MRHT
Pathology Department
User Manual

14th Edition, September 2025

Pathology Department,
Midlands Regional Hospital Tullamore,
Arden Rd, Tullamore, Co. Offaly, R35 NY51

Contact through reception 0579321501, Internal Ext. 3000

1.0 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. ". In addition the MRHT Mortuary and Phlebotomy services fall under the remit of the wider Pathology department structure. The Mortuary Department is located adjacent to the Pathology Department on the ground floor of the hospital. The laboratory offers a wide range of pathology tests to all hospital doctors and general practitioners in the Offaly area and specialist services to clinicians in the Laois/Longford/Westmeath areas.

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 service users. The Pathology Department is committed to upholding the rights of the patients and ensure that all Laboratory process are undertaken in a way which is free from discrimination.

The purpose of this User Manual is to act as a quick 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. Included in this manual are details about the scope of service, location and hours of operations, key contact personnel, availability of clinical advice, the range of tests currently available, and expected turnaround times. In order to obtain the best possible laboratory services, it is essential to ensure that all specimens are collected properly, and that both the specimen and request form are labelled with the appropriate information.

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.

Every effort has been made to ensure that information provided in this manual is current and accurate at the time of writing. Medical and scientific staff in each speciality are available to discuss any aspect of the service in more detail, see contact details listed in Section 4.9. The information in this handbook is subject to change and will be reviewed on an annual basis, only the current version is valid for use.

The latest electronic version is publicly available on the HSE website MRHT Pathology Department homepage which can be found by logging on to:
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.
It is also available to hospital users on Ward Enquiry and through the "MRHT Medicines App" or MEG app.

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
Laboratory Manager, Pathology Department, Midlands Regional Hospital, Tullamore.

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2.0 Changes since last revision

Section	Details of change
	Section 1.0 • Added line ". In addition the MRHT Mortuary and Phlebotomy services fall under the remit of the wider Pathology department structure"
Section 4.0 **General Information**	**Section 4.1:** • Updated Quality Policy to include Mortuary and Phlebotomy services **Section 4.3** • Added reference to reporting of notifiable diseases, reporting of SAE and SARs to NHO, reporting of Annual Hospital Blood Bank report to HPRA. **Section 4.4** • Added reference to HSE policy 'The Management of Consumer Feedback to include Comments, Compliments and Complaints in the Health Service Executive' and link • Added that complaints can be made through MRHT Patient Advocacy and Liaison Service (PALS) @ mrht.pals@hse.ie **Section 4.6** • removed reference to location of service user registration form on MRHT webpage, replaced with relevant personnel **Section 4.7:** • Updated standard hours of operation to include Mortuary and Phlebotomy services **Section 4.8.1:** • Updated with contact details for Mortuary, NPT and Phlebotomy services **Section 4.8.2:** • Add reference to EXT 8888 in event of a Life-Threatening Haemorrhage. **Section 4.9.1:** • Updated with contact details for Phlebotomy and Secretarial/Administration Officer **Section 4.9.3:** • Removed reference to Dr. Crotty - retired, added details for Dr. Carmel Ryan, Dr. Ian Hosien and Dr. Lal **Section 4.11:** Added location of Mortuary **Section 4.12.8:** Added clarification regarding FOB/FIT testing **New Section 4.13.3** • Instructions for optimal serum yield and serum quality after blood collection using the Sarsdtedt S-Monovette Serum-Gel **Section 4.14.2:** • Added the provision of patient address, while not mandatory, is "Highly Desirable" for positive patient identification. Added GP Healthlink code **Section 4.16** • Added new point "Failure to adhere to the handling of serumS Monovette samples (see section 4.14.13) after sample is collected **Section 4.19**

	• Added reference to The Laboratory Services Reform Programme Advice Notes "Communication of Laboratory Results Likely to Require Urgent Action" (Jun 2025) **Section 4.19.2** • Updated information regarding access to MRHT Ward Enquiry Lookup and Histology Lookup **Section 4.21** • Added information on advisory service provided by the Pathology Department Consultants **Section 4.21.5** Updated information on Phlebotomy services
Section 5.0 Biochemistry	**Section 5.2**: Added 25 OH Vitamin D **Section 5.5**: • Added line "For laboratory tests that have separate reference ranges for males and females, all ranges quoted on laboratory reports for females are for non- pregnant females" • **Under Albumin**: added "Prolonged use of tourniquet may cause an increase in plasma albumin measurements" • **Under ALP**: added "Activity is higher in children and in pregnancy. Chelating anti-coagulants such as EDTA must be avoided. EDTA contaminated samples will not be reported for ALP. Refer to order of draw to prevent EDTA contamination" • **Under AST**: added "Delay in sample transport/processing may invalidate the results" • **Under Calcium**: added " Notes / comments: Chelating anti-coagulants such as EDTA must be avoided. EDTA contaminated samples will not be reported for Calcium. Refer to order of draw to prevent contamination. Separate from clot or cells as soon as possible. Calcium decreases with prolonged exposure to clot. • **Under HbA1c** added "Haemoglobin A1c Results < 20 mmol/mol may not be suitable for diagnosis and monitoring of Diabetes. Consider using alternative measures of glycaemic status e.g. Fructosamine. Consider the possibility of underlying conditions e.g. anaemia. Contact the laboratory to discuss further." • **Under LDH**: added "Separate serum or plasma from clot or cells as soon as possible. Delayed separation may cause increased LDH" • **Added new section for 25 OH Vitamin D test details** • **Under PSA** added link to NCCP guideline • **Under Troponin** added new notes/comment section **Added new section 5.8 Sample Requirements for Biochemistry Fluid Tests** **Section 5.9**: Added TAT for Procalcitonin and Vitamin D **Added new Section 5.10 Biochemistry Additional Testing**
Section 6.0 Blood Bank	**Section 6.4.2:** Change sample volume paediatrics 1.3ml to 1.2ml **Section 6.3:** Updated Consultant Haematologist details **Section 6.4.5:** added reference to BT Ward Lookup **Section 6.5.1:** Added new BT request form **Section 6.5.6:** • Added "The Blood Bank has a zero-tolerance policy on amendments for the 3 core identifiers i.e., Name, DOB and Patient ID " **Section 6.6.1:** • Consent and Blood Transfusion Information Leaflet section rewritten, added info leaflets available in other languages on IBTS website. **Sec 6.6.8:** • Remove reference to T/HVBT/GL/009 - Guideline for Prescribing Red Cells in MRHT and section on Patients at risk of cardiac failure. Replace with a paragraph on TACO – Transfusion Associated Circulatory Overload. **Section 6.6.9:** • Added 'It is best practice to issue platelets and other products on a valid sample, however they may still be issued

	on a sample number up to 1 month after receipt in the laboratory. **Section 6.6.11:** • Added "The Fibrinogen concentrate available in MRHT is subject to change. At the time of this document release it is Fibryga" **Section 6.6.13:** • Recommendations for Reversal of Warfarin tables updated. **Section 6.9:** Updated costs of components/products for 2025**.**
Section 7.0 External Tests	**Section 7.6** **Added the following tests:** • Anti ganglioside antibodies • MPN screen • Voriconazole • atypical HUS Screen • Colorectal Molecular Panel • Lung Molecular Panel • Melanoma Molecular Panel • MSI Molecular • Oncomine Molecular • PDL-1 IHC **Updated sample requirements for the following tests:** • Adams 13 • EPO • EPO receptor abs • Insulin • Keppra • Lamotrigine • Levetiracetam • Metanephrines urine • Myoglobin
Section 8.0 Haematology Laboratory	**Section 8.2.2:** • Mixing studies are currently not accredited **Section 8.3:** • Updated Consultant Haematologist details **Section 8.4.2** • Added "Please note that the Haematology Laboratory operates a strict "No Request, No Test" policy for coagulation samples. Please refer to T/HAE/GL/001 for the Emergency Department indications for ordering Coagulation Screen/Tests". **Section 8.4.3** • Added "The TAT stated for each parameter is based on normal results. Abnormal results or those samples that require further testing/investigations may increase the TAT of results." • Added paragraph on ESR results are not based on the Westergren method **Section 8.4.5** • Added that MGG staining of bone marrow aspirate slides is currently not accredited.
Section 9.0 Histopathology	**Section 9.3** • Updated Histology personnel contact details **Section 9.4.3.2** • removed reference to HTS labs **Section 9.4.3.7** • Muscle referral reports are available on DART **Section 9.4.3.8** • Renal referral reports are available on DART
Section 10.0 Microbiology Laboratory	**Section 10.3** • Added Healthlink is available for Microbiology test results for GPs. **Section 10.4** • Added - Tissue and Fluid samples taken in Theatre should be hand delivered to the Microbiology Laboratory without delay. • Additional information regarding specimen collection and sample stability. **Section 10.4.2**

	• Update Microbiology request form **Section 10.5** • **CSF (CEREBROSPINAL FLUID)** - updated reporting units for cell count • **CPE Screening (PCR Method)** - updated TAT • **FAECES** - updated TAT • **FLUIDS** - added section on additional tests • **MRSA SCREENING (PCR Method)** - removed reference to elective, non-prosthetic joint, patients • **SPUTUM** - added additional special requirements • **TISSUE AND BIOPSIES** - updated TAT and section on additional tests • **Added new test section - VRE Screening (Culture Method)** **Section 10.7** • Removed Influenza virus A/B and RSV
Section 12.0 **Near Patient Testing**	**Section 12.3** • Updated with consumable details used for ApexBio Ketosure device **Section 12.4** • Updated with details on how to access bloodgas training online 24/7 **Section 12.5:** • LIAT devices connected to middleware for management of software, activity and troubleshooting events. **New section 12.8:** • APEXBIO meter installation, including location and instructions to request training and access to ketosure meter network;access is restricted to trained users only **Section 12.9** • Updated with details about poor EQA compliance/fulfilment on Ketosure device
Section 13.0 **Phlebotomy Services**	**Added new Section for Phlebotomy Services**
Section 14 **Test Index**	**Test Index Table Modifications** • Updated index to reflect current test catalogue

3.0 Definitions/Abbreviations

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.
Laboratory:	The Laboratory and Pathology Department are interchangeable in this document.
LIS:	Laboratory Information System
MRHT:	Out Patients' Department.
Pathology Department:	the Laboratory and Pathology Department are interchangeable in this document.
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
Point of Care Testing (POCT):	Point of care testing and Near Patient Testing are interchangeable in this document
Near Patient Testing (NPT):	Near Patient Testing and Point of Care Testing are interchangeable in this document
INAB	Irish National Accreditation Body
HPRA	Health Products Regulatory Authority

Section 4.

General Information

4.0 General Information

4.1 Pathology Department Quality Management System and Quality Policy

Pathology Department, MRHT, is committed to providing a high quality, efficient and comprehensive service to its users. The Pathology Department strives to be accredited by the Irish National Accreditation Board (INAB) and compliant with the International Standard titled "Medical Laboratories Particular Requirements for Quality and Competency" (ISO 15189) and the requirements of EU Blood directive 2002/98/EC. MRHT Laboratory is an accredited testing lab: Registration No 221MT, the scope of accreditation can accessed on the INAB website www.inab.ie or on request from the laboratory. INAB monitors total quality performance and checks for compliance with the EU Blood directive 2002/98/EC and 2005/61/EC. The quality of results is of fundamental importance and the Pathology Department operates to strict scientific and management standards. To ensure a high quality service all results are authorised within a framework of comprehensive internal quality control checks and participation in recognised External Quality Assessment Schemes. The Pathology Department Quality Policy is included below and is also wall mounted within the department.

The Pathology Department at MRHT comprising of Microbiology, Haematology, Histology, Blood Transfusion and Biochemistry disciplines along with the Mortuary, Near Patient Testing and Phlebotomy services, is committed to providing a service of the highest quality and shall be aware and take into consideration the needs and requirements of its patients and service users.

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

- Operate a quality management system to integrate the organisation, procedures, 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.
- Ensure that the patient's well-being, safety and rights are the primary consideration.
- Commit to the health, safety and welfare of its entire staff.
- Ensure that all activities are undertaken impartially and shall not allow commercial, financial or other pressures to compromise impartiality.
- 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: 2022 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 are fit for intended use and 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 treatment of patients, samples or remains with due care and respect
- The assessment of user satisfaction, in addition to internal audit and external quality assessment, in order to produce continual quality improvement of the service.
- The safe testing, storage, distribution and transfusion of Blood and Blood Components/Products.
- The identification risk in order to improve patient care and service provision
- The investigation and reporting of Serious Adverse Events and Serious Adverse Reactions to the National Haemovigilance Office.
- Provision of Clinical Advisory Services

4.2 Patient Consent

All procedures carried out on a patient need the informed consent of the patient. Issues concerning patient consent for laboratory investigations are the responsibility of the requesting clinician. Patients have a fundamental legal and ethical right to consent to or refuse treatment. For guidance healthcare workers must refer to the "HSE National Consent Policy" for direction in relation to consent or refusal of treatment. The Pathology Department assumes that specimens submitted for testing were obtained with the consent of the patient for the performance of analysis to facilitate diagnosis and treatment. Special procedures, including more invasive procedures, or those with an increased risk of complications to the procedure will need a more detailed explanation and in some cases, written consent. In emergency situations, consent might not be possible; under these circumstances, it is acceptable to carry out the procedure, provided they are in the patient's best interest.

Where consent forms are required to be completed, this is stated in the requirements for the particular test, refer to Section 7.6. For external tests, these can be downloaded from the internet e.g. thrombophilia -
http://www.stjames.ie/GPsHealthcareProfessionals/Referral/ReferralForms/
Alternatively, contact External Tests on 057-9358354

4.3 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, privacy 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. Data protection breaches will be handled in line with HSE data protection policy. The Pathology Department also complies with the 'HSE Privacy Notice – Patients & Service Users' available at https://www.hse.ie/eng/gdpr

The Pathology Department transfers/shares data with third party referral laboratories/agents to facilitate provision of a comprehensive diagnostic service. Requests for tests not performed in the Pathology Department will be referred to specialist external laboratories which may be outside of the HSE and will involve the communication of patient information and clinical details to the external laboratory. Only information necessary to ensure the highest quality of care is shared and anyone who receives this information is also bound by confidentiality and the data protection laws. Some external laboratories used may be overseas. Overseas transfers are within the EEA and on the basis that anyone to whom we pass it protects it in the same way we would and in accordance with applicable laws. A number of referral laboratories in the UK may also be used. Details on referral laboratories can be obtained from the relevant Pathology Department disciplines.

Additionally as a HSE laboratory, we share data with a number of Health and Social Care bodies, regulatory bodies and reporting programmes. In certain situations, we may have to disclose your personal information to other agencies, in accordance with legal requirements, i.e. Dept. of Social Welfare, Department of Health, the Courts etc., or in an emergency situation to prevent injury to you or to other persons.

The Pathology Department is required by law (legislative requirement) to notify the Medical Officer of Health (MOH)/Director of Public Health (DPH/Health Protection Surveillance Centre) of certain diseases. The list of Notifiable Diseases and their respective causative pathogens is contained in the Infectious Diseases Regulations 1981 and Subsequent amendments. The most recent amendment: S.I No. 528/2024 Infectious Diseases (Amendment) (No. 2) Regulations 2024 can be found on the HPSC website under List of Notifiable Diseases https://www.hpsc.ie/notifiablediseases/listofnotifiablediseases/

In addition, the Pathology Department, is also required by law under Article 15 of the EC Blood Directive 2002/98/EC, to report all Serious Adverse Reactions (SARs) and Serious Adverse Events (SAEs) to the National Haemovigilance Office. The Pathology Department also submits an annual Hospital Blood Bank Report to the Health Products Regulatory Authority (HPRA) this report includes a declaration of compliance with the requirements of S.I No 3060 of 2005 and provide details of the systems that are in place to ensure compliance.

When the laboratory is required by law or authorized by contractual arrangements to release any other confidential information, the patient concerned shall be notified of the information released, unless prohibited by law. It is the policy of the Pathology Department that it shall inform the user and/or the patient in advance, of the information it intends to place in the public domain. This notification will usually be undertaken via the requesting clinician.

4.4 User Satisfaction, Complaints and Compliments

The goal of the Pathology Department is to ensure that our users receive accurate, reliable, meaningful and timely laboratory results. It is your right as a service user of the HSE to make a complaint if you believe that standards of care, treatment or practice fall short of what is acceptable. The Pathology Department documents all grievances from Clinicians, Patients or other related parties and investigates these as formal complaints in accordance with the Pathology Department complaints procedure which is aligned with the HSE policy 'The Management of Consumer Feedback to include Comments, Compliments and Complaints in the HSE' available at https://www.hse.ie/eng/services/yourhealthservice/feedback/complaints/policy/. If a complaint cannot be resolved within the Pathology Department, the complainant is advised of their right to an independent review by the Hospital Complaints Officer and if not resolved at that stage, an independent review by the Ombudsman.

If you need to make a complaint, we want the process to be easy, effective and fair. In order to make a complaint please contact the appropriate Departmental Chief Medical Scientist, the Laboratory Manager or the Quality Manager (refer to section 4.9 for contact details).
Alternatively, patients can provide feedback via the fowlloing routes

- HSE Your Service Your Say https://www2.hse.ie/services/forms/your-service-your-say/
- National Inpatient Experience Survey,
- MRHT Consumer and Legal Affairs Manager mrht.yoursay@hse.ie.
- MRHT Patient Advocacy and Liaison Service (PALS) mrht.pals@hse.ie

Patient feedback that is relevant to the Pathology Department is communicated to Laboratory Management via the MHRT Consumer and Legal Affairs Department or the MRHT Patient Advocacy and Liaison Service. The Pathology Department welcomes all feedback particularly in relation to the selection of examination methods and the interpretation of examination method.

4.5 Freedom of Information

Under the Freedom of Information Act 2014, all individual have the right to access his or her personal records. The MRHT Consumer and Legal Affairs team process requests for records under Freedom of Information legislation and General Data Protection Regulations. Patients or a healthcare provider acting on their behalf can make a request to have access to their records by contacting the MRHT Consumer and Legal Affairs team, email MRHT.Records@hse.ie.

4.6 Provision of services to GPs

All GP practices accessing the MRHT Pathology Departments must complete and return the "MRHT Laboratory Service User Registration Form", this is to ensure that laboratory has the appropriate routine and out of hours contact details for each practice. This registration form can be obtained by contacting the Laboratory Manager, Laboratory Quality Manager or Laboratory IT Manager (refer to section 4.9 for contact details)

Please note: it is a **Mandatory** requirement to provide an Out of Hours/Emergency Contact number for reporting of "critical" patient results outside normal practice hours. Where an out-of-hours services is listed e.g. MIDOC, arrangements must be made between the GP and the out-of-hours service to ensure that notifiable results can be telephoned directly to them and that appropriate patient follow up will occur. This is a critical clinical risk management issue for all parties concerned. It is the responsibility of the practice to update this contact information with the MRHT Pathology Department in the event of any changes.

The default method for communication of test results to GP's will be via Healthlink electronic transmission, therefore all GPs accessing the Pathology Departments service must be registered with Healthlink (www.healthlink.ie) in order to receive laboratory reports electronically. Hard-copy reports will only be issued in exceptional circumstances.

The Pathology Department reserves the right to restrict specialised referral requests from General Practitioners. All specialised referral requests must be approved by the appropriate Consultant.

4.7 Pathology Department Operating Hours

The hours of operation vary across the constituent departments.

Laboratory Service

The standard hours of operation are 08:00 to 20:00hrs Mon- Friday (excluding public holidays). To ensure staffing availability is aligned with activity staff rostering focuses on the core hours of 09:00 to 17:00. All work outside of the standard Mon-Fri 08:00-20:00hrs period is delivered under the out of hours/on-call service arrangements.

Mortuary Service

The core hours for the Mortuary service at MRHT are 09:00-17:30hrs Mon- Friday (excluding public holidays). No Routine/Weekend or out of hours/on-call Service arrangements exist.

Phlebotomy Service

The core hours for the service at MRHT are 08:00-16:00hrs Mon-Thursday and 08:00-13:00hrs Friday. The Mon- Fri phlebotomy service is delivered via a structured series of ward rounds typically (7am to 3pm) and a clinic based OPD model (8am to 5pm) with reduced activity from 1pm on Fridays. In addition a phlebotomy service operates on Saturday, Sunday and Bank Holiday mornings to address essential Hospital activity. The service is delivered via a voluntary roster where staffing resources allows and the typical hours of operation are 07:00-12:00hrs

External GP access to Phlebotomy requires booking via 057 9358635

The overall hours of service and operational arrangements are summarised are below

4.7.1 Weekday Routine Operation Hours

Monday – Friday (excluding Public Holidays)	
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*
Mortuary	09:00-17:30hrs
Phlebotomy	08:00-16:00hrs (Reduced Services from 1pm Fri afternoons)
***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.	

4.7.2 Out-of-hours/On-Call/Weekend Operating Hours

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

4.8 Pathology Department Contact Information

4.8.1 General Enquires – Routine Hours

Department	Contact Number
Blood Transfusion	057 93**58385**
Biochemistry	057 93**58504**
Haematology	057 93**58351**
Histopathology	057 93**58338**
Coagulation	057 9358347
Microbiology	057 93**58371**
Specimen Reception	057 93**58354**
External Test Results	057 93**57741**
Mortuary	057 93**58461 or** Hospital Switch **external 0579321501 or** internal **3000**
Near Patient Testing	Via: email Hannora.martyn@hse.ie
Phlebotomy	057 93**58635** Bleep via Hospital Switch external 0579321501 or internal 3000
Pathology Office	057 93**58342** Histology Secretary 057 93**58379** Laboratory accounts 057 93**59396** Demographic Entry

4.8.2 Out-of-Hours/On-Call/Weekends

Service	On-Call Disciplines	Contact
Blood Transfusion Haematology	Medical Scientist cover for Blood Transfusion and Haematology	Hospital Reception 057 9321501 Internal Ext. 3000 Laboratory On-Call Mobile 086 0482356 EXT 8888 in Reception staff can call in event of a Life-Threatening Haemorrhage.
Biochemistry Microbiology	Medical Scientist cover for Microbiology and Biochemistry	Hospital Reception 057 9321501 Internal Ext. 3000 Laboratory On-Call Mobile: • 9-2pm Biochemistry 086 7742465 • 9-2pm Microbiology 086 7777347 • After 2pm on 086 7742465
Laboratory Consultant Out-of-Hours Emergency Contact	Haematology, Histopathology, Microbiology	Hospital Reception 0579321501 Internal Ext. 3000
Mortuary	Out of Hours Mortuary Services	Can be contacted via Nursing Administration through Hospital Reception 057 9321501 Internal Ext. 58489/8490

4.9 Pathology Department Key Personnel and Contact Information

4.9.1 Scientific Staff

Discipline	Contact Name	Contact Details
Laboratory Manager	Mr Aidan Fallon	057 93**59400** aidan.fallon@hse.ie
Chief Medical Scientist Biochemistry	Ms Joan Martyn	057 93**57778** joan.martyn@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
Chief Medical Scientist Microbiology	Mr Ultan Smith	057 93**58390** ultanf.smith@hse.ie

4.9.2 Other Key Personnel

Discipline	Contact Name	Contact Details
Haemovigilance Officer	Ms Denise Murphy	057 93**58350 Bleep 290** denisej.murphy@hse.ie
Laboratory Quality Manager	Ms Orlaith McDonnell Specialist Medical Scientist	057 935**7752** orlaith.mcdonnell@hse.ie
Laboratory IT Manager	Ms Michelle Dunne Senior Medical Scientist	057 93**58312** michelle.dunne@hse.ie
Microbiology Surveillance Scientist	Ms Breda Duffy Specialist Medical Scientist Ms Michelle Maher Specialist Medical Scientist	057 93**57774** breda.duffy@hse.ie michelle.maher@hse.ie
Near Patient Testing Co-ordinator	Ms Hannora Martyn Specialist Medical Scientist	057 93**57794** hannora.martyn@hse.ie
Specimen Reception Manager	Mr Robert Revill Specialist Medical Scientist	057 95**8308** robert.revill@hse.ie
Mortuary Senior Pathology Technician	Vacant. Refer Queries to Lab Manager	057 93**59400** aidan.fallon@hse.ie
External Results	Mr David Loughman Team Lead	057 93**57741** David.loughman@hse.ie
Senior Phlebotomist	Ms Toni Cunningham	0860611193 Toni.cunningham@hse.ie
Secretarial/ Administration Officer	Ms Jill Reams	057 9359393 Jill.Reams@hse.ie

4.9.3 Laboratory Consultants

Discipline	Contact Name	Contact Details
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 Histopathologist	Dr Carmel Ryan	057 93**58279** Carmel.ryan3@hse.ie
Consultant Microbiologist	Dr Ian Hosein	Ian.hosein@hse.ie Consultant Microbiologist can be contacted through reception 057 93**21501** Internal Ext. 3000
Consultant Microbiologist	Dr Pankaj Lal	Pankaj.lal@hse.ie Consultant Microbiologist can be contacted through reception 057 93**21501** 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 9321501 or Internal *Ext. 3000)*

4.10 Out-of-Hours/On-Call/Weekend Service Provision

All work outside of the standard Mon-Fri 08:00-20:00hrs period is delivered under the out of hours/on-call service arrangements. The arrangements are broken down into (1) Weekend Sessional Services and (2) On-Call services. Note: No Histology out of hours service exists.

(1) Weekend/Public Holidays- 'Sessional Service'

The laboratory provides an enhanced on-call or sessional service from 09:00 to 14:00 hrs. Staffing arrangements are in place up to 14:00hrs across the four on-call departments to cater for phlebotomy runs and essential hospital activity over weekends and public holidays. The sessional service ceases at 14:00hrs, any non-urgent work receipted after this time will be deferred for processing on the next available day.

(2) On-Call Service

Outside of the routine day and sessional services the Pathology Department's On-Call service is for medical emergencies (emergent activity), where the results are likely to influence immediate management of the patient. During the On-Call period, two staff members are rostered to cover four departments; Haematology & Blood Transfusion (Staff Member 1) and Biochemistry and Microbiology (Staff Member 2).

Rostered On-call staff carry dedicated mobiles and are contactable via the Hospital Switch system during this period. These staff members are lone workers with no ancillary support.

- On-Call Medical Scientists should only be contacted by the requesting clinician when an emergent on-call test is required. Non emergent on-call work will be processed at the earliest opportunity during the on call period- no phone call is required.
- After 00:00hrs please do not phone the on-call person regarding non-emergent activity. Non emergent on-call work will be processed at the earliest opportunity during the night- no phone call is required.

Request Forms

The request form accompanying the emergency sample must be fully completed as per Section 7 "Pathology Policy on Request Form Completion and Specimen Labelling".

The White 4 part General Laboratory Request Form is used up to 2pm at weekends- Biochemistry and Haematology/Coagulation requests can be made on the same form. The green on call Biochemistry and pink Haematology request forms are completed for on call Biochemistry and Haematology tests at all other times. The regular Microbiology specimen request form is used for on call Microbiology 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.

4.10.1 On-Call Test Catalogue*

On-Call test Catalogue (Laboratory Tests Available On-Call)	
Biochemistry	Glucose U/E and Creatinine Cardiac Enzymes 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.
On-Call test Catalogue (Laboratory Tests Available On-Call)	
Haematology/ Coagulation	FBC ESR only with relevant clinical details (otherwise processed during following routine hours or enhanced session service) Infectious Mononucleosis Screen (processed during following routine hours or enhanced session service) 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 https://www.hse.ie/eng/about/who/acute-hospitals-division/hospital-groups/dublin-midlands-hospital-group/our-hospitals/mrht or available to download from the eMEG app 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)

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

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

4.11 Location of and Access to the Pathology Department

Postal Address:

Pathology Department,
Midlands Regional Hospital Tullamore,
Arden Rd,
Tullamore,
Co. Offaly. R35 NY51

- The Pathology Department 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 authorised personnel at all times.
- During routine hours delivery of specimens to Specimen Reception by hospital staff and the public can be assessed via Pathology Door 2.
- Patients/non-HSE staff/general public are not permitted beyond Specimen Reception for security reasons.
- Alternatively delivery of specimens by non-hospital staff can be placed in the designated fridge for pathology samples situated near Hospital Reception, the fridge is clearly marked "Laboratory Specimen Fridge".
- 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.
- The Mortuary Department is located adjacent to the Pathology Department on the ground floor of the hospital.

4.12 Specimen Collection

4.12.1 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 Infection Prevention/Control National Clinical Guideline No 30, available on MRHT Q-Pulse and eMEG application.

4.12.2 Patient Preparation for Laboratory Tests

4.12.2 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).

4.12.3 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 4.14 below.
- **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 4.7).

4.12.4 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 your hands thoroughly with soap and water.
- Label the specimen with **patient forename, surname and DOB**. Please state the date and 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.
- Note: Samples are referred externally for testing.

4.12.5 Urine for Pregnancy test

- Early morning urine is recommended for pregnancy testing.
- 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.

4.12.6 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 before and after taking the sample
- 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

4.12.7 Urine for Urine Legionella/Streptococcus Pneumoniae Antigen Test

- Urinary antigen testing requests will be processed on ICU patients, Oncology patients and other patients as approved by the Consultant.
- 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 before and after taking the sample.
- 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.

4.12.8 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

Stool for Occult Blood – FIT Test Method

- 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.
- The Microbiology Laboratory offers a Qualitative (Positive/Negative) FIT Test
    - It does not quantify the level haemoglobin in stool samples
    - Approximate limit of detection is 50ug/L or 50ng/ml.

4.12.9 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.
- AFB requests are referred to the Irish Mycobacteria Reference Laboratory (IMRL) at St. James Hospital (SJH). These tests require the requesting clinician to complete the IMRL Specimen Request Form (LF-IMRL-0195) prior to sending samples to the Laboratory Specimen Reception. "Rapid Molecular Testing" requires prior approval by the Consultant Microbiologist at SJH. The requesting Clinician MUST phone to get

approval from SJH Consultant Microbiologist before completing the request form and sending the sample to the Laboratory Specimen Reception. The Consultant Microbiologist at SJH can be contacted by phoning the SJH Registrar Office at 01 416 2985 during routine hours or via SJH switchboard at 01 410 3000 out of hours. Failure to complete the IMRL Specimen Request Form and/or receiving approval from the Consultant Microbiologist at SJH will lead to delays in sending the request to the referral laboratory.

- IMRL Specimen Request Forms are available from the Laboratory Specimen Reception or at the following Link: https://www.stjames.ie/services/laboratorymedicinelabmed/irishmycobacteriareferencelaboratory/.
- 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.

4.13 Specimen Collection

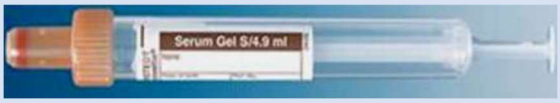
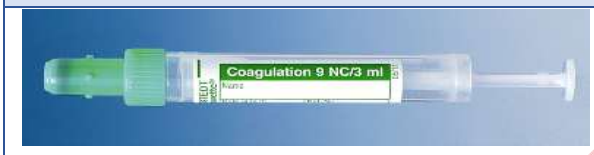
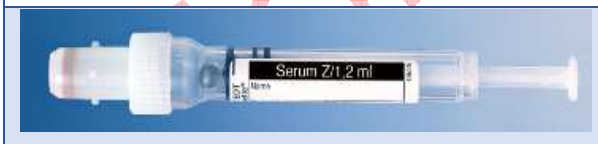
- It is the responsibility of the doctor, nurse or phlebotomist taking the sample to:
  - Use approved sample collection containers
  - Ensure that all appropriate sterile equipment is within date and all packaging is intact.
  - Explain the procedure and rationale to the patient, answering any questions, thus ensuring an informed verbal consent is obtained.
  - Check the patient identification, positive patient identification is an essential to ensure accuracy of results.
  - Ensure patient meets any special requirements if required e.g. fasting etc.
  - 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. Labels should not overlap or touch the bottom or lid of the container.**
  - **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.
  - Use approved sample collection biohazard bags which can contain any spills or leaks within the bag.

Please note: any deviations or exclusions from, or additions to the documented collection procedure must be recorded on the request form by the sample collector.

4.13.1 Specimen Bottles/Tubes

- The Sarsdtedt blood collection tubes are the preferred tube types used by the Pathology Department.
- Details of the type and volume of sample required for a particular assay are outlined in the relevant departmental sections. The most commonly used blood bottle types are outlined below.
- Blood taken into expired collection tubes may render the sample unsuitable, or impact on the reliability of the result.
- Please ensure that all specimen bottles are filled to the correct mark.
- *Please ensure that all blood specimens are mixed well by gently inverting the sample 4-5 times. Contact the relevant Laboratory for advice if the minimum sample volume cannot be achieved.
- Do not shake samples.
- The Greiner Vacuette system for blood collection is used in Regional Hospital Mullingar, these samples are accepted by the MRHT for those tests analysed for Mullingar patients

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

Specimen Bottle	Bottle Type and Information
	**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. *
	**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.
	**EDTA as above but: Pink 7.5 ml** **Product No: 01.1605.006** Blood Transfusion tests only.*
	**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.
	**Sodium Citrate: Green 3 ml** **Product No: 05.1165.001** Coagulation tests.* 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.*
	**Lithium Heparin: Orange 7.5 ml** **Product No: 01.1604.400** Used for trace metal tests.* 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.*
	**Paediatric - Glucose test.***
	**Safety Needle.** **Product No: 85.1162.200** **Needle 21G x 1.5''**

4.13.2 Order of Draw when sampling using the Sarsdtedt Monovette System

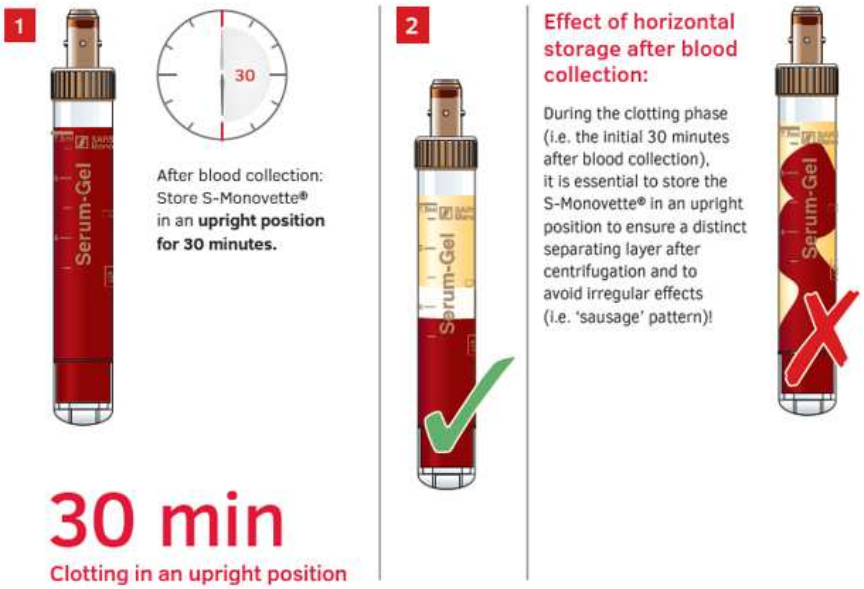
- If the Monovette system is used as designed, cross-contamination should not occur, as the caps are not removed from the tubes.
- Due to the vacuum the tubes will also automatically fill with blood to the appropriate fill-line.
- The tubes are siliconised to reduce adhesion of clots to tube walls and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

4.13.3 Instructions for optimal serum yield and serum quality after blood collection using the Sarsdtedt S-Monovette Serum-Gel

- To ensure optimum serum quality suitable for diagnostic and analytical use, please ensure to observe the following instructions after blood collection:



4.14 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 ISO 15189 Standards.
- Each request, completed via a manual request form and accepted by the laboratory is considered an agreement.
- The act of completing the request form and submitting the sample and request to the laboratory indicates that the requestor agrees to the laboratory conditions for providing medical laboratory services.
- 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.

Please Note:

- 'Self-referral' (self-testing) of own / family / relatives/ friends' clinical specimens for Laboratory testing without instruction from a registered Medical Practitioner is prohibited.
- The service provided by the Pathology Departments is intended to assist in the clinical management of patients and is not provided for medico-legal or forensic purposes or criminal investigations.

4.14.1 Selecting the Request Form

- For accurate identification of patients and specimens, it is essential that request forms be completed fully, legibly and accurately. Please remember that inadequate information on request forms makes it impossible to issue a report to the correct location or contact the doctor in case of urgent or unexpected results.
- The laboratory has a number of different request forms most of which are colour coded for the different pathology departments. 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 White 4 Part 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 White 4 part General Laboratory Request Form** is used up to 2pm at weekends- Biochemistry and Haematology/Coagulation requests can be made on the same form.

- **The Green on call Biochemistry and pink Haematology request forms** are completed for on call Biochemistry and Haematology tests at all other times.

- **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.

4.14.2 Completing the Request Form

The following outlines the procedure for completion of laboratory request forms with the exception of the form for Blood Transfusion refer to 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.

The provision of a patient address on request forms is not currently mandatory, however it is considered **Highly Desirable**. When provided alongside a patient's name and date of birth, an address significantly enhances the uniqueness and traceability of the patient, helping to prevent potential misidentification errors —especially in cases where patients share similar names or dates of birth. We therefore strongly encourage all service users to include a full and accurate patient address on all patient request forms.

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

Information Required on the Request Form

a) Patient Surname and First Name/s (unabbreviated). (Mandatory)

b) Patient date of birth. (Mandatory)

c) Patient's address (Highly Desirable)

d) Patient hospital ID (Chart Number) for patient in hospital, if available.

e) Ward/GP Location.

f) Requesting Doctor/GP Name & GP Healthlink code

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.

4.14.3 Specimen Labelling

The following outlines the procedure for labelling specimens for the Laboratory. Additional information is required for the labelling of Blood Transfusion and Microbiology specimens; refer to 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), using a small computer generated label or using the BloodTrack PDA label.

Blood Transfusion samples can only be accepted if they are legibly hand written or labelled with a BloodTrack PDA label. Please note: Labels should not overlap or touch the bottom or lid of the container.

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). (Mandatory)**
b) **Patient date of birth. (Mandatory)**
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.

N.B. Patient Name (Surname & First Name(s)) and DOB MUST be IDENTICAL on BOTH Request Form and Specimen for sample acceptance

4.14.4 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.
- Patient details different on Specimen/Request form i.e. Mismatch
- 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.

4.15 Specimen Transportation

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

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 follow these guidelines**
  - Transport specimens at room temperature unless otherwise stated.
  - 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.

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 for advice.

4.15.1 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. Green carriers are available for ED-Laboratory use only. 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.

Sample Type	Comment
Albumin for infusion	
Bone marrow biopsies	Biopsies, Heparin, RPMI, EDTA bone marrow aspirates, slides. Always 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/Blood Components for transfusion	i.e. Red Cell Concentrate and Platelets, Plasma, Factor Concentrates. etc.
24Hr Urine Containers	
Items >1 kg in weight	
Tissues/Fluids/Swabs taken in Theatre	Hand deliver to Microbiology Laboratory. If during oncall hours phone Micro/Bio Oncall Medical Scientist in advance of delivery.

Table 1. List of items which are NOT permitted for transport via the chute system

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

Table 2. Delivery of specimens via the Pneumatic Chute
Routine Hours: 08:00 – 17:45 Monday–Friday

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**

Table 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

4.15.2 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.

4.15.3 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 into 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:

- The packaging must be of good quality, strong enough to withstand the shocks and loadings normally encountered during carriage.
- 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.
- 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.

4.15.4 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.

4.16 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

- Failure to adhere to the handling of serum S Monovette samples (see section 4.14.13) after sample collection
- Sample bottle expiry
- Samples must be appropriately labelled 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
- Ideally collect Microbiology samples before antimicrobial therapy where possible

4.17 Requesting Additional Testing

If further additional tests are required on a specimen, which has already been received in the Laboratory, please contact the relevant laboratory discipline to determine the feasibility of using the initial specimen for analysis as the age of the specimen may affect the validity of test results. Laboratory staff will advise if the initial sample is still valid for additional testing. A new written request should be made using the appropriate request form. Laboratory staff will advise on the correct selection of the request form, as required. In the event of analytical failure, the laboratory will notify the requesting clinician / location should further samples be required.

Refer to Departmental sections for further specific details.

4.18 Frequency of Testing

- The frequencies stated in this handbook refer to normal, routine working days.
- The frequencies do not take into account cases where repeat testing of samples is required 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.
- Certain test requests are batch tested, refer to individual departmental sections.

4.19 Reporting of Results

- As per The Laboratory Services Reform Programme Advice Notes "Communication of Laboratory Results Likely to Require Urgent Action" (Jun 2025)
  "The primary responsibility for follow up action on any laboratory test result rests with ***the person who requested the test****. Prior to requesting a test, the practitioner is responsible for ensuring that a process is in place to ensure that they or another competent team member, is available to receive and act on the result when it becomes available. The requestor is also responsible for giving the laboratory a clear indication if there is exceptional urgency or importance associated with processing a particular sample"*
- 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.
- 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.
- Hard copy reports are provided to GPs who do not use Healthlink.
- Histopathology reports are available in hardcopy only.
- Written reports issued during emergency on-call service 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.
- Where requests for copies of patient results are received, the Pathology Department will assume that consent has been agreed with the patient for the release of such test results in the best interest of patient care.
- Measurement uncertainty has been determined for all relevant examination procedures, is regularly reviewed and can be provided to clinical users on request from the relevant Chief Medical Scientist.
- Guides to interpretation of results are also issued on some reports. If further clinical guidance is required to interpret results this can be obtained by contacting the consultant in charge for the relevant discipline.
- Where results indicate special counselling is required for the patient (e.g. genetic testing), it is the requesting clinician's responsibility to facilitate this.

4.19.1 Critical Result Notification

As per The Laboratory Services Reform Programme Advice Notes "Communication of Laboratory Results Likely to Require Urgent Action" (Jun 2025)

"The primary responsibility for follow up action on any laboratory test result rests with the person who requested the test. Prior to requesting a test, the practitioner is responsible for ensuring that a process is in place to ensure that they or another competent team member, is available to receive and act on the result when it becomes available. The requestor is also responsible for giving the laboratory a clear indication if there is exceptional urgency or importance associated with processing a particular sample"

Critical results are communicated as a verbal report by telephone to the clinical team or authorised health care professional. In the event the requesting clinician is not contactable the critical result may be to release electronically so that it is available to the user if they check the platform. Where it is possible to confirm that an urgent result has been viewed electronically additional communication may not be required.

Critical results are broadly classifies results according to imminent risk to the patient and the urgency of intervention. Results are classified into categories A, B & C.

- **Category A** results require communication within 2 hours. This classification indicates potential immediate danger to the patient, or a potentially life-threatening illness when urgent intervention is required.
- **Category B** results require communication within 24 hours, and preferably on the same working day.
- **Category C** results could have an immediate impact on a patient's management (either treatment or investigation); however action is likely to be taken on the next working day. Telephone communication of these results on the next working day was deemed satisfactory.

Requesters must perform readback verification with the laboratory delivering verbal results to confirm correct transmission and understanding of the information provided.

While the MRHT Pathology Department staff will do their best to adhere to the above guidelines, it is the duty of the requesting clinician to follow up, in a timely fashion, on the results of investigations requested on patients under their care. Failure to do so may result in missed opportunities to identify trends in patient deterioration. In the event the requesting clinician is not contactable and where clinically indicated, a MRHT Pathology Consultant may consider contacting Gardaí for assistance and/or may contact the National Emergency Operations Centre (NEOC) to arrange for the patient to be brought to their nearest Emergency Department.

4.19.2 Access to MRHT Ward Enquiry Lookup (and Histology)

☑ Standard Access (with @hse.ie email)

1. **Install the Icon(s)**
   - Request via the **National Service Desk (NSD)** on Ivanti (if required)
2. **Apply for Access**
   - Click this button on Ward Lookup (HSE login required).
   - Complete and submit the access form.
   - Account details will be emailed after review.

⏳ Temporary Access (no HSE email yet)

1. Email ✉ MRHTWardLookup@hse.ie (staff or manager).
2. A short form will be emailed back.
3. Temporary login (valid 7 days) will be issued securely.
4. Apply via standard route once HSE email is active.

🛈 Support

- **Access issues / password reset:** Use this button on the Ward Lookup home screen and complete password reset form.

- **Other queries:** MRHTWardLookup@hse.ie
- Access to results from specific disciplines (i.e. Histology) is granted on the principle of least privilege.
- Instructions can also be requested from the Laboratory IT Manager via MRHTWardLookup@hse.ie
- **Notes:** All white blood cell lines may not be displayed on Ward Enquiry if a manual WBC Differential has been performed, please contact the Haematology department directly if you required individual cell counts

4.19.3 Healthlink Electronic Link

- Healthlink is an electronic reporting system to GP's.
- Laboratory results for Blood Sciences and Microbiology are transmitted electronically to subscribed GPs once fully authorised.
- Printed copies of results from Histology and External Referral Laboratories are provided via standard post.
- To access Blood Science results electronically please email the Laboratory IT Manager via MRHTLabResultQueries@hse.ie
- For queries relating to Microbiology results, please email MRHTMicroQueries@hse.ie
- Please also notify the Laboratory IT Manager of any changes to GP staff to allow us maintain the correct database links, refer to section 4.3

4.20 Laboratory Supplies

Please do not ask for supplies during Out-of-Hours/Weekends. Supplies are never available from on-call staff.

4.20.1 Ordering Laboratory Supplies

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

4.20.2 Supplies for Clinical Areas/Departments within the Hospital

Laboratory supplies are available to Clinical Areas/Departments of MRHT via the KanBan system or directly from the Pathology Department.

Where the KanBan 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 Clinical area/Department must complete 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.

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

A minimum of 2 working days notice is required to fulfil an order.

Please send completed order forms to the Laboratory email laborders.mrht@hse.ie by Tuesday 12.00 pm for collection on Thursday or Friday from 9.00 to 17.00 excluding lunch time.

Completed orders will be made available 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.

4.21 Pathology Services Available

4.21.1 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.

Haematology/Blood Transfusion

- Consultant Haematologist(s) lead the Blood Transfusion and Haematology clinical and laboratory service and will advise on diagnosis or interpretation of tests.
- Blood Transfusion and Haematology Medical Scientific staff are authorised to give advice on scientific information such as the use of laboratory services and sample requirements.
- Consultant Haematologists also provide advice to hospital clinicians & GPs who make enquiries regarding interpretation of reports.
- The Haemovigilance Officer is available to offer clinical advice on Blood Transfusion and Haemovigilance issues under the direction of the Consultant Haematologist(s) and can be contacted through the switchboard on Bleep 290.
- Haematology clinics are held in the Outpatients Department of MRH at Tullamore. Appointments can be made by sending a referral letter to the Haematology secretaries in MRHT. Currently, there is a waiting list for routine referrals but urgent patients will be seen as soon as possible.
- Patients are also seen and transfused in the Regional Oncology/Haematology Day Ward under the supervision of the Consultant Haematologist

Histopathology

- Histopathology and Cytopathology services in the Midlands are centralised at the Midlands Regional Hospital Tullamore where samples from the three Midlands Hospitals (MRHT, MRHP, MRHM) are processed. All Histopathology surgical cases are reported by the Consultant Histopathologists.
- Consultant Histopathologists are contactable by telephone to discuss patient reports both at preliminary stages of diagnosis and when final diagnosis is determined. It is standard for urgent diagnoses to be telephoned to the appropriate senior clinician. This is documented in the patient report.

- Histopathologists participate in Multi Disciplinary Team (MDT) meetings including local Oncology and GI meetings and Inter-institutional MDT meetings with St James Hospital in Dublin. The Consultant Histopathologist with special interest in Cytopathology performs FNAC at ward and outpatient level as requested.
- Histopathologists also provide advice to GPs who make enquiries regarding interpretation of Histology reports and advise clinical staff regarding issues surrounding post mortem examinations.
- After peer review of difficult cases, where consensus of opinion has not been reached, an external opinion is sought from recognised experts in specific fields both nationally and internationally. Such advice may also be sought at the request of the relevant senior clinician.
- Coroner's and non-Coroner's post mortem examinations (PMEs) are also performed by Consultant Histopathologists. Coroner's PMEs from counties Longford, Westmeath and Offaly are performed in MRH Tullamore, as are non-Coroner's PMEs from MRH Tullamore and MRH Mullingar. Coroner's PMEs from Co. Laois and non-Coroner's PMEs from MRH Portlaoise are performed in MRH Portlaoise. Coroner PME reports are issued directly to the relevant Coroner.
- Senior Medical Scientist Staff are authorised to give advice on scientific information such as use of laboratory service

Microbiology

- The Microbiology Advisory Service offers comprehensive advice on all aspects of infectious diseases diagnosis and management.
- Clinical advice is available to clinicians and GPs on a 24/7 basis. Daily wards rounds are undertaken in ICU, and other wards as clinically indicated. Weekly MDT meetings (ICU and haematology-oncology services) are attended by the Consultant Microbiologist.
- From a laboratory perspective, positive blood cultures, sterile site cultures (including CSF) and any other serious positive cultures are phoned and discussed with clinicians. Laboratory results have a comment appended to them providing further clinical advice and guidance as appropriate. Advice is provided to Healthcare workers, including GPs on suitability and appropriateness of specimens/testing.
- Teaching is provided to house staff and consultants through twice yearly (at least) grand round presentations, journal clubs, induction programme and specialty specific journal clubs.
- Antimicrobial guidelines are produced in partnership with the antimicrobial pharmacist and reviewed and updated yearly. These Pharmacy guidelines are distributed to all clinicians. Prophylactic antibiotic protocols covering general surgery and orthopaedic surgery have been developed in consultation with the relevant services.

Similar guidelines have been developed for febrile neutropenic patients on the haematology-oncology service.

- Microbiology Medical Scientist Staff where authorised, give advice on scientific information such as use of laboratory service and sample requirements.

Biochemistry

- Clinical advice is provided by a visiting Consultant Chemical Pathologist from St. James' Hospital.
- Chief/Senior Medical Scientists also provide advice to hospital clinicians & GPs who make enquiries regarding interpretation of reports following consultation with the Consultant Chemical Pathologist.
- Medical Scientist Staff where authorised give advice on scientific information such as use of laboratory services and sample requirements.

Refer to section 4.9 Pathology Department Key Personnel and Contact

4.21.2 Autopsies

Please inform Nursing Administration as soon as an autopsy (either consented or Coroners) is required.

4.21.3 Haemovigilance Service

The Haemovigilance service in MRHT is a Consultant Haematologist led service. 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).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.)

4.21.4 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.

4.21.5 Phlebotomy

The Mon- Fri phlebotomy service is delivered via a structured series of ward rounds typically (7am to 3pm) and a clinic based OPD model (8am to 5pm) with reduced activity from 1pm on Fridays. In addition a phlebotomy service operates on Saturday, Sunday and Bank Holiday mornings to address essential Hospital activity. The service is delivered via a voluntary roster where staffing resources allows and the typical hours of operation are 07:00-12:00hrs

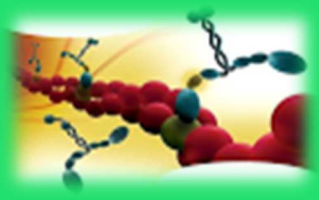
External GP access to Phlebotomy requires booking via 057-9358354

4.21.6 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.

Section 5.

Biochemistry Laboratory



5.0 Biochemistry Laboratory

5.1 Introduction to the Biochemistry Laboratory

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.

5.2 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)
AFP (Alpha-fetoprotein)
Alcohol* (see Ethanol)
ALT (Alanine aminotransferase)
ASOT (Anti Streptolysin-O Titre)
Beta Crosslaps* (CTx)
Bilirubin - Total
CA 125
CA 19.9
Cardiac enzymes (CE)
Chloride
Corrected Calcium
Creatinine - enzymatic
CTx (see Beta Crosslaps)
Electrolytes (Sodium, Potassium, Chloride)
Gamma-GT (Gamma glutamyl transferase)
Glucose
HCG
Lactate dehydrogenase (LDH)
Lipid profile - fasting
Acetaminophen* (Paracetamol)
Albumin
ALP (Alkaline Phosphatase)
Amylase
AST (Aspartate aminotransferase)
Bicarbonate
Bilirubin – Direct (Conjugated Bilirubin)
CA 15.3
Calcium
CEA (Carcinoembryonic antigen)
Cholesterol
Creatine Kinase (CK)
Creatinine
C-Reactive Protein (CRP)
eGFR
Ethanol* (Ethyl Alcohol)
Gentamicin*
HbA1c
HDL-Cholesterol (HDL)
Lipid profile - random

Whole Blood / Serum / Plasma cont'd:

LDL-Cholesterol (LDL)
NTproBNP* (N-terminal pro B-type natriuretic peptide)
Phosphorous
Procalcitonin
Procollagen Type-1 N-terminal Propeptide* (P1NP)
PTH*
RF (Rheumatoid Factor)
Sodium
Troponin-T (Tn-T)*
Uric acid
25 OH Vitamin D
Liver function tests (LFTs)
Magnesium
Paracetamol* (see Acetaminophen)
Potassium
Protein
PSA
Salicylate*
Triglycerides
Urea
Vancomycin*

Urine Test List:

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

CSF:

CSF glucose*
CSF Protein*

Fluids:

Tests are fluid dependant; contact Biochemistry laboratory for information if required re testing of fluids.

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. Liver profile requests originating from GPs do not include LDH. If LDH required it must be detailed on the request from
Proteins	Total Protein, Albumin
Renal (U+E)	Urea, Creatinine and Electrolytes (Na, K, Cl). Renal profile requests originating from GPs do not include potassium. If potassium is required it must be detailed on the request form

5.3 Hours of Operation and Contact Details

<table>
<tr><th colspan="3">Monday – Friday
(excluding Public Holidays)</th></tr>
<tr><th>Departmental Address</th><th>Routine hours</th><th>Contact Details</th></tr>
<tr><td rowspan="3">Biochemistry,
MRHT,
Tullamore,
Co Offaly,
Ireland.
R35 NY51</td><td>Core Hours
09:00-17:00hrs
(Full Operational Service)</td><td rowspan="2">057-9358504</td></tr>
<tr><td>Extended Working day
08:00 - 20:00hrs
(Reduced Services outside of Core Hours)</td></tr>
<tr><td>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</td><td>Contact via switchboard
Internal Ext 3000

External 057-932 1501</td></tr>
<tr><td colspan="3">*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.</td></tr>
<tr><th colspan="3">Saturdays, Sundays and Public Holidays</th></tr>
<tr><td></td><td>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.</td><td>Contact via switchboard
Internal Ext 3000

External 057-932 1501</td></tr>
</table>

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

5.4 Pre-Testing Information

5.4.1 Handling and Transport of Samples

All samples are to be taken into the correct sample containers and transported to the laboratory in the 4 Part General Request Form specibag during routine hours and in the Biochemistry On-call Request form specibag during on-call hours.

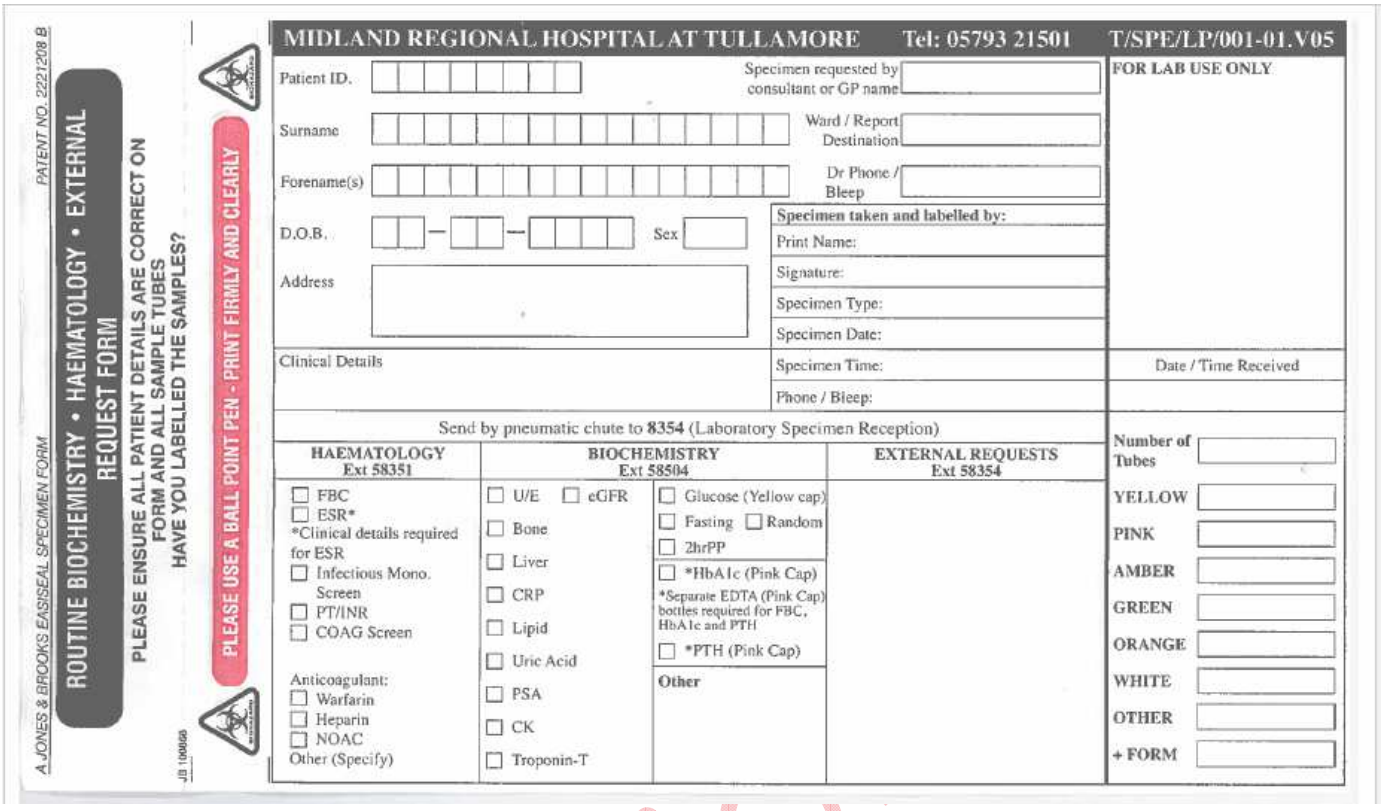
To protect the safety of all healthcare staff, the following precautions for the transportation of samples must be followed:

- 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.

5.4.2 Form and Sample Labelling Requirements

All parts of the 4 part General Request form or Biochemistry On-call Request form are to be completed in full as per the labelling requirements stated in **Section 4.14** of the **General Information section** of this manual.

a) 4 Part General Request Form (Front of form)



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 & BROOKS EASISEAL SPECIMEN FORM PATENT NO. 2221208 B

JB 160658

MIDLAND REGIONAL HOSPITAL AT TULLAMORE Tel: 05793 21501 T/SPE/LP/001-01.V05

Patient ID. | Specimen requested by consultant or GP name | FOR LAB USE ONLY

Surname | Ward / Report Destination

Forename(s) | Dr Phone / Bleep

D.O.B. — — Sex | Specimen taken and labelled by:

Address | Print Name:

Signature:

Specimen Type:

Specimen Date:

Clinical Details | Specimen Time: | Date / Time Received

Phone / Bleep:

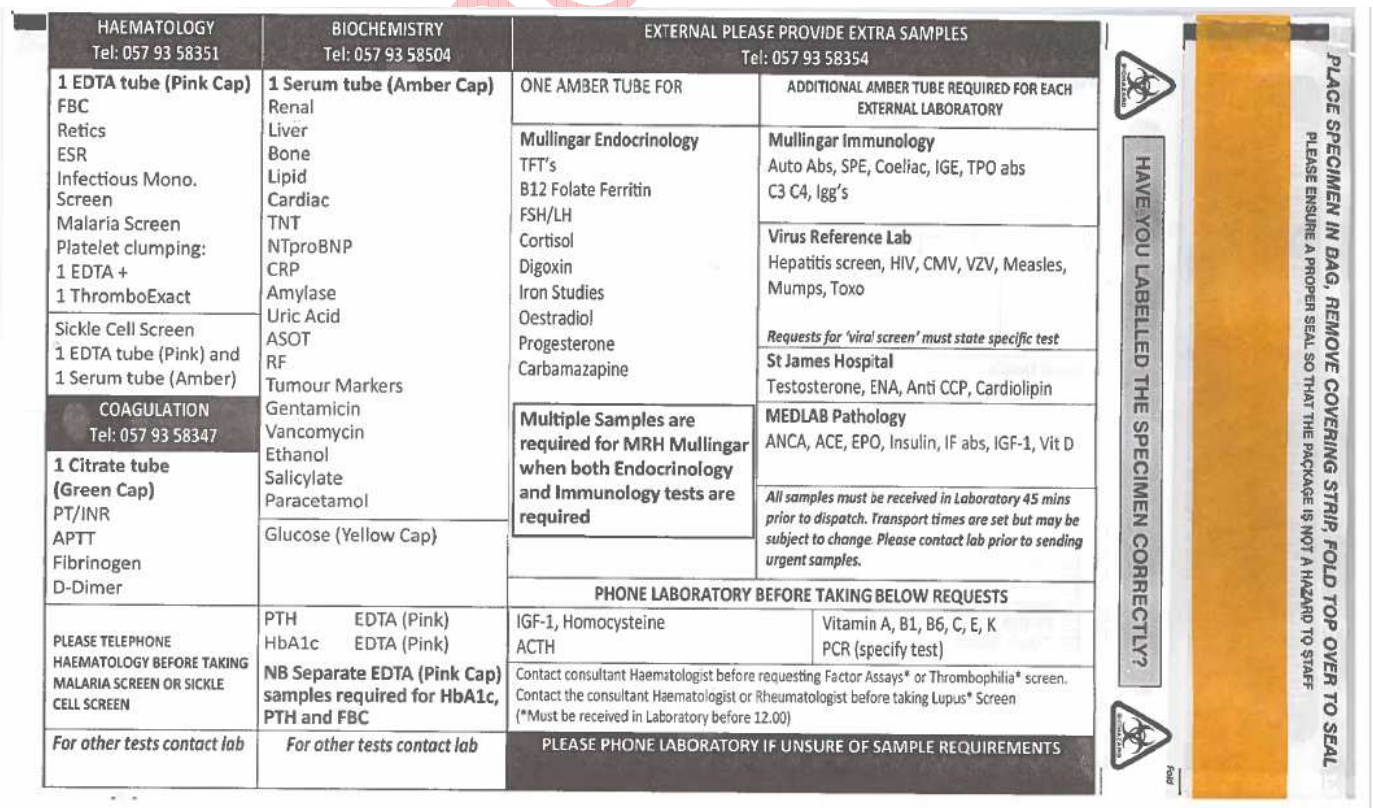
Send by pneumatic chute to **8354** (Laboratory Specimen Reception)

HAEMATOLOGY Ext 58351	BIOCHEMISTRY Ext 58504		EXTERNAL REQUESTS Ext 58354
☐ FBC ☐ ESR* *Clinical details required for ESR ☐ Infectious Mono. Screen ☐ PT/INR ☐ COAG Screen Anticoagulant: ☐ Warfarin ☐ Heparin ☐ NOAC Other (Specify)	☐ U/E ☐ eGFR ☐ Bone ☐ Liver ☐ CRP ☐ Lipid ☐ Uric Acid ☐ PSA ☐ CK ☐ Troponin-T	☐ Glucose (Yellow cap) ☐ Fasting ☐ Random ☐ 2hrPP ☐ *HbA1c (Pink Cap) *Separate EDTA (Pink Cap) bottles required for FBC, HbA1c and PTH ☐ *PTH (Pink Cap) **Other**	

Number of Tubes	
YELLOW	
PINK	
AMBER	
GREEN	
ORANGE	
WHITE	
OTHER	
+ FORM	

b) 4 Part General Request Form (Back of form)

General test guidelines are given on the back of the General Request Form.



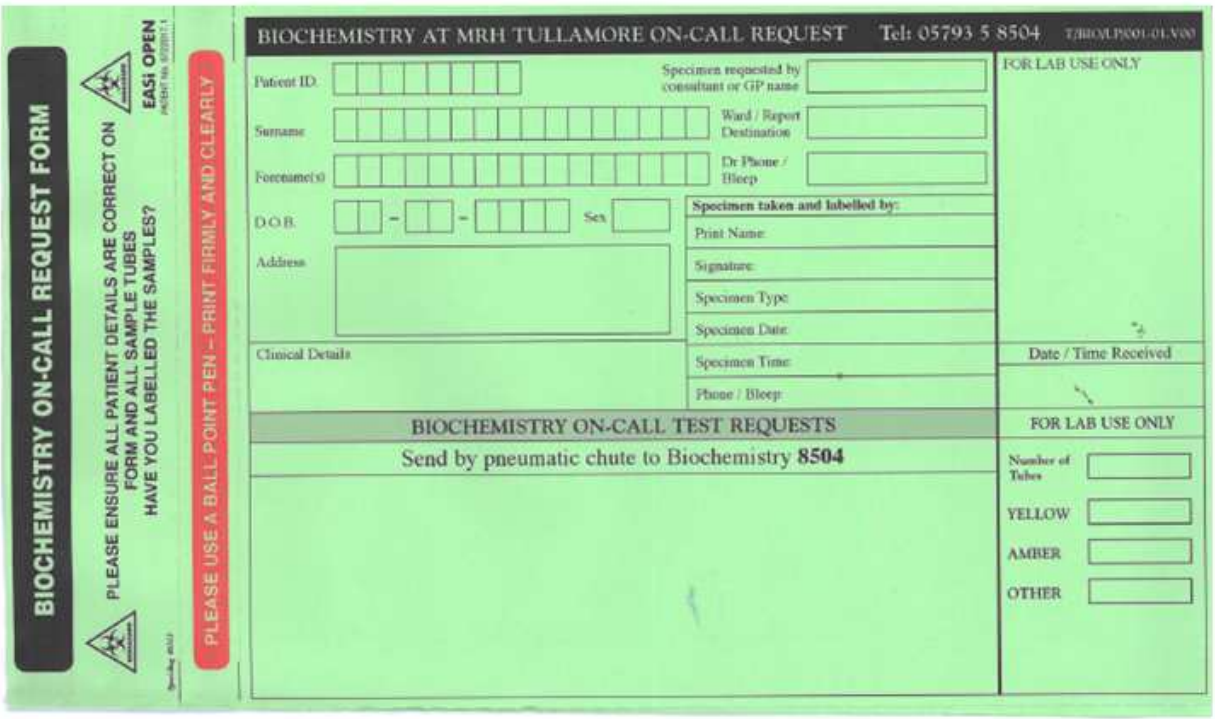
HAEMATOLOGY Tel: 057 93 58351	BIOCHEMISTRY Tel: 057 93 58504	EXTERNAL PLEASE PROVIDE EXTRA SAMPLES Tel: 057 93 58354	
1 EDTA tube (Pink Cap) FBC Retics ESR Infectious Mono. Screen Malaria Screen Platelet clumping: 1 EDTA + 1 ThromboExact	**1 Serum tube (Amber Cap)** Renal Liver Bone Lipid Cardiac TNT NTproBNP 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
COAGULATION Tel: 057 93 58347			**Virus Reference Lab** Hepatitis screen, HIV, CMV, VZV, Measles, Mumps, Toxo *Requests for 'viral screen' must state specific test*
1 Citrate tube (Green Cap) PT/INR APTT Fibrinogen D-Dimer	Glucose (Yellow Cap)	**Multiple Samples are required for MRH Mullingar when both Endocrinology and Immunology tests are required**	**St James Hospital** Testosterone, ENA, Anti CCP, Cardiolipin
			MEDLAB Pathology ANCA, ACE, EPO, Insulin, IF abs, IGF-1, Vit D
			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)



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).

5.5 Sample Requirements for Routine Biochemistry Tests

For laboratory tests that have separate reference ranges for males and females, all ranges quoted on laboratory reports for females are for non- pregnant females

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 heparitoxicity 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
Prolonged use of tourniquet may cause an increase in plasma albumin measurements

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.

Activity is higher in children and in pregnancy.

Chelating anti-coagulants such as EDTA must be avoided. EDTA contaminated samples will not be reported for ALP. Refer to order of draw to prevent EDTA contamination

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.

Delay in sample transport/processing may invalidate the results

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.

Notes / comments: Chelating anti-coagulants such as EDTA must be avoided. EDTA contaminated samples will not be reported for Calcium. Refer to order of draw to prevent contamination.

Separate from clot or cells as soon as possible. Calcium decreases with prolonged exposure to clot.

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

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.
Haemoglobin A1c Results < 20 mmol/mol may not be suitable for diagnosis and monitoring of Diabetes. Consider using alternative measures of glycaemic status e.g. Fructosamine. Consider the possibility of underlying conditions e.g. anaemia. Contact the laboratory to discuss further.

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; consequently, HDL results are of limited diagnostic value. In some patients with abnormal liver function, the HDL-cholesterol result may significantly differ from the designated comparison method result due to the presence of lipoproteins with abnormal lipid distribution. 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 for in house and OPD originating requests. LDH is not included in the liver profile for requests from GP locations. If LDH is required please consult BIO/COM/2025/11 for instructions for correct procedure.

Haemolysis interferes due to release of LDH from erythrocytes.
Separate serum or plasma from clot or cells as soon as possible. Delayed separation may cause increased LDH

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:
Abnormal liver function affects lipid metabolism; consequently LDL results are of limited diagnostic value. In some patients with abnormal liver function, the LDL-cholesterol result is significantly negatively biased 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.
LDH is not part of the LFT profile for requests originating from GP locations. Refer to individual test LDH for additional information.

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

Notes/ comments:
Mg-Chelating anti-coagulants such as EDTA, fluoride or oxalate must be avoided. EDTA contaminated samples will not be reported for Magnesium. Refer to order of draw to prevent contamination

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:
Haemolysis interferes due to potassium release from the erythrocytes.
Potassium is available as part of the renal profile for in house and OPD originating requests. Potassium is not included in the renal profile for requests from GP locations. If potassium is required please consult BIO/COM/2025/12 for instructions for correct procedure.

Unspun samples should NEVER be stored in the fridge when a potassium result is required on a sample. Chelating anti-coagulants such as EDTA must be avoided. EDTA contaminated samples will not be reported for Potassium. Refer to order of draw to prevent contamination.

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

PROCALCITONIN (PCT)

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

Special requirements:
A separate sample is required if a PCT is requested with other biochemistry test requests

Notes / comments: PCT cannot be added on to previously analysed samples

Availability of assay: Monday to Friday 9.00 to 17.00. Saturdays/Sundays/ Bank Holidays 09.00 to 13.30

Reference range: <0.06 ug/L

Additional clinical cut off information: "Procalcitonin < 0.5 ug/L: Local bacterial infection is possible. Systemic infection is unlikely. Low risk for progression to Sepsis; ≥ 0.5 to < 2.0 ug/L: Systemic infection is possible. May progress to Sepsis; ≥ 2.0 to < 10.0 ug/L: Systemic infection is likely. High risk for progression to Sepsis; ≥ 10 ug/L: High likelihood of Sepsis/Sepsis Syndrome/Septic shock."

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

(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

The full NCCP guideline can be accessed at the following link:
https://www.hse.ie/eng/services/list/5/cancer/profinfo/resources/gpreferrals/nccp-prostate-cancer-gpreferral-guideline.pdf

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.
Lipaemia or hyperproteinaemia may cause falsely reduced sodium concentration (pseudohyponatraemia) measured by indirect ion selective electrode method. Na can be measured by direct ion selective electrode method on the blood gas analyser if psudohyponatraemia is suspected.

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: Concentrations increase during pregnancy

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

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: For acute medical setting only

Due to the high sensitive nature of this assay, failure to adhere to the Sarstedt Serum Gel Instructions for "optimal serum yield and sample quality" post blood collection, may reduce sample quality and as a consequence cause high or low TnT fliers.
The limit of Quantification (LoQ) for Roche hsTnT assay is 13 ng/L. Values reported below this may be imprecise – interpret results with caution and in conjunction with clinical history and findings as per ED chest pain pathway

Availability of assay: Daily (24 hours for in-house patients).
For GP requests**:** Prior discussion and consultation with the Biochemistry Department is required. Refer to BIO/COM/2025/10 for details.

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.

25 OH Vitamin D

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

Special requirements: Include appropriate clinical details with the request. Sample must be sent on the same day it is taken

Notes / comments: For GP requests the biochemistry department implements the recommendations of the HSE Laboratory Service Reform Programme Advice Note (2024) "Indications for Measurement of Vitamin D Levels". The advice note can be accessed at

https://www.hse.ie/eng/about/who/cspd/lsr/resources/indications-for-measurement-of-vitamin-d-levels.pdf

Where Vitamin D request is appropriate the minimum testing interval after supplementation is 3 months.

Availability of assay: Monday to Friday 9.00 to 17.00 (Excluding bank holidays)

Reference range: 51-250 nmol/L.

25 OH VITAMIN D: <30 nmol/L: Suggests Vitamin D deficiency.
25 OH VITAMIN D: 30-50 nmol/L: Suggests Vitamin D insufficiency.
25 OH VITAMIN D: >50 nmol/L: Suggests normal Vitamin D status
25 OH VITAMIN D: >250 nmol/L: A risk of vitamin D toxicity in adults ingesting substantial amounts of calcium

5.6 Sample Requirements for Urine Biochemistry Tests

(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. (excluding bank holidays)

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

5.7 Sample Requirements for Biochemistry CSF 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

5.8 Sample Requirements for Biochemistry Fluid Tests

Fluid Total Protein/ Albumin/LDH/Amylase

Specimen type / container: MSU container/Sterile Container (Theatre originating Fluids).

Special requirements: None.

Notes / comments: Haemolysis invalidates LDH result

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

Reference Range: No reference ranges available for fluid assays

Fluid Glucose

Specimen type / container: Yellow top Sarstedt Monovette (Fluoride/oxalate)

Special requirements: None

Notes / comments: None

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

Reference Range: No reference range available

5.9 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.

The laboratory must be contacted directly for all Critical samples.

Test name/profile	Routine	Priority	Critical
Routine biochemistry (in-house patients) e.g. Renal/liver/bone	6 hrs	2 hrs	1 hr
Troponin t	3 hrs	2 hrs	1 hr
Gentamicin/vancomycin	3 hrs	2 hrs	N/a
Gp samples*	Same day	3 hrs	N/a
Tumour markers*	6 hrs	N/a	N/a
Hba1c*	6 hrs	N/a	N/a
Procalcitonin	Same day	N/a	N/a
25 oh vitamin d	Up to 3 days	N/a	N/a

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

5.10 Biochemistry Additional Testing

The time limit for add on requests is based on the stability of the analyte in the stored previously analysed sample. There is no requirement to phone the Biochemistry Department to request an in house add- on test request. A new written request should be made using the appropriate request form. Once the add- on request is received the sample will be checked to ensure its remaining volume is sufficient for the add- on request. The stability of the test being added on to the stored previously analysed sample is checked to ensure it is still viable and stable. Where an add-on request cannot be processed due to insufficient remaining sample or test is no longer stable in the stored sample a report will be issued to that effect. Where an add on test is critical a phone call can be made to the Biochemistry Department to prioritise the request but must be followed with the appropriate add- on request form.

Several tests cannot be added on to a previously analysed and/or opened sample. This is due to either evaporation effects such as is the case for ethanol and bicarbonate or carryover effects such as is the case for HCG-B and Procalcitonin. Samples that have many analytes marked as "haemolysed" on the original report will inevitably be unsuitable for most add-on requests.

Test for which a new sample is required:

- Ethanol
- Bicarbonate
- HCG-B
- Procalcitonin

5.11 Biochemistry Sample Retention Times

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

5.11 Biochemistry Quality Assurance

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

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. Ethanol Programme 6. Cardiac Programme 7. Immunoassay Speciality II
IEQAS (Labquality)	1. Urine Drugs of Abuse

Section 6.

Blood Bank

6.0 Blood Bank

6.1 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 correctly investigated as early as possible. 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 on **Q-Pulse**, search using "HVBT". In addition, prompt guides for Haemovigilance are available on the **MEG app (medicines e-guide)** under "Haemovigilance". This app is available on clinical PCs or is available to download to mobile devices. Contact HVO for more information.

We advocate the use of the Electronic BloodTrack System (EBTS) for labelling all Blood Transfusion samples.

6.2 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

6.3 Hours of Operation and Contact Details

Monday – Friday (excluding Public Holidays)		
Departmental Address	**Routine hours**	**Contact Details**
Blood Transfusion, MRHT, Tullamore, Co Offaly, Ireland. R35 NY51	**Core Hours** 09:00-17:00hrs (Full Operational Service)	057-93**58385** **or** 057-93**58386** **Fax Number:** 057-9359395
	Extended Working day 08:00 - 20:00hrs (Reduced Services outside of Core Hours)	
	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	**Contact via switchboard** Internal Ext 3000 EXT 8888 in Reception staff can call in event of a Life-Threatening Haemorrhage. External 057-932 1501
***Routine Workload Cut-off:** • All GP and in-house/OPD routine samples must be receipted in the Blood Bank by 4pm. • Routine samples arriving after the stated deadlines may not be processed until the next routine working day.		
Saturdays, Sundays and Public Holidays		
	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.	**Contact via switchboard** Internal Ext 3000 External 057-932 1501

Blood Bank Personnel	Contact Name	Contact Details
Consultant Haematologist	Dr Kanthi Perera	057 93**59250** (Secretary) Consultant Haematologist on-call can be contacted through reception Ext. 3000 meegahage.perera@hse.ie
	Haematology Medical Team	Contact via switchboard Ext.**3000**
Chief Medical Scientist Blood Bank	Ms Bernie Weston	057 93**58384** bernie.weston@hse.ie
Senior Medical Scientist	Ms. Suzanne Barrow	057-93**58385** suzanne.barrow@hse.ie
Senior Medical Scientist-Quality	Ms. Patrice Minnock	057-93**58385** patrice.minnock@hse.ie
Haemovigilance Officer	Ms. Denise Murphy	057-93**58350** or **Bleep 290** denisej.murphy@hse.ie

6.4 General Information

6.4.1 Preferred Sample Type

- 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 aid 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.

6.4.2 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)	Turnaround 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	2 x 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)	AIHA	EDTA	2 x 7.5	24hrs or sent to NBC-IBTS (5 working days)
Weak D Genotyping Extended RBC Genotyping Molecular Investigation for other Blood Groups		EDTA	≥ 3ml (Note samples MUST be stored at Room Temperature)	14 Days 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 1.2ml 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.

6.4.3 Turnaround Time (TAT)

- **Cut-off time for OPD same day reporting**: Receipt of arrival in the Blood Bank by 16:00.
- **Patient samples with complex antibodies may not be completed on the same day.**
- Estimated turnaround times for testing are recorded in Section 6.4.2. See Section 6.5.7 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.
- Patient's on specific treatment e.g. Daratumumab, a therapeutic human monoclonal antibody for the treatment of Multiple Myeloma, require samples to be sent to the IBTS for antibody investigation and crossmatch of red cells. This will delay the routine expected turnaround time and the samples will be processed in line with the IBTS turnaround time of 8 hours.

6.4.4 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.
- In exceptional circumstances, the 72 hour rule may be extended on approval by the Consultant Haematologist, where testing is performed in the IBTS e.g. patient's with auto-antibodies.
- The validity of BT samples can now be checked on ward lookup or phone the Blood Bank to determine validity if necessary.

6.4.5 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) available in the Clinical Area
- The validity of BT samples can now be checked on ward lookup or phone the Blood Bank to determine validity if necessary.

6.4.6 Confirm Group Sample Requirements

- A Confirm Group sample will be required for all patients requiring blood/blood products who present with no previous Blood Transfusion history in this hospital if 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.

6.4.7 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 (5 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.
- **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.

Important

1. **Patients with known antibodies: These patients** should have a blood transfusion sample sent to the blood bank 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.

6.4.8 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 on Q-Pulse, search using "HVBT". In Addition prompt guides for Haemovigilance are available on the MEG app (medicines e-guide) under "Haemovigilance". This app is available on clinical PCs or is available to download to mobile devices. Contact HVO for more information.

6.4.9 Technical Advice

- Advice on sample requirements and test procedures can be obtained from the Blood Bank.
- Medical Scientific staff (within their capacity) 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.

6.4.10 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 and reporting of Serious Adverse Reactions, Serious Adverse Events, Near Misses and Wrong Blood in Tube events as mandated by the National Haemovigilance Office.
- The HVO is responsible for the development of guidelines for transfusion practise and provision of education for collectors, medical and nursing staff relating to current transfusion practice.
- The HVO is responsible for training of clinical staff within their capacity. This includes training for use of Electronic Blood Tracking System devices and provision of access to the system.
- Other functions of haemovigilance include traceability of blood components, auditing transfusion practice.
- Organising of the Hospital Transfusion Committee
- In conjunction with Medical Scientist in BT the HVO has a responsibility to follow up look back and recalls of components & products if requested to do so by the IBTS.
- The HVO provides clinical advice under the direction of the Consultant Haematologist.
- A guideline on the function of the HVO is available on Q-Pulse reference – T/HVBT/GL/034
- Refer to section 6.3 for contact details.

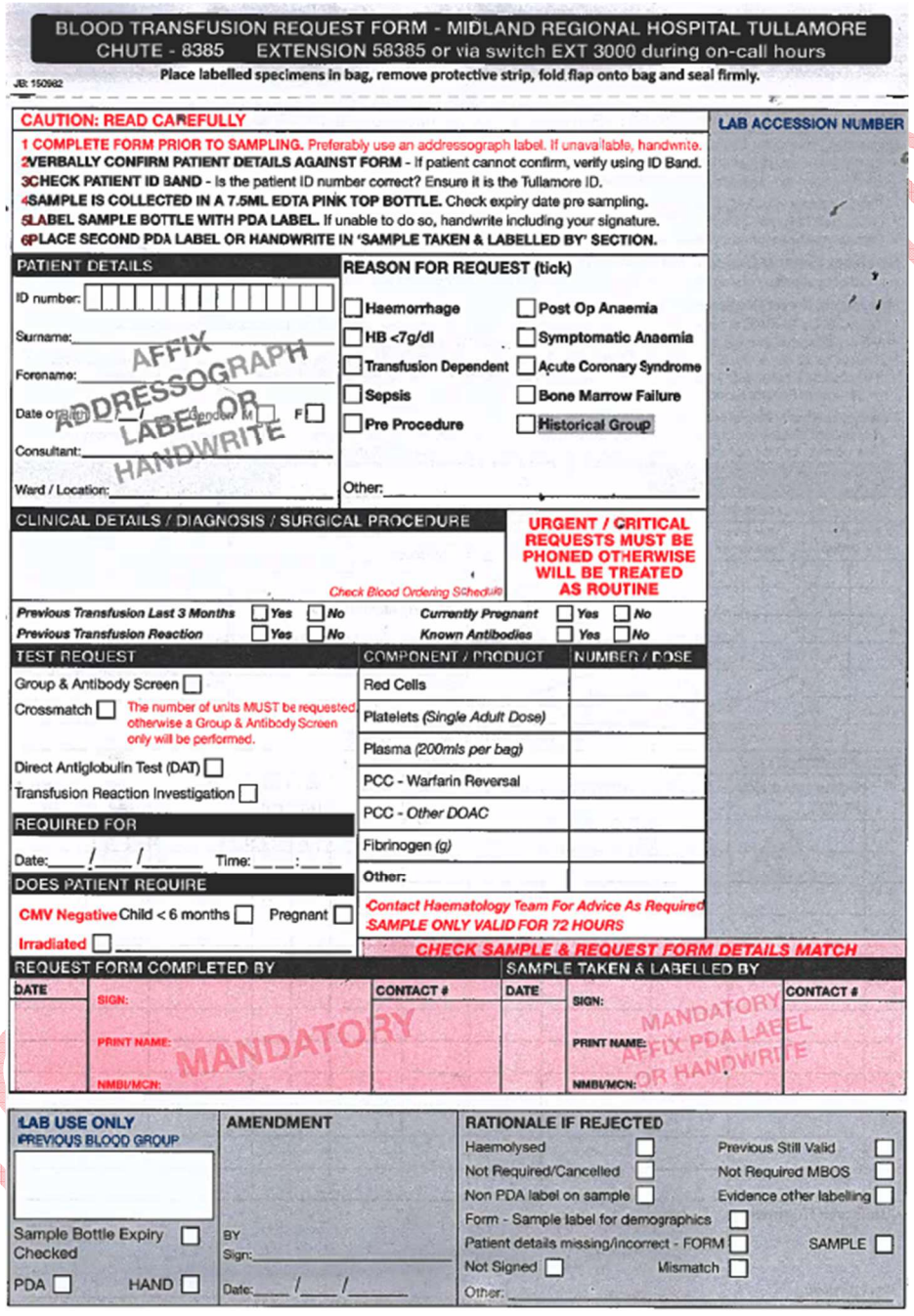
6.5 Pre-Transfusion Testing Information

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.

6.5.1 Completion of the Blood Transfusion 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.



BLOOD TRANSFUSION REQUEST FORM - MIDLAND REGIONAL HOSPITAL TULLAMORE
CHUTE - 8385 EXTENSION 58385 or via switch EXT 3000 during on-call hours
Place labelled specimens in bag, remove protective strip, fold flap onto bag and seal firmly.

CAUTION: READ CAREFULLY
1 COMPLETE FORM PRIOR TO SAMPLING. Preferably use an addressograph label. If unavailable, handwrite.
2 VERBALLY CONFIRM PATIENT DETAILS AGAINST FORM - If patient cannot confirm, verify using ID Band.
3 CHECK PATIENT ID BAND - Is the patient ID number correct? Ensure it is the Tullamore ID.
4 SAMPLE IS COLLECTED IN A 7.5ML EDTA PINK TOP BOTTLE. Check expiry date pre sampling.
5 LABEL SAMPLE BOTTLE WITH PDA LABEL. If unable to do so, handwrite including your signature.
6 PLACE SECOND PDA LABEL OR HANDWRITE IN 'SAMPLE TAKEN & LABELLED BY' SECTION.

LAB ACCESSION NUMBER

PATIENT DETAILS
ID number:
Surname:
Forename:
Date of Birth: / / Gender M F
Consultant:
Ward / Location:
AFFIX ADDRESSOGRAPH LABEL OR HANDWRITE

REASON FOR REQUEST (tick)
Haemorrhage | Post Op Anaemia
HB <7g/dl | Symptomatic Anaemia
Transfusion Dependent | Acute Coronary Syndrome
Sepsis | Bone Marrow Failure
Pre Procedure | Historical Group
Other:

CLINICAL DETAILS / DIAGNOSIS / SURGICAL PROCEDURE
Check Blood Ordering Schedule

URGENT / CRITICAL REQUESTS MUST BE PHONED OTHERWISE WILL BE TREATED AS ROUTINE

Previous Transfusion Last 3 Months Yes No
Previous Transfusion Reaction Yes No
Currently Pregnant Yes No
Known Antibodies Yes No

TEST REQUEST	COMPONENT / PRODUCT	NUMBER / DOSE
Group & Antibody Screen	Red Cells	
Crossmatch (The number of units MUST be requested otherwise a Group & Antibody Screen only will be performed.)	Platelets (Single Adult Dose)	
Direct Antiglobulin Test (DAT)	Plasma (200mls per bag)	
Transfusion Reaction Investigation	PCC - Warfarin Reversal	
	PCC - Other DOAC	
	Fibrinogen (g)	
	Other:	

REQUIRED FOR
Date: / / Time: :

DOES PATIENT REQUIRE
CMV Negative Child < 6 months Pregnant
Irradiated

Contact Haematology Team For Advice As Required
SAMPLE ONLY VALID FOR 72 HOURS

CHECK SAMPLE & REQUEST FORM DETAILS MATCH

REQUEST FORM COMPLETED BY			SAMPLE TAKEN & LABELLED BY		
DATE	SIGN: PRINT NAME: NMBI/MCN: MANDATORY	CONTACT #	DATE	SIGN: PRINT NAME: NMBI/MCN: MANDATORY AFFIX PDA LABEL OR HANDWRITE	CONTACT #

LAB USE ONLY
PREVIOUS BLOOD GROUP
Sample Bottle Expiry Checked
PDA HAND

AMENDMENT
BY
Sign:
Date: / /

RATIONALE IF REJECTED
Haemolysed | Previous Still Valid
Not Required/Cancelled | Not Required MBOS
Non PDA label on sample | Evidence other labelling
Form - Sample label for demographics
Patient details missing/incorrect - FORM | SAMPLE
Not Signed | Mismatch
Other:

The above request form is document controlled and subject to change. For current version see Q-Pulse.

- 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 including the pre-printed sample labels**.

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). These requests are the responsibility of the person requesting the test. (see point 6.5.2)
16. Time/Date Test 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.

6.5.2 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. Available on Q-Pulse or MEG app.

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 are 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 HSCT 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.

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 X-Ray irradiation kills any remaining lymphocytes in these products, which might otherwise cause TA-GVHD in susceptible patients.

Irradiated blood components are recommended for specific patient groups as outlined in table below.

INDICATIONS FOR IRRADIATED BLOOD COMPONENTS
POTENTIAL RECIPIENTS OF ALLOGENIC HSCT from Day 1 of conditioning
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
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 7 days prior to harvest and **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/Exchange transfusions of the newborn: Up to 6 months after expected delivery date (40 weeks gestation). 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.

6.5.3 Sample Collection

- **Only one patient is bled at a time to minimise 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 the 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 you must never loan your ID card 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 or on MEG app)**.
- For training on BT sampling or access to use BloodTrack contact the Haemovigilance Officer or Blood Bank, refer to section 6.3 for contact details.

6.5.4 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.

6.5.5 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)

6.5.6 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 /wrote out the request form and request that they attend the Blood Transfusion Laboratory to 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.
- **The Blood Bank has a zero-tolerance policy on amendments for the 3 core identifiers i.e. Name, DOB and Patient ID**

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. Sample labelled with computer generated label (Blood Track PDA generated label is the only label accepted on BT samples)
5. No signature on the sample of the person who took the sample
6. No sample date/time on either form/sample
7. Sample unsuitable *e.g.* gross haemolysis
8. Sample showing evidence of breakage or leaking
9. Sample insufficient volume (dependent on test requests)
10. Sample greater than 24 hours' old
11. Incorrect sample type
12. Expired sample bottle
13. 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.

6.5.7 Emergency Situations Including Sampling

Critical Samples (e.g. life threatening 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/unknown patients:

The minimum information on the transfusion sample must be:

- Surname: Unknown
- Forename: Unknown
- Gender of patient
- Patient Identification (PID) Number
- DOB: 01/01/1900
- Signature of person who took the sample
- If there are multiple unknown patients presenting at the one time, these patients will be identified as UnknownOne, UnknownTwo etc. on arrival and entered on iPMS as such.

If the patient DOB is unknown, the iPMS system will default to 01/01/1900.

Note: All patients are assigned a PID number at 'check in' in the Emergency Department, even in the case of iPMS downtime.

- 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.
30-40 mins	Issue of Plasma	Issue of max 4 Group compatible LG-Octaplas Units.
5-10 mins	Issue of Platelets	1 bag of B Rh (D) Neg/ A Rh (D) Neg in PAS, non-high titre, CMV Neg on stand-by (if available from IBTS) for immediate issue in emergency situations
2-3 hours	Issue of additional Platelets	Additional bags of platelets must be ordered from the IBTS, delivered and issued
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.

6.5.8 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.

6.5.9 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.

6.5.10 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 Rh (D) Positive blood for an Rh (D) Negative patient who would normally be excluded from receiving Rh (D) 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 autoimmune haemolytic anaemia (AIHA) 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.

6.6 Information on Components and Products

6.6.1 Consent and Blood Transfusion Information Leaflet

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**. If obtained the verbal consent should be documented on the patient's Blood Transfusion Prescription Record Sheet (BTPRS) and/or healthcare record. Tick boxes are located on the BTPRS for documenting provision of an information leaflet and gaining of verbal consent.

There is a legal and ethical duty to involve patients in decision making. All patients have a fundamental legal and ethical right to consent to or refuse treatment. For guidance healthcare workers must refer to the **HSE National Consent Policy** for direction in relation to consent or refusal of treatment.

Specific points to consider in relation to transfusion are

- The rationale, risks and benefits.
- Does the patient understand the information?
- an interpreter to translate the information leaflets can be requested where the patient is unable to understand the leaflet (i.e. language).

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

The **Patient Information Leaflet (PIL)** can be used to support the conversation around consent. Leaflets are available in the clinical areas (inform the HVO or BT lab if you require additional leaflets). In addition, the PIL is available in a number of languages at https://www.hse.ie/eng/services/publications/hospitals/blood-transfusion-leaflets.html

There are circumstances when obtaining verbal consent and issuing a PIL may not be practicable or required e.g.

- Unconscious/impaired patients who are unable to consent but where possible next of kin/parent/guardian in attendance should be advised of the plan of care.
- Patients who are regular transfusion recipients and receive blood as part of their maintenance therapy do not require to be re-issued with a PIL on every transfusion episode but should be offered to the patient at least every three months. Verbal consent should be obtained each time. The patient management plan should be readily accessible in the patient health care record e.g., haematology targets.

Alert! Patients should be made aware they can no longer donate blood if they have been transfused.

It is recommended the GP is notified of any transfusions in the GP discharge summary.

Day Patients discharged from hospital following a transfusion should have a Patient Information Leaflet and information regarding hospital contact numbers in the event of a suspected reaction.

6.6.2 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 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.

6.6.3 Maximum Blood Ordering Schedule (MSBOS) & Blood Stock Management

- The MSBOS for the hospital are currently available for
- General Surgical
- Orthopaedics
- Ear Nose and Throat (ENT).
- Check Q-Pulse or MEG app 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 limited and precious resource of blood.

6.6.4 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.

6.6.5 Additional Test Requests

- **Additional requests for blood components/products after the initial pre transfusion sample is sent to the Blood Bank** (*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 send it to the Blood Bank 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.

6.6.6 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 Bank. 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.

6.6.7 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. Factor Concentrates 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 the completed label in an envelope marked ***Blood Transfusion Laboratory*** and return to the Blood Bank.

6.6.8 Red Cell (RC) – Information

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

RC is ordered from the Blood Bank by completing in full a Blood Transfusion request form and providing a correctly filled and labelled 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 check sample validity on ward look up first or phone Blood Bank if unsure before taking a sample from a patient.

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

- **Transfusion Associated Circulatory Overload – TACO** is defined as acute or worsening respiratory compromise and/or acute or worsening pulmonary oedema during or up to 12 hours after transfusion, with additional features including cardiovascular system changes not explained by the patient's underlying medical condition, evidence of fluid overload and a relevant biomarker. Identifying risk factors for TACO prior to transfusion allows initiation of appropriate mitigating measures. TACO reactions are potentially preventable. Single unit red cell transfusions are recommended where possible, especially in non-bleeding patients (BSH 2017). Paediatric and child transfusions should be prescribed in mls.

Further information is available in guideline T/HVBT/GL/006 – "The Administration of Blood Components and Products" or on the MEG app.

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 Red Cells (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 RC/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.

6.6.9 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 and MEG app.
- 1 bag of B Rh (D) Neg/A Rh (D) Neg Platelets in PAS, non-high titre, CMV negative are reserved on stand-by (if available from the IBTS) for immediate issue in emergency major haemorrhage situations. Non-urgent/additional bags of platelets must be ordered from the 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 labelled 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. It is best practice to issue platelets and other products on a valid sample, however they may still be issued on a sample number up to 1 month after receipt in the laboratory.
- 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 kg dose is 10-20 mls/kg but seek Haematologist advice. If a Life Threatening Bleed, 10ml/kg Platelets for every 20ml/kg of RC transfused.
- 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.
- For routine platelet orders, allow a minimum of 3 hours for transportation and issue.
- The stand-by emergency bag of platelets can be issued within 5-10 minutes.
- 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.**

6.6.10 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 and MEG app.

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.
- 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 a laboratory controlled fridge.
- It is advisable to repeat the coagulation screen post infusion of plasma products.

6.6.11 Fibrinogen

The Fibrinogen concentrate available in MRHT is subject to change. At the time of this document release it is Fibryga. Information is updated if the product changes. See T/HVBT/GL/007 "The use of Factor Concentrates" or the MEG app and the product information leaflet supplied with the fibrinogen concentrate. Fibrinogen is indicated for the treatment of patients with acquired hypofibrinogenaemia, for example, in patients with disseminated intravascular coagulation, severe blood loss, or failure of hepatic synthesis.

Dosage:

- 1 g of Fibrinogen concentrate will raise plasma fibrinogen by 0.25g/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).

6.6.12 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 with prompt guides for PCC & Fibrinogen available on the MEG app.

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. Fibryga)	➢ 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

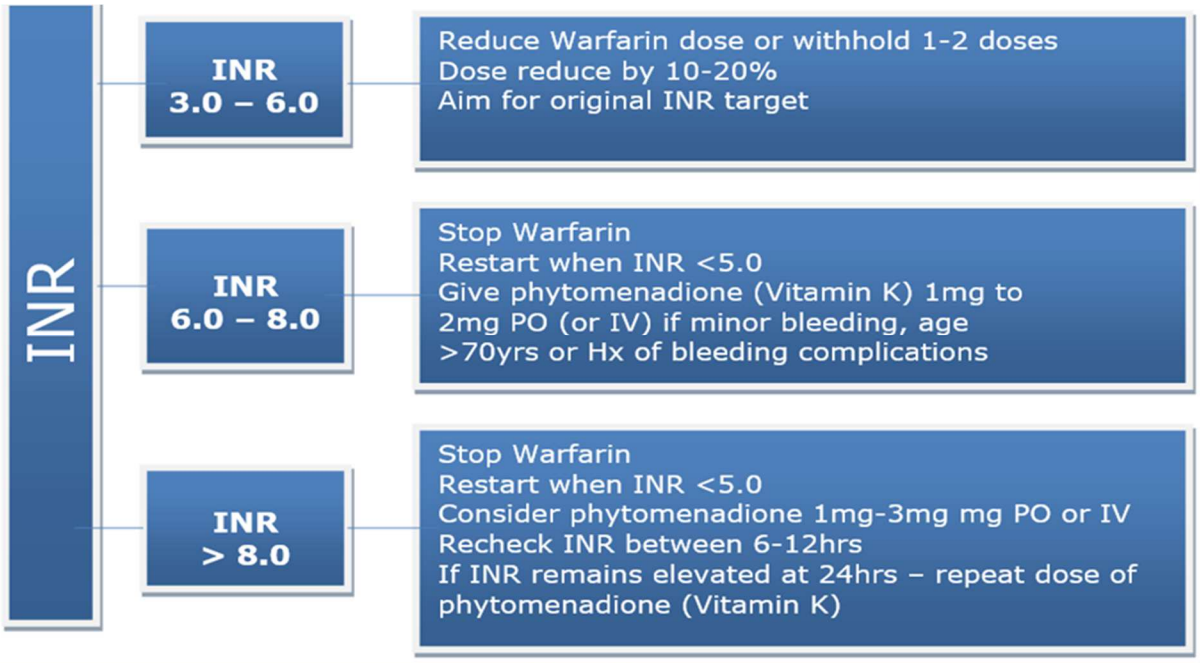
*Prothrombin Complex Concentrate (Octaplex) is currently the product of choice for the reversal of the effects of Warfarin. Off licence use of PCC may be recommended for major haemorrhage, secondary to a Direct Oral Anticoagulant (i.e. Anti Xa inhibitor only) in life threatening/major bleed but seek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

6.6.13 Recommendations for Reversal of Warfarin

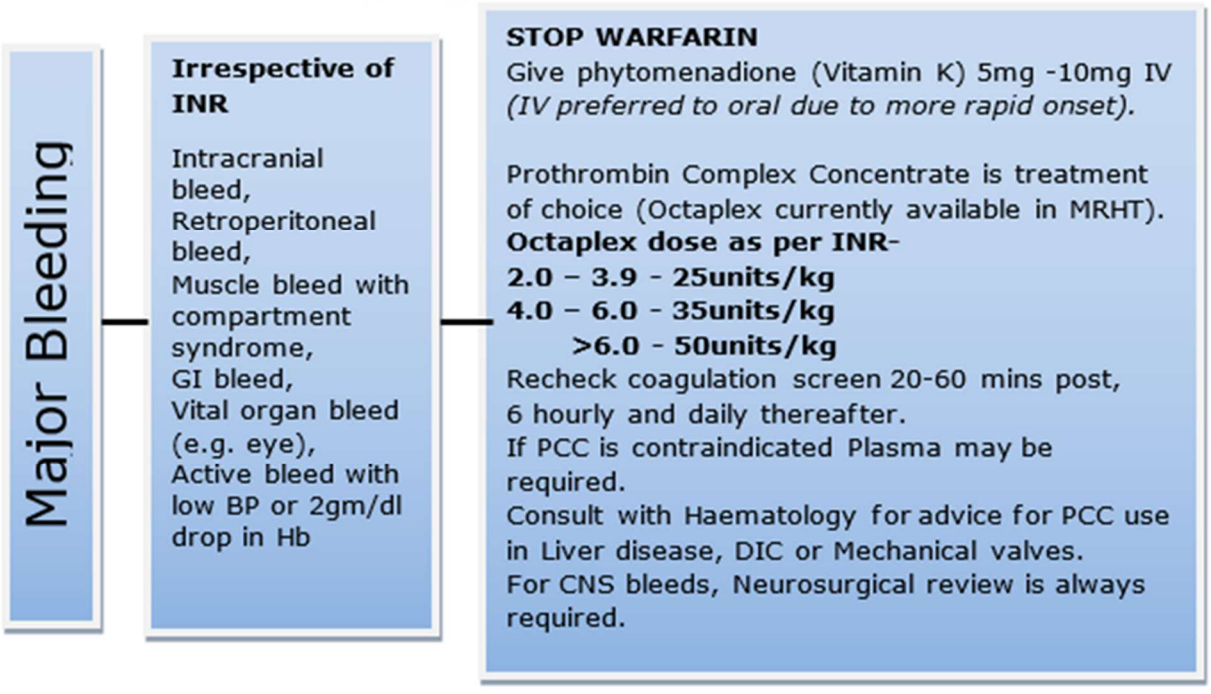
Full guideline "The Use of Factor Concentrates" is available on Q Pulse & Quick guide on e-MEG. The following are extracts from the guideline

ELEVATED INR – NONE or MINOR BLEEDING

(Minor epistaxis is considered non major 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 phytomenadione (Vitamin K) **5mg PO or IV.**

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 for 18 to 24 hours reverse anticoagulation with phytomenadione (Vitamin K) 2mg – 5mg IV or PO to reduce INR to <1.5. Should start to work in 6 hours from administration.

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

Discuss with Haematology.

Repeat Coag screen pre surgical intervention.

6.6.14 Requests for Albumin

- Indications for Albumin use are detailed in Guideline T/HVBT/GL/006 "The Administration of Blood Components and Products", current revision and on MEG app.
- **Indications 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 Department)
  - 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.

6.6.15 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 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.

6.6.16 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.

6.6.17 Active Bleeding & Life Threatening Haemorrhage

Major haemorrhage is a clinical emergency that results in morbidity and mortality: practice guidance is important to reduce these risks (Stanworth et al 2022). Early recognition and commencing appropriate management as soon as possible is the goal.

Terms commonly used to describe **life threatening haemorrhage (LTH)** and which are used interchangeably are massive haemorrhage or major haemorrhage. Due to inconsistency in definitions, the National Guideline Development Group (GDG) have chosen to adopt the term life threatening haemorrhage (LTH) which implies less ambiguity as to the level of blood loss observed (NCEC 2022).

There are many **definitions of "Massive Haemorrhage**" usually based on the 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 ≤ 3 hours.

However these do not necessarily assist prompt recognition of a LTH and some prefer a definition based on clinical status i.e. Life threatening haemorrhage is associated with clinical features including tachycardia (>110 beats per minute), hypotension (<90mmHg systolic blood pressure) or significant change in vital signs from baseline and suggests a sudden loss of at least 50% of blood volume.

Guideline **T/HVBT/GL/014** "Active Bleeding & Life Threatening Haemorrhage" is available on Q-Pulse. The posters for Acute Massive/Major Blood Loss Template are displayed in the relevant clinical areas and are available on the MEG App

- In the event of a Life Threatening Haemorrhage, contact Blood Transfusion Medical Scientist immediately. This is done directly by phone / pager / or via switchboard.
- Activation of "CODE RED" is explained in the guideline and on the relevant posters.
- Contacting key personnel is explained in the guideline and on the relevant posters.

6.6.18 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 and prompt guide is available on the MEG App. This lists signs and symptoms, causes, management and investigations required. If further advice is required, contact the Consultant Haematologist(s)/Registrar for advice (via the switch board).

Depending on the type of reaction, actions/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
- BNP for Suspected Transfusion Associated Overloads (TACO)
- Further investigations as per Haematologist and Transfusion Medical Scientist's instruction.
- All Serious Adverse Reactions must be reported to the Haemovigilance Officer directly or by informing a Medical Scientist.

6.7 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.

6.8 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 Rh (D) grouping 2. Antibody Detection 3. Antibody Identification 4. Antigen-typing 5. DAT 6. Crossmatching

6.9 Blood Transfusion Costs

Average cost per unit/bag/vial of Blood Components/Products in 2025.

Products	2025
RCC	€339
Platelets	€698
Plasma	€116
PCC (Octaplex)	€382
Fibrinogen (Fibryga)	€460
Alb (Flexibumin)**20%**	€78
Alb (Flexibumin) **5%**	€97

Subject to change

These costs are for individual products only and do not take into consideration staffing, transportation, reagents and overheads. Out of hours/on-call testing and investigations performed in the IBTS are a significant expense and should only be requested on the recommendation of the Haematology Team.

Section 7.

EXTERNAL TESTS

7.0 External Tests

7.1 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

7.2 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.

7.3 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 4.14** 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**).

7.4 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 7.6** for individual test requirements.
Refer to **Section 4.14** 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.

7.5 Sample Rejection

Laboratory staff are only authorised to accept samples which meet with the required labelling criteria. Please refer to **Section 4.15** of the **General Information Section** of this manual for further information.

7.6 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	Spin, separate & freeze <4hrs	N/A
ACTH (adrinocorticotrophic hormone)	2xEDTA: pink 2.7ml	Patient fasting. Bring samples to lab on ice. Spin, separate & freeze.	N/A
Adalimumab Abs (Humira)	1xSerum: amber 4.9ml	Spin, separate & freeze	N/A
Adalimumab level (Humira)	1xSerum: amber 4.9ml	None	N/A
ADAMTS 13 /Anti ADAMTS antibodies (inhibitory activity)	2xCitrate: green 3ml (sent to St James Hospital)	Completed ADAMTS13 Activity Request Form. Samples sent either as: 1) 2x un-centrifuged citrated samples dispatched by 1 pm same day as collection. 2) If later than 1pm. Immediately: Spin spec at 2000rpm / 10mins. Separate and spin again at 2000rpm /15mins. Separate avoiding buffy coat and put into 4 x 150µl (min) aliquots. Freeze at -70°C and transport frozen.	Must be discussed with Consultant Haematology Team at MRHT prior to sending
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
Aldolase	1 x Serum: amber 4.9ml	Refrigerated	N/A
Aldosterone (recumbant & standing)	2xEDTA: pink 2.7ml	Patient 45 min recumbent, 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 recumbent, 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

Referred Test	Sample	Special Requirements	Test Restricted to:
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
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
Amikacin level	1xSerum: amber 4.9ml	Send urgently by taxi to Eurofins Biomnis. 8 hour turnaround time	N/A
Amino Acids	1xLithium heparin: orange 2.7ml Or MSU	Spin, separate and freeze plasma immediately. Urine must be frozen immediately. pH urine before freezing	N/A
Aminophylline level	1xSerum: amber 4.9ml	None	N/A
Amiodarone (Cordarone)	1xSerum: WHITE Tube (no gel)	Spin, separate and freeze serum <4hrs	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

Referred Test	Sample	Special Requirements	Test Restricted to:
ANCA & 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	Antenatal form from Mullingar	N/A
Anti B19 (Parvovirus)	1xSerum: amber 4.9ml	None	N/A
Anti Cardiolipin antibodies	1xSerum: amber 4.9ml	None	N/A
Anti CCP (anti cyclic citrullinated peptide)	1xSerum: amber 4.9ml	None	N/A
Anti ganglioside antibodies	1xSerum: amber 4.9ml	None	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-Phospholipid A2 Receptor antibodies (PLA2R)	1xSerum: amber 4.9ml	None	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. SJH Thrombophilia screen/lupus anticoagulation request from required.	N/A
Anti trypsin level	1xSerum: amber 4.9ml	None	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
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. Hand delivery only to lab	Consultant Haematologist
APCR (Activated protein C resistance). See thrombophilia screen.	2xEDTA: pink 2.7ml 6xCitrate: green 3ml 1xSerum: amber 4.9ml	Must reach SJH same day. Test usually requested with Factor V Leiden. SJH Thrombophilia screen/lupus anticoagulation request from required.	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
Atypical HUS screen (Hemolytic Uremic Syndrome)	3 x Transfusion EDTA 7.5 ml 2 x 7ml Serum: amber	Send to Laboratory without delay 1 EDTA & 2serum spun 2,000g for 15 min, freeze aliquoted plasma and serum 2 EDTA – send at room temperature, do NOT freeze Combined aHUS Lab Diagnostics Request form to be completed	Must be discussed with Consultant Haematology Team at MRHT prior to sending
B12 level	1xSerum: amber 4.9ml	MRHM Vitamin/Folate B12 clinical indication form required for GP requests.	N/A
B2 Microglobulin	1xSerum: amber 4.9ml	None	N/A
B2-Glycoprotein I	1xSerum: amber 4.9ml	None	N/A
Bartonella antibodies (cat scratch)	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 D Glucan	1xSerum: amber 4.9ml	Requesting Clinician MUST complete SJH Fungal Biomarkers Request Form	N/A
Beta HCG (serum)	1xSerum: amber 4.9ml	None	N/A
Bile acids (Bile salts)	1xSerum: amber 4.9ml	None	N/A
BK virus (polyoma)	1xSerum: amber 4.9ml 1xUrine MSU	Send to Laboratory without delay Spin, separate, freeze serum. Freeze urine.	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Blood transfusion investigation	2xEDTA: white/red7.5 ml	Contact MRHT Blood Transfusion Laboratory	IBTS
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	Spin, separate and freeze	N/A
C1 Esterase inhibitor	1xSerum: amber 4.9ml	None	N/A
C3 & C4 Complement	1xSerum: amber 4.9ml	None	N/A
Calcitonin	1xSerum: amber 4.9ml	Send to Laboratory without delay. Spin, separate and freeze	N/A
Calprotectin	Random faeces	Please indicate date and time of sample Send individual sample and request form for Calprotectin requests	N/A
Carbamazepine level (Tegretol)	1xSerum: amber 4.9ml	None	N/A
Cardiolipin antibodies	1xSerum: amber 4.9ml	None	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Carnitine (free and total)	2xLith Heparin: orange 2.7ml	Spin, separate and freeze <1hr	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 – acidified with HCL (10ml of 0.1NHCL added.)	pH & volume noted. 2x Biomnis Urine tube: brown top. Freeze	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	N/A
CF common mutations	2x EDTA: Pink 2.7 ml	Consent form needed	Consultant
CFTR mutation (sent to cytogenetics in Crumlin as part of acute pancreatitis screen)	2xEDTA: pink 2.7 ml	Consent form needed.	Consultant
CH100/CH50	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 trachomatis/Neisseria gonorrhoeae	Urine collected in Aptima Device	Aptima containers stored in Microbiology Laboratory	N/A
Chlamydia pneumoniae	BAL/ Sputa/ Lower respiratiory tract specimens	None	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
Chlorpromazine (Largactil)	1 x Serum: white 7.5ml	Spin & freeze<4hrs State time and strength of last dose. Do not use gel 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	

Referred Test	Sample	Special Requirements	Test Restricted to:
Chromosomal Analysis	1xLithium heparin: orange 2.7ml	Send Ambient. Medical history required. Eurofins Genetic test request form required	N/A
Chromosome studies	Depend on test specified	Please specify test	N/A
Citrate (Urinary)	24 hr Urine Non acidified	Volume noted. 2x Biomnis Urine tube: brown top. Frozen	N/A
CLL (FISH)	2 x EDTA: pink 2.7ml + 1 x Lith Hep: Orange 2.7 ml	None	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
Colorectal Molecular Panel	FFPE block	Colorectal malignant diagnosis	Must be discussed with Oncology/Consultant Pathologist at MRHT prior to sending
Copper level	1xSerum: amber 4.9ml 24 hr urine(acid washed bottle)	Separate serum from gel. Decant urine into Trace Metal bottles before sending.	N/A
Cordarone (amiodarone)	1xSerum: WHITE Tube (no gel)	Spin, separate and freeze serum <4hrs	N/A
Cortisol 24hr urinary	24 hr Urine (non-acidified)	Refrigerated. 2x Biomnis Urine tube: brown top.	N/A
Cortisol level	1xSerum: amber 4.9ml	Must specify sample time.	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

Referred Test	Sample	Special Requirements	Test Restricted to:
Crithidia	1xSerum: amber 4.9ml	None	N/A
Cryptococcus neoformans	1xSerum: amber 4.9ml or CSF	Send same day to Micro Lab, CSF bench SJH (discuss with Consultant Microbiologist)	SJH Consultant Microbiologist
CSF for Oligoclonal Bands	1xSerum: amber 4.9ml and CSF (minimum 300µl)	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
Cystine (Urinary)	MSU	Fasting, Freeze <1hr 2x Biomnis Urine tube: brown top.	N/A
Cytogenetics on tissue/bone marrow	Bone Marrow Aspirate	Consent form needed.	Consultant
Cytogenetics 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	Discuss with Consultant Microbiologist	N/A
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
DPD (Dihydropyrimidine Dehydrogenase)	2xEDTA: pink 2.7ml	Consent form needed.	Consultant
E. coli typing	Nutrient agar slope of organism	Contact MRHT Microbiology Lab. Adhere to transport regulations for packaging.	Microbiology Consultant

Referred Test	Sample	Special Requirements	Test Restricted to:
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
Enterovirus Screening	Stool/Respiratory secretions/CSF/Blood/Vesicular Fluid	Note: A faecal sample is the specimen of choice for enterovirus culture.	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	Spin, separate and freeze <4hrs	N/A
EPO (erythropoietin) receptor antibodies	1xSerum: amber 4.9ml	Spin, separate and freeze <4hrs	N/A
Erythrocyte pyruvate kinase	1x ACD tube (provided on request): Light Yellow 6.0ml	ACD whole blood Refrigerated	N/A
Ethylene Glycol	1xGlucose: yellow 2.7ml	None	N/A
Extrinsic factor antibodies	1xSerum: amber 4.9ml	Send to Crumlin for Paediatric 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
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. SJH Thrombophilia screen/lupus anticoagulation request from required	Consultant Haematologist

Referred Test	Sample	Special Requirements	Test Restricted to:
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. SJH Thrombophilia screen/lupus anticoagulation request from required	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 Lithium Heparin: orange 2.7ml	Consent form needed.	Consultant
FISH (multiple myeloma)	Bone marrow aspirate slides	3 unstained unfixed smears	Consultant
Fish allergy	1xSerum: amber 4.9ml	None	N/A
Flecainide (Tambocor)	1xSerum: WHITE 7.5ml	Spin, separate and freeze <4hrs	N/A
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	MRHM Vitamin/Folate B12 clinical indication form required for GP requests.	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Fragile X screen	4xEDTA: pink 2.7ml	Send ambient. Medical history required. 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	1xSerum: amber 4.9ml	Internal for Renal Dialysis Unit Only	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	Requesting Clinician MUST complete SJH Fungal Biomarkers Request Form	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 (see Pancreatitis Acute)	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 + Aprotinin	Spin at 4C. Separate and freeze<1hr	N/A
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

Referred Test	Sample	Special Requirements	Test Restricted to:
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	MRHM Haemochromatosis molecular genetic testing Consent form required.	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	Minimum 0.5 ml blood Minimum 0.5ml unspun CSF	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
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

Referred Test	Sample	Special Requirements	Test Restricted to:
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	Histology Consultant
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
HIT Screen Heparin-induced thrombocytopenia screen	2x serum (send to SJH Coagulation)	SJH HIT screen request form required	Must be discussed with Consultant Haematology Team at MRHT prior to sending. Availability Routine hours (014162049) Monday - Friday 9am-5pm or out of hours only by authorisation by Coagulation Consultant (SJH switchboard on 014103000)
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	3xCitrate: green 3ml 1xEDTA: white/red7.5 ml 1xSerum: amber 4.9ml	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	Refrigerated	N/A
Hydroxyproline	Fasting Random Urine	Frozen <4hrs	Hydroxyproline no longer available suggest send Fasting urine for N-telopeptides and CrossLaps
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
Immunophenotyping (bone marrow/peripheral blood)	Bone Marrow/EDTA peripheral blood	MML Request Form required	Consultant Haematologist

Referred Test	Sample	Special Requirements	Test Restricted to:
Infliximab Antibody	1xSerum: amber 4.9ml	Send frozen	N/A
Infliximab Level	1xSerum: amber 4.9ml	None	N/A
Influenza A or B antibodies	1xSerum: amber 4.9ml	None	N/A
Insulin level	1xSerum: amber 4.9ml	Spin, separate and freeze <30 mins	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)	1xSerum: WHITE 7.5m (No GEL)	Spin, separate and freeze <4hr	N/A
~~KRAS protein (V-Ki-ras2 Kirsten rat sarcoma viral oncogene homolog)~~	~~FFPP Block, freshly cut H&E~~	~~Accompanying documentation Solid tumour molecular diagnostics request form~~	~~Histology Consultant~~
La (& Ro) antibodies	1xSerum: amber 4.9ml	None	Consultant
Lamotrigine (lamictal)	1xSerum: WHITE 7.5m (No GEL)	Spin, separate and freeze <4hr	N/A
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

Referred Test	Sample	Special Requirements	Test Restricted to:
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
Levetiracetam (keppra)	1xSerum: WHITE 7.5m (No GEL)	Spin, separate and freeze <4hr	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
Listeria monocytogenes PCR	CSF	Minimum 0.5ml Must be specifically requested by Consultant Microbiologist. Must include clinical indication for testing on IMSRL request form.	Listeria monocytogenes PCR
Lithium level	1xSerum: amber 4.9ml	None	N/A
Liver-Kidney microsomal antibody	1xSerum: amber 4.9ml	None	N/A
Lung Molecular Panel	FFPE block	None	Must be discussed with Oncology/Consultant Pathologist at MRHT prior to sending
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. SJH Thrombophilia screen/lupus anticoagulation request from required	Consultant Haematologist
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
Macroprolactin	1xSerum: amber 4.9ml	Spin, separate and freeze	N/A
Malaria verification	1xEDTA: pink 2.7ml 2 unstained slides	None	Haematology Laboratory

Referred Test	Sample	Special Requirements	Test Restricted to:
Manganese level	1xSerum: amber 4.9ml	Serum must be removed from gel	N/A
Measles antibodies	1xSerum: amber 4.9ml	None	N/A
Melanoma Molecular Panel	FFPE block	None	Must be discussed with Oncology/Consultant Pathologist at MRHT prior to sending
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 with HCL (10ml of 0.1NHCL added.)	Acidified container, pH and volume. 2x 4ml Biomnis Urine tube: brown top. Freeze	N/A
Metanephrines (plasma)	2xLithium Heparin: orange 2.7ml	Fasting, Spin, separate and freeze <1hr	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, Genetic test request form.	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

Referred Test	Sample	Special Requirements	Test Restricted to:
Monkeypox Virus	Viral swab taken from a cutaneous lesion either ulcer or vesicular fluid if present	Inform Consultant Microbiologist. Inform Public Health and NVRL to alert of probable sample for MPX investigation.	Double bag sample at point of collection in clinical setting. Transport to the NVRL as Category A Pathogen.
MPN Screen – Myeloproliferative neoplasms (JAK2 CALR MPL)	2xEDTA: pink 2.7 ml	None	Consultant Haematologist
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	Contact MRHT Microbiology Lab. Adhere to transport regulations for packaging.	Consultant Microbiologist
Multiple myeloma (FISH)	Bone marrow aspirate slides	3 unstained unfixed smears	Consultant
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
MSI Molecular	FFPE	Histology report	Must be discussed with Oncology/Consultant Pathologist at MRHT prior to sending
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	N/A
Myeloid Gene Panel	1x Blood Transfusion EDTA 7.5 ml	Must have completed HMDC Referral Form Minimum 5ml Blood Volume in Sample	N/A
Myeloperoxidase antibodies. (MPO antibodies.)	1xSerum: amber 4.9ml	None	N/A
Myoglobin	1xSerum: amber 4.9ml	Spin, separate and freeze <4hr	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Myoglobin (Urinary)	24 hr or random urine	Centrifuge and Freeze <4hr Biomnis Urine tube: brown top.	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 >500µl 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 Antibodies (HU, RI, YO, CV2, MA2)	1xSerum: amber 4.9ml	Refrigerated	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
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	1xCSF tubes, 1xserum: amber 4.9ml	300µl unspun CSF and 5ml of amber tube blood	N/A
Organic acids	Fresh MSU or 1xLithum heparin: orange 2.7ml	pH urine, freeze immediately in conical tube. Must have relevant clinical details and Temple St metabolic request form. Spin and separate Lithium Heparin freeze <2hrs	N/A
Oncomine Molecular	FFPE block	Scrolls of FFPE Histology Report	Must be discussed with Oncology/Consultant Pathologist at MRHT prior to sending
Osmolality	1xSerum: amber 4.9ml or 1 x MSU	None	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Ova and parasites	Stool sample	PHL Dublin Routine Enteric Request Form Required	N/A
Oxalate (urinary)	24hr urine	Acidified container, pH and volume. 2x Biomnis Urine tube: brown top.	N/A
Pancreatic polypeptide (PTH related peptide)	1ml ETDA plasma + Aprotinine	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 to 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
Paraquat level	2xSerum: amber 4.9ml 20ml 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
PDL-1 IHC	FFPE Block	Histology report Organ-Specific	Must be discussed with Oncology/Consultant Pathologist at MRHT prior to sending
Penicillin G Allergy	1xSerum: amber 4.9ml	None	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
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
Porphobilinogen	1xUrine MSU	Protect from light	N/A
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
Prader Willi	2x EDTA pink 2.7ml	Eurofins Constitutional Molecular Genetics test request form required	Consultant
Procalcitonin	1xSerum: amber 4.9ml	Spin, separate & freeze	N/A
Pro collagen III antibodies	1xSerum: amber 4.9ml	Spin and Freeze <4 hrs	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Pro insulin level	1xSerum: amber 4.9ml	Spin, separate & freeze <4hrs	N/A
Progesterone	1xSerum: amber 4.9ml	None	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. SJH Thrombophilia screen/lupus anticoagulation request from required	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	SJH Thrombophilia screen/lupus anticoagulation request from required	Consultant Haematologist
Pyruvate dehydrogenase (Anti-mitochondrial antibodies)	1xSerum: amber 4.9ml	Refrigerated	N/A
Pyruvate kinase	1x ACD tube (provided on request): Light Yellow Top 6.0ml	ACD whole blood Refrigerated	N/A
Q Fever (Coxiella burnetti) antibodies	1xSerum: amber 4.9ml	Refrigerated	N/A
Quantiferon (TB)	Special bottles available from OPD ordered from Eurofins Biomnis.	Must arrive in Eurofins Biomnis within 16 hours. Incubate samples if storing overnight. Do not request after 10am on Fridays.	Consultant Microbiologist
Red cell folate (Erythrocyte folic acid)	2xEDTA: pink 2.7ml	Fasting sample	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.	Histology Consultant

Referred Test	Sample	Special Requirements	Test Restricted to:
Renin (& aldosterone if required) recumbent and standing	4xEDTA: pink 2.7ml	Patient 45 min recumbent, 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	1xPlasma: orange top Lithium Heparin 2.7ml	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.	By arrangement with NVRL.	Consultant Microbiologist.
Selenium level	1xSerum: amber 4.9ml	Remove from gel	N/A
Serotonin	2xLithium Heparin 2.7ml	Spin, separate and freeze <1hr. 48hr diet required available on Eurofins Biomnis website	N/A
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

Referred Test	Sample	Special Requirements	Test Restricted to:
Skin IF	On saline moistened gauze in dry container	Contact MRHT Histology Laboratory. Must receive before 11 am and send by immediate transport	Histology 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	By arrangement with NVRL.	Consultant Microbiologist
STFR - (soluble transferring receptor)	1xSerum: amber 4.9ml	None	N/A
Synacthen test (Cortisol)	1xSerum: amber 4.9ml	Clearly state sample times.	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	State date/time and strength of last dose	N/A
Tambacor (Flecanide)	1xSerum: amber 4.9ml		N/A
TB culture	Sputum, CSF, Bone marrow or tissue	Sent untreated. St. James Hospital IMRL Specimen Request Form (LF-IMRL-0195) required	N/A
TB Rapid Molecular Investigation	Sputum/BAL/Tissue/Other	Clinician must complete IMRL Specimen Request Form.	Consultant in SJH MUST be phoned in advance to give approval
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
Testosterone - free index	1xSerum: amber 4.9ml	None	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
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 (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, cardiolipinantibodies, 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. SJH Thrombophilia screen/lupus anticoagulation request from required. Paediatric bottles not sufficient.	Consultant Haematologist
Thyroglobulin levels	1xSerum: amber 4.9ml	Specify if antibodies or levels required	N/A
Thyroid binding inhibitor immunoglobulin (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
Tobramycin level (pre)	1xSerum: amber 4.9ml	Spin, separate & freeze.	N/A
Topiramate (topamax)	1xSerum: amber 4.9ml	None	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Torch screen (CMV, Toxoplasma, Rubella, Herpes simplex)	1xSerum: amber 4.9ml	None	N/A
Total Iron Binding Capacity TIBC (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
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
Trileptal levels	1xSerum: amber 4.9ml	Spin and freeze <4 hr	N/A
Trypsin (Immunoreactive trypsin)	1xSerum: amber 4.9ml	Spin, separate & freeze <4 hr	N/A
Tryptase	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 Cysteine	MSU - random MSU 2x10mls	Fasting, freeze <1hr	N/A
Urinary Cortisol	24 hr Urine (non acidified)	Volume noted. 2 X MSU sent for test.	N/A

Referred Test	Sample	Special Requirements	Test Restricted to:
Urinary osmolality	MSU - random MSU 1x10mls	None	N/A
Urine Protein Electrophoresis	24 hr Urine (non acidified) or random MSU	None	N/A
Valporate (Epilim)	1xSerum: amber 4.9ml	None	N/A
Vanillylmandelic acid (VMA)	24 hr Urine - with HCl	pH & volume noted. 2x Biomnis Urine tube: brown top. Freeze.	N/A
Varicella antibodies	1xSerum: amber 4.9ml	None	N/A
Vedolizumab Level	1xSerum: amber 4.9ml	None	N/A
Vedolizumab Abs	1xSerum: amber 4.9ml	Send frozen	N/A
Vascular Endothelial Growth Factor (VEGF) assay	Plain (clotted) blood unhaemolysed - Separate off gel and fridge or frozen >1week	Send frozen to Neuroimmunology and CSF Lab, University College London	Consultant Haematologist
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	Vitamin/Folate B12 clinical indication form required for GP requests.	N/A
Vitamin B6	2xEDTA: pink 2.7ml	Protect from light	N/A
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

Referred Test	Sample	Special Requirements	Test Restricted to:
Vitamin E	1xLithium Heparin: orange 2.7ml	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
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
Voriconazole	1xSerum: WHITE 7.5ml	No Gel Tube. No need to freeze	N/A
Xanthochromia	CSF collected in Brown (retrieve from Microbiology)	>1ml of CSF supernatent and amber tube blood. Refer to Consultant Microbiologist	N/A
Yersinia	1xSerum: amber 4.9ml	None	N/A
Zinc	1xSerum: amber 4.9ml	Remove serum from gel	N/A

Section 8.

HAEMATOLOGY LABORATORY

8.0 Haematology Laboratory

8.1 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.

8.2 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.

8.2.1 Haematology Test Index

- Full Blood Count (FBC)
- Automated Differential White Cell Count
- Automated Reticulocyte Count
- Blood Film Examination
- Manual WBC Differential
- Erythrocyte Sedimentation Rate (ESR) (only with relevant clinical details)
- 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***

8.2.2 Coagulation Test Index

- 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) *This test is currently not accredited

8.3 Hours of Operation and Contact Details

<table>
<tr><th colspan="3">Monday – Friday
(excluding Public Holidays)</th></tr>
<tr><th>Departmental Address</th><th>Routine hours</th><th>Contact Details</th></tr>
<tr><td rowspan="3">Haematology Laboratory,
MRHT,
Tullamore,
Co Offaly,
Ireland.
R35 NY51</td><td>Core Hours
09:00-17:00hrs
(Full Operational Service)</td><td rowspan="2">057-9358351
or
057-9358347</td></tr>
<tr><td>Extended Working day
08:00 - 20:00hrs
(Reduced Services outside of Core Hours)</td></tr>
<tr><td>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</td><td>Contact via switchboard
Internal Ext 3000

External 057-932 1501</td></tr>
<tr><td colspan="3">*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.</td></tr>
<tr><th colspan="3">Saturdays, Sundays and Public Holidays</th></tr>
<tr><td></td><td>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.</td><td>Contact via switchboard
Internal Ext 3000

External 057-932 1501</td></tr>
</table>

Haematology Personnel	Contact Name	Contact Details
Consultant Haematologist	Dr Kanthi Perera	057 93**59250** (Secretary) Consultant Haematologist on-call can be contacted through reception Ext. 3000 meegahage.perera@hse.ie
	Haematology Medical 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

8.4 Pre-Testing Information

8.4.1 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, only, this excludes the weekend and bank holiday enhances sessional service 9am – 2pm where the white 4 Part General Request Form should be used.

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 8.4.3.

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

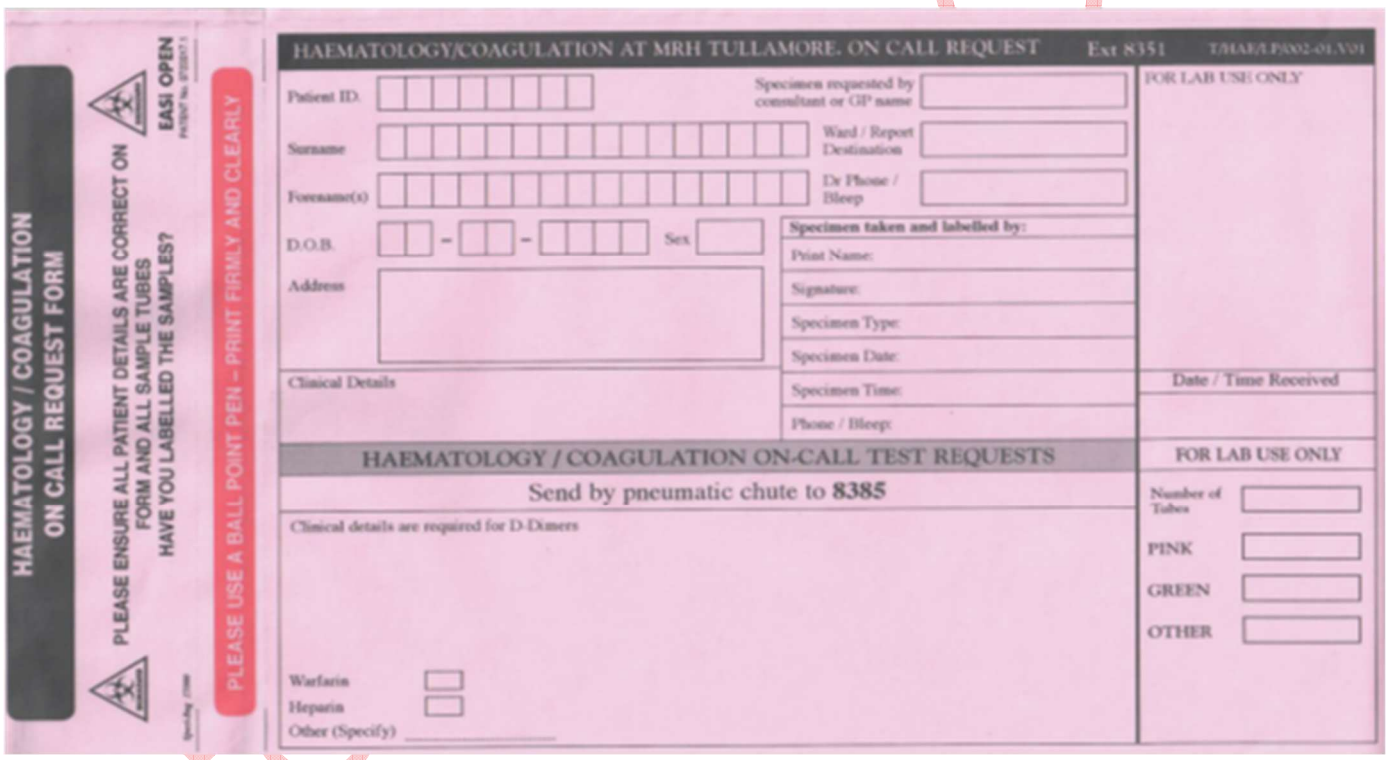
- The outside of the sample tube must not be contaminated with blood/body fluids.
- Blood or body fluid-stained laboratory request forms must not be submitted.
- Samples must be placed in the plastic bag that is attached to the request form.
- Samples can be transported to the laboratory at room temperature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

8.4.2 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 4.14** of the **General Information Section** at the beginning of this manual.

Please reference the Biochemistry section for the General Biochemistry/ Haematology Request Form. If a test request is not clearly stated on the request form, it may not be performed regardless of the samples received. Please note that the Haematology Laboratory operates a strict **"No Request, No Test"** policy for coagulation samples. Please refer to T/HAE/GL/001 for the **Emergency Department indications for ordering Coagulation Screen/Tests**

Please notes: Labels should not overlap or touch the bottom or lid of the specimen container.



8.4.3 Sample Requirements, Stability and TATs

As per **section 4.3** of the General Information, the routine core 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 Table 1 for the Haematology and Coagulation sample requirements, stability and TAT of each test.

Test	Sample Type	Stability	Comments	Turnaround Times		
				Routine (GP)	Routine (in-house)	Priority / Critical*
Full Blood Count (FBC)	2.7 ml EDTA (pink)	<72 hours		Same Day	6 hrs	1 hr
Automated Differential White Cell	2.7 ml EDTA (pink)	<72 hours		Same Day	6 hrs	1 hr
Blood Film Examination	2.7 ml EDTA (pink)	<24 hours	Reason for request should be provided	72 hrs	72 hrs	*
Erythrocyte Sedimentation Rate (ESR)	2.7 ml EDTA (pink)	<24 hours	One sample only required for FBC & ESR but must be filled to the correct level	24 hrs	24 hrs	2 hrs
Reticulocyte Count	2.7 ml EDTA (pink)	<12 hours		Same Day	6 hrs	1 hr
Infectious Mononucleosis Screen (I.M.)	2.7 ml EDTA (pink)	<72 hours	One sample only required for FBC and I.M. Tests are processed twice daily in the morning and evening	24 hrs	24 hrs	n/a
Malaria Rapid Diagnostic Test	2.7 ml EDTA (pink)	<12 hours	Sample to be taken during fever spike. Lab should be contacted in advance & Malaria Request Form T/HAE/LP/017-04 must be completed and sent with all requests.	n/a	4 hrs	2 hrs
Blood Smear (thick & thin films) for Malaria / Parasites				n/a	6 hrs	6 hrs
Sickle Cell Screen	2.7 ml EDTA (pink)	<12 hours	Haematology laboratory must be contacted in advance.	n/a	4 hrs	2 hrs
Prothrombin time (PT)/INR	3ml Sodium Citrate (green)	<24 hours	Sample **must** be filled to the correct level. **State if patient is on Warfarin.**	Same Day	6 hrs	1 hr
Activated Partial Thromboplastin time (APTT) / APTT Ratio	3ml Sodium Citrate (green)	<24 hours <4 hours for patients on Heparin	Sample **must** be filled to the correct level. **State if patient is on Heparin.**	Same Day	6 hrs	1 hr
Coagulation Screen (PT and APTT)	3ml Sodium Citrate (green)	<24 hours	Sample **must** be filled to the correct level. **State if any anticoagulant therapy**	Same Day	6 hrs	1 hr
D-Dimers	3ml Sodium Citrate (green)	<24 hours	Sample **must** be filled to the correct level.	Same Day	6 hrs	1 hr
Fibrinogen	3ml Sodium Citrate (green)	<24 hours	Sample **must** be filled to the correct level.	Same Day	6 hrs	1 hr
Mixing Studies	3ml Sodium Citrate (green)	<24 hours	Sample **must** be filled to the correct level. Only processed at the request of Consultant Haematologist Teams	n/a	6 hrs	1 hr

Table1: Sample requirements, test stability and TAT's

Notes:

- **The laboratory must be contacted directly for all Critical samples and priority & critical blood film requests**
- The TAT stated for each parameter is based on normal results. Abnormal results or those samples that require further testing/investigations may increase the TAT of results.
- Most samples are processed as they arrive in the laboratory. Non-urgent samples arriving after routine hours may be analysed on the next routine working day.

- All turnaround times (TAT) stated are from receipt of sample (pre-examination), not time of venepuncture, to reported time (post-examination).The TAT for Sickle screen and Malaria screen is for when the result is not abnormal. The TAT will increase if further testing/investigations are indicated. Positive Sickle screen may be referred to external laboratory for full Haemoglobinopathy screen. Positive Malaria will be referred to Hospital for Tropical Diseases, London for confirmation of species
- The uncertainty of measurement (UOM) of each test is reviewed and applied annually. These can be provided at users request.
- The costs of tests can be provided at users request.
- 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.
- TAT are reviewed quarterly and adjusted when relevant. Sample stability is assessed every 5 years or after any major change in testing procedure (with approval of Consultant Haematologist).
- ESR results are obtained with an ESR instrument that is not based on the standard Westergren method. The sensitivity and specificity of this method for various disease states may be different from the standard Westergren method and should be interpreted with clinical context. The test may be affected by interference factors such as anaemia, hemolysis, lipemia

8.4.4 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 (via hospital switch) in advance of requesting special Haematology tests.

Refer to 'External Tests' section of this user manual for a list of sample requirements for external tests. Please remember that external request forms may be required (please refer to external laboratory own user manual).

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

8.4.5 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. The optimal time to take bone marrow samples is between 9am-12:30pm to ensure there is adequate time to package and transport to the referral site within 24hours.

Please note the Grunwald-Giemsa (MGG) staining of bone marrow aspirate slides is currently not accredited.

For external referrals, please ensure that the relevant external request form accompanies the Histology request form and is appropriately completed with testing requirements specified. These request forms are available from the laboratory or can be downloaded from the relevant external laboratory website / user manual.

Commonly used referral laboratories and their request forms:

- Munich Leukaemia Laboratory (MLL) for immunophenotyping, cytogenetics, FISH and NGS:
  - https://www.mll.com/en/request-form/mll_request_form.pdf
- For Cancer Molecular Diagnostics (CMD) for cytogenetics, NGS:
  - http://www.stjames.ie/media/Cancer%20Molecular%20Diagnostics%20request%20form.pdf

8.5 Reference intervals and Critical phoning limits

Site-specific reference intervals have been established and are in use for the adult population for all full blood counts (see Table 2) and coagulation tests (see Table 3) and in the Haematology Laboratory at the Midlands Regional Hospital Tullamore.

Paediatrics reference intervals are taken from current relevant literature and can be provided upon request.

Site-specific reference intervals are verified every 2 years and adjusted where required.

Parameter	Unit	Range		Critical Phoning Limit
		Male	Female	
Red Blood Cells (RBC)	$x10^{12}/l$	4.2 - 5.5	3.9 - 4.9	
Haemoglobin (Hb)	g/dl	12.9 - 16.6	11.7 - 15.0	≤7 **or** ≥20 males / ≥18 females
Haemocrit (Hct)	l/l	0.4 - 0.5	0.36 - 0.45	≥0.6
Mean Cell Volume (MCV)	fl	84 - 97		
Mean Cell Haemoglobin (MCH)	pg	27 - 33		
MCH Concentration (MCHC)	g/dl	31.7 - 35.2	31.4 - 34.7	
Red cell Distribution Width (RDW)	%	11.5 - 14.5		
Reticulocytes (Retic)	$x10^9/l$	29 - 112	30 - 99	≥200
Platelet	$x10^9/l$	135 - 400		≤50 **or** ≥600
White Blood Cells (WBC)	$x10^9/l$	3.8 - 9.5		≥30
Neutrophils	$x10^9/l$	2.0 - 6.0		≤0.5 **or** ≥30
Lymphocytes	$x10^9/l$	0.7 - 3.1		
Monocytes	$x10^9/l$	0.2 - 1.0		
Eosinophils	$x10^9/l$	.02 - 0.4		
Basophils	$x10^9/l$	0.01 - 0.1		

Table 2: FBC site-specific reference intervals and critical phoning limits for the adult population

Parameter	Unit/ Calculation	Range (M&F)	Critical Phoning Limit
Prothrombin Time (PT)	**s**	10.3 - 13.1	>20sec*
International Normalised Ratio (INR)	$INR = (\frac{PTtest}{Mean\ Normal\ PT})^{ISI}$		>5.0 >6.0: Warfarin Clinic only
Activated Partial Thromboplastin Time (APTT)	**s**	24.2 - 33.1	>45secs*
APTT Ratio	$APTT\ Ratio = \frac{APTT\ Test}{Mean\ Normal\ APTT}$		>3.0*
Clauss Fibrinogen	**g/l**	1.6 - 5.7	<1.0g/L
D-Dimer	**ng/ml (FEU)**	<500	

* in absence of anticoagulant therapy

Table 3: Coagulation site-specific reference intervals and critical phoning limits for the male & female adult population:

8.6 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

8.7 Quality Assurance

The Haematology Laboratory participates in the following Quality Assurance Schemes

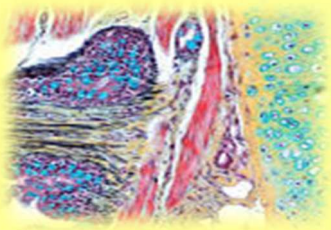
Distributor	QA Programme
UK National External Quality Assessment Scheme (NEQAS) Irish External Quality Assessment Scheme (IEQAS) LabQuality External Quality Assessment Scheme Randox International Quality Assessement Scheme (RIQAS)	1. Full Blood Count 2. Reticulocytes 3. Automated WBC Differential 4.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

8.8 Costs

The cost per Haematology test is available on request please contact the departmental Chief Medical Scientist, refer to Section 8.3 for details.

Section 9.

HISTOPATHOLOGY LABORATORY



9.0 Histopathology

9.1 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 4.14** of the **General Information** section is strongly recommended

9.2 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 Histopathology 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

9.3 Hours of Operation and Contact Details

Monday – Friday (excluding Public Holidays)		
Departmental Address	**Routine hours**	**Contact Details**
Histology Laboratory, MRHT, Tullamore, Co Offaly, Ireland. R35 NY51	**Core Hours** 09:00-17:00hrs (Full Operational Service)	057-93**58338**
	Extended Working day 08:00 - 18:00hrs (Reduced Services outside of Core Hours)	
Saturdays, Sundays and Public Holidays		
No on-call service provided		

Histopathology Personnel	**Contact Name**	**Contact Details**
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	vacant	057-93**58338**
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		057-9358342 / 057-9359393

9.4 Pre-Testing Information

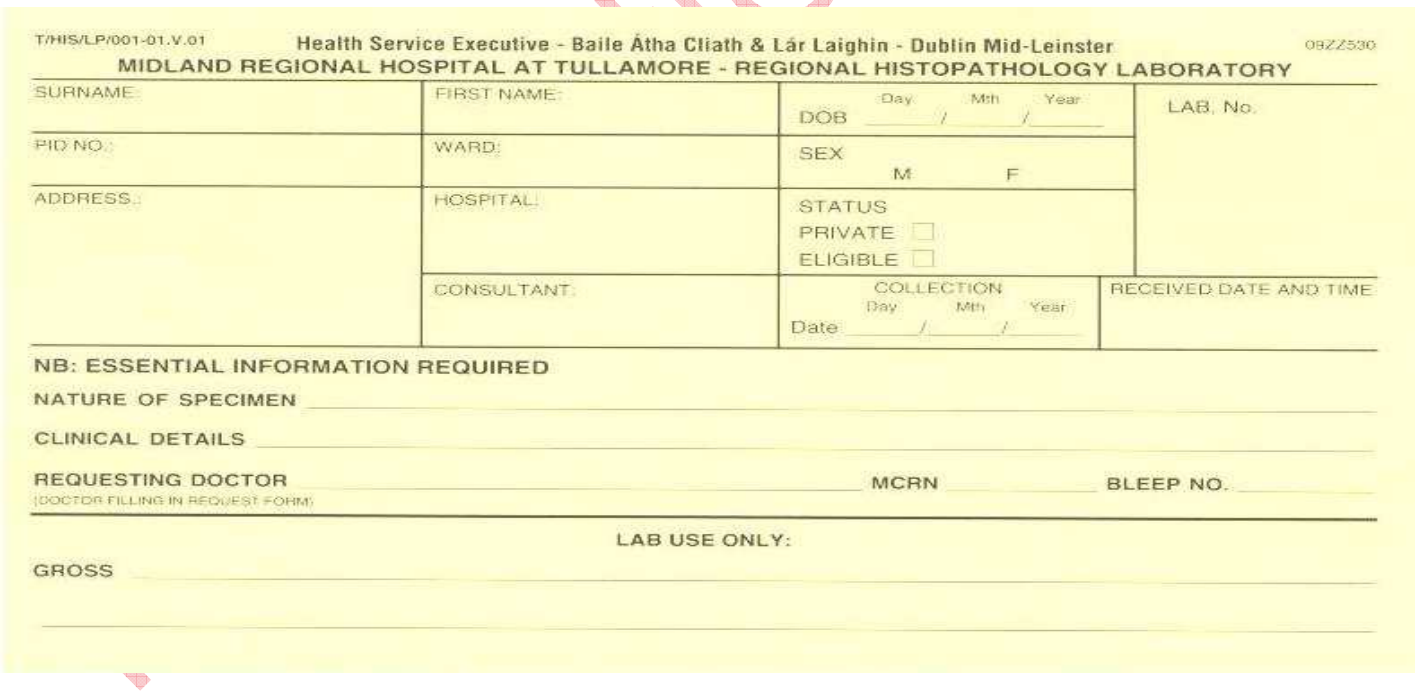
9.4.1 Handling and Transport of Samples

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.

9.4.2 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 08ZZ530

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 _____ MCRN _____ BLEEP NO. _____

(DOCTOR FILLING IN REQUEST FORM)

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.**
i) **Specimen type and anatomical site of origin on each individual specimen.** Required for all specimens sent to the Histopathology laboratory.
j) **Patient full address. NB for GP samples especially**
k) **Clinical details/Medications.**
l) **Doctor's signature and bleep number**

Positive patient identification before collection of the sample is essential.

Samples are to be labelled as per the labelling requirements stated in **Section 4.14** 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 each individual specimen.**

9.4.3 Sample Requirements for Histology Tests

9.4.3.1 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.

9.4.3.2 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 not 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 Times

- 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 depending on the complexity of the case.

- Non urgent samples:
  - Specimen turnaround time follows the categories used in the National Histopathology Quality Assurance Programme see table below.

Category	Example Sample types	Turnaround Time / routine 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	20-25
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

9.4.3.3 Fresh Lymph Nodes

N.B. Lymph Nodes 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
- 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.

- **N.B.** 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

9.4.3.4 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

9.4.3.5 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

9.4.3.6 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.

9.4.3.7 Muscle Biopsies

N.B. As this is a referral test requiring special transport, the Histopathology Laboratory 057-93 58338 MUST be contacted to book the muscle biopsy at least 24 hours in advance.

- **Specimen Requirements**
  - 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 and and are available on DART via a link in the LIS.
  - 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)

9.4.3.8 Renal Biopsies

N.B. As this is a referral test requiring special transport, the Histopathology Laboratory 057-93 58338 MUST be contacted to book the muscle biopsy at least 24 hours in advance.

- **Specimen Requirements**
  - 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 and are available on DART via a link in the LIS.
  - 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).

9.4.3.9 Skin Biopsies For If

N.B. As this is a referral test requiring special transport, the Histopathology Laboratory 057-93 58338 MUST be contacted to book the skin biopsy at least 24 hours in advance.

- **Specimen Requirements**
  - 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 and are available on DART via a link on the LIS.
  - 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).

9.4.3.10 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.

9.4.3.11 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

- **GI MDT 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

9.5 Sample Rejection

Laboratory staff are only authorised to accept samples which meet the required standard. Please refer to **section 4.15** 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.

9.6 Sample Retention

Sample	**Retention Times**
Routine Histopathology Specimens (tissue remaining in container)	4 weeks after reporting
Routine Histopathology Specimens (no tissue remaining in container)	6 Weeks
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.

9.7 Quality Assurance

The Histology Laboratory participates in the following Quality Assurance Programmes;

Distributor	QA Programme
UK NEQAS (National External Quality Assessment Service) Cellular Pathology Techniques	1. Specialist Techniques 2. Non Gynae Cytopathology diagnostic Module 3. Bone Marrow 4. Frozen Section 5. Tissue Diagnostics
UK NEQAS (National External Quality Assessment Service) for ICC & ISH	Immunohistochemistry
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.

Section 10.

MICROBIOLOGY LABORATORY

10.0 Microbiology

10.1 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.**

10.2 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
Bone allograft culture	Cannulae culture
CAPD Fluid (Continuous Ambulatory Peritoneal Dialysis Fluid)	CPE Screening (PCR (Red swab) and culture (black swab) Method)
COVID-19 (SARS-CoV-2)	CSF
Ear Swabs	Eye Swabs
Faeces Enteric Pathogen Screening (PCR and Culture Method)	Fluids
Fungal Culture and Microscopy	Genital Tract and Associated Specimens
Influenza/RSV Screening (PCR Method)	Meningococcal PCR (CSF only)
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 (Red Swab) and Culture (black swab) Method)	Wound swabs
Mouth Swabs	

10.3 Hours of Operation and Contact Details

<table>
<tr><th colspan="3">Monday – Friday
(excluding Public Holidays)</th></tr>
<tr><th>Departmental Address</th><th>Routine hours</th><th>Contact Details</th></tr>
<tr><td rowspan="3">Microbiology Laboratory,
MRHT,
Tullamore,
Co Offaly,
Ireland.
R35 NY51</td><td>Core Hours
09:00-17:00hrs
(Full Operational Service)</td><td rowspan="2">0579358371</td></tr>
<tr><td>Extended Working day
08:00 - 20:00hrs
(Reduced Services outside of Core Hours)</td></tr>
<tr><td>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</td><td>Contact via switchboard
Internal Ext 3000

External 057-9321501</td></tr>
<tr><td colspan="3">*Routine Workload Cut-off:
All GP and in-house/OPD routine samples must be received in specimen reception by 4pm. The TAT of samples outside these hours cannot be guaranteed.
Routine samples arriving after the stated deadlines may not be processed until the next routine working day.</td></tr>
<tr><th colspan="3">Saturdays, Sundays and Public Holidays</th></tr>
<tr><td></td><td>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.</td><td>Contact via switchboard
Internal Ext 3000

External 057-9321501</td></tr>
<tr><td colspan="3">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'</td></tr>
</table>

Microbiology Personnel	Contact Name	Contact Details
Consultant Microbiologist	Locum Consultant Microbiologist	Can be contacted through reception (057-9321501 Internal Ext. 3000)
Chief Medical Scientist	Mr Ultan Smith	057-93**58390** ultanf.smith@hse.ie
Senior Medical Scientist	Ms. Anne Dolan	057-93**58371** anne.dolan3@hse.ie
Senior Medical Scientist	Ms. Fiona Hanlon	057-93**58371** fiona.hanlon@hse.ie
Senior Medical Scientist	Ms. Janine Nicholson	057-93**58371** janine.nicholson@hse.ie
Specialist Medical Scientist (Molecular Microbiology)	Mr Oliver Cleary	057-93**58382** oliver.cleary@hse.ie

General Enquires

Ward Lookup is available for Microbiology test results.

Healthlink is available for Microbiology test results for GPs.

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

General Microbiology Enquires	057 93**58371**
Sputum and Faeces Enquiries	057 93**58508**
Molecular Testing Enquiries	057 93**58372**
Urine Enquires	05793**58375**
Swabs	05793**57791**
Blood Cultures	05793**57788**

10.4 Pre-Testing Information

10.4.1 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. It is advised that specimens taken in Theatre such as tissues/fluids swabs should also be hand delivered.

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
7. Tissue and Fluid samples taken in Theatre should be hand delivered to the Microbiology Laboratory without delay.
8. Ideally collect Microbiology specimens before antimicrobial therapy has been initiated when possible.
9. Any further queries regarding specimen collection or sample stability can be directed to the Microbiology Laboratory via the contact details provided.

10.4.2 Form and Sample Labelling Requirements

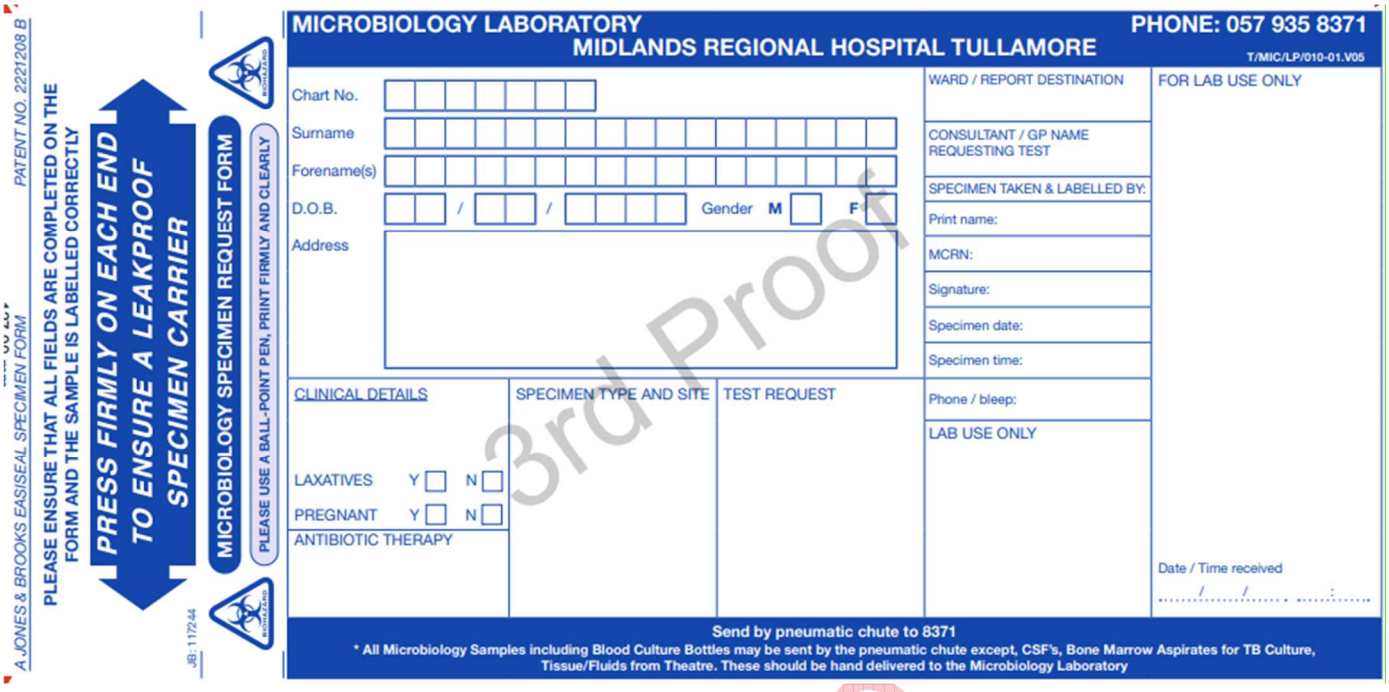
FORM LABELLING

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)

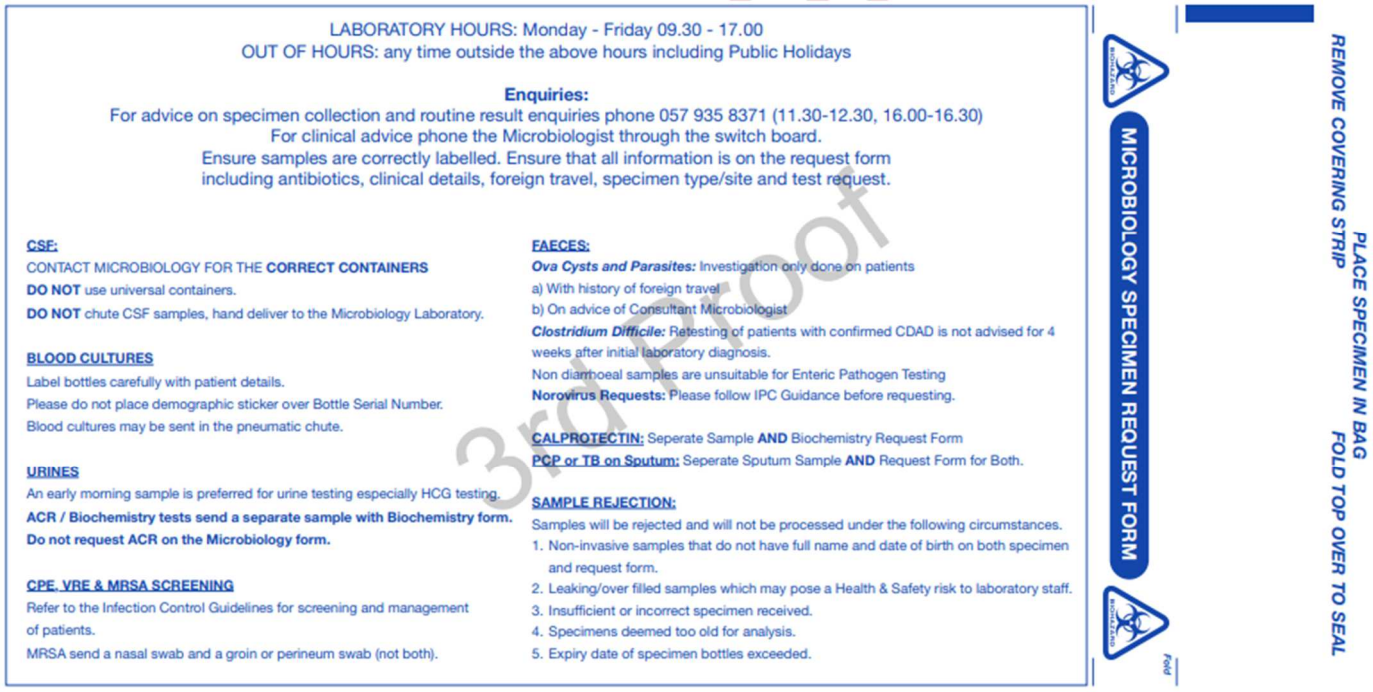
Note: Computer generated labels may be used on the request form (please ensure that **one label is attached to each sheet of the request form**).

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

Front of Microbiology Request Form



Back of Microbiology Request Form



SPECIMEN LABELLING

Positive patient identification 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.

10.4.3 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 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 (routine hours). 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. . In-house PCR Screening not to be used for staff screening.
Turnaround Time	Final Report: < 24 hours
Additional Information	Please indicate clearly on request form the reason SARS-CoV-2 screening is required. **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 Xanthochromia 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 per cmm Infants (1-12 months) — 0-15 cells per cmm Children/Adults (1 year +) — 0-5 cells per cmm No RBCs should be present in normal CSF
Additional Information	Samples will be forwarded to appropriate external lab for additional testing such as , TB, Xanthochromia and oligoclonal bands where requested.

CSF (CEREBROSPINAL FLUID) for Viral/Bacterial PCR	
Specimen Type	CSF
Sample Volume	Minimum volume of 500µl.
Special Requirements	**All tests requested MUST be clearly stated.** Samples that meet the following criteria will be processed 24/7: • Patients presenting with acute meningitis/encephalitis **AND** viral/bacterial PCR testing has been specifically requested. Clinical presentation **MUST** be recorded on request form. • CSF samples that have a WBC of >5 WBC/cmm. • CSF samples that have a positive gram stain. Samples that do not meet the above criteria but viral/bacterial PCR is requested will be processed **ONLY** during the hours of 09:00 – 18:00 Monday-Sunday including Bank Holidays.
Turnaround Time	Requests that meet the above criteria: <3 hours Requests that do not meet the above criteria: <24hours.
Additional Information	The following bacteria and viruses are tested in-house. Viruses: Cytomegalovirus (CMV), Enterovirus (EV), Herpes simplex virus 1 (HSV-1), Herpes simplex virus 2 (HSV-2), Human herpesvirus 6 (HHV-6), Human parechovirus (HPeV) and Varicella zoster virus (VZV) Bacteria: Escherichia coli K1, Haemophilus influenza, Listeria monocytogenes, Neisseria meningitides, Streptococcus agalactiae, Streptococcus pneumonia. Positive specimens are referred to the Irish Meningitis and Sepsis Reference Laboratory (IMSRL) for specific meningococcal grouping. Cryptococcus testing (C. neoformans/C. gattii) is available in-house if specifically requested. All samples requesting Cryptococcus testing are also sent to the reference lab for Cryptococcal antigen testing. Test requests for bacteria, viruses or yeast that cannot be processed in-house will be forwarded to the appropriate external lab for testing.

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 (Negative Screens) 48-72 hours (Positive Screens)

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/extended incubation 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	**Enteric Pathogen PCR Screening: *Salmonella, Shigella, Verotoxigenic E. coli (VTEC), Campylobacter, Giardia and Cryptosporidium.*** 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. 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. **Please note: For Enteric Pathogen PCR, all non-diarrhoeal faecal specimens (Grading between 1-3) (Bristol Chart) are unsuitable for analysis and will be rejected.**
Sample Volume	Minimum volume: 1 – 2 g per test required. Please do not overfill container.
Turnaround Time	Final Report for Enteric Pathogen PCR: 1-2 working days for negative (may be longer if positive) for all samples received before 11am cut-off Monday – Friday (excluding Public Holidays): Calprotectin: Send separate sample and form to specimen reception for referral of sample externally. Not tested in Microbiology Ova, Cysts and Parasites: Tested Externally Clostridium difficile screen: 24 hours. Rota /Adenovirus: Result available within 1 working day (Not done weekends or public holidays) Norovirus:24 hours Occult blood: Result available within 1-2 working days (Not done weekends or bank holidays). Test is a FIT Test (Qualitative Result Only ie. Pos/Neg). Helicobacter pylori-antigen testing: Result available within 1-2 working days (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 (other than Cryptosporidium/Giardia)**: 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. (may be longer if extended incubation is required Interim Report released earlier if significant growth.
Additional tests	16s/18s PCR test requests are sent externally. These must be approved by the Consultant Microbiologist. The request must be sent on an additional request form within 7 days of the sample date.

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.

Additional Information Cont'd	**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/antifungal profiles 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: Not tested in Microbiology- Referred externally Use Aptima Collection Kit (Male/Female). (Available from Specimen Reception).
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:** Refer to the Consultant Microbiologist.
Turnaround Time	HVS/Endocervical/penile: 2-3 working days

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 2 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**
Turnaround time	Result: <24 hours

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	Frequency of specimens (1 every 3 days) collected are dependent on clinical condition of patient. Send separate sample and request form for PCP testing to Specimen Reception for referral externally. Send separate sample and request form for TB testing to Specimen Reception for referral externally. Note Complete IMRL Request Form. 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	Transport of specimens to the laboratory should not be delayed. If processing is delayed, refrigeration is preferable to storage at ambient temperatures. 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 / Clean Area Pack Hand deliver sample to the Microbiology Laboratory immediately.
Special Requirements	Tissue samples for microbiology must not be placed in formalin. All specimens must be clearly distinguishable from each other. Each specimen identifier must clearly describe the specimen type and precise anatomical location from which it was obtained. These details must be clearly recorded on both the specimen request form and specimen container.
Turnaround Time **Additional tests**	Microscopy: <24 hours Final report: 7-9 days. Interim Report released earlier if significant growth. TAT may be longer if organism susceptibilities are required or if extended incubation is required. 16s PCR test requests are sent externally. These must be approved by the Consultant Microbiologist. The request must be received in Microbiology on an additional request form within 7 days of the sample date.

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. Where this is not possible, refrigeration at 4°C is recommended. Please state if patient is pregnant or neutropaenic on the request form.
Test Method	Automated analyser/Manual Microscopy 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 and Oncology Patients only. Oncology patient MUST be clearly identified on Specimen Request Form as this is not always clear. Oncology patients may be an inpatient in many various wards. If testing is required on a non-ICU/Oncology 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

VRE Screening (Culture Method)	
Specimen Requirements	Rectal Swab
Special Requirements	Black Charcoal swab 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 culture method. Patients previously positive for VRE should not be rescreened.
Turnaround Time	Result: 24 hours (Negative screens),48-72 (positive screens)

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.

10.5 Sample Rejection

Laboratory staff are only authorised to accept samples which meet the required labelling criteria as described in **Section 10.4.2** above.

10.6 Sample Retention

Sample	**Retention Time**
General Swabs, Sputa, Faeces, Urines	One week
PCR Specimens (CPE/VRE/MRSA/Covid/FLU/RSV)	One week
CSF	One month
Positive Blood cultures	Two weeks
Tissue/Fluid	Two weeks
Serum for virology	Six months

10.7 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 10. Viruses in CSF
IEQAS Laboratory Medicine EQA Scheme	1. FOB 2. Gram stain. 3. H pylori Ag 4. Urine culture 5. Urine Microscopy 6. Synovial Fluid
Wales External Quality Assessment Scheme	Pregnancy Testing
QCMD	CPE Analysis Respiratory Viruses Central Nervous System II Parasitic Gastroenteritis Bacterial Gastroenteritis MALDI

Section 11.

Mortuary Service

11.0 Mortuary Services

11.1 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

11.2 Hours of Operation and Contact Details

Monday – Friday (excluding Public Holidays)		
Departmental Address	**Routine hours**	**Contact Details**
Mortuary, MRHT, Tullamore, Co Offaly, Ireland. R35 NY51	**Core Hours** 09:00-17:30hrs	057 93**58504** **Can be contacted via Nursing Administration switchboard** Internal Ext 3000 External 057-932 1501
Saturdays, Sundays and Public Holidays		
No Routine/Weekend or On Call Service Can be contacted via Nursing Administration switchboard Internal Ext 3000 External 057-932 1501		

Mortuary Personnel	**Contact Name**	**Contact Details**
Mortuary Senior Pathology Technician	Vacant. Refer Queries to Lab Manager	057 93**59400** aidan.fallon@hse.ie

11.3 Service Information

11.3.1 Autopsy/Post Mortem from Tullamore

- **Patient BID:**
  - If the patient dies before reaching the hospital contact nursing administration on 057 9358489/ 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 9358489/8490 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 9358489/8490
  - 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

11.3.2 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.

11.3.3 Turnaround Time for All Autopsies

- 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.

11.3.4 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.

Section 12.

Near Patient Testing (NPT)

12.0 Near Patient Testing

12.1 Introduction

The Pathology Department, Tullamore provides a routine near patient testing service to the hospital. Tests performed as part of the Near Patient Testing service are not currently cover under the INAB scope of accreditation.

DEFINITION: Testing performed by non-laboratory staff near to, or at the side of the patient rather than in the clinical laboratory environment.

BENEFITS: Rapid generation of a VALID and ACCURATE result can contribute to improved outcomes for patient.

DRAWBACKS: Lack of adherence to NPT procedures and protocols may result in generation of an INCORRECT RESULT which may impact diagnosis/care pathway of patient negatively. Inappropriate use of NPT consumables is a costly drawback of NPT service provision.

A near patient test result should be interpreted in conjunction with patient's history and/or clinical presentation.

12.2 Contact Details for Near Patient Testing Co-Ordinator

Monday – Friday (excluding Public Holidays)		
Departmental Address	**Routine hours**	**Contact Details**
Near Patient Testing, MRHT, Tullamore, Co Offaly, Ireland. R35 NY51	**Core Hours** 08:30-16:30hrs	057 93**57794** **Can be contacted via switchboard** Internal Ext 3000 External 057-932 1501
Saturdays, Sundays and Public Holidays		
No Routine/Weekend or On-Call Service There is limited support available for bloodgas analysis during enhanced service hours on Saturday/Sunday/Public Holiday under the remit of the Biochemistry Department. Please phone switch to be connected with Biochemistry during 09:00 – 14:00 sessions on Saturday/Sunday/Public Holiday.		

NPT Personnel	Contact Name	Contact Details
NPT Co-ordinator Specialist Medical Scientist	Ms. Hannora Martyn	057 93**597794** Hannora.martyn@hse.ie

12.3 NPT Consumables

Please refer to table below to obtain relevant NPT Supplies. **Please order as required only.** Do not order in bulk.

DEVICE	CONSUMABLE	CATALOGUE NUMBER	KIT SIZE	SUPPLIED BY	CPT[1]
ROCHE COBAS LIAT	COBAS LIAT SARS-CoV & Flu A/B assay test	09351990702	20 PER BOX	**NPT**	€50
SIEMENS CLINITEK STATUS	Siemens Clinitek Clinitest hCG test	06484105	25 PER BOX	**NPT**	€2.72
SIEMENS CLINITEK STATUS	Quantimetrix Dropper Plus Controls	1440-04	1X Level 1 1X Level 2	**NPT**	37.30
SIEMENS CLINITEK STATUS	Thermal printer paper	5773	5 rolls/unit	**NPT**	€33.83
WERFEN GEM 5000	600 Reagent pack	00055360010	600 TESTS	**NPT**	€2.84
WERFEN GEM 5000	450 Reagent pack	00055445010	45O TESTS	**NPT**	€2.84
WERFEN GEM 5000	150 Reagent pack	00055415010	150 TESTS	**NPT**	€2.84
WERFEN GEM 5000	Thermal printer paper		20 rolls per box	**NPT**	€0.01
Roche INFORM II	Roche AccuChek Unform II strips	05942861018	50 strips per box	**Pharmacy**	€0.60
Roche INFORM II	ROCHE ACCU-CHEK PERFORMA CONTROLS	05078164001	1 x LEVEL 1 1 X LEVEL 2	**Pharmacy**	€0.01
APEXBIO Ketosure	Ketosure POC Ketone Strips[2]	09290664001	50 strips	**Laboratory Supplies**	€3.50
APEXBIO Ketosure	KETOSURE POC KETONES CONTROL SOLUTIONS[2]	09290699001	Ketosure POC Control Solution Level 1X1 Ketosure POC Control Solution Level 2X1	**Laboratory Supplies**	€20.00

[1]***Cost Per Test is an approximate value. Cost per test does not include any overheads incurred in provision of NPT service (capital, staffing costs).***

[2]***Complete FORM 2: KETOSURE DEVICE CONSUMABLES ORDER FORM T/NPT/EQ/001-02.V00 and send to laboratory supplies. Please allow 24 hour hours for fulfilment. DO NOT ORDER IN BULK.***

12.4 GEM 5000 Blood Gas Analysis

Location of the GEM 5000 analysers and associated back-up devices are listed below:

LOCATION	BACK-UP
ED RESUS	ED MAU
ED MAU	ED RESUS
ICU	CCU
CCU	ICU

Please use assigned back-up analyser if the device in your location is out of order.

Access to Bloodgas Device Network

- **Access is restricted to trained users only.**
  Bloodgas training is delivered online only and is accessible 24/7. Duration is of approximately 15 minutes and includes an online competency assessment.
  Sharing of GEM user passwords is **forbidden** and the practice is monitored daily. Persistent password sharing will result in user deactivation. Reactivation will only be possible post retraining. **Gem 5000 BLOODGAS TRAINING IS AVAILABLE ONLINE ONLY in an effort to make training more accessible.**

REQUIREMENTS TO ACCESS TRAINING AND COMPETENCY TOOL

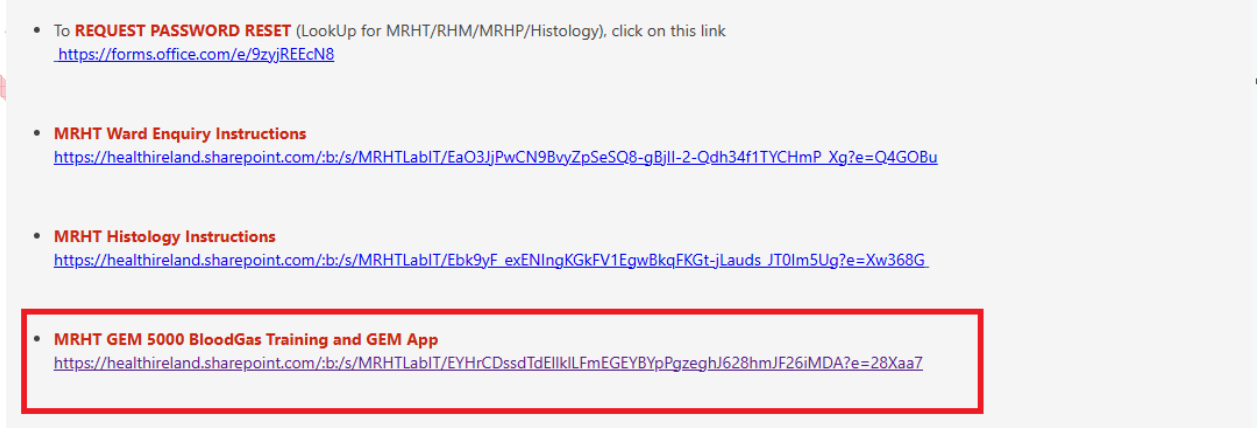
- **Access to WARD LOOKUP**
- **HSE email account**
- **BLOODTRACK barcode on staff identification badge**
- **Device with feature/application to scan QR codes**

Ward Lookup

GEM 5000 BLOODGAS TRAINING IS AVAILABLE ONLINE VIA WARD LOOK UP

1. On WARD ENQUIRY page select 

2. On list displayed, click on **MRHT GEM 5000 BloodGas Training and GEM App**



The link will generate a PowerPoint presentation which incorporates a QR barcode to launch The **Brennan & Co Group training application**.

It is advisable to become familiar with all information contained within this presentation as the competency tool is composed of 10 questions based on same material.

The instructions to activate the GEM Training Application on user's mobile device are straightforward – **PLEASE FOLLOW INSTRUCTIONS.**

COMPONENTS OF TRAINING APPLICATION

1. **Information on THREE stages of bloodgas analysis**
2. **Registration on GEM Training Application**
3. **6 minute filmclip on operation of GEM 5000 device**
4. **Competency exercise with 100% PASS requirement**
5. **User agreement on THREE post analytical statements**
6. **Generation of PASS/FAIL COMPETENCY**
7. **Generation of Certificate of Completion or option to RETAKE the test in the event of FAILURE event**

SUCCESSFUL COMPLETION OF TRAINING APPLICATION

The PASS rate of 100% is required before the software will generate a Certificate of Completion to both user and Near Patient Testing (NPT) Department.

Upon receipt of Certificate of Completion, 24 hours is required to register the user on GEM network by NPT department.

A **FAIL** result is generated in the **event of less than ten questions answered correctly**. The user is advised to retake the competency assessment.

PLEASE NOTE: A CERTIFICATE OF COMPLETION IS GENERATED ONLY WHEN THE COMPETENCY ASSESSMENT IS PASSED.

Refer to Q Pulse for following documents associated with use of GEM 5000 devices:

DOCUMENT NUMBER	DOCUMENT NAME
T/NPT/LP/004	Processing of arterial and venous samples on GEM Premier 5000 Blood Gas Analyser
PATH/NPT/MSDS/5	Gem Premier 5000 pak iQM Safety Data Sheet

12.5 ROCHE COBAS LIAT Analysis

Location of COBAS LIAT analysers and associated backup devices are listed below:

LOCATION	BACK-UP
ED RESUS	ED MAU
ED MAU	ED RESUS

- The COBAS LIAT devices are validated for SARS-CoV-19 and Influenza A&B screening.
- COBAS LIAT devices are for use with ED patients only.
- The LIAT devices are connected to middleware solution for purpose of software management, activity and troubleshooting.
- Samples must be sent to microbiology for additional testing in the following scenarios:

COBAS LIAT RESULT	ACTION
Positive COBAS LIAT SARS-CoV-19	Send to microbiology for official recording
Positive COBAS LIAT Influenza A/B	Send to microbiology for official recording
SARS-CoV-19 CT value requirement	Send to microbiology for testing
COBAS LIAT result does not support patient presentation	Send to microbiology for testing

Refer to Q Pulse for following documents associated with use of Roche COBAS LIAT devices:

DOCUMENT NUMBER	DOCUMENT NAME
T/NPT/LP/001	Screening Clinical Specimens for SARS-CoV-2 and Influenza A/B on Roche COBAS LIAT ® System
PATH/NPT/MSDS/1	Roche Cobas LIAT Sars-CoV2 and Influenza A/B Test kit Safety Data Sheet

To schedule training please contact: Hannora.Martyn@hse.ie

12.6 SIEMENS CLINITEST hCG:

Urine pregnancy testing is available in the following clinical areas:

LOCATION	BACK-UP
ED RESUS	ED MAU
ED MAU	ED RESUS
DAY HOSPITAL	ED MAU or CHILDRENS WARD
CHILDRENS WARD	DAY HOSPITAL OR ED MAU

- The Clinitest hCG assay is validated for urinary hCG value of 25mIU/mL and above.
- **Failure to follow the correct testing procedure will result in an erroneous result.**
- A fresh urine sample may be collected 48-72 hours post initial borderline result and tested. An early morning urine sample is the most appropriate sample for pregnancy confirmation.
- A serum sample must be taken for ß-hCG quantitation in the event of
  1. **borderline result where result is required URGENTLY.**
  2. **negative result where there is a suspicion of pregnancy.**
  3. **Clinitest hCG result does not fit with patient history or clinical presentation.**

Refer to Q Pulse for following documents associated with use of Siemens Clinitest hCG test:

DOCUMENT NUMBER	DOCUMENT NAME
T/NPT/LP/002	Screening Urine Specimens for hCG using Siemens Clinitest hCG Pregnancy test
PATH/NPT/MSDS/3	Siemens Clinitest hCG test cassettes Safety Data Sheet
PATH/NPT/MSDS/4	Quantimetrix Dropper Plus Point-of-Care Urinalysis Dipstick Control

To schedule training please contact: Hannora.Martyn@hse.ie

12.7 ROCHE INFORM II Glucometers

There are 48 Roche inform II glucometer meters operating as standalone devices currently. The Roche Inform II meters are unsuitable for glucose monitoring in patients with the following:

- Poor peripheral perfusion
- Haematocrit less than 10% and greater than 65%

Confirmatory testing is required in the following scenarios:

- NPT glucose result is less than or equal to (≤) 2.5mmol/L.
- NPT glucose result is greater than or equal to (≥) 20.0mmol/L.
- If " **LO**" is displayed on the meter, glucose concentration may be 0.6mmol/L or less
- If "**HI**" is displayed on the meter, glucose concentration may be 33.3mmol/L or more.
- NPT glucose testing is not suitable for patients with poor peripheral perfusion
- If a repeat blood glucose result does not reflect the patient's clinical symptoms.

12.8 APEX BIO KETOSURE Devices

The APEXBIO Ketosure solution is installed in the locations listed below. The Ketosure meters are connected to middleware for the management of quality control, traceability, user access and software upgrades.

Access to the meters is restricted to trained users only.

Each ward which has completed Ketosure training is assigned a user guide compiled for MRH Tullamore specifically. The guide includes all information for meter operation, troubleshooting, meter access and information for ordering supplies.

KETOSURE DEVICE LOCATIONS

LOCATION	METER ASSIGNED	COMMENTS
EMERGENCY DEPARTMENT	2	
ICU	1	**Do not remove from ICU**
CCU	1	**Do not remove from CCU**
DIABETES OPD	1	
BOORA	1	Shared with Pallas ward
ALLEN	1	Shared with Ardan ward
CLONMACNOISE	1	Shared with Shannon ward
BROSNA WARD	1	
CHARLEVILLE	1	Shared with OHIU/OHDU
DAY HOSPITAL	1	

KETOSURE TRAINING AND ACCESS – **please refer to KETOSURE USERGUIDE (Guide NO. 7) on ward**

1. CONTACT DESIGNATE KETOSURE SUPERUSER/TRAINER ON YOUR WARD/CLINICAL AREA TO ARRANGE TRAINING SESSION.
2. ATTEND TRAINING SESSION PROVIDED BY Ketosure Superuser/Trainer assigned to ward
    - KNOWLEDGE AND THEORY
    - KETOSURE DEMONSTRATION
    - KETOSURE PRACTICAL EXERCISE

3. COMPLETION OF FORM 1: APEXBIO KETOSURE TRAINING CHECKLIST AND THEORETICAL COMPETENCY T/NPT/EQ/001-01.V00 by both trainer and staff member. **RETURN COMPLETED FORM TO NPT CO-ORDINATOR:**

HANNORA MARTYN
NPT COORDINATOR
PATHOLOGY LABORATROY
MRH TULLAMORE
Hannora.Martyn@hse.ie

4. **NEW KETOSURE USER WILL UPDATED ON NAVIFY POC MIDDLEWARE WITHIN 24 HOURS OF RECEIPT OF COMPLETED FORM 1: APEXBIO KETOSURE TRAINING CHECKLIST AND THEORETICAL COMPETENCY (T/NPT/EQ/001-01.V00)**

5. **STAFF MEMBER WILL BE NOTIFIED REGARDING ACTIVATION AS KETOSURE OPERATOR VIA EMAIL ADDRESS SUPPLIED ON TRAINING FORM/LINE MANAGER**

12.3 Reporting Of Device Breakdowns

Please email **NPT co-ordinator** with details of the breakdown event, to include:

- Name of device
- Location of device
- Serial number of device
- Details of error incident including error code display, description
- Date and time of event
- Name of reporter
- Contact details of reporter to include email address and telephone number

12.9 Quality Assurance

The Near Patient Testing service participates in a number of different EQA schemes covering all devices listed. For further details in EQA participation, please contact the NPT Co-ordinator. ***Failure to return an EQA exercise will result in Ketosure deactivation in that ward; ward manager will be informed. The device will be reactivated when the EQA exercise is fulfilled by the ward.***

Section 13.

Phlebotomy Services

13.0 Phlebotomy Services

13.1 Introduction

The Phlebotomy service at MRHT is delivered via a structured series of ward rounds typically (7am to 3pm) and a clinic based OPD model (8am to 5pm) with reduced activity from 1pm on Fridays. In addition a phlebotomy service operates on Saturday, Sunday and Bank Holiday mornings to address essential Hospital activity. The service is delivered via a voluntary roster where staffing resources allows and the typical hours of operation are 07:00-12:00hrs

13.2 Contact Details for Phlebotomy

Monday – Friday (excluding Public Holidays)		
Departmental Address	**Routine hours**	**Contact Details**
Phlebotomy, MRHT, Tullamore, Co Offaly, Ireland. R35 NY51	**Core Hours** 08:00-16:00hrs (Reduced services from 1pm on Fridays)	**Can be contacted via switchboard** Internal Ext 3000 External 057-932 1501
Saturdays, Sundays and Public Holidays		
A phlebotomy service operates on Saturday, Sunday and Bank Holiday mornings to address essential Hospital activity. The service is delivered via a voluntary roster where staffing resources allows and the typical hours of operation are 07:00-12:00hrs		

Phlebotomy Personnel	Contact Name	Contact Details
Senior Phlebotomist	Ms. Toni Cunningham	086 0611193 Toni.cunningham@hse.ie

13.3 Service Users

In patients: The Phlebotomy service caters for inpatients at MRHT via a structured series of routes encompassing the wards and clinical locations within the Hospital.

Out Patients: The Phlebotomy service caters for outpatients at MRHT via a clinic structure consisting of two phlebotomy rooms and a waiting area

GPs: The service as capacity to deal with a limited number of GP referrals via the OPD clinic. All referrals must be booked via 0579358635

Section 14.

TEST INDEX

14. Test Index

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
ABG (Arterial Blood Gas)	Internal	**49**	Biochemistry
ACE (angiotensin converting enzyme)	Eurofins Biomnis	**116**	Biochemistry
Acetaminophen (Paracetamol)	Internal	**50**	Biochemistry
Acetylcholine receptor antibodies	Eurofins Biomnis	**116**	Immunology
ACR (Urinary Albumin:Creatinine Ratio)	Internal	**74**	Biochemistry
ACTH (adrinocorticotrophic hormone)	Beaumont	**116**	Biochemistry
Activated Partial Thromboplastin time (APTT)	Internal	**149**	Haematology
Adalimumab (Humira)	Eurofins Biomnis	**116**	Immunology
ADAMTS 13 /Anti ADAMTS antibodies (inhibitory activity)	St James Hospital	**116**	Haematology
ADH (anti diuretic hormone)	Eurofins Biomnis	**116**	Biochemistry
Adrenal antibodies	Eurofins Biomnis	**116**	Immunology
Adrinocorticotrophic hormone (ACTH)	Beaumont	**116**	Biochemistry
AFP (Alpha-fetoprotein)	Internal	**50**	Biochemistry
Alanine aminotransferase (ALT)	Internal	**52**	Biochemistry
Albumin	Internal	**51**	Biochemistry
Albumin BT	Internal	**109**	Blood Transfusion
Alcohol (see Ethanol)	Internal	**60**	Biochemistry
Aldolase	Eurofins Biomnis	**116**	Biochemistry
Aldosterone (recumbent & standing)	St James Hospital	**116**	Biochemistry
Aldosterone and renin (Random)	Eurofins Biomnis	**116**	Biochemistry
Allergy tests	Mullingar	**117**	Immunology
Alkaline Phosphatase (ALP)	Internal	**51**	Biochemistry
Alpha 1 anti-trypsin	Mullingar	**117**	Biochemistry
Alpha 1 anti-trypsin phenotype	Alpha 1 Foundation	**117**	Biochemistry
Alpha gliadin antibodies (tTG/tissue transglutaminase abs)	Mullingar	**117**	Immunology
Alpha-fetoprotein (AFP)	Internal	**50**	Biochemistry
ALT (Alanine aminotransferase)	Internal	**52**	Biochemistry
Aluminium	Public Analysts Lab	**117**	Biochemistry
AMH (anti Mullerin hormone)	Eurofins Biomnis	**117**	Biochemistry
Amikacin level	Eurofins Biomnis	**117**	Biochemistry
Amino Acids	Temple Street	**117**	Biochemistry
Aminophylline level	St James Hospital	**117**	Biochemistry

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
Amiodarone (cordarone)	Eurofins Biomnis	**117**	Biochemistry
AML/APL transcripts (PML RARA)	St James Hospital Or MLL (Germany)	**117**	Haematology
Ammonia	Mullingar	**117**	Biochemistry
Ampicillin allergy	Eurofins Biomnis	**117**	Immunology
Amylase	Internal	**52**	Biochemistry
ANA (anti nuclear antibody/antibody screen)	Mullingar	**117**	Immunology
ANCA & ANCA-C/P (proteinase 3- anti-neutrophil cytoplasmic antibodies)	St James Hospital	**119**	Immunology
Androstenedione	St James Hospital	**119**	Biochemistry
ANF (anti nuclear factor)	Mullingar	**119**	Immunology
Angiotensin converting enzyme (ACE)	Eurofins Biomnis	**118**	Biochemistry
Antenatal blood group	Mullingar	**119**	Blood Transfusion
Anti B19 (Parvovirus)	VRL	**119**	Microbiology
Anti Cardiolipin antibodies	St James Hospital	**119**	Immunology
Anti CCP 9anti cyclic citrullinated peptide)	St James Hospital	**119**	Immunology
Anti diuretic hormone (ADH)	Eurofins Biomnis	**117**	Biochemistry
Anti ganglioside antibodies	Eurofins Biomnis	**118**	Biochemistry
Anti gliadin antibodies (tTG/tissue transglutaminase antibodies).	Mullingar	**119**	Immunology
Anti glomerular basement antibodies	Eurofins Biomnis	**119**	Immunology
Anti-Mullerin hormone (AMH)	Eurofins Biomnis	**118**	Biochemistry
Anti-Phospholipid A2 Receptor antibodies (PLA2R)	Eurofins Biomnis	**119**	Biochemistry
Anti phospolipid antibodies	St James Hospital	**119**	Immunology
Anti proteinase 3	St James Hospital	**118**	Immunology
Anti smooth muscle Antibodies	Mullingar	**119**	Immunology
Anti-thrombin level	St James Hospital	**119**	Haematology
Anti trypsin level	Mullingar	**119**	Immunology
Anti-Xa (factor 10)	St James Hospital	**119**	Haematology
APCR (Activated protein C resistance). See thrombophilia screen.	St James Hospital	**120**	Haematology
APTT (Activated Partial Thrombo-plastin time)	Internal	**149**	Haematology
Arterial Blood Gas (ABG)	Internal	**49**	Biochemistry
ASOT (Anti Streptolysin-O Titre)	Internal	**52**	Biochemistry
Aspartate aminotransferase (AST)	Internal	**53**	Biochemistry

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
Aspergillus antibodies	Eurofins Biomnis	**120**	Microbiology
AST (Aspartate aminotransferase)	Internal	**53**	Biochemistry
Atypical pneumonia screen	Eurofins Biomnis	**120**	Microbiology
Autopsy/Post Mortem	Internal	**193**	Histology
B12 level	Mullingar	**120**	Biochemistry
B2 Microglobulin	Mullingar	**120**	Immunology
B2-Glycoprotein I	St James Hospital	**120**	Biochemistry
Bartonella (cat scratch) antibodies	Eurofins Biomnis	**120**	Microbiology
BCR-ABL	St James Hospital Or MLL (Germany)	**120**	Haematology
Beta Crosslaps (CTx)	Internal	**53**	Biochemistry
Beta D Glucan	St James Hospital	**120**	Microbiology
Beta HCG (serum)	Mullingar	**120**	Biochemistry
Bicarbonate	Internal	**54**	Biochemistry
Bile acids (Bile salts)	Eurofins Biomnis	**120**	Biochemistry
Bilirubin – Direct (Conjugated Bilirubin)	Internal	**54**	Biochemistry
Bilirubin - Total	Internal	**54**	Biochemistry
BK virus (polyoma)	VRL	**120**	Microbiology
Blood culture	Internal	**176**	Microbiology
Blood Film Examination	Internal	**149**	Haematology
Blood Group and Antibody Screen (Group and Hold)	Internal	**84**	Blood Transfusion
Blood Smear for parasites/ Malaria Screen	Internal	**149**	Haematology
Blood Transfusion Investigation	Internal	**84**	Blood Transfusion
Bone allograft culture	Internal	**177**	Microbiology
Bone marrow & blood flow cytometry/ immunophenotyping	St James Hospital Or MLL (Germany)	**120**	Haematology
Bone Marrow Failure	St James Hospital Or MLL (Germany)	**120**	Haematology
Bone Marrow Investigations	Internal	**150**	Haematology/ Histology
Bordetella pertussis antibody	Eurofins Biomnis	**120**	Microbiology
Borrelia burgdorferi antibodies (Lyme disease)	VRL	**121**	Microbiology
Brucella antibodies	Eurofins Biomnis	**121**	Microbiology
Budgerigar feathers allergy	Mullingar	**121**	Immunology
C - Peptide levels	Eurofins Biomnis	**121**	Biochemistry
C1 Esterase inhibitor	St James Hospital	**121**	Immunology
C3 & C4 Complement	Mullingar	**121**	Immunology

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
CA 125	Internal	**54**	Biochemistry
CA 15.3	Internal	**55**	Biochemistry
CA 19.9	Internal	**55**	Biochemistry
Calcitonin	Eurofins Biomnis	**121**	Biochemistry
Calcium	Internal	**55**	Biochemistry
Calprotectin	Eurofins Biomnis	**121**	Biochemistry
Cannulae Culture	Internal	**177**	Microbiology
Carbamazepine level (Tegretol)	St James Hospital	**121**	Biochemistry
Carcinoembryonic antigen (CEA)	Internal	**56**	Biochemistry
Cardiac enzymes (CE)	Internal	**56**	Biochemistry
Cardiolipin antibodies	St James Hospital	**121**	Immunology
Carnitine (free and total)	Eurofins Biomnis	**121**	Biochemistry
CAPD Fluid	Internal	**177**	Microbiology
Cat allergy	Mullingar	**121**	Immunology
Catch scratch (Bartonella antibodies)	Eurofins Biomnis	**121**	Microbiology
Catecholamines (Child <16 years)	Beaumont	**121**	Biochemistry
Catecholamines (Adult)	Eurofins Biomnis	**121**	Biochemistry
CCP antibodies (cyclic citrullinated peptide)	St James Hospital	**121**	Immunology
CD4/8 T cell subsets	St James Hospital	**121**	Haematology
CE (Cardiac enzymes)	Internal	**55**	Biochemistry
CEA (Carcinoembryonic antigen)	Internal	**55**	Biochemistry
Ceruloplasmin	Mullingar	**121**	Biochemistry
CF common mutations	Eurofins Biomnis	**121**	Molecular Diagnosis
CFTR mutation (sent to cytogenetics in Crumlin as part of acute pancreatitis screen)	Crumlin	**122**	Molecular Diagnostics
CH100/CH50	St James Hospital	**122**	Molecular Diagnostics
Chitotriosidase level	Willink Genetics Lab Manchester	**122**	Biochemistry
Chlamydia and Gonorrhoea	VRL	**122**	Microbiology
Chloride	Internal	**56**	Biochemistry
Chloroquine level	Eurofins Biomnis	**122**	Biochemistry
Chlorpromazine (Largactil)	Eurofins Biomnis	**122**	Biochemistry
Cholesterol	Internal	**56**	Biochemistry
Cholinesterase	Eurofins Biomnis	**122**	Biochemistry
Chromium	Charing Cross	**122**	Biochemistry
Chromogranin A	Eurofins Biomnis	**122**	Biochemistry
Chromosomal Analysis/Studies	SJH, MLL or Eurofins Biomnis	**122**	Genetics

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
Citrate (Urinary)	Eurofins Biomnis	**122**	Biochemistry
CK (Creatine Kinase)	Internal	**57**	Biochemistry
CLL (FISH)	Crumlin	**122**	Molecular Diagnostics
CMV PCR (cytomegalovirus)	VRL	**122**	Microbiology
CMV antibodies (cytomegalovirus)	VRL	**122**	Microbiology
Coagulation Screen (PT and APTT)	Internal	**149**	Haematology
Coagulation Factors	Internal	**106**	Blood Transfusion
Cobalt level	Charing Cross	**123**	Biochemistry
Coeliac antibodies (tTG/tissue glutaminase abs/Alpha gliadin)	Mullingar	**123**	Immunology
Colorectal Molecular Panel	St James Hospital	**161**	Histology
Collagen Screen	Mullingar	**123**	Immunology
Copper level	Public Analysts Lab	**123**	Biochemistry
Cordarone (amiodarone)	Eurofins Biomnis	**123**	Biochemistry
Corrected Calcium	Internal	**57**	Biochemistry
Cortisol (Serum)	Mullingar	**123**	Biochemistry
Cortisol 24hr urinary	Eurofins Biomnis	**123**	Biochemistry
COVID-19 PCR	Internal	**177**	Microbiology
Coxiella burnetii antibodies	Eurofins Biomnis	**123**	Microbiology
Coxsackie virus culture	VRL	**123**	Microbiology
CPE Screening(carbapenemase resistant Enterobaecteriaceae)	Internal	**179**	Microbiology
C-Reactive Protein (CRP)	Internal	**58**	Biochemistry
Creatine Kinase (CK)	Internal	**57**	Biochemistry
Creatinine	Internal	**57**	Biochemistry
Creatinine - enzymatic	Internal	**57**	Biochemistry
Crossmatch of blood units	Internal	**82**	Blood Transfusion
Crithidia	St James Hospital	**123**	Immunology
CRP (C-Reactive Protein)	Internal	**58**	Biochemistry
Cryptococcus neoformans	St James Hospital	**123**	Microbiology
CSF	Internal	**179**	Microbiology
CSF for Oligoclonal Bands	St James Hospital	**123**	Immunology
CSF flow cytometry	St James Hospital	**123**	Haematology
CSF glucose	Internal	**72**	Biochemistry
CSF Protein	Internal	**72**	Biochemistry
CSF for viral studies	VRL	**123**	Microbiology
CTx (Beta Crosslaps)	Internal	**53**	Biochemistry
Cyclic citrullinated peptide (CCP) antibodies	St James Hospital	**123**	Immunology

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
Cyclosporin	St James Hospital	**123**	Biochemistry
Cystic fibrosis screen-108 common mutations	Eurofins Biomnis	**123**	Molecular Diagnostics
Cystine (Urinary)	Eurofins Biomnis	**123**	Biochemistry
Cytogenetics on tissue/bone marrow	St James Hospital, MLL Germany, Eurofins Biomnis	**124**	Molecular Diagnostics
Cytogenetics FISH (EDTA)	St James Hospital, MLL Germany, Crumlin	**124**	Molecular Diagnostics
Cytology Fluids – including TBNA, Sputa and Brushings	Internal	**162**	Histology
Cytomegalovirus antibodies (CMV)	VRL	**124**	Microbiology
Cytomegalovirus PCR (CMV)	VRL	**124**	Microbiology
Cytotoxic antibodies	Beaumont	**124**	Immunology
DAT(Direct Antiglobulin Test)	Internal	**82**	Blood Transfusion
D-Dimers	Internal	**149**	Haematology
Dengue virus antibodies	VRL	**124**	Microbiology
DHEAS (dehydroepiandrosterone sulfate)	St James Hospital	**124**	Biochemistry
Differential White Cell	Internal	**149**	Haematology
Digoxin levels	St James Hospital	**124**	Biochemistry
Direct Antiglobulin Test (DAT)	Internal	**82**	Blood Transfusion
Direct Coombs Test (DCT)	Internal	**82**	Blood Transfusion
DNA double strand (dsDNA) antibodies	Mullingar	**124**	Molecular Diagnosis
Dog allergy	Mullingar	**124**	Immunology
DPD (Dihydropyrimidine Dehydrogenase)	Eurofins Biomnis	**124**	Biochemistry
E. Coli typing	Cherry Orchard	**124**	Microbiology
Ear Swabs	Internal	**180**	Microbiology
EBV (Epstein Barr Virus)	VRL	**124**	Microbiology
EBV (Epstein Barr Virus) PCR	VRL	**124**	Microbiology
eGFR	Internal	**59**	Biochemistry
Electrolytes (Sodium, Potassium, Chloride)	Internal	**59**	Biochemistry
EMA (Eosin 5 Melemide for flow cytometry)	St James Hospital	**124**	Haematology
ENA ELISA (extractable nuclear antigens)	St James Hospital	**124**	Immunology
Endomysial antibodies	Mullingar	**124**	Immunology

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
Eosin 5 Melemide (EMA for flow cytometry)	St James Hospital	**124**	Haematology
Epanutin (phenytoin)	St James Hospital	**125**	Biochemistry
EPO (Erythropoetin) receptor antibodies	Eurofins Biomnis	**125**	Immunology
EPO (Erythropoietin) levels	Eurofins Biomnis	**125**	Biochemistry
Epstein Barr Virus (EBV)	VRL	**125**	Microbiology
Erythrocyte pyruvate kinase	Eurofins Biomnis	**125**	Biochemistry
Erythrocyte Sedimentation Rate (ESR)	Internal	**149**	Haematology
ESR (Erythrocyte Sedimentation Rate)	Internal	**149**	Haematology
Ethanol (Alcohol)	Internal	**60**	Biochemistry
Ethanol (Ethyl Alcohol)	Internal	**60**	Biochemistry
Ethyl Alcohol (Ethanol)	Internal	**60**	Biochemistry
Ethylene Glycol	Birmingham	**125**	Biochemistry
Extrinsic factor antibodies	Mullingar	**125**	Haematology
Extrinsic Factor assay screen: must state required factors (see individual factors)	St James Hospital	**125**	Haematology
Eye Swabs	Internal	**180**	Microbiology
Extended RBC Genotyping	IBTS	**84**	Blood Transfusion
Factor IX	St James Hospital	**125**	Haematology
Factor V (Leiden)	St James Hospital	**125**	Haematology
Factor VII assay	St James Hospital	**125**	Haematology
Factor VIII assay	St James Hospital	**125**	Haematology
Factor VIII:C	St James Hospital	**125**	Haematology
Factor X	St James Hospital	**125**	Haematology
Factor Xa (Anti-Xa)	St James Hospital	**125**	Haematology
Factor XI assay	St James Hospital	**125**	Haematology
Factor XII assay	St James Hospital	**125**	Haematology
Factor XIII	St James Hospital	**125**	Haematology
Faeces	Internal	**181**	Microbiology
Fanconi anaemia	Eurofins Biomnis	**126**	Molecular Diagnosis
Farmers lung antibodies (Microspora faenii)	Eurofins Biomnis	**126**	Microbiology
FBC (Full Blood Count)	Internal	**149**	Haematology
Ferritin	Mullingar	**126**	Biochemistry
Fibrinogen	Internal	**149**	Haematology

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
Fibrinogen Concentrate(Riastap)	Internal	**106**	Blood Transfusion
Fine Needle Aspiration (FNA)Cytology	Internal	**162**	Histology
Fipili PDGFRA studies	Salisbury District Hospital	**126**	Molecular Diagnosis
FISH (CLL)	Crumlin	**126**	Molecular Diagnosis
FISH (Multiple myeloma)	Crumlin	**126**	Molecular Diagnosis
Fish allergy	Mullingar	**126**	Immunology
Flecanide (Tambacor)	Eurofins Biomnis	**126**	Biochemistry
Flow cytometry - Bone marrow & blood	St James Hospital	**126**	Haematology
Fluids	Internal	**182**	Microbiology
Fluids for Cytology – including TBNA, Sputa and Brushings	Internal	**161**	Histology
FNA (Fine Needle Aspiration) Cytology	Internal	**162**	Histology
Folate & Vitamin B12	Mullingar	**126**	Biochemistry
Folicle stimulating hormone (FSH)	Mullingar	**126**	Biochemistry
Fragile X screen	Eurofins Biomnis	**126**	Molecular Genetics
Free light chain assay	St James Hospital	**126**	Immunology
Free T3	Mullingar	**126**	Biochemistry
Free T4 (See TFT's)	Mullingar	**126**	Biochemistry
Frozen Sections	Internal	**159**	Histology
Fructosamine	Eurofins Biomnis	**126**	Biochemistry
FSH (folicle stimulating hormone)	Mullingar	**126**	Biochemistry
Full Blood Count (FBC)	Internal	**149**	Haematology
Fungal Culture and Microscopy	Internal	**182**	Microbiology
G6PD (Glucose 6 phosphate dehydrogenase)	Eurofins Biomnis	**126**	Biochemistry
GAD (Glutamic Acid Decarboxylase) autoantibodies	Eurofins Biomnis	**126**	Immunology
Galactomannan	St James Hospital	**127**	Biochemistry
Gamma glutamyl transferase (Gamma-GT)	Internal	**60**	Biochemistry
Gamma-GT (Gamma glutamyl transferase)	Internal	**60**	Biochemistry
Ganglioside antibodies	Eurofins Biomnis	**127**	Immunology
Gastrin	Eurofins Biomnis	**127**	Biochemistry
Genetic Cationic Trypsinogen SPINK-1 mutation	Crumlin	**127**	Molecular Diagnostics
Genital Tract and Associated Specimens	Internal	**183**	Microbiology
Gentamicin	Internal	**65**	Biochemistry
GIST Molecular Panel	St James Hospital	**161**	Histology

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
Globulin level	Mullingar	**127**	Immunology
Glomular basement membrane	Eurofins Biomnis	**127**	Immunology
Glucagon	Eurofins Biomnis	**127**	Biochemistry
Glucose	Internal	**61**	Biochemistry
Glucose (CSF)	Internal	**72**	Biochemistry
Glucose 6 phosphate dehydrogenase (G6DP)	Eurofins Biomnis	**128**	Haematology
Glutamic acid decarboxylase (GAD) autoantibodies	Eurofins Biomnis	**127**	Immunology
Glycoprotein I (B2)	St James Hospital	**127**	Biochemistry
Grass pollen allergy	Mullingar	**127**	Immunology
Group and Hold (Blood Group and Antibody Screen)	Internal	**84**	Blood Transfusion
Growth hormone (somatrophin)	St James Hospital	**127**	Biochemistry
GTT (Glucose tolerance test)	Internal	**61**	Biochemistry
Gynaecological Cytology	Internal	**163**	Histology
Haemochromatosis mutations	Mullingar	**127**	Molecular Diagnostics
Haemoglobinopathy screen (Adult)	St James Hospital	**127**	Haematology
Haemoglobinopathy screen (Child <16 years)	Crumlin	**127**	Haematology
Haemophilia screen	St James Hospital	**127**	Haematology
Haemophilus influenzae PCR	Temple Street	**127**	Microbiology
Haemosiderin	St James Hospital	**127**	Biochemistry
Haptogloblin	Mullingar	**127**	Haematology
Hb A2 (see Thalassaemia)	St James Hospital	**128**	Haematology
Hb electrophoresis (Thalassaemia)	St James Hospital	**128**	Haematology
HbA1c	Internal	**61**	Biochemistry
HCG (Human chorionic gonadotrophin) Tumour Marker	Internal	**61**	Biochemistry
HCG (Human chorionic gonadotrophin) Pregnancy Marker	Mullingar	**128**	Biochemistry
HDL (HDL-Cholesterol)	Internal	**62**	Biochemistry
HDL-Cholesterol (HDL)	Internal	**62**	Biochemistry
Hepatitis A antibodies	VRL	**128**	Microbiology
Hepatitis and HIV viral screen	VRL	**128**	Microbiology
Hepatitis B antibodies	VRL	**128**	Microbiology
Hepatitis B Core antibodies	VRL	**128**	Microbiology
Hepatitis B HBsAg (antigen)	VRL	**128**	Microbiology
Hepatitis B PCR (DNA viral load)	VRL	**128**	Microbiology
Hepatitis B total Core antibodies	VRL	**128**	Microbiology

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
Hepatitis C antibodies	VRL	**128**	Microbiology
Hepatitis C antigen	VRL	**128**	Microbiology
Hepatitis C PCR (RNA viral load)	VRL	**128**	Microbiology
Hepatitis E antibodies	VRL	**128**	Microbiology
Hepatitis screen (HBsAg & Hep C)	VRL	**128**	Microbiology
Her2Neu	St James Hospital	**128**	Histology
Herpes simplex virus	VRL	**128**	Microbiology
HIAA - 5 (5-hydroxyindoleacetic acid)	Beaumont	**128**	Biochemistry
High affinity Hb	St James Hospital	**128**	Haematology
Histology (Routine)	Internal	**159**	Histology
Histoplasmosis	Eurofins Biomnis	**128**	Microbiology
HIT Screen Heparin-induced thrombocytopenia screen	St James Hospital	**128**	Haematology
HIV antibodies	VRL	**129**	Microbiology
HIV viral load (PCR)	VRL	**129**	Microbiology
HLA typing (oncology)	IBTS	**129**	Blood Transfusion
HLA B27 (Tissue typing)	IBTS	**129**	Blood Transfusion
HLA Class I typing for HLA matched platelets	IBTS	**129**	Immunology
HLA tissue typing for potential transplant patients/family	Beaumont	**129**	Immunology
Homocysteine	Eurofins Biomnis	**129**	Biochemistry
House dust mite allergy	Mullingar	**129**	Immunology
HPA-Human platelet antigen typing	IBTS	**129**	Immunology
Human chorionic gonadotrophin (HCG)	Mullingar	**129**	Biochemistry
HPA (Human platelet antigen typing)	IBTS	**129**	Blood Transfusion
Hydroxyindoleacetic acid - 5 (5-HIAA)	Beaumont	**129**	Biochemistry
Hydroxy-Progesterone - 17 (progesterone)	Eurofins Biomnis	**129**	Biochemistry
Hydroxyproline	Eurofins Biomnis	**129**	Biochemistry
I.M. (Infectious Mononucleosis Screen)	Internal	**149**	Haematology
IgE	Mullingar	**130**	Immunology
IGF-1 (insulin like growth factor 1)	St James Hospital	**130**	Biochemistry
IgG 4 (IgG Sub-classes)	Eurofins Biomnis	**130**	Immunology
IgG Subclasses Profile	Eurofins Biomnis	**130**	Immunology
Immunoglobulin A (IgA)	Mullingar	**130**	Immunology
Immunoglobulin E (IgE)	Mullingar	**130**	Immunology
Immunoglobulin G (IgG)	Mullingar	**130**	Immunology
Immunoglobulin gene rearrangement studies (PCR)	St James Hospital	**130**	Molecular Diagnostics

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
Immunoglobulin M (IgM)	Mullingar	**130**	Immunology
Immunohistochemistry	Dependent on availability of INAB accredited tests across multiple sites	**130**	Histology
Immunophenotyping (peripheral blood)	St James Hospital Or MLL (Germany)	**130**	Haematology
Infectious Mononucleosis Screen (I.M.)	Internal	**149**	Haematology
Infliximab Antibody	Eurofins Biomnis	**130**	Biochemistry
Infliximab Level	Eurofins Biomnis	**130**	Biochemistry
Influenza A & B and RSV detection	Internal	**184**	Microbiology
Influenza A & B antibodies	Eurofins Biomnis	**130**	Microbiology
INR (Prothrombin time/PT)	Internal	**149**	Haematology
Insulin level	Eurofins Biomnis	**130**	Biochemistry
Intrinsic factor antibodies	Eurofins Biomnis	**130**	Haematology
Intrinsic pathway screen	St James Hospital	**130**	Haematology
Iron Latent Cap (see iron studies)	Mullingar	**130**	Biochemistry
Iron levels (see iron studies)	Mullingar	**131**	Biochemistry
Iron Overdose	Mullingar	**131**	Biochemistry
Iron studies (TIBC, UIBC, iron saturation & transferrin)	Mullingar	**131**	Biochemistry
Islet antibodies	Eurofins Biomnis	**131**	Immunology
JAK2 - Exon 12 mutation analysis	Addenbrookes Hospital	**131**	Molecular diagnostics
JAK2 V617F mutation analysis: PCR test	St James Hospital	**131**	Molecular diagnostics
JCV (JC virus)	VRL	**131**	Microbiology
Karyotyping	Eurofins Biomnis	**131**	Molecular Diagnostics
Keppra (levetiracetam)	Eurofins Biomnis	**131**	Biochemistry
La (& Ro) antibodies	St James Hospital	**131**	Immunology
Lactate dehydrogenase (LDH)	Internal	**62**	Biochemistry
Lamotrigine (lamictal)	Eurofins Biomnis	**131**	Biochemistry
Largactil (Chlorpromazine)	Eurofins Biomnis	**131**	Biochemistry
LDH (Lactate dehydrogenase)	Internal	**62**	Biochemistry
LDL (LDL-Cholesterol)	Internal	**62**	Biochemistry
LDL-Cholesterol (LDL)	Internal	**62**	Biochemistry
Lead levels	Public Analysts Lab	**131**	Biochemistry
Leptospira antibodies	VRL	**131**	Microbiology
Leucocyte /HLA antibodies	IBTS	**131**	Blood Transfusion
Leutenising Hormone (LH)	Mullingar	**131**	Biochemistry
Levetiracetam (keppra)	Eurofins Biomnis	**131**	Biochemistry
LH (lutenising hormone)	Mullingar	**131**	Biochemistry

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
Lipase	Eurofins Biomis	**131**	Biochemistry
Lipid profile – fasting	Internal	**63**	Biochemistry
Lipid profile - random	Internal	**63**	Biochemistry
Lipoprotein A	Eurofins Biomnis	**131**	Biochemistry
Listeria monocytogenes PCR	IMSRL	**132**	Microbiology
Lithium level	Portlaoise	**132**	Biochemistry
Liver function tests (LFTs)	Internal	**63**	Biochemistry
Liver-Kidney microsomal antibody	Mullingar	**132**	Immunology
Lung Molecular Panel	St James Hospital	**161**	Histology
Lupus anticoagulant	St James Hospital	**132**	Haematology
Lyme disease (Borrelia burgdorferi)	VRL	**132**	Microbiology
Lymph Nodes	Internal	**161**	Histology
Lymphocyte immunophenotyping	St James Hospital or MLL (Germany)	**132**	Haematology
Lymphocyte subsets	St James Hospital or MLL (Germany)	**132**	Haematology
Macroprolactin	Eurofins Biomnis	**132**	Biochemistry
Magnesium	Internal	**63**	Biochemistry
Malaria Screen/Blood Smear for parasites	Internal	**152**	Haematology
Malaria verification	Tropical Disease Centre London	**132**	Haematology
Manganese level	Eurofins Biomnis	**132**	Biochemistry
Measles antibodies	VRL	**132**	Microbiology
Melanoma Molecular Panel	St James Hospital	**161**	Histology
Meningitis screen on child (Haemophilus influenza PCR, Neisseria meningitidis PCR & Streptococcus pneumonia PCR)	Temple Street	**132**	Microbiology
Meningococcal PCR (Neisseria meningitidis PCR)	Internal	**132**	Microbiology
Mercury	Public Analysts Lab	**132**	Biochemistry
Metabolic screen	Temple Street	**133**	Biochemistry
Metanephrines 24 hr. urine	Eurofins Biomnis	**133**	Biochemistry
Metanephrines (plasma)	Eurofins Biomnis	**133**	Biochemistry
Methotrexate	Eurofins Biomnis	**133**	Biochemistry
Micro Array	Eurofins Biomnis	**133**	Genetics
MSI Molecular	Beaumont Hospital	**161**	Histology
Microspora faenii (farmers' lung)	Eurofins Biomnis	**133**	Microbiology
Milk allergy	Mullingar	**133**	Immunology

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
Mitochondrial antibodies.	Mullingar	**133**	Immunology
Mixing Studies	Internal	**149**	Haematology
Molecular Investigation for other Blood Groups	IBTS	**83**	Blood Transfusion
Monkeypox Virus	NVRL	**133**	Microbiology
Mouth Swabs	Internal	**186**	Microbiology
MPN Screen (JAK2 CALR MPL)	St James Hospital	**134**	Molecular diagnostics
MPO abs (Myeloperoxidase antibodies)	St James Hospital	**133**	Immunology
MRD studies (minimum residual disease)	St James Hospital	**133**	Haematology
MRSA Screening	Internal	**185**	Microbiology
MRSA Typing	St James Hospital	**133**	Microbiology
Multiple myeloma (FISH)	MLL (Germany) or Eurofins Biomnis (France)	**133**	Molecular Diagnostics
Mumps antibodies	VRL	**133**	Microbiology
Muscle Pathology	Beaumont	**164** **133**	Histology
Muscular Dystrophy-1(Muscular genetics/DNA analysis)	Crumlin	**133**	Molecular Diagnostics
Mycoplasma pneumoniae antibodies	Eurofins Biomnis	**133**	Microbiology
MYD88	MLL Germany or Kings College Hospital, London	**134**	Haematology
Myeloid Gene Panel	SJH OR MLL Germany	**134**	Haematology
Myeloperoxidase antibodies (MPO abs.)	St James Hospital	**134**	Immunology
Myoglobin	Eurofins Biomnis	**134**	Biochemistry
Myoglobin - urine	Eurofins Biomnis	**134**	Biochemistry
Myositis	Eurofins Biomnis	**134**	Immunology
Nail cuttings for fungal culture	Mullingar	**134**	Microbiology
nDNA antibodies(DNA)	Mullingar	**134**	Immunology
Neisseria meningitides PCR (meningococcal PCR)	Temple Street	**134**	Microbiology
Neuro Pathology	Beaumont	**134**	Histology
Neuronal Antibody (HU, RI, YO, CV2, MA2)	Eurofins Biomnis	**134**	Immunology
Neurontin (Gabapentin)	Eurofins Biomnis	**134**	Biochemistry
Neutrophil cytoplasmic antibodies	St James Hospital	**134**	Immunology
Neutrophil elastase mutation	Hanover Germany	**134**	Molecular Diagnosis
Norovirus (SRSV)	VRL	**134**	Microbiology
Novoseven (Recombinant Coagulation Factor VII)	St James Hospital	**107**	Blood Transfusion

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
NTproBNP (N-terminal pro B-type natriuretic peptide)	Internal	**64**	Biochemistry
Octaplex (Human Prothrombin Complex)	IBTS	**107**	Blood Transfusion
Oestradiol	Mullingar	**134**	Biochemistry
Olanzapine	Eurofins Biomnis	**134**	Biochemistry
Oligoclonal bands	St James Hospital	**134**	Immunology
Oncomine Molecular	St James Hospital	**161**	Histology
Organic acids	Temple Street	**134**	Biochemistry
Osmolality	St James Hospital	**135**	Biochemistry
Ova and parasites	Cherry Orchard Hospital	**135**	Public Health Lab
Oxalate (urinary)	Eurofins Biomnis	**135**	Biochemistry
P1NP (Procollagen Type-1 N-terminal Propeptide)	Internal	**65**	Biochemistry
Pancreatic polypeptide (PTH related peptide)	Eurofins Biomnis	**135**	Biochemistry
Pancreatitis (acute): Carbonic Anhydrase 1 & 2 (Anti Carbonic Anhydrase antibodies & Anti Lactoferrin antibodies) Genetic cationic trypsinogen SPINK-1 mutation CFTR mutation (sent to cytogenetics in Crumlin as part of acute pancreatitis screen)	 Eurofins Biomnis Crumlin Crumlin	**135**	Biochemistry
Parainfluenza virus 1,2,3 antibodies	Eurofins Biomnis	**135**	Microbiology
Paracetamol (Acetaminophen)	Internal	**64**	Biochemistry
Paraquat	Beaumont	**135**	Biochemistry
Parietal cell antibodies	Mullingar	**135**	Immunology
Parvovirus antibodies	VRL	**135**	Microbiology
PB (peripheral blood) immunophenotyping	St James Hospital or MLL Germany	**135**	Haematology
PDL-1	St James Hospital or Poundbury Cancer Inst	**161**	Histology
Penicillin G Allergy	Mullingar	**136**	Immunology
Penicillin V Allergy	Mullingar	**136**	Immunology
Pertussis antibodies (Bordatella pertussis)	Eurofins Biomnis	**136**	Microbiology

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
Phenobarbatone	Eurofins Biomnis	**136**	Biochemistry
Phenytoin (Epanutin)	St James Hospital	**136**	Biochemistry
Phospholipid antibodies (B2-glycoprotein and cardiolipin antibodies)	St James Hospital	**136**	Immunology
PLA2R (Anti-Phospholipid A2 Receptor antibodies)	Eurofins Biomnis	**121**	Biochemistry
Phosphorous	Internal	**64**	Biochemistry
Plasma (LG OCTAPLAS)	Internal	**106**	Blood Transfusion
Plasma Viscosity	St James Hospital	**136**	Biochemistry
Platelets	Internal	**105**	Blood Transfusion
Platelet antibodies	IBTS	**136**	Blood Transfusion
Platelet refractoriness	IBTS	**136**	Haematology
Platelet transfusion	Internal	**105**	Blood Transfusion
PML RARA (AML/APL transcripts)	St James Hospital or MLL Germany	**136**	Molecular Diagnostics
Pneumococcol antibody titre	St James Hospital	**136**	Microbiology
PNH (paroxysmal nocturnal haemoglobinuria)	St James Hospital	**136**	Biochemistry
Polyoma (BK virus)	VRL	**136**	Microbiology
Porphobilinogen	St James Hospital	**136**	Biochemistry
Porphyrins	St James Hospital	**136**	Biochemistry
Post transfusion purpura-PTP	IBTS	**136**	Immunology
Potassium	Internal	**64**	Biochemistry
Preader Willi	Eurofins Biomnis	**136**	Molecular Genetics
Pregnancy Tests	Internal	**186**	Microbiology
Procalcitonin	Eurofins Biomnis	**70**	Biochemistry
Pro collagen III antibodies	Eurofins Biomnis	**137**	Immunology
Procollagen Type-1 N-terminal Propeptide* (P1NP)	Internal	**65**	Biochemistry
Pro insulin level	Eurofins Biomnis	**137**	Biochemistry
Progesterone	Mullingar	**137**	Biochemistry
Prograf (tacrolimus)	Eurofins Biomnis	**137**	Biochemistry
Prolactin	Mullingar	**137**	Biochemistry
Protein	Internal	**66**	Biochemistry
Protein (CSF)	Internal	**72**	Biochemistry
Protein C & Protein S	St James Hospital	**137**	Molecular Genetics
Protein electrophoresis (total protein, albumen, immunoglobulins, B-2 microglobulin)	Mullingar	**137**	Immunology
Proteinase 3 ANCA	St James Hospital	**137**	Immunology

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
Prothrombin mutation	St James Hospital	**137**	Molecular Genetics
Prothrombin time (PT)/INR	Internal	**149**	Haematology
PSA	Internal	**65**	Biochemistry
PT (INR / Prothrombin time)	Internal	**149**	Haematology
PTH	Internal	**66**	Biochemistry
Pyruvate dehydrogenase	Eurofins Biomnis	**137**	Biochemistry
Pyruvate kinase	Eurofins Biomnis	**137**	Biochemistry
Q Fever (Coxiella burnetti) antibodies	Eurofins Biomnis	**137**	Microbiology
Quantiferon (TB)	Eurofins Biomnis	**137**	Microbiology
Recombinant Coagulation Factor VII (*e.g.* Novoseven)	St James Hospital	**107**	Blood Transfusion
Recombinant Coagulation Factor VIII (*e.g.* Elocta)	St James Hospital	**107**	Blood Transfusion
Red Cell Concentrate (RCC)	Internal	**103**	Blood Transfusion
Red cell folate	Eurofins Biomnis	**137**	Biochemistry
Reducing substances	Eurofins Biomnis	**137**	Biochemistry
Renal pathology	Beaumont	**137** **165**	Histology
Renin (& aldosterone if required) recumbent and standing	St James Hospital	**138**	Biochemistry
Renin (active) - random sample	Eurofins Biomnis	**139**	Biochemistry
Reticulocyte Count	Internal	**149**	Haematology
RF (Rheumatoid Factor)	Internal	**67**	Biochemistry
Rheumatoid Factor (RF)	Internal	**67**	Biochemistry
Risperidone level	Eurofins Biomnis	**138**	Biochemistry
Ristocetin co-factor (RiCOF)	St James Hospital	**138**	Haematology
Ro (& La) antibodies	St James Hospital	**138**	Immunology
Routine Histology	Internal	**159**	Histology
Rubella antibodies (antenatal)	VRL	**138**	Microbiology
Rubella antibodies (non antenatal)	VRL	**138**	Microbiology
Salicylate	Internal	**67**	Biochemistry
Salmonella/Shigella typing	Internal	**181**	Microbiology
SARS (Severe acute respiratory syndrome causing virus)	VRL	**138**	Microbiology
Selenium level	Eurofins Biomnis	**138**	Biochemistry
Serum eGFR (see also Urinary Creatinine Clearance)	Internal	**59 (70)**	Biochemistry
Sex hormone binding globulin	Eurofins Biomnis	**138**	Biochemistry
Sickle cell - Adult (see Thalassaemia)	St James Hospital	**138**	Haematology

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
Sickle cell – Child <16 years (see Thalassaemia)	Crumlin	**138**	Haematology
Sinus Aspirate	Internal	**186**	Microbiology
Sirolimus	Eurofins Biomnis	**138**	Biochemistry
Skin Biopsies	Internal	**166**	Histology
Skin IF	St James Hospital	**139**	Immunology
Skin scrapings for fungal culture	Mullingar	**139**	Microbiology
Smooth muscle antibodies	Mullingar	**139**	Immunology
Sodium	Internal	**67**	Biochemistry
Sodium valporate	Mullingar	**139**	Biochemistry
Somatomedin-C (IgF-1)	St James Hospital	**139**	Biochemistry
Somatrophin (growth hormone)	St James Hospital	**139**	Biochemistry
Sputum	Internal	**186**	Microbiology
Specific Gravity (see Osmolality)	St James Hospital	**137**	Biochemistry
SRSV (small round structured virus or Norovirus)	VRL	**139**	Microbiology
STFR - (soluble transferring receptor)	St James Hospital	**139**	Haematology
Synacthen test	Mullingar	**139**	Biochemistry
Syphillis -VDRL - antenatal	VRL	**139**	Microbiology
Syphillis -VDRL - non-antenatal	VRL	**139**	Microbiology
T3 or T4 (Free)	Mullingar	**139**	Biochemistry
Tacrolimus (Prograf)	Eurofins Biomnis	**139**	Biochemistry
Tambacor (Flecanide)	Eurofins Biomnis	**139**	Biochemistry
TB culture	St James Hospital	**139**	Microbiology
TB Rapid Molecular Investigation	St James Hospital	**139**	Microbiology
TB QUANTIFERON	Eurofins Biomnis	**139**	Microbiology
TBII (thyroid binding inhibitor immunoglobulin)	Eurofins Biomnis	**140**	Immunology
T-cell receptor (TCR) gene rearrangement studies: PCR test	St James Hospital or MLL Germany	**139**	Molecular Diagnostics
T-cell subsets (CD4/8)	St James Hospital or MLL Germany	**139**	Haematology
Tegretol (Carbamazapine)	St James Hospital	**139**	Biochemistry
Testosterone - free index	St James Hospital	**140**	Biochemistry
Testosterone level- male/female/child	St James Hospital	**140**	Biochemistry
Tetanus antibodies	Eurofins Biomnis	**140**	Microbiology
TFTs (thyroid function tests - TSH & Free T4)	Mullingar	**140**	Biochemistry
Thalassaemia (Hb electrophoresis for HbA2 or HbF)	St James Hospital	**140**	Haematology

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
Thalassaemia (α or β genotype)	Kings College Hospital	**140**	Haematology
Theophylline	St James Hospital	**140**	Biochemistry
Thiamine (see vitamin B1)	Eurofins Biomnis	**140**	Biochemistry
Thiopurine methyl transferase (Haem TPMT)	Eurofins Biomnis	**140**	Biochemistry
Throat Swab for C/S	Internal	**187**	Microbiology
Thrombin antibody	St James Hospital	**140**	Haematology
Thrombophilia screen (Protein C & S, cardiolipin antibodies, prothrombin, lupus anticoagulant, homocysteine, antithrombin activity, factor V Leiden, factor VIII, fibrinogen)	St James Hospital	**140**	Haematology
Thyroglobulin levels	Eurofins Biomnis	**140**	Biochemistry
Thyroid binding inhibitor immunoglobulin (TBII)	Eurofins Biomnis	**140**	Immunology
Thyroid peroxidase antibodies (TPO)	Mullingar	**140**	Immunology
Thyroid receptor antibodies	Eurofins Biomnis	**140**	Immunology
Thyroid stimulating hormone (TSH)	Mullingar	**140**	Biochemistry
TIBC (see iron studies)	Mullingar	**141**	Biochemistry
Tissue/Biopsy for C/S	Internal	**187**	Microbiology
Troponin T High sensitivity (hs TNT)	Internal	**68**	Biochemistry
Tobramycin level (pre)	Eurofins Biomnis	**141**	Biochemistry
Topiramate (topamax)	Eurofins Biomnis	**141**	Biochemistry
Torch screen (Toxoplasma, CMV, Rubella, Herpes simplex)	VRL	**141**	Microbiology
Total Iron Binding Cap (see iron studies)	Mullingar	**141**	Biochemistry
Toxacara antibodies	Hospital for Tropical Diseases, London	**141**	Microbiology
Toxicology for drugs of abuse	Eurofins Biomnis	**141**	Biochemistry
Toxicology – Urine (drugs of abuse)	Internal	**70**	Biochemistry
Toxoplasma antibodies	VRL	**141**	Microbiology
Tpha (antenatal)	VRL	**141**	Microbiology
Tpha (non-antenatal)	VRL	**141**	Microbiology
TPMT (Thiopurine methyl transferase)	Eurofins Biomnis	**141**	Biochemistry
TPO (thyroid peroxidase antibodies)	Mullingar	**140**	Immunology
Transferrin receptor (STFR –soluble ransferring receptor)	St James Hospital	**141**	Haematology
Transferrin saturation (see iron studies)	Mullingar	**141**	Biochemistry

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
Transfusion Reaction Investigation	IBTS	**83**	Blood Transfusion
Transfusion related acute lung injury (TRALI)	IBTS	**141**	Blood Transfusion
Treponema pallidum (tpha) antenatal	VRL	**141**	Microbiology
Treponema pallidum (tpha) non antenatal	VRL	**141**	Microbiology
Triglycerides	Internal	**68**	Biochemistry
Trileptal levels	Eurofins Biomnis	**141**	Biochemistry
Trypsin (Immunoreactive trypsin)	Eurofins Biomnis	**141**	Biochemistry
Tryptase	Eurofins Biomnis	**141**	Biochemistry
TSH (thyroid function tests - TSH & Free T4)	Mullingar	**141**	Biochemistry
TSH receptor antibodies	Eurofins Biomnis	**141**	Immunology
tTG antibodies (tissue transglutaminase antibodies/alpha gliadin antibodies)	Mullingar	**141**	Immunology
Tuberculosis (TB) Culture	Internal	**187**	Microbiology
UIBC (see iron studies)	Mullingar	**141**	Biochemistry
Urea	Internal	**68**	Biochemistry
Uric acid	Internal	**68**	Biochemistry
Urinary ACR (Urinary Albumin:Creatinine Ratio)	Internal	**69**	Biochemistry
Urinary Albumin:Creatinine Ratio (Urinary ACR)	Internal	**69**	Biochemistry
Urinary Amylase	Internal	**69**	Biochemistry
Urinary Calcium	Internal	**69**	Biochemistry
Urinary Citrate	Eurofins Biomnis	**141**	Biochemistry
Urinary Cortisol	Eurofins Biomnis	**142**	Biochemistry
Urinary Creatinine	Internal	**70**	Biochemistry
Urinary Creatinine Clearance (see also serum eGFR)	Internal	**70**	Biochemistry
Urinary Cysteine	Eurofins Biomnis	**142**	Biochemistry
Urinary Drugs of abuse	Internal	**70**	Biochemistry
Urinary Electrolytes	Internal	**70**	Biochemistry
Urinary Magnesium	Internal	**71**	Biochemistry
Urinary Microalbumin	Internal	**71**	Biochemistry
Urinary osmolality	St James Hospital	**142**	Biochemistry
Urinary Phosphorous	Internal	**71**	Biochemistry
Urinary Protein	Internal	**71**	Biochemistry
Urinary Urea	Internal	**71**	Biochemistry

Test Name	Processing Internal or External	Page Ref	Category for Filing in Chart
Urinary Uric Acid	Internal	**71**	Biochemistry
Urine 24h Electrophoresis	Mullingar	**142**	Immunology
Urine SPE (electrophoresis)	Mullingar	**142**	Immunology
Urine culture	Internal	**188**	Microbiology
Urine Legionella/Strep. pneumonia Antigen	Internal	**189**	Microbiology
Valproate (Eplim)	Mullingar	**142**	Biochemistry
Vancomycin	Internal	**69**	Biochemistry
Vanillylmandelic acid (VMA)	Eurofins Biomnis	**142**	Biochemistry
Varicella antibodies	VRL	**142**	Microbiology
Vascular Endothelial Growth Factor (VEGF) assay	University College London	**142**	Haematology
Vedolizumab antibodies	Eurofins Biomnis	**142**	Biochemistry
Vedolizumab Level	Eurofins Biomnis	**142**	Biochemistry
VDRL (antenatal)	VRL	**142**	Microbiology
VDRL (non-antenatal)	VRL	**142**	Microbiology
Venlafaxine	Eurofins Biomnis	**142**	Biochemistry
VIP (vasoactive intestinal polypeptide)	Eurofins Biomnis	**142**	Biochemistry
Viral Screen must specify tests	VRL	**142**	Microbiology
Vitamin A	Eurofins Biomnis	**142**	Biochemistry
Vitamin B1 (thiamine)	Eurofins Biomnis	**142**	Biochemistry
Vitamin B6	Eurofins Biomnis	**142**	Biochemistry
Vitamin B12 & Folic Acid	Mullingar	**142**	Biochemistry
Vitamin C	Eurofins Biomnis	**142**	Biochemistry
Vitamin D (25-OH)	Internal	**69**	Biochemistry
Vitamin E	Eurofins Biomnis	**142**	Biochemistry
Vitamin K	Eurofins Biomnis	**143**	Biochemistry
Voriconazole	St James Hospital	**143**	Biochemistry
VRE Screening	Internal	**189**	Microbiology
VMA (vanillylmandelic adic)	Eurofins Biomnis	**142**	Biochemistry
Von Williebrand factor (vWF:Ag)	St James Hospital	**143**	Molecular Genetics
Weak D Genotyping	IBTS	**83**	Blood Transfusion
White Cell Differential	Internal	**149**	Haematology
Wound swabs	Internal	**189**	Microbiology
Xanthochromia	Beaumont	**143**	Microbiology
Yersinia	Eurofins Biomnis	**143**	Microbiology
YO antibodies (HU, RI, YO, CV2, MA2)	Eurofins Biomnis	**143**	Immunology
Zinc	Public Analysts Lab	**143**	Biochemistry