urinary Antigens 7. Blood Donor Screen 8. Hepatitis Serology Anti-HBs 9. Viral gastroenteritis
IEQAS Laboratory Medicine EQA Scheme	FOB; Gram stain; H pylori Ag; Urine culture, Urine Microscopy, Synovial Fluid, Influenzae virus
Wales External Quality Assessment Scheme	Pregnancy Testing
QCMD	CPE Analysis SARS-CoV-2

Mortuary Service

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1. INTRODUCTION

2. HOURS OF OPERATION AND CONTACT DETAILS

3. SERVICE INFORMATION

1. INTRODUCTION

The mortuary receives into its care, clients from both the hospital and community setting. Midland Regional Hospital Tullamore conduct between 200 – 250 post mortems per year. These comprise of coronial, forensic, pediatric and in house hospital post mortems. The mortuary at the Midland Regional Hospital Tullamore is the only mortuary providing autopsy services within the regions of Offaly, Westmeath, Longford and offers cover to Laois when required.

The mortuary at the Midland Regional Hospital Tullamore is equipped with:

- Family Room
- Viewing Room
- Preparation Room
- Autopsy Room
- Office, Store Rooms and changing and toilet facilities

2. HOURS OF OPERATION AND CONTACT DETAILS

Postal Address	**Hours of Operation**	**Phone (internal EXT in bold)**
Mortuary MRHT Tullamore Co. Offaly Ireland	**Weekday Core Hours** 09:00-17:30hrs **Out of Hours/Weekend/Public Holidays** No Routine/Weekend or On Call Service	**Routine hours** 057 93**58504** Can be contacted via Nursing Administration through reception (057) 932 1501 Ext 58489/8490
Histology Point of Contact		
Mortuary Senior Pathology Technician	**Mr Emmet Lennon**	**057 9358461** **emmet.lennon@hse.ie**

3. SERVICE INFORMATION

3.1 AUTOPSY/POST MORTEM FROM TULLAMORE

Patient BID:

- If the patient dies before reaching the hospital contact nursing administration on 057 935**8489**/ **8490**
- Nursing administration will arrange transport to the mortuary and will contact the coroner and the Histopathologist on call

Patient dies in Hospital and requires coroners post mortem:

- It is the responsibility of the doctor in charge to contact the coroner
- The team should then contact nursing administration: 057 935**8489**/**8490** to arrange transport to the mortuary
- Nursing administration will also contact the Histopathologist on call to arrange autopsy

The clinician requires an in-house post mortem:

- All non-coroner and non forensic reports require next of kin consent
- The consent form is available from nursing administration 057 935**8489**/**8490**
- It is the responsibility of the relevant clinical team to contact the next of kin and arrange for the form to be signed
- A next of kin information leaflet on the autopsy process is also available from nursing administration
- Contact nursing administration also to arrange transport to the mortuary
- It is the responsibility of nursing administration to contact the Histopathologist on call to arrange autopsy

3.2 AUTOPSY/POST MORTEM FROM LONGFORD WESTMEATH

The notifications and paperwork required for the autopsy are performed by nursing administration in MRH Mullingar.
NB: Longford patients and Westmeath patients requiring autopsy must first be transferred to the mortuary in MRH Mullingar where nursing administration will process the paperwork before transfer to Tullamore.

Coroners Autopsies
Once it has been decided that the deceased person is to be transported to the Mortuary of the MRHT for autopsy, Nursing Administration staff MRHM contact the Undertaker appointed by the relevant Coroner to inform them that transportation of the remains between MRHM and the Mortuary of MRHT is required.

In most Coroner's cases it will be preferable for the identifying Garda to travel to MRHT to do the subsequent identification and to supply a copy of

the C71 form to mortuary staff. On a case by case basis and in order to facilitate families in so far as is possible, the process of identification of remains to Gardai may be carried out on site at the MRHM in the presence of the Mortuary Attendant prior to transfer of remains to the mortuary MRHT. The Mortuary Attendant can then subsequently identify the body to the Consultant Histopathologist who will be performing the autopsy if the identifying Garda is subsequently unable to attend MRHT.

House Autopsies (Non Coroner autopsies)

For non coroner autopsies Hospital **medical staff** are responsible for obtaining consent from next-of-kin. Nursing Administration MRHM check that a consent form signed by the next-of-kin is contained in the medical record prior to sending the medical case notes to MRHT. In addition to next of kin consent, requests for non-Coroner's post mortems should be accompanied by details of the cause of death, the specific question(s) that are to be answered by the post mortem examination and the scope of the examination (full or limited).

If no consent form is in the Medical case notes Nursing Administration will contact the relevant Medical team to request that they organise signed consent by the next of kin prior to the autopsy.

For all autopsies

Nursing Administration MRHM also contact their Nursing Administration Colleagues in MRHT to ensure that the Anatomic Pathology Technician (APT) / Multitask Attendant (MTA) is available. This ensures that the APT / MTA is on site at the mortuary MRHT to receive the remains.

Where possible all transfers of remains should be done during normal working hours. If a delay occurs then the Pathologist must be informed by telephone. Patient notes are transferred in a sealed envelope from MRHM to the mortuary of the MRHT. This can be done by utilising the existing inter-laboratory taxi service, by having the Mortuary assistant transport them directly when travelling from the MRHM or alternatively by giving them to the undertaker accompanying the body. The Histopathologist is notified of how the notes are being transported

The Consultant Histopathologist will be responsible for returning the medical chart to Medical Records MRHM.

Return of the Remains

Depending on individual family requests and arrangements, the remains may be transferred by the relevant undertaker to the Mortuary of the MRHM for viewing prior to the funeral taking place or may be taken directly to the funeral home of the appointed undertaker. The mortuary attendant will contact the undertaker to arrange transport

3.3 FOR ALL AUTOPSIES

Turnaround time

- Uncomplicated Post Mortem reports may take up to 6 months
- More complicated cases may take up to 12 months depending on testing required.
- Coroner's post mortem results are available from the relevant coroner's office only
- Non-coroners post mortem results are available from the consultant who requested the post mortem examination.
- The reporting Histopathologist is available to answer any questions next of kin may have relating to the report at any time

3.4 FORENSIC POST MORTEM

All forensic Post Mortems are carried out by the State pathologist or the Assistant State Pathologist. Reports for these cases are neither generated by nor available from the Midland Regional Pathology service.

TEST INDEX

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
ABG (Arterial Blood Gas)	Internal	**45**	Biochemistry
ACE (angiotensin converting enzyme)	Eurofins Blackthorn	**119**	Biochemistry
Acetaminophen (Paracetamol)	Internal	**46**	Biochemistry
Acetylcholine receptor antibodies	Eurofins Blachthorn	**119**	Immunology
ACR (Urinary Albumin:Creatinine Ratio)	Internal	**70**	Biochemistry
ACTH (adrinocorticotrophic hormone)	Beaumont	**119**	Biochemistry
Activated Partial Thromboplastin time (APTT)	Internal	**153**	Haematology
ADAMTS 13 /Anti ADAMTS antibodies (inhibitory activity)	Belfast City Hospital	**119**	Haematology
ADH (ant diuretic hormone)	Eurofins Biomnis	**119**	Biochemistry
Adrenal antibodies	Eurofins Biomnis	**119**	Immunology
Adrinocorticotrophic hormone (ACTH)	Beaumont	**119**	Biochemistry
AFP (Alpha-fetoprotein)	Internal	**47**	Biochemistry
Alanine aminotransferase (ALT)	Internal	**48**	Biochemistry
Albumin	Internal	**47**	Biochemistry
Albumin BT	Internal	**111**	Blood Transfusion
Alcohol (see Ethanol)	Internal	**59**	Biochemistry
Aldolase	Eurofins Biomnis	**119**	Biochemistry

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Aldosterone (recumbent & standing)	St James Hospital	**119**	Biochemistry
Aldosterone and renin	St James Hospital	**119**	Biochemistry
Allergy tests	Mullingar	**119**	Immunology
Alkaline Phosphatase (ALP)	Internal	**47**	Biochemistry
Alpha 1 anti-trypsin phenotype	Alpha 1 Foundation	**120**	Biochemistry
Alpha gliadin antibodies (tTG/tissue transglutaminase abs)	Mullingar	**120**	Immunology
Alpha-fetoprotein (AFP)	Internal	**47**	Biochemistry
ALT (Alanine aminotransferase)	Internal	**48**	Biochemistry
Aluminium	Public Analysts Lab	**120**	Biochemistry
AMH (anti Mullerin hormone)	Eurofins Biomnis	**120**	Biochemistry
Aminophylline level	Mullingar	**120**	Biochemistry
Amiodarone (cordarone)	Mullingar	**120**	Biochemistry
AML/APL transcripts (PML RARA)	St James Hospital	**120**	Haematology
Ammonia	Mullingar	**120**	Biochemistry
Ampicillin allergy	Eurofins Biomnis	**120**	Immunology
Amylase	Internal	**48**	Biochemistry
ANA (anti nuclear antibody/antibody screen)	Mullingar	**120**	Immunology

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
ANCA antibody titre & ANCA-C/P (proteinase 3-anti-neutrophil cytoplasmic antibodies)	St James Hospital	**120**	Immunology
Androstenedione	St James Hospital	**120**	Biochemistry
ANF (anti nuclear factor)	Mullingar	**120**	Immunology
Angiotensin converting enzyme (ACE)	Eurofins Blackthorn	**120**	Biochemistry
Antenatal blood group	Mullingar	**120**	Blood Transfusion
Anti B19 (Parvovirus)	VRL	**120**	Microbiology
Anti Cardiolipin antibodies	St James Hospital	**120**	Immunology
Anti CCP 9anti cyclic citrullinated peptide)	St James Hospital	**121**	Immunology
Anti diuretic hormone (ADH)	Eurofins Biomnis	**121**	Biochemistry
Anti gliadin antibodies (tTG/tissue transglutaminase antibodies).	Mullingar	**121**	Immunology
Anti glomerular basement antibodies	Eurofins Blackthorn	**121**	Immunology
Anti-Mullerin hormone (AMH)	Eurofins Biomnis	**121**	Biochemistry
Anti phospolipid antibodies	St James Hospital	**121**	Immunology
Anti proteinase 3	St James Hospital	**121**	Immunology
Anti smooth muscle Antibodies	Mullingar	**121**	Immunology

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Anti-thrombin level	St James Hospital	**121**	Haematology
Anti trypsin level	Mullingar	**121**	Immunology
Anti-Xa (factor 10)	St James Hospital	**121**	Haematology
APCR (Activated protein C resistance). See thrombophilia screen.	St James Hospital	**121**	Haematology
APTT (Activated Partial Thrombo- plastin time)	Internal	**153**	Haematology
Arterial Blood Gas (ABG)	Internal	**45**	Biochemistry
ASOT (Anti Streptolysin-O Titre)	Internal	**49**	Biochemistry
Aspartate aminotransferase (AST)	Internal	**49**	Biochemistry
Aspergillus antibodies	Eurofins Biomnis	**121**	Microbiology
AST (Aspartate aminotransferase)	Internal	**49**	Biochemistry
Atypical pneumonia screen	Eurofins Biomnis	**121**	Microbiology
Autopsy/Post Mortem	Internal	**197**	Histology
B12 level	Mullingar	**121**	Biochemistry
B2 Microglobulin	Mullingar	**121**	Immunology
B2-Glycoprotein I	St James Hospital	**122**	Biochemistry
Bartonella (cat scratch) antibodies	Eurofins Biomnis	**122**	Microbiology
BCR-ABL	St James Hospital	**122**	Haematology

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Benefix (Recombinant Factor IX)	St James Hospital	**108**	Blood Transfusion
Beta Crosslaps (CTx)	Internal	**50**	Biochemistry
Beta HCG (serum)	Mullingar	**122**	Biochemistry
Bicarbonate	Internal	**51**	Biochemistry
Bilirubin – Direct (Conjugated Bilirubin)	Internal	**51**	Biochemistry
Bilirubin - Total	Internal	**51**	Biochemistry
BK virus (polyoma)	VRL	**122**	Microbiology
Blood culture	Internal	**179**	Microbiology
Blood Film Examination	Internal	**152**	Haematology
Blood Group and Antibody Screen (Group and Hold)	Internal	**81**	Blood Transfusion
Blood Smear for parasites/ Malaria Screen	Internal	**152**	Haematology
Blood Transfusion Investigation	Internal	**81**	Blood Transfusion
BNP (Brain Natriuretic Peptide)	Internal	**63**	Biochemistry
Bone allograft culture	Internal	**179**	Microbiology
Bone marrow & blood flow cytometry	St James Hospital	**122**	Haematology
Bone Marrow Failure	St James Hospital	**122**	Haematology
Bone marrow immunophenotyping	St James Hospital	**122**	Haematology
Bone Marrow Investigations	Internal	**155**	Haematology
Bordetella pertussis antibody	Eurofins Biomnis	**122**	Microbiology

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Borrelia burgdorferi antibodies (Lyme disease)	VRL	**122**	Microbiology
Brucella antibodies	Eurofins Biomnis	**122**	Microbiology
Budgerigar feathers allergy	Mullingar	**122**	Immunology
C - Peptide levels	Eurofins Blackthorn	**122**	Biochemistry
C1 Esterase inhibitor	St James Hospital	**122**	Immunology
C3 & C4 Complement	Mullingar	**123**	Immunology
CA 125	Internal	**52**	Biochemistry
CA 15.3	Internal	**52**	Biochemistry
CA 19.9	Internal	**53**	Biochemistry
Calcitonin	Eurofins Blackthorn	**123**	Biochemistry
Calcium	Internal	**53**	Biochemistry
Calprotectin	Eurofins Blackthorn	**123**	Biochemistry
Cannulae Culture	Internal	**179**	Microbiology
Carbamazepine level	Mullingar	**123**	Biochemistry
Carcinoembryonic antigen (CEA)	Internal	**54**	Biochemistry
Cardiac enzymes (CE)	Internal	**53**	Biochemistry
Cardiolipin antibodies	St James Hospital	**123**	Immunology
Carnitine (free and total)	Eurofins Biomnis	**123**	Biochemistry
CAPD Fluid	Internal	**180**	Microbiology
Cat allergy	Mullingar	**123**	Immunology

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Catch scratch (Bartonella antibodies)	Eurofins Biomnis	**123**	Microbiology
Catecholamines	Beaumont	**123**	Biochemistry
CCP antibodies (cyclic citrullinated peptide)	St James Hospital	**123**	Immunology
CD4/8 T cell subsets	St James Hospital	**123**	Haematology
CE (Cardiac enzymes)	Internal	**53**	Biochemistry
CEA (Carcinoembryonic antigen)	Internal	**54**	Biochemistry
Ceruloplasmin	Mullingar	**123**	Biochemistry
CF common mutations	Eurofins Blackthorn	**123**	Molecular Diagnosis
CFTR mutation (sent to cytogenetics in Crumlin as part of acute pancreatitis screen)	Crumlin	**123**	Molecular Diagnostics
CH100	St James Hospital	**123**	Molecular Diagnostics
Chitotriosidase level	Willink Genetics Lab Manchester	**123**	Biochemistry
Chlamydia	VRL	**123**	Microbiology
Chloride	Internal	**54**	Biochemistry
Chloroquine level	Eurofins Biomnis	**123**	Biochemistry
Chlorpromazine (Largactil)	Eurofins Biomnis	**124**	Biochemistry
Cholesterol	Internal	**54**	Biochemistry
Cholinesterase	Eurofins Biomnis	**124**	Biochemistry

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Chromium	Charing Cross	**124**	Biochemistry
Chromogranin A	St James Hospital	**124**	Biochemistry
Chromosomal Analysis	Eurofins Blackthorn	**124**	Genetics
Chromosome studies	Eurofins Blackthorn	**124**	Molecular Diagnosis
Citrate (Urinary)	Eurofins Biomnis	**124**	Biochemistry
CK (Creatine Kinase)	Internal	**55**	Biochemistry
CKMB (Creatine Kinase MB isoenzyme)	Internal	**55**	Biochemistry
CLL (FISH)	St James Hospital	**124**	Molecular Diagnostics
CMV (cytomegalovirus) PCR	VRL	**124**	Microbiology
CMV antibodies (cytomegalovirus)	VRL	**124**	Microbiology
Coagulation Screen (PT and APTT)	Internal	**153**	Haematology
Coagulation Factors	Internal	**108**	Blood Transfusion
Cobalt level	Charing Cross	**124**	Biochemistry
Coeliac antibodies (tTG/tissue glutaminase abs/Alpha gliadin)	Mullingar	**124**	Immunology
Collagen Screen	St James Hospital	**124**	Immunology
Copper level	Public Analysts Lab	**124**	Biochemistry
Cordarone (amiodarone)	Mullingar	**124**	Biochemistry

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Corrected Calcium	Internal	**55**	Biochemistry
Cortisol	Mullingar	**125**	Biochemistry
Cortisol 24hr urinary	Eurofins Biomnis	**124**	Biochemistry
COVID-19 PCR	Internal	**181**	Microbiology
Coxiella burnetii antibodies	Eurofins Biomnis	**125**	Microbiology
Coxsackie virus culture	VRL	**125**	Microbiology
CPE Screening(carbapenemase resistant Enterobaecteriaceae)	Internal	**182**	Microbiology
C-Reactive Protein (CRP)	Internal	**57**	Biochemistry
Creatine Kinase (CK)	Internal	**55**	Biochemistry
Creatine Kinase MB isoenzyme (CKMB)	Internal	**55**	Biochemistry
Creatinine	Internal	**56**	Biochemistry
Creatinine - enzymatic	Internal	**56**	Biochemistry
Crossmatch of blood units	Internal	**81**	Blood Transfusion
Crithidia	St James Hospital	**125**	Immunology
CRP (C-Reactive Protein)	Internal	**57**	Biochemistry
Cryptococcus neoformans	St James Hospital	**125**	Microbiology
CSF	Internal	**181**	Microbiology
CSF for Oligoclonal Bands	St James Hospital	**125**	Immunology
CSF glucose	Internal	**73**	Biochemistry
CSF Protein	Internal	**74**	Biochemistry
CSF for viral studies	VRL	**125**	Microbiology
CTx (Beta Crosslaps)	Internal	**50**	Biochemistry

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Cyclic citrullinated peptide (CCP) antibodies	St James Hospital	**125**	Immunology
Cyclosporin	St James Hospital	**125**	Biochemistry
Cystic fibrosis screen-108 common mutations	Eurofins Blackthorn	**125**	Molecular Diagnostics
Cytogenetics on tissue/bone marrow	Crumlin	**125**	Molecular Diagnostics
Cytogenitics FISH (EDTA)	Crumlin	**125**	Molecular Diagnostics
Cytology Fluids – including Wangs, Sputa and Brushings	Internal	**165**	Histology
Cytomegalovirus antibodies (CMV)	VRL	**125**	Microbiology
Cytomegalovirus antibodies (CMV) PCR	VRL	**125**	Microbiology
Cytotoxic antibodies	Beaumont	**125**	Immunology
DAT(Direct Antiglobulin Test)	Internal	**81**	Blood Transfusion
D-Dimers	Internal	**153**	Haematology
Dengue virus antibodies	VRL	**125**	Microbiology
DHEAS (dehydroepiandrosterone sulfate)	St James Hospital	**126**	Biochemistry
Differential White Cell	Internal	**152**	Haematology
Digoxin levels	Mullingar	**126**	Biochemistry
Direct Antiglobulin Test (DAT)	Internal	**81**	Blood Transfusion
Direct Coombs Test (DCT)	Internal	**81**	Blood Transfusion
DNA double strand (dsDNA) antibodies	Mullingar	**126**	Molecular Diagnosis

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Dog allergy	Mullingar	**126**	Immunology
E. Coli typing	Cherry Orchard	**126**	Microbiology
Ear Swabs	Internal	**182**	Microbiology
EBV (Epstein Barr Virus)	VRL	**126**	Microbiology
EBV (Epstein Barr Virus) PCR	VRL	**126**	Microbiology
eGFR	Internal	**57**	Biochemistry
Electrolytes (Sodium, Potassium, Chloride)	Internal	**58**	Biochemistry
EMA (Eosin 5 Melemide for flow cytometry)	St James Hospital	**126**	Haematology
ENA ELISA (extractable nuclear antigens)	St James Hospital	**126**	Immunology
Endomysial antibodies	Mullingar	**126**	Immunology
Eosin 5 Melemide (EMA for flow cytometry)	St James Hospital	**126**	Haematology
Epanutin (phenytoin)	Mullingar	**126**	Biochemistry
EPO (Erythropoetin) receptor antibodies	Eurofins Blackthorn	**126**	Immunology
EPO (Erythropoietin) levels	Eurofins Blackthorn	**126**	Biochemistry
Epstein Barr Virus (EBV)	VRL	**126**	Microbiology
Erythrocyte pyruvate kinase	St James Hospital	**126**	Biochemistry
Erythrocyte Sedimentation Rate (ESR)	Internal	**152**	Haematology
ESR (Erythrocyte Sedimentation Rate)	Internal	**152**	Haematology
Ethanol (Alcohol)	Internal	**59**	Biochemistry
Ethanol (Ethyl Alcohol)	Internal	**59**	Biochemistry

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Ethyl Alcohol (Ethanol)	Internal	**59**	Biochemistry
Extrinsic factor antibodies	St James Hospital	**126**	Haematology
Extrinsic Factor assay screen: must state required factors (see individual factors)	St James Hospital	**126**	Haematology
Eye Swabs	Internal	**182**	Microbiology
Extended RBC Genotyping	IBTS	**126**	Blood Transfusion
Factor IX	St James Hospital	**126**	Haematology
Factor V (Leiden)	St James Hospital	**127**	Haematology
Factor VII assay	St James Hospital	**127**	Haematology
Factor VIII assay	St James Hospital	**127**	Haematology
Factor VIII:C	St James Hospital	**127**	Haematology
Factor X	St James Hospital	**127**	Haematology
Factor Xa (Anti-Xa)	St James Hospital	**127**	Haematology
Factor XI assay	St James Hospital	**127**	Haematology
Factor XII assay	St James Hospital	**127**	Haematology
Factor XIII	St James Hospital	**127**	Haematology
Faeces	Internal	**183**	Microbiology

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Fanconi anaemia	Eurofins Blackthorn	**127**	Molecular Diagnosis
Farmers lung antibodies (Microspora faenii)	Eurofins Blackthorn	**127**	Microbiology
FBC (Full Blood Count)	Internal	**152**	Haematology
Ferritin	Mullingar	**127**	Biochemistry
Fibrinogen	Internal	**153**	Haematology
Fibrinogen Concentrate(Riastap)	Internal	**107**	Blood Transfusion
Fine Needle Aspiration (FNA)Cytology	Internal	**165**	Histology
Fipili PDGFRA studies	Salisbury District Hospital	**127**	Molecular Diagnosis
FISH (CLL)	Crumlin	**127**	Molecular Diagnosis
FISH (Multiple myeloma)	Crumlin	**127**	Molecular Diagnosis
Fish allergy	Mullingar	**127**	Immunology
Flecanide (Tambacor)	Eurofins Blackthorn	**127**	Biochemistry
Flow cytometry - Bone marrow & blood	St James Hospital	**128**	Haematology
Fluids	Internal	**184**	Microbiology
Fluids for Cytology – including Wangs, Sputa and Brushings	Internal	**165**	Histology
FNA (Fine Needle Aspiration) Cytology	Internal	**165**	Histology
Folate & Vitamin B12	Mullingar	**128**	Biochemistry
Folicle stimulating hormone (FSH)	Mullingar	**128**	Biochemistry

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Fragile X screen	St James Hospital	**128**	Molecular Genetics
Free light chain assay	St James Hospital	**128**	Immunology
Free T3	Mullingar	**128**	Biochemistry
Free T4 (See TFT's)	Mullingar	**128**	Biochemistry
Frozen Sections	Internal	**162**	Histology
Fructosamine	Eurofins Blackthorn	**128**	Biochemistry
FSH (folicle stimulating hormone)	Mullingar	**128**	Biochemistry
Full Blood Count (FBC)	Internal	**152**	Haematology
Full virology screen	Internal	**128**	Microbiology
Fungal Culture and Microscopy	Internal	**184**	Microbiology
G6PD (Glucose 6 phosphate dehydrogenase)	Eurofins Blackthorn	**128**	Biochemistry
GAD (Glutamic Acid Decarboxylase) autoantibodies	Eurofins Blackthorn	**128**	Immunology
Galactomannan	St James Hospital	**128**	Biochemistry
Gamma glutamyl transferase (Gamma-GT)	Internal	**59**	Biochemistry
Gamma-GT (Gamma glutamyl transferase)	Internal	**59**	Biochemistry
Ganglioside antibodies	St James Hospital	**128**	Immunology
Gastrin	Eurofins Blackthorn	**128**	Biochemistry

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Genetic Cationic Trypsinogen SPINK-1 mutation	Crumlin	**128**	Molecular Diagnostics
Genital Tract and Associated Specimens	Internal	**185**	Microbiology
Gentamicin	Internal	**59**	Biochemistry
Globulin level	Mullingar	**128**	Immunology
Glomular basement membrane	St James Hospital	**128**	Immunology
Glucagon	Eurofins Biomnis	**128**	Biochemistry
Glucose	Internal	**60**	Biochemistry
Glucose (CSF)	Internal	**73**	Biochemistry
Glucose 6 phosphate dehydrogenase (G6DP)	Eurofins Blackthorn	**128**	Haematology
Glutamic acid decarboxylase (GAD) autoantibodies	Eurofins Blackthorn	**129**	Immunology
Glycoprotein I (B2)	St James Hospital	**129**	Biochemistry
Grass pollen allergy	Mullingar	**129**	Immunology
Group and Hold (Blood Group and Antibody Screen)	IBTS	**129**	Blood Transfusion
Growth hormone (somatrophin)	St James Hospital	**129**	Biochemistry
GTT (Glucose tolerance test)	Internal	**60**	Biochemistry
Gynaecological Cytology	Internal	**166**	Histology
Haemochromatosis mutations	Mullingar	**129**	Molecular Diagnostics

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Haemoglobinopathy screen	St James Hospital	**129**	Haematology
Haemophilia screen	St James Hospital	**129**	Haematology
Haemophilus influenzae PCR	Temple Street	**129**	Microbiology
Haemosiderin	St James Hospital	**129**	Biochemistry
Haptogloblin	Mullingar	**129**	Haematology
Hb A2 (see Thalassaemia)	St James Hospital	**129**	Haematology
Hb electrophoresis (Thalassaemia)	St James Hospital	**129**	Haematology
HbA1c	Internal	**61**	Biochemistry
HCG (Human chorionic gonadotrophin)	Internal	**61**	Biochemistry
HCG (Human chorionic gonadotrophin)	Internal	**61**	Biochemistry
HDL (HDL-Cholesterol)	Internal	**61**	Biochemistry
HDL-Cholesterol (HDL)	Internal	**61**	Biochemistry
Hepatitis A antibodies	VRL	**129**	Microbiology
Hepatitis and HIV viral screen	VRL Internal for Renal Only	**129** **186**	Microbiology
Hepatitis B antibodies	VRL Internal for Renal Only	**129** **186**	Microbiology
Hepatitis B Core antibodies	VRL Internal for Renal Only	**129** **186**	Microbiology
Hepatitis B HBsAg (antigen)	VRL Internal for Renal Only	**129** **186**	Microbiology

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Hepatitis B PCR (DNA viral load)	VRL	**130**	Microbiology
Hepatitis B total Core antibodies	VRL Internal for Renal Only	**130** **186**	Microbiology
Hepatitis C antibodies	VRL Internal for Renal Only	**130** **186**	Microbiology
Hepatitis C antigen	VRL	**130**	Microbiology
Hepatitis C PCR (RNA viral load)	VRL	**130**	Microbiology
Hepatitis E antibodies	VRL	**130**	Microbiology
Hepatitis screen (HBsAg & Hep C)	VRL Internal for Renal Only	**130** **186**	Microbiology
Her2Neu	St James Hospital	**130**	Microbiology
Herpes simplex virus	VRL	**130**	Microbiology
HIAA - 5 (5-hydroxyindoleacetic acid)	Beaumont	**130**	Biochemistry
High affinity Hb	St James Hospital	**130**	Haematology
Histology (Routine)	Internal	**162**	Histology
Histoplasmosis	Eurofins Biomnis	**130**	Microbiology
HIV antibodies	VRL Internal for Renal Only	**130** **186**	Microbiology
HIV viral load (PCR)	VRL	**130**	Microbiology
HLA typing (oncology)	IBTS	**130**	Blood Transfusion
HLA B27 (Tissue typing)	IBTS	**130**	Blood Transfusion

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
HLA Class I typing for HLA matched platelets	IBTS	**130**	Immunology
HLA tissue typing for potential transplant patients/family	Beaumont	**130**	Immunology
Homocysteine	Eurofins Biomnis	**130**	Biochemistry
House dust mite allergy	Mullingar	**130**	Immunology
HPA-Human platelet antigen typing	IBTS	**131**	Immunology
Human chorionic gonadotrophin (HCG)	Mullingar	**131**	Biochemistry
HPA (Human platelet antigen typing)	IBTS	**131**	Blood Transfusion
Hydroxyindoleacetic acid - 5 (5-HIAA)	Beaumont	**131**	Biochemistry
Hydroxy-Progesterone - 17 (progesterone)	Mullingar	**131**	Biochemistry
Hydroxyproline	Eurofins Blackthorn	**131**	Biochemistry
I.M. (Infectious Mononucleosis Screen)	Internal	**152**	Haematology
IgE	Mullingar	**131**	Immunology
IGF-1 (insulin like growth factor 1)	St James Hospital	**131**	Biochemistry
IgG 4 (IgG Sub-classes)	Eurofins Biomnis	**131**	Immunology
IgG Subclasses Profile	Mullingar	**131**	Immunology
Immunoglobulin A (IgA)	Mullingar	**131**	Immunology
Immunoglobulin E (IgE)	Mullingar	**131**	Immunology
Immunoglobulin G (IgG)	Mullingar	**131**	Immunology

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Immunoglobulin gene rearrangement studies (PCR)	St James Hospital	**131**	Molecular Diagnostics
Immunoglobulin M (IgM)	Mullingar	**131**	Immunology
Immunohistochemistry	Dependent on availability of INAB accredited tests across multiple sites	**131**	Histology
Immunophenotyping (peripheral blood)	St James Hospital	**131**	Haematology
Infectious Mononucleosis Screen (I.M.)	Internal	**152**	Haematology
Influenza A & B and RSV detection	Internal	**186**	Microbiology
Influenza A & B antibodies	VRL	**132**	Microbiology
INR (Prothrombin time/PT)	Internal	**153**	Haematology
Insulin level	Eurofins Blackthorn	**132**	Biochemistry
Intrinsic factor antibodies	Eurofins Blackthorn	**132**	Haematology
Intrinsic pathway screen	St James Hospital	**132**	Haematology
Iron Latent Cap (see iron studies)	Mullingar	**132**	Biochemistry
Iron levels (see iron studies)	Mullingar	**132**	Biochemistry
Iron Overdose 01 8092673	Mullingar	**132**	Biochemistry

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Iron studies (TIBC, UIBC, iron saturation & transferrin)	Mullingar	**132**	Biochemistry
Islet antibodies	Eurofins Blackthorn	**132**	Immunology
JAK2 - Exon 12 mutation analysis	St James Hospital	**132**	Molecular diagnostics
JAK2 V617F mutation analysis: PCR test	St James Hospital	**132**	Molecular diagnostics
JCV (JC virus)	VRL	**132**	Microbiology
Karyotyping	Eurofins Blackthorn	**132**	Molecular Diagnostics
Keppra (levetiracetam)	Eurofins Blackthorn	**132**	Biochemistry
KRAS protein (V-Ki-ras2 Kirsten rat sarcoma viral oncogene homolog)	St James Hospital	**132**	Histology
La (& Ro) antibodies	St James Hospital	**132**	Immunology
Lactate dehydrogenase (LDH)	Internal	**62**	Biochemistry
Lamotrigine (lamictal)	Eurofins Blackthorn	**132**	Biochemistry
Largactil (Chlorpromazine)	Eurofins Biomnis	**133**	Biochemistry
LDH (Lactate dehydrogenase)	Internal	**62**	Biochemistry
LDL (LDL-Cholesterol)	Internal	**63**	Biochemistry
LDL-Cholesterol (LDL)	Internal	**63**	Biochemistry
Lead levels	Public Analysts Lab	**133**	Biochemistry
Leptospira antibodies	VRL	**133**	Microbiology

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Leucocyte /HLA antibodies	IBTS	**133**	Blood Transfusion
Leutenising Hormone (LH)	Mullingar	**133**	Biochemistry
Levetiracetam (keppra)	Eurofins Blackthorn	**133**	Biochemistry
LH (lutenising hormone)	Mullingar	**133**	Biochemistry
Lipase	Eurofins Biomis	**133**	Biochemistry
Lipid profile – fasting	Internal	**63**	Biochemistry
Lipid profile - random	Internal	**63**	Biochemistry
Lipoprotein A	Eurofins Biomnis	**133**	Biochemistry
Lithium level	Portlaoise	**133**	Biochemistry
Liver function tests (LFTs)	Internal	**63**	Biochemistry
Liver-Kidney microsomal antibody	Mullingar	**133**	Immunology
Lupus anticoagulant	St James Hospital	**133**	Haematology
Lyme disease (Borrelia burgdorferi)	VRL	**133**	Microbiology
Lymph Nodes	Internal	**164**	Histology
Lymphocyte immunophenotyping	St James Hospital	**133**	Haematology
Lymphocyte subsets	St James Hospital	**133**	Haematology
Magnesium	Internal	**63**	Biochemistry
Malaria Screen/Blood Smear for parasites	Internal	**152**	Haematology
Malaria verification	Tropical Disease Centre London	**133**	Haematology

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Manganese level	Eurofins Biomnis	**133**	Biochemistry
Measles antibodies	VRL	**133**	Microbiology
Meningitis screen on child (Haemophilus influenza PCR, Neisseria meningitidis PCR & Streptococcus pneumonia PCR)	Temple Street	**134**	Microbiology
Meningococcal PCR (Neisseria meningitidis PCR)	Temple Street	**134**	Microbiology
Mercury	Public Analysts Lab	**134**	Biochemistry
Metabolic screen	Temple Street	**134**	Biochemistry
Metanephrines 24 hr. urine	Beaumont	**134**	Biochemistry
Methotrexate	Eurofins Blackthorn	**134**	Biochemistry
Micro Array	Eurofins Blackthorn	**134**	Genetics
Microspora faenii (farmers' lung)	Eurofins Biomnis	**134**	Microbiology
Milk allergy	Mullingar	**134**	Immunology
Mitochondrial antibodies.	Mullingar	**134**	Immunology
Mixing Studies	Internal	**153**	Haematology
Molecular Investigation for other Blood Groups	IBTS	**81**	Blood Transfusion
Mouth Swabs	Internal	**188**	Microbiology
MPO abs (Myeloperoxidase antibodies)	St James Hospital	**134**	Immunology

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
MRD studies (minimum residual disease)	St James Hospital	**134**	Haematology
MRSA Screening	Internal	**187**	Microbiology
MRSA Typing	St James Hospital	**134**	Microbiology
Multiple myeloma (FISH)	Crumlin	**134**	Molecular Diagnostics
Mumps antibodies	VRL	**135**	Microbiology
Muscle Pathology	Beaumont	**135**	Histology
Muscular Dystrophy-1(Muscular genetics/DNA analysis)	Crumlin	**135**	Molecular Diagnostics
Mycoplasma pneumoniae antibodies	VRL	**135**	Microbiology
MYD88	Kings College Hospital, London	**135**	Haematology
Myeloid Gene Panel	Kings College Hospital, London	**135**	Haematology
Myeloperoxidase antibodies (MPO abs.)	St James Hospital	**135**	Immunology
Myoglobin	Eurofins Blackthorn	**135**	Biochemistry
Myositis	Eurofins Biomnis	**135**	Immunology
Nail cuttings for fungal culture	Mullingar	**135**	Microbiology
nDNA antibodies(DNA)	Mullingar	**135**	Immunology

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Neisseria meningitides PCR (meningococcal PCR)	Temple Street	**135**	Microbiology
Neuro Pathology	Beaumont	**135**	Histology
NEURONAL ANTIBODY (HU, RI, YO, CV2, MA2)	Eurofins Blackthorn	**135**	Immunology
Neurontin (Gabapentin)	Eurofins Blackthorn	**135**	Biochemistry
Neutrophil cytoplasmic antibodies	St James Hospital	**135**	Immunology
Neutrophil elastase mutation	Bristol	**135**	Molecular Diagnosis
Norovirus (SRSV)	VRL	**136**	Microbiology
Novoseven (Recombinant Coagulation Factor VII)	St James Hospital	**108**	Blood Transfusion
Octaplex (Human Prothrombin Complex)	IBTS	**108**	Blood Transfusion
Oestradiol	Mullingar	**136**	Biochemistry
Olanzapine	Eurofins Blackthorn	**136**	Biochemistry
Oligoclonal bands	St James Hospital	**136**	Immunology
Organic acids	Temple Street	**136**	Biochemistry
Osmolality	St James Hospital	**136**	Biochemistry
Oxalate (urinary)	Eurofins Biomnis	**136**	Biochemistry
P1NP (Procollagen Type-1 N-terminal Propeptide)	Internal	**65**	Biochemistry

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Pancreatic polypeptide	Eurofins Biomnis	**136**	Biochemistry
Pancreatitis (acute): Carbonic Anhydrase 1 & 2 (Anti Carbonic Anhydrase antibodies & Anti Lactoferrin antibodies) Genetic cationic trypsinogen SPINK-1 mutation CFTR mutation (sent ot cytogenetics in Crumlin as part of acute pancreatitis screen)	Eurofins Biomnis Crumlin Crumlin	**136**	Biochemistry
Parainfluenza virus 1,2,3 antibodies	Eurofins Biomnis	**136**	Microbiology
Paracetamol (Acetaminophen)	Internal	**64**	Biochemistry
Paraquat	Beaumont	**137**	Biochemistry
Parietal cell antibodies	Mullingar	**137**	Immunology
Parvovirus antibodies	VRL	**137**	Microbiology
PB (peripheral blood) immunophenotyping	St James Hospital	**137**	Haematology
Penicillin G Allergy	Mullingar	**137**	Immunology
Penicillin V Allergy	Mullingar	**137**	Immunology
Pertussis antibodies (Bordatella pertussis)	Eurofins Biomnis	**137**	Microbiology
Phenobarbatone	Mullingar	**137**	Biochemistry
Phenytoin (Epanutin)	Mullingar	**137**	Biochemistry

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Phospholipid antibodies (B2-glycoprotein and cardiolipin antibodies)	St James Hospital	**137**	Immunology
Phosphorous	Internal	**64**	Biochemistry
Plasma (LG OCTAPLAS)	Internal	**106**	Blood Transfusion
Plasma Viscosity	St James Hospital	**137**	Biochemistry
Platelets	Internal	**105**	Blood Transfusion
Platelet antibodies	IBTS	**137**	Blood Transfusion
Platelet refractoriness	IBTS	**137**	Haematology
Platelet transfusion	IBTS	**137**	Blood Transfusion
PML RARA (AML/APL transcripts)	St James Hospital	**137**	Molecular Diagnostics
Pneumococcol antibody titre	St James Hospital	**137**	Microbiology
PNH (paroxysmal nocturnal haemoglobinuria)	St James Hospital	**137**	Biochemistry
Polyoma (BK virus)	VRL	**137**	Microbiology
Porphyrins	St James Hospital	**138**	Biochemistry
Post transfusion purpura-PTP	IBTS	**138**	Immunology
Potassium	Internal	**65**	Biochemistry
Preader Willi	Eurofins Biomnis	**138**	Molecular Genetics
Pregnancy Tests	Internal	**188**	Microbiology
Pro collagen III antibodies	Eurofins Biomnis	**138**	Immunology

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Procollagen Type-1 N-terminal Propeptide* (P1NP)	Internal	**65**	Biochemistry
Pro insulin level	Eurofins Biomnis	**138**	Biochemistry
Progesterone (Hydroxy-Progesterone – 17)	Mullingar	**138**	Biochemistry
Prograf (tacrolimus)	Eurofins Biomnis	**138**	Biochemistry
Prolactin	Mullingar	**138**	Biochemistry
Protein	Internal	**66**	Biochemistry
Protein (CSF)	Internal	**74**	Biochemistry
Protein C & Protein S	St James Hospital	**138**	Molecular Genetics
Protein electrophoresis (total protein, albumen, immunoglobulins, B-2 microglobulin)	Mullingar	**138**	Immunology
Proteinase 3 ANCA	St James Hospital	**138**	Immunology
Prothrombin mutation	St James Hospital	**138**	Molecular Genetics
Prothrombin time (PT)/INR	Internal	**153**	Haematology
PSA	Internal	**66**	Biochemistry
PT (INR / Prothrombin time)	Internal	**153**	Haematology
PTH	Internal	**66**	Biochemistry
Pyruvate dehydrogenase	St James Hospital	**138**	Biochemistry
Pyruvate kinase	St James Hospital	**138**	Biochemistry

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Q Fever (Coxiella burnetti) antibodies	Eurofins Biomnis	**138**	Microbiology
Quantiferon (TB)	Eurofins Blackthorn	**139**	Microbiology
Recombinant Coagulation Factor VII (*e.g.* Novoseven)	St James Hospital	**108**	Blood Transfusion
Recombinant Coagulation Factor VIII (*e.g.* Advate)	St James Hospital	**108**	Blood Transfusion
Red Cell Concentrate (RCC)	Internal	**81**	Blood Transfusion
Red cell folate	Eurofins Blackthorn	**139**	Biochemistry
Reducing substances	Eurofins Blackthorn	**139**	Biochemistry
Renal pathology	Internal	**139**	Histology
Renin (& aldosterone if required) recumbent and standing	St James Hospital	**139**	Biochemistry
Renin (active) - random sample	Eurofins Biomnis	**139**	Biochemistry
Reticulocyte Count	Internal	**152**	Haematology
RF (Rheumatoid Factor)	Internal	**67**	Biochemistry
Rheumatoid Factor (RF)	Internal	**67**	Biochemistry
Risperidone level	Eurofins Biomnis	**139**	Biochemistry
Ristocetin co-factor (RiCOF)	St James Hospital	**139**	Haematology
Ro (& La) antibodies	St James Hospital	**139**	Immunology
Routine Histology	Internal	**162**	Histology

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Rubella antibodies (antenatal)	VRL	**139**	Microbiology
Rubella antibodies (non antenatal)	VRL	**139**	Microbiology
Salicylate	Internal	**67**	Biochemistry
Salmonella/Shigella typing	Internal	**183**	Microbiology
SARS (Severe acute respiratory syndrome causing virus)	VRL	**139**	Microbiology
Selenium level	Eurofins Blackthorn	**139**	Biochemistry
Serum eGFR (see also Urinary Creatinine Clearance)	Internal	**57 (71)**	Biochemistry
Sex hormone binding globulin	Eurofins Blackthorn	**140**	Biochemistry
Sickle cell (see Thalassaemia)	Internal	**152**	Haematology
Sinus Aspirate	Internal	**189**	Microbiology
Sirolimus	Eurofins Biomnis	**140**	Biochemistry
Skin Biopsies	Internal	**169**	Histology
Skin IF	St James Hospital	**140**	Immunology
Skin scrapings for fungal culture	Mullingar	**140**	Microbiology
Smooth muscle antibodies	Mullingar	**140**	Immunology
Sodium	Internal	**68**	Biochemistry
Sodium valporate	Mullingar	**140**	Biochemistry
Somatomedin-C (IgF-1)	St James Hospital	**140**	Biochemistry

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Somatrophin (growth hormone)	St James Hospital	**140**	Biochemistry
Sputum	Internal	**190**	Microbiology
SRSV (small round structured virus or Norovirus)	VRL	**140**	Microbiology
STFR - (soluble transferring receptor)	St James Hospital	**140**	Haematology
Synacthen test	Mullingar	**140**	Biochemistry
Syphillis -VDRL - antenatal	VRL	**140**	Microbiology
Syphillis -VDRL - non-antenatal	VRL	**140**	Microbiology
T3 or T4 (Free)	Mullingar	**140**	Biochemistry
Tacrolimus (Prograf)	Eurofins Biomnis	**140**	Biochemistry
Tambacor (Flecanide)	Eurofins Blackthorn	**140**	Biochemistry
TB culture	St James Hospital	**140**	Microbiology
TB QUANTIFERON	Eurofins Blackthorn	**140**	Microbiology
TBII (thyroid binding inhibitor immunoglobulin)	Eurofins Biomnis	**141**	Immunology
T-cell receptor (TCR) gene rearrangement studies: PCR test	St James Hospital	**141**	Molecular Diagnostics
T-cell subsets (CD4/8)	St James Hospital	**141**	Haematology
Tegretol	Mullingar	**141**	Biochemistry
Testosterone - free index	St James Hospital	**141**	Biochemistry

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Testosterone level-male/female/child	St James Hospital	**141**	Biochemistry
Tetanus antibodies	Eurofins Biomnis	**141**	Microbiology
TFTs (thyroid function tests - TSH & Free T4)	Mullingar	**141**	Biochemistry
Thalassaemia (Hb electrophoresis for HbA2 or HbF)	St James Hospital	**141**	Haematology
Thalassaemia (α or β genotype)	Kings College Hospital	**141**	Haematology
Theophylline	Mullingar	**141**	Biochemistry
Thiamine (see vitamin B1)	Eurofins Blackthorn	**141**	Biochemistry
Thiopurine methyl transferase (Haem TPMT)	Eurofins Blackthorn	**141**	Biochemistry
Throat Swab for C/S	Internal	**189**	Microbiology
Thrombin antibody	St James Hospital	**141**	Haematology
Thrombophilia screen (Protein C & S, cardiolipin antibodies, prothrombin, lupus anticoagulant, homocysteine, antithrombin activity, factor V Leiden, factor VIII, fibrinogen)	St James Hospital	**141**	Haematology
Thyroglobulin levels	Eurofins Blackthorn	**141**	Biochemistry
Thyroid binding inhibitor immunoglobulin (TBII)	Eurofins Biomnis	**142**	Immunology

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Thyroid peroxidase antibodies (TPO)	Mullingar	**142**	Immunology
Thyroid receptor antibodies	St James Hospital	**142**	Immunology
Thyroid stimulating hormone (TSH)	Mullingar	**142**	Biochemistry
TIBC (see iron studies)	Mullingar	**142**	Biochemistry
Tissue/Biopsy for C/S	Internal	**190**	Microbiology
Tn-T (Troponin-T)	Internal	**68**	Biochemistry
Tobramycin level (pre)	Eurofins Biomnis	**142**	Biochemistry
Topiramate (topamax)	Eurofins Blackthorn	**142**	Biochemistry
Torch screen (Toxoplasma, CMV, Rubella, Herpes simplex)	VRL	**142**	Microbiology
Total Iron Binding Cap (see iron studies)	Mullingar	**142**	Biochemistry
Toxacara antibodies	Hospital for Tropical Diseases, London	**142**	Microbiology
Toxicology for drugs of abuse	Beaumont	**142**	Biochemistry
Toxicology – Urine (drugs of abuse)	Beaumont	**142**	Biochemistry
Toxoplasma antibodies	VRL	**142**	Microbiology
Tpha (antenatal)	VRL	**142**	Microbiology
Tpha (non-antenatal)	VRL	**142**	Microbiology
TPMT (Thiopurine methyl transferase)	Eurofins Blackthorn	**142**	Biochemistry

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
TPO (thyroid peroxidase antibodies)	Mullingar	**142**	Immunology
Transferrin receptor (STFR –soluble ransferring receptor)	St James Hospital	**142**	Haematology
Transferrin saturation (see iron studies)	Mullingar	**142**	Biochemistry
Transfusion Reaction Investigation	IBTS	**81**	Blood Transfusion
Transfusion related acute lung injury (TRALI)	IBTS	**142**	Blood Transfusion
Treponema pallidum (tpha) antenatal	VRL	**142**	Microbiology
Treponema pallidum (tpha) non antenatal	VRL	**142**	Microbiology
Triglycerides	Internal	**68**	Biochemistry
Trileptal levels	Eurofins Biomnis	**143**	Biochemistry
Troponin-T (Tn-T)	Internal	**68**	Biochemistry
Tryptase	Eurofins Blackthorn	**143**	Biochemistry
TSH (thyroid function tests - TSH & Free T4)	Mullingar	**143**	Biochemistry
TSH receptor antibodies	St James Hospital	**143**	Immunology
tTG antibodies (tissue transglutaminase antibodies/alpha gliadin antibodies)	Mullingar	**143**	Immunology
Tuberculosis	St James Hospital	**143**	Microbiology
UIBC (see iron studies)	Mullingar	**143**	Biochemistry

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Urea	Internal	**69**	Biochemistry
Uric acid	Internal	**69**	Biochemistry
Urinary ACR (Urinary Albumin:Creatinine Ratio)	Internal	**70**	Biochemistry
Urinary Albumin:Creatinine Ratio (Urinary ACR)	Internal	**70**	Biochemistry
Urinary Amylase	Internal	**70**	Biochemistry
Urinary Calcium	Internal	**70**	Biochemistry
Urinary Citrate	Eurofins Blackthorn	**143**	Biochemistry
Urinary Cortisol	Eurofins Biomnis	**143**	Biochemistry
Urinary Creatinine	Internal	**70**	Biochemistry
Urinary Creatinine Clearance (see also serum eGFR)	Internal	**71**	Biochemistry
Urinary Drugs of abuse	Internal	**71**	Biochemistry
Urinary Electrolytes	Internal	**71**	Biochemistry
Urinary Magnesium	Internal	**72**	Biochemistry
Urinary Microalbumin	Internal	**72**	Biochemistry
Urinary osmolality	St James Hospital	**143**	Biochemistry
Urinary Phosphorous	Internal	**72**	Biochemistry
Urinary Protein	Internal	**72**	Biochemistry
Urinary Urea	Internal	**73**	Biochemistry
Urinary Uric Acid	Internal	**73**	Biochemistry
Urine 24h Electrophoresis	Mullingar	**143**	Immunology
Urine SPE (electrophoresis)	Mullingar	**143**	Immunology
Urine culture	Internal	**191**	Microbiology

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
Urine Legionella/Strep. pneumonia Antigen	Internal	**191**	Microbiology
Valproate	Mullingar	**143**	Biochemistry
Vancomycin	Internal	**69**	Biochemistry
Vanillylmandelic acid (VMA)	Beaumont	**143**	Biochemistry
Varicella antibodies	VRL	**143**	Microbiology
VDRL (antenatal)	VRL	**143**	Microbiology
VDRL (non-antenatal)	VRL	**143**	Microbiology
Venlafaxine	Eurofins Biomnis	**143**	Biochemistry
VIP (vasoactive intestinal polypeptide)	Eurofins Biomnis	**143**	Biochemistry
Viral Screen must specify tests	VRL	**143**	Microbiology
Vitamin A	Eurofins Biomnis	**143**	Biochemistry
Vitamin B1 (thiamine)	Eurofins Blackthorn	**143**	Biochemistry
Vitamin B6	Eurofins Blackthorn	**143**	Biochemistry
Vitamin B12 & Folic Acid	Mullingar	**143**	Biochemistry
Vitamin C	Eurofins Biomnis	**144**	Biochemistry
Vitamin D (25-OH)	Eurofins Blackthorn	**144**	Biochemistry
Vitamin E	Eurofins Biomnis	**144**	Biochemistry
Vitamin K	Eurofins Blackthorn	**144**	Biochemistry

Test Name	Processing Internal or external	Page Ref	Category for Filing in Chart
VRE Screening	Internal	**192**	Microbiology
VMA (vanillylmandelic adic)	Beaumont	**144**	Biochemistry
Von Williebrand factor (vWF:Ag)	St James Hospital	**144**	Molecular Genetics
Weak D Genotyping	IBTS	**81**	Blood Transfusion
White Cell Differential	Internal	**152**	Haematology
Wound swabs	Internal	**192**	Microbiology
Xanthochromia	Beaumont	**144**	Microbiology
Yersinia	Eurofins Blackthorn	**144**	Microbiology
YO antibodies (HU, RI, YO, CV2, MA2)	Eurofins Biomnis	**144**	Immunology
Zinc	Public Analysts Lab	**144**	Biochemistry