HSE Mid West Laboratory User Manual



Approved by: Ms. Marie Carr, Laboratory Manager and Dr Hilary O'Leary, Pathology Clinical Director

This is a controlled document. White hard copies are only valid on the date printed.

The postal address of the UHL Laboratory Service is:

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The postal address of the Ennis Hospital Laboratory Service is:

The Pathology Department,
Ennis Hospital,
Ennis,
Co. Clare, V95 HN29

The postal address of the Nenagh Hospital Laboratory Service is:

The Pathology Department,
Nenagh Hospital,
Nenagh,
Co. Tipperary, E45 PT86

The postal address of the Public Health/Tb Laboratory is:

Public Health Laboratory,
Ballycummin Avenue,
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Amendment Table

The HSE Mid West Laboratory User Manual(s) is controlled in accordance with local quality management system requirements. The changes to this revision are listed in the table below.

Test Repertoire	Change Details MP-A-GEN-USERMAN Current Edition 21	Change reference
General Information	Updated Contact details for Pathology Key Personnel in Section 6 Updated the Terms and Conditions for Requesting text added: • Please note: The primary responsibility for follow up action on any laboratory test result rests with the person who requested the test. The timeframe within which they follow up to seek the test result should take account of their clinical assessment of the need for urgency and the time within which a result is likely to be available. • Reference ranges quoted in this manual are based on biological sex assigned at birth. Clinical interpretation should consider sex assigned at birth, current gender identity, and relevant medical history e.g. hormone therapy. • Incomplete or missing test requester information may result in rejection of the request. See below for specifics regarding provision of clinical details. • Where a referral laboratory requires documented evidence of consent, testing will not be performed unless a valid request form and consent form bearing the patient's signature (or that of their parent/guardian) accompanies the sample. The requesting clinician must retain a copy of the consent form in the patient's medical records. Additional information for the handling of urgent samples. The following text was added to Section 19.3 "Samples regarded as urgent by the requesting clinician should be hand delivered to the respective laboratory discipline to mitigate against delays in transport to the laboratory using the chute, routine rounds or other modes of transport external to the laboratory. The chute should never be used for the transport of irreplaceable specimens such as CSF. " and "GPs should complete all request forms in full, especially for urgent requests." Section 14 added text: "Samples regarded as urgent by the requesting clinician should be clearly marked on request forms as urgent. Urgent in-house request should be hand delivered to the relevant laboratory discipline. GPs must submit a fully completed urgent GP request form to the laboratory." Removed reference to INAB scope for 209MT as Blood Transfusion is now amalgamated with Pathology under 303MT Updated contact for Laboratory Information Systems Manager Included information that requests for analytical methods are available from departments on request Removed Fax numbers throughout document as these are no longer in use within Pathology Added departmental emails that can be used when required Serology/Virology: SerologyVirologyUHL@hse.ie can be used when requesting add on tests.	CRL36448 CRL35591 CRL36196 CRL37609 CRL37610 CRL37174 CRL37611 CRL36730 CRL37876 CRL38028

Test Repertoire	Change Details MP-A-GEN-USERMAN Current Edition 21	Change reference
	Recommended speed and times for centrifugation added to Section 14.19 Section 19.5: GPs may request copies of blood science reports via uhlbloodscience@hse.ie Updated Section 16 with information for requesting Add-on tests. Critical reporting policy updated: read as new	
Histology	Placenta Histopathology updated to reflect that all perinatal pathology is now referred to CUH Updated contact details for Chief Medical Scientist Histology Update to state that Lumea Chips may be used for Prostate Needle Biopsies Clarification provided regarding Urgent Histology Requests Details for the Participation in UK NEQAS Melanoma EQA Scheme added Processing of Transperinel Prostate Biopsies repatriated to HSE Mid West Limerick from Galway The requirement to use Theatre Document Sheets added to Section 14 Addition of Dr. Javier Mohigefer, Dr. Sherley Diaz Mercedes & Dr. Monica Calle Garcia	CRL36551 CRL36896 CRL36853 CRL36416 CRL37057 CRL30358 CRL36416 CRL37843
Microbiology	Chlamydia/GC/TV testing: Updated information for specimen collection Removal of reference to aminoglycosides (Amikacin, Tobramycin, Gentamicin) & Vancomycin antibiotic assays as now tested as part of the Biochemistry test repertoire. MRSA Screen: test limitations updated. Faeces section: positive *C. difficilie* samples sent to Cherry Orchard for typing Updated testing for TB with details of the GeneXpert MTB/RIF assay now being performed in TB Laboratory UHL Urine specimens should be refrigerated at 2 - 8°C overnight if same day delivery to the laboratory is not possible	CRL36173 CRL36043 CRL36527 CRL37282 CRL37560 CRL38012
Biochemistry	Addition of aminoglycosides (Amikacin, Tobramycin, Gentamicin) & Vancomycin antibiotic assays in Biochemistry test repertoire. Updated Table 14.4 with Lithium heparin tube and product code and to state that the Glucose sample tube can also be used for lactate. Updated A1AT Notes in Test Repertoire Updated Section 6.8.1 Clinical Biochemistry Emergency Service updated to include the below tests available without prior Consultant approval; CSF profile, hCG, dig, Antibiotics, Lithium, Procalcitonin, Urinary Protein Creatinine ratio (PCR) – Maternity only, Urinary Sodium, Urinary Potassium, Urinary Creatinine For IgE(allergen specific) testing updated the number of panels that can be requested by GPs from 3 to 4	CRL 36043 CRL 36371 CRL36404 CRL36624 CRL35729 CRL36194 CRL35633 CRL36011 CRL36085 CRL36134 CRL36510 CRL36619 CRL37251 CRL37838 CRL36982 CRL37837

Test Repertoire	Change Details MP-A-GEN-USERMAN Current Edition 21	Change reference
	Requirement for Vitamin D request form for primary care and a link to same added to test repertoire. Removed line stating “One full blood sample (Clotted – Brown Cap) is sufficient for UHL Chemistry and Endocrinology tests”. From Section 14 Specimen collection for Biochemistry. Troponin T test comments updated to “Interpret results in context of clinical presentation, risk score, ECG findings as per local agreed chest pain pathway.” Removed CO2 from index of tests listed against Renal profile Clarified tests included in Renal profile for primary care in UHL and Ennis Following text added to details for Monomeric Prolactine Screen “or patients who have screened negative within the last 3 years for macroprolactin, but whose total prolactin levels have increased significantly (> 50%).” FIB4 test in Biochemistry Test Table: Update interpretative comment with text " ": use with caution……AST > 250 U/L ,platelets > 500 x 109/L "or low platelet from other causes such as platelet clumping, medications, infection, autoimmune disorders etc” Added ‘Limitations’ text to FIB4 notes section: Limitations: This test should not be performed when there are other causes of liver disease, when there is any acute liver injury from any cause, or when there is any other condition present that may affect the components of the equation. These may include hemolysis or muscle injury (rising AST) or chronic alcohol use or immune thrombocytopenic purpura (reduced platelet count) etc For Paracetamol comment updated to “”Caution: In Paracetamol (acetaminophen) overdose, its metabolite NAPQI and antidote N Acetylcysteine may interfere with Roche enzymatic, trinder-based assays, potentially causing falsely low results for plasma/serum creatinine, lactate, uric acid, total CHOL, LDLC, HDL and Triglycerides.” For Ammonia: Update reference intervals and updated comment: Preterm/sick babies may have ammonia concentration up to 150 umol/L. Initial high ammonia result should be confirmed by repeat sample as soon as possible. For primary care requests the Potassium test must be clearly written on the request form. Added comment that Sulfasalazine may cause false high results for Total Protein in fluids and urine. Updated TAT for Urgent Troponin in Ennis to 120 min Updated IL6 test information. TAT changed to 7 working days. Removed from on-call service listing. Updated critical phoning limits table Update interpretative comments for OGTT Updated Reference range for Total Bilirubin and corrected typo in Ammonia ref range	CRL37891 CRL37899

Test Repertoire	Change Details MP-A-GEN-USERMAN Current Edition 21	Change reference
Blood Transfusion	Updated Platelet Alloantibody comments to include 'Discuss request with the Consultant Haematologist. & Samples will only be accepted Monday - Thursday as the referral centre in Dublin require them within 48hrs of testing Updated Platelet Antigen testing comments to include 'Discuss request with the Consultant Haematologist. & Samples will only be accepted Monday - Thursday as the referral centre in Dublin require them within 48hrs of testing. Updated the contact details for on-call staff in section 6.7 and 6.8.2 (contact made via switch)	CRL35707 CRL35537
Serology	H.pylori stool antigen updated to reflect it is now being referred to Biomnis Dublin for testing TAT for Syphilis antibodies defined at 8 days Test Information for Neurological antibodies updated to include requirements including; NMDA antibodies require paired serum & CSF The tests requires consultation with the neurology team prior to sending the request Addition of email SerologyVirologyUHL@hse.ie for requests for add on test.	CRL36064 CRL36508 CRL35958
Haematology	Notes updated in the Haematology test repertoire for APCR, ATIII, Protein S, Free Protein S, Protein C & Thrombophilia screen to now state that these tests must to be sanctioned by the UHL Haematology Team. FBC Reference Range Corrected; Red Blood cell count for age category for adult female updated from 12-130years to read 18-130years. Update to ESR requirements; addressograph labels can now be accepted for this request type. Critical Alert limits added to Section 27 Haematology Service Added note to H63D Mutation: Haemochromatosis genetic test (HFE) should not be performed on patients under 16 years of age. This aligns with HSE and international recommendations on genetic testing under the age of consent"	CRL36309 CRL35928 CRL35960 CRL36802 CRL38041

1 Foreword

The Pathology Department of the HSE Mid West (formerly UL Hospitals group) is comprised of the following key disciplines in University Hospital Limerick: Blood Bank, Clinical Biochemistry, Haematology, Histopathology, Microbiology and Serology / Virology. The TB laboratory, part of the Microbiology laboratory is located in the Public health Laboratory, Raheen Business Park. The Laboratory at Ennis Hospital provides a limited Clinical Biochemistry and Haematology service to hospital 'in patients' and outpatient clinics and to General Practitioners in County Clare. The Laboratory services for Nenagh Hospital consist of an 'on-site' STAT Laboratory to accommodate Hospital 'in-patients' i.e. Hospital Wards, OPD, LIU and Clinics, requiring Biochemistry and Haematology tests.

The purpose of this manual is to act as a reference guide for clinical users of the Pathology Service of the University Hospital Limerick, Ennis Hospital and Nenagh Hospital. To avoid unnecessary testing please take note of specific testing requirements provided in the testing repertoire of this manual or if necessary consult the appropriate laboratory advisory service. Included in the manual are details about the scope of service, location and hours of operation of respective laboratories, contact details for key laboratory personnel, availability of clinical advice, and lists by laboratory section of the range of tests currently available, expected turnaround times and other relevant notes. The test repertoire of the Laboratories of University Hospital are incorporated into this manual and is available online with other laboratory guidance documents at;

https://healthservice.hse.ie/staff/information-healthcare-workers/laboratory-user-manuals/

The Pathology Departments of HSE Mid West strive to provide a service that consistently meets the needs and expectations of the medical profession, while contributing to patient well being. This user manual has been prepared for the benefit of our users and employees, in our capacity to provide continuous service improvements. Specific criteria for acceptance of requests for examination of patient specimens should be noted. If acceptance criteria are not fulfilled, the Laboratory regrets that it may not be in a position to process the specimen request.

Every effort has been made to ensure that information provided in this manual is current and accurate at the time of being issued. Medical Practitioners should use this manual as a guide to individual testing on the basis of clinical findings. For further information on access to Laboratory Services provided by the HSE please see the following link;
https://assets.hse.ie/media/documents/Access_to_Laboratory_Services_provided_by_HSE_and_HSE_affiliated_agencies.pdf

Should amendments be required to be made to any section of this manual, which impacts on the service, the laboratory will endeavour to advise you. This manual provides an overview of HSE Mid West Laboratory services; please do not hesitate to contact the relevant laboratory for further information and advice, if required.

We are committed to providing the very best service possible, and will where feasible, implement any improvements / suggestions put forward by our users.

For patients or their families reviewing this manual, please note the information contained herein is a reference guide for Clinical users, patients cannot request testing from this service. You should follow your healthcare providers instructions on providing required samples and note that test reports are returned to the requesting clinician only. Laboratory staff cannot discuss results with patients or their families. For laboratory policy on complaints, data protection and consent please refer to the relevant sections of this manual. Refer also to the Mortuary section for hours of operation and visitors policy.

Marie Carr, Laboratory Manager HSE Mid West Pathology Services.

2 HSE Mid West Mission Statement

"All of the staff of this hospital will work together in a respectful, caring and professional way to deliver the best possible patient experience in a safe and clean environment and in the most effective and efficient way possible. We are committed to achieving this each and every day."

3 HSE Mid West Statement of Vision

"Be a valued, trusted and leading provider of excellence in healthcare which is patient centred, clinically integrated, team based and research driven."

4 HSE Statement of Values

"Care, Compassion, Trust and Learning"

5 Quality Assurance and Quality Policy

The Laboratories of the Pathology department have an extensive internal quality assurance system and participate in external quality assessment schemes. The Laboratories strive 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. The scope of accreditation can be accessed on the INAB website www.inab.ie. under reference 303MT Where a flexible scope has been approved tests are marked on the schedule of accredited tests with notations **1-4. This means that within certain predefined criteria, the Laboratory can report tests to users as accredited once validation and verification criteria have been met and clinically approved. There is no change to the requirements for validation/verification of tests marked as flexible scope tests. The HSE Mid West Pathology Laboratories undergo annual surveillance inspection of accredited services by INAB auditors after which a decision on maintenance of accreditation is made by this inspection body.

Laboratory management is committed to the delivery of an impartial and confidential service underpinned by ethical governance. The management of risk and the effective implementation of controls is integral to Laboratory operations.

All samples are treated with care and respect during transport, receipt, handling and subsequent storage to ensure sample integrity. Samples are stored only for the length of time prescribed in laboratory procedures as informed by relevant guidelines and are outlined in this manual where relevant. Every effort is made to ensure the correct performance of laboratory examinations per the requirements of ISO15189 regardless of the test's accreditation status.

Test reports are directed only to the requesting clinician or their specified nominee to support appropriate patient care. Laboratory incidents are reported via the laboratory non-conformance system and users are informed promptly of errors or issues with sample handling or testing to minimise risks to patient care and facilitate corrective actions where relevant or appropriate.

Laboratory management is also committed to upholding the open disclosure policies of the HSE. Medical Scientists working at HSE Mid West Laboratories are subject to the Medical Scientists Registration Board (CORU) Code of Professional Conduct and Ethics. Clinical Laboratory Consultants

are subject to the Medical Council's (IMC) Guide to Professional Conduct and Ethics for Registered Medical Practitioners.

Quality policies for HSE Mid West Laboratories (PP-A-POL-QUALPOL) are displayed centrally in Pathology Laboratories; they are also available on request from the Pathology Quality Manager.

6 General Information

6.1 Contact Details of Key Members of Pathology

General Pathology UHL			
Name	**Position**	**Tel. No.**	**Email**
Ms Marie Carr	Laboratory Manager	061 - 48 2244 / 2756	marie.carr@hse.ie
Ms Mary Deasy	Project Manager	061-482640	maryc.deasy@hse.ie
Mr Michael Lynskey	Laboratory Information Systems Manager	061 - 48 5097	michaelv.lynskey@hse.ie
Ms Maria Hayes	Pathology Quality Manager		mariac.hayes@hse.ie
NPT/POCT	UHL	087 9109426	POCTHelpdesk@hse.ie
Ms Coranne Heffernan	Chief Medical Scientist; Pre-analytics	061-585618	Coranne.Heffernan@hse.ie

Blood Transfusion UHL			
Name	**Position**	**Tel. No.**	**Email**
Dr Hilary O'Leary	Consultant Haematologist (Associate Clinical Director Diagnostics Directorate)	061 - 48 2036	
Dr Diana Trejos	Consultant Haematologist	061 - 48 2642	
Professor Ruth Clifford	Consultant Haematologist	061 - 48 2618	
Dr Aisling Nee	Consultant Haematologist	061 - 48 2618	
Dr Cian McEllistrim	Consultant Haematologist	061 - 48 2036	
Mr Paul Fitzsimons	Chief Medical Scientist Blood Transfusion	061 - 48 2035	PaulR.Fitzsimons@hse.ie
Blood Transfusion Laboratory	Senior Scientific Staff	061 - 48 2267 /2814	
Ms Loretta O'Brien	Senior Medical Scientist/ Quality Officer	061 – 48 2703/ 5342	loretta.obrien1@hse.ie

Ms Norma O'Brien	Haemovigilance Co-ordinator	061 - 48 5341	norma.obrien1@hse.ie
	Haemovigilance Officer UHL	061 - 48 2846 086 6011594	
	Haemovigilance team	061 - 48 5342	
	Document Controller	061 - 48 5342	
	Medical Scientist 'On Call'	Contact No. 8.00 p.m. – Midnight 061 48 2267	Contact No. Post Midnight Internal users contact switch - Dial "9" and request laboratory on call contact person. External users dial 061 - 30 11 11 and request laboratory on call contact person

Clinical Biochemistry UHL			
Name	Position	Tel. No.	Email
Dr Erum Rasheed	Consultant Chemical Pathologist	061-482670	
Ms Martina Langan	Chief Medical Scientist Biochemistry	061 - 48 2881	martina.langan@hse.ie
Mr Donncha Sheehan	Senior Biochemist / Quality officer	061 - 482257	donncha.sheehan@hse.ie
	Medical Scientist 'On Call'	Contact No. 8.00 p.m. – Midnight 061 48 2257	Contact No. Post Midnight Internal users contact switch - Dial "9" and request laboratory on call contact person. External users dial 061 - 30 11 11 and request laboratory on call contact person

Haematology UHL			
Name	Position	Tel. No.	Email
Dr Diana Trejos	Consultant Haematologist	061 - 48 2642	
Dr Hilary O'Leary	Consultant Haematologist (Associate Clinical Director Diagnostics Directorate)	061 - 48 2036	
Professor Ruth Clifford	Consultant Haematologist	061 - 48 2618	
Dr Aisling Nee	Consultant Haematologist	061 - 48 2618	
Dr Cian McEllistrim	Consultant Haematologist	061 - 48 2036	

Mr William Quirke	Chief Medical Scientist Haematology	061 - 48 2847	william.quirke@hse.ie
Ms Siobhan Joy	Senior Medical Scientist (Quality Officer)	061 – 48 2258	siobhan.joy@hse.ie
	Medical Scientist 'On Call'	Contact No. 8.00 p.m. – Midnight 061 48 2258	Contact No. Post Midnight Internal users contact switch - Dial "9" and request laboratory on call contact person. External users dial 061 - 30 11 11 and request laboratory on call contact person.

Histology UHL			
Name	Position	Tel. No.	Email
Dr Olubunmi Ipadeola	Consultant Histopathologist	061- 48 2240 /2248	
Dr Vourneen Healy	Consultant Histopathologist	061- 48 2240 /2248	
Dr Elizabeth Mulcahy	Consultant Histopathologist	061- 48 2240 /2248	
Dr Peter Faul	Consultant Histopathologist	061- 48 2240 /2248	
Dr Johny Salazar	Consultant Histopathologist	061- 48 2240 /2248	
Dr Máire Lavelle	Consultant Histopathologist	061- 48 2240 /2248	
Dr. Javier Mohigefer	Consultant Histopathologist	061- 48 2240 /2248	
Dr. Sherley Diaz Mercedes	Consultant Histopathologist	061- 48 2240 /2248	
Dr. Monica Calle Garcia	Consultant Histopathologist	061- 48 2240 /2248	
Ellen Murphy	Chief Medical Scientist Histopathology	061- 48 2856	Ellen.murphy2@hse.ie
Ms Kate O'Connor	Senior Medical Scientist / Quality Officer	061- 58 5829	kate.oconnor@hse.ie

Microbiology & Serology/Virology UHL			
Dr Nuala O'Connell	Consultant Microbiologist	061- 48 5099 061 482246/2240	
Dr Lorraine Power	Consultant Microbiologist	061- 48 5099 061 485656	
Dr Brid Minihan	Consultant Microbiologist	061-485334	
Ms Maureen O'Hara	Chief Medical Scientist Microbiology	061- 48 2840	maureen.ohara@hse.ie
Mr Colm McDonnell	Chief Medical Scientist Serology	061 – 48 2797	colm.mcdonnell@hse.ie
Ms Loreto Moloney	Senior Medical Scientist / Quality Officer Microbiology	061 48 5096	Loreto.Moloney@hse.ie
Ms Emma Stack	Senior Medical Scientist / Quality Officer	061-48 5003	emma.stack@hse.ie
	Medical Scientist 'On Call'	Contact No. 8.00 p.m. – Midnight 061 48 2502	Contact No. Post Midnight Internal users contact switch - Dial "9" and request laboratory on call contact person. External users dial 061 - 30 11 11 and request laboratory on call contact person

Public Health and TB Laboratory Raheen			
Public Health Laboratory	General enquiries	061-482845	
Ms Kathleen Doran	Senior Medical Scientist/ Quality Officer Public Health Laboratory	061-464261	**Kathleen.doran@hse.ie**
TB Laboratory	-	061-464264	**tblab@hse.ie**

Pathology Ennis			
Ms Maeve O'Donnell	Chief Medical Scientist Ennis	065 – 686 3146	maeve.odonnell1@hse.ie

Pathology Nenagh			
Scientist	Laboratory Nenagh	067- 42355 Ext 355/354	

Phlebotomy Outpatient Service

GP and Private Clinic referrals for specialist blood testing (by appointment only)	University Hospital Limerick Blood testing location: Outpatients Department 1, ground floor.	061-585653*	Note 1*: To book a blood test please leave a message and phlebotomist will respond within 5 working days to arrange an appointment. Note 2: A valid Laboratory request form signed by the requesting clinician is required. **Letters or notes requesting blood tests are not accepted.** Unsigned forms and/or those with no requesting clinician details will be not be processed. Note 3: Urgent bloods cannot be booked through this service.

The Mortuary			
Ms Sabrina Mullahy	Senior Anatomical Pathology Technician	061 482933 / 086 3846610	
Mr Oisin O'Neill	Senior Anatomical Pathology Technician	061 482933 / 086 3846610	

Laboratory Porters UHL			
Mr Alan Mackessey **Mr Eugene Conway** **Mr Dermot McAuliffe**	Laboratory Porters	061- 48 2841 Bleep 059	alan.mackessey@hse.ie

Freedom of Information Requests, Legal cases, Personal information requests	
Contact relevant Mid West Information Governance Offices contacts available at:	https://www2.hse.ie/freedom-of-information-foi-requests/

Complaints/feedback Contacts	
Complaints/feedback related to HSE MID WEST Laboratory services should be directed to:	Relevant laboratory discipline or the Laboratory Manager as above.
HSE Complaints/Feedback mechanism also available online at:	https://www2.hse.ie/complaints-feedback/

6.2 Laboratory Telephone Extension Numbers

The telephone enquiry service should be used for emergency enquiries only.

General Enquiries: Laboratory, UHL	Telephone Number
GP Enquiries Blood Sciences	061 - 482838
Blood Transfusion	061 - 48 2267 / 2035 / 2814
Clinical Biochemistry **Referral Queries** General Queries	061- 482257 Note: phone enquiries for test results are available from: 9.30 – 12.30 Monday to Friday only at **061 – 482806** 061 – 482257
Haematology Results / General Enquiries Coagulation Anticoagulation Clinic Anticoagulation Co-ordinator	061- 48 2258 061- 48 2851 061- 48 2270 Bleep # 180
Histopathology	061- 48 2856 / 727 218
Microbiology General Enquiries Out of hours / 'On Call' hours Respiratory Urines HVS/STD Blood Cultures Faeces Routine Swabs Antibiotic Assays TB	061 – 482240 061 – 482502 061 – 482844 061 – 482843 061 – 482839 061 – 482842 061 – 482854 061 – 482712 061 – 482277 061 – 464264
Serology / Virology	061- 48 2254 / 2833
Molecular Laboratory	061 - 485003
Laboratory Office	061- 48 2248 / 2435 / 2240 / 2303 / 5099
Phlebotomy UHL **Milena Zdjedar**	Calls only accepted from Clinicians (GPs / Consultants) 061 585653 / Hospital Switch 061 301111 - Bleep 711
General Enquiries: Laboratory, Ennis	**Telephone Number**
Laboratory Office Ennis Reports	065-6863230 / 3243
Biochemistry Ennis	065-6863147
Haematology Ennis	065-6863142
General Enquiries: Laboratory, Nenagh	**Telephone Number**
Nenagh Laboratory	067- 42355 Ext 355/354

6.3 Hours of Operation of Pathology UHL

Hours of Operation of Pathology Reception		
Days	Routine Hours	Sample Deadline for receipt of all samples from Primary Care (GPs) Mon- Thurs: 9.00 a.m. – 4.00 p.m.
Monday – Thursday Friday	8.30a.m – 5. 30p.m 8.30a.m – 5.00p.m	
Hours Of Operation of Laboratory Services		
Days	Routine Hours	On Call Service
Monday – Friday (Biochemistry / Haematology/ Blood Transfusion / Microbiology)	8.00 a.m. – 8.00 p.m. (including lunchtime)	Emergency On Call Service provided from 8.00 p.m. – 8.00 a.m. Contact No. Post-Midnight Internal users contact switch - Dial “9” and request laboratory on call contact person. External users dial 061 - 30 11 11 and request laboratory on call contact person.
Histology	8.00 a.m.– 5.30 p.m.	Contact Histopathologist on call
Serology / Virology	9.00 a.m.– 8.00 p.m.	Emergency On Call Service. See service provided in ‘On Call’ / Emergency Service provided per discipline.
Saturday (Biochemistry / Haematology / Blood Transfusion / Microbiology /Serology)	10.00 a.m. – 1.00 p.m. (Limited Service)	Emergency On Call Service provided from 1.00 p.m. See service provided in ‘On Call’ / Emergency Service provided per discipline.
Saturday (Histology)	8.00 a.m. – 1.00 p.m.	Contact Histopathologist on call
Sunday and Public Holidays		Emergency On Call Service See service provided in ‘On Call’ / Emergency Service provided per discipline.
Monday-Friday TB Laboratory Raheen	9.00 a.m.– 5.00 p.m	Urgent AFB smear/ZN stain after 2pm need approval by Consultant Microbiologist
Monday-Friday Public Health Laboratory Raheen	9.00 a.m.– 5.00 p.m.	Outbreak investigation by prior arrangement with the laboratory.
Monday-Friday Near Patient Testing/POCT Dept	9.00 a.m.– 5.00 p.m.	Contact: POCTHelpdesk@hse.ie queries will be reviewed next working day.

Note: If there is no response from the required laboratory ‘on call’, contact switchboard for contact telephone number.

6.4 Hours of Operation & Scope of Service Ennis Laboratory

Hours Of Operation of Laboratory Services		
Days	Routine Hours	On Call Service
Monday – Friday Biochemistry / Haematology)	9.00 a.m. to 5.00 p.m.	5.00 p.m.to 8:00 p.m. Emergency only On Call Service provided from 8.00 p.m.– 9.00 a.m. by UHL Note: Cut off times for receipt of GP samples in Ennis lab are 16:00 hours Mon to Thursday and 14:00 hours on Fri.
Saturday/Sunday and Public Holidays		9.00 a.m. to 5.00 p.m. Emergency only On Call Service provided from 5.00 p.m.– 9.00 a.m. by UHL

The Laboratory at Ennis Hospital provides a limited Clinical Biochemistry and Haematology service to hospital 'in patients' and outpatient clinics and to General Practitioners in County Clare.

Tests performed in Ennis Hospital Pathology Department are listed in the test repertoire of this manual and on the Ennis Pathology request form.

Please complete the Ennis request form for tests performed in Ennis . Separate request forms and specimens are required for tests performed in UHL.

The Ennis Pathology laboratory acts as a dispatch point for the transfer of specimens to the relevant laboratory discipline in Limerick, at the following times: 09:30hrs, 13:30hrs and 14:30hrs Monday to Friday and 10:30hrs and 15:30Hrs Saturday, Sunday and Public Holidays

Please note that samples are registered on the Laboratory Information System on arrival at the relevant laboratory in UHL. Turnaround times as quoted for the UHL test repertoire apply from receipt of samples in UHL laboratory.

The blood gas analyser is available 24/7 for on-site users however if the analyser is out of service, or any individual test is not available then the pathology dept. can be contacted within the hours listed above. Outside of these hours the biochemistry dept. UHL Limerick is to be contacted.

All Laboratory test requests 'after-hours' including weekends/Public Holidays which require urgent analysis are sent to UHL Laboratories via taxi.

The transport of samples to UHL outside of Ennis laboratory opening hours is co-ordinated by Ennis Hospital Nursing office. Please note: UHL laboratory request forms must be used.

Samples for transfusion testing are taken in Ennis and sent to Limerick with the daily laboratory delivery.As the majority of transfusions administered in Ennis are elective, the majority of samples should be sent during working hours, however, urgent samples can be sent at any time.

The transfusion laboratory in Limerick must be contacted in advance to advise them of all out of hour's samples for transfusion testing from Ennis.

In the event of a requirement for emergency transfusion, two units of group O Rh D negative red cell concentrate are available in the issue fridge in Ennis.

Please find tests requirements and test repertoire for Ennis in the Haematology and Biochemistry test tables of this manual.

6.5 Hours of Operation & scope of Service Nenagh Laboratory

Hours Of Operation of Laboratory Services		
Days	Routine Hours	On Call Service
Monday – Friday (Biochemistry / Haematology/	9.00 a.m. to 5.00 p.m. (excluding lunchtime 1.00 p.m. – 2.00 p.m.)	Emergency On Call Service provided from 5.00 p.m.– 9.00 a.m. by UHL
Saturday		Emergency only On Call Service provided by UHL
Sunday and Public Holidays		Emergency only On Call Service provided by UHL
Note 'cut-off' specimen receipt time of 16:30hrs, thereafter samples are dispatched to UHL		

The Laboratory services for Nenagh Hospital consist of an 'on-site' STAT Laboratory to accommodate Hospital 'in-patients' i.e. Hospital Wards, OPD, LIU and Clinics, requiring Biochemistry and Haematology tests.

The Nenagh Pathology laboratory acts as a dispatch point for the transfer of specimens to the relevant laboratory discipline in Limerick, at the following times; 10:00 hrs. and 14:00 hrs.

Tests performed in Nenagh Hospital Pathology Department are listed in the test repertoire of this manual.

Separate request forms and specimens are required for tests performed in UHL.

Please note that samples are registered on the Laboratory Information System on arrival at the relevant laboratory in UHL.

There are two taxi trips per routine working day taking samples to UHL Laboratories–at approximately 10:00 hrs. and 14:00 hrs. respectively.

All Laboratory test requests 'after-hours' including weekends/Public Holidays which require urgent analysis are sent to UHL Laboratories via taxi coordinated by the Director of Nursing office in Nenagh.

Samples for transfusion testing are taken in Nenagh and sent to Limerick with the daily laboratory delivery at 10:00 hrs. and 14:00 hrs.

As the majority of transfusions administered in Nenagh are elective, the majority of samples should be sent during working hours.

The transfusion laboratory in Limerick must be contacted in advance to advise them of all out of hours' samples for transfusion testing from Nenagh.

In the event of a requirement for emergency transfusion, two units of group O Rh D negative red cell concentrate are available in the issue fridge in Nenagh.

Please find tests requirements and test repertoire for Nenagh in the Haematology and Biochemistry test tables of this manual.

6.6 Hours of Operation of Mortuary / Post Mortem (Autopsy) Services

Hours of Operation of Mortuary / Post Mortem (Autopsy) Services		
Days	Routine Hours	On Call Service
Monday – Friday	9.00 a.m.– 5.00 p.m. (including lunchtime)	Emergency On Call Service provided from 5.00 p.m.to 9.00 a.m.
Saturday, Sunday and Public Holidays	9.00 a.m.– 12.00 p.m.	Emergency only On Call Service provided from 12.00 p.m. to 9.00 a.m.

Viewing of the deceased in the 'Chapel of Rest' is only via appointment with the Anatomical Pathology Technician (APT) on duty.

Access to the Mortuary is by prior arrangement only with the Anatomical Pathology Technician on duty.

Release of the deceased remains to Funeral Directors is only via the APT on duty during routine hours. There is always an APT available via UHL Switchboard 24hrs / day to assist with any queries that may be deemed urgent regarding the collection of deceased remains. In an out of hour's emergency situation, hospital staff must contact the Anatomical Pathology Technician (APT) on duty via Main Hospital Switch at 061 30 11 11.

6.7 'On-Call' Service UHL

An 'on-call' system operates outside normal hours for emergency work only i.e. non-deferrable tests necessary for decisions regarding patient management.

Urgent / Emergency samples must be delivered directly to relevant laboratories to ensure prompt processing. It is essential that the scientific staff on call are contacted using the relevant telephone number below when urgent / critical specimens are to be sent to the laboratory using the pneumatic chute / delivered directly to the laboratory.

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

On-Call Contact Numbers UHL		
Department	Contact No. 8.00 p.m. – Midnight	Contact No. Post-Midnight
Blood Transfusion	Internal users contact switch - Dial "9" and request laboratory on call contact person. External users dial 061 - 30 11 11 and request laboratory on call contact person.	Internal users contact switch - Dial "9" and request laboratory on call contact person. External users dial 061 - 30 11 11 and request laboratory on call contact person.
Clinical Biochemistry	061 48 2257	
Haematology	061 48 2258	
Microbiology	061 48 2502	

On-Call Contact Numbers UHL		
Department	Contact No. 8.00 p.m. – Midnight	Contact No. Post-Midnight
Serology / Virology	061 48 2502	

6.8 'On-Call' / Emergency Service Provided per Laboratory Discipline UHL

6.8.1 Clinical Biochemistry Emergency Service

Clinical Biochemistry		
Test	24/7 Without Consultation	24/7 With Consultation
ABG	√	
Amikacin	√	
Ammonia	√	
Albumin	√	
Alk Phos	√	
ALT	√	
Amylase	√	
AST	√	
Bilirubin Direct	√	
Bilirubin Total	√	
Calcium	√	
Carbamazepine		√
Chloride	√	
Cholesterol	√	
CK	√	
CO2	√	
Cortisol		√
CO-Hb	√	
Creatinine	√	
CRP	√	
CSF Profile (Lactate/Protein/Glucose)	√	
Digoxin	√	
Ethanol	√	
Gentamicin	√	
GGT	√	
Glucose	√	
HCG	√	
HDL Cholestrol	√	

Clinical Biochemistry		
Test	24/7 Without Consultation	24/7 With Consultation
IL6		
Ionised Calcium	√	
Iron	√	
Potassium	√	
Lactate	√	
LDH	√	
LDL cholesterol (Direct)	√	
Lithium	√	
Magnesium	√	
Osmolality (Serum & Urine)	√	
Paracetamol	√	
Phenobarbitone		√
Phenytoin		√
Phosphate	√	
Procalcitonin	√	
Sodium	√	
Salicylate	√	
Theophylline		√
Tobramycin	√	
Total Protein	√	
Transferrin	√	
Triglycerides	√	
Troponin	√	
Urate	√	
Urea	√	
Urinary Protein Creatinine ratio (PCR) – Maternity only	√	
Urinary Sodium	√	
Urinary Potassium	√	
Urinary Creatinine	√	
Urine Amphetamine		√
Urine Barbiturate		√
Urine Benzodiazepines		√
Urine Cannabinoids		√
Urine Cocaine		√
Urine Methadone		√
Urine Opiates		√
Valproate		√

Clinical Biochemistry		
Test	24/7 Without Consultation	24/7 With Consultation
Vancomycin	√	

6.8.2 Blood Transfusion Emergency Service

The on-call service for Blood Transfusion is provided to process non-deferrable/urgent test requests, the results of which will impact on immediate patient management.

Do not forward routine requests to the laboratory during on-call hours.

Tests performed on-call include:

Group and hold

Crossmatch

Direct Antiglobulin Test

Antibody identification

Red cell phenotyping

A member of the haematology on-call team MUST approve requests for all other tests; the Consultant requesting the test must contact the Haematology Consultant on call via the Hospital switchboard (Ext 2119).

Clinical advice is available 24/7 for emergency situations.

After 8pm Monday to Friday and over the weekend laboratory on-call personnel must be contacted via Hospital switchboard (Dial "9"). Failure to do this may result in prolonged turnaround times for urgent requests. External users dial 061 - 30 11 11 and request laboratory on call contact person.

Delivery of Samples 'Out of Hours'

Samples may be delivered to the laboratory via the Pneumatic Chute system or by 'hand'.

Samples delivered by hand should be left on the desk in the Blood Transfusion laboratory reception area.

Samples left at other locations may not be noticed by personnel 'On-Call' resulting in a delay in processing of samples and provision of results.

6.8.3 Haematology Emergency Service

The on-call service for Haematology is provided to process non-deferrable/urgent test requests, the results of which will impact on immediate patient management.

Do not forward routine requests to the laboratory during on-call hours.

Tests performed on-call include:

- Full blood count and white cell differential
- Reticulocyte count
- Coagulation screen (PT, INR and APTT)
- D-Dimer (All requests must include relevant clinical details)
- Fibrinogen

A member of the haematology on-call team MUST approve requests for all other tests; the Consultant requesting the test must contact the Haematology Consultant on call via the Hospital switchboard (Ext 2119).

After midnight, laboratory on-call personnel must be contacted via Hospital switchboard (Ext 2119). Failure to do this may result in prolonged turnaround times for urgent requests.

Clinical advice is available 24/7 for emergency situations.

Delivery of Samples 'Out of Hours'

Samples may be delivered to the laboratory via the Pneumatic Chute system or by 'hand'.

Samples delivered by hand should be left in the Blood Sciences reception area reception area.

Samples left at other locations may not be noticed by personnel 'On-Call' resulting in a delay in processing of samples and provision of results.

6.8.4 Microbiology Emergency Service

Microbiology

The on-call service for Microbiology is provided to process non-deferrable sample types/urgent test requests.

Clinical advice is available 24/7 for emergency situations.

Out of Hours: Contact with the Consultant Microbiologist on-call is available through the switchboard. This service is confined to consultant contact only.

Microbiology offers a 24/7 Service. Routine service is provided from 8am-8pm Mon-Friday. The out of hour's on -call period includes weekdays 8pm-8am, weekends and Bank Holidays during which on-call cover is provided over the entire weekend period.

Please Note: refer to the Infection Control Screening (MRSA, VRE, CPE/KPC, and ESBL) section of this user manual for infection control screening protocols during weekends/out of hours.

Blood Cultures are read and reported daily. Other routine cultures from wounds and Urines are reported and progressed on a Saturday session from 9.30 am to 1pm based on location and sample type i.e. Critical care, Neonatal, Theatre, Orthopaedic, eyes, skin grafts, sterile sites, abscesses, pus from all locations and thereafter at the request of the clinical microbiology team.

Tests performed during the on-call period:

- Receipt and loading of Blood cultures, processing Positive Blood cultures and appropriate onward communication of results.
- CSF analysis (including *Filmarray* as appropriate) and appropriate onward communication of results
- Urine microscopy/culture: Paediatric / ED/ AMU/ SAU/Oncology/HDU/ICU/NEO/Dialysis. (ED only after midnight)
- Urinary antigen testing: Paediatric / ED/ AMU/ SAU/Oncology/HDU/ICU/NEO/Dialysis up to midnight.
- Pregnancy tests.
- Urgent/Critical care sputum up to midnight.
- Sterile Fluid e.g. CAPD, joint, Pleural and Ascitic fluids up to midnight.
- Tissue, bone and swabs from Theatre up to midnight.
- Corneal scrapings.
- Tips for culture (up to midnight)
- Tests performed 8pm-8am *only* as directed by Consultant Microbiologists following clinical consultation as follows:
- Urgent *C. difficile* screens
- Urgent TB direct microscopy (Auramine/ZN stain)

6.8.5 Serology / Virology Emergency Service

The out-of-hours service in Serology/Virology is for urgent requests only.

The Consultant Microbiologist must approve all urgent requests before testing can proceed.

It is the responsibility of the requesting doctor to contact the Consultant Microbiologist on-call through the hospital switchboard. If approved, the requestor must contact the Microbiology Laboratory with the patient's details and the investigation(s) that are required urgently.

The following urgent requests are available by arrangement outside the routine working hours:

- Needle-stick injury investigation
- Urgent pre-dialysis screen
- Organ donor serology screens
- Urgent Hepatitis Screens
- Urgent HIV requests
- Determination of immune status in pregnant women exposed to Varicella Zoster (VZV)
- Nasopharyngeal swabs (NPS) for SARS-CoV-2, Influenza A/B & RSV

Clinical advice is available 24/7 for emergency situations.

The expected turnaround time of these requests out of hours and routine is 4 hours.

6.8.6 Histopathology Emergency Service

Histopathology
Clinical advice is available from reporting Histopathologists (refer to contact details section above).
Delivery of Histology Samples to UHL out of hours is discouraged please retain samples for next working day delivery.
Urgent Histology samples should be clearly identified with appropriate clinical details and contact numbers for requsting Clinicians stated on the request form

7 Definitions and Abbreviations

'Analytical Turnaround' Time (TAT): Turnaround time (TAT) is given as the maximum number of working hours/days between sample receipt and issuing a report either in the computer or by phone under normal operating conditions. In addition to the routine service, each department operates an "urgent" service whereby the target turnaround time is shorter. The turnaround time for each investigation is given in the alphabetical listing in the test repertoire.

TATs are routinely monitored as part of the laboratory's quality improvement program.

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

Specimens referred to external specialist laboratories for analysis are dispatched by courier service as appropriate. The turnaround times for receipt of hardcopy reports of tests referred to external specialist laboratories can take a number of weeks.

In Progress: Analysis Incomplete. Refer to particular test turnaround time in this manual.

Referral Laboratory: A referral laboratory is an external laboratory to which a sample is submitted for examination and report.

Emergency only On Call Service: On Call Service provided only for emergency specimens outside of core working hours.

Urgent: Samples labelled 'URGENT' will be prioritised in the laboratory process as appropriate, and on authorisation of results, results will be available on the Laboratory Information System.

Primary Sample (Specimen): The sample prepared for sending to, or as received, by the laboratory and which is intended for examination.

MN-CMS stands for Maternal and Newborn Clinical Management System. It is an electronic health record (EHR) system for women and babies in Ireland's maternity, gynaecology, and neonatal services. It is being implemented in all 19 maternity units across Ireland. The system allows for the sharing of patient information among relevant healthcare providers. MN-CMS and iLAB are interfaced to allow electronic test ordering and return of results to the EHR. The system is designed to comply with the General Data Protection Regulation (GDPR), ensuring patient data is handled securely and ethically, according to eHealth Ireland.

ENN	Ennis Pathology Laboratory
IPMS	Integrated patient management system
BSHL	Bons Secours Hospital Limerick (previously Barringtons Hospital)
N/A	Not Applicable
NEN	Nenagh Pathology Laboratory
NHIRL	National Histocompatibility and Immunogenetics Reference Laboratory
NBC	National Blood Centre
NPT	Near Patient testing
UHL	University Hospital Limerick
TAT	Turnaround time
D	Days
W	Weeks
Hr	Hours
POCT	Point of Care Testing
Blood Science	Biochemistry and Haematology Laboratories

8 Laboratory Locations and Access

UHL Laboratories

Within University Hospital Limerick, the Laboratories of the Pathology department are located on the first floor of the Outpatients Department. Signage may read “Pathology” and / or Pathology Laboratory. The Laboratories can be accessed via the stairwell at entrance to the Children’s Unit / Ward or via the lift located in Outpatient’s Reception.

The Molecular Laboratory is located on the ground floor of the hospital. Access is via the exit door at the bottom of the stairwell that leads up to the main Pathology Laboratory. Signage is in place at the exit door which is security swipe card controlled.

The Laboratory including the Molecular Laboratory is controlled via security swipe card access for hospital staff. Access to Pathology Reception area is restricted to hospital personnel from 8 p.m. – 8 a.m.

Taxi drivers delivering samples to the Laboratory out of hours must obtain a temporary swipe access card from Hospital Security.

The Public Health/TB Laboratory is located in Ballycummin Avenue, Raheen Business Park V94D1W9. Access to the Public Health Laboratory is restricted via swipe card for laboratory staff. All visitors must check in at reception to gain access.

Ennis Laboratory

The Laboratory is located at the rear of the main hospital building in a one-story block. There is a one-way traffic system in operation in the hospital. Enter the hospital campus via the main entrance and follow the road around the main hospital building. The Pathology laboratory is located at the rear of the hospital on the left-hand side past the general stores. Access to Pathology Laboratories is restricted to hospital personnel on related laboratory business via swipe card.

Nenagh Laboratory

The Pathology Laboratory at Nenagh General Hospital is located in the left wing of the hospital, past Accident & Emergency & Radiology departments. At the end of this corridor take a right turn & the pathology front entrance may be seen.

Access to Pathology Reception and Laboratories is restricted to hospital personnel on related laboratory business via swipe card.

9 Location of the Mortuary UHL

The Mortuary is located on the ground floor of the hospital. Access to the Mortuary is restricted to authorised personnel only and is controlled by security swipe access cards.

The main Mortuary entrance is located to the rear of the hospital. Funeral Directors / Ambulance personnel can access the “Receipt / Release of the Deceased” area via a security barrier near the Main Mortuary Reception entrance.

10 UL Hospitals Pathology Policy on Request Form Completion and Specimen Labelling

10.1 Identified Risks Pre-analytical Collection

With the exception of electronically generated MN-CMS test requests (University Maternity Hospital only), HSE Mid West Laboratories currently operates a paper-based test requesting system, with all requests manually booked into the laboratory information system (iLAB) upon receipt.

Errors during specimen/sample collection, including labelling, can cause delays in processing of tests and, if not recognised, can lead to issue of incorrect results, diagnostic error, delayed or incorrect treatment or transfusion of incompatible blood. These have the potential to cause significant delays, errors and harm in the care and treatment of patients.

The laboratory policy on request form completion and specimen labelling must be followed by all users to ensure that such risks are minimised. Where electronic ordering is in place, users are required to follow and complete all steps for sample collection and request transmission.

Rejection criteria are further outlined in the test information for each discipline where relevant.

Every effort is made to report all rejected test requests or samples immediately to the requesting source via iLAB/ Healthlink as appropriate. Instructional or guidance comments are issued with rejected test requests or samples to inform the requester of the reason for rejection. See also section 19 below.

The risk of test rejection is high where test requesters do not adhere to the requirements for hardcopy request form and sample labelling as outlined previously in section 10.

The risk of test rejection is high where MN-CMS requesters do not adhere to protocols for completion of test ordering and sample labelling.

Histology requests that do not contain relevant clinical details to aid in the determination of priority may be returned to the requester for appropriate update.

Please note that blood haematocrit levels may affect the available serum or plasma volume for the performance of requested tests, even when sample tubes are filled correctly. In such cases, additional samples may be required.

It is the responsibility of the requesting source/clinician to review results in a timely manner and to request repeat tests where clinically indicated.

10.2 Advice to Users for Safe Practice in the Collection of Laboratory Samples

- Ensure uninterrupted collection and labelling of specimens/samples as one continuum at the service user's bedside. Note: in this instance 'bedside' refers also to collection practice in Clinics, GP practices and other Healthcare settings as well as inpatient facilities.

- Ensure positive patient identification by confirming identification on service user's wristband/ chart and asking service user to confirm their details. If in doubt an official form of identification such as a drivers licence should be requested.

- For paper requests ensure handwritten test requests are clearly legible and provide clinical details as appropriate. Failure to do so will result in potential specimen rejection or delayed processing for irreplacable samples.

- Regarding electronic ordering systems e.g. MN-CMS, user diligence and care is required to ensure proper electronic ordering is accurately and appropriately completed so that lab orders appear on specimen reception in the laboratory. Failure to do so may result in unnecessary delays in patient care. Users are requested to follow ordering protocols carefully and complete all relevant training on the system.

- Check that service user details on sample/specimen match the details on the referral/request form.

- Optimise availability and the use of appropriate equipment used in sample labelling (label printers, computer terminals)

- Prior to taking samples, check this manual for any special considerations for the particular tests. Please also refer to the policies on request form completion and specimen labelling in the acute and community setting as outlined below.

- Adhere to procedures regarding aseptic principles to minimize the risk of infection and/ or contamination of patient samples. This is particularly important for Blood Culture and informs the order of draw as outlined below in this manual.

- Ensure training for staff responsible for taking sample/specimens is targeted to an awareness of risks associated with labelling errors and that haemovigilance protocols are always adhered to.

10.3 Acute Setting Policy on Request Form Completion and Specimen Labelling

Policy on Request Form Completion and Specimen Labelling- Acute Setting

The purpose of this Policy is to ensure that the correct results and blood products / components are always issued to the correct patient and to ensure unequivocal traceability of the patient to the request and sample, patient identification must always be verified, prior to sampling.

The Policy applies to specimens being submitted for analysis across all laboratory disciplines of the HSE Mid West in Limerick, Ennis and Nenagh Hospitals. Informed consent may be required for certain test requests and blood/blood component transfusions. It is the responsibility of the phlebotomist or clinician collecting samples or issuing blood product(s) to ensure that patient consent is formally recorded. Tests requiring formal consent and additional documentation requirements for laboratory acceptance are outlined in the laboratory test repertoire tables. Otherwise, the receiving laboratory assumes that specimens submitted for testing were obtained with the consent of the patient for the performance of analysis to facilitate diagnosis and treatment or requested in the best interest of the patient in emergency situations e.g. patient unresponsive.

Refer to the UHL Laboratory User Manual for the terms and conditions for requesting tests.

Refer to ML225 Services Provided by the Public Health Laboratory Limerick with respect to samples received from the Healthcare Environment

Required Information

Failure to meet the requirements of this Policy may result in the Laboratory being unable to process the request or delays in reporting critical results. All requests and samples must be submitted using the HSE Mid West approved request forms and specimen containers. These can be obtained from ULH and Ennis Hospital Pathology departments. **Please note users will be informed regarding the release of new request form revisions and should remove older versions of the request form from their practice when prompted to do so. Please also note that any updated processes will apply regardless of the version of the request form used.**

Sample Request Form (current revision)	Specimen Tube / Container (within expiry date)
• Patient's First Name and Surname • Patient's Date of Birth • Patient's Gender at Birth • Patient's Ethnic Origin where requested on the form • Patient's Hospital Number • Current Ward Location* • Patient's Address • Name of Requesting Consultant / Clinician*	• Patient's First Name and Surname • Patient's Date of Birth • Patient's Hospital Number • Date & Time of Sample Collection • Specimen Type and Anatomical Site of Origin as appropriate • Signature of person taking the sample (required for Blood Transfusion Samples)

<table>
<tr><td>

- Name and bleep number of doctor for contact regarding the request*
- Name & bleep no. of Person collecting the Sample
- Date & Time of Sample Collection
- Specimen Type and Anatomical Site of Origin where applicable
- Appropriate Clinical Information
- Investigations requested

</td><td></td></tr>
<tr><td>All the information listed above must be completed on each sample request form.</td><td>The safest way to label sample tubes is with the labels generated from the Blood Track PDA device, otherwise sample tubes must be handwritten.

iPMS / PAS Labels are not suitable for use on Blood Specimen Collection Bottles these labels damage instruments and impede pre analytical checks.</td></tr>
<tr><td colspan="2">Where a “Copy to” report is requested for another Clinician / GP, please provide full name and address of the Clinician / GP that the copy report is to be issued to, failure to provide full legible details will result in reports being sent back to requesting source only.</td></tr>
<tr><td colspan="2">* Failure to provide contact details and up-to-date ward location may result in delayed reporting of critical results and is a significant patient safety risk as well as a drain on Laboratory resource. Samples taken at out patient clinics/other clinics not normally operational out of hours must have adequate contact details included on the request form for follow up of critical results by the laboratory. Inadequately completed request forms may result in request rejection.

The healthcare professional who requests the test is ultimately responsible for reviewing the results and taking appropriate action.

Rejected tests will be electronically reported as soon as practicable. It is the responsibility of the requesting clinician to repeat test requests where clinically indicated.</td></tr>
</table>

10.4 Community Setting Policy on Request Form Completion and Specimen Labelling

Policy on Request Form Completion and Specimen Labelling- Community Setting

The Purpose of this Policy is to ensure that the correct results and blood products / components are always issued to the correct patient. To ensure unequivocal traceability of the patient to the request and sample, patient identification must always be verified prior to sampling. The Policy applies to specimens being submitted for analysis across all laboratory disciplines at the UL Hospitals in Limerick, Ennis and Nenagh.

Informed consent may be required for certain tests and procedures. It is the responsibility of the phlebotomist or clinician collecting samples to ensure that patient consent is formally recorded. Tests requiring formal consent and additional documentation requirements for laboratory acceptance are outlined in the laboratory test repertoire tables. Otherwise, the receiving laboratory assumes that specimens submitted for testing were obtained with the consent of the patient for the performance of analysis to facilitate diagnosis and treatment.

Refer also to the terms and conditions for requesting tests located in this manual.

Required Information

Failure to meet the requirements of this policy may result in the Laboratory being unable to process the request.

In the case of Blood Transfusion requests, both the sample request forms and specimen labels **must** be handwritten.

All requests and samples must be submitted using the UL Hospitals approved request forms and specimen containers. These can be obtained from the Pathology Services of the ULH and Ennis Hospitals as appropriate. **Please note users will be informed regarding the release of new request form revisions and should remove older versions of the request form from their practice when prompted to do so.** Please also note that any updated processes will apply regardless of the version of the request form used.

Sample Request Form (current revision)	**Specimen Tube / Container (within expiry date)**
• Patient's First Name and Surname • Patient's Date of Birth • Patient's Gender at Birth • Patient's Ethnic Origin where requested on the form • Patient's Address • Patient's Hospital Number (desirable) • Name of requesting doctor* • Out of hours contact number of requesting doctor (if not already provided to the service)* • Date & Time of Sample Collection • Specimen Type and Anatomical Site of Origin where applicable • Appropriate Clinical Information	• Patient's First Name and Surname • Patient's Date of Birth • Patient's Hospital Number (desirable) • Date & Time of Sample Collection • Specimen Type and Anatomical Site of Origin as appropriate

<table>
<tr><td>• Investigations requested</td><td></td></tr>
<tr><td>All the information listed above must be completed on each sample request form.</td><td>All the information listed above must be completed on each specimen tube / container</td></tr>
<tr><td colspan="2">Note 1: General Practitioners may use addressograph-type labels giving full patient demographic details on the sample request form - Blood Transfusion excepted.

Note 2: It is the responsibility of the requesting doctor(s) using printed labels to have safe procedures in place for controlling the printing, affixing and checking of such labels. If printed addressograph labels are used to label specimens, it is essential that (a) all the required information is clearly legible on the label, (b) the labels fit properly to the specimen container and will not conceal visibility of sample i.e. the printed label should be no larger than the manufacturers' specimen tube label. Please note addressograph labels larger than the tube label should not be used for Haematology or Biochemistry tests- these labels damage instruments and impede pre analytical checks.

Note 3: There is a clear obligation on General Practitioners to ensure that the patient details on the specimen tubes agree completely with those on the request form. When this is not the case, the Laboratory will be unable to process the request.

Note 4: General Practitioners should use designated GP identification barcode labels which can be obtained via email to the porter at LabConsumables@hse.ie using the consumables requesting form provided by the porter.

Note 5: Requests for tests on patients from Nursing Homes must clearly state the (a) full name of the GP requesting the test(s) / GP barcode label, (b) Nursing home details and (c) Patient's home address.

Note 6: Where "Copy To" reports are required, please specify the full name / address of the Nursing Home / Clinician / GP to which the Copy to report(s) is to be issued. Nursing Home requests must have the attending GPs name and location preferably with GP barcode on the request form.

Note 7: GP test requests for Biochemistry and Haematology UHL should be completed on the UHL Blood Sciences Request Form, where applicable.</td></tr>
<tr><td colspan="2">* Failure to provide contact details may result in delayed reporting of critical results and is a significant patient safety risk as well as a drain on Laboratory resource. Samples taken at clinics other than GP practices must include adequate contact details on request forms for follow up of critical results by the laboratory. Inadequately completed request forms may result in request rejection.

The healthcare professional who requests the test is ultimately responsible for reviewing the results and taking appropriate action.

Rejected tests will be electronically reported as soon as practicable. It is the responsibility of the requesting clinician to repeat test requests where clinically indicated.</td></tr>
</table>

11 Terms and Conditions for Requesting Tests

- Test requesters using the services of HSE Mid West (MW) Laboratories are required to review and adhere to the terms and conditions for use of this service as well as the specific requirements for sample collection and testing intervals as described in this manual.

- Please note: The primary responsibility for follow up action on any laboratory test result rests with the person who requested the test. The timeframe within which they follow up to seek the test result should take account of their clinical assessment of the need for urgency and the time within which a result is likely to be available.

- Reference ranges quoted in this manual are based on biological sex assigned at birth. Clinical interpretation should consider sex assigned at birth, current gender identity, and relevant medical history e.g. hormone therapy.

- Test requesters are required to provide out of hours contact details for communication of unexpected findings. Where these are not provided the laboratory reserves the right to reject samples.

- Users of the laboratory service should ensure that their contact details i.e. name, address, telephone number are up to date. Any changes should be notified to the Laboratory Information Systems Manager.

- Hospitals are expected to operate rotas that are available to the laboratory and that identify a person(s) competent to accept and act on critical results on patients at all times.

- Requests for tests in the HSE MW laboratory service must be made by a registered Medical Practitioner or an appropriately qualified healthcare professional acting on the instructions of a registered Medical Practitioner. The full name and where applicable e.g. GPs address must be clearly legible on the request form if not using prescribed identity barcodes. '**Self-referral' (self-testing) of own / family / relatives/ friends' clinical specimens for Laboratory testing without instruction from a registered Medical Practitioner is prohibited.**

- The patient test request form must be completed in full as outlined in the policy in this manual on request form completion and specimen labelling. Patient details such as age and gender at birth are critical as the reference ranges of some tests are age and gender specific. **Incomplete or missing test requester information may result in rejection of the request. See below for specifics regarding provision of clinical details.**

- Only current revisions of request forms should be used. Please discard older versions of request forms when instructed to do so on release of a revision.

- Information provided on the request form and the results of laboratory investigations will be stored by the laboratory in accordance with the policies of the Health Service Executive on data storage and document retention.

- Demand management: In maintaining diagnostic stewardship, and notwithstanding correctly identified samples or chronic disease management programmes (CDMs); the HSE MW Laboratory Service reserves the right to decline to perform specific requested tests from any service requester where the requesting clinician has not provided the clinical details required by the laboratory User Manual to support the appropriateness of testing.

- The HSE Mid West Laboratory Service reserves the right to restrict GP testing to a catalogue appropriate to community - based care in line with the Sláintecare plan and CDMs. Users may contact relevant laboratory consultants where tests are clinically indicated that fall outside the prescribed catalogue as described in this manual.

- Requests for tests not performed in the Laboratories of the HSE MW will be referred to specialist external laboratories and will involve the communication of patient information and clinical details to the external laboratory. Details on referral laboratories can be obtained from the respective Pathology Laboratory. In cases where Clinical governance of referred tests is in question the laboratory may refer the requester to another Laboratory service that can provide appropriate clinical governance.

- The HSE MW Laboratory service reserves the right to restrict specialised referral requests from General Practitioners. All specialised referral requests must be approved by the appropriate Laboratory Consultant.

- Issues concerning patient consent for laboratory investigations are the responsibility of the requesting doctor or healthcare provider. The HSE MW Laboratories assume that specimens submitted for testing were obtained with the consent of the patient for the performance of analysis to facilitate diagnosis and treatment. Certain genetic and specialised tests require explicit informed consent. **Where a referral laboratory requires documented evidence of consent, testing will not be performed unless a valid request form and consent form bearing the patient's signature (or that of their parent/guardian) accompanies the sample. The requesting clinician must retain a copy of the consent form in the patient's medical records.**

- GP practices or other clinics using centrifuges should be aware of and implement the requirements for centrifugation as detailed in this manual. Users should be aware of their responsibilities in maintaining the adequate performance of equipment through the requisition of calibration services and other maintenance as recommended by the manufacturers. Users are also advised that the laboratory may request evidence of compliance with these conditions for audit purposes.

- The intended primary function of the HSE Mid West Laboratories, as a HSE funded laboratory service, is to provide diagnostic services to HSE and HSE affiliated health and social care services in hospital and community settings and to doctors engaged in General Practice in Ireland. Where deemed necessary by Laboratory and Hospital Management, and notwithstanding any service level agreements or other arrangements that may be in place, the HSE MW Laboratory Service reserves the right to withdraw or restrict services to non-HSE-affiliated requesters in order to prioritise and preserve the provision of services to its primary users.

- **The service provided by the HSE MW Laboratories is intended to assist in the clinical management of patients and is not provided for medico-legal or forensic purposes or criminal investigations.**

- The patient identification details given in laboratory reports are drawn from the Patient Administration Systems of the Health Service Executive (IPMS) and are based on the information supplied on the request form(s) by the requesting doctor.

- **Results are not communicated directly to patients by this laboratory service.** Results are reported to the requesting hospital Clinician or (in the case of copy reports) nominated clinician or General Practitioner who can then explain their significance to the patient within the context of their discussions of the clinical problem.

- Laboratory reports are the copyright of the Health Service Executive.

- Unless a specific request is made, a patient is deemed to accept the usual procedures of the HSE MW Laboratories relating to the storage and disposal of specimens. Any such specific request must be practicable, reasonable, and given with sufficient notice.

- Users of the laboratory service are requested to avoid over ordering of consumables and to manage stock appropriately (based on expiry date) to assist in managing service cost.

Change to Patient Demographics

- The laboratory would appreciate if recent changes to patient demographics (e.g. change of Address, marriage status/maiden name etc.) could be highlighted on the request form so that a new medical record is not inappropriately established.

- Record Patient's Home address on all request forms to facilitate correct identification on the laboratory system and to avoid creation of a 'New' patient record which may result in prolonged turnaround times etc. and loss of historic links to previous results on the laboratory system.

- We discourage use of locations such as Residential/Nursing Homes, Prison, Psychiatric hospitals etc. as address of patient. Request forms should at least reference previous addresses so that records can be updated.

Clinical Details

- All test requests referred to the Laboratory should include relevant clinical details, medications and ethnic group (where relevant to the test requested). **Failure to provide adequate clinical details may place laboratory staff at significant risk of accidental exposure and laboratory acquired infection (LAI). Critical clinical information includes:**
    - Recent history of foreign travel with details of same
    - History of fevers (acute, prolonged) or pyrexia of unknown origin
    - Consumption of unpasteurised milk and milk products
    - Contact with animals (dead/live) including imported animals (in particular dogs from Eastern Europe)
    - Epidemiological links: any known association with an ongoing outbreak
- Contact the clinical microbiologist on-duty via switch before collecting or sending specimens suspected to contain HCID- high consequence infectious disease i.e. Hazard Group 3 and 4 biological agents.

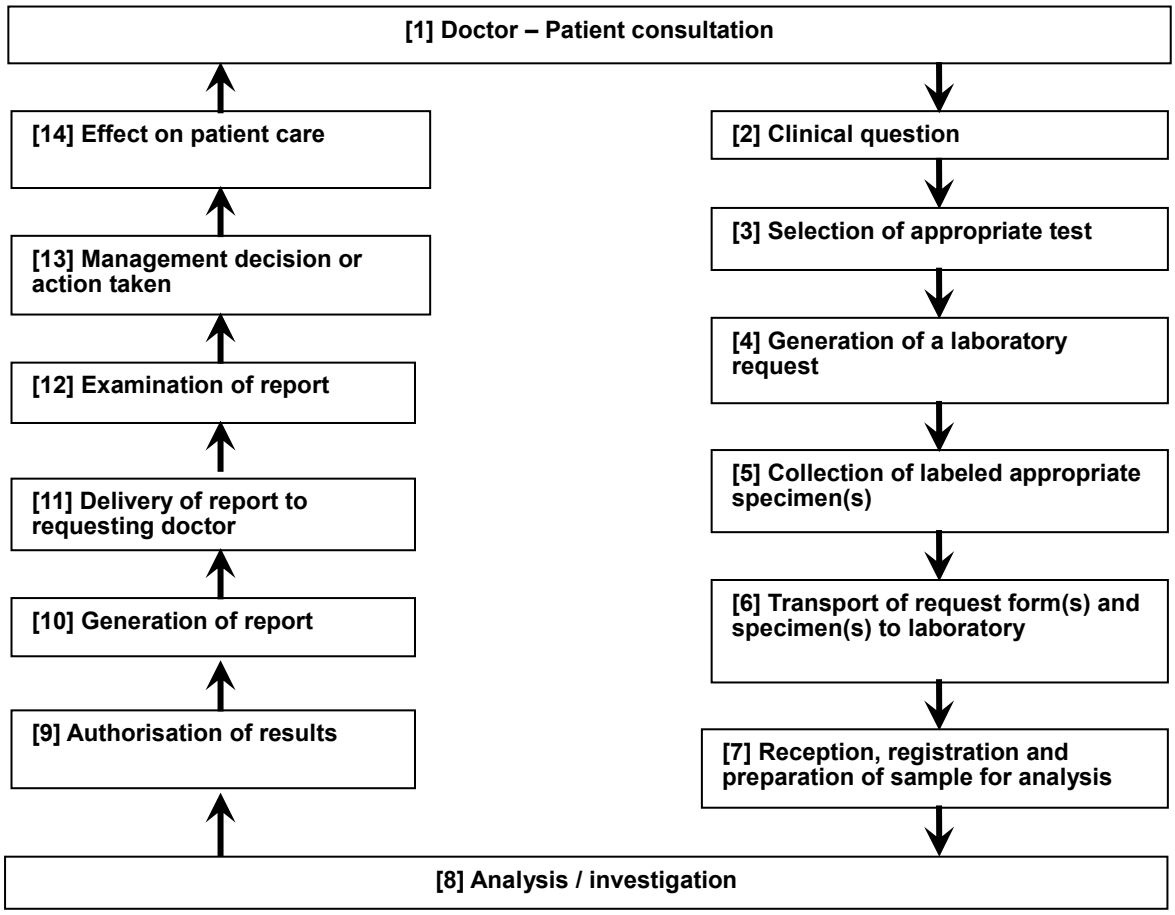
12 Ordering of Laboratory Supplies

To ensure an efficient service, please complete the appropriate Requisition Form available from the Pathology Department as outlined below. The Laboratory requests that users of the service do not arrive at the Pathology Department with requests for supplies to be filled 'while they wait'. Your co-operation in this matter will ensure a fast and efficient service.

Laboratory Porter contact details and instructions for the request and subsequent collection of Laboratory supplies by user groups of UHL Laboratories are outlined in the table below.

User Group	**Ordering Method**	**Consumable collection point**
General Practitioners in Limerick and Tipperary / Croom Hospital / University Maternity Hospital, Limerick / Nenagh Hospital /St. John's Hospital etc.	Complete supply request form LF-L-GEN-REQGPCONSUM email completed form to LabConsumables@hse.ie **NB: A minimum of two working days' notice is required to fulfil an order.**	Completed orders will be left in the Pathology Reception area for collection, with the requesting destination marked on them. **Note:** Blood collection consumables for GPs in North Tipperary are to be collected via Nenagh Stat Laboratory
Ennis Hospital and General Practitioners in Clare: orders for Laboratory Supplies must be sent to the Laboratory at Ennis Hospital.	Complete supply request form LF-E-GEN-BTLRQSTFMORD email completed form to ennislab.orders@hse.ie **NB:** Forms should be received by Tuesday to guarantee supply	Collection point at Ennis Laboratory Friday (for forms received the previous Tuesday).
UHL Wards	Requisition Form LF-L-GEN-REQWRDCONSUM Pathology Laboratory Consumables - Ward List	The Laboratory Porter checks and replenishes supplies on all wards in the University Hospital Limerick on a weekly basis.
UHL Theatres	Requisition Form LF-L-GEN-REQTHEATRECONSUM Pathology Laboratory Consumables - Theatre List	The Laboratory Porter replenishes supplies as required.
Laboratory Porters Contact details	Telephone No.:	061 – 482841 / Bleep 059

13 The Clinical Laboratory Sample Test Cycle



14 Specimen Collection

- Refer also to section 10 of this manual.
- Please provide separate samples for each laboratory discipline. It is Pathology policy not to split samples between laboratories.
- Please ensure that Biochemistry samples are received in the Laboratory within 12 hours of venesection. Sample integrity is compromised on samples over 12 hours old. This is applicable to samples received at all HSE Mid West Laboratory sites.
- It is essential that specimen and form labelling are clear and accurate and comply with the requirements of the Pathology Policy on request form completion and specimen labelling in previous section of this manual.
- Samples regarded as urgent by the requesting clinician should be clearly marked on request forms as urgent. Urgent in-house request should be hand delivered to the relevant laboratory discipline. GPs must submit a fully completed urgent GP request form to the laboratory.
- Please indicate if patient is a twin, where possible.

- Please note specimens with a collection date exceeding 48 hours on arrival to the Microbiology Laboratory will be rejected due to reduced viability of organisms in the sample. Please do not submit specimens to the Microbiology Laboratory if it is known that the delay in arriving in the laboratory will exceed 48 hours.

- Samples that do not meet the criteria for acceptance by the laboratory will be rejected. The reasons for rejection are varied and will be described on the test report e.g. leaked in transit, unsuitable samples for test request, insufficient or mismatched demographics, test requested on incorrect request form etc.

- Pre-analytical storage requirements are outlined where relevant for each test/analyte in discipline test tables. Please ensure storage guidelines are adhered to in order to ensure sample integrity and quality of results.

14.1 Blood Collection

Bleeding of patients is per current Approved Hospital Venepuncture Policy. Refer also to the following: (a) HSE National Clinical Policy and Procedural Guideline for Nurses and Midwives undertaking venepuncture in adults and (b) HSE National Clinical Policy and Procedural Guideline for Nurses and Midwives undertaking venepuncture in children.

Always use blood collection tubes that are in-date. Blood taken into expired collection tubes may render the sample unsuitable, or impact on the reliability of the result.

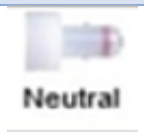
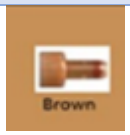
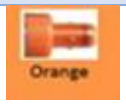
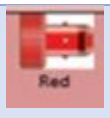
Obtain consent and complete consent forms where required e.g. for genetic tests. Adhere to procedures regarding aseptic principles to minimize the risk of infection or contamination of patient samples. This is particularly important for Blood Culture and informs the order of draw as outlined below.

14.2 Order of Draw of Samples

In order to avoid potential contamination of subsequent tubes, it is recommended that when blood is collected for several analyses from a single venepuncture, that the sequence (order of draw) outlined below is followed:

1. Blood Culture
2. Coagulation specimen tubes – coagulation studies
3. Clotted specimen tubes
4. Heparinised specimen tubes
5. EDTA
6. Glucose

14.3 Sarstedt S-Monovette Guide Order of Draw

Colour Code	Order of Draw/Additive
	**1st** **Blood Cultures (aseptic technique)**
	**2nd** **No additive**
	**3rd** **Sodium Citrate (Coagulation)**
	**4th** **Serum Gel**
	**5th** **Lithium Heparin Gel**
	**6th** **Lithium Heparin for Metal Analysis**
	**7th** **EDTA**
	**8th** **RED**
	**9th** **EDTA gel tube**
	**10th** **Fluoride gel**

14.4 Specimen Tubes to Be Used for Collecting Blood

Acknowledgement:

Sarstedt AG & Co., for permission to reproduce the images of Sarstedt tubes and needles and associated instructions for use of the S-Monovette blood collection system.

Specimen Tubes for Routine Tests



Product No.: 09201; 4ml S-Monovette

Biochemistry: most routine tests except Glucose - must be first sample taken

Serology / Virology: Serology / Virology tests.

Biochemistry: Antimicrobial assays

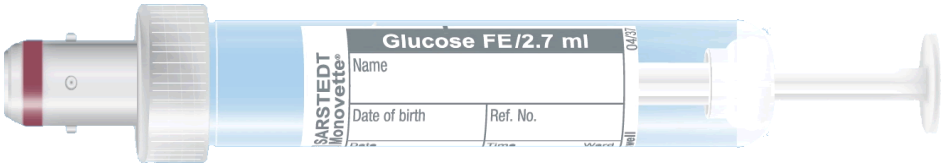


Product No.: 04-1929100; ml S-Monovette

Emergency Biochemistry and all Biochemistry tests for dialysis patients.

Some specialised tests including chromosome studies / karyotyping.

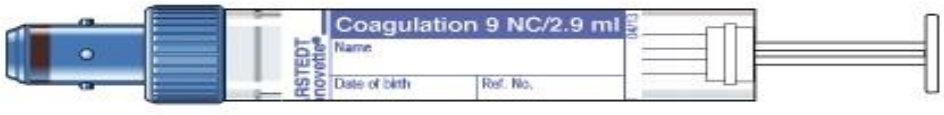
Please mix sample well by inverting 4-5 times.



Product No.: 04-1918100; ml S-Monovette

Glucose Sample and also Lactate

Please ensure that full sample is taken and mix well by inverting 4-5 times.



Product No.: 04-1902100; ml Monovette

All Coagulation Tests

Please ensure that full sample is taken and mix well by inverting sample 4-5 times.

Product No.: 05-1167100; ml S-Monovette 09100; ml K2E S-Monovette

Full Blood Count (F.B.C.) please ensure that full sample is taken and mix well by inverting sample 4-5 times.

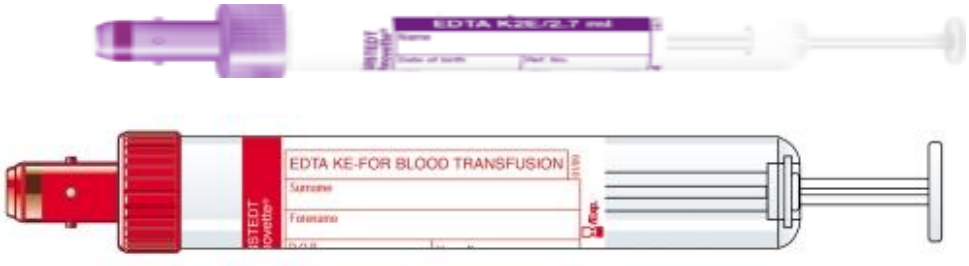
Haemoglobin A1c

ESR

Viral PCR / Genotyping.

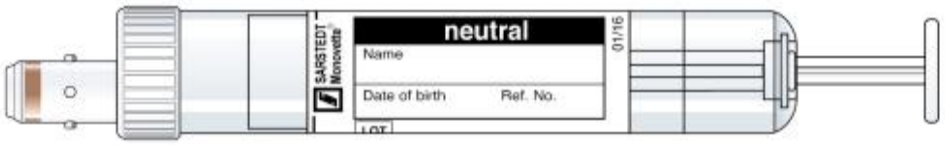
DNA Studies, CF Genotyping.

HLA Typing.



Product No.: 01-1605004; ml S-Monovette

Routine Blood transfusion, Blood Group and Hold and crossmatch and Antibody Identification where appropriate.



Product No.: 02-1726001

Anti-D Quantitation and Antibody Identification where appropriate.

Available on request from Blood Transfusion Laboratory.



Product No.: 01-1604400

Trace metal Analysis: See Biochemistry section of this book.

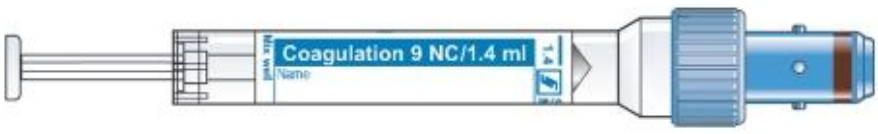
Use with metal free Safety Monovette needle only (ref. No. 81600400).

Specimen Tubes for Paediatric Tests



Product No.: 06-1667001; ml S-Monovette

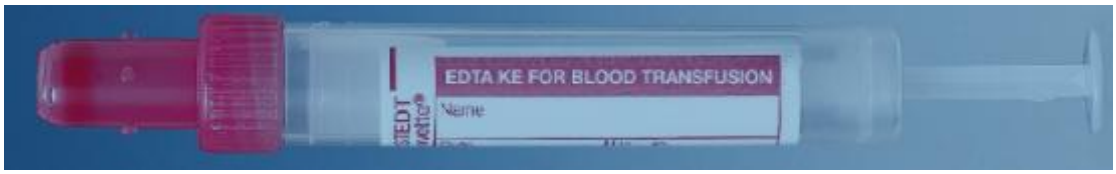
Paediatric Serum - Clinical Biochemistry Tests and Serology / Virology Tests.



Product No.: 06-1668100; ml S-Monovette

Paediatric Coagulation Tests

Please ensure full sample is taken and mix well by inverting 4-5 times.



Product No.: 05-1167001013; ml S-Monovette for blood transfusion

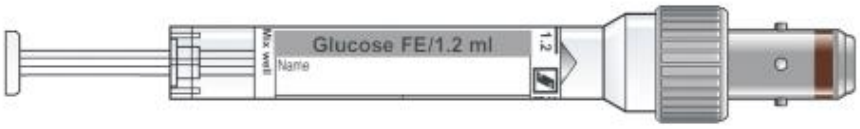
Paediatric Blood Transfusion; Blood Group and Direct Antiglobin Test.



Product No.: 06-1666100; ml S-Monovette

Serology / Virology: Paediatric Tests for chromosome studies / karyotyping.

Please mix sample well by inverting 4–5 times.



Product No.: 06-1665100; ml S-Monovette

Paediatric Glucose sample.

Please ensure that full sample is taken and mix well by inverting 4–5 times.



Product No.: 09301; ml S-Monovette

Serology/Virology: Blood borne Virus PCR- HIV PCR/ Viral Load, Hepatitis C PCR/ Vital Load

Please ensure that full sample is taken and mix well by inverting 4–5 times.

Sarstedt Safety Monovette Needles



Product No.: 85-1441-200; Safety Monovette Needle, 22G, 1”



Product No.:85-1162-600; Safety Monovette Needle 21G, 11/2”, metal free needle for trace metal analysis using LH-metall-analytik specimen tube only (01-1604400).

Sarstedt Butterfly Needle



Product No.: 85-1640005; 23G, 3/4”. Butterfly Needle

14.5 Instructions for the S-Monovette System

Instructions for the S-Monovette System are as outlined in the User Guide provided by Sarstedt.

14.6 Blood specimen volume requirements Serology

Test Details	Patient Type	Specimen Tube
General Serology/Virology blood tests/screens	**Adult Patients**	One filled serum gel tube **Type:** Sarstedt S-Monovette 4.9 mL **Colour:** Brown It is recommended that a second serum specimen tube be sent **if more than 6 investigations** are required to ensure sufficient specimen volume to complete all requested investigations Tests that are sent to referral laboratories require a separate specimen tube and request form (refer to alphabetical test listing for information on tests sent to referral laboratories).
General Serology/Virology blood tests/screens	**Paediatric / Neo-natal Patients**	One filled serum gel tube **Type:** Sarstedt S-Monovette 1.1 mL **Colour:** Brown It is recommended that a second serum specimen tube be sent if more than 4 investigations are required to ensure sufficient specimen volume to complete all requested investigations. If difficulties in obtaining blood specimens are expected, it is advised that the requesting doctor would contact the laboratory prior to specimen collection so tests can be ranked in order of priority. **Please note - The minimum specimen volume requirements to process a single test is 0.4 mL of blood** (equivalent to half-filled pediatric tube).
Other	All	Volume requirements for specimen types other than blood samples are provided in the 'Special requirements or comments' section in the alphabetical test listing.

Refer to the detailed list of tests and sample requirements for serology/virology

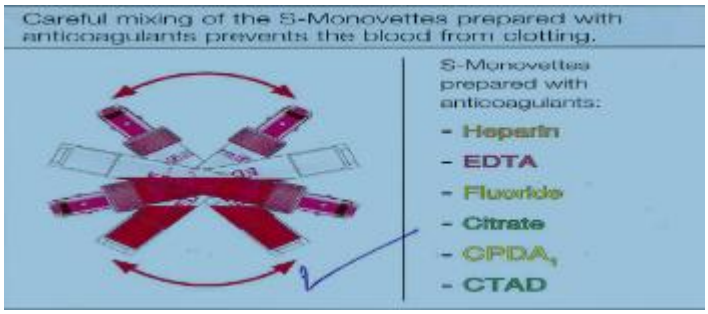
14.7 Blood specimen volume requirements Biochemistry

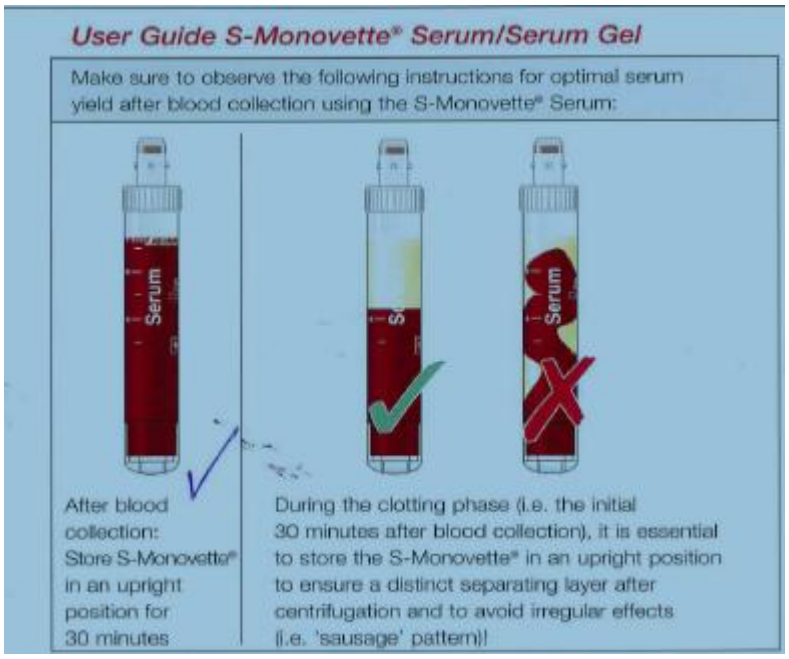
Test Details	Patient Type	Specimen Tube
General Biochemistry	Adult Patients	One filled lithium heparin gel tube Type: Sarstedt S-Monovette 4 mL Colour: Green OR One filled serum gel tube Type: Sarstedt S-Monovette 4 mL Colour: Brown
Glucose, Lactate	Adult Patients	One filled fluoride oxalate tube Type: Sarstedt S-Monovette 4.9 mL Colour: Grey
Ammonia, PTH	All Patients	One filled Sarstedt S Monovette EDTA Type: Sarstedt S-Monovette 2.7 mL Colour: Purple or red
General Biochemistry	Paediatric / Neo-natal Patients	One filled serum gel tube Type: Sarstedt S-Monovette 1.1 mL Colour: Brown OR One filled lithium heparin gel tube Type: Sarstedt S-Monovette 1.1 mL Colour: Green Identify the test priority on the request form for low volume samples Please note - The minimum specimen volume requirements to process a single test is 0.4 mL of blood (equivalent to half-filled paediatric tube).
CSF Biochemistry	All Patients	Universal container Routine CSF min. sample volume: 500 µL Xanthochromia min. sample volume: 1 mL
Urine spot	All Patients	One filled urine tube Type: Vacutainer: 4 mL Colour: Brown
Urine 24 hr	All Patients	24-hour Urine Collection container, plain or acidified
Urine SPE	All Patients	Universal container Minimum 20 mL
Fluid	All Patients	Universal container Minimum 1 mL
Referral Biochemistry	All Patients	Tests that are sent to referral laboratories require a separate specimen tube and request form. Refer to alphabetical test listing for information on tests sent to referral laboratories.

14.8 Volume requirements Specimens other than Blood

Note: Volume requirements for specimen types other than blood samples are provided in the 'Special requirements or comments' section in the alphabetical test listing for other departments.

14.9 Guide for Handling Blood Specimens Following Collection





14.10 Quantiferon TB Gold (QFT) Tubes

See Quantiferon test in Serology/Virology Section. Tubes for the Quantiferon test should be requested directly from the Serology/Virology Laboratory. **Note:** quantiferon testing is not routinely available to general practice. GPs may contact the testing laboratory Eurofins Biomnis to arrange sample collection and testing privately by this provider



14.11 Collection of Urine / Faeces Specimens

Collection of urine specimens / faeces / swabs specimens is described as appropriate in the respective Laboratory Test Repertoire section.

14.12 Instructions for completion of 24-hour urine collections

Approved containers for the collection of 24-hour urine are available from the Clinical Biochemistry Laboratory. Please ensure that the identification label on the container contains details of the patient's name, date of birth, hospital number/address and the name of the requesting doctor.

It is important that the following instructions are carried out with care; otherwise, the results of the tests will be invalid.

14.12.1 Procedure 24-hour urine collections

Immediately before the beginning of the collection period (usually the morning), the bladder must be emptied and the urine discarded. Record the time and date on the container label.

All urine passed during the next 24 hours must be collected and added to the container.

At the end of the 24-hour period, the bladder must be emptied and the urine collected added to that already in the container. Record the time and date on the container label.

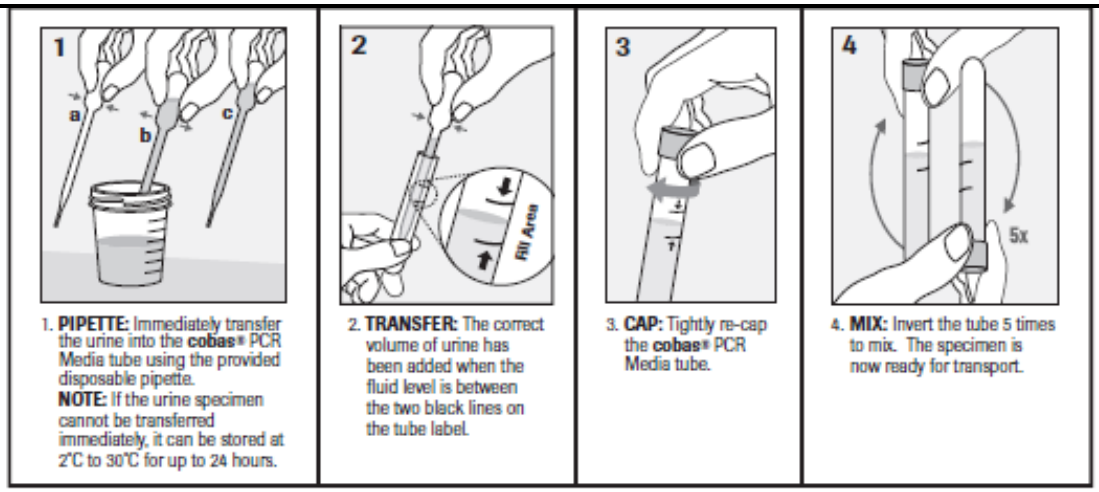
After completing the collection, arrange for the delivery of the container to the Clinical Biochemistry Laboratory accompanied by the laboratory request form or referral letter.

14.13 Swabs for Microbiology and Virology Investigations

	**Black/Blue top Charcoal** swab with AMIES transport medium for general Microbiology culture and infection control

	screening except CPE
	Carbapenamase Producing Enterobacteriac eae Screen (CPE/KPC) **Green Top Swab** Faeces/Swab of faeces/ Illeostomy swab / Rectal swab / Stool. (Copan Faecal Swab; 502CS01)
	**Sterile dry swab for Acanthamoeba investigation** [available on request from Microbiology Lab]
 For: ENT specimens & Perinasal / nasopharyngeal swab for Bordetella pertussis. (Note: Nasopharyngeal aspirate is the preferable specimen)	**Blue top flexible wire swab** in Amies transport medium plus charcoal
	**Viral Swab** Swab for respiratory viruses, e.g. Flu, RSV, SARS-Cov-2. Skin swab for herpes simplex (HSV), VZV [Red cap Swab]

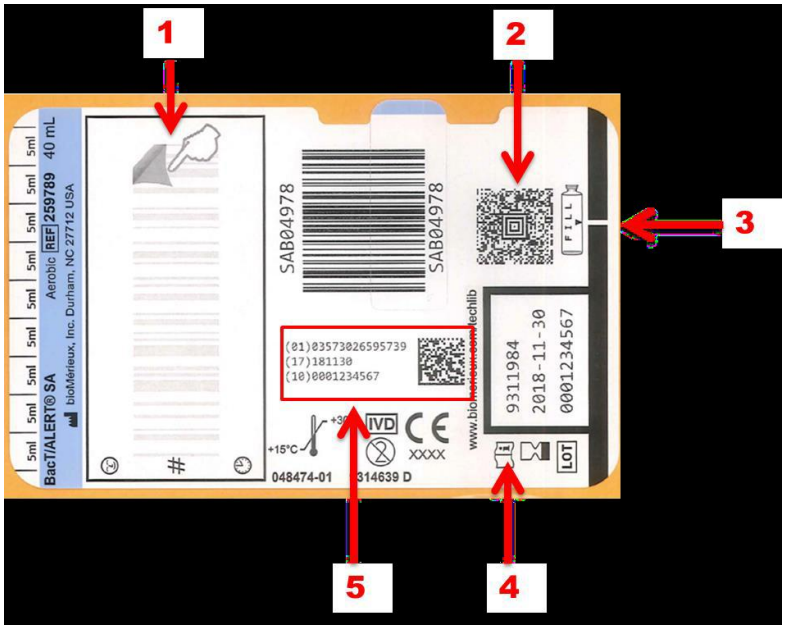
  cobas® PCR Media Dual Swab Sample Kit, thinner slocked swab, cotton swab and Cobas media tube. https://elabdoc-prod.roche.com/eLD/api/downloads/3b804236-75a3-eb11-0391-005056a772fd?countryIsoCode=XG	**Chlamydia/GC PCR- swabs** **cobas® PCR Media Dual Swab Sample Kits** **refer to test information section**
	**Chlamydia/GC PCR -Urine** **cobas ® PCR urine tube with urine transfer pipette device.**



Specimen Collection- URINE for Chlamydia/GC PCR cobas ® PCR urine tube with urine transfer device.

14.14 Blood Culture Bottles

Blood Culture Bottle Label components:

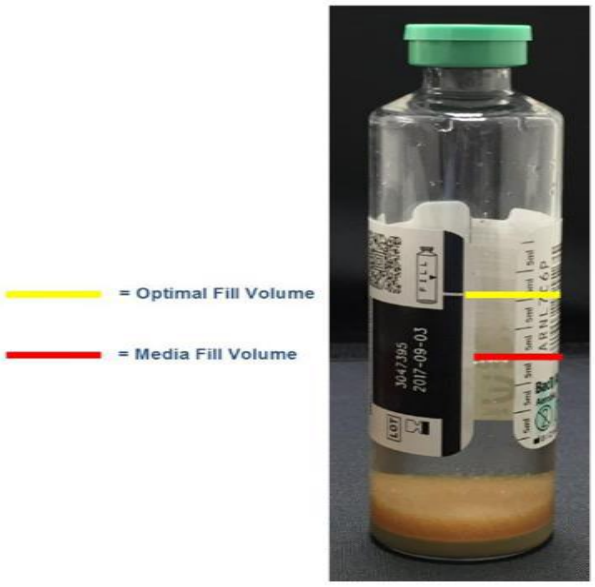


1. User, please apply patient information label or clearly handwrite in position 1 only.
2. User please do not obstruct this Aztec barcode position 2 below.
3. User please note: All culture bottles will have a Fill Line (black bar running vertically down the right edge of the label marked in position 3.
4. IFU instructions for use reference number- for Laboratory reference marked in position 4

5. Unique Device Identifier (UDI) for compliance with both EU 2017/746 and Code of Federal Regulations (CFR) 21 80 standards, see position 5.

6. (!) Removable barcode for laboratory use only- please do not obstruct or remove see position 6.

Blood Culture Bottle Filling Requirements



All culture bottles have a Fill Line (black bar running vertically down the right edge of the label). See Number 3 above. This feature does not apply to the paediatric blood culture bottle due to the low fill volume and the optimal amount of blood collected from paediatric patients depends on their body weight.

The mark "Fill-to" is the white line - marked in yellow and indicates the level when the optimal blood volume of 10mL is reached (the red line refers to the media volume in an unused bottle). The amount of blood collected is an important variable for the detection of microorganisms in patients with suspected sepsis. With the correct blood volume in a blood culture bottle, the detection rate of the pathogens present in small numbers (bacteria, fungi) increases. The right amount of blood also reduces the likelihood of false positive results.

NB Send/transport Blood Cultures without delay to the Laboratory.

14.15 Recommended sampling containers: AFB/Mycobacterial testing & Bronchial Washings

Recommendation regarding use of Sarstedt Universal containers for Mycobacterial /AAFB /TB investigation.

For health and safety reasons when taking specimens for Mycobacterium spp. investigation, the TB Lab have requested that all samples submitted for Mycobacterial testing, be sent in the durable Sarstedt Universal containers (Figure 1 below) rather than the standard Sterilin Universal containers (Figure 2 below). This is to facilitate safe handling and processing of specimens for Mycobacterial investigation by laboratory staff. Your cooperation is appreciated.



Figure1

Recommended for TB / bronchial washing samples/ Urine for TB

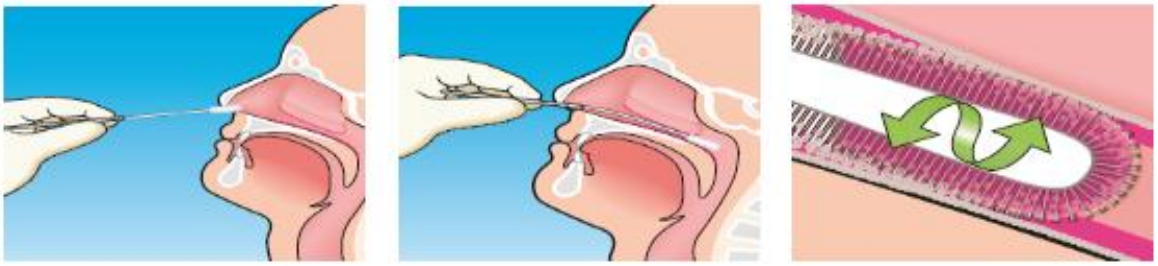


Figure 2

Not recommended for TB / bronchial washing samples

*Note: Collect specimens in appropriate CE marked leak proof (Sarstedt) containers and transport specimens in sealed plastic bags. Yellow-capped Sarstedt are not suitable for TB processing as lids warp during centrifugation. Use white capped Sarstedt sterile universal containers only.

14.16 Procedure for collecting Nasopharyngeal Swabs (NPS) for Respiratory Viruses



1. Gently insert the swab along the nasal septum just above the floor of the passage to the nasopharynx until resistance is met.

2. Rotate the swab gently against the nasopharyngeal mucosa for 10-15 seconds then gently remove swab.

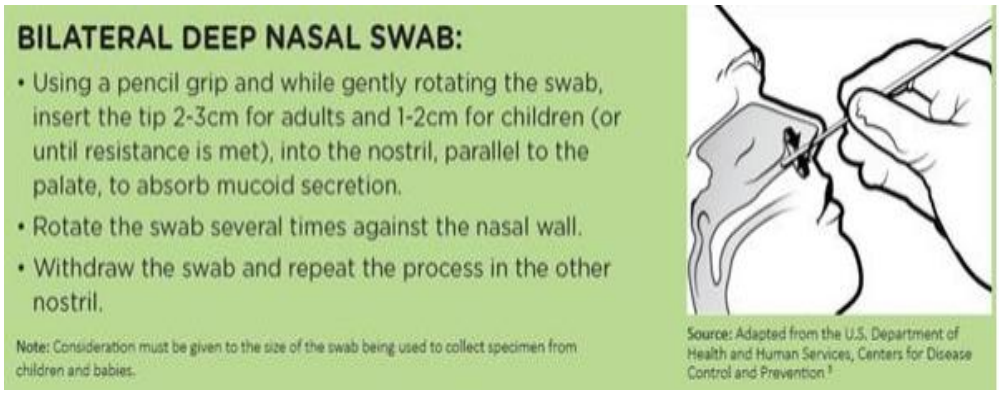


3. After the swab is removed from the patient place it into the tube of UTM transport medium all the way to the bottom of the tube

4. Holding the swab shaft close to the rim of the tube, break the applicator shaft at the breakpoint indication line. Hold the tube opening away from your face. Write patient details on the collection tube label.
   **Viral swab collection kits can be ordered from the Laboratory Porters (061 482841) **

Procedure for collecting Deep Nasal Swab for Respiratory Viruses

The preferred swab type for SARS-CoV-2 surveillance is a deep nasal swab. This is more comfortable for a patient undergoing repeat testing rather than a combined nasopharyngeal and throat swab:



14.17 Specimen Containers for Histology Specimens

Large Specimens

Large specimens must be put into a 5-15 Litre specimen containers, as appropriate to sample size.

Specimens must be fully immersed in formalin. For fixative volumes please refer to the Histology test repertoire.

Single Placentas must be placed in 5 Litre Containers, fully immersed in formalin,

Twin Placentas must be placed in 10 Litre Containers, fully immersed in formalin.

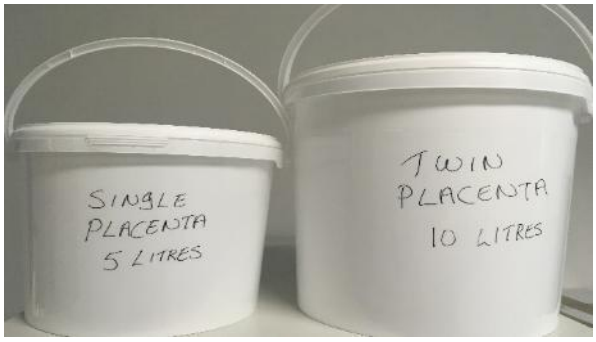


Figure: 1 Large Specimen Containers

Small Specimens

Small specimens must be put into one of the following containers (Figure 2):

- 20ml universal
- 40ml red-topped
- 125ml pink-topped
- 250ml white-topped container

Note: Needle Biopsies should be placed in a Safe Cell Cassette which is closed and then placed in a formalin container



Figure: 2 Small Specimen Containers

14.17.1 Collection, Handling and Storage of Histology Specimens

- Specimen collection is at the discretion of the Clinician.
- Sharps used for specimen collection must be disposed of in appropriate sharps waste disposal bins.
- Sharps must not be sent to the Histology Laboratory under any circumstances.
- Routine Histology Specimens must be placed directly into formalin and can be stored at room temperature until transported to the Histology Laboratory.
- Urgent Histology samples should be clearly identified with clinical details and contact number for the requesting Clinician clearly stated on the request form.
- Sample should be completely immersed in formalin to ensure results are not compromised due to drying artefact.
- Skins for Direct Immunofluorescence (DIF) should be sent in Zeus Transport Medium, a separate sample in formalin should also be sent to the laboratory.
- Frozen Section specimens must be sent dry directly to the Histology Laboratory.
- Frozen Sections will not be processed on patients with TB, Hepatitis B, C, COVID-19 or HIV
- A copy of Dental X-Rays to be sent in with all dental biopsies should a second opinion be required.
- FNA slides for Cytology Referral should be stored at room temperature until transported to the Histology Laboratory.
- Non-gynaecological fluid samples for Cytology Referral should be stored at 4-6°C until transported to the Histology Laboratory.
- All samples should have date and time of sample collection recorded on the request form. This is especially important for CSFs which cannot be processed if >24 hours old.
- Theatre Document Records (triple sheet) should be completed by the requestor (except GPs) and should accompany the specimen container & request form to the laboratory

14.17.2 Labelling of Histology Specimens

- The most current edition of the University Hospital Limerick Histology Request Form and the approved Specimen Containers must be used in all cases.

1. Request Forms and Specimens must be labelled correctly with:
    - Patient's Full Name
    - Hospital Number (N/A for GP's)

- Date of Birth
- Ward / Location
- Specimen Type

Request Forms must also contain the following information:

- Patient's Full Address
- Name of Requesting Clinician
- Clinical Details

2. All details on the request form must correspond to those on the specimen container.
3. Specimen labels must be fixed onto the side of the specimen container, not the lid. (See figure 1)
4. Request forms must not be stuck onto specimen containers as an alternative to a correct specimen label.

Note 1: Specimens with request forms stuck onto container as an alternative to a correct specimen label will be treated as unlabelled and returned to the sender.

Note 2: Any specimens received without clinical details will be returned to the sender.

14.17.3 Histology Specimen Rejection Criteria:

Any request form that does not have:

1. Patients full first name*
2. Patients Surname*
3. Date of Birth
4. Hospital Number (n/a for GP's)
5. Patient's full address
6. Specimen type*
7. Clinical Details

* If specimen type is not labelled on the request form or container then sample should be rejected however if the container is labelled the sample can be accepted.

Specimens may be rejected if sufficient clinical details are not provided

Any specimen that does not have

1. Patient's full first name*
2. Patients Surname*
3. Date of Birth/ Hospital number
4. Specimen Type

14.18 Patient Collected Specimens

Details of collection and transport requirements as described in this manual and must be clearly communicated to the patient by the Clinician prior to patient collecting samples.

It is the responsibility of the requesting clinician to ensure that specimens collected and submitted to the Laboratory by the patient are fully labelled, submitted in the correct specimen containeraccompanied by a fully completed request form; transported in accordance with specified requirements and submission timeframes and stored appropriately where same day submission is not possible.

14.19 Sample Centrifugation

The HSE Mid West Pathology Service does not provide centrifuges to external practices. Samples should not be centrifuged off-site unless the following conditions are met:

- The practice uses calibrated equipment that complies with all relevant regulatory standards and this calibration is confirmed periodically per manufacturer's instructions by an ISO17025 accredited supplier for this service.
- Centrifugation is performed according to the specific requirements of centrifugation (spin speed and duration) for each sample type, See below.
- This requirements for sample centrifugation in this laboratory must be adhered to by users performing centrifugation.

Centrifugation recommendations for Serum Gel Monovettes	
Minimum time (minutes)	Relative centrifugal force (RCF) G
15	2000G
10	2500G
4	≥3000G

Please note: Evidence of required completed maintenance will be sought by the pre-analytics section during compliance audits. Centrifugation checks are carried out on receipt of centrifuged samples in the laboratory. **Failures in gel separation will result in sample rejection and this will be noted on the test report.**

Sample Type: Only Lithium Heparin and serum (SST) samples can be centrifuged as per requirements for applicable tests.

General Advice for Users
Where centrifuges are in use outside of the laboratory environment, it is the responsibility of the practice to ensure that staff are sufficiently trained to perform the procedure and informed of the risks associated with the procedure. **The below advice is not a replacement for user training; it is a general overview of centrifugation requirements to enable the user to meet laboratory criteria for acceptance of centrifuged samples.**

Placement and set up advice:

- Once the centrifuge has been placed and calibrated it must not be moved – if it is necessary that it be moved, the supplier must be contacted to move the centrifuge and recalibrate.

- For non-floor models the centrifuge must be placed on a firm sturdy benchtop / desk that accommodates the entire width/breadth of the centrifuge. (The surface should not shake when the centrifuge is running).

- The Centrifuge must be secured by the supplier to the bench top.

- Before use the supplier must provide the certificate of calibration on placement, calibration should cover the range of centrifuge speeds required. **Users must keep this information on file in the instruments book of life together with instruction manual, warranties etc.** Further accredited calibration should be performed periodically as recommended by the manufacturer and records of calibration should be kept in the instruments book of life. The laboratory will request this information when conducting compliance audits for ISO15189 accredited activity.

- Centrifuge settings –should be programmed by the supplier based on the provided laboratory requirements on installation and not changed by the user.

- Please see Sarstedt IFU: centrifugation recommendations for S-monovettes guide for further details https://www.sarstedt.com/en/download/brochures/

15 Handling of Specimens

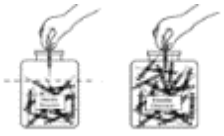
Always assume that all “blood and body fluids” are infectious for blood-borne diseases such as HBV (Hepatitis B Virus), HCV (Hepatitis C Virus) and HIV (Human Immuno-Deficiency Virus). All blood and body fluids should be handled using universal precautions.

Spillages of specimens should be dealt with in accordance with HSE-management-of-blood-and-body-fluid-spillages, Standard Precautions Guideline available at www.hse.ie

15.1 Safe Disposal of Materials used in Specimen Collection

The European Union (Prevention of Sharps injuries in the Healthcare Sector) Regulations 2014, define sharps as an object or instrument necessary for the exercise of specific healthcare activities, which are able to cut, prick or cause injury or infection. This includes equipment such as needles, blades (such as scalpels) and other sharp medical instruments. Risk reduction measures must be carried out in all healthcare settings where sharps are in use. Materials used in specimen collection should be handled and disposed of per HSE safe use of sharps available at www.hse.ie .

All sharps bins must conform to UN Standard 3291 and be available at the point of use. Disposable gloves should be worn for all activities that carry a risk of exposure to blood or body fluids. Never overfill a sharps bin, users must not go over the “fill line” which is designed to prevent overfilling



and accidental spillage of contents. All sharps must be placed in a sharps container immediately after use. Sharps containers should be assembled securely in accordance with manufacturer’s instructions and stored in secure locations while awaiting collection for disposal.

15.2 Handling of samples post collection.

All specimens should be dispatched to the laboratory as soon as possible. Some samples require special handling i.e., protection from light, immediate freezing, transport within a temperature interval, within a time frame appropriate to the nature of the examination etc. If in doubt, regarding the specimen container required or the special requirements when taking the specimen please refer to the 'special requirements and comments' section of the relevant investigation or contact the laboratory for advice.

With reference to Microbiology specimens, all specimens >48hrs old on arrival in the Laboratory will be rejected. Refrigeration of specimens is undesirable for investigation of labile fastidious organisms. Sample quality will deteriorate if transport is delayed.

16 Additional Examination Requests

- Each laboratory discipline has a procedure for the handling of add-on test requests. It is advisable to contact the relevant laboratory discipline if additional investigations are required, to ensure sufficient sample is available and the sample is still viable. The time limit for add on requests will be based on the stability of the analyte.

- The laboratory will inform you if an oral request is sufficient or if an additional request form is required. Note: Blood Sciences do not accept oral requests from in-house requesters. Additional requests will only be accepted on request forms.

- Additional requests on Histology specimens must be made through the reporting Pathologist.

- In the event of analytical failure, the laboratory will notify the requesting clinician / location should further samples be required.

17 Repeat Testing Interval

Minimal retesting intervals (MRI) are defined as the minimum time before a test should be repeated, based on the properties of the test and the clinical situation in which it is used. The minimum repeat testing interval is defined for the respective tests where appropriate in the test repertoire of this manual.

18 Delivery of Biological Specimens

18.1 Regulations for Transport of Biological Specimens

Transport of biological specimens by public road must be in compliance with the current ADR transport regulations and HSE National Guidelines for the Preparation for Transport of Patient Specimens and other Biological Materials. It is the responsibility of the consignor to comply with these regulations. This standard is to safeguard the drivers of vehicles carrying diagnostic specimens on the road between sites and provides protection to passengers and / or the emergency services in the event that the vehicle is involved in a road traffic accident. Consignors of UN 3373 may be nursing homes, doctors, dentists, the HSE (hospitals and primary care clinics), and personnel working in clinics, nursing homes, hospitals and surgeries.

Note 1: An Post prohibits the sending of diagnostic specimens by regular mail.

Note 2: The consignor is defined as:

a. The routine courier contracted to transport specimens from General Practitioners Surgeries in accordance with ADR Transport Regulations.
Or

b. The GP surgery sending specimens when routine contracted courier is not used.
Or

c. The establishment i.e., hospital / nursing home / other sending specimens to a Laboratory in the Mid Western Area

Note 3: Transportation temperature: Where specific transport/storage conditions are not specified, ambient temperature is applicable. Ensure that specimens are not exposed to extremes of temperature e.g. placed in direct sunlight, near a heat source (e.g. radiator) or allowed to chill or freeze.

Standard transport temperature requirements should be maintained follows:

- Refrigerated: +2° to +8°C
- Frozen: -15° to -25°C
- Ambient: > +15° to +25°C
- Samples should be transported directly to the Laboratory in a timely fashion from the point of collection.
- Samples should not be stored overnight in the transport vehicle.
- The Laboratory periodically audits sample transport times and temperature to verify ambient temperature conditions are met during transportation.

Failure to transport specimens to the laboratory in a timely manner or under the required conditions may result in deterioration of the specimen and the sample being unsuitable for some/all of the analyses requested.

It is the responsibility of the consignor to ensure that transport containers are maintained in good condition and are cleaned regularly using detergent. Disinfection will be required in the event of a specimen spillage. Suitable disinfectants and dilutions of detergents are outlined in the UL Hospitals Infection Control Policy – Cleaning and Disinfection Guideline.

Note 4: Microbiology samples >48hrs old will be rejected. If there is a delay in transport post collection, refrigeration is preferable to storage at ambient temperature. Exceptions include Cerebrospinal Fluid (CSF) and Blood Cultures. Please refer to individual sample types for other sample specific special precautions.

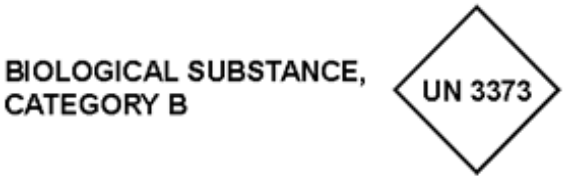
Category B Biological Substances

Most samples can be transported as UN 3373 BIOLOGICAL SUBSTANCE, CATEGORY B in accordance with Packing Instruction 650. It is the responsibility of the consignor of infectious substances assigned to UN3373 to ensure that the packaging complies with all of the requirements of Packing Instruction P650 and appropriate training is provided to relevant staff in the application of P650.

Consignors may enter into a CONTRACT FOR CARRIAGE with a carrier e.g. a courier company, under the terms of which the carrier may assume part of the consignor's role as packer of the dangerous goods. In the absence of a contract for carriage, it remains the responsibility of the consignor to apply all layers of packaging and mark the package in accordance with P650. Consignors should refer to the Health and Safety Authority, Information note on the carriage by road of UN No. 3373, BIOLOGICAL SUBSTANCE, CATEGORY B or further requirements.

The system for packaging UN 3373 is a three layer system, of which either the secondary packaging or the outer packaging must be rigid. To comply with packing instruction 650 for road transport, the following requirements must be satisfied.

1. The specimen must be contained in a primary leak proof container.
2. The primary receptacle must be contained in a secondary leak proof container.
3. There must be sufficient absorbent between the primary and secondary container to absorb the entire amount of liquid in the primary containers should they leak.
4. Either the primary or secondary container must be able to withstand an internal pressure of 95 kPa – the primary container in use for the laboratories of the UL Hospitals satisfies this requirement.
5. The secondary container must be contained in an outer package with at least one minimum surface dimension of 100 x 100 mm.
6. The outer package must display the following markings:



7. Either the secondary or outer packaging must be rigid.
8. The assembled package should be capable of withstanding am drop test without leakage from the primary container.

Note: All 24 hr urine assays performed outside the University Hospital Limerick facility must be collected and transported in packaging that meets with current ADR transport regulations. **To obtain the appropriate packaging please contact the Laboratory Porters per the 'Ordering Laboratory Supplies' section of this manual.**

The Laboratory monitors specimen deliveries for compliance with packaging requirement to safeguard the Health and Safety of delivery personnel and receiving Laboratory staff. Incidents of non-compliance will be reported on the Laboratory non-conformance system for appropriate corrective action.

18.2 Primary Care Delivery to Pathology Laboratory Ennis Hospital

Days	Routine Hours	
Monday – Friday	9am-5pm	**Deadline for receipt of all samples from Primary Care is 4.00 pm Monday – Thursday and 2.00 pm on Fridays. Samples received outside of these times may not meet pre-analytical testing criteria or miss scheduled transport to UHL.** It is essential that specimens be transported safely and efficiently to the laboratory in order to ensure the safety of staff transporting samples, other staff, patients and members of the public, and to ensure that the specimens reach the laboratory in proper conditions, in a timely manner. All specimens should be dispatched to the

		laboratory as soon as possible. Some samples may require special handling. Urgent specimens outside of these hours should be delivered to the respective laboratory discipline in Pathology UHL. Note: Where there are specific time and temperature requirements for testing of specimens once collected, these are indicated in the individual test requirements. **Note:** *In-house samples only*. Specimens may be delivered directly to the Pathology Reception area Monday – Friday from 09.00 a.m. – 5.00 p.m.

Samples should be transported to the laboratory as soon as possible.

Specimens are delivered to the Pathology Laboratory from the main hospital building by laboratory porter at regular intervals during the day or when specifically requested.

Samples from GPs, Nursing Homes and other outside sources can be delivered directly to Pathology Reception or by the Shannon Doc specimen collection / delivery system.

For specimens requiring immediate attention: for example, separation and freezing it is important that the sample is handed directly to a member of the laboratory staff. Please ensure that you are informed of specimen requirements by reviewing the test repertoire and special requirements in this manual prior to submitting samples.

18.3 Nenagh Hospital Pathology Laboratory Sample Delivery

Samples should be transported to the laboratory as soon as possible. The Laboratory services for Nenagh Hospital consist of an ‘on-site’ STAT Laboratory to accommodate Hospital ‘in-patients’ i.e. Hospital Wards, OPD, LIU and Clinics, requiring Biochemistry and Haematology tests.

Specimens are delivered to the Pathology Laboratory from the main hospital building by laboratory porter or medical staff at regular intervals during the day. NOTE: Separate request forms and specimens are required for tests performed in UHL.

The Nenagh Pathology laboratory acts as a dispatch point for the transfer of specimens arising from Nenagh in-patients to the relevant laboratory discipline in Limerick, at the following times, 09:30 hrs and 13:30 hrs. GP samples are managed via scheduled transport deliveries from GP practices directly to UHL.

Please note that samples are registered on the Laboratory Information System on arrival at the relevant laboratory in UHL.

18.4 Pathology UHL Sample Deliveries

Days	Routine Hours	**Sample Deadline for receipt of all routine samples from Primary Care**
Monday – Thursday	8:30a.m – 5:30p.m	**Mon- Thurs: 9.00 a.m. – 4.00 p.m.**
Friday	8:30a.m – 5:00p.m	**Fri: 9.00 a.m. – 2.00 p.m.**
		<u>Samples received outside of these times may not meet pre-analytical testing criteria.</u>
		Where individual specimens are hand delivered by patients the Specimen reception book should be completed. It is essential that all specimens be transported safely and efficiently to the laboratory in order to ensure the safety of staff transporting samples, other staff, patients and members of the public, and to ensure that the specimens reach the laboratory in proper conditions, in a timely manner. All specimens should be dispatched to the laboratory as soon as possible. Some samples may require special handling. **Note:** Where there are specific time and temperature requirements for testing of specimens once collected, these are indicated in the individual test requirements.

Days	On-call Hours	**Specimen transport boxes and request forms should be used as directed in the table below to facilitate timely delivery to destination laboratory out of routine hours.** It is essential that all specimens be transported safely and efficiently to the laboratory in order to ensure the safety of staff transporting samples, other staff, patients and members of the public, and to ensure that the specimens reach the laboratory in proper conditions, in a timely manner. All specimens should be dispatched to the laboratory as soon as possible. Some samples may require special handling.
Monday – Friday	5:30pm-8am	
Weekend Saturday Sunday or Bank Holiday	24hrs *	**Note:** Where there are specific time and temperature requirements for testing of specimens once collected, these are indicated in the individual test requirements. *refer to department on-call schedules for further information **Access to the UHL Pathology Reception area is restricted to hospital personnel from 4 p.m. – 8 a.m Mon to Thursday and 2pm Friday to 8am Monday. Taxi drivers couriers etc all have access as there is a swipe card in security for admittance.**

18.4.1 Transport System for scheduled routine collections UHL Laboratory

Commercial packaging systems are in place for collection of routine samples. These consist of a rigid secondary container capable of holding a significant number of primary receptacles and a rigid outer transport box.

When using such systems please ensure that:

a. There is sufficient absorbent in the secondary container to absorb the entire amount of liquid that may be present in the primary containers.
b. That the secondary container is properly closed.
c. That there are no visible signs of damage to the outer container – all defective transport boxes should be removed from service.
d. And that the correct UN 3373 BIOLOGICAL SUBSTANCE, CATEGORY B label is visible on the outer transport box.

Examples of secondary and tertiary containers that can be used when transporting by taxi / courier are as per Figures 1 & 2.

It is the responsibility of the consignor to purchase these containers.

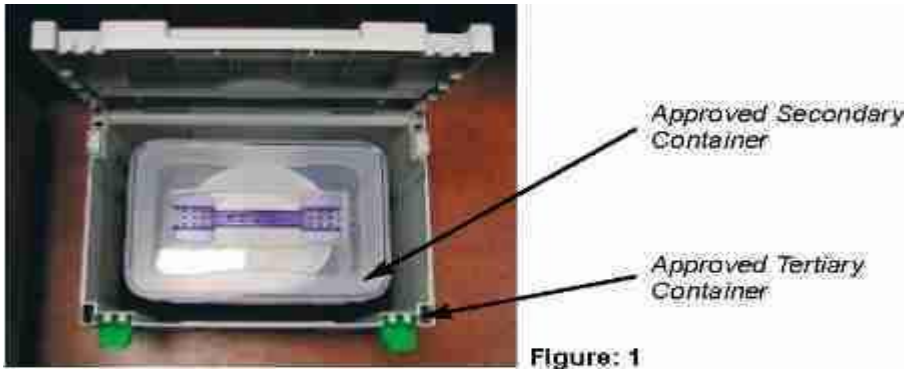


Figure: 1

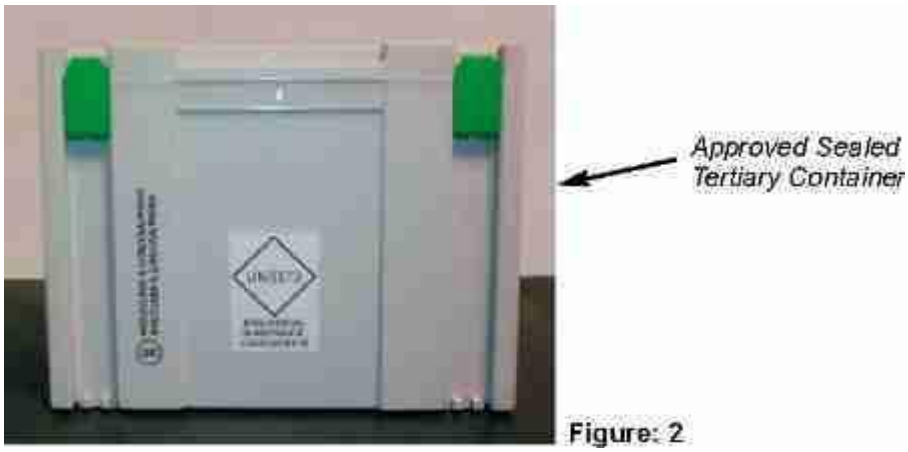
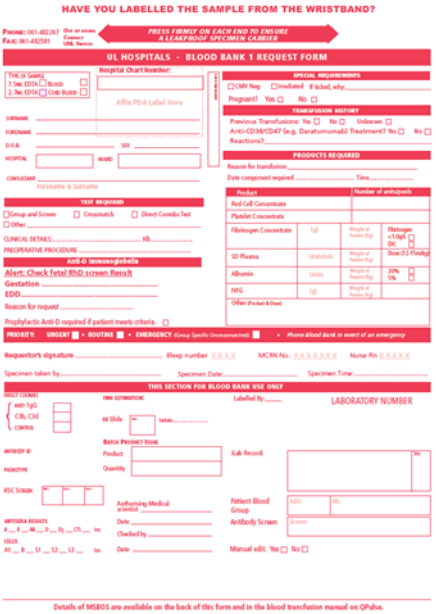
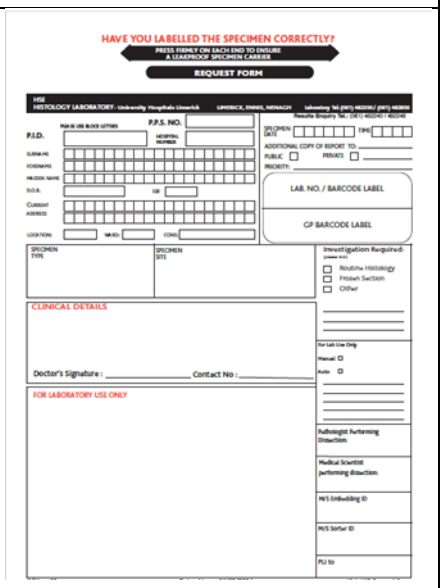


Figure: 2

Transport of Histology Specimens from Ennis, Nenagh and St. John's Hospital is per LI-L-HIS-TRANSPORTENSTJ. Delivery of Histology samples out of hours is discouraged. Please retain for next working day delivery.

18.4.2 Out of hours Specimen Transport Boxes and Request Forms UHL

Laboratory Destination UHL	Transport Box in Use	Corresponding Request Form
Blood Bank		
Blood Sciences (includes Haematology and Biochemistry)	 **Rigid cardboard sample container**	
Microbiology,Serology/Virology		

		 
Histology sample delivery out of hours is discouraged. Please retain samples for delivery to UHL on the next working day. **NB: use purple CUH request form for Cytology referrals.**	 	 

18.4.3 Delivery of emergency samples / one off samples UHL Laboratory

As it is often not practical to store sufficient transport boxes for one-off emergency samples, the following system may be used otherwise for multiple sample delivery during the out of hours period please use rigid transport boxes as described below:

a. Place the primary specimen in a rigid leak proof secondary container with sufficient absorbent.
b. Place the secondary container in an envelope of minimum dimension 100 x 100 mm and label with the UN 3373 BIOLOGICAL SUBSTANCE, CATEGORY B marking.
c. For multiple sample deliveries during the out of hours period rigid colour coded containers should be used as outlined below.

18.5 Delivery of Biological Specimens <u>within</u> UHL

a. Specimens may be delivered directly to main Pathology Reception during routine hours. Out of hours, specimens should be delivered directly to the laboratory where the tests will be performed.

   Or

b. Specimens may be delivered internally within UHL to the relevant laboratory using the pneumatic chute system. **Note:** please review temperature requirements for sample transport in the relevant test repertoire section.

18.5.1 Instructions on Use of the Pneumatic Chute System UHL

1. Place the labelled specimen(s) and sample request form in the designated 'Red / Green / Blue capped Canisters' for sample transportation.
2. Limit the number of samples to two or three per canister.
3. Ensure canister lid is fully closed.
4. Instructions on the operation of the chute are available at each chute station.
5. The chute is available for internal use for the transport of specimens only, to the listed laboratory per table below:

Laboratory Station	**Availability Weekdays (Mon – Fri)**	**Availability Weekends (Sat – Sun)**
Blood Bank	Open 24 hours	Open 24 hours
Clinical Biochemistry	Open 24 hours	Open 24 hours
Haematology	Open 24 hours	Open 24 hours
Microbiology	Open 24 hours	Open 24 hours
Serology / Virology *	8.30 a.m. – 7.45p.m.	10.00 a.m. – 1.00p.m. (Saturday only)

* Serology / Virology samples outside of the above hours should be sent via the chute to the Microbiology Department only.

6. In the event of a breakdown of the pneumatic chute system, the following process must be followed:

7. Contact the Aerocom (APT) helpdesk on 01- 8413005 followed by an email to “Lab Chute” address on Microsoft Outlook with specific details of the problem. (Company support is provided 24*7).

- Provide Zone and Station number as applicable.
- Provide details of any error code as noted on display.
- Record log as provided by APT, if applicable.

If the chute system is out of commission for greater than one hour during routine working hours, the Laboratory Manager / Maintenance will contact the Facilities Manager to authorise Porters to cover the chute downtime and deliver specimens to the Laboratories.

During ‘out of hours’ the head porter / designee will contact the night ADON to approve porter cover for delivery of specimens to the respective Laboratory disciplines.

Note 1: Critical / Irreplaceable samples should be ‘hand delivered’ directly to the laboratory e.g., CSFs.

Note 2: Histology specimens must not be sent in the pneumatic chute to the laboratory.

Note 3: The laboratory returns all micro-chipped identified canisters received to the appropriate designated hospital location. Post midnight, the laboratory On-Call personnel should not be contacted for canisters. If none are available, the night Porter should be contacted for delivery of samples directly to the laboratory.

18.6 Emergency Response in the Case of an accident or leakage from the package during transport

If leakage is observed or a package is damaged as a result of an accident, contact the forwarding Location (GP Surgery / Hospital / Clinic) / Laboratory in the University Hospital Limerick for advice via (061 482838). Do not touch the package. If emergency responders have arrived on scene, please advise them of the presence of UN3373 materials.

As soon, as is practical, clean up as follows:

1. Wear gloves and protective clothing, including face and eye protection if indicated.
2. Cover any visible spillage with a cloth or paper towels to contain it.
3. Pour an appropriate disinfectant over the cloth or paper towels and the immediate surrounding area (5% bleach solutions are generally appropriate, and quaternary ammonium disinfectants may also be used).
4. Apply the disinfectant concentrically beginning at the outer margin of the spill area, working towards the centre.
5. After about 30 min, clear away the materials. Place the damaged package in a leak proof container e.g., yellow sack and remove to a controlled lab area to see if the samples can be salvaged. If there is broken glass or other sharps are involved, use a dustpan or a piece of stiff cardboard to collect the materials and deposit them into a puncture-resistant container for disposal (sharps bin).
6. Clean and disinfect the area of the spillage (if necessary, repeat steps 2–5).
7. Dispose of contaminated materials into a leak-proof, puncture-resistant waste disposal container.

18.7 Formalin Spill

Cover small formalin spillages with disposable absorbent towels.

For larger formalin spillages, use a formaldehyde Spill Kit (Spill-X-FP from VWR International), to polymerise the formalin.

The area should then be wiped with disinfectant (Trigene 1:50 dilution).

18.8 Biological Hazard

Known biohazard specimens, fresh tissue and cytology fluid spills should be cleaned with absorbent towel that must then be collected into an autoclave bag, and autoclaved before disposal. The area should then be wiped with disinfectant (Trigene 1:50 dilution).

19 Reporting of Laboratory Results

19.1 Description of Standard Channels for Reporting

Laboratory Results are available on the laboratory information system (iLAB / APEX) to all HSE Mid West Hospitals who use the Pathology Service. Enquiries on laboratory results should be made through the “Ward Enquiry Function” of the laboratory information system (iLAB / APEX). Refer to the iLAB section of this manual. Electronic reporting to results management systems or electronic health records is described below.

Where preliminary or provisional test reports are released, they are identified as ‘not fully authorised’ or ‘XYZ results to follow’.

Measurement uncertainty is determined, regularly reviewed and addressed as appropriate in the respective laboratory testing / examination procedures. Details of current examination procedures/analytical methods, including performance specification can be provided to clinical users on request from the Consultant Head of Discipline / Chief Medical Scientist.

Hard Copy reports are distributed daily to the wards within the University Hospital Limerick, Dooradoyle and Ennis Hospital

Hard Copy reports are sent to the acute hospitals within the HSE Mid West daily (Monday – Friday). The University Maternity Hospital operates an electronic health record (EHR) under MN-CMS and test results are electronically transmitted to the EHR results section.

Critical results are communicated as a verbal report by telephone to the clinical team or authorised health care professional. Critical results are defined in individual laboratory test repertoire sections. It is our policy to telephone apparently unexpected results that may immediately affect patient management.

General Practitioners are encouraged to provide a mobile telephone number to facilitate reporting of ‘urgent critical results.

Access to Histology reports on the Laboratory Information System (ILAB / APEX) is available to designated Consultants within the UL Hospitals.

The laboratory is unable to provide results to patients/their relatives. Any requests for results by the patient/relative must be made via the requesting clinician. The laboratory may telephone results to an identified clinician as requested by the patient/relative as required.

Laboratory test reports issued by the accredited Laboratories of the Pathology Department of the HSE Mid West comply with the requirements of the INAB R1 Regulation and INAB Policy PS23. The following is stated on electronic test reports of the accredited laboratories (a): “An INAB Accredited Testing Laboratory Reg. No 303MT” and (b): Non-accredited tests are clearly identified in mixed test reports such that the difference in accreditation status is positively and unambiguously identified.

The Public Health Laboratory is a designated official food testing laboratory under S.I. 79 of 2020, as defined in Regulation (EU) No. 2017/625. The Public Health Laboratory may also receive and test samples from the Healthcare Environment It is accredited to ISO17025 – General Requirements for the competence of testing and calibration laboratories. The scope of accreditation can be accessed on the INAB website www.inab.ie, reference 096T.

The Public Health Laboratory has its own LIMS system, Labware. Results are not available on iLab.

19.2 Identification of Testing Locations on Test Reports

Provision of Serology/Virology, Microbiology (including TB testing), Blood Transfusion, and Histology laboratory services is centralised at University Hospital Limerick (UHL) and the TB Laboratory in Raheen, which operates under the management of UHL Microbiology for TB services. Blood Sciences testing (Haematology and Biochemistry) is available at UHL, Ennis Laboratory, and Nenagh Laboratory, as outlined in the scope of service provision in this manual.

Where practicable, the testing laboratory is identified on the test report. If this is not feasible, unique laboratory accession numbers may be used to indicate the testing location as shown in the table below (unless otherwise specified on the report). If required, the laboratory can also confirm the location of testing by reviewing the audit trail within the Laboratory Information System.

Site	Accession number prefix	Discipline
Ennis Hospital	HE	Haematology
	BE	Biochemistry
Nenagh Hospital	HN	Haematology
	BN	Biochemistry
University Hospital Limerick	TX	Blood Transfusion
	HH	Haematology
	BB	Biochemistry
	M*X* (*X*=specimen type)	Microbiology
	MT	TB Laboratory, Raheen
	SS	Serology/Virology
	PH	Histopathology

19.3 Risks Identified for Analytical and Post Analytical Examination Phases

Every effort is made by HSE Mid West Laboratory Services to provide clear unambiguous test reports with appropriate interpretive comments. The laboratory invites feedback from users via direct contact with the laboratory in the event of any issues or suggestions for improvements on our reports, user surveys performed by the laboratory from time to time also provide an avenue for user feedback.

Analytical risks include but are not limited to; procedural non-conformity, equipment or reagent error, delayed turnaround time (TAT), invalid quality control, use of inappropriate reference values.

Post analytical (reporting) risks include but are not limited to; reporting incorrect results, incorrect transcription of results, report sent to incorrect person.

Please note quoted reference ranges are appropriate to sex assigned at birth. For patients undergoing gender transition or receiving gender affirming hormone therapy, clinicians should interpret results in the context of the patient's clinical history and treatment regimen rather than relying solely on laboratory flags.

These risks are managed in the laboratory through following established protocols including robust internal quality control, interlaboratory comparison, maintenance of staff competency, reporting of incidents (laboratory non-conformance reporting), adequate verification/validation of examination procedures according to ISO15189 and INAB PS24. IVDR compliant devices, reagents and equipment are used throughout the laboratory and a public declaration regarding use of non-IVDR compliant devices is available on request.

Turnaround time (TAT) is calculated from the time of booking in on the LIS. For in-house patients samples regarded as urgent by the requesting clinician should be hand delivered to the respective laboratory discipline to mitigate against delays in transport to the laboratory using the chute, routine rounds or other modes of transport external to the laboratory. **The chute should never be used for the transport of irreplaceable specimens such as CSF. GPs should complete all request forms in full, especially for urgent requests.**

Test requesters are advised that the laboratory currently operates a paper requesting and manual booking system, except for Maternity MN-CMS electronic requests, which inherently carries a risk of booking inaccuracy. To mitigate this risk; all handwritten request forms must be clearly legible. If all test requests cannot be accommodated legibly on a single form, use multiple forms to ensure clarity and prevent missed tests.

Test requesters should be aware of the limitations of the on-call service and restrictions in respect of performing emergency work *only*. Please review the hours of operation for HSE MW Laboratories as outlined in section 6 of this manual. The out of hours service offered by HSE MW Laboratories is also outlined in this manual.

19.3.1 Responsibilities of Test Requesters

Test requesters using the services of HSE Mid West Laboratories are required to review and adhere to the terms and conditions for use of this service as well as the specific requirements for request form and sample labelling, sample collection and testing intervals as described in this manual.

The requester holds primary responsibility for reviewing and acting on reported test results in a timely manner.

Test requesters are required to provide out of hours contact details for communication of unexpected findings. Where these are not provided, the laboratory may reject submitted samples.

Requesters must respond promptly to laboratory requests for missing information or corrective action This includes, for example, the completion of disclaimer forms in cases where an irreplaceable sample does not meet pre-analytical requirements.

Requesters must notify the laboratory immediately upon becoming aware of any issues related to patient demographics, sample identification, missed tests, or errors in sample collection at source.

Requesters must accept telephoned results and assess the impact of abnormal results on patient care. Immediate clinical evaluation and appropriate follow-up are essential to ensure patient safety.

Requesters must perform readback verification with the laboratory delivering verbal results to confirm correct transmission and understanding of the information provided. This universally recommended practice helps prevent miscommunication and ensures accurate documentation of critical results.

19.4 Reporting of Rejected Test Requests or Samples

See also section 10 above

Pre-analytical screening is performed for all sample types to ensure sample integrity and suitability for the requested tests. Where the requirements of sample collection are not met as specified in this manual or in specific discipline specific procedures, samples may be rejected.

Every effort is made to report all rejected test requests or samples immediately to the requesting source via our standard reporting channels. Instructional or guidance comments are issued where appropriate with rejected test requests or samples to inform the requester of the reason for rejection. **It is the responsibility of the requesting source/clinician to review results in a timely manner and to request repeat tests where clinically indicated.**

The requesting source will be telephoned in the event of rejection of irreplacable samples. A disclaimer agreement to process the sample may be entered into by the user in this instance where sample integrity is not compromised. Please note that irreplaceable samples are specimens considered to be critical to patient care, but recollection is not possible e.g. CSF, Pre-antibiotic Blood Culture, Neonatal samples, Bone, Tissue, non-gynaecologic cytology samples, body fluids and some timed blood/urine samples.

Laboratory tests that are solicited and ordered through MN-CMS (PowerChart) are electronically transmitted to the Electronic Health Record (EHR). These results are accessible within the appropriate Pools in the Message Centre, as well as in the Results Review module. Unsolicited results, however, are available only in the Results Review module of the EHR. Prior to contacting the laboratory regarding missing results, users are advised to consult the Results Review module to verify whether the results have been received. All laboratory results are also available in iLAB, which should be used as the primary source for results review during any MN-CMS system downtime.

19.5 Laboratory Reports to General Practitioners (GPs)

Electronic reports are available from the Laboratory Information System via Healthlink.

Hard copy reports are provided to GPs who do not have Healthlink. All service users should avail of electronic reporting via Healthlink. (See Healthlink section for contact details).

GPs may request copies of blood science reports via uhlbloodscience@hse.ie

19.5.1 Healthlink

Healthlink is the name given to a Department of Health and Children funded project, which allows electronic links to be established between General Practitioners, Hospitals, and the Health Service Executive to allow for the timely, secure transfer of patient related administrative and clinical data. Please contact the Laboratory Information Systems Manager for Healthlink associated issues. Details on Healthlink can also be obtained from the Healthlink website: www.Healthlink.ie or by telephone on 01-8825606.

Please refer also to the link below for *'Good Practice Guidelines for Users of Healthlink in the Mid-Western Area'*. This document outlines the requirements for Healthlink users to provide updates to the laboratory in relation to staff and practice system changes as well as registration information and advice on ensuring accurate test ordering.

https://healthservice.hse.ie/staff/information-healthcare-workers/laboratory-user-manuals/

19.6 Referral Laboratory Reports

Referral laboratory details are displayed on the Laboratory Information System while the test is in progress. Referral reports are available on ILAB & Healthlink for a limited number of referral laboratories that have an electronic interface with UHL. For referral laboratories with no interface with UHL, scanned copies of referral reports are available to ILAB users with access to DART. Hard copy referral reports are sent to the requesting clinician.

Note: it is the policy of some genetics testing facilities to issue reports only to the requesting Clinician, in these instances the laboratory acts as a dispatch point for these requests.

Note: For Microbiology referrals: Referral Laboratory contact details are available from microbiology where required. Some microbiology investigations may include referral of isolates for toxin testing or epidemiological typing where deemed appropriate by the clinical microbiologist. Such referrals may occur in the course of investigations of outbreaks/ unusual community isolates or treatment failure incidences. If isolates are referred for further typing in the course of investigation this will be indicated on iLAB, however, contact details of reference laboratories may not be provided in these instances as results are largely used for academic purposes, please contact the microbiology laboratory if further information on any of these isolates is required.

19.7 Critical results reporting Policy

The HSE Mid West Laboratory Services operates under the guidelines provided by the HSE Laboratory Services reform Programme, Advice Note; '*Communication of Laboratory Results Likely to Require Urgent Action'*.

A critical result is a laboratory result that indicates a serious pathophysiological state and is reasonably likely to require urgent clinical assessment or intervention to prevent actual or potential harm to a patient. The laboratory has defined criteria (agreed with users where appropriate or applied from established guidelines) for the identification and verbal communication of critical results. These include results that the laboratory can identify as reasonably likely to require urgent action OR result(s) where there may be serious consequences for patient health if the result is not reviewed in a timely manner.

To support a risk-based approach to critical result management, the Laboratory broadly classifies results likely to require urgent clinical action into categories A, B and C according to the immediacy of risk to the patient and the urgency of clinical intervention required. These categories are used to prioritise additional verbal communication of results where deemed necessary to support patient safety. Critical results will be authorised and made available through the primary reporting channel (LIS/electronic reporting systems) as soon as practicable following verification. Additional communication activities, where undertaken, will be prioritised according to clinical risk and local escalation procedures.

Effective and timely two-way communication between laboratory users and the laboratory services they use is a shared responsibility. While the laboratory operates risk-based procedures for the identification and additional verbal communication of critical results, the ultimate responsibility for reviewing laboratory reports, assessing patient risk and ensuring appropriate clinical follow-up rests with the requesting clinician or healthcare professional.

Reliance should not be placed solely on supplementary notification processes, as these are intended to support, but not replace, routine review of authorised laboratory results.

Recipients of verbally communicated results must perform readback verification to confirm correct transmission and understanding of the information provided**.**

19.8 Policy on Faxing Results

The HSE Mid West Pathology Service does not fax results. Secure email will be requested for transmission of reports electronically and only provided to trusted third parties involved in the ongoing care and management of the patient.

19.9 Reports Received in Error

Laboratory Reports may be issued to the incorrect requesting location in error resulting in delayed provision of results.

Although every effort is made to avoid such occurrences with GP 'bar-coded location' labels / PDA labels etc., errors may occur during manual sample booking.

To alleviate the delays in reporting associated with such errors:

- Return hardcopy report/copy of electronic report directly to the testing laboratory.

  Or

- Telephone the relevant laboratory advising them of the need to verify records and re-issue the report(s).
- Healthlink reports received in error should be permanently removed from the patient record in the practice system.

Please do not forward reports directly to the patient noted.

See also Data Protection below.

20 Contact for Clinical Advice and Interpretation

Pathology results are reported with reference / therapeutic ranges. A guide to interpretation of results and clinical advice is provided where relevant on test reports and in this manual as applicable. Please note quoted reference ranges are appropriate to sex assigned at birth. For patients undergoing gender transition or receiving gender affirming hormone therapy, clinicians should interpret results in the context of the patient's clinical history and treatment regimen rather than relying solely on laboratory flags.

Information on medical indications and appropriate selection of available procedures, clinical advice and interpretation is available and can be obtained by contacting the appropriate Consultant / Laboratory. Details on current examination procedures including performance specification can be provided to clinical users on request by contacting the relevant laboratory discipline.

The contact details for Consultant Staff are given in contacts section of this manual.

Clinical advice relating to reports sent to external laboratories should be directed to the referral laboratory.

21 Pathology Service Users

Users of the laboratory service should ensure that their contact details i.e. name, address, telephone number are up to date. Any changes should be notified to the Laboratory Information Systems Manager.

Hospitals are expected to operate rotas that are available to the laboratory and that identify a person(s) competent to accept and act on critical results on patients at all times.

22 User Satisfaction, Comments and Complaints

The goal of the Pathology Department is to ensure that our users receive accurate, reliable, meaningful and timely laboratory results. If users encounter any problems with the services or have suggestions for service improvement, please contact the Chief Medical Scientist of the appropriate Laboratory discipline or the Laboratory Manager using the contact details listed in this manual. Alternatively, you can raise your issue via the HSE your service your say portal by completing the online feedback form or emailing yoursay@hse.ie. Surveys are also conducted periodically by the HSE Mid West Laboratories where test requesters and patients are encouraged to respond with their feedback.

23 Data Protection

As a Data Controller, the HSE is required to adhere to the data protection principles specified in the General Data Protection Regulation (GDPR) as well as the Data Protection Acts of 1988-2018. It is the policy of the Pathology Department to manage personal data and information with the highest degree of integrity, security and confidentiality. In the unlikely event of a data breach the laboratory reports and escalates the incident using Laboratory (non-conformance reporting) and HSE established procedures. Should the Information Governance Manager classify the incident as a reportable data breach, a data breach form is sent to the Data Commissioner's office for evaluation, which will determine whether additional steps or investigations are necessary.

The laboratory treats as confidential any information obtained or created during the performance of laboratory activities and will only share such information with trusted third parties for the benefit of patient care, making relevant information available to any other health service provider at the request of the patient or the request of a healthcare provider acting on their behalf e.g. copy reports. Data may also be viewed by trusted third parties in the course of clinical or regulatory audit e.g. the Irish National Accreditation Board (INAB), National Screening Service regulatory audits, QPS or clinical audit etc.

The quality risk and patient safety department (QRPS) manage and review all data access requests under the framework of the Freedom of Information Act via the Mid West information governance offices before escalating such requests to the Laboratory. Requests from the Gardaí must be accompanied by client (patient) consent. Where this is not provided, access to clinical material or Laboratory records can only be provided in accordance with a Court order or at the request of the coroner.

To operate in the public interest, comply with contractual arrangements and support healthcare planning, the laboratory adheres to all statutory and regulatory requirements. In accordance with the Healthcare (Provision of Information) Act, as amended by the Data Protection Act 2018, the laboratory releases confidential patient information to trusted third parties that protect it in the same way we would and in accordance with applicable laws. Information is submitted in the format required by the relevant body.

The HSE’s lawful basis for processing personal data of service users is as follows:

1. The processing is necessary in order to protect the vital interests of the person (referred to as the data subject in Data Protection language). This would apply in emergency situations such as in the Emergency Department when unconscious sharing information with other emergency services for rescue or relocation in storms etc.

2. The processing is necessary for a task carried out in the public interest or in the exercise of official authority vested in the controller; for the HSE this official authority is vested in us through the Health Act 2004 (as amended).

Data is released to the following third parties, including but not limited to:

- National Cancer Registry.
- CIDR (Computerised Infectious Diseases Reporting).
- SARI (Severe Acute Respiratory Infections).
- SARS-CoV-2 WGS (Whole Genome Sequencing).
- C. difficile surveillance (partially de-identified information).
- Carbapenemase Resistant Enterobacteriaceae (CPE) surveillance.
- EARS-Net (European Antimicrobial Resistance Network) surveillance.

- NRAO (Novel or Rare Antimicrobial Resistant Organism) surveillance.
- National Haemovigilance Office (NHO).
- National Screening Programs.
- Shared care record*

* Laboratory results displayed within the HSE Shared Care Record represent results that have been validated and authorised in the HSE Mid West Laboratory Information System in accordance with the Laboratory's accredited quality management system. The Shared Care Record is a nationally managed clinical information system, and the Laboratory contributes data to this system in accordance with national HSE requirements. The Laboratory collaborates with national programme teams in relation to data quality assurance and validation activities. The processing and sharing of patient information are undertaken in accordance with applicable data protection legislation and HSE information governance requirements.

24 Consent

Where consent forms are required to be completed, this is stated in the requirements for the test or included the requirements for referral laboratory request acceptance. Completion of consent forms is mandatory for all genetic tests and predictive tests for inherited diseases. Issues concerning patient consent for laboratory investigations are the responsibility of the requesting doctor. The HSE MW Laboratories assume that specimens submitted for testing were obtained with the consent of the patient for the performance of analysis to facilitate diagnosis and treatment or requested in the best interest of the patient in emergency situations e.g. patient unresponsive.

Where a referral laboratory requires documented evidence of consent, testing will not be performed unless a valid request form and consent form bearing the patient’s signature (or that of their parent/guardian) accompanies the sample. The requesting clinician must retain a copy of the consent form in the patient's medical records.

Scope of Service Provision HSE MID WEST Pathology Laboratories

25 Post-mortem / Autopsy Service

Post- mortems / autopsies are carried out either following instruction from the Coroner (Coroner's Autopsy) or at the request of the Clinician with responsibility for the patient's care (Diagnostic / House Autopsy) per the UL Hospitals Post Mortem Examinations Policy, a copy of which should be located in each ward.

An information leaflet, 'Guide to the work of the Coroner' can be found in the 'End of Life' locker on each ward.

All non-coronial and non-forensic (i.e. Diagnostic or Hospital) Post Mortems require Next of Kin Consent.

Consent forms, for non-coronial post mortems, are available on each ward in in the 'End of Life' locker

A fully completed Mortuary Form (found in the Care after Death Checklist) must accompany the deceased to the Mortuary.

- Contact details for the Mortuary and hours of operation are outlined above.

25.1 Post-mortem Reports

- Coroner Post-mortem reports are sent only to, and are available only from, the presiding Coroner and the Gardaí associated with the case.
- House / Diagnostic Post-mortems are sent to the requesting Consultant only. Any queries will be forwarded to the requesting Consultant.

25.2 Forensic Post-mortems

- The State Pathologist or Assistant State Pathologist performs all forensic Post-mortems.
- The UL Hospitals Pathology Service does not generate reports on these cases.
- Reports on these Post-mortems are not available from the UL Hospitals Pathology Service.

26 Biochemistry Service

The biochemistry department at UHL offers a comprehensive range of assays for diagnosis and monitoring of disease. The service includes:

- General biochemistry including profiling for renal, liver, bone, cardiac and lipid profiles.
- Immunoassay tests including thyroid, gonadal and pituitary function.
- Therapeutic drug monitoring.
- Anitbiotic Assays (Amikacin, Gentamicin, Tobramycin & Vancomycin)
- Urine testing for routine biochemical parameters.

Refer to the detailed list of tests and sample requirements for Biochemistry

The Pathology Laboratory at Ennis Hospital provides a limited range of Biochemistry tests (renal, liver, bone profiles, cardiac function tests, lipid, glucose, protein and amylase levels) and acts as a dispatch centre for the transfer of specimens to UHL Monday to Friday.

The Pathology Department at Nenagh Hospital provides a limited range of Biochemistry tests (renal, liver and cardiac function tests, glucose, protein and amylase levels) and act as a dispatch centre for transfer of samples to UHL Monday to Friday.

26.1 Biochemistry Test Profiles

The following is a list of Profiles and associated tests that may be ordered. Please note some profiles are limited to specific location as indicated by the name. **Note for GPs that require Drugs of abuse screening:** please contact the National Drug Treatment Centre directly on 01 648 8645, these requests are not processed by the HSE MID WEST laboratories.

Profile Name	Tests Included in Profile
Renal	Sodium, Potassium, Chloride, Urea, Creatinine, eGFR
Renal (GP)*	Sodium, Chloride, Urea, Creatinine, eGFR
Liver	Total Protein, Albumin, Total Bilirubin, Alkaline Phosphatase, Gamma GT, ALT
Bone	Calcium, Phosphate, Alkaline Phosphatase, Albumin, Adj. Calcium.
ED	Renal, Liver, Bone, CRP
Lipid	Total Cholesterol, LDL-Cholesterol, HDL-Cholesterol, Triglyceride, Non-HDL Cholesterol
Iron Studies	Iron, Transferrin, Transferrin Saturation, TIBC
TFT	TSH, free T4
Haematinics	B12, Folate and Ferritin

*** For GPs, Potassium can be requested as a separate standalone test. Potassium must be clearly written in the "additional tests area" on the blood sciences request form.**

- Potassium requests will only be processed when both date and time of sampling are clearly indicated on the request form.
- Un-separated samples from the previous day will not be processed for potassium analysis.

These measures are in place to mitigate the increased risk of misinterpretation due to artefactual elevation of potassium levels which can result from various pre-analytical factors outside the laboratory's control (e.g., delayed separation, haemolysis, prolonged transport).

Failure to comply with the above conditions will result in rejection of potassium request. *

26.2 Add-On Requests Biochemistry

Biochemistry specimens are stored for a defined period post analysis.

If additional tests are required, In-House requestors should send a completed request form indicating the sample number (BBXXXXXX), the tests required and the reason for add-on.

External requestors may request an add on via UHLBLOODSCIENCE@HSE.IE

Analysis of additional tests is subject to stability and in some cases, it may be necessary to collect another sample.

26.3 Tests not suitable for Biochemistry add-on request

- Ammonia
- Lactate
- HCG
- IL6
- Procalcitonin

26.4 Critical Alert Limits for Biochemistry

Critical alert limits for Biochemistry tests are informed by national and international guidelines or agreed with service users as appropriate. These values are outlined in the tables below.

Results falling outside these critical limits (Category A) require urgent telephone notification to the requesting doctor or qualified member of staff or their nominee.

If GP or Out-patient areas cannot be reached then only category A results will be considered for immediate further action and implementation of the escalation procedure for communication of critical results.

It is the responsibility of requesting doctor to clearly write contact details and patient location on the request form so that critical results can be communicated in timely fashion. Failure to do so may result in delayed or undelivered critical notifications.

While the Biochemistry Department staff will make every effort to adhere to these guidelines, it remains the duty of test requesters to follow up promptly on the results of investigations requested for patients under their care.

26.5 Critical Phoning Limits General Chemistry

**** MUST ALWAYS BE PHONED IN THE FIRST INCIDENCE OR IF RESULTS ARE NOT IMPROVING OVER TIME****

Analyte	Units	Critical Phone Action Limits Lower	Upper	Comment	Urgency OOHs GPs/OPD
Blood					
Blood gases					A

Analyte	Units	Critical Phone Action Limits Lower	Upper	Comment	Urgency OOHs GPs/OPD
PH pCO2 pO2	 Kpa Kpa	<7.2 <2.5 <6.0	>7.6 >8.0 -		
Ammonia	umol/L	-	>100 all age groups	Phone regardless of previous critical result	A
Amylase	IU/L	-	≥500		A
ALT	IU/L	-	≥525		A
AST	IU/L	-	≥525		A
Bile Acids	µmol/L	-	≥40		-
Bilirubin (Total)	µmol/L	-	≥250 (neonates ≤ 1 month old only)		A
Direct Bilirubin (Conjugated)	µmol/L	-	≥25 (neonates ≤ 1 month old only)		A
Bicarbonate	mmol/L	≤10	-		A
*Adjusted Calcium (<18 years old) (Total Calcium if adjusted calcium is not calculated e.g. <18 years old)	mmol/L mmol/L	≤1.80* ≤1.80	Adults: >3.0* (GP/OPD) ≥3.5 (Inpatients) **≤ 16 years:** >3.0	*report with albumin	A A
Creatine kinase	IU/L	-	**Adults:** ≥5000 **≤ 16 years:** ≥2000		A
Creatinine	µmol/L	-	**Adults:** ≥354	(excluding pre and post-dialysis patients)	A

Analyte	Units	Critical Phone Action Limits Lower	Upper	Comment	Urgency OOHs GPs/OPD
			≤ 16 years: ≥200		
C reactive protein	mg/L	-	≥300		A
eGFR	mls/min	≤15	-	If new event	A
Glucose	mmol/L	≤2.5	**Adults:** ≥25.0 **≤ 16 years:** ≥15.0		A
Lactate	mmol/L	-	≥4.0		A
Magnesium	mmol/L	≤0.40	-		A
Phosphate	mmol/L	≤0.30	-		A
Potassium	mmol/L	≤2.5	≥6.0 ≥7.0 (pre and post dialysis bloods) ≥6.5 (GP)	If K is elevated, exclude haemolysis, old sample, edta contamination. Check FBC.	A
Sodium	mmol/L	**Adults:** ≤120 (In house) ≤125 (GP and out-patients)	≥155 (for all age groups)		A
		≤ 16 years: ≤130			A
Troponin T	ng/L	-	>50		A
			For renal patients: ≥100ng/L(if no prior history of raised troponin) ≥300ng/L (for renal patients with previously		

Analyte	Units	Critical Phone Action Limits Lower	Upper	Comment	Urgency OOHs GPs/OPD
			elevated but stable troponin)		
Triglycerides	mmol/L		**Adults:** ≥20 **≤ 16 years:** ≥10		A
Urea	mmol/L		**Adults:** ≥30 **≤ 16 years:** ≥10	Excluding pre and post-dialysis patients	A
Vitamin B12	pg/ml	<125 pg/ml		Only first occurrence	B
Sweat					
Sweat Chloride	mmol/L		≥30 for all age groups	When sweat chloride test is performed as a part of a diagnostic work up for cystic fibrosis.	-
Urine					
Urine PCR	mg/mmol		≥30	from location = maternity or in pregnancy if known or indicated on form	-
Urine prophibilinogen to creatinine ratio	umol/mmol creatinine			Phone all positive results	-
CSF					
CSF xanthochromia	Phone all positive results				-

26.6 Endocrinology critical levels for phoning

Analyte	Units	Lower limit	Upper limit	Comments	Urgency OOHs GPs/OPD
Cortisol	nmol/L	<100		Unless on exogenous steroids or part of a dexamethasone suppression test. If in doubt phone.	If Cortisol is <50 A Otherwise B.
FT4	pmol/L	≤5	≥50	If new event or results not improving (also give TSH result)	C
FT3	pmol/L		≥10	If new (give TFT result)	C
TSH	mIU/L		**Adults >**50 **≤ 16 years:** >30	If new event or results not improving (also give FT4 result)	C

26.7 Toxicology screen

Analyte	Units	Upper limit	Comment
Ethanol	mg/dl	**Adults ≥** 400 **≤ 16 years: ≥** 200	
Paracetamol	mg/L	≥100	
Salicylate	mg/L	≥300	
Urine drug of abuse screen			Phone to requesting source in case of positive result in neonates.

26.8 Therapeutic drug monitoring critical levels of phoning

Drug	Units	Upper limit	Comment	Urgency OOHs GPs/OPD
Carbamazepine	mg/L	≥25		B
Digoxin	ug/L	≥2.5	Check sample timing >6 hrs post dose. Give K result also. If potassium <3 mmol/L there is increased risk of toxicity.	A
Lithium	mmol/L	≥1.5		A
Phenytoin	mg/L	≥25		B
Phenobarbital	mg/L	≥60		B
Theophylline	mg/L	≥25		A
Valproate	mg/L	≥150		B

26.9 Monoclonal Protein Studies critical levels for phoning

Analyte	Units	Upper limit	Comment	Urgency OOHs GPs/OPD
Paraprotein	g/L	IgG > 15 IgA > 15 IgM >15 IgD/IgE any level	First time detection	C

26.10 Antibiotic critical levels of phoning

Analyte	Units	Upper limit	Comment	Urgency OOHs GPs/OPD
Vancomycin	ug/mL	>25 (ICU) >20 All other locations		A
Amikacin	ug/mL	>40 peak >5 trough		A

26.11 Reporting critical values to the Adult Emergency Department UHL

****MUST ALWAYS BE PHONED IN THE FIRST INCIDENCE****

Agreed with local ED Consultants

Analytes	Lower limit	Upper limit	Units	Notes
Sodium	≤120	>155	mmol/L	
Potassium	≤2.5	≥6.0	mmol/L	
Glucose	≤2.5	≥25 ≥30 (in known diabetic)	mmol/L	
Creatinine		≥354	µmol/L	
C reactive protein	-	≥300	mg/L	
Adjusted Calcium (Total Calcium if adjusted calcium not available)	≤1.8	≥3.5	mmol/L	
Troponin -T		>50	ng/L	
Paracetamol		≥100	mg/L	
Salicylate		≥300		
Urine prophibilinogen to creatinine ratio			µmol/mmol creatinine	Phone all positive results
Vancomycin		>20	µg/ml	
Amikacin Trough(Pre dose) Peak		 >5 >40	µg/ml	

26.12 Protocol for Oral Glucose Tolerance Test (OGTT)

OGTT Rationale for Testing

An OGTT should only be considered to establish a diagnosis of diabetes if blood glucose values fall into an equivocal range and is not necessary if the diagnostic criteria for diabetes are present.

In pregnancy, patients with a pre-existing Type 1 or 2 Diabetes do not require an OGTT. If required OGTT in pregnancy should be performed at weeks 24-28.

The patient should be advised to maintain their normal diet for 3 consecutive days prior to test. Perform OGTT after at least 3 days of unrestricted diet (> 150g CHO daily). The patient should fast (no food or fluids except water) overnight (8-12 hours).

Procedure for OGTT

1. Confirm patient has fasted for at least 8-12 hours.
2. Collect first venous Blood sample (Fasting glucose) into Fluoride EDTA bottle (Sarstedt, grey cap) and label this bottle with PID, date and time.
3. Patient must drink the full content of the Rapilose OGTT solution pouch (300mL) over 5-10 minutes.
4. One hour later take a second venous Blood sample collected into a Fluoride EDTA bottle (grey cap); label tube with PID, Date and Time
5. Two hours post glucose drink collect third venous Blood sample (2 hr post prandial glucose) into a Fluoride EDTA (grey cap); label tube with PID, Date and Time

Glucose Preparations for OGTT

Rapilose® OGTT Solution: (Rapilose® NDC Stock item: 12MX1013)

- For oral glucose tolerance testing, the standard dose for an adult is one pouch of Rapilose® OGTT Solution (300mL / 75g anhydrous glucose). It can be adjusted to paediatric applications based on body mass.
- The dose for children that weigh less than 43kg is 7mL (5g anhydrous glucose) per kg of body weight. The total children's dose should not exceed 75g.
- Each 300mL pouch of Rapilose® OGTT Solution contains exactly 75g anhydrous glucose, which is the adult dose recommended by the World Health Organisation.
- Rapilose® OGTT Solution is in a ready to drink format in a 300mL aluminium foil pouch with a tamper evident twist off cap and is gluten, lactose, fat, caffeine, and alcohol free.
- Rapilose® OGTT Solution has an 18-month shelf-life, when stored unopened at room temperature.

Polycal® Liquid (neutral or orange):

- Polycal liquid may also be used as the 75 g glucose load for OGTT
- This 75g load is prepared by mixing 113mL of Polycal® with 250-300mL of water.

Gestational Diabetes:

A diagnosis of gestational diabetes is made when one or more values are met or exceeded on the 75 g OGTT in Pregnancy:

- Fasting Glucose > 5.1 mmol/L
- One-hour glucose ≥ 10.0 mmol/L
- Two-hour glucose ≥ 8.5 mmol/L

Post-natal Women with GDM should be offered advice on:

- Diet and lifestyle
- Risk of GDM in subsequent pregnancies
- Risk of Type 2 Diabetes in future
- The need for 6-12 weeks postpartum and annual OGTT

Blood glucose monitoring in the postnatal period:

- Post-delivery the maternal blood glucose and insulin levels may rapidly return to normal. Insulin therapy should be discontinued immediately postpartum.
- Capillary blood glucose monitoring should be discontinued once blood glucose returns to normal levels.
- Overt type 1 or diabetes should be suspected and investigated if hyperglycaemia persists.

- A 75g OGTT, using the WHO criteria for the non-pregnant population should be performed at 6-12 weeks postpartum and yearly thereafter as an increased risk of developing diabetes and cardiovascular disease exists.

Refer to HSE 2010 Guidelines for the Management of Pre-gestational and Gestational Diabetes Mellitus from Pre-conception to the Post-natal period.

Interpretative comments:

Diabetes: Fasting plasma glucose ≥ 7.0 mmol/L and/or 2hr post-load glucose ≥ 11.1 mmol/L in symptomatic patients**

Impaired fasting glucose: Fasting plasma glucose 6.1-6.9 mmol/L

Impaired glucose tolerance: 2 hr post-load plasma glucose 7.8-11.0 mmol/L

Note: Glucose diagnostic thresholds differ during pregnancy. See above or refer to local guidelines

2-hr plasma glucose = venous plasma glucose 2–h after 75g oral glucose load or 2-hr post meal

**Interpretation: In the absence of symptoms of D.M., diagnosis requires confirmation with at least one additional diagnostic blood glucose measurement on another day. Other causes of a raised blood glucose should be excluded.

The values given under "Reference Range", refers to plasma venous glucose concentrations

27 Haematology Service

The Pathology Department at Ennis Hospital provides a limited range of Haematology (FBC including WBC differential, Coagulation Screen, INR, ESR, Infectious Mononucleosis test, Reticulocyte count) laboratory tests. It also acts a centre for the transfer of specimens to UHL Monday to Friday.

The Pathology Department at Nenagh Hospital provides a limited range of Haematology (FBC including WBC differential, D-Dimer, ESR, Reticulocyte count). It also acts a centre for the transfer of specimens to UHL Monday to Friday.

The Haematology Laboratory at UHL provides a comprehensive range of laboratory tests and clinical support for the management of Haematological Disorders including Haematological Malignancies. It provides an oral anticoagulant monitoring service. The laboratory is the referral centre in the region for morphology, haematinics, immunophenotyping (of lymphoproliferative disorders and immune monitoring), thrombophilia screening and other bleeding disorders.

Refer to the detailed list of tests and sample requirements for Haematology

27.1 GP Referral into the Clinical Haematology Service UHL.

Please click on the link below for detailed guidance for General Practitioners on referral to the clinical Haematology team for the investigation of Anaemia, Leucocytosis, Polycythaemia/erythrocytosis,Thrombocythaemia/thrombocytosis,Paraproteins/MGUS,

Lymphocytosis,Lymphadenopathy Macrocytosis,Neutropenia,Thrombocytopenia,Eosinophilia and suspected systemic macrocytosis, suspected haemochromatosis.

UHL GP Referral guide for Haematology

27.2 Reference Intervals Haematology

- Reference intervals quoted in this manual refer to adult intervals.
- Age and sex related intervals where applicable are quoted on the test report form.

FULL BLOOD COUNT Assay	Patient Age	Gender	Unit Of Measure	Reference Interval Low	Reference Interval High
Haemoglobin	0-2 days	All	g/dl	13.5	19.5
Haemoglobin	2-4 days	All		14.5	22.5
Haemoglobin	4- 8 days	All		13.5	21.5
Haemoglobin	8- 21 days	All		12.5	20.5
Haemoglobin	21 days -1 month	All		10.0	18
Haemoglobin	1-2 months	All		9	14
Haemoglobin	2 months -3 years	All		10.5	13.5
Haemoglobin	3-7 years	All		11.5	14.5
Haemoglobin	7-13	All		11.5	15.5
Haemoglobin	13-19 years	Male		13.0	16
Haemoglobin	13-19 years	Female		12.0	16.0
Haemoglobin	19-130 years	Male		13.5	16.5
Haemoglobin	19-130 years	Female		12	16
Red Blood Cell Count	0-1 days	All	x 10^ 12/l	3.9	5.3
Red Blood Cell Count	1-3 days	All		4.0	6.6
Red Blood Cell Count	3-7 days	All		3.9	6.3
Red Blood Cell Count	7-14 days	All		3.6	6.2
Red Blood Cell Count	14 days -1 month	All		3.0	5.4
Red Blood Cell Count	1-2 months	All		2.7	4.9
Red Blood Cell Count	2-3 months	All		3.1	4.5
Red Blood Cell Count	3 months-2 years	Male		3.7	5.3
Red Blood Cell Count	3 months-2 years	Female		3.9	5.3

FULL BLOOD COUNT Assay	Patient Age	Gender	Unit Of Measure	Reference Interval Low	Reference Interval High
Red Blood Cell Count	2-6 years	All		3.9	5.3
Red Blood Cell Count	6-12 years	All		4.0	5.2
Red Blood Cell Count	12-18 years	Male		4.5	5.3
Red Blood Cell Count	12-18 years	Female		4.1	5.1
Red Blood Cell Count	18-130 years	Male		4.5	5.9
Red Blood Cell Count	18-130 years	Female		4.0	5.2
Haematocrit	0-2 days	All	L/L	0.42	0.60
Haematocrit	2-4 days	All		0.45	0.67
Haematocrit	4-8 days	All		0.42	0.66
Haematocrit	8-21 days	All		0.39	0.63
Haematocrit	21 days -1 month	All		0.31	0.55
Haematocrit	1-2 months	All		0.29	0.42
Haematocrit	2-3 months	All		0.29	0.41
Haematocrit	3 months-3years	All		0.33	0.39
Haematocrit	3-13 years	All		0.35	0.45
Haematocrit	13-19 years	Male		0.37	0.49
Haematocrit	13-19 years	Female		0.36	0.46
Haematocrit	19-130 years	All		0.36	0.46
Mean Cell Volume	0-2 days	All	fl	98	118
Mean Cell Volume	2-4 days	All		95	121
Mean Cell Volume	4-8 days	All		88	126
Mean Cell Volume	8-21 days	All		86	124
Mean Cell Volume	21 days-1 month	All		85	123
Mean Cell Volume	1-2 months	All		77	115
Mean Cell Volume	2-3 months	All		74	118
Mean Cell Volume	3 months-3 years	All		70	86
Mean Cell Volume	3-6 years	All		75	87

FULL BLOOD COUNT Assay	Patient Age	Gender	Unit Of Measure	Reference Interval Low	Reference Interval High
Mean Cell Volume	6-13 years	All		77	96
Mean Cell Volume	13-130 years	All		78	97
Mean Cell Haemoglobin	0-4 days	All	pg	31	37
Mean Cell Haemoglobin	4 days-1 month	All		28	40
Mean Cell Haemoglobin	1-2 months	All		26	34
Mean Cell Haemoglobin	2-3 months	All		25	35
Mean Cell Haemoglobin	3 months-3 years	All		23	31
Mean Cell Haemoglobin	3-7 years	All		24	30
Mean Cell Haemoglobin	7-13 years	All		25	33
Mean Cell Haemoglobin	13-19 years	All		25	35
Mean Cell Haemoglobin	19-130 years	All		26	34
Mean Cell Haemoglobin Concentration	0-1	All	g/dl	30	33
Mean Cell Haemoglobin Concentration	1-2	All		29	34
Mean Cell Haemoglobin Concentration	2-14	All		28	35
Mean Cell Haemoglobin Concentration	14 days-2months	All		29	34
Mean Cell Haemoglobin Concentration	2 months-2 years	All		30	33
Mean Cell Haemoglobin Concentration	2-130 years	All		31.5	37
RDW	All	All	%	11	16
Platelet Count	All	All		150	450
White Blood Cell Count	0-7 days	All	x10^9/L	10.0	26.0
White Blood Cell Count	7 days-1 year	All		6.0	18.0

FULL BLOOD COUNT Assay	Patient Age	Gender	Unit Of Measure	Reference Interval Low	Reference Interval High
White Blood Cell Count	1-8 years	All		5.0	15.0
White Blood Cell Count	8-13 years	All		4.5	13.5
White Blood Cell Count	13-130 years	All		4.0	11.0
Neutrophil Count	0-1	All		5.0	13.0
Neutrophil Count	1-3	All		1.5	7.0
Neutrophil Count	3 days-2 years	All		1.0	8.5
Neutrophil Count	2-6 years	All	x10^9/L	1.5	8.5
Neutrophil Count	6-12 years	All		1.5	8.0
Neutrophil Count	12-16 years	All		1.8	8.0
Neutrophil Count	16-130 years	All		2.0	7.0
Lymphocyte Count	0-1 days	All		3.5	8.5
Lymphocyte Count	1-3 days	All		2.0	5.0
Lymphocyte Count	3days-2 years	All		3.0	13.5
Lymphocyte Count	2-6 years	All	x10^9/L	2.0	9.5
Lymphocyte Count	6-12 years	All		1.5	7.0
Lymphocyte Count	12-16 years	All		1.2	5.2
Lymphocyte Count	16-130 years	All		1.0	3.0
Monocyte Count	0-1 days	All		0.5	1.5
Monocyte Count	1-3 days	All		0.3	1.1
Monocyte Count	3 days-6 years	All	x10^9/L	0.3	1.5
Monocyte Count	6-16 years	All		0.1	0..8
Monocyte Count	16-130 years	All		0.2	1.0
Eosinophil Count	0-1 days	All	x10^9/L	0.1	2.5

FULL BLOOD COUNT Assay	Patient Age	Gender	Unit Of Measure	Reference Interval Low	Reference Interval High
Eosinophil Count	1-3 days	All		0.2	2.0
Eosinophil Count	3 days-2 years	All		0.1	0.3
Eosinophil Count	2-6 years	All		0.3	0.8
Eosinophil Count	6-16 years	All		0.1	0.8
Eosinophil Count	16-130 years	All		0.02	0.5
Basophil Count	0-6 years	All		0.02	0.1
Basophil Count	6-16 years	All	x10^9/L	0	0.2
Basophil Count	16-130 years	All		0.02	0.1
Reticulocyte Count	0-1 days	All		324	617
Reticulocyte Count	1-5 days	All		85	400
Reticulocyte Count	5 days-1month	All		34	724
Reticulocyte Count	1-3months	All		21	205
Reticulocyte Count	3-12 months	All	x10^9/L	8	171
Reticulocyte Count	1-3 years	All		56	120
Reticulocyte Count	3-7 years	All		16	121
Reticulocyte Count	7-130 years	All		35	123
% Retic	0-1 days	All		1.72	8.62
% Retic	1-5 days	All		1.9	9.1
% Retic	5 days-1 month	All		0.1	6.9
% Retic	1-3 months	All		0.1	6.27
% Retic	3-12 months	All	%	0.1	4.7
% Retic	1-3 years	All		0.35	2.95
% Retic	3-7 years	All		0.25	2.57
% Retic	7-130 years	All		0.75	2.7

27.3 Reference Ranges During Pregnancy

Analyte:	Trimester 1:	Trimester 2:	Trimester 3:	Post-Natal:
Haemoglobin (g/dL)	11.0 - 14.9	10.0 - 13.9	9.8 - 13.9	7.47 - 12.69
Platelets (x10^9 /L)	152 - 390	146 - 373	125 - 364	97 - 354
Neutrophils (x10^9 /L)	4.1 - 6.7	5.6 - 8.3	6.4 - 9.9	6.8 - 12.0

27.4 Critical Alert Limits Haematology

Analyte	Units	Action Limits		Urgency	Comment
		Low Threshold	High Threshold		
Absolute Neutrophil Count	x 10^9/L	<0.5		A	
Platelet Count	x 10^9/L	<30		A	
INR			>5.0	A	Patients on Warfarin/anticoagulation
Fibrinogen	g/L	<2.0		A	For Obstetrics **ONLY**
Fibrinogen	g/L	<1.5		A	For non-obstetrics patients
Protein C	g/l			A	On all Suspected meningococcal septicaemias
All factor assays		<30%		A	Where previous deficiency is not known
Malaria Screen			Positive	A	

27.5 Coagulation specimen requirements

Relevant anticoagulant therapy (medications) should be included with all Coagulation requests.

Relevant clinical details are required to facilitate D Dimer analysis. Requests may be rejected if no indication for testing is provided.

Samples will be rejected for the following reasons:

- Under-filled samples i.e., any sample that is more than 4mm below the blue fill line indicated on the sample bottle.
- Overfilled samples i.e., any sample that is more than 4mm above the blue fill level indicated on the bottle.
- Any sample that is considered grossly haemolysed.
- Partially activated or clotted samples
- Lipaemic specimens for D-Dimers, Free Protein S, ATIII, Protein C, vWF: Ag and Anti-Xa requests
- Indications for testing not provided against D Dimer requests.

Special precautions should be adhered to ensure coagulation samples are not contaminated with heparin or taken from a drip site.

Requests for non-routine coagulation tests for patients<16years are referred to OLHSC, Crumlin for analysis.

All non-routine coagulation tests require Consultant signature / approval on request form.

27.5.1 Coagulation Reference Ranges UHL, Ennis and Nenagh

Reference Intervals are quoted on test reports as appropriate.

Coagulation Assay	Patient Age	Gender	Unit Of Measure	Reference Interval Low	Reference Interval High
APTT	0 – 1 Days	All	secs	31.3	54.5
APTT	2 – 5 Days	All		25.4	59.8
APTT	6 Days – 4 Weeks	All		32.0	55.2
APTT	4 Weeks – 3 Months	All		29.0	50.1
APTT	3 Months – 6 Months	All		28.0	42.9
APTT	6 Months – 130 Years	All		28	40

DDIMER	0 – 70 Years	All	ug/ml FEU	0.01	0.5
DDIMER	71 – 130 Years	All		0.01	1.00

Fibrinogen	0 – 1 Days	All	g/l	1.6	4.0
Fibrinogen	2 – 5 Days	All		1.6	4.5
Fibrinogen	6 Days – 4 Weeks	All		1.6	3.8
Fibrinogen	4 Weeks – 3 Months	All		1.5	3.8
Fibrinogen	3 Months – 6 Months	All		1.5	3.9
Fibrinogen	3 Months – 1 Year	All		1.6	4.0
Fibrinogen	1 Year – 130 Years	All		2.0	4.0

PT	0 – 1 Days	All	sec	11.5	16.8
PT	2 – 5 Days	All		11.5	16.5
PT	6 Days – 4 Weeks	All		12.0	15.5
PT	4 Weeks – 130 Years	All		12.5	15.5

28 Histology Service

The Department of Histology provides diagnostic surgical pathology and autopsy services to the UL Hospitals. The Histology Laboratory also processes Diagnostic - Non-Gynaecological Cytology (fluid cytology). These services are also provided to St John's Hospital, Nenagh Hospital and Ennis Hospital, as well as to the local community of General Practitioners.

Non-Gynaecological Cytology (fluid cytology) samples received in Histopathology laboratory are referred on to the Cytology Laboratory, Cork University Hospital, Cork on a daily basis Monday to Friday 9am-5pm. contact 021 4922511.

28.1 Overview of Services

The Histology Department provides a comprehensive Histopathology and Autopsy service.

Facilities and techniques routinely available Include:

- Routine processing
- Frozen section
- Special Histochemistry
- Immunohistochemistry
- Referral for Cytology, Gynae and non-Gynae
- Dual in situ hybridization (DDISH)
- Referral tests for molecular testing

The test repertoire and requirements are outlined in the Histology test repertoire section of this manual.

Major Clinical Specialities Include:

- Urology
- Gastroenterology (Medical and Surgical)
- Breast
- Oncology
- Gynaecology
- Dermatology
- Endocrinology
- Rheumatology
- Paediatrics

28.2 Referral Tests Histology

Tests referred by Histology are described in the test repertoire section of this manual.

Cut off time for sample delivery to the Histology laboratory at UHL is 5pm to guarantee referral on the following working day. Samples for cytology received after 8am will be delivered to CUH on the next working day.

Clinical details including all relevant previous history (e.g. previous biopsy results/synchronous samples etc.) must be recorded on the cytology sample request form.

Patient demographics including sample type, must be clearly labelled on both sample request form and specimen containers.

Mobile number of requesting clinician should to be added to all cytology request forms to allow for clinical correlation, if required.

Urgent cytology requests/reports will need to be discussed directly with the reporting Cytopathologist in CUH using the contact details below.

Contact Details for Key Personnel in Cytology Laboratory, Cork University Hospital

Any Medical Scientist	Histology Laboratory CUH	Tel: 021 4922511
Dr Julie McCarthy Consultant Cytopathologist	CUH	Tel: 086 0299511
Dr Tara Jane Browne Consultant Cytopathlogist	CUH	Tel: 087 9047183
Dr. Brian Hayes Consultant Cytopathlogist	CUH	Tel: 086 3042707

Hard copy reports will be available from the UHL laboratory office at 061 482240/ 482248. Electronic copy reports will be available via DART.

Sample requirements for CUH cytology service are detailed below in the Histology test repertoire in this manual. **Please use the CUH (purple) request form available from Histology dept. for Cytology referral requests.**

28.2.1 Referral Reports

Referral specimens are entered on the Laboratory Information System (iLAB).

Once they have been scanned onto DART, hardcopy referral lab reports are forwarded to the requesting Location / Consultant. Electronic copies of all referral reports are available on DART via iLAB.

24 hours' notice must be provided to the Histology Laboratory in order to arrange appropriate referral of samples. This is particularly important where Service Level Agreements are not in place with the referral laboratory.

Please note: Histology Laboratory UHL cannot take responsibility for samples referred directly to Referral Laboratories from source.

28.3 Histology Reports

Histology Reports are now available on iLAB to authorised Consultants.

Cytology Reports are now available on DART (via iLAB) to authorised Users.

A detailed list of tests and sample requirement for Histology is available in TABLE/SECTION (Reference to new table)

Reference Intervals are available on Histology/Cytology reports as appropriate to test.

28.4 Critical Alert Results Histology

Critical results are defined as follows.

- Frozen section results
- Urgent results as verified by the Consultant Histopathologist
- Unexpected diagnosis

28.5 Additional Requests Histology Specimens

- Additional requests must be made through the reporting Pathologist.

28.6 Quality Assurance Histology

Consultant Histopathologists participate in generally available EQA programmes in diagnostic Pathology for Quality Assurances purposes. The Laboratory participates in the National Quality Assurance programme through input of data into the National Quality Assurance and Improvement System (NQAIS-Histopathology).

The Histology Laboratory is a member of the following external quality assessment schemes:

- UKNEQAS for Specialist Techniques
- UKNEQAS Tissue Diagnostics
- UKNEQAS for Her 2 Immunohistochemistry
- UKNEQAS for Breast Hormone Immunohistochemistry
- UKNEQAS for Lymphoma Immunohistochemistry
- UKNEQAS for Routine ICC Immunohistochemistry
- UKNEQAS for Alimentary Tract Immunohistochemistry
- UKNEQAS for KI67 in Breast Cancer
- UKNEQAS for P16 in Head and Neck Pathology
- UK NEQAS Bone Marrow Trephine Scheme
- UK NEQAS Mismatch Repair Proteins Scheme
- UK NEQAS Melanoma Scheme
- NordiQC Immunohistochemistry General Module

29 Microbiology Laboratory

The Clinical Microbiology laboratory provides a quality diagnostic service in the investigation of the causative agents of infectious disease and the provision of antimicrobial susceptibilities to its clients.

This incorporates:

a. General Microbiology including Mycobacteriology.
b. Referral of Faecal Parasitology (please note molecular parasitology for Cryptosporidium and Giardia is performed in-house).
c. Mycology for samples other than skin hair and nails
d. Referral of Mycology for skin hair and nails
e. Antimicrobial Susceptibility testing based on the EUCAST standards.
f. Antifungal Susceptibility testing

The laboratory also provides a consultative service in Clinical Microbiology, Infectious Disease and Infection Control. It provides a venue for the training of Medical Scientists, participation in on-going education and development, introduction of new methods (including molecular) and relevant clinical research leading to the provision of a timely and effective service. The laboratory practices an extensive internal quality control programme and participates in many external quality assurance programmes.

Note 1: Please note specimens with a collection date exceeding 48 hours on arrival to the Microbiology laboratory will be rejected due to reduced viability of organisms in the sample.

Note 2: Please do not submit specimens to the Microbiology laboratory if it is known that the delay in arriving in the laboratory will exceed 48 hours.

Note 3: non-haemolytic group A streptococci may not be recognised in mixed cultures.

Note 4: Non uniform distribution of microorganisms between test portions of samples, time of sampling, storage of samples and transport conditions may contribute to the quality of the result. A negative result may not exclude infection.

Note 5: Provision of clinical details and clear descriptions of sampled site is essential for appropriate testing of submitted samples.

29.1 Critical Alert Results Microbiology

The Microbiology Laboratory complies with the HSE Advice Note: Communication of Laboratory Results Likely to Require Urgent Action. Results deemed critical in the acute setting are communicated to the requesting source by the Consultant Microbiology team or Medical Scientist as appropriate.

29.2 Clinical Medical Microbiology Advice

Routine: Clinical medical microbiology advice is available Monday – Friday, 9.00am to 5pm.

NCHDs should always have the following basic information ready before seeking antimicrobial advice:

- Name of patient and chart number, Date of admission, Age

- Rural or urban dwelling, nursing home resident or long-term care facility
- Symptoms (including temp. pattern if relevant) and working diagnosis.
- Actual antimicrobials recently prescribed – iv or oral, dosage and frequency
- Imaging results as appropriate
- Surgical intervention history as appropriate
- Microbiology results as appropriate (history of MRSA, CPE/KPC, ESBLs, C. difficile, etc.)
- What lines and drains are in situ? Is patient on TPN? Immune function – splenectomy, HIV, haematological malignancy, recent chemotherapy, steroids, anti-TNF, etc.?
- History of allergies? Systemic parameter results? Co-morbidities?
- Recent travel history if relevant, occupation and social interests (water sports, animal contact, walking in woodlands, etc.), sexual history where relevant.

Out of Hours: Contact with the Consultant Microbiologist on-call is available through the switchboard. This service is confined to consultant contact only.

References ranges are provided in this user manual where appropriate and clinical advice comments are included on microbiology test reports where applicable/relevant. Refer to the detailed list of tests and sample requirement for microbiology

30 Serology / Virology Laboratory

The Serology/Virology Laboratory provides an extensive range of laboratory investigations and clinical support to assist in the diagnosis, treatment, and monitoring of viral and microbial infection. The department provides a comprehensive range of serological assays for the diagnosis and monitoring of autoimmune and connective tissue disorders. In addition, the laboratory provides infectious disease and immunity screening to patients and staff members in the region. The Laboratory provides a range of molecular investigations for the diagnosis and monitoring of viral infections and is a ‘spoke’ site for the national whole genome sequencing programme for SARS-CoV-2.

Refer to the detailed list of tests and sample requirements for serology/virology

30.1 Clinical advice and Interpretation Serology

The Consultant Microbiologist on-call is available for clinical advice through the hospital switchboard.

Comments or suggestions relating to the service should be directed to the Chief Medical Scientist.

30.2 Urgent Requests Serology

Urgent requests must be identified in the priority section of the Serology/Virology request form. It is advised that if a test result is required urgently then the laboratory should be contacted by phone.

During routine working hour’s urgent requests for tests received which are available daily will be processed urgently.

A number of Serology/Virology requests are run in ‘batches’ and are not processed urgently. Requests for urgent tests not routinely processed on the day of receipt need to be approved beforehand by the Consultant Microbiologist.

30.3 Requests for Additional Tests Serology

Additional investigations may be added to an existing request for serum specimens submitted to the laboratory within the preceding 4 months. Comments will be added to the report where additional requests have been added to samples which exceed the stated stability in the manufacturer's instructions for use. Additional requests on specimen types other than serum samples should be discussed with the laboratory beforehand.

To request an additional test be added to a sample please email SerologyVirologyUHL@hse.ie

30.4 Consent Forms Serology Investigations

Consent forms are mandatory for all genetic tests and predictive tests for inherited diseases. Consent forms for genetic testing are available from the laboratory (061 482254).

31 Public Health Laboratory Raheen

The Public Health Laboratory provides an extensive range of tests for food, water and environmental samples from the healthcare environment. This includes determining the microbiological quality of washer disinfector rinse waters, dialysis fluid/water, the surveillance of Pseudomonas aeruginosa in augmented care units and Legionella testing. A testing service is also provided to the HSE catering departments to ensure food production complies with EU and FSAI guidelines. Use the link below to access ML225 ‘Services Provided by the Public Health Laboratory Limerick with respect to samples received from the Healthcare Environment’ for details on sample requirements, labelling, storage, transportation, reporting, and designation of results.

https://www.hse.ie/eng/services/list/3/acutehospitals/hospitals/ulh/staff/resources/pppgs/labmanual.html

The laboratory also accepts water samples from members of the public who want to check the microbiological safety of their drinking water supply.

32 Near Patient Testing (NPT) HSE MID WEST Service Overview

NPT/POCT is defined as medical testing, at or near the site of patient care. Specially trained healthcare (non-laboratory) professionals carry out these tests, which are typically performed on blood, urine or swabs. The aim of NPT/POCT is to collect the specimen and obtain accurate results conveniently and immediately, at or near the location of the patient. The physician and care team will receive the results quicker, enabling clinicians to support the timely diagnosis, monitoring and treatment of patients.

The NPT/POCT team is responsible for providing support for staff training (2,500+) and routine maintenance of multiple analytical systems across the six sites within HSE MID WEST. The NPT/POCT team are based in the modular building in UHL and look after the following equipment:

- 21 Blood gas analysers-measures O2 and CO2 levels in blood, acid/base parameters, electrolytes and metabolites. Analysers are located in all critical areas such as ED, ICU and Theatres and other designated areas.

- 267 glucose & ketone meters-measures glucose and ketone levels in diabetic and non-diabetic patients to identify those with hyper or hypo glycaemia.

- 3 Urinary HCG & 82 urinalysis analysers-urinary pregnancy screening and semi-quantitative measurement of blood, Leucocytes, Urobilinogen, Bilirubin, Nitrite, Specific Gravity, Glucose, Protein, Ketones, pH

- 1 Blood HCG analyser- quantitative determination of human chorionic gonadotropin (hCG) plus beta subunit hCG in EDTA whole blood

- 2 COVID-19/Flu analysers-molecular analyser that can detect COVID 19 and Flu using 1 single nasal swab

- 4 Hb A1C analysers-measures Hb A1C in adult and paediatric Diabetes clinics

- +Pending devices e.g. hromboelastograph analyser, Haemochron

In addition to support and maintenance, the NPT/POCT oversee the complete implementation process for new devices, in liaison with the multi-disciplinary NPT/POCT Committee.

Please note: All new devices must be applied for and sanctioned by the NPT/POCT team and the NPT/POCT committee.

The NPT/POCT team is responsible for the distribution, analysis and review of an extensive suite of external quality assurance (EQA) schemes for all the NPT/POCT equipment within the six sites in HSE MID WEST.

32.1 NPT / POCT Reference Intervals

Analyte / Test	**Reference Interval**		
Whole Blood Specimen-Capillary sample measured on the Freestyle Precision Pro System	(non-pregnant)	(Pregnant) HSE (2010)	(Neonates)
Fasting Blood Glucose	4.1-5.9 mmol/L	3.5 – 5.0mmol/L	>2.6mmol/L
Blood Glucose 1 to 2 hours after meals	<8.9 mmol/L	Blood glucose 1 hour after meals <7.0mmol/L	>2.6mmol/L

Analyte / Test	**Reference Range**
AQT FLEX Beta hCG	
Pre-menopausal women	< 2IU/L
Post-menopausal women	< 6 IU/L
β-ketone	between 0.6 -1.5 mmol/L
*Expected results (β Ketones). Normally levels of β-OH are expected to be <0.6 mmol/L. β-OH levels may increase if a person fasts, exercises vigorously or has diabetes and becomes ill.	

Analyte / Test	Units of Measurement	Arterial sample	Venous Sample
FIO2	%		
pH		7.35-7.45	7.32-7.43
pCO2	kpa	4.3-6.4	5.5-6.8
pO2	kpa	11-14.4	4.0-5.3
Na	mmol/L	136-145	136-145
K	mmol/L	3.4-4.5	3.4-4.5
Cl	mmol/L	98-107	98-107
iCa	mmol/L	1.15-1.33	1.15-1.33
Anion gap (K+)	mmol/L	10-20	10-20
Glucose (fasting)	mmol/L	3.6-5.3	3.6-5.3
Lactate	mmol/L	0.4-0.8	0.6-1.40
sO2	%	94-98	70-80
ct Hb	g/dl	14-17 (male)	
		12-15 (female)	
Actual HCO3	mmol/L	22-28	22-29
SBE	mmol/L	-3.2 +2.7	-3.2 +2.7
tCO2 (P)	mmol/L	22-30	22-30
O2Hb	%	90-95	
COHb	%	0.-1.5 (non-smoker)	0.-1.5 (non-smoker)
MetHB	%	0.0-1.5	0.0-1.5

33 Blood Transfusion HSE MID WEST Service

The Blood Transfusion Department incorporates the Blood Transfusion laboratory, the Haemovigilance and Traceability functions, and the clinical transfusion consultancy service. The Blood Transfusion laboratory is responsible for serological testing, processing, and storing of blood components/products for transfusion. Transfusion services are provided to the hospitals in the UL Hospitals, BSHL and Milford Care Centre.

This should be read in conjunction with the blood transfusion manual, which provides information, instructions, and advice on

- Procedures associated with blood transfusion and
- Guidelines on use of blood and blood products.

The blood transfusion manual is available on Q Pulse or on hard copy where Q pulse is not available.

All users are reminded that they must have regular, updated, documented training before participating in any step in the blood transfusion chain.

33.1 Background information Blood Transfusion

The Blood Transfusion Department includes the blood transfusion laboratory, the haemovigilance team and blood transfusion quality personnel. The laboratory is located in the University Hospital Limerick and provides a transfusion service to the following hospitals in the Mid West Area:

- University Hospital Limerick
- Ennis Hospital
- Nenagh Hospital
- Croom Hospital
- University Maternity Hospital
- St. John's Hospital
- Milford Care Centre
- BSHL

The Blood Transfusion Department operates to the ISO 15189 quality management system including INAB terms and conditions, ensuring compliance with the relevant Directives (2002/98/EC, 2004/33/EC Annex IV, 2005/61/EC, and Statutory instruments 360 of 2005 and 547 of 2006). Refer to INAB website www.INAB.ie for accredited tests 303MT.

33.2 Test Repertoire Blood Transfusion

The tests provided include:

- ABO and RhD group
- Antibody screen and identification
- Anti-D and anti-c quantitation (referred to National Blood Centre, Dublin)
- Crossmatch (serological or electronic crossmatch)
- Cold agglutinins (referred to National Blood Centre, Dublin)
- Direct Coomb's test
- Fetal maternal haemorrhage estimation by flow cytometry (Rotunda Hospital Dublin) and acid elution
- Fetal genotyping (referred to IBGRL Bristol)
- Fetal RHD Screening (referred to IBGRL Bristol)
- Platelet alloantibody test (referred to National Blood Centre, Dublin)
- Platelet antigen testing (referred to National Blood Centre, Dublin)
- Patient and red cell concentrate phenotype.
- Product issue
    - Albumin
    - Solvent Detergent Plasma
    - Factor VIIa
    - Factor VIII
    - Factor IX
    - Intravenous Immunoglobulin

- Intravenous & intramuscular anti-D
- Antithrombin concentrate.
- Prothrombin complex concentrate (PCC's) e.g., Octaplex and Feiba
- Praxbind® (idarucizumab)
- C1 esterase inhibitor concentrate.
- Fibrinogen
- Ondexxya

Refer to the blood transfusion manual for information on indications for selection of blood components/products.

33.3 Sample and request form requirements Blood Transfusion

33.4 Sample collection

Please refer to HP-A-BTR-SAMPLEREQ available in the Blood transfusion manual and on QPULSE.

If specific preparation of the patient/sample/transport container is required, it will be specified in the relevant test section. Two types of sample bottles are provided for pre-transfusion testing:

ADULT: 7.5ml EDTA transfusion laboratory sample bottle

PAEDIATRIC: 2.7ml EDTA paediatric sample bottle

For referral tests a variety of sample types are required, these are specified in the appropriate section for each referral test.

Electronic sample collection labels generated using Blood Track Tx are the preferable sample labelling method. Patient details can also be handwritten on blood transfusion samples. Please note addressograph self-adhesive labels are not acceptable on the request form or sample. Where cold aantibodies are suspected the Laboratory will prequest the user to send repeat samples in a pre-warmed flask provided by the blood transfusion laboratory.

33.5 Acceptance

Inadequately/incorrectly completed sample or request forms will be rejected. Samples received > 48 hours after collection and not stored between +2°C and +8°C will also be rejected.

Sample storage:

Samples are stored in the blood transfusion refrigerator and are discarded after seven days, unless a request has been received to reserve the sample for a specific purpose.

33.6 Request forms

There are five hard copy blood bank request forms available and one electronic request ordering system:

Blood Bank 1 request form	This form is used in hospitals to request tests and blood components/products.
Blood Bank 2 request form	This form is used for blood group investigations including all antenatal investigations.
Blood Bank 3 request form	This form is used for suspected transfusion reaction investigations.
Blood Bank 4 request form	This form is used in major emergencies. These forms are only available in the major emergency charts.
Blood Bank 5 request form	This form is used for blood group investigation and to request routine antenatal anti-D prophylaxis (RAADP)
Maternal & Newborn Clinical Management System (MN-CMS) electronic request	This is an interfaced request received electronically to the iLAB system in the Laboratory

For completion of request forms, refer to the HP-BTR-A-REQUEST procedure available in the Blood Transfusion Manual and on QPULSE.

33.7 Test Requirements Blood Transfusion

Refer to Blood Transfusion Test Repertoire for Sample Type and Special Requirements.

33.8 Blood Component / Product Issue

Blood components/products need to be requested by the doctor on a blood transfusion laboratory 1 request form. Refer to the specific guideline available on Q Pulse ISSACUTE and/or the hard copy blood transfusion manual for guidance.

Refer to Blood Transfusion Blood Product Repertoire for Requesting Requirements.

33.9 Reports

Electronic reports are available on iLab and via Healthlink. Hard copy reports are delivered by post to the requesting location/consultant via the laboratory office or via a taxi to offsite hospitals. In-house reports in UHL are delivered daily towards via portering service.

Referral reports are returned to the requesting laboratory either electronically or via hardcopy report and forwarded to the requesting source, a record of returned reports is held on iLAB with the exception of some genetic tests where reports are sent to the requesting Consultant only per referral laboratory policy and in these instances the laboratory acts as the dispatch point only for these tests.

34 iLAB (Laboratory Information System – Formerly APEX)

Refer to Appendix 1 on this Manual for an overview of use of the Laboratory Information System-iLAB

TEST REPERTOIRE

A. Microbiology

Acanthamoeba	
Special requirements and comments:	Sterile Dry Swabs, please contact the Microbiology Laboratory at 061-48 2842 for these swabs. This test should only be requested where clinically indicated. Please contact Consultant Microbiologist prior to submitting specimen. Specimens are referred to Micropathology Ltd. Coventry, UK , Tel: 0044 24 76323222
Turnaround time:	24 hours upon receipt by the Referral laboratory Monday to Friday.
Bile	
Specimen requirements and comments:	Sterile universal container.
	Bile may be collected in theatre or from a closed drainage system by aspiration with a needle and syringe.
Sample volume:	Minimum volume of 1ml.
Special precautions:	Deliver to the laboratory immediately. The volume of specimen influences the transport time that is acceptable. Large volumes of purulent material will maintain the viability of anaerobes for longer. Suggested transport times for varying volumes of specimen when examining for anaerobes: <u>Volume of aspirated material Optimal time for transport to the Laboratory</u> <1mL <10 min 1mL <30 min >2mL <3 h The recovery of anaerobes is compromised if the transport time exceeds 3h. Please specify on the request form if the patient is immunocompromised or if investigation for Salmonella spp is required.

	If processing is delayed, refrigeration is preferable to storage at ambient temperature.
Turnaround time:	Aerobic report: 2-3 working days.
	Anaerobic report: 5-7 working days
Blood Culture	
Test information:	Note 1: If blood for other tests such as blood gases or ESR is to be taken at the same venepuncture, the blood culture bottles should be inoculated first to avoid contamination. It is preferable to take blood for culture separately. Note 2: Please fill blood cultures to the optimal fill line marked on bottles. Refer to section 18.10 Note 3: Please ensure blood cultures are referred to the Microbiology Laboratory immediately after collection. Blood cultures must be placed on the continuous monitoring blood culture machine in the laboratory within a maximum of 4hr. Please add date and time of collection to request form. Note 4: Please state date & time of collection on request form.
Specimen requirements	Adult Aerobic Bottle (Green) Anaerobic Bottle (Orange) Neo-nates Paediatric Bottle (Yellow) Infants Paediatric Bottle (Yellow) Pre-teen children Paediatric bottle (Yellow)
Sample volume	Adult 5-10mL blood Neo-nates Paediatric 1-2mL blood Infants 2-3mL blood Pre-teen children 3-5mL blood
Sample Collection	Department of Health Recommendations – Taking Blood Cultures Blood cultures should only be collected by members of staff (medical, nursing, healthcare assistant, or phlebotomist) who have been trained in the collection procedure and whose competence in blood culture collection has been assessed. · Always make a fresh stab In patients with suspected bacteraemia, it is generally recommended that two sets of cultures be taken at separate times from separate sites.

	Do not use existing peripheral lines/cannulae or sites immediately above peripheral lines. (If a central line is present, blood may be taken from this and from a separate peripheral site when investigating potential infection related to the central line; the peripheral vein sample should be collected first.) Identify a suitable venepuncture site before disinfecting the skin. Avoid femoral vein puncture because of the difficulty in adequate skin cleansing and disinfection. · Thoroughly disinfect the skin before inserting the needle Thoroughly cleanse the patient's skin before venepuncture. Use soap and water to clean visibly soiled skin and then clean your own hands. Use a 2% chlorhexidine in 70% isopropyl alcohol impregnated swab to disinfect the patient's skin and allow to dry. · Once disinfected, don't touch the skin again To avoid cross-contamination from the collector's fingers (even when gloved), it is vitally important not to palpate the site again once it has been disinfected. · Disinfect the culture bottle cap before transferring the sample Ideally, remove the plastic cover immediately before collecting the sample; the top of the bottle will be clean but not sterile. Disinfect the tops of the culture bottles with a 2% chlorhexidine in 70% isopropyl alcohol impregnated swab. Allow the alcohol to fully evaporate before proceeding with bottle inoculation. NB: The use of blood collection adapter caps without winged blood collection sets is not recommended. It is not possible to accurately judge sample volume and there is the potential for possible backflow of blood culture media into patient veins. 1. Skin preparation Clean hands using correct hand hygiene technique (use of the World Health Organisation's '5 moments of hand hygiene' or the NPSA 'Clean you hands campaign' is recommended). · Clean any visibly soiled skin on the patient with soap and water then dry. · Apply a disposable tourniquet (if applicable) and palpate to identify vein. · Clean skin with a 2% chlorhexidine in 70% isopropyl alcohol impregnated swab and allow to dry. · Do not repalpate skin following cleaning · If a culture is being collected from a central venous catheter, disinfect the access port with a 2% chlorhexidine in 70% isopropyl alcohol impregnated swab. 2. Bottle preparation · Label bottles with appropriate patient information.

	· Ensure that barcodes on the bottles are not covered by additional labels and that any tear-off barcode labels are not removed. · Clean the tops of culture bottles with a 2% chlorhexidine in 70% isopropyl alcohol impregnated swab and allow to dry. 3. Sample collection - use either method A or B as follows: A: NEEDLE AND SYRINGE METHOD · Clean hands again using correct hand hygiene technique (use of the World Health Organisation's '5 moments of hand hygiene' or the NPSA 'Clean your hands campaign' is recommended) or use alcohol hand rub and apply clean examination gloves (sterile gloves are not necessary). · Gloves and apron are worn (in line with local policy). Personal protective equipment (PPE) is disposed of correctly (in line with local policy) after use. · Insert needle. Do not palpate again after cleaning. · Collect sample and release tourniquet. · Cover the puncture site with an appropriate dressing. · If blood is being collected for other tests, always inoculate the blood culture bottles first. · Inoculate blood into culture bottles; do not change the needle between sample collection and · Inoculation; inoculate anaerobic culture first. · Discard needle and syringe in a sharps container. · Clean hands again using correct hand hygiene technique (use the World Health · Organisation's '5 moment of hand hygiene' or the NPSA 'Clean Your Hands Campaign are recommended). B: WINGED BLOOD COLLECTION METHOD · Clean hands again using correct hand hygiene technique (use of the World Health Organisation's '5 moments of hand hygiene' or the NPSA 'Clean your hands campaign' is recommended) or use alcohol hand rub and apply clean examination gloves (sterile gloves are not necessary). · Gloves and apron are worn (in line with local policy) Personal protective equipment (PPE) is disposed of correctly (in line with local policy) after use. · Attach winged blood collection set to blood collection adapter cap. · Insert needle into prepared site. Do not palpate again after cleaning. · Place adapter cap over blood collection bottle and pierce septum.

	· Hold bottle upright and use bottle graduation lines to accurately gauge sample volume and collect sample; inoculate aerobic culture first. · If blood is being collected for other tests, always collect the blood culture first. · Cover the site with an appropriate sterile dressing. · Discard winged blood collection set in a sharps container. · Clean hands using correct hand hygiene technique (use of the World Health Organisation's '5 moments of hand hygiene' or the NPSA 'Clean your hands campaign' is recommended) after removing gloves. 4. Number and time of collection – General guide *Suspected sepsis or acute septic shock.* In cases of suspected sepsis or acute septic shock or in individuals with any prosthetic material in situ (valve, hip etc), collect 2-3 separate venepunctures (two bottles each) immediately before starting treatment. *Suspected line sepsis* Please ensure that a blood culture set is taken both peripherally and from the suspected line. *Infective endocarditis (IE) or chronically ill patients* In suspected Infective endocarditis (IE) or chronically ill patients, obtain three blood culture sets during the first 1-2 hours of evaluation; if all are sterile 24 hours later, obtain three more sets. From patients who have received antimicrobial agents within two weeks prior to admission, obtain two separate blood cultures on each of three successive days. *Suspected bacteremia* For suspected bacteremia in patients already on antimicrobial therapy, if therapy cannot be suspended for a few days, draw 2-3 cultures within the first 48 hours. Cultures should be taken immediately before the next dose of antimicrobial agent if the patient is receiving intermittent parenteral therapy. *Pyrexia of unknown origin (PUO)* For fever of unknown origin (e.g., occult abscess, typhoid fever, or brucellosis), obtain two or three blood cultures initially. Then 24-36 hours later, obtain two more cultures immediately before the expected (usually afternoon) temperature elevation. *Sepsis of the newborn* One to two blood cultures usually suffice for diagnosing sepsis of the newborn. The physician should determine the volume of blood. Inject 1-2mL into a paediatric bottle. *Blood culture for Mycobacterium sp.* Please refer to the TB section in this manual.

	5. Incubation Routine blood cultures are incubated for five days, unless the lab is notified to hold for a longer period (e.g., when IE, brucellosis or systemic fungal infections such as histoplasmosis are suspected). The routine 5-day incubation period is adequate for recovery of most yeasts (e.g., *Candida species*).
Special precautions:	DO NOT COVER BOTTLE BARCODE AS THIS IS SCANNED AS PART OF THE ANALYTICAL PROCESS · Ensure that the blood culture bottles have not exceeded their expiry date. · Sample is taken preferably before antimicrobial treatment is started. · Collect specimens as soon as possible after a spike of fever, except in endocarditis where timing is less important. · Indicate if specific organisms are sought e.g. endocarditis. · Blood cultures should be transported to the laboratory and incubated within a maximum of 4 hours · **Do not refrigerate.**
Turnaround time:	Blood Culture Bottles are placed on the continuous monitoring blood culture machine in the laboratory within a maximum of 4hrs from collection. Blood cultures are monitored continuously. Positive result; Blood Culture gram stains are available within three hrs to the requesting source. Positive results are telephoned as soon as available to the requesting source. Positive Culture results are communicated to the requesting source by the Clinical Microbiologist/Specialist Registrar as appropriate Final positive report is issued when all relevant investigations are complete. Negative result; 36 hours-negative report available on line. 48 hours - negative report available on line. Final negative report: 5 -7 days (7 days if endocarditis is suspected).
Bordetella Pertussis	
Specimen type:	Nasopharyngeal aspirate is the preferable specimen. Pernasal / nasopharyngeal swabs will suffice. (Amies charcoal swab- Flexible twisted wire - blue cap, Available from the microbiology laboratory, Tel: 061-482255) Cough Plates should not be used

Specimen collection:	A perinasal swab (Amies Charcoal - blue cap with flexible wire shaft) is inserted through a nostril and advanced along the floor of the nose until it reaches the nasopharynx. It has been suggested that the swab be held against the posterior nasopharynx for up to 30 seconds or until the patient coughs. In practice, it is more likely that a patient will only be able to tolerate this for a few seconds. Note: Sampling of nasopharyngeal secretions in patients with whooping cough may precipitate a paroxysm of coughing and cause obstruction of the airways. Resuscitation equipment must be available if whooping cough is suspected. The specimen collector should avoid exposure to direct coughs from the patient. Nasopharyngeal exudate may be obtained using a suction catheter (No.8 French) inserted through the nose. The exudate is collected in a sterile plastic trap in which the specimen is transported to the laboratory or in a sterile clear plastic universal container.
Special precautions:	Deliver to the laboratory immediately.
Turnaround time:	Final report: 7–9 days. Positive isolates are telephoned when available to the requesting source.
Breast Milk	
Specimen type:	Breast milk
Specimen collection:	Express into a sterile universal container
Special precautions:	N/A
Turnaround time:	Final report 3-5 working days
Bronchoalveolar Lavage, and associated specimens including sputum	
Test information:	Please refer to Sputum, Bronchoalveolar Lavage, and Associated Specimens
Cannula / Intravascular Tips	
Specimen type:	Line tips, e.g. CVP or Hickman lines. Cannula associated swabs. **Tips should only be submitted to the laboratory when line sepsis is suspected.** Urinary catheter tips, epidural tips and drain tips are **NOT** processed.
Specimen collection:	Cannulae Disinfect the skin around the cannula entry site, remove cannula using aseptic technique, and **cut off 4cm of the tip** into a sterile universal container using sterile scissors Swabs

	Sample the inflamed area around the catheter insertion site using a charcoal swab
Sample volume:	N/A
Turnaround time:	Final report: 2-4working days
CAPD Fluid (Continuous Ambulatory Peritoneal Dialysis Fluid)	
Specimen requirements and sample volume	3 x 30ml sterile Sarstedt universal containers of CAPD (dialysate) fluid approximately (25 -30ml in each container) If blood culture bottles are also used, they should be inoculated aseptically with 5-10ml of dialysate.
Turnaround time:	Microscopy: <3 hours Final report: 5-7 working days Positive Microscopy results are telephoned to the requesting source as soon as available.
Special precautions:	If processing is delayed, refrigeration is preferable to storage at ambient temperature. Delays of over 12 hours are undesirable.
Carbapenamase Producing Enterobacteriaceae Screen (CPE/KPC)	
Test information:	Refer to Infection Control Screening
Chlamydia/GC/Trichomonas vaginalis STI Screening	
Specimen requirements General	cobas® PCR Media Dual Swab Sample Kits or cobas ® PCR urine tube with urine transfer device. Specimen collection kits (Available from the Laboratory Porters) **Trichomonas testing only performed when relevant clinical details provided.** **! if you notice any crystallisation of the reagent around the tube cap please discard and use another tube. Inform the Laboratory if this is noticed regularly.**  **Health and safety** • cobas® PCR Media contains guanidine hydrochloride. Do not allow direct contact between guanidine hydrochloride and sodium hypochlorite (bleach) or other highly reactive reagents such as acids and bases. These mixtures can release a noxious gas. • If cobas® PCR Media is spilled, FIRST clean with a suitable laboratory detergent and water, and then with 0.5% sodium hypochlorite. • Avoid contact of the cobas® PCR Media with the skin, eyes or mucous membranes. If contact does occur, immediately wash with large amounts of water, otherwise, burns can occur. • DO NOT PRE-WET SWAB IN cobas® PCR MEDIA BEFORE COLLECTION!

	• See document links attached below for further information.
Specimen Requirements: Throat, rectal, HVS, urethral swabs and eye swabs:	**U**se the WOVEN swabs provided with the cobas PCR Media Dual Swab sample packet. Flock swab is not used.
Specimen Requirements: Endocervical specimens	Use the WOVEN swab to remove excess mucus from the cervical os and surrounding mucosa. Used for **cleaning only**, discard after use. It is important to remove excess mucus from the cervical os and surrounding mucosa to ensure adequate sample is obtained. The presence of mucus (> 0.5% w/v) in endocervical specimens may cause false negative test results, which is why cleaning the cervical os and surrounding mucosa is important before taking the sample. To collect specimen use FLOCKED swab
Specimen Requirements: Urine (male/female)	**Prior to sampling, the patient should not have urinated for at least one hour.** Given that collection of larger volumes of urine may reduce test sensitivity, please direct patient to provide first-catch urine (approximately 10 to 50 mL of the initial urine stream) into a universal container and to use the pipette to transfer the urine into the cobas® PCR sample tube. When transferred the liquid level should be between the two black lines on the cobas® PCR Media tube label window. If the liquid level is above or below these lines, the specimen has not been collected properly and cannot be used for testing See page 57/58 above for urine collection For males consider rectal swabs based on sexual history.
Specimen Requirements: Trichomonas vaginalis	Endocervical, hvs swab or urine only.
Specimen Requirements: Patient <15 yrs:	If a specimen is received from a patient <15yrs please contact Microbiologist on clinical duty for advice on whether to process specimen & release results for medico-legal reasons
Specimen transport and storage	Specimens should be transported as soon as possible. Following specimen collection, transport and store the cobas® PCR Tube containing swab or urine at 2°C to 30°C.
Turnaround time:	Specimens are batched for processing, allow 7 working days.
Special precautions:	Ensure that containers are labeled in accordance with the pathology specimen labeling policy. **Note**: Specimens will be rejected if there are two swabs in the tube, no swab in the tube, incorrect swab in the tube, **an excess of blood** or if **a rectal swab is grossly contaminated with faeces.**
Test limitations	• Please read for extensive review. https://a.storyblok.com/f/173850/x/bc9d478af1/cobas58_68-88_ctng_ifu_-can.pdf • Products containing carbomer(s), including vaginal lubricants, creams and gels may interfere with the test and should not be used during or prior to collecting urogenital specimens. Several products can cause false negative or invalid results, specifically

	Metronidazole Vaginal Gel, Replens, RepHresh Odor Eliminating Vaginal Gel, and RepHresh Clean Balance.The interference is attributed to carbomers (thickening agents) within these products. The text notes that Table 23 (Link above)is not an exhaustive list of carbomer-containing products that could cause issues. • cobas® CT/NG/TV for urine testing is recommended to be performed on first catch urine specimens (defined as the first 10 to 50 mL of the urine stream). The effects of other variables such as first-catch vs. mid-stream, post-douching, etc. have not been evaluated. • cobas® CT/NG has only been validated for use with male and female urine, clinician-instructed self-collected vaginal swab specimens, clinician-collected vaginal swab specimens, anorectal swab specimens, oropharyngeal swab specimens and endocervical swab specimens, all collected in cobas® PCR Media (Roche Molecular Systems, Inc.) performance has not been validated for use with other collection media and/or specimen types. • cobas® TV has been validated for use with male and female urine, clinician-instructed self-collected vaginal swab specimens, clinician-collected vaginal swab specimens, and endocervical swab specimens, all collected in cobas® PCR Media (Roche Molecular Systems, Inc.) • cobas® CT/NG/TV has not been evaluated in patients younger than 14 years of age, eye swabs or penile/urethral/meatal swabs. • False negative or invalid results may occur due to polymerase inhibition. The CT/NG/TV Internal Control is included in cobas® CT/NG/TV to help identify the specimens' containing substances that may interfere with nucleic acid isolation and PCR amplification. • Detection of C. trachomatis and N. gonorrhoeae and T.vaginalis is dependent on the number of organisms present in the specimen and may be affected by specimen collection methods, patient factors (i.e., age, history of STD, presence of symptoms), stage of infection and/or infecting strains. • The test has been validated with samples containing up to 5% (v/v) blood in swab samples and 0.35% blood in urine samples. A higher than acceptable concentration of blood could give invalid or false negative results. Rectal swabs grossly contaminated with faeces will be rejected. • The effects of other potential variables such as vaginal discharge, use of tampons, douching, etc. and specimen collection variables have not been evaluated. • Though rare, mutations within the highly conserved regions of the genomic DNA of C.trachomatis, N.gonorrhoea and/or T. vaginalis covered by cobas® TV primers and/or probes may result in failure to detect the presence of the bacterium. • Detection of C. trachomatis and N. gonorrhoeae is dependent on the number of organisms present in the specimen and may be affected by specimen collection methods, patient factors (i.e., age, history of STD, presence of symptoms), stage of infection and/or infecting C. trachomatis, N. gonorrhoeae, and/or T. vaginalis strains. • cobas® CT/NG/TV has not been evaluated with patients who were currently being treated with antimicrobial agents active against CT or NG or TV as well as patients with a history of hysterectomy. • A result of DNA/RNA 'not detected' for the biological sample submitted for testing means that: Infection is not present, or infection is present but DNA/RNA are at a low level below the limit of detection of the assay, or the sample was submitted at a very early or late stage of infection therefore DNA/RNA is below the limit of assay detection, or DNA/RNA was not detected due to issues with inadequate/sub-optimal sample collection. • If clinical presentation is not consistent with a result of 'DNA/RNA not detected' consider repeat testing or discuss further with the Clinical Microbiology team
Creutzfeldt-Jakob Disease (CJD)	

Specimen type:	Refer to CSF (Cerebrospinal Fluid)
Cryptococcal Antigen Test	
Specimen type:	Gel Serum (brown top) CSF
Specimen requirements and comments:	**Note**: Requests for Cryptococcal antigen test **must** be discussed with the Consultant Microbiologist / prior to requesting the test. *Relevant Clinical details such as HIV infection, immunosuppression, travel to British Columbia or US Pacific Northwest (Cryptococcus gattii), or a strong clinical suspicion of infection are required to perform the test.*
Turnaround time:	Same day
Reference interval:	Qualitative result (Antigen Positive/Negative)
CSF (Cerebrospinal Fluid)	
Optimal time of Collection:	Preferably before antimicrobial therapy is started, but therapy must not be delayed unnecessarily pending lumbar puncture and CSF culture
Specimen requirements:	• CSF is normally collected sequentially into three or more separate universal containers which should be numbered consecutively (1, 2, 3, etc.) on the container. Do not Label Container Lid. If xanthochromia is queried, wrap one specimen in tinfoil. CJD Investigations: Contact the Consultant Microbiology team prior to taking sample as samples must be frozen within 30 minutes of collection. Specimens must be accompanied by CJD Questionnaire. Please contact the Microbiology laboratory for a copy of this form. Note: samples will not be accepted for testing without a completed questionnaire.
Sample volume:	A minimum volume of 1ml of sample in each. For Mycobacterial testing, at least 10 ml where possible.
Special precautions:	• Specimens should be transported as soon as possible. Time between collection to microscopy and culture should occur within a maximum of 2 hours **• DO NOT USE PNEUMATIC CHUTE SYSTEM** **• HAND DELIVER ALL SPECIMENS TO THE MICROBIOLOGY LABORATORY** **• PLEASE ALERT THE MEDICAL SCIENTIST "ON CALL" IF THE CSF IS SENT DURING THE "OUT OF HOURS" PERIOD.** • Specimens should be transported as soon as possible. Cells disintegrate and a delay may produce a cell count that does not reflect the clinical situation of the patient.

Turnaround time:	Processed on receipt. (Samples held in microbiology for six months, additional test requests are accepted based on the requirements of the test acceptance criteria with respect to age of sample.)	
	Microscopy report:	<2 hours
	Final negative culture report:	Available electronically next working day post 48-hour incubation.
	Final positive culture report:	Available on completion of organism identification and antimicrobial sensitivity testing.
	Creutzfeldt-Jakob disease:	10 days upon receipt of the specimens by the referral laboratory. CSF samples for Creutzfeldt-Jakob disease (CJD) investigation are referred to Beaumont Hospital. Samples cannot be sent without an accompanying CJD form. Please contact the Microbiology laboratory for a copy of this form.
	Whipples Disease	Referred test: Turnaround time 14 days from receipt of sample; PCR Detection for Tropheryma whipplei CSF samples requesting same are referred to: Molecular Pathology Laboratory Clinical Science Building St James' university Hospital Beckett Street Leeds LS9 7TF Please contact the Microbiology laboratory (2255) for further details.
Reference Interval:	Normal CSF Reference Values	*Ref: PHE SMI B27 Investigation of Cerebrospinal Fluid, Kastenbaum et al*
	Leucocytes	*PEDIATRICS Volume 125, Number 2, February 2010* Neonates less 28 days ≤ 15 cells /ul Infants 29-56 days 4 cells/ul
	Erythrocytes	Infants 1 to 12 months 0-15 cells /ul Children/Adults 1 year + 0-5 cells /ul No RBCs should be present in normal CSF

Additional information:	All CSFs, with a leucocyte count >5/µl, will be routinely tested on the FilmArray® Meningitis/Encephalitis Panel for 14 pathogens 24/7. Please note a negative result does not exclude infection. Where there is a high clinical suspicion of encephalitis please discuss with Clinical Microbiology Team as targeted single pathogen PCR may be more appropriate. The targets tested on FilmArray® are; <u>Bacteria</u> 1. Escherichia coli K1 2. Haemophilus influenzae 3. Listeria monocytogenes 4. Neisseria meningitidis 5. Streptococcus agalactiae 6. Streptococcus pneumoniae <u>Viruses</u> 7. Cytomegalovirus (CMV) 8. Enterovirus 9. Herpes simplex virus 1 (HSV-1) 10. Herpes simplex virus 2 (HSV-2) 11. Human herpesvirus 6 (HHV-6) 12. Human parechovirus 13. Varicella zoster virus (VZV) <u>Fungi</u> 14. Cryptococcus neoformans/gattii
	The exceptions are CSF samples submitted from Haematology / Oncology wards. CSF samples, which fall outside of these criteria, will need to be discussed with the consultant microbiologist(s) prior to testing. For TB PCR, please refer to the TB section
Limits of Detections for FilmArray analysis are as outlined in below table:	

ME Panel Test Result	Species/Isolate Tested	LoD Concentration	Detection at LoD Concentration[a]
BACTERIA			
E. coli K1	*E. coli* K1, strain C5 [Bort]; type O18ac:K1:H7 ATCC 700973	1×10^3 CFU/mL	20/20 100%
H. influenzae	*H. influenzae*, strain AMC 36-A-1 [572] type b, biotype I ATCC 10211	1×10^3 CFU/mL	20/20 100%
L. monocytogenes	*L. monocytogenes*, strain 1071/53, type 4b ATCC 13932	1×10^3 CFU/mL	20/20 100%
N. meningitidis	*N. meningitidis*, strain M-1574 [199/W135] ATCC 43744	100 CFU/mL ($\sim1.80\times10^3$ copies/mL)	19/20 95%
S. agalactiae	*S. agalactiae*, type strain, G19, group B ATCC 13813	1×10^3 CFU/mL	20/20 100%
S. pneumoniae	*S. pneumoniae*, strain SV 1, serotype 1 ATCC 33400	100 cells/mL ($\sim1.50\times10^3$ copies/mL)	19/20 95%
VIRUSES			
CMV[b]	CMV, strain AD-169 Zeptometrix 0810003CF	100 $TCID_{50}$/mL (4.30×10^3 copies/mL)	20/20 100%
EV (Species A-D)	Coxsackievirus A6, species A, strain Gdula ATCC VR-1801	50 $TCID_{50}$/mL	20/20 100%
	Coxsackievirus A9, species B Zeptometrix 0810017CF	5 $TCID_{50}$/mL	20/20 100%
	Coxsackievirus A17, species C, strain G-12 ATCC VR-1023	5 $TCID_{50}$/mL	20/20 100%
	EV 70, species D, strain J670/71 ATCC VR-836	50 $TCID_{50}$/mL	20/20 100%
HSV-1	HSV-1, strain MacIntyre Zeptometrix 0810005CF	250 $TCID_{50}$/mL (1.51×10^3 copies/mL)	20/20 100%
HSV-2	HSV-2, strain MS Zeptometrix 0810006CF	50 $TCID_{50}$/mL (1.29×10^3 copies/mL)	20/20 100%
HHV-6	HHV-6A, strain U1102 NCPV 0003121v	1×10^4 copies/mL	19/20 95%
	HHV-6B, strain HST NCPV 0006111v	1×10^4 copies/mL	19/20 95%
HPeV	HPeV, type 3 Zeptometrix 0810147CF	500 $TCID_{50}$/mL	19/20 95%
VZV	VZV, strain Ellen Zeptometrix 0810171CF	0.10 $TCID_{50}$/mL (1.66×10^3 copies/mL)	20/20 100%
YEAST			
C. neoformans/gattii	*C. neoformans* var. *grubii*, type strain, H99 [H99JP, NYSD 1649] ATCC 208821	100 CFU/mL	20/20 100%
	C. gattii, strain A6MR39, AFLP6C, VGIIc ATCC MYA-4877	100 CFU/mL	20/20 100%

[a] Detection data are from LoD confirmation testing performed on the FilmArray system.
[b] A dilution series of the World Health Organization (WHO) CMV International Standard (NIBSC 09/162) was also tested on FilmArray and FilmArray 2.0 systems. CMV was detected in 100% of replicates (10/10) at a concentration as low as 5.0×10^3 IU/mL (IU = International Units).

Duodenal Aspirate (for the presence of Giardia lambia): Test Referred to Cherry Orchard Hospital Dublin		
Specimen type:	Duodenal drainage	
Specimen requirements:	Sterile Container	
Sample volume:	Minimum volume: 0.5 ml.	
Special precautions:	Specimens should be sent to the laboratory immediately.	
Turnaround time:	7 days	
Ear		
Specimen requirements:	Otitis - Externa Media Charcoal swab of any pus/ exudate Fungal Scrapings from the ear canal are placed in DERMAPAKenvelopes. (Please contact the Microbiology Laboratory for same.)	
Sample Volume	N/A	
Special Precautions:	Dry swabs are NOT suitable. Delays of over 48 h are undesirable	
Turnaround time:	Aerobic report: 2-3 working days Anaerobic report: 3-5 working days Fungal culture: 14 days	
Eye Investigations (Acanthamoeba, Conjunctivitis, Corneal scrapings, Intraocular fluids, Contact lens)		
Specimen requirements:	Routine	Charcoal swab For neonates' request Gram stain if required
	Acanthamoeba sp This test should only be requested where clinically indicated. Please contact Consultant Microbiologist prior to submitting specimen.	Sterile Dry Swabs, please contact the Microbiology Laboratory at 061-48 2842 for these swabs. Specimens are referred to Micropathology Ltd. Coventry, UK , Tel: 0044 24 76323222

	Canalicular pus:	Sterile leak-proof container in a sealed plastic bag.
	Chlamydia trachomatis:	cobas® PCR Media Dual Swab Sample collection kits (Available from Laboratory). Refer to the Chlamydia section within the manual
	Corneal Scrapings and Intraocular fluids:	Sterile needles may be used to aspirate or scrape material, and sterile scalpel blades to scrape material. Because of the small amounts of material involved, inoculation of plates and preparation of glass slides may need to be done at the patients' side. (Agar plates and glass slides are available from the Laboratory). Place material in the centre of the agar plate using the scalpel. Plates should be inoculated in the below order 1 Columbia Blood Agar 2 Chocolate Agar 3 Neomycin Blood agar 4 Sabouraud Dextrose 5 Gram slide (specimen to be scrapped within circle) Corneal scrapings should be of sufficient quantity to make a visible deposit on a microscope slide and to inoculate culture plates. For each scrape of the eye a fresh needle must be used. Inoculate the surface of the agar with a large "C" streak (if the syringe needle is dug deep into the agar this will delay signs of bacterial growth). If there is insufficient specimen to make both a smear and perform inoculation of plates, cultures should be the priority.
	Contact lens:	In contact lens case with fluid
	Neisseria gonorrhoeae:	Air dried smear in addition to swab.
	Orbital cellulitis:	Aspirates from the affected tissues into a sterile leak-proof container in a sealed plastic bag.
Turnaround time:	Routine Culture	Final report: 2-5 working days
	Anaerobic Culture	3-5 working days
	Acanthamoeba sp.	24 hours upon receipt by the Referral laboratory Monday to Friday.
	Actinomyces sp.	Negative Report: 8-10 working days Positive report: 10-12 working days

Extended Spectrum Beta Lactamases (ESBL)	
	Refer to Infection Control Screening
Faeces	
Specimen type:	**NB: Do not send repeat sample for testing within 14 days of a positive result.** • Faeces for routine Polymerase Chain Reaction (PCR) - previously culture and sensitivity • Faeces for Ova, Cysts and Parasites (OCP) See OCP section. • Faeces for Clostridium difficile (C. diff) Diarrhoeal specimens only suitable for C diff. Specimens must be delivered to the laboratory without delay as toxin degradation may occur with prolonged storage.
Specimen collection:	Routine PCR/sensitivity/ C. difficile toxin B gene test • Fresh sample in a clean, sterile, leakproof container. Faeces may also be collected from a sterile bedpan. However, if there is any contamination with urine, residual soap, detergent, or disinfectant in the pan, the sample is unsatisfactory. • Specimens of faeces should be transported to the laboratory and processed as soon as possible, because a number of important pathogens such as Shigella species may not survive the pH changes that occur in faeces specimens that are not promptly delivered to the laboratory, even if refrigerated. C. difficile toxin degradation may also occur. • Please submit a separate sample to the Serology/Virology Laboratory for virology testing eg norovirus. A separate sample is also required by Biochemistry for Faecal Occult Blood (FOB), Faecal Elastase and Faecal Calprotectin. • PLEASE NOTE: Specimens will not be processed by PCR for Salmonella, Shigella, Campylobacter, E.coli VTEC, Cryptosporidium and Giardia from patients who have been in-house >72 HOURS. • *PLEASE NOTE: Specimens from patients < 2years of age are not routinely processed for C difficile. • *Specimens from paediatric inpatients (2-16 years) in UHL ONLY will no longer be processed for C difficile unless specifically requested by the paediatric consultants.
Sample volume:	Minimum volume: 1–2g **Note:** Additional testing requires additional material

Turnaround time:	Clinically significant isolates are telephoned when available to the requesting source. **Final report:** *Clostridium difficile* **toxin B gene:** Processed daily Mon-Fri. Results available after 4pm. **Please contact the consultant microbiologist on clinical duty through switchboard in the hospital if *C. difficile* testing is required urgently out of hours/over the weekend.** **Final Report: Routine PCR** Negative PCR: 1-2 working days. Positive PCR: 1-2 working days. Confirmatory culture and sensitivities (if relevant) will follow. **VTEC PCR positive samples** are referred to the Public Health Laboratory, Cherry Orchard Hospital, Dublin for verocytotoxin studies. Tel: 01 79551575 / 79551576. Samples are referred for confirmation and typing only under the following circumstances: · Samples VTEC positive for the first time · VTEC indeterminate samples which have remained indeterminate following repeat PCR, usually cpv value ≥35 released as 'Indeterminate for Vtec' The latter point may indicate a true negative sample, hence referral for confirmation Results are available after 2-3 working days. *Salmonella and Shigella* **sp isolates** are referred to the National Salmonella, Shigella & Listeria Reference Laboratory of Ireland, Galway for Whole Genome Sequencing. Tel: 091 544628 Results are available after 6 days. Interim findings/ results available electronically on the iLAB system.
Test method:	Routine: Faeces will be tested for: Salmonella sp, Shigella sp Campylobacter sp, Verotoxigenic E. coli Cryptosporidium sp, Giardia sp

	Additional testing: Relevant clinical details are required	Yersinia sp Vibrio parahaemolyticus Vibrio cholerae Aeromonas / Plesiomonas sp
	Stools for Clostridium difficile Toxin B gene: All requests liquid stool only	Clostridium difficile Toxin B gene PCR positive samples are further tested for the presence of Toxins A&B as an indicator of active toxin production.
Additional information:	Full clinical information should be provided on the request form, especially the presence and duration of symptoms, recent travel, shellfish ingestion and previous antibiotic therapy. ***Clostridoides difficile*:** All healthcare associated C.difficile isolates are sent for typing to the Public Health Laboratory, Cherry Orchard Dublin. ***C. difficile PCR positive and Toxin positive results:*** Results indicate C. difficile toxin is present; therefore, active C. difficile disease is likely. Review current antibiotics and stop if possible. For symptomatic adult patients in the community, commence metronidazole 400 mgs PO TDS for 10-14 days and isolate with contact precautions. For hospitalised patients, commence ORAL vancomycin 125mg qds for 10-14 days and isolate with contact precautions. Contact Clinical Microbiology Team for advice if severe disease or relapsing/recurrent infection: see hospital antimicrobial guidelines for case severity definitions. **Please Note: Test of clearance for *C.difficile* is not indicated repeat samples within 14 days of a positive result will not be tested.** ***C. difficile PCR positive and Toxin negative results (any setting***: Results indicate C. difficile which carries the toxin gene is present, however C. difficile toxin is NOT detected in stool. Active C. difficile disease is LESS likely, but is not outruled. Isolate patient with contact precautions. Review current antibiotics and stop if possible. For Adults, If clinical features of active C. difficile disease present,	

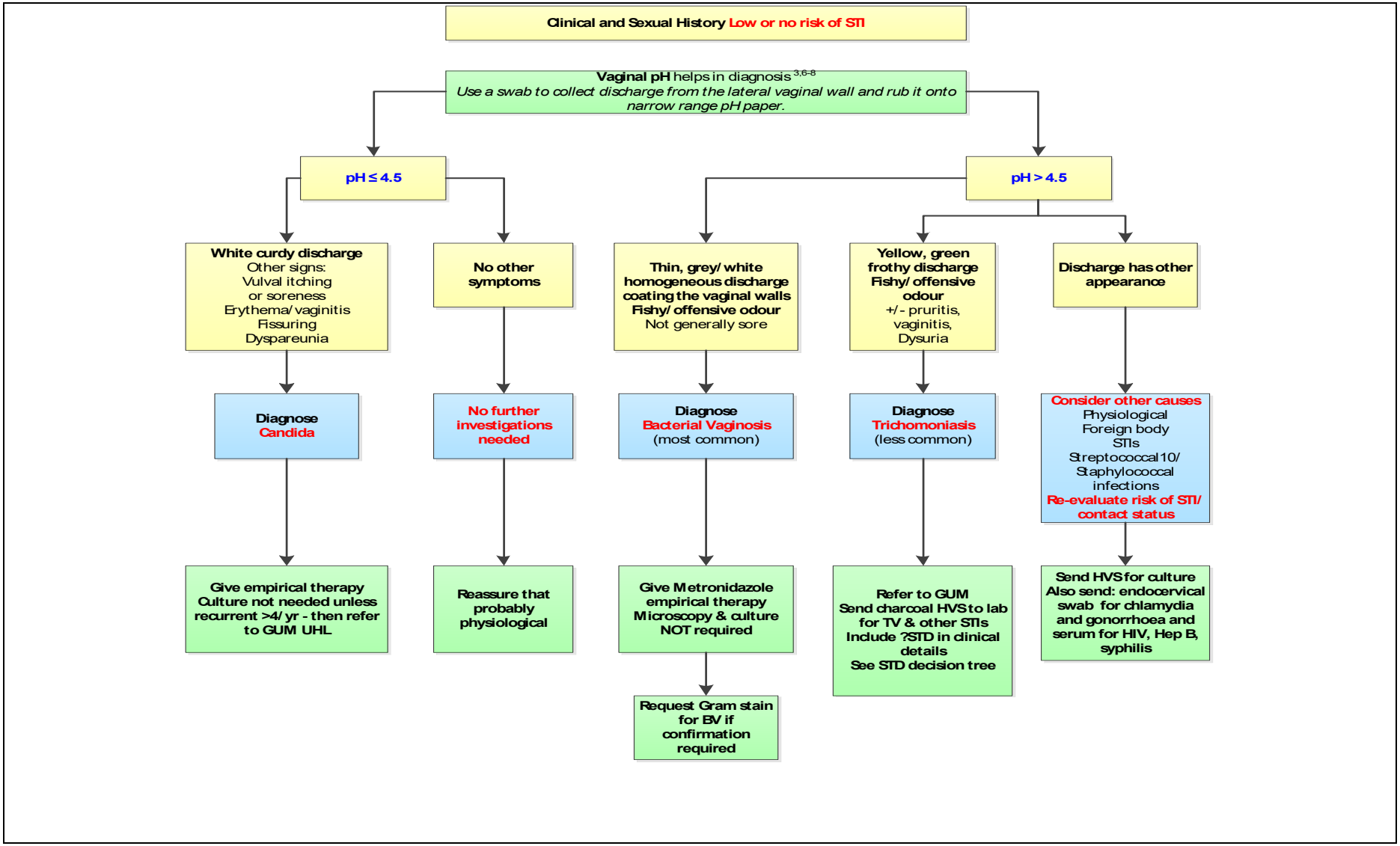
	commence metronidazole 400 mgs po tds for 10-14 days, or ORAL vancomycin 125mg qds for moderate/severe disease. See hospital antimicrobial guidelines for case severity definitions. Contact Clinical Microbiology Team for advice if severe or relapsing/recurrent disease. **Test of clearance is not indicated;** Notes: A result of DNA/RNA 'not detected' for the biological sample submitted for testing means that: Infection is not present, or infection is present but DNA/RNA are at a low level below the limit of detection of the assay, or the sample was submitted at a very early or late stage of infection therefore DNA/RNA is below the limit of assay detection, or DNA/RNA was not detected due to issues with inadequate/sub-optimal sample collection.If clinical presentation is not consistent with a result of 'DNA/RNA not detected' consider repeat testing or discuss further with the Clinical Microbiology team.
Fluids (Sterile)	
Specimen type:	Fallopian Tube Aspirate / Tubo-Ovarian Fluid / Pouch of Douglas Fluid / Joint fluid / Synovial fluid / Bursa fluid, Peritoneal fluid / Ascitic fluid / Pleural fluid / Pericardial fluid, Amniotic fluid
Specimen requirements:	Clean, sterile, leakproof container (universal container) plus EDTA for cell count where applicable Swabs are not a recommended specimen. Anaerobic cultures will not be performed on swab specimens. Total white cell count microscopy is not performed unless specifically requested with an accompanying EDTA specimen and in the case of ascites only where SBP is suspected. Please indicate? SBP on request form for ascites. NB: If Biochemistry testing is required on sterile fluid, please send a separate specimen (Sarstedt 4.9ml neutral tube) with a separate request form for Biochemistry tests. Exception; samples for pH must be sent in a blood gas syringe with the appropriate Biochemistry request form.
Preparation of patient and specimen collection:	Disinfect overlying skin. Obtain specimen via percutaneous needle aspiration or surgery. Aspirate fluids that collect in pericardial, pleural, peritoneal and synovial spaces with the utmost precaution to avoid introducing micro-organisms and to avoid contamination of the specimen. If directly aspirating into a syringe (recommended), remove the needle and cap the syringe for transport. If the material cannot be aspirated into a syringe, place it into a sterile tube or container. Label the specimen. Inoculate ascitic fluid specimens (in spontaneous bacterial peritonitis) at the bedside into blood culture bottles. Put 10ml of fluid into aerobic and anaerobic blood culture bottles (20ml total). Submit additional fluid in a sterile container, as much as possible for Gram stain and additional lab processing (e.g., acid-fast bacilli [AFB], fungal cultures).
Sample volume:	A minimum volume of 1ml
Special precautions:	• Deliver immediately to the laboratory.

<table>
<tr><td></td><td colspan="5">• The volume of specimen influences the transport time that is acceptable.
• Large volumes of purulent material maintain the viability of anaerobes for longer. Results from delayed samples must be interpreted with caution bearing in mind the difficulties in isolating anaerobes from these samples.</td></tr>
<tr><td>Turnaround time:</td><td colspan="5">Cell Count/ Uric Acid Crystals: Same day
Gram stain: Same day
Negative Culture: 6 working days
Positive Culture: 6–9 days</td></tr>
<tr><td>Test method:</td><td colspan="5">• Total White Cell Count, (two-part differential leucocyte count if cell count > 250/µl)
• Uric Acid crystals (joint fluids or topheous aspirate only)
• Gram Stain
• Culture for pathogenic organisms</td></tr>
<tr><td>Additional information:</td><td colspan="5">Fluids may also be sent to the Microbiology Department in blood culture bottles.
If cytology for malignancy is required, please send a separate specimen for Cytology. Refer to Histology test repertoire for further information</td></tr>
<tr><td>Reference Range:</td><td colspan="5">SYNOVIAL/JOINTFLUID</td></tr>
<tr><td></td><td>FINDINGS</td><td>NORMAL</td><td>NON INFLAMMATORY</td><td>INFLAMMATORY</td><td>SEPTIC</td></tr>
<tr><td></td><td>Colour
Clarity
Viscosity
WBC /ul
PMNs</td><td>Clear
Transparent
High
<200
<25%</td><td>Yellow
Transparent
High
200 – 2000
<25%</td><td>Yellow-Green
Opaque
Low
2,000 – 150,000
>50%</td><td>Yellow
Opaque
Variable
15,000-200,000
>75%</td></tr>
<tr><td></td><td colspan="5">Other Sterile Fluid Findings</td></tr>
<tr><td></td><td>Fluid Type</td><td>Clinical Interpretation</td><td>Conditions</td><td>Cell type</td><td>Total cell count /µl</td></tr>
<tr><td></td><td>Pericardial Fluid</td><td>Normal</td><td></td><td>Leucocyte</td><td><1000</td></tr>
</table>

		Abnormal		**Leucocyte**	**>1000**
	Peritoneal Fluid	**Normal**		**Leucocyte** **Erythrocyte**	**<300** **<100,000**
		Abnormal	**Spontaneous Bacterial Peritonitis (SBP)**	**Leucocyte** **%Neutrophil PMN)** **Erythrocyte**	**>300** **>50%PMN** **>100,000**
	Pleural Fluid	**Normal**		**Leucocytes**	**<1000**
		Abnormal		**Leucocytes**	**>1000**
	References: Color Atlas of Body Fluids. An Illustrative Field Guide, Based on Proficiency Testing. K. A. Galagan (MD), D. Blomberg (MD), P.J. Cornbleet (MD, PhD), E.F. Glassy (MD).2006 (available on reading bench as reference text) Note: The presence of >100 Leucocytes/µl in CAPD fluid closely correlates with infection. Ref: ISPD Peritonitis Recommendations, HPA Standard Operating Procedure (Investigation of Continuous Ambulatory Peritoneal Fluid SMI B25. Note: Reference ranges for Bile are not applicable				
Fungal Microscopy and Culture					
Specimen type:	Non Systemic Infection: Skin / Scalp scrapings Nail scrapings Hair Systemic infection: All specimens **Note:** Skin / scalp scrapings, nail scrapings and hair specimens are not suitable for routine bacteriological investigation. Scrapings / Hair should be placed in DERMAPAK Envelopes				

Specimen Requirements:	(Contact Microbiology Laboratory at 482255) This investigation is referred to Biomnis Laboratories Tel: +353 1 295 8545 and is restricted to Dermatology Consultants 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.
Specimen Collection:	Prior cleaning is essential if greasy ointments or powders have been applied to the region.
	Scalp
	Specimens from the scalp are best obtained by scraping with a blunt scalpel. The contents should include hair stubs, the contents of plugged follicles and skin scales. Hair may also be plucked from the scalp with forceps (infected hairs are usually easy to remove in this way). Cut hairs are unsatisfactory as the focus of infection is usually below or near the surface of the scalp.
	Nail clippings
	Nail clippings should be taken from any discoloured, dystrophic or brittle parts of the nail. These should be cut as far back as possible from the free edge of the nail and include its full thickness, scrapings can also be taken from beneath the nail to supplement the clipping sample.
	Skin
	Skin samples should be collected by scraping outwards from the edges of the lesions, with either a blunt scalpel blade or with the edge of a glass microscope slide. The edge of the lesion is where there is likely to be the most fungus.
	- Loose slides should not be used.
Special precautions:	- Do not use fixatives. Microscopy
Turnaround time:	Performed twice weekly Culture Final report: 28 days
Gastric Aspirates (Neonatal)	
Specimen requirements:	Sterile universal container
Sample volume:	N/A
Special precautions:	Specimens should be collected <4h post delivery and before feeding.
Turnaround time:	Final report: 2 – 3 working days

Genital Tract & Associated Specimens	
Specimen type:	High Vaginal (See decision tree below) Cervical Urethral Rectal IUCDS (Intra Uterine Contraceptive Devices) Pus Chlamydia (Refer to Chlamydia/GC STI Screening)
Specimen requirements:	High Vaginal — Charcoal Swab Cervical — Charcoal Swab Urethral — Air- Dried smear plus swab is useful. Amies Charcoal - aluminium wire - orange cap. Rectal — Charcoal Swab Bacterial Vaginosis — A pH should be performed and a value submitted. An air-dried smear of vaginal discharge may be sent in addition to the swab IUCD'S — Sterile universal container Pus — Sterile universal container Fluids — Sterile universal container
DIAGNOSIS OF ABNORMAL VAGINAL DISCHARGE IN FEMALE PATIENTS OF REPRODUCTIVE AGE WITH STI RISK	


Clinical and Sexual History Low or no risk of STI
Vaginal pH helps in diagnosis 3,6-8
Use a swab to collect discharge from the lateral vaginal wall and rub it onto narrow range pH paper.
pH ≤ 4.5
pH > 4.5
White curdy discharge
Other signs:
Vulval itching
or soreness
Erythema/ vaginitis
Fissuring
Dyspareunia
No other symptoms
Thin, grey/ white homogeneous discharge coating the vaginal walls
Fishy/ offensive odour
Not generally sore
Yellow, green frothy discharge
Fishy/ offensive odour
+/- pruritis, vaginitis, Dysuria
Discharge has other appearance
Diagnose Candida
No further investigations needed
Diagnose Bacterial Vaginosis (most common)
Diagnose Trichomoniasis (less common)
Consider other causes
Physiological
Foreign body
STIs
Streptococcal 10/ Staphylococcal infections
Re-evaluate risk of STI/ contact status
Give empirical therapy
Culture not needed unless recurrent >4/ yr - then refer to GUM UHL
Reassure that probably physiological
Give Metronidazole empirical therapy
Microscopy & culture NOT required
Request Gram stain for BV if confirmation required
Refer to GUM
Send charcoal HVS to lab for TV & other STIs
Include ?STD in clinical details
See STD decision tree
Send HVS for culture
Also send: endocervical swab for chlamydia and gonorrhoea and serum for HIV, Hep B, syphilis

	Refer to Chlamydia/GC STI Screening • For FEMALES – ASYMPTOMATIC with SEXUAL RISK • For MALES – ASYMPTOMATIC with SEXUAL RISK • FOR MALES – DISCHARGE PRESENT / DYSURIA with SEXUAL RISK
Specimen collection: General Considerations	· Most episodes of Vaginal Discharge are physiological and empirical treatment for candidiasis and Bacterial Vaginitis (BV), if suspected, is appropriate. Please note exceptions to this in notes at the bottom of the decision tree.
	· **Gram stains** on HVS specimens are used as a diagnostic tool for **Bacterial Vaginosis (BV).**
	· If microbiological confirmation of BV is desired **Gram stain only** will be performed on HVS samples received with clinical details of 'suspect BV/suggestive of BV' included on the request form (i.e. no culture will be undertaken) as this can be used as a diagnostic tool for BV.
	· If the clinical details of 'suspect BV/suggestive of BV' are not included on the request form a gram stain **will not** be performed.
	· Provision of **appropriate clinical details** will direct the laboratory's testing repertoire (i.e. culture and/or gram) and provide the best service for the patient. Clinical details such as pregnancy, recurrent candidiasis (as defined in the decision tree), intra menstrual /post coital bleeding, pelvic pain, and 'suspect BV/suggestive of BV' allow us to test each specimen appropriately. **If clinical details are not provided on the request form, the specimen will not be processed.**
	· HVS samples processed in the laboratory for culture **will not be cultured** for gonorrhea as an endocervical swab for Chlamydia and Gonorrhea PCR is the preferred sample type.
	· Pre-insertion of Intrauterine device (IUD) / IUD in situ: An STI screen should be offered to all women who are identified as being at risk of STIs if they are pre-insertion of an IUD or have an IUD in situ; a single vulvovaginal or endocervical sample for Chlamydia / Gonorrhoea PCR is adequate. There is no requirement to take routine High Vaginal Swabs for culture unless a discharge is present. Specimens submitted with clinical details of 'Pre-coil' or 'IUD / Coil in situ' will not be processed for culture. Provision of additional appropriate clinical details (as defined in the attached decision tree) will direct the laboratory's testing repertoire (i.e. culture and/or gram) and provide the best service for the patient. See Chlamydia / Gonorrhoea /Trichomonas for sample requirements for molecular investigation of STI.
	· **The decision trees** above are provided in an effort to illustrate the rationale behind this approach and to assist in your clinical assessment and management of the patient
	· **The pH is a helpful aid** for your diagnosis however, there are other clinical parameters outlined re. discharge type, odour and patient history that will aid your decision to collect a HVS specimen and inform your approach to clinical detail provision
	· **Please see HVS advisory memo reissued 2018.**
	· For detection of viruses: separate samples should be collected into appropriate transport media Contact the Serology / Virology laboratory at 061-482797

Specimen collection: Cervical swabs	Cervix (endocervix): Wipe the cervix clean of vaginal secretion and mucus. Use a speculum without lubricant - it may be toxic to certain bacteria. Under direct vision, gently compress the cervix with the blades of speculum, and use a rotary motion with a culture swab. Obtain exudate from endocervical glands. Alternatively, insert the swab into the cervical os, allow it to remain in place for a few seconds, and remove it. Return the culture swab to the Amies transport medium with charcoal base or **cobas® PCR Media Dual Swab Sample Kits**
Specimen collection: High vaginal swabs	After the introduction of the speculum, the swab should be rolled firmly over the surface of the vaginal vault. The swab should then be placed in transport medium with charcoal.
Specimen collection: Urethral swabs	Contamination with micro-organisms from the vulva or the foreskin should be avoided. Thin swabs are available for collection of specimens. The patient should not have passed urine for at least 1 hour. For males, if a discharge is not apparent, attempts should be made to “milk” exudate from the penis. The swab (Amies Charcoal - aluminum wire - orange cap), is gently passed through the urethral meatus and rotated. Place the swab in transport medium with charcoal.
Specimen collection: Intrauterine contraceptive devices (IUCDs)	The entire device should be sent.
Specimen collection: Rectal swabs	Rectal swabs are taken via a proctoscope. If a proctascope is not available, consider blind swabs.
Specimen collection: Throat swabs	Throat swabs should be taken from the tonsillar area and/or posterior pharynx avoiding the tongue and uvula.
Specimen collection: Fluids and pus	Fluids and pus
	These are taken from the fallopian tubes, tubo-ovarian and Bartholin’s abscesses etc during surgery.
Specimen collection: Extragenital samples for PCR	Confirmatory testing is performed to confirm GC results.
Specimen requirements: Male Urine*	cobas® PCR Media Dual Swab Sample Kits - refer to Chlamydia/GC STI Screening
	*Consider rectal swabs as determined by patient history
Turnaround time:	Final Report: 3-4 working days for HVS/ Penile other specimen types require extended incubation.
Additional information: genital tract and associated specimens:	· Please test for syphilis in patients with genital ulcer disease (test may be negative if tested within 2 weeks of chancre, there is no facility for dark ground microscopy locally), generalised maculopapular rashes, aseptic meningitis, bearing in mind the multiple possible clinical manifestations of syphilis.

	· Routine syphilis, Hepatitis B and HIV serology should be offered to all patients getting a sexual health screen as standard of care. · Where Neisseria gonorrhoeae (GC) is detected via PCR, please request swabs for GC culture. · Low vaginal swabs are discouraged because the presence of high numbers of commensal flora makes them difficult to interpret · Self taken vulval / vaginal swabs for chlamydia/ GC have better yield than urine in women. · Maternity Patients: re gram staining on HVS samples from maternity patients Gram stain performed only if Query bacterial vaginosis (?BV) is noted on request form as a clinical detail. Refer to memo 01.06.17 sent to UL Maternity Hospital.
Gonococcal PCR	
	refer to Chlamydia/GC STI Screening
Group B Streptococcus (GBS) Culture	
Specimen requirements:	Vaginal swab
Specimen collection:	Swab the lower vagina (vaginal introitus) and the rectum with the same swab or two different swabs
Special precautions:	Cervical swabs are not recommended Swabs in Amies transport medium with charcoal If processing is delayed, refrigeration is preferable to storage at ambient temperature. Delays of over 48h are undesirable
Turnaround time:	2 working days
Group B Streptococcus (GBS) PCR	
Specimen type:	Blood sample
Specimen requirements:	Blood: EDTA sample (Violet Top)
Sample volume:	Blood: Minimum volume 1ml
Special precautions:	Deliver immediately to the Laboratory
Turnaround time:	Group B streptococcus (GBS) PCR will only be carried out on blood from infants <7 days old. For children over 7 days of age it should be discussed with the laboratory. Group B streptococci PCR results are available 24 hours after receipt by the referral laboratory Monday-Friday.

	On receipt of the result, the Microbiology Laboratory telephones all positive results to the requesting source. Final written report: 5 days
Additional information:	Specimens are referred to the Irish Meningococcal and Meningitis Reference Laboratory (IMMRL), Temple St, Dublin for testing. Telephone number: 01 – 8784266 Refer to CSF (Cerebrospinal Fluid) for Film Array PCR
Haemophilus Species PCR Testing	
Specimen type:	EDTA (Violet Top) sample
Specimen requirements:	Blood: EDTA (Violet Top)sample
Sample volume:	Blood: Minimum volume 1ml
Special precautions:	Deliver immediately to the Laboratory
Turnaround time:	• PCR results are available 24 hours upon receipt by the referral laboratory Monday-Friday • Specific group available after 2 working days. • On receipt of the result the Microbiology Laboratory telephones all positive results to the requesting source. • Final written report: 5 days
Additional information:	Specimens are referred to the Irish Meningococcal and Meningitis Reference Laboratory (IMMRL), Temple St, Dublin for testing. Telephone number: 01 8784266
Helicobacter Pylori	
Test method:	Preferred test is Antigen Detection in Faeces. Refer to the: Helicobacter pylori Stool Antigen
Helicobacter pylori - Gastric/Antral/Duodenal biopsies	
Specimen Type:	Gastric/Antral/Duodenal biopsies are collected in Port-pyl medium (Biomerieux) a stock of which is located in the Microbiology Laboratory. The Microbiology Laboratory must be contacted in advance of taking biopsies to ensure sufficient media is in stock. This media can be sent out to the requesting source via the laboratory porters. Please use separate vials for each biopsy taken.
Turnaround time:	15 days
Additional information:	Specimens are referred to Eurofins Biomnis, Three Rock Road, Sandyford Business Estate, Dublin 18, D18 A4C0

Infection Control Screening (MRSA, VRE, CPE/KPC, ESBL)	
	Refer to the Infection Prevention and Control Policies at https://www.hpsc.ie/ for up to date screening protocols for alert organisms; Methicillin Resistance Staphylococcus aureus (MRSA), Vancomycin Resistant Enterococci (VRE), Carbapenem-Resistant Enterobacteriaceae (CRE / (KPC) and Extended-Spectrum Beta-Lactamases (ESBLs). **Please Note: Is it a limitation of the screening process that growth depends on the requirements of each individual micro-organism. It is therefore possible that certain strains which have specific requirements (substrate, temperature, incubation conditions, etc.) may not develop or may not produce typical colonies. This may result in false negative results.**
METICILLIN RESISTANCE STAPHYLOCOCCUS AUREUS (MRSA)	**<u>MRSA screening is ONLY available to GP/Community/Day Hospitals in cases of pre op or where agreed in consultation with Consultant microbiologists. If these details are not clearly written on the request form these specimens will be rejected.</u>** **For Inpatients, routine MRSA screening is only processed Monday to Friday. Weekend processing is targeted and limited to urgent requests on ICU, HDU, Neonatal, Oncology and Orthopaedic patients and where agreed by the Consultant Microbiologist.** **Please do NOT send routine MRSA screens over the weekend as they will exceed 48 hours on the next working day (Monday) and will not be processed. Routine screening samples sent Sunday evening will be processed on Monday. Routine screening Samples sent on Monday of Bank Holiday weekends will be processed on Tuesday.**
Specimen type:	Screening sites on Admission for Adults and Children over One Year who fulfil criteria for screening. (Refer to the UHL MRSA policy) Bilateral nares (same swab) Groin (same swab) Once MRSA has been identified a full screen from the following sites is performed: · Nares · Groin or perineum · Any wound sites or abnormal skin · Sputum if present · CSU (if catheterised) · Medical devices sites · Throat if MRSA is persistent despite attempts at decolonisation Screening sites on Admission Bilateral nares (same swab)

	for Neonates and Infants Under One Year who fulfil criteria for Screening. (Refer to the UHL MRSA policy) Umbilicus Perineum
Specimen requirements:	Charcoal Swab Sputum Urine
Sample volume:	Urine: Minimum volume: 1ml
Special precautions:	N/A
Turnaround time:	Negative result: Final report 2 working days Positive result: Final report 3 working days
Additional Information:	· To check for MRSA clearance, request an MRSA investigation only. · Do not request C/S. · Please ensure that all clinical details are provided on the request form. · Please ensure that all clinical details are provided on the request form. Please Note: The growth requirements of a very small number of MRSA strains can lead to their partial or total inhibition in culture and therefore a false negative result.
VANCOMYCIN RESISTANT ENTEROCOCCI (VRE) SCREEN	**VRE screening is only performed on specimens from ICU/ HDU/ DIALYSIS or as agreed with the Consultant Microbiologist**
	NB: there is no need to check for clearance if the patient is previously VRE positive.
Specimen type:	Faeces/Swab of faeces/ Illeostomy swab / Rectal swab
Specimen requirements:	Sterile leak-proof container. Charcoal swab.
Turnaround time:	Negative report: 2 working days Positive report: 4 working days

Carbapenamase Producing Enterobacteriaceae Screen (CPE/KPC)	
Specimen type:	Faeces/Swab of faeces/ Illeostomy swab / Rectal swab / Stool. Other samples as per Infection Control Policy.
Specimen requirements:	Green Top Swab (Copan Fecal Swab; 502CS01
Special precautions:	Please Indicate if the patient was previously CPE positive.
Turnaround time:	Negative report: 1 working day Positive report: 3-4 working days
Additional Information:	Please ensure that all clinical details are provided on the request form. Samples from patients who are known to be colonized with CPE organisms are only tested once per year.
Extended Spectrum Beta Lactamases (ESBL)	
	ESBL screening is only performed on specimens from: · Neonatal patients · Postpartum mothers at the UMH Limerick when their baby is being admitted to Neonatal Intensive Care Unit · Dialysis · Or as agreed with the Consultant Microbiologist
Specimen type:	Faeces/Swab of faeces/ Illeostomy swab / Rectal swab /Urine.
Specimen requirements:	Charcoal Swab Faeces Urine
Sample volume:	Minimum volume: 1mL
Special precautions:	Please Indicate if the patient was previously ESBL positive.
Turnaround time:	Negative report: 2 working days Positive report: 4 working days
Legionella Urinary Antigen	
Specimen type:	Urine collected in a sterile leak-proof container

Sample volume:	Minimum volume = 1ml.
Specimen requirements:	Only tested for ICU / HDU patients and where appropriate clinical details are provided. Urine specimens should be delivered to the laboratory as soon as possible after collection. Specimens may be refrigerated at 2 - 8°C overnight if same day delivery to the laboratory is not possible.
Turnaround time:	Same day
	The Legionella urinary antigen test is for detection of *Legionella pneumophilia* serogroup 1 antigen and for epidemiological investigations if antigen is detected. Culture is recommended to detect causative agents other than *L. pneumophilia* serogroup 1.
Comment:	Refer to Legionella Culture
	Urinary antigen detection is a very convenient method of diagnosing Legionnaires' disease. Antigen becomes detectable soon after onset of symptoms and the test may remain positive for several weeks, even after other tests have become negative. Antigen detection is a highly specific method (>99%) of diagnosing legionellosis, its sensitivity being similar to that of culture (80-85%).
Legionella Culture	
Specimen type:	· Pleural Fluid · Broncho-Alveolar Lavage (BAL). · Bronchial/tracheal aspirate, · Transtracheal aspirate · Lung biopsy/tissue, pleural fluid, transtracheal aspirate
Special Precautions:	Test method **does not** recommend the use of sputum samples. Deliver immediately to the Laboratory. **Approval required from the Consultant Microbiologist**
Specimen requirements:	Sterile sealed container
Sample volume:	Pleural Fluid: Minimum volume 1ml BAL: Large a volume as possible Tissue and Biopsies: Specimens should ideally be large enough to carry out all microscopic preparations and cultures
Turnaround time:	Final report: 11 days Positive cultures are telephoned immediately to the requesting source.

Leptospirosis	
Test method:	Direct microscopy for Leptospira is no longer performed in the Microbiology Laboratory. Leptospiral IgM testing is recommended. Refer to Leptospira Antibody (IgM)
Meningococcal PCR	
Specimen type:	Blood sample
Specimen Requirements:	Blood: EDTA sample (Violet Top)
Sample volume:	Blood: Minimum volume 0.5ml
Special precautions:	Deliver immediately to the Laboratory
Turnaround time:	• Meningococcal PCR results are available 24 hours after receipt by the referral laboratory Monday-Friday. • Specific meningococcal group available after 2 working days. • On receipt of the result, the Microbiology Laboratory telephones all positive results to the requesting source. • Final written report: 7 days
Additional Information:	Specimens are referred to the Irish Meningococcal and Meningitis Reference Laboratory, (IMMRL), Temple St, Dublin for testing. Telephone number is 01 8784266 Specimens are referred to the Irish Meningococcal and Meningitis Reference Laboratory, (IMMRL), Temple St, Dublin for testing. Telephone number is 01 8784266
Meticillin Resistance Staphylococcus aureus (MRSA)	
	Refer to Infection Control Screening
Mouth	
Specimen type:	Mouth swab
Specimen collection:	Sample pus if present, otherwise sample any lesions or inflamed areas. A tongue depressor or spatula may be helpful to aid vision and avoid contamination from other parts of the mouth.
Specimen requirements:	Charcoal swab
Sample volume:	N/A
Turnaround time:	Aerobic Report: 2-3 working days

Test method:	Routine Swab:	Cultured for Yeasts. Stained for Vincent's organisms if indicated by clinical details
	Clinical details of Mouth ulcers:	ß-haemolytic streptococci *Staphylococcus aureus*
Additional Information:	Please state on request form if fungal investigation is required Please include clinical details of halitosis/bad breath/poor oral hygiene or suspected gum disease- Gram stain for Vincents organisms will only be performed if these details are present	
Mycoplasma genitalium in genital specimens		
Specimen requirements and comments:	**Specimen types** • Genital swab PCR/ NATT buffer (400uL) minimum • Straight urine in universal container • Charcoal swabs can be tested, but not preferred Samples are referred to: Micropathology Ltd, University of Warwick Science Park, Venture Centre, Sir William Lyons Road, Coventry, CV4 7EZ, United Kingdom www.micropathology.com Tel: +44 (0) 2476 323 222 Fax: +44 (0) 2476 323 333	
Turnaround time:	2 days from day of receipt by the referral laboratory Mon-Thurs. Note: Mycoplasma genitalium macrolide resistance: 4 days TAT on samples positive for Mycoplasma genitalium	
Special precautions:	Ensure that containers are labeled in accordance with the pathology specimen labeling policy.	
Nasal Swab		
Sample type:	Refer to Nose Swab	
Nose Swab		

Test Information:	**Nasal cultures do not predict the etiologic agent of sinus, middle ear or lower respiratory tract infections and should not be submitted in lieu of specimens from these sites.** **Adult Nasal swabs are rejected except for investigation of MRSA carriage for infection control screening of inpatients and pre operative screening *only* in the Community setting.** Specimens indicating the presence of a lesion, or taken from children <15 years are routinely examined only for *Staphylococcus aureus* and *beta-hemolytic Streptococci*. If diphtheria and rhinoscleroma are suspected discuss with the Clinical microbiologist prior to requesting investigation for *Corynebacterium diphtheriae* and *Klebsiella rhinoscleromatis* respectively.
Specimen type:	Nose / Nasal swab
Specimen requirements:	Charcoal swab
Specimen Collection:	Obtain a culture swab. A nasal speculum may be needed for some patients. Carefully insert the swab at least 1cm into the nares. Firmly sample the membrane by rotating the swab and leaving it in place for 10-15 seconds. Withdraw the swab and place it in the transport charcoal medium.
Sample volume:	N/A
Special precautions:	Full clinical information should be provided on the request form.
Turnaround time:	Final report: 2-4 working days
Ova, Cysts and Parasites (OCP)	
Specimen type	Faeces, urine for schistosoma, duodenal aspirates for giardia, Sellotape slide/perianal swab for detection of Enterobius vermicularis (pinworm).
Specimen requirements	Fresh sample in a clean, sterile, leakproof container. A minimum of three specimens collected on alternate days (48 hrs apart) is recommended for a complete OCP examination where parasite infestation is suspected as shedding of cysts and ova may be intermittent. Relevant clinical details are required for processing e.g. Relevant Travel history, persistent diarrhoea (>14 and <28 days) with negative first line stool investigations, consumption of shellfish Urine for *Schistosoma Haematobium* (bilharziasis) Total urine collected between 10.00 -14.00h into sterile containers without boric acid preservative is required.

	<u>Perianal swab/sellotape slide</u> Sample between 22.00h and midnight, or early in the morning, before defecation or bathing. • Sellotape slide: Apply sellotape to the perianal region, pressing the adhesive side of the tape firmly against the left and right perianal folds several times. A tongue depressor can be used to wrap the tape around. Smooth the tape back on the slide, adhesive side down. Label slide with patient name and date of birth • Perianal swab - cotton-wool swab in dry container. Spread buttocks apart, and rub the moistened cotton wool swab over the area around the anus, but do not insert into the anus. Place cotton wool swab back into its container (no transport medium required). Ensure container is labelled appropriately. Occasionally, an adult worm may be collected from a patient and sent in saline or water for identification. Please note: PCR for Giardia and Cryptosporidium is performed routinely on all faeces samples from community and <72 hours post admission. Specimens will not be processed for OVA, CYSTS and PARASITES unless clinical details are provided.
Turnaround Time	7 days
Additional information	Samples are referred to Cherry Orchard Hospital for testing (except for PCR on Giardia and Cryptospordium which is performed in house). Worms received for identification are sent to the Hospital for Tropical Disease, London.
Orthopaedic Tissue	
Specimen type:	Tissue
Specimen requirements:	Samples inoculated into cooked meat broth with beads. Contact the microbiology laboratory at (061)482255 for same. • The volume of the specimen influences the transport time that is acceptable. Larger pieces of tissue maintain the viability of anaerobes for longer.
Special precautions:	• If specimen is small, place it in sterile water to prevent desiccation. • Tissue samples for microbiology must not be placed in formalin. Aerobic Culture: 7-10 days

Turnaround time:	Anaerobic culture: 7-14 days
	Positive reports are referred to the Consultant Microbiologist on Clinical duty
Pneumococcal PCR	
Specimen type:	Blood sample
Specimen requirements:	Blood: EDTA sample (Violet Top)
Sample volume:	Blood: Minimum volume 1ml
Special precautions:	Deliver immediately to the Laboratory
Turnaround time:	• Pneumococcal PCR results are available 24 hours after receipt by the referral laboratory Monday-Friday. • Specific meningococcal group available after 2 working days. • On receipt of the result the Microbiology Laboratory telephones all positive results to the requesting source. • Final written report: 5 days
Additional information:	Specimens are referred to the Irish Meningococcal and Meningitis Reference Laboratory (IMMRL), Temple St, Dublin for testing. Telephone number is 01 8784266
Pneumococcal Urinary Antigen	
Specimen type:	Urine collected in a sterile leak-proof container
Sample volume:	Minimum volume = 1ml.
Specimen requirements and comments:	· Only tested for ICU / HDU patients and where appropriate clinical details are provided. · Urine specimens should be delivered to the laboratory as soon as possible after collection. · Specimens may be refrigerated at 2 - 8°C overnight if same day delivery to the laboratory is not possible.
Turnaround time:	Same day
Comment:	A negative *Streptococcus pneumoniae* test does not exclude infection with S. pneumoniae. Therefore, the results of this test as well as culture results, serology or other antigen detection methods should be used in conjunction with clinical findings to make an accurate diagnosis. It is not recommended to perform this test within 5 days of receiving the *S.pneumoniae* vaccine. Pneumococcal urinary antigen testing is not performed on children under 5.
Pneumocystis jiroveci (carinii)	

Specimen type:	Bronchoalveolar lavage / sputum
Specimen requirements and comments:	Sterile universal container Sputum/BAL/NPA Sample are referred to Micropathology Ltd. Coventry, UK , Tel: 0044 24 76323222 **Exception**: All BALS from ICU are referred to NVRL Dublin for both atypical screen and PCP
Sample volume:	Bronchoalveolar lavage: 30ml Induced sputum: 2-4ml
Turnaround time:	1-2 days from day of receipt by the referral laboratory Mon-Thurs. Positive results are telephoned to the requesting source.
Pregnancy Test	
Specimen requirements:	Sterile universal container
Sample volume:	Urine: Minimum volume: 1ml
Special precautions:	**DO NOT USE BORIC ACID CONTAINERS**
Turnaround time:	Urgent samples: < 30 mins Routine samples: same day
Additional Information:	Inconsistent urine hCG results may occur in the following circumstances: · *Conditions other than pregnancy that cause elevated levels of urinary hCG. · *If the patient is on treatment with drugs containing hCG · *In patients with abnormal bladder or kidney function (e.g. · enterocystoplasties and renal failure) · *If the urine sample contains excessive amounts of bacteria Please note that if the test result is non-consistent with clinical evidence, further evaluation may be required. NB: Serum HCG levels are performed in the Biochemistry Department.
Sinus Aspirate	
Specimen requirements:	Aspirate
Specimen collection:	The specimen will be collected by a specialist ENT surgeon.

Sample volume:	Minimum volume: 1ml
Special precautions:	• The volume of specimen influences the transport time that is acceptable. Large volumes of purulent material maintain the viability of anaerobes for longer. • The recovery of anaerobes in particular is compromised if the transport time is delayed.
Test method:	Routine: Gram stain. Culture for pathogenic organisms.
Turnaround time:	Final report: 2-3 working days Final report: 2-3 working days
Sputum, Bronchoalveolar Lavage, and Associated Specimens	
Specimen type:	Bronchial aspirate — Bronchoalveolar lavage Bronchial brushings — Transthoracic aspirate Bronchial washings — Transtracheal aspirate Protected catheter specimen — Cough swabs Sputum – expectorated
Specimen requirements:	Sterile leak-proof container in a sealed plastic bag
Specimen collection:	For sputum specimens the material required is from the lower respiratory tract, expectorated by deep coughing. When the cough is dry, physiotherapy, postural drainage or inhalation of an aerosol before expectoration may be helpful. **Saliva and per-nasal secretions are not suitable.** Early morning specimens for examination of *Mycobacterium sp*. should be collected on at least 3 consecutive days. BAL and associated specimens need specialist collection according to local protocols. Specimens include brushings (Bartlett protected brush), transbronchialbiopsies or bronchial secretions that are aspirated through the inner channel of the bronchoscope with or without an irrigating solution.
Sample volume:	A minimum volume of 1ml
Special precautions:	• Early morning freshly expectorated sputum is recommended for Mycobacterium species • Saliva and postnasal secretions are not suitable. • Please state on the request form if the patient is a Cystic Fibrosis patient. • A separate sample should be taken for cytology testing if required and sent to the Histology Laboratory.

Turnaround time	Negative routine culture: 3 working days Positive routine culture: 4 working days Cystic Fibrosis: Routine culture/ Burkholderia sp culture: 5 days Fungal culture: 14 days New Burkholderia sp isolates are referred to the Laboratory of Healthcare Associated Infections, Colindale, London for confirmation. • Sample should reach the laboratory within 4 hours.
Additional information:	Any delay beyond this time may allow overgrowth of Gram-negative bacilli; additionally, *Haemophilus* species and *S. pneumoniae* may not survive.
	• If specimens are not processed on the same day as they are collected interpretation of results should be made with care.
Throat Swab	
Specimen type:	Charcoal swab
Specimen collection:	Throat swab taken from the tonsillar area and/or posterior pharynx, avoiding the tongue and uvula. Specimen to be taken at onset of symptoms or before antimicrobial therapy where possible. **Please note: repeat throat swabs submitted within 48 hours are NOT processed.**
Special precautions:	• If processing is delayed, refrigeration is preferable to storage at ambient temperature. • Delays of over 48 h are undesirable
Turnaround time:	Aerobic report: 2-3 working days
	Anaerobic report (if clinical details of query quinsy): 5-10 days
Additional Information:	Ideally, inoculation of specimens for N. gonorrhoeae should be made directly onto culture media at the time of collection and these should be incubated without delay. Transport time should be as short as possible. Where quinsy is suspected please state on the request form. Pus is a more appropriate sample for this investigation. Please state on request form if patient suffers from recurrent throat infections. Please indicate if the patient is immunocompromised Please indicate if the patient is immunocompromised
Teicoplanin Antibiotic Assay	

Specimen requirements and comments:	Test referred to the UK – by arrangement with consultant microbiologist only. Monday –Thursday Service or by prior arrangement if urgently required at weekends or Bank Holidays. **Pre dose sample only required**. Gel Serum (Brown top) filled to line Paediatric Gel Serum (Brown top) ~~filled to line~~ Time and date of Sample must be stated on request form. Reference Laboratory Details: Antimicrobial Reference Laboratory, North Bristol NHS Trust, Southmead Hospital tel: +44 117 4146 220/6269
Sample volume:	1-2mL of separated serum. Teicoplanin binds to glass and plastics and therefore there may be a significant loss of drug if a small volume of serum is dispatched in a relatively large container.
Turnaround time:	< 2 days on receipt by reference lab. Results will be telephoned to the requesting Laboratory or emailed on the day of receipt for samples received between 9:00 and 15:00 hrs Monday to Friday. A written confirmation report will be sent by post.
Reference internal:	Glycopeptides Trough Level targets (See hospital Microguide for further details) Reference range: a) Complicated Skin and soft tissue infection, urinary tract infection and pneumonia – Pre dose >15 mg/L but <60mg/L b) Bone and Joint infection – Pre dose >20 mg/L but <60 mg/L c) Infective endocarditis – Pre dose >30mg/L (maintenance) but <60 mg/L NB: Trough and peak levels should not exceed above levels. Please refer to the HSE MID WEST Antimicrobial Guidelines for further details on dosage requirements Re-assay interval: 6-8 Days – Assuming initial results are within expected range.
Additional information:	• Random levels are not recommended by the consultant microbiologist because of difficulty with interpretation • Pre-dose (Trough) Level: Blood sample is drawn 30 mins before the dose is due to be given. • The Microbiology Laboratory requests the provision of a Microbiology request form and a separate clotted blood sample.
Tissues and Biopsies (Refer below for Orthopaedic Tissue)	
Specimen type	Tissue Biopsy
Specimen requirements:	Sterile leak-proof container in a sealed plastic bag.
Special Precautions:	Do not send dry tissue. Tissue samples for microbiology must not be placed in formalin.

Turnaround time:	Aerobic Culture: 5-10 working days Anaerobic culture: 5-10 working days
Tuberculosis (TB)	
Specimen type:	• Bone Marrow • Bronchial washing, aspirate, brushing • Broncho-alveolar lavage (BAL) • Blood (Specific bottles available from the laboratory) • Cerebrospinal fluid (CSF), body fluids, aspirates • Gastric lavage fluid • Pus • Post-mortem specimens • Skin or tissue biopsies • Sputum • Urine **NB: swabs are not recommended specimens for TB testing and will not be processed for same without agreement from the duty Clinical Microbiologist.**
Specimen requirements:	Sterile leak-proof container in a sealed plastic bag.
	Use of Sarstedt 30ml universal containers is essential to avoid leakage of specimen. Other transport containers not recommended. Refer to section 18.12 of this manual for diagram of appropriate container
Sample volume:	BAL/Bronchial Washings: Minimum sample size is 5ml. Bone Marrow: Add bone marrow directly to the culture medium. (Specific bottles required, please contact TB laboratory for same. Bone marrow is sent to Referral Laboratory for processing). As large a sample as possible should be obtained. Blood: Add 1-5 ml (3-5 ml optimal) of blood to the culture medium. (Specific bottles required, please contact Microbiology laboratory for same)

	Please specify if routine mycobacterial culture or investigation for Mycobacterium chimaera is required. Advance notice must be given to Microbiology Laboratory to allow for request of specific culture bottles from relevant Referral Laboratory. Requests only accepted following discussion with Consultant Microbiologist on Clinical Duty. Inoculated culture bottle(s) must be returned to Microbiology Laboratory **before 11am** to facilitate return postage within 24 hours of inoculation. 3 cultures taken within 24 hours recommended for *M.chimaera* investigation. CSF, body fluids, aspirates, pus: Collect aseptically as much as possible into a sterile container. A minimum volume of 5ml of CSF is required. Other fluids up to a maximum of 1 litre Gastric lavage fluid: The laboratory **MUST** be informed prior to taking the sample. **Samples need to be delivered to the Laboratory a.s.a.p. and within 4 hours of collection to avoid acidic degradation of organisms.** Collect early in the morning (before breakfast) on consecutive days. Preferably, a minimum volume of 5-50ml per sample. Usually used for children where there are problems obtaining sputum. Skin/tissue biopsy/post mortem specimens: Collect aseptically into a sterile container without preservatives. Select a caseous portion if possible. The majority of organisms will be found in the periphery of a caseous lesion. As large a sample as possible should be sent. Sputum: Collect early in the morning on at least 3 consecutive days. Preferably, collect a minimum volume of 5ml per sample. Saliva and postnasal secretions are not suitable. Urine: Collect the entire early morning urine on 3 consecutive days. **Collect samples in 30ml sterile Sarstedt containers as per section 18.12. A minimum of 60mls EMU collection each day over 3 consecutive days is required for AFB analysis in the Microbiology Laboratory.** NB: Boric acid/other preservative containers are not suitable and will be rejected. Insufficient Volume of Urine will also be rejected for this test. Urine is not an appropriate specimen for the diagnosis of pulmonary tuberculosis. Examination of urine should be restricted to those patients who are immunocompromised, suspected of having renal or disseminated tuberculosis or when sterile pyuria or haematuria have been demonstrated.
Turnaround time:	Microscopy: Within 24hrs of receipt of the sample (Mon-Thurs)

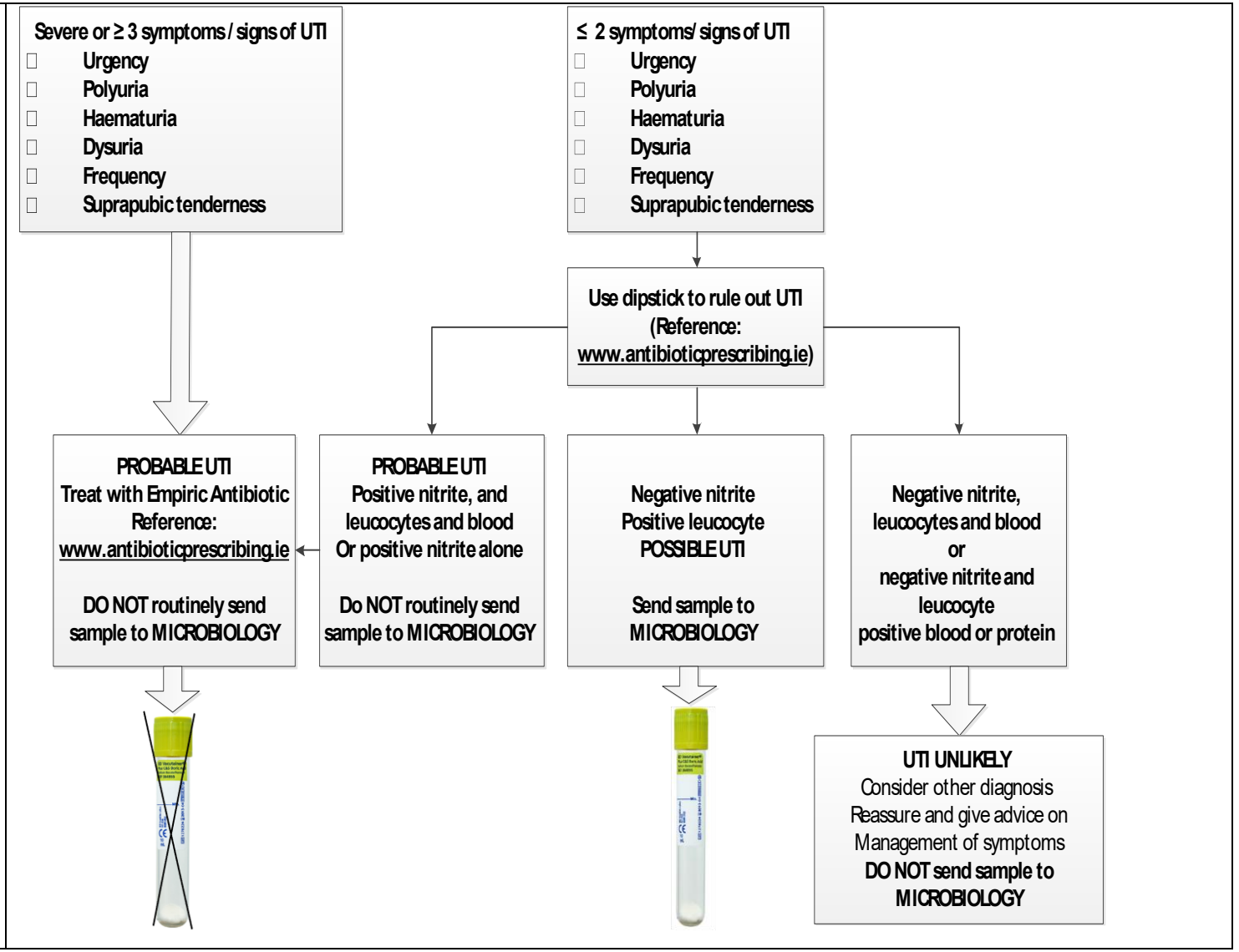
	Culture: • Negative culture 6-12 weeks • Positive culture 1-12 weeks Positive microscopy and positive cultures are communicated to the requesting source immediately. Positive isolates and specimens are referred to the Irish Mycobacterial Reference Laboratory (IMRL), St. James' Hospital, Dublin, Tel: (01) 4162980 for species Identification and susceptibilities. Turnaround times as follows: · M.tuberculosis complex: 10-14 days · Drug susceptibilities: 15-30 days · MOTT ID – Variable · GeneXpert MTB/RIF PCR: Result within 24hours of receipt. Positive results will be phoned. Blood/bone marrow culture: min. 6 weeks from receipt
Additional Information:	· **Please submit a blood sample for HIV testing to the Serology/Virology Laboratory if submitting a sputum sample for TB investigation.** · Following a positive microscopy/ culture a repeat sample is recommended during treatment at 4-6 weeks to check for resistance (i.e. compliance with treatment). · **Note 1**: Routine culture and sensitivity does not include TB culture; the investigation must be requested. **Limitations** · Certain rare, fastidious mycobacteria may not grow or may grow slowly in the BacTalert MP culture medium used. If these fastidious atypical mycobacteria are suspected, alternative methods of isolation or culture media, processing without decontamination or extended incubation may be required for recovery. Examples include *M.abscessus, M. haemophilum* and *M.malmoense*. BacTalert culture bottles are incubated at 35°C precluding the recovery of mycobacteria that require other incubation temperatures (e.g. *M.marinum, M.ulcerans, M.haemophilum*). Recovery of such mycobacteria requires additional incubation at appropriate temperatures. Clinical input and advice re appropriate sample processing is recommended if these strains are suspected. Inclusion of appropriate clinical details on request forms is essential to ensure correct sample processing. Recovery of Mycobacteria is dependent on the quality of specimen collected and the number of culturable organisms in the specimen. Collection over 3 consecutive days is recommended for respiratory infection. **NB:** Please send samples to the Laboratory as soon as they are taken – do not wiat to send all three samples together as overgrowth of commensals may compromise recovery of Mycobacteria.
Tuberculosis (TB) PCR	
Special requirements and comments:	CSFs may be referred for TB PCR (following consultation with the Consultant Microbiologist team). This test is referred to Micropathology UK, Tel: 0044 24 76323222- turnaround time: Mycobacterium genus DNA: 4 days Sputum samples: GeneXpert MTB/RIF PCR is now performed in TB Laboratory (Raheen) on Direct Microscopy AAFB smear positive sputum samples. Test turnaround time allowing for microscopy examination and sample preparation is within 48 hours of receipt in the TB laboratory Monday to Thursday. Turnaround times on a Friday may differ and GeneXpert testing on Fridays will be performed following discussion with the Consultant Microbiologist group. Positive results will be phoned to the Consultant Microbiologist on clinical duty. GeneXpert MTB RIF/Ultra is validated for use with Sputum samples only.

	(Positive AAFB cultures are still referred to IMRL ST James' Hospital Tel: (01) 4162980. Turnaround time for culture, whole genome sequencing and susceptibility results on AAFB cultures can take several weeks) Tissue sections: tissue sections from Histology Dept UHL for Mycobacterium PCR can be referred by Microbiology to St James' University Hospital Leeds UK or Micropathology UK, following discussion with Consultant Microbiologist. Turnaround on these referrals can be approximately 8-10 days **Specimens are only referred in consultation with the consultant microbiologist.**
Ureaplasma urealyticum / parvum in genital specimens	
Specimen requirements and comments:	Specimen types – • Genital swab PCR/ NATT buffer (400uL) minimum • Straight urine in universal container • Charcoal swabs can be tested, but not preferred Samples are referred to: Micropathology Ltd, University of Warwick Science Park, Venture Centre, Sir William Lyons Road, Coventry, CV4 7EZ, United Kingdom www.micropathology.com Tel: +44 (0) 2476 323 222 Fax: +44 (0) 2476 323 333
Turnaround time:	2 days from day of receipt by the referral laboratory Mon-Thurs.
Special precautions:	Ensure that containers are labeled in accordance with the pathology specimen labeling policy.
Vancomycin Resistant Enterococci Screening	
	Refer to Infection Control Screening
Voriconazole Assay	
Specimen type:	Serum
Special requirements and comments:	Routine Microbiology request form, UHL Please take sample on a Monday or Tuesday morning to facilitate transport of samples to St James' on a Tuesday afternoon".

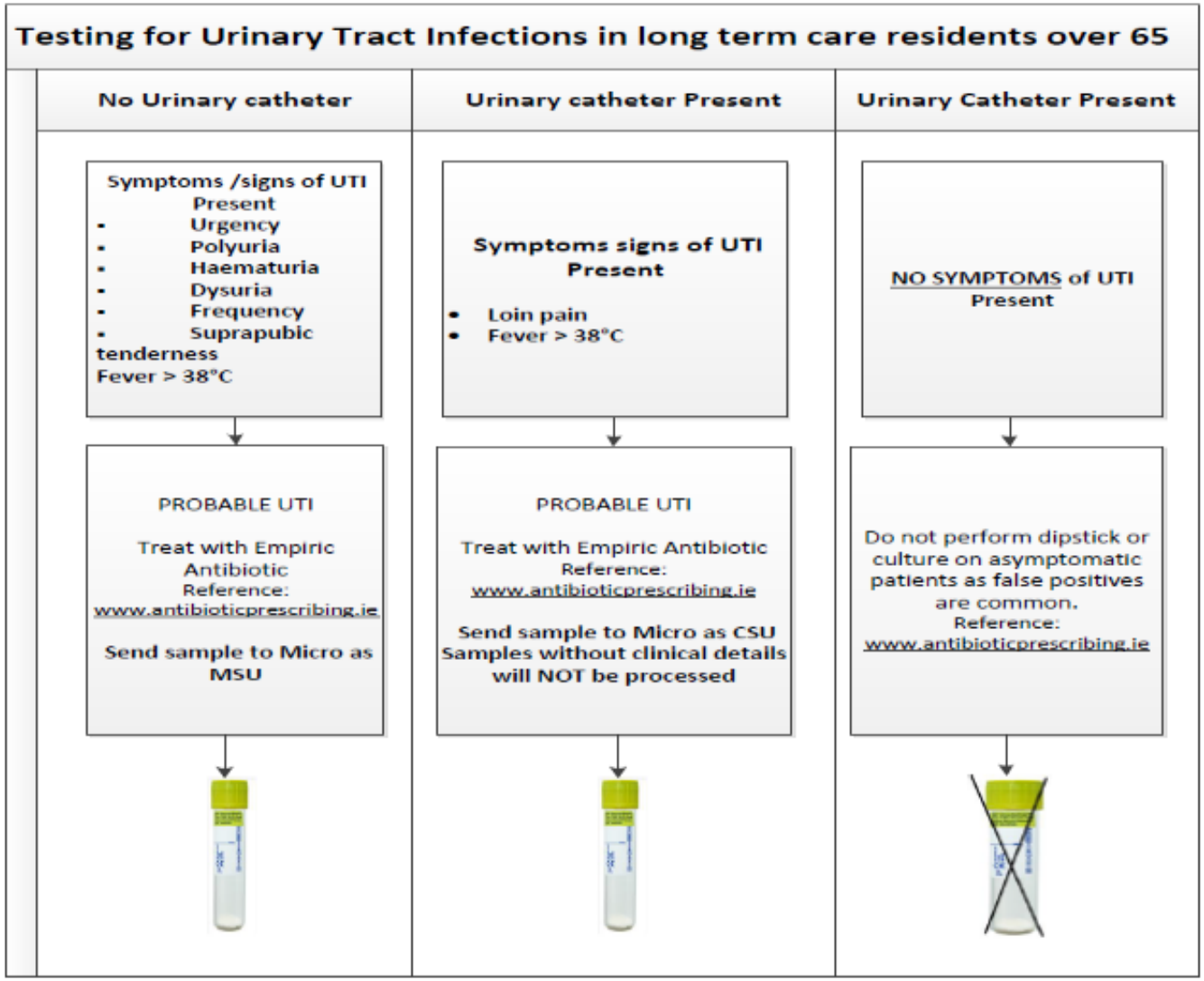
	Referral Laboratory: Biochemistry Laboratory, St James's Hospital, Dublin 8 Tel: 01 410300
Turnaround time:	5 Days, Test is performed on **Wednesday only**
Reference Interval:	The referral laboratory report provides appropriate reference values.
Urine Microscopy/ Culture (refer to TB section for TB requests on EMU)	
Specimen type:	MSU or bag specimen in 10ML BD VACUTAINER WITH BORIC ACD Sarstedt Monovette Z' 10mL urine **OR** BD Vacutainer® Urine Tube without boric acid, 9ml if very small volume of urine available (available only in Peadiatric wards) CSU specimens are only processed from the following wards: • Urology • ICU / HDU • Oncology **OR** Where the following clinical details are provided: • Dysuria • Fever / pyrexia • Haematuria • elevated systemic parameters • Part of septic screen • Sepsis • Rigors **Please Note:** Repeat Urine specimens submitted within 48 hours are **NOT** processed (Exceptions include Paediatric specimens and specimens submitted from UMH Limerick).
Specimen requirements:	**Please refer to algorithm below for guidance on when to take a sample from Adults in the community and long term care residents over 65.**

	10ML BD VACUTAINER WITH BORIC ACD Routine Samples: - Mid-stream urine (MSU), Clean-catch urine, Suprapubic aspirate, Catheter urine (CSU), Bag, Ileal conduit – urostomy urine, Cystoscopy urine, nephrostomy Sarstedt Monovette Z' 10mL urine **Note: Please refer to TB section for EMU for TB-** (preservative free containers only accepted for TB and 60ml volume over 3 consecutive days required) OR BD Vacutainer® Urine Tube without boric acid, 9ml if very small volume of urine available Mix well. Urine for *Schistosoma Haematobium* (bilharziasis) Total urine collected between 10.00 -14.00h into sterile containers without boric acid preservative is required. Refer to OCP section for further details
Specimen collection:	Please use BD urine collection kit with transfer straw 10ML BD VACUTAINER WITH BORIC ACD Sarstedt Monovette Z' 10mL urine **OR** BD Vacutainer® Urine Tube without boric acid, 9ml if very small volume of urine available Collect urine specimens by the clean-voided midstream technique, by diagnostic catheterization, by supra-pubic aspiration or from an in dwelling catheter. The first morning specimen is preferred. **Urinary catheter tips are not cultured** because the tip is contaminated as it is removed from the urethra. A pooled, 24-hour collection is unacceptable for culture, as is more than one specimen within 24 hours.
Sample volume:	9ml of sample in boric acid container is optimum for bacterial pathogen detection. A minimum of 2ml is required for microscopy.
Special precautions:	Specimens should be transported and processed within 4h if possible unless boric acid preservative is used. Urine specimens should be refrigerated at 2 - 8°C overnight if same day delivery to the laboratory is not possible • If boric acid is used it is important to mix well.
Turnaround time:	**Urgent Urine Microscopy: 4hours**

	Microscopy: 1 working day Negative culture: 1-2 working days Positive culture: 2-3 working days
Reference Interval:	**Urine Microscopy:** **Pyuria:** ≥10^4 WBC/ml is significant, although higher numbers of WBC (white blood cells) may be found in healthy, asymptomatic women. **Urine Bacterial Growth**: **Note:** Interpretation of culture results must be made with care. Some patient groups (children and dysuric women) may have significant growth at lower levels ≥10^2 cfu/ml than those quoted below. ≥10^5 cfu/mL colony forming units: consistent with infection ≤10^5 cfu/mL colony forming units: usually indicative of contamination 10^4-10^5 cfu/mL colony forming units of pure growth: evaluated based on clinical information or confirmed by repeat culture. **Ref:** PHE SMI B41 and PHE National User Manual U3 **Testing Algorithm: Testing for uncomplicated Urinary Tract Infection in ADULTS (>16 <65 Years old, no fever or flank pain)**


Severe or ≥ 3 symptoms / signs of UTI
Urgency
Polyuria
Haematuria
Dysuria
Frequency
Suprapubic tenderness
≤ 2 symptoms/ signs of UTI
Urgency
Polyuria
Haematuria
Dysuria
Frequency
Suprapubic tenderness
Use dipstick to rule out UTI
(Reference:
www.antibioticprescribing.ie)
PROBABLE UTI
Treat with Empiric Antibiotic
Reference:
www.antibioticprescribing.ie
DO NOT routinely send
sample to MICROBIOLOGY
PROBABLE UTI
Positive nitrite, and
leucocytes and blood
Or positive nitrite alone
Do NOT routinely send
sample to MICROBIOLOGY
Negative nitrite
Positive leucocyte
POSSIBLE UTI
Send sample to
MICROBIOLOGY
Negative nitrite,
leucocytes and blood
or
negative nitrite and
leucocyte
positive blood or protein
UTI UNLIKELY
Consider other diagnosis
Reassure and give advice on
Management of symptoms
DO NOT send sample to
MICROBIOLOGY

	Specific guidelines on testing and treatment are available for following patient populations from antibioticprescribing.ie (Section: Conditions and Treatments/Urinary) **Pyelonephritis** **Recurrent UTI in women** **UTI in Children** **UTI in long term care residents over 65** **UTI in pregnant women** **Exceptions to routine testing guideline in adults with probable or possible UTI** **Send a urine for culture in the following cases:** · failed antibiotic treatment or persistent symptoms · recent hospitalisation · Consider Males before treatment of UTI · Pyelonephritis **Diagnosis of UTI in patients > 65 years requires a combination of Reliable clinical signs** Only send urine for culture in patients who are symptomatic. Do not send urine for culture solely on the basis of urine odour or appearance


Testing for Urinary Tract Infections in long term care residents over 65
No Urinary catheter
Urinary catheter Present
Urinary Catheter Present
Symptoms /signs of UTI Present
Urgency
Polyuria
Haematuria
Dysuria
Frequency
Suprapubic tenderness
Fever > 38°C
Symptoms signs of UTI Present
Loin pain
Fever > 38°C
NO SYMPTOMS of UTI Present
PROBABLE UTI
Treat with Empiric Antibiotic
Reference:
www.antibioticprescribing.ie
Send sample to Micro as MSU
PROBABLE UTI
Treat with Empiric Antibiotic
Reference:
www.antibioticprescribing.ie
Send sample to Micro as CSU
Samples without clinical details will NOT be processed
Do not perform dipstick or culture on asymptomatic patients as false positives are common.
Reference:
www.antibioticprescribing.ie

	Diagnosis of UTI in patients > 65 years requires a combination of reliable clinical signs Only send urine for culture in patients who are symptomatic. Do not send urine for culture solely on the basis of urine odour or appearance. **Do not perform urine dipsticks on > 65 years without symptoms** Half of older adults, and most with a urinary catheter, will have bacteria present in the bladder/urine without an infection. This "asymptomatic bacteriuria" is not harmful, and although it causes a positive urine dipstick and culture, antibiotics are not beneficial, and may cause harm See Diagnosis & management of UTI in long term care residents on www.antibioticprescribing.ie (Section: Conditions and Treatments/Urinary)
Whipples disease:	
Special requirements and comments:	Refer to CSF
Whooping Cough	
Special requirements and comments:	Refer to Bordetella Pertussis
Wound	
Specimen type:	Skin / Superficial wound Abscesses Post operative Deep wound Ulcer swabs Drain fluids (Drain tips are not processed)
Specimen requirements:	Charcoal swab of pus or exudates. Samples of pus in a sterile leak-proof container is the preferred specimen. **Laboratory will not process any chronic ulcers or surgical wound swabs form non acute Hospitals unless the clinical criteria associated with infection as opposed to colonisation are clearly given on the request form.**
Sample Volume:	A minimum of 1ml of pus in a sterile leak-proof container.
Special precautions:	• Specimens should be transported and processed as soon as possible.

	• The volume of specimen influences the transport time that is acceptable. Large volumes of purulent material maintain the viability of anaerobes for longer. The recovery of anaerobes is compromised if the transport time exceeds 3h.
Turnaround time:	Aerobic culture: 2–3 working days 4-5 working days if AST is performed on fastidious pathogens Anaerobic culture: 5–7 days Swabbing dry crusted areas are unlikely to be helpful.
Additional information:	Specimens are processed according to the clinical details provided. Please provide clinical details. Swabs should not be repeated for testing unless there is a change in the clinical condition of the patient Anaerobic enrichment is only performed on samples of pus; please provide a sample of pus if available as opposed to sending a swab of pus. Ulcer swabs should not be submitted unless there is clinical evidence of infection. Anaerobic culture will not be performed unless there are appropriate clinical details to support this investigation **NB:** swabs are not recommended specimens for TB testing and will not be processed for same without agreement from the duty Clinical Microbiologist. **Please Note: Repeat wound swabs submitted within 48 hours are NOT processed.**

B. Serology / Virology

Acetylcholine Receptor Antibodies	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	*This test is referred to the Neurology Laboratory, Churchill Hospital, Oxford, UK* *Tel: +44 1865 225995* This test is not routinely available to general practitioners. Testing may be provided by arrangement only and following discussion with the Laboratory.
Turnaround time:	2-3 weeks
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
Repeat testing Interval:	Frequency determined by clinical context – every 6 months while on treatment
Adenovirus Stools	
Specimen type:	Fresh stool sample collected in a sterile leak-proof universal container (white cap).
Special requirements and comments:	All stool samples sent for the investigation of viral gastroenteritis will have a PCR assay performed for Adenovirus, Rotavirus, Norovirus, Sapovirus and Astrovirus. Samples should be collected during the acute phase of illness. The assay is intended for use with liquid/loose stool samples submitted from symptomatic patients for investigation of viral gastroenteritis. A minimum sample volume of 5g is required. **Notes:** 1. Testing is restricted to the acute hospital, long stay unit and residential unit settings 2. A positive PCR result indicates the presence of viral DNA/RNA. It does not distinguish between viable and non viable virus. Consequently, results must always be interpreted in conjunction with other clinical and laboratory data. 3. A result of DNA/RNA 'not detected' for the biological sample submitted for testing means that: Infection is not present, or infection is present but DNA/RNA are at a low level below the limit of detection of the assay, or the sample was submitted at a very early or late stage of infection therefore DNA/RNA is below the limit of assay detection, or DNA/RNA was not detected due to issues with inadequate/sub-optimal sample collection.

	If clinical presentation is not consistent with a result of 'DNA/RNA not detected' consider repeat testing or discuss further with the Clinical Microbiology team.
Turnaround time:	2 working days
Reference interval:	Detected / Not Detected Relevant interpretive comments are included on the report.
Repeat testing Interval:	Repeat testing to check for viral clearance is not indicated
Adenovirus Antibodies	
Special requirements and comments:	This test is only available in specific circumstances and with prior approval of the Consultant Microbiologist. Direct detection methods are recommended for the investigation of Adenovirus infection. *This test is referred to the BIOMNIS Laboratories, Dublin.* *Tel: 01 295 8545*
Specimen type:	Gel Serum (Brown Top)
Turnaround time:	Test Availability: By Arrangement
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
Adrenal Antibodies	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	Indications for testing and clinical information must be provided with the request. *This test is referred to the BIOMNIS Laboratories, Dublin. Tel: 01 295 8545*
Turnaround time:	2 - 3 weeks
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
Repeat testing Interval:	Repeat testing of limited value – frequency to be determined by clinical context

Amniotic Fluid PCR (Prenatal Screen)	
Special requirements and comments:	*Requests for prenatal screening of amniotic fluid test are referred directly from UMHL to a referral Laboratory, there is no interaction for this test with HSE MID WEST Pathology.* Refer to Fluids (Sterile) for fluid culture.
Amoeba Antibodies	
Specimen type:	Gel Serum (brown top).
Special requirements and comments:	Please provide relevant clinical details with request. This test is only available following prior arrangement with the Consultant Microbiologist. *This test is referred to the BIOMNIS Laboratories, Dublin.* *Tel: 01 295 8545*
Turnaround time:	1 - 2 weeks
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
ANA (Antinuclear Antibodies) / Autoantibodies	
Specimen type:	Gel Serum (Brown top)
Special requirements and comments:	Indications for the assessment of nuclear autoantibodies include the following features not explained by another cause. Requests for testing for nuclear autoantibodies should include one or more of the following or other relevant clinical details. (a) Evidence of inflammatory arthritis not consistent with rheumatoid/psoriatic arthritis (3 or more clinically inflamed swollen joints, small joint involvement, early morning stiffness) (b) Sicca syndrome (c) Photosensitive rash, Vasculitic rash, Discoid rash (d) Skin changes suggestive of scleroderma (e) Raynaud's phenomenon (f) Renal disease with evidence of renal inflammation on urine dipstick or microscopy (g) Clinical, laboratory or radiological evidence of myositis (h) Haemolytic anaemia, immune thrombocytopaenia, autoimmune neutropaenia

	(i) Pleurisy, pericarditis or other serositis (j) Symptoms or signs suggestive of autoimmune neurological disease (k) Clinical and laboratory evidence of autoimmune liver disease Assessment for nuclear autoantibodies is not indicated in settings such as "fatigue" and "arthralgia", not accompanied by any of the features outlined in (a) – (k) above. Reference: The Laboratory Services Reform Programme Advice note on Assessment of autoantibodies against nuclear antigens (ANA). **Note:** ANA testing should not be requested without a clinical evaluation that leads to a presumptive diagnosis. Samples which are ANA positive are automatically titrated and reflex testing for ENA and Anti-dsDNA is performed. ***Please note that ANA testing is not available outside routine working hours. Urgent testing will only be performed on the next working day***
Turnaround time:	3 working days
Reference interval:	Positive / Negative ANA titre and staining pattern are also reported Relevant interpretive comments are included on the report.
Repeat testing interval:	Generally, repeat ANA testing in patients who have tested negative for ANA in the past is not indicated. If the clinical course changes over time a repeat ANA test may be requested. With the exception of antibodies to dsDNA, variation in the titre levels of other antibodies to nuclear antigens has not been shown to provide useful clinical information. Therefore, repeating tests which were previously reported positive (other than Anti-dsDNA), is not indicated.
ANCA (p-ANCA/c-ANCA) Anti-Neutrophil Cytoplasmic Antibody	
Specimen type:	Gel Serum (Brown top)
Special requirements and comments:	All requests for ANCA serology must have clinical details provided on the request form. Requests should be supported by clinical data suggestive of an ANCA related vasculitis. ANCA should be requested ONLY in patients with the following present symptoms/symptom complexes (1):

	• Urinary findings suggestive of glomerulonephritis (e.g. blood +/- protein on urine dipstick) with or without co-existent declining eGFR • Pulmonary haemorrhage or pulmonary-renal syndrome • Cutaneous vasculitis with systemic features • Multiple lung nodules or other radiological evidence typical of AAV • Asthma with eosinophilia or other systemic features * • Chronic destructive disease of the upper airways • Long-standing sinusitis or otitis • Subglottic tracheal stenosis • Mononeuritis multiplex or other peripheral polyneuropathy • Retro-orbital mass • Scleritis • Altered cognitive function with systemic features * • Otherwise unexplained systemic disease * (* Typically would include, but not limited to, any of: unintentional weight loss, pyrexial >38°C, fevers, sweats, myalgia, arthralgia, raised CRP in absence of infection) (1) – Bossuyt et al. Revised 2017 *International consensus on testing of ANCA in granulomatosis with polyangiitis and microscopic polyangiitis Nat Rev Rheum 2017*
Turnaround time:	3 working days **Note:** Urgent ANCA testing is available by arrangement with the laboratory. Urgent testing is available only during the following hours: · 09:00 – 20:00 [Monday to Friday], · 09:00 – 13:00 [Saturdays] · 10:00 – 14:00 [Sundays & Bank Holidays]. Requests for urgent testing outside these hours cannot be facilitated.
Reference interval:	Positive / Negative

	ANCA titre and staining pattern are also reported ANCA positive samples are automatically reflex tested for Anti-MPO and Anti-PR3 Relevant interpretive comments are included on the report.
Repeat testing interval:	In cases of negative results: >3 weeks (if patient is symptomatic) In cases of ANCA positive results - On treatment: 6 months Off treatment: annually
Anti-HBsAg /Hepatitis B Vaccine Immunity screen	
Specimen type:	Gel Serum (brown top).
Special requirements and comments:	Hepatitis B immunity screen should be requested in the 'Investigations required' section of the Serology/Virology request form. Repeat requests for Immuno-competent individuals with previous results of >100 mIU/mL are not indicated. *Post –vaccination serological testing –* routine post-vaccination testing for anti-HBs is recommended 2 months after completing the course of vaccination for persons at risk of HBV exposure, e.g. health care workers, dialysis patients, sexual partners of HBsAg positive persons. This does not apply to children receiving routine childhood immunization with hepatitis B vaccine (Ref; Immunisation guidelines of Ireland, 2008)
Turnaround time:	1 working day Urgent requests are processed on the day of receipt.
Reference interval:	<10 mIU/mL: Non-immune >/=10 mIU/mL: Immune – No further action required. Relevant interpretive comments regarding further vaccination are included on the report.
Repeat testing interval:	A result of >/=10 mIU/mL is immune-competent - no further testing required (refer to the latest edition of the immunisation guidelines of Ireland for advice on vaccination in immuno-compromised groups, dialysis patients). https://www.hse.ie/eng/health/immunisation/hcpinfo/guidelines/immunisationguidelines.html
ASOT (Anti-Streptolysin O Titre)	
Specimen type:	Gel Serum (brown top).
Special requirements and comments:	Please provide relevant clinical details with request.

Turnaround time:	1 working day
Reference interval:	Adults: < 200 IU/mL Children: < 150 IU/mL Relevant interpretive comments are included on the report.
Repeat testing interval:	>2 weeks
Aspergillus Antigen (Galactomannan Test & PCR) & Fungal Serology	
Specimen type:	Gel Serum (brown top) - Galactomannan & B-D-GlucanTest 2 x EDTA (Violet Top) - Aspergillus PCR
Special requirements and comments:	**Note**s: *1.* Requests for Galactomannan, B-D-Glucan and Aspergillus PCR **must** be discussed with the Consultant Microbiologist / Infectious Diseases Consultant prior to requesting the test. 2. Requests for this Aspergillus PCR test are referred to PHE Mycology Reference Unit, Bristol, Tel: +44 117 342 5028 3. Requests for Galactomannan and B-D-Glucan are referred to the Serology Laboratory, St James' Hospital.. 4. A result of DNA/RNA 'not detected' for the biological sample submitted for testing means that:Infection is not present, or infection is present but DNA/RNA are at a low level below the limit of detection of the assay, or the sample was submitted at a very early or late stage of infection therefore DNA/RNA is below the limit of assay detection, or DNA/RNA was not detected due to issues with inadequate/sub-optimal sample collection. If clinical presentation is not consistent with a result of 'DNA/RNA not detected' consider repeat testing or discuss further with the Clinical Microbiology team.'
Turnaround time:	4-5 days for fungal serology tests 2 – 3 weeks for PCR
Reference interval:	The referral laboratory report provides appropriate ranges, interpretive comments and advice on frequency of retesting.
Aspergillus Precipitans	
Test information	This test is only available when ordered by a Consultant Respiratory Physicians in HSE MID WEST. Requests not ordered by a Consultant Respiratory Physician are only available following prior arrangement with the Respiratory team *Requests that are part of the Hypersensitivity Pneumonitis panel are sent to Biomnis Laboratories*

Atypical Pneumonia Screen	
Special requirements and comments:	Serology for Mycoplasma pneumonia and Chlamydia pneumonia is available by arrangement only following discussion with the Microbiologists. For inpatients molecular detection by PCR on a respiratory sample may be indicated – discuss with Microbiology Laboratory. A urine sample sent to the Microbiology Laboratory is recommended for the investigation of Legionella.
Avian Precipitins	
Special requirements and comments:	This test is only available when ordered by a Consultant Respiratory Physicians in HSE MID WEST. Requests not ordered by a Consultant Respiratory Physician are only available following prior arrangement with the Respiratory team *This test is referred to the BIOMNIS Laboratories, Dublin. Tel: 01 295 8545*
Specimen type:	Gel Serum (Brown top)
Turnaround time:	1 - 2 weeks
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
Repeat testing interval:	Not routinely required.
Anti-Phospholipase-A2-Receptor Antibodies	
Specimen type:	Gel Serum (brown top)
Special requirements and comments:	Indications for testing and clinical information must be provided with the request. This test is available to the renal consultants only. *This test is referred to the BIOMNIS Laboratories, Dublin.* *Tel: 01 295 8545*
Turnaround time:	1 - 2 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Repeat testing Interval:	Repeat testing of limited value – frequency to be determined by clinical context

Bartonella Antibodies (Cat Scratch Disease)	
Special requirements and comments:	Requests for *Bartonella* antibodies should be discussed with the Consultant Microbiologist / Infectious Diseases Consultant prior to requesting the test. Please provide relevant clinical details with request. *This test is referred to the BIOMNIS Laboratories, Dublin.* *Tel: 01 295 8545*
Specimen type:	Gel Serum (Brown top)
Turnaround time:	3 - 4 weeks
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
Bordetella pertussis Antibodies (IgM & IgG)	
Test information:	**Note:** A perinasal swab / Nasopharyngeal aspirate for culture is recommended for the investigation of *Bordetella pertussis* infection. Refer to Bordetella Pertussis
Specimen type:	Gel Serum (Brown top)
Special requirements and comments:	Serology testing is only available following prior arrangement with the Consultant Microbiologist. *This test is referred to the BIOMNIS Laboratories, Dublin.* *Tel: 01 295 8545*
Turnaround time:	1 - 2 weeks
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
Brucella Antibodies (IgG & IgM)	
Special requirements and comments:	Brucella serology is only available in specific circumstances and following prior arrangement and discussion with the Consultant Microbiologist. Requests for Brucella serology require a Brucella Diagnostic Unit request form. This form is available by contacting the laboratory. Requests will only be referred to the referral laboratory on receipt of the completed request form.

	This test is referred to the Brucella Reference Unit (BRU), Liverpool, UK *Tel: +44 151 706 4404*
Specimen type:	Gel Serum (Brown top)
Turnaround time:	2 – 3 weeks
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
Campylobacter jejuni Antibodies	
Serum sample (brown top).	Gel Serum (Brown Top).
Special requirements and comments:	Serology testing is only available following prior arrangement with the Consultant Microbiologist. *This test is referred to the BIOMNIS Laboratories, Dublin.Tel: 01 299 0650 / 01 295 8545*
Turnaround time:	2 - 3 weeks
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
Cardiac / Striated Muscle Antibodies	
Specimen type:	Gel Serum (Brown Top).
Special requirements and comments:	*This test is referred to the BIOMNIS Laboratories, Dublin.* *Tel: 01 295 8545*
Turnaround time:	2 - 3 weeks
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
Cardiolipin Antibodies / Phospholipid Antibodies	
Specimen type:	**Gel Serum (Brown Top).**

Special requirements and comments:	Requests for Cardiolipin are tested for IgG antibodies. All requests for Cardiolipin Antibodies / Phospholipid Antibodies are also tested for antibodies to ß2-Glycoprotein-1 IgG. This test is referred to the Immunology Laboratory, St. James Hospital, Tel. 01-4162925.
Turnaround time:	7 working days
Reference interval:	Positive / Negative Relevant interpretive comments are included on the report.
Repeat testing interval:	>1 year
CCP (Anti-Citric Citrullinated Peptide) Antibodies	
Specimen type:	Gel Serum (Brown Top).
Special requirements and comments:	Sample testing positive for Rheumatoid Factor are automatically reflex tested for anti-CCP antibodies.
Turnaround time:	2 working days
Reference interval:	>17 U/mL = Positive Relevant interpretive comments are included on the report.
Repeat testing interval:	>3 months
Chikungunya Serology	
Special requirements and comments:	**Note:** Requests for this test requires prior arrangement with the referral laboratory. *This test is referred to the National Virus Reference Laboratory, Dublin.* *Tel: 01 716 4414/ 716 4415*
Specimen type:	**Gel Serum (Brown Top).**
Turnaround time:	Test Availability: By Arrangement

Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
Chlamydia pneumoniae / Chlamydophila pneumoniae Antibodies	
Test information:	Serology testing is available by arrangement only following discussion with the Consultant Microbiologist. Molecular testing by PCR on respiratory samples may be considered in the inpatient setting following discussion with the Microbiology Laboratory.
Chlamydiae psittaci Antibodies	
Special requirements and comments:	Requests for this test **must** be discussed with the Consultant Microbiologist / Infectious Diseases Consultant prior to requesting the test. *This test is referred to the BIOMNIS Laboratories, Dublin.* *Tel: 01 295 8545*
Specimen type:	**Gel Serum (Brown Top).**
Turnaround time:	2 - 3 weeks
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
Chlamydia trachomatis Antibodies	
Special requirements and comments:	Serology test for Chlamydia trachomatis is no longer available. Please send a urine sample/urethral swab to the Microbiology Department. Refer to Chlamydia/GC STI Screening
Chromosome Studies (Cytogenetics) / DNA Studies (Molecular Genetics)	
Specimen type:	2 x Lithium Heparin (Green Top) / 2 x EDTA (Violet Top) Lithium Heparin samples are required for the following tests: Newborn chromosome analysis, Karyotyping, FISH analysis, Down Syndrome – Trisomy 21, Trisomy 18, Turner Syndrome, Prader-Willi Syndrome, Angelman Syndrome, Di George Syndrome, Williams Syndrome. EDTA samples are required for the following tests: Array CGH, DNA studies (Molecular genetics) for Fragile X, CF genotyping, Becker Muscular Dystropy, Friedrich's Ataxia, Marfan Syndrome, Myotonic Dystrophy, Rett Syndrome.

Special requirements and comments:	Clinical details must be provided with all requests for Cytogenetics and Molecular genetics. Samples should ideally be sent to Serology/Virology from Monday to Thursday. **Note:** Consent forms are **mandatory** for all requests for Cytogenetics and Molecular genetics. Consent forms are available from the Serology/Virology laboratory. Where testing will predict the inheritance of a disease in a healthy person (e.g. Huntington Disease) counseling and consent are mandatory. Pre-symptomatic tests require specific request and consent forms which can be obtained by contacting the Serology/Virology laboratory. *Adult requests for Chromosome studies / Karyotyping are referred to Biomnis Laboratories, France* *Tel: 01 295 8545* *Paediatric requests (< 18 years old) for Chromosome studies are referred to the Department of Clinical genetics, CHI, Crumlin* *Tel: 01 4096737*
Turnaround time:	BIOMNIS Cytogenetics requests – 6 - 8 weeks Paediatric Cytogenetics requests – 16 - 20 weeks Paediatric Molecular Genetics requests – 16 - 20 weeks
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
Repeat testing interval:	Performed only once
CMV Antibodies (IgG)	
Specimen type:	Gel Serum (Brown Top).
Turnaround time:	1 working day
Special requirements and comments:	Note: Repeat requests for Immuno-competent individuals with previous results of >6 AU/mL are not indicated.
Reference interval:	Negative / Positive Relevant interpretive comments are included on the report.
Repeat testing interval:	Once off for requests for CMV status

CMV Antibodies (IgM)	
Specimen type:	Gel Serum (Brown Top).
Special requirements and comments:	Note: A urine sample and EDTA sample for PCR taken within 3 weeks of birth is the suggested investigation for suspected neonatal CMV infection (see CMV Antigen (Urine) & CMV PCR). Samples should not be taken from patients receiving therapy with high biotin doses (i.e. > 5 mg/day) until at least 8 hours following the last biotin administration
Turnaround time:	1 working day Note: additional days are required for confirmation of positive/reactive samples. Positive samples are referred to NVRL, Dublin for further testing.
Reference interval:	Positive / Negative Relevant interpretive comments are included on the report.
CMV Antigen (Urine)	
Specimen type:	Urine collected in a sterile leak-proof container. Minimum volume = 1ml.
Special requirements and comments:	Samples should be sent immediately to Serology/Virology Monday to Friday (am) only. *This test is referred to the National Virus Reference Laboratory, Dublin.* *Tel: 01 716 4415 / 716 4414.*
Turnaround time:	1 - 2 weeks
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
CMV PCR / CMV Viral Load	
Specimen type:	2 x EDTA (Violet Top) Urine sample in neonate < 3 weeks' old
Special requirements and comments:	Samples should be sent immediately to Serology/Virology Monday to Friday (am) only. *This test is referred to the National Virus Reference Laboratory, Dublin.* *Tel: 01 716 4415 / 716 4414.*

Turnaround time:	1 - 2 weeks
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
Coeliac Screen (Tissue Transglutaminase IgA)	
Specimen type:	Gel Serum (Brown Top).
Special requirements and comments:	Tissue Transglutaminase IgA is the appropriate serological screening test for coeliac disease. Equivocal and positive anti-tTG samples will be automatically tested for anti-endomysial antibodies. IgA deficiency is present in approximately 1:30 patients with coeliac disease. If there is a high clinical suspicion of coeliac disease and the Anti-tTG IgA result is negative the patient should be investigated for IgA deficiency. A sample should be sent to the Biochemistry Laboratory for Immunoglobulins and SPEP. The laboratory will identify patients with an IgA deficiency who were TTG IgA negative and will automatically reflex test these for EMA IgG. EMA IgG tests are referred to the Immunology Lab, St. James Hospital, Dublin.
Turnaround time:	3 working days
Reference interval:	<20 RU/ml – Negative ≥20 RU/ml – Positive Relevant interpretive comments are included on the report.
Repeat testing interval:	Negative results: >3 months In diagnosed coeliac patients' follow-up IgA tTG can be used to monitor response to a gluten free diet. Adults: Retesting at 6–12 months depending on pretreatment value. Children: Retesting at 6 months in children
Complement Assay CH50/CH100	
Specimen type:	Gel Serum (Brown Top).
Special requirements and comments:	*This test is referred to the Immunology Lab, St. James Hospital, Tel. 01-4162925*

Turnaround time:	2 -4 weeks
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
Repeat testing Interval:	Performed once only
Covid-19 (SARS CoV-2)	
Special requirements and comments:	Viral swabs are available from the Laboratory by contacting the Laboratory Porter (see 'Ordering of Laboratory Supplies' in the introduction section of the manual). Viral swabs should be delivered to the laboratory as soon as possible after collection. Viral swabs may be refrigerated at 2 - 8°C overnight if same day delivery to the laboratory is not possible. 'Detected' results are indicative of SARS-CoV-2 RNA detection, but may not represent the presence of transmissible virus. A result of DNA/RNA 'not detected' for the biological sample submitted for testing means that: Infection is not present,or infection is present but DNA/RNA are at a low level below the limit of detection of the assay, or the sample was submitted at a very early or late stage of infection therefore DNA/RNA is below the limit of assay detection, or DNA/RNA was not detected due to issues with inadequate/sub-optimal sample collection. If clinical presentation is not consistent with a result of 'DNA/RNA not detected' consider repeat testing or discuss further with the Clinical Microbiology team If patient has had consecutive Not Detected swab results within the past 7 days and if further testing is deemed necessary, this must only be carried out on a lower respiratory tract specimen. Suggest discussion with the duty microbiologist. The molecular assay used at UHL for SARS CoV-2 RNA detection includes RSV RNA and Influenza A & B RNA. Therefore, requests for SARS CoV-2 during the winter repiratory virus season will be automatically tested for all 4 targets – Influenza A RNA; Influenza B RNA and RSV RNA and SARS-CoV2 RNA.
Specimen type:	Combined nasopharyngeal/throat swab, sputum sample (in-house patients only). Refer to Procedure for collecting Nasopharyngeal Swabs (NPS) for Respiratory Viruses. Note: The charcoal swab (Microbiology) is unsuitable for viral investigations.
Turnaround time:	In house testing: <24 hours [requests from UL Hospitals, residential care settings, hospital and community healthcare workers, post-mortem requests]
Reference interval:	Detected/ Not detected. Note - Negative results do not preclude infection and should not be used as the sole basis for treatment or other patient management decisions.

Coxsackie Antibodies	
Special requirements and comments:	Please note this test is only available following prior arrangement with the Consultant Microbiologist. *This test is referred to the BIOMNIS Laboratories, Dublin.* *Tel: 01 295 8545*
Specimen type:	Serum sample (brown top).
Turnaround time:	1 – 2 weeks
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
Coxsackie Virus	
Special requirements and comments:	Refer to: Enterovirus/Enterovirus Antibodies
Coxiella burnetti (Q-fever) IgM / IgG	
Specimen type:	Gel Serum (Brown Top).
Special requirements and comments:	Requests for *Coxiella burnetti* serology should be discussed with the Consultant Microbiologist or the Infectious Diseases consultant prior to requesting the test. Please provide relevant clinical details with request. This test is referred to the RIPL, UK PHE Laboratory, Porton Down. Tel: +44 1980 612224.
Turnaround time:	1 – 2 W.
Reference interval:	The referral laboratory report provides appropriate ranges, interpretive comments and advice on frequency of repeat testing.
Coxiella burnetti (Q-fever) PCR	

Specimen type:	Gel Serum (Brown Top).
Special requirements and comments:	Requests for *Coxiella burnetti* serology should be discussed with the Consultant Microbiologist or the Infectious Diseases consultant prior to requesting the test. Please provide relevant clinical details with request. *This test is referred to the SPRU, UK PHE Laboratory, Porton Down.Tel: +44 1980 612224.*
Turnaround time:	1 – 2 weeks
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
Dengue Virus Serology	
Special requirements and comments:	**Note:** Requests for this test requires prior arrangement with the referral laboratory. *This test is referred to the National Virus Reference Laboratory, Dublin.* *Tel: 01 716 4414/ 716 4415.*
Specimen type:	Gel Serum (Brown Top)
Turnaround time:	Test Availability: By Arrangement
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Diphtheria Antibodies	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	*This test is referred to the BIOMNIS Laboratories, Dublin.* *Tel: 01 295 8545* **Note:** Diphtheria antibody testing is used to check for vaccine related immunity and not for diagnostic purposes.
Turnaround time:	2 - 3 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
EBV (Epstein-Barr virus) Antibodies	
Specimen type:	Gel Serum (Brown Top)

Special requirements and comments:	**Note**: The EBV serology profile is an expensive, labour-intensive test and should not be employed as the 'front line' test for the diagnosis of infectious mononucleosis. In patients with symptoms compatible with infectious mononucleosis, a positive Paul-Bunnell heterophile antibody test (Monospot - Haematology) result is diagnostic, and no further testing is necessary. Refer to: Monospot (Infectious Mononucleosis) The EBV serology profile consists of three assays: EBV-CA IgG, EBV-CA IgM & EBNA-1 IgG
Turnaround time:	3 working days
Repeat testing Interval:	Once off for requests for EBV IgG status
Endomysial Antibodies	
Special requirements and comments:	Tissue Transglutaminase (Anti-tTG) has replaced Anti-Endomysial IgA (EMA) as the screening test for Coeliac Disease. All samples which are Anti-tTG positive are automatically reflex tested for Anti-EMA.
Specimen type:	Serum sample (brown top).
Turnaround time:	7 working days
Reference interval:	Positive / Negative Relevant interpretive comments are included on the report.
Repeat testing Interval:	Performed once only
Enterovirus/Enterovirus Antibodies	
Special requirements and comments:	Note: Serology for Enterovirus is no longer available. Direct methods of viral antigen detection – viral culture & viral PCR are the recommended tests for Enteroviruses. Please contact the laboratory, if necessary, for information on the appropriate sample required for the investigation of enteroviral infection. *Enterovirus requests are referred to the National Virus Reference Laboratory, Dublin.* *Tel: 01 716 4414/ 716 4415.*
Farmers lung (Micropolyspora faeni) Precipitins	
Special requirements and comments:	From July 1st 2014 Farmers lung precipitin testing is no longer available in the Serology/Virology Laboratory. For the investigation of Farmers lung quantitative serum IgE & IgG levels using the FEIA method should be requested. Requests are sent to the Immunology Laboratory, St James' Hospital.

GAD (Glutamic Acid Decarboxylase) Antibodies	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	Appropriate clinical details are required. *This test is referred to BIOMNIS Laboratories, Dublin (IDDM requests) or to the Neurology Laboratory Oxford for neurological GAD investigation.* *Biomnis Tel: 01 299 0650 / 01 295 8545* *Oxford Tel: +44 1865 225995* Requests for IDDM-1 antibody serology are part of a profile that includes anti-GAD anti-IA2A and anti-ZNT8. This test is not routinely available to general practitioners. Testing may be provided by arrangement only and following discussion with the Laboratory.
Turnaround time:	3 - 4 weeks
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
Repeat testing Interval:	Repeat testing not routinely required
GBM (Anti-Glomerular Basement Membrane) Antibodies	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	Appropriate clinical details are required.
Turnaround time:	7 working days **Note:** Urgent anti-GBM requests are available by arrangement with the laboratory. Urgent testing is available only during the following hours: - 09:00 – 20:00 [Monday to Friday], - 09:00 – 13:00 [Saturdays] - 10:00 – 14:00 [Sundays & Bank Holidays]. Requests for urgent testing outside these hours cannot be facilitated.

Reference range:	< 20 RU/mL – Negative ≥ 20 RU/mL – Positive Relevant interpretive comments are included on the report.
Repeat testing Interval:	In cases on anti-GBM positive results: every 3–6 months while on treatment
Genetic Screening	
Specimen requirements:	*See Chromosome Studies*
Gonococcal Complement Fixation Test (GCFT)	
Special requirements and comments:	Gonococcal complement fixation test (GCFT) is no longer available in the Serology/Virology Laboratory. Please send appropriate sample(s) to the Microbiology Laboratory for culture / molecular testing. Refer to:Chlamydia/GC Screening
Haemophilus Influenza B (HIB) Antibodies	
Special requirements and comments:	This test is available by arrangement only following discussion with the Consultant Microbiologist. This test is referred to the BIOMNIS Laboratories, Dublin. Tel: 01 299 0650 / 01 295 8545
Specimen type:	**Gel Serum (Brown Top)**
Turnaround time:	3 - 4 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Hantavirus Serology	
Special requirements and comments:	**Note:** Requests for this test requires prior arrangement with the referral laboratory. This test is referred to the National Virus Reference Laboratory, Dublin. Tel: 01 716 4414 / 01 716 4415
Specimen type:	Gel Serum (Brown Top)

Turnaround time:	Test Availability: By Arrangement
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Helicobacter pylori Antibodies	
Special requirements and comments:	The Helicobacter pylori serology test is no longer available. Refer to the:Helicobacter pylori Stool Antigen
Helicobacter pylori Stool Antigen	
Specimen type:	Fresh stool sample collected in a clean, sterile, leak-proof container. Please submit samples in a standard universal container (white cap). Note: Watery stool samples (composed mainly of fluid with little or no solid matter) are not suitable for analysis
Special requirements and comments:	A minimum sample volume of 5g is required. Samples should be submitted within 24 hours of collection. *Pre-treatment: Antimicrobials*, proton pump inhibitors and bismuth preparations are known to suppress H. pylori and ingestion of these prior to testing may give a false negative result. The aforementioned compounds should be discontinued 2 weeks prior to sample collection. *Post-treatment*: Testing to monitor the efficacy of eradication therapy should only be requested > 4 weeks after completion of therapy. As per ESPHGAN & NASPGHAN guidelines, testing for H pylori stool antigen in children and adolescents (<18 years of age) **is NOT** recommended. The stool antigen test does not differentiate between H pylori colonisation and H pylori infection. Endoscopic biopsy is the recommended diagnostic test for investigation of H pylori disease. This test is referred to the BIOMNIS Laboratories, Dublin.
Turnaround time:	7 working days
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.

Repeat testing Interval:	The negative predictive value of the stool antigen test is >95%. Therefore, provided sample collection complies with the pre and post treatment requirements, then there is no need to retest for H. pylori unless there is an imperative clinical requirement. Treat as functional dyspepsia. Low dose PPI or H2A for one month, then as required (BIA / *PHE* Guidelines).
Hepatitis Screen (Hepatitis A, B, C & E)	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	Testing for Hepatitis A Virus (HAV), Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), Hepatitis E (HEV), is recommended in patients in whom an abnormal liver chemistry profile (LCP) has been recorded, assuming no other obvious cause, and in those displaying signs or symptoms of acute hepatitis. HEV IgM testing is no longer routinely performed. If suspected please contact the laboratory to arrange testing. Abnormal LCP can be defined as an increase of twice the upper limit of the normal (ULN) range. Testing for HCV in those who do not necessarily have an abnormal LCP should be performed in accordance with the National HCV Screening Guidelines (2017). If at the time of presentation, the LCP abnormalities are known to be present for more than 6 months in an immunocompetent individual, then testing for HBV and HCV only is reasonable (with reflex testing for HDV if HBV infected). Ref: National Lab Handbook for Investigation of Viral Hepatitis (May 2018).
Turnaround time:	Hepatitis A,B,C – 1 working day. Urgent requests are processed within 4 hours of receipt. Hepatitis E – See below section Hepatitis E Virus (HEV) Antibodies **Note:** additional days are required for confirmation of positive/reactive samples.
Reference interval:	Positive / Negative Relevant interpretive comments are included on the report.
Hepatitis A Virus IgG Antibodies (Immunity Screen)	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	Please indicate ‘Immunity check’ in the clinical details section of the Serology/Virology request form. Samples should not be taken from patients receiving therapy with high biotin doses (i.e. > 5 mg/day) until at least 8 hours following the last biotin administration.
Turnaround time:	1 working day

Reference interval:	Positive / Negative Relevant interpretive comments are included on the report.
Repeat testing interval:	For positive results – performed once only.
Hepatitis A Virus IgM Antibodies	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	None **Limitation** A negative HAV IgM result on a sample taken within 5 days of onset of symptoms does not exclude recent HAV infection. HAV IgM can remain detectable for 6 months following primary infection. Samples should not be taken from patients receiving therapy with high biotin doses (i.e. > 5 mg/day) until at least 8 hours following the last biotin administration
Turnaround time:	1 working day
Reference interval:	Positive / Negative Relevant interpretive comments are included on the report.
Repeat testing Interval:	>1 week
Hepatitis B core Antibody (Anti-HBc)	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	None
Turnaround time:	1 working day Note: additional days are required for confirmation of positive/reactive samples.
Reference interval:	Positive / Negative Relevant interpretive comments are included on the report.

Repeat testing Interval:	For positive results – performed once only.
Hepatitis B Virus Antibody (Anti-HBs Immunity screen)	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	Hepatitis B immunity screen should be requested in the 'Investigations required' section of the Serology/Virology request form. Repeat requests for Immuno-competent individuals with previous results of >100 mIU/mL are not indicated.
Turnaround time:	1 working day
Reference interval:	<10 mIU/mL: Non-immune ≥10 mIU/mL: Immune – No further action required Relevant interpretive comments regarding further vaccination are included on the report.
Repeat testing interval:	A result of ≥10 mIU/mL in immune-competent - no further testing required (refer to the latest edition of the immunisation guidelines of Ireland for advice on vaccination in immuno-compromised groups, dialysis patients). https://www.hse.ie/eng/health/immunisation/hcpinfo/guidelines/immunisationguidelines.html
Hepatitis B Virus Quantitative PCR	
Specimen type:	2 X Gel Serum (Brown Top)
Special requirements and comments:	Requests for viral PCR must be separated and frozen within 6 hours of venepuncture. Please ensure arrangements are in place prior to taking samples to ensure that they can be submitted to the laboratory within this time frame. If samples are being sent for viral PCR outside core working hours the laboratory should be contacted in advance. See section on 'Out-of-Hours' service. *This test is referred to the National Virus Reference Laboratory, Dublin.* *Tel: 01 716 4414/ 716 4415*
Turnaround time:	2 - 3 weeks

Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
Hepatitis B Virus Surface Antigen (HBsAg)	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	Samples testing positive for HBsAg are tested for the appropriate markers of Hepatitis B infection (Anti-HBc, Anti-HBs, Anti-HBe, HBeAg and Anti-HBc IgM). All newly confirmed HBsAg positive samples are automatically tested for Hepatitis D. Requests for HDV are referred to NVRL, Dublin.
Turnaround time:	1 working day **Note:** additional days are required for confirmation of positive/reactive samples.
Reference interval:	Positive / Negative Relevant interpretive comments are included on the report.
Hepatitis C Virus Antibodies	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	Requests for HCV antigen testing will have HCV RNA testing performed. Samples should not be taken from patients receiving therapy with high biotin doses (i.e. > 5 mg/day) until at least 8 hours following the last biotin administration
Turnaround time:	1 working day Anti-HCV reactive / HCV RNA not detected results which have not been previously confirmed are referred for confirmation to the *National Virus Reference Laboratory, Dublin.* *Tel: 01 716 4414/ 716 4415* **Notes:** additional days are required for confirmation of new positive/reactive samples.
Reference interval:	Positive / Negative Relevant interpretive comments are included on the report.
Repeat testing Interval:	In cases of significant exposure to HCV positive material: · If negative test at 12 and 24 weeks for HCV antibody · Test for HCV RNA at 6 weeks and 12 weeks

Hepatitis C Virus PCR / Molecular Quantitative / Genotyping		
Specimen type:	For screening purposes – e.g. Haemodialysis –1 X EDTA/K2 Gel 4.9mL (Red Top) or alternatively an EDTA (Violet Top) is also suitable for testing For viral load and genotyping in patients that are viraemic - 2 X EDTA/K2 Gel 4.9mL (Red Top) or alternatively a 2 x EDTA (Violet Top)	
Special requirements and comments:	Requests for viral PCR must be separated and frozen within 24 hours of venepuncture. Please ensure arrangements are in place prior to taking samples to ensure that they can be submitted to the laboratory within this time frame. HCV RNA (viral load) testing and genotyping are used to inform the decision to initiate antiviral therapy and monitor treatment responses.	
Turnaround time:	PCR Testing - 2 working days Urgent requests are processed on the day of receipt Genotyping requests are referred to NVRL, Dublin with a turnaround time of 2 weeks	
Reference range:	The laboratory report provides appropriate ranges and interpretive comments.	
	Hepatitis C RNA Result	**Interpretation**
	Not detected	Target not detected
	<12 IU/mL <1.08 Log IU/mL	Detected <LLOQ*
	1.08 to 8.00 Log IU/mL	Quantitation value reported.
	>100,000,000 IU/mL >8.00 Log IU/mL	>ULOQ**
	* LLOQ Lower limit of quantitation **ULOQ Upper limit of quantitation	
Hepatitis Delta Virus (HDV) [Subviral Particle]		

Special requirements and comments:	**Note:** Hepatitis D (Delta) testing is performed automatically on all newly confirmed HBsAg positive samples. This test is referred to the National Virus Reference Laboratory, Dublin. Tel: 01 716 4414/ 716 4415
Specimen type:	Gel Serum (Brown Top)
Turnaround time:	1 - 2 weeks
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
Hepatitis E Virus (HEV) Antibodies	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	HEV IgM testing is no longer routinely performed. If suspected please contact the laboratory to arrange testing. Positive HEV IgM samples will be referred to NVRL for HEV RNA testing.
Turnaround time:	3 working days
Reference interval:	Positive / Negative Relevant interpretive comments are included on the report.
Repeat testing Interval:	>1 week
Herpes Simplex Virus 1 & 2 (Viral Culture / PCR)	
Specimen type:	Skin / lesion swab - Viral Transport Swab UTM (red cap)
	Note: The charcoal swab (Microbiology) is unsuitable for viral investigations.
Special requirements and comments:	Appropriate clinical details are required. **Note:** Viral transport swabs are available from the Laboratory by contacting the Laboratory Porter (see 'Ordering of Laboratory Supplies' in the introduction section of this user manual)

	Viral transport swabs should be delivered to the laboratory as soon as possible after collection. Viral transport swabs may be refrigerated at 2 - 8°C overnight if same day delivery to the laboratory is not possible. *This test is referred to the National Virus Reference Laboratory, Dublin.* *Tel: 01 716 4414/ 716 4415*
Turnaround time:	1 - 2 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Herpes simplex Virus 1 & 2 Serology	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	*This test is referred to the National Virus Reference Laboratory, Dublin.* *Tel: 01 716 4414/ 716 4415* **Note:** Herpes simplex virus serology is not recommended for investigation of HSV. Patients who are symptomatic should have a viral swab for Herpes simplex taken, or alternatively, should be referred to the Infectious Disease OPD / STI/GUM clinic, UHL. The clinical indication for HSV serology testing must be discussed with the Consultant Microbiologist / Infectious Diseases Consultant prior to submitting a request to the Laboratory.
Turnaround time:	1 – 2 weeks
Reference interval:	Positive / Negative
	Relevant interpretive comments are included on the report.
HIV 1 & 2 Antibody/Antigen	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	This test is an Immunoassay for the in vitro qualitative determination of HIV-1 p24 antigen and antibodies to HIV-1, including group O, and HIV-2 in human serum.
Turnaround time:	1 working day Urgent requests are processed within 4 hours of receipt. **Note:** additional days are required for confirmation of positive/reactive samples.

	HIV reactive samples are referred for confirmation and HIV typing to the *National Virus Reference Laboratory (NVRL), Dublin. Tel: 01 716 4414/ 716 4415*
Reference interval:	Nonreactive results are reported as 'Negative' (see guide below for interpretation and follow-up of negative results). Reactive results are reported as 'Preliminary Positive' and referred to NVRL for confirmation. A follow-up sample is requested Grayzone results are reported as 'Equivocal' and a follow-up sample is requested
Repeat testing Interval:	Interpretation and follow-up of HIV 'Negative' results (PHE Guideline V11): a) *Recent exposure but no HIV related signs or symptoms* – recommend retest according to the window period of infection. Refer to the BASHH statement on HIV seroconversion window period. Contact the Laboratory for further advice if required. b) *No known recent exposure and no HIV related signs or symptoms* – regular testing is recommended for those who remain at risk of infection. c) *HIV infection related signs or symptoms* – Please send a further sample taken at least 7 days after the most recent sample if HIV infection is still suspected.
HIV-1 PCR / Molecular Quantitative / Resistance testing	
Laboratory:	**Serology/Virology**
Specimen type:	For viral load and resistance testing in patients that are viraemic - 2 X EDTA/K2 Gel 4.9mL (Red Top) or alternatively a 2 x EDTA (Violet Top)
Special requirements and comments:	Requests for viral PCR must be separated and frozen within 24 hours of venepuncture. Please ensure arrangements are in place prior to taking samples to ensure that they can be submitted to the laboratory within this time frame. This assay is not intended to be used as a screening test for HIV-1.
Turnaround time:	PCR Testing - 2 working days. Urgent requests are processed on the day of receipt. Resistance testing requests are referred to NVRL, Dublin with a turnaround time of 2 weeks.
Reference range:	The laboratory report provides appropriate ranges and interpretive comments.

HIV-1 RNA Result	**Interpretation**
Not detected	Target not detected
<20 Copies/mL <1.3 Log Copies/mL	Detected <LLOQ*

	<table><tr><td></td><td></td></tr><tr><td>1.3 to 7.00 Log Copies/mL</td><td>Quantitation value reported.</td></tr><tr><td>>10,000,000 Copies/mL >7.00 Log Copies/mL</td><td>>ULOQ**</td></tr></table> *LLOQ= Lower limit of quantitation **ULOQ= Upper limit of quantitation
HLA Disease association (HLA-B27, HLA-B57:01, HLA-B51)	
Specimen type:	2 X EDTA (Violet Top) **Note:** HLA tissue typing requests for transplantation are handled by the Blood Transfusion Laboratory, UHL. Please refer to HLA Class I & II typing of transplant patients and family members
Special requirements and comments:	In order to select the most appropriate test, clinical information and reason for request must be included on the request form. The specific HLA disease association test should be specified on the request form. Indications for testing for HLA-B27 include features not explained by another cause, detailed below: A) Suspected ankylosing spondylitis / axial spondyloarthritis • Chronic (more than 3 months duration) back pain with onset before the age of 45 years and inflammatory features • Features suggestive of inflammatory back pain: Morning stiffness lasting more than 30minutes Improvement of pain and stiffness with exercise Night pain • Imaging findings suggestive of sacroiliitis or spinal inflammation • Known family history of spondylarthritis or other HLA-B27 associated disease in setting of a compatible clinical picture B) Peripheral features of spondyloarthritis • Enthesitis – inflammation of tendons or ligaments

	• Dactylitis • Oligoarthritis in young adults C) Recurrent acute anterior uveitis D) Suspected inflammatory arthritis in specific disease settings • Psoriasis with symptoms suggestive of axial involvement • Inflammatory bowel disease with symptoms suggestive of axial involvement or atypical peripheral arthritis • Reactive arthritis especially with a recurrent or chronic course *HLA disease association requests are referred to the Doctors Laboratory (TDL), London* via Eurofins Biomnis. *Tel: + 353 (0)1 2958545* (Eurofins, Biomnis)
Turnaround time:	1 - 2 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Repeat testing Interval:	Performed once only
HTLV (Human T-cell Lymphotropic Virus) Antibodies	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	Appropriate clinical details are required. *This test is referred to the National Virus Reference Laboratory, Dublin.* *Tel: 01 716 4414/ 716 4415.*
Turnaround time:	1 - 2 weeks
Reference interval:	The referral laboratory report provides appropriate ranges and interpretive comments.
Influenza A & B Antibodies	

Special requirements and comments:	Influenza A & B serology is no longer available. See Influenza Virus A & B PCR for details on testing for Influenza.
Hypersensitivity pneumonitis panel	
Specimen type:	Gel serum (Brown top)
Special requirements and comments:	This panel includes Avian precipitins, Farmers lung (Micropolyspora faeni) precipitins and Aspergillus precipitins This test profile is available to the Respiratory physicians at HSE MID WEST. Requests not ordered by a Respiratory Physician are only available following prior arrangement with the Respiratory team. *This test is referred to BIOMNIS laboratories, Dublin. Tel: 01 295 8545*
Turnaround time:	1-2 weeks
Influenza Virus A/B & RSV PCR	
Specimen type:	· In house testing – A nasopharyngeal swab (NPS) is the recommended sample type · Refer to Procedure for collecting Nasopharyngeal Swabs (NPS) for Respiratory Viruses · **Note**: The charcoal swab (Microbiology) is **unsuitable** for **viral** investigations.
Special requirements and comments:	· Samples should be taken before 6pm Monday-Friday and sent immediately to the Laboratory. · The molecular assay used at UHL for Influenza RNA detection includes RSV RNA and SARS-CoV2 RNA. Therefore, requests for either Influenza or RSV will be automatically tested for all 4 targets – Influenza A RNA; Influenza B RNA and RSV RNA and SARS-CoV2 RNA. · This test is available at weekends and public holidays by contacting a member of the 'on call' staff via the Microbiology Laboratory (061 482502). · **Testing for viral clearance is not indicated** · Nasopharyngeal swabs are available from the Laboratory by contacting the Laboratory Porter (see 'Ordering of Laboratory Supplies' in the introduction section of the manual). · Viral swabs should be delivered to the laboratory as soon as possible after collection. · Viral swa may be refrigerated at 2 - 8°C overnight if same day delivery to the laboratory is not possible. · Cross reaction with influenza strains included in the commonly used influenza vaccines may lead to false positive results. Paediatric patients who recently received influenza vaccination may be shedding for up to 3 weeks post vaccination.

	Note: Local testing is only available routinely during the respiratory season week 40 to week 20 of the following calendar year. The laboratory notifies the users regarding local testing availability each season.
Turnaround time:	UHL: 1 working day Urgent requests during routine working hours: TAT= 3hours
Reference range:	The 4PLEX PCR profile includes: Flu A RNA; Flu B RNA & RSV RNA and SARS-CoV2 RNA. Results are reported as Detected / Not Detected Note - Negative results do not preclude influenza virus infection and should not be used as the sole basis for treatment or other patient management decisions.
Repeat testing Interval:	Testing for viral clearance is not indicated
Insulin antibodies	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	Appropriate clinical details are required. This test is referred to the BIOMNIS Laboratories, Dublin. Tel: 01 299 0650 / 01 295 8545
Turnaround time:	2 - 3 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Repeat testing Interval:	Repeat testing not routinely required
Intrinsic Factor Antibodies	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	Requests for intrinsic factor are automatically tested for parietal cell antibodies.
Turnaround time:	7 working days

Reference range:	Positive / Negative Relevant interpretive comments are included on the report.
Repeat testing Interval:	Repeat testing not routinely required
Islet Cell Antibodies	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	Appropriate clinical details are required. *This test is referred to the BIOMNIS Laboratories, Dublin.* *Tel: 01 295 8545*
Turnaround time:	2 - 3 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Repeat testing Interval:	Repeat testing not routinely required
Legionella Antibodies	
Special requirements and comments:	Serology testing is available by arrangement only following discussion with the Consultant Microbiologist. *This test is referred to the BIOMNIS Laboratories, Dublin.* *Tel: 01 299 0650 / 01 295 8545* **Note – Legionella Urinary Antigen is the recommended test for the diagnosis of Legionella Infection.** Refer to Legionella Urinary Antigen
Specimen type:	Gel Serum (Brown Top)
Turnaround time:	2 – 3 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Leptospira Antibody (IgM)	

Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	Appropriate clinical details are required. *This test is referred to the National Virus Reference Laboratory, Dublin.Tel: 01 716 4414/ 716 4415.* Note: Positive / Reactive samples for *Leptospira* IgM are referred by NVRL for confirmation and typing to the Rare & Imported Pathogens Laboratory, PHE, Porton Down, UK Tel: +44 1980 612348
Turnaround time:	4 working days
	Turnaround time for referred requests for confirmation and typing: 2 – 3 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Liver-Kidney-Microsomes Antibodies (LKM)	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	Requests for anti-liver-kidney-microsomes (LKM) are automatically tested for anti-smooth muscle antibodies (ASMA), anti-mitochondrial antibodies (AMA) and anti nuclear antibodies (ANA)
Turnaround time:	3 working days
Reference range:	Positive / Negative Relevant interpretive comments are included on the report.
Repeat testing Interval:	Repeat testing of limited value – frequency to be determined by clinical context
Lyme Disease (Borrelia burgdorferi) Serology	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	This test is referred to the National Virus Reference Laboratory, Dublin.Tel: 01 716 4414/ 716 4415. **Notes:** · Erythema migrans (EM) is a clinical diagnosis. Antibody testing is NOT recommended in patients presenting with EM due to the low sensitivity of antibody testing in early lyme borreliosis (LB) · Serology testing is useful for the investigation of disseminated or late LB

	· Serology testing has a low Positive Predictive Value (PPV) when the *a priori* chance of LB is low Appropriate clinical details are required with all requests for Lyme serology. *Positive / Reactive samples are referred for confirmation to the Rare & Imported Pathogens Laboratory, PHE, Porton Down, UK. Tel: +44 1980 612100*
Turnaround time:	5 working days Turnaround time for referred confirmatory / follow-up results: 1 – 2 weeks
Reference interval:	Positive / Weak Positive / Negative Relevant interpretive and advice comments are included on the report.
Repeat testing Interval:	In cases of negative results: >2 weeks In cases of confirmed positive Lyme serology – no further antibody testing required.
Malaria Antibodies	
Special requirements and comments:	Note: This test has limited value in the diagnosis of patients with clinical symptoms of malaria. If patient is febrile the appropriate sample(s) should be sent to the Haematology Laboratory. Please refer to the Malaria Screen for further information. *This test is referred to the BIOMNIS Laboratories, Dublin.Tel: 01 295 8545*
Specimen type:	Gel Serum (Brown Top)
Turnaround time:	2 - 3 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Measles Antibodies (IgG)	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	Requests for patients previously reported Measles IgG positive should not be repeated. An appropriate comment will be attached to reports for unprocessed repeat requests for Measles IgG. **Note**: Evidence of protection for individuals born since 1978 is documented evidence of two doses of measles vaccine. Serology testing is not indicated.
Turnaround time:	7 working days

Reference range:	Positive / Negative / Borderline Borderline results are referred to *NVRL, Dublin. Tel: 01 716 4414/ 716 4415* Relevant interpretive comments are included on the report.
Repeat testing Interval:	Performed once only. Serology testing post vaccination is not indicated.
Measles Antibodies (IgM)	
Specimen type:	Gel Serum (Brown Top) / Saliva (Oral Fluid)
Special requirements and comments:	**Note:** Prior arrangement is required with the Consultant Microbiologist and the laboratory for all requests for Measles IgM, Tel: 061 482254. Saliva collection swabs are available from the Department of Public Health, Limerick. Tel: 061 483337. *Measles IgM requests are referred to the National Virus Reference Laboratory, Dublin. Tel: 01 716 4414/ 716 4415*
Turnaround time:	1 – 2 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Meningococcal Antibodies	
Special requirements and comments:	**Note:** Prior arrangement is required with the Consultant Microbiologist and the laboratory for all requests for Meningococcal antibodies, contact 061 482254. This test is referred to the *BIOMNIS Laboratories, Dublin.Tel: 01 299 0650 / 01 295 8545*
Specimen type:	Gel Serum (Brown Top)
Turnaround time:	3 - 4 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Mitochondrial Antibodies (AMA)	
Specimen type:	Gel Serum (Brown Top)

Special requirements and comments:	Requests for mitochondrial antibodies (AMA) are automatically tested for anti-smooth muscle antibodies (ASMA) and anti-liver-kidney-microsomes (LKM).
Turnaround time:	3 working days
Reference range:	Positive / Negative Relevant interpretive comments are included on the report.
Repeat testing Interval:	Repeat AMA testing is of limited value – frequency to be determined by clinical context Anti-M2 antibody testing is performed once only.
Mumps Antibodies (IgG)	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	Requests for patients previously reported Mumps IgG positive should not be repeated. An appropriate comment will be attached to reports for unprocessed repeat requests for Mumps IgG. **Note**: Evidence of protection for individuals born since 1978 is documented evidence of two doses of MMR. No Serology testing is necessary.
Turnaround time:	7 working days
Reference range:	Positive / Negative / Borderline Borderline results are referred to NVRL, Dublin. *Tel: 01 716 4414/ 716 4415* Relevant interpretive comments are included on the report.
Repeat testing Interval:	Performed once only. Serology testing post vaccination is not indicated.
Mpox [MPXV CLADE I & II]	
Specimen type:	Viral swab (Red Cap)
Special requirements and comments:	Notes: 1. The Microbiology team should be notified of all suspected cases of Mpox 2. The swab should be taken from a cutaneous lesion either ulcer or vesicular fluid if present. If there are concerns that patient is presenting during the prodromal stage and there are no cutaneous lesions, a throat swab may be taken instead. A negative result for

	the throat swab does not rule out mpox and clinical correlation is advised and a follow up swab sample is required if lesions develop. Otherwise follow-up samples from confirmed cases are not recommended 3. Clearly label the anatomical site of sample collection on both the swab and the laboratory request form 4. Double bag the sample at the point of collection in the clinic setting. Mpox requests are referred to the National Virus Reference Laboratory, Dublin. Tel: 01 716 4414/ 716 4415. NVRL will test VZV DNA and HSV 1 and HVS 2 DNA concurrently with Mpox requests
Turnaround time:	1 – 3 days
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Mumps Antibodies (IgM)	
Specimen type:	Gel Serum (Brown Top) / Saliva (Oral Fluid).
Special requirements and comments:	Appropriate clinical details are required on all requests for Mumps IgM. Saliva collection swabs are available from the Department of Public Health, Catherine Street, Limerick. Tel: 061 483337. *Mumps IgM saliva (oral fluid) requests are referred to the National Virus Reference Laboratory, Dublin. Tel: 01 716 4414/ 716 4415.*
Turnaround time:	Serum IgM Test: 7 working days Mumps IgM oral fluid test: 1 – 2 weeks
Reference range:	Positive / Negative Relevant interpretive comments are included on the report.
Repeat testing Interval:	>1 week
Mycoplasma pneumoniae Antibodies	
Specimen type:	Gel Serum (Brown Top)
Special requirements and comments:	Serology testing is available by arrangement only following discussion with the Consultant Microbiologist. Molecular testing by PCR on respiratory samples may be considered in the inpatient setting following discussion with the Microbiology Laboratory. See Sputum, Bronchoalveolar Lavage, and Associated Specimens

	Patients <20 years old Mycoplasma serology requests are referred to the National Virus Reference Laboratory, Dublin. Tel: 01 716 4414/ 716 4415. Requests for patients >20 years of age are referred to Biomnis Laboratories; *Tel: 01 299 0650 / 01 295 8545*
Turnaround time:	1 – 2 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Myositis panel	
Specimen type	Gel Serum (Brown top)
Specimen requirements and comments:	This test profile is available to the Rheumatology/ Respiratory physicians at HSE MID WEST. Requests not ordered by a Consultant Rheumatologist/ Respiratory Physician are only available following prior arrangement with the Consultant Rheumatologist/ Respiratory team. *This test is referred to the St James' Immunology Laboratory, Dublin. Tel: 01 4162907 / 01 4162928*
Turnaround time:	3 weeks
Neurological Antibodies	
Specimen type:	Gel Serum (Brown Top) Note: NMDA antibodies require paired serum & CSF
Special requirements and comments:	**Tests include:** Neuro-immunology diagnostics (including MuSK Abs; Voltage gated Ca2+ channel Abs; Voltage gated K+ channel Abs; Aquaporin-4 Abs; NMDA receptor Abs; Glycine receptor Abs; Ganglioside Abs; Myelin Associated Glycoprotein Abs, Neuronal Abs; Anti-Myelin Oligodendrocyte Abs; The tests list above require consultation with the neurology team prior to sending the request Any requests for neurology antibodies on CSF samples are only available to Consultant Neurologists and their team *Tests are referred to the Neurosciencses Lab, Oxford University Hospitals, England.*

	Tel: 00 44 1865 225995
Turnaround time:	2-4 weeks depending on the test.
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Repeat testing Interval:	Repeat testing of limited value – frequency to be determined by clinical context
Norovirus (Stools)	
Specimen type:	Fresh stool sample collected in a clean, sterile, leak-proof container.
Special requirements and comments:	All stool samples sent for the investigation of viral gastroenteritis will have a PCR assay performed for Adenovirus, Rotavirus, Norovirus, Sapovirus and Astrovirus. Samples should be collected during the acute phase of illness. The assay is intended for use with liquid/loose stool samples submitted from symptomatic patients for investigation of viral gastroenteritis. A minimum sample volume of 5g is required. **Notes:** 1. Testing is restricted to the acute hospital, long stay unit and residential unit settings 2. Urgent testing for Norovirus (stools) may be arranged through request from the Consultant Mircobiologist. 3. A positive PCR result indicates the presence of viral DNA/RNA. It does not distinguish between viable and non viable virus. Consequently, results must always be interpreted in conjunction with other clinical and laboratory data. 4. A result of DNA/RNA 'not detected' for the biological sample submitted for testing means that: Infection is not present,or infection is present but DNA/RNA are at a low level below the limit of detection of the assay, or the sample was submitted at a very early or late stage of infection therefore DNA/RNA is below the limit of assay detection, or DNA/RNA was not detected due to issues with inadequate/sub-optimal sample collection. If clinical presentation is not consistent with a result of 'DNA/RNA not detected' consider repeat testing or discuss further with the Clinical Microbiology team
Turnaround time:	2 working days
Reference range:	Detected / Not Detected Relevant interpretive comments are included on the report.
Repeat testing Interval:	Testing for viral clearance is not indicated

Parainfluenza Virus	
Specimen type:	Nasopharyngeal aspirate / viral swab
Special requirements and comments:	Samples should be taken before 3pm Monday-Friday and sent immediately to Serology /Virology.
Turnaround time:	1 working day
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Parietal Cell Antibodies	
Specimen type:	Gel Serum (brown top)
Special requirements and comments:	Requests for parietal cell antibodies are automatically tested for intrinsic factor antibodies.
Turnaround time:	7 working days
Reference range:	Positive / Negative Relevant interpretive comments are included on the report.
Repeat testing Interval:	Repeat testing is not routinely required
Parvovirus Antibodies (IgM & IgG)	
Specimen type:	Gel Serum (brown top)
Special requirements and comments:	Appropriate clinical details are required. *This test is referred to the National Virus Reference Laboratory, Dublin.Tel: 01 716 4414/ 716 4415.*
Turnaround time:	1 – 2 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.

Pemphigus / Pemphigoid Antibodies	
Specimen type:	Gel Serum (brown top)
Special requirements and comments:	Appropriate clinical details are required. *This test is referred to the St James' Immunology Laboratory, Dublin.* *Tel: 01 4162907 / 01 4162928*
Turnaround time:	1 - 2 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Repeat testing Interval:	On treatment: 6 months Off treatment: annually
Pneumococcal Antibodies	
Special requirements and comments:	Note 1: Pneumococcal Urinary Antigen is the recommended test for the diagnosis of Pneumococcal infection. **Note 2**: Pneumococcal antibody serology is **not recommended** for the investigation of pneumococcal infection. Measurement of specific pneumococcal antibodies is clinically useful in two settings: 1. To determine protective status (immunity) of patient. 2. To assess B-cell functionality in a patient with recurrent infection. *This test is referred to the BIOMNIS Laboratories, Dublin.* *Tel: 01 299 0650 / 01 295 8545*
Specimen type:	Gel Serum (brown top)
Turnaround time:	3 - 4 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Polio Virus Antibodies	

Special requirements and comments:	Polio virus serology is used to determine the immunity status of an individual as a result of either previous infection or previous vaccination. This test is **only available by arrangement** following discussion with the Consultant Microbiologist. *This test is referred to the BIOMNIS Laboratories, Dublin.* *Tel: 01 299 0650 / 01 295 8545* Note: The diagnostic test of choice for acute poliovirus infection is viral culture performed on two stool specimens collected 24 - 48 hours apart and within 14 days of the onset of paralysis (see Viral Studies - Stools).
Specimen type:	Gel Serum (brown top)
Turnaround time:	2 - 3 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Polyoma Virus (JC / BK)	
Specimen type(s):	• Gel Serum (brown top) • Urine sample collected in a sterile sealed container - Minimum volume required = 1ml. • CSF (Cerebrospinal Fluid).
Special requirements and comments:	Samples should be sent immediately to Serology / Virology. *This test is referred to the National Virus Reference Laboratory, Dublin.* *Tel: 01 716 4414/ 716 4415.*
Turnaround time:	1 - 2 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Purkinje Fibre Antibodies	
Specimen type:	Gel Serum (Brown Top);
Special requirements and comments:	Appropriate clinical details are required. *This test is referred to the BIOMNIS Laboratories, Dublin. Tel: 01 299 0650 / 01 295 8545*
Turnaround time:	3 - 4 weeks

Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Q-Fever Antibodies (Coxiella burnetti)	
Specimen type:	Gel Serum (Brown Top);
Special requirements and comments:	Samples for *Coxiella burnetti* IgM and/or IgG are referred to the RIPL, UK PHE Laboratory, Porton Down. Tel: +44 1980 612224. Requests for *Coxiella burnetti* should be discussed with the Consultant Microbiologist or the Infectious Diseases consultant prior to requesting the test.
Turnaround time:	1 – 2 weeks
Reference range:	The referral laboratory report provides appropriate ranges, interpretive comments and advice on frequency of retesting.
Quantiferon	
Specimen type:	Quantiferon –TB Gold (QFT®) tubes 1. Nil Control (Grey cap) 2. TB1 Antigen (Green cap) 3. TB2 Antigen (Yellow Cap) 4. Mitogen Control (Violet cap) Contact the Serology/Virology laboratory at Ext 2254 for collection packs
Indications for testing:	The QuantiFERON TB Gold Plus test is an indirect screening analysis for infection by M.tuberculosis which uses specific peptides from the M.tuberculosis complex (Ag TB). This test is recommended in the investigations of cases concerning patients aged from 5 years old and at 8-10 weeks after the last contact. Also In HIV-infected patients and before undergoing anti-TNF alpha treatment as well as for the monitoring of health professionals and recent migrants. The test is not recommended for the diagnosis of Tuberculosis, however, it may be helpful in some difficult cases. (HCSP 2011). **Please Note:** quantiferon testing is not routinely available to general practice. GPs may contact the testing laboratory Eurofins Biomnis to arrange sample collection and testing privately by this provider.
Special requirements and comments:	Samples are referred to: Eurofins, Biomnis Three Rock Rd, Sandyford Business Park, Sandyford, Dublin 18. Tel: + 353 (0)1 2958545 Samples should be taken early in the morning in order to be incubated by the laboratory prior to referral for testing.

	Specimen collection: · Label Tubes & the designated quantiferon request form appropriately, noting date & time sample taken. (there is no need to complete an additional UHL Serology/Virology request form) · Collect Blood by venipuncture. Fill all 4 tubes strictly to the black mark on the side of the tubes 1ml. NB. If using a butterfly needle, prime the line with a normal vacuette tube. · Immediately after filling the tubes, gently invert them end over end 10 times to ensure the entire surface of the tube is coated with blood. Antigens have been dried onto the inner wall of the blood collection tubes so it is essential that the contents of the tubes be thoroughly mixed with the blood. · The tubes must be transferred to a 37°C incubator in the laboratory as soon as possible after collection. Do not refrigerate or freeze the samples prior to transfer to the laboratory for incubation. Do not delay transport to the Laboratory to avoid delays in referral. · Samples received >16hrs after collection will be rejected. Any queries regarding the collection and transport of samples please phone the Serology/Virology Laboratory @ 061-482254
Assay Limitations:	Factors associated with false negative interferon-γ release assay results in patients with tuberculosis are advanced age and low peripheral lymphocyte counts
Turnaround time:	1-2 weeks from receipt of specimen. Results will be available on iLAB via LIS2LIS interfacing. The hardcopy referral report is also sent to the requestor.
Reference range:	The referral laboratory report provides appropriate ranges, interpretive comments and advice on frequency of retesting.
Rheumatoid Factor (RF)	
Specimen type:	Gel Serum (Brown Top);
Special requirements and comments:	Appropriate clinical details are required. Serial measurement of Rheumatoid Factor is not useful in monitoring the response to therapy. Where there is a strong clinical suspicion of Rheumatoid disease, and the RF is negative, anti-CCP testing should be requested. Samples testing RF positive are automatically reflex tested for anti-CCP antibodies.
Turnaround time:	1 working day
Reference range:	<14 IU/mL-Negative; 14-70 IU/mL-Weak positive; >70 IU/mL-Positive Relevant interpretive comments are included on the report.
Repeat testing Interval:	Repeat testing is not routinely required

Rotavirus (Stools)	
Specimen type:	Fresh stool sample collected in a clean, sterile, leak-proof container.
Special requirements and comments:	All stool samples sent for the investigation of viral gastroenteritis will have a PCR assay performed for Adenovirus, Rotavirus, Norovirus, Sapovirus and Astrovirus. Samples should be collected during the acute phase of illness. The assay is intended for use with liquid/loose stool samples submitted from symptomatic patients for investigation of viral gastroenteritis. A minimum sample volume of 5g is required. **Notes:** 1. Testing is restricted to the acute hospital, long stay unit and residential unit settings 2. A positive PCR result indicates the presence of viral DNA/RNA. It does not distinguish between viable and non viable virus. Consequently, results must always be interpreted in conjunction with other clinical and laboratory data. 3. A result of DNA/RNA 'not detected' for the biological sample submitted for testing means that: Infection is not present,or infection is present but DNA/RNA are at a low level below the limit of detection of the assay, or the sample was submitted at a very early or late stage of infection therefore DNA/RNA is below the limit of assay detection, or DNA/RNA was not detected due to issues with inadequate/sub-optimal sample collection. <u>If clinical presentation is not consistent with a result of 'DNA/RNA not detected' consider repeat testing or discuss further with the Clinical Microbiology team</u> 4. Rotavirus requests in paediatrics - the assay detects rotavirus strains included in the commonly used rotavirus vaccines – Rotarix® (GSK) and RotaTeq® (Merck). Patients who recently received rotavirus vaccination may be shedding the virus in stool for as long as 15 days post-vaccination. Therefore, recent vaccination must be considered when interpreting rotavirus positive results.
Turnaround time:	2 working days
Reference range:	Detected / Not Detected Relevant interpretive comments are included on the report.
Repeat testing Interval:	Testing for viral clearance is not indicated
RPR Test	
Special requirements and comments:	See Syphilis Antibodies
Repeat testing Interval:	Testing for viral clearance is not indicated

Respiratory Virus Panel - Molecular	
Specimen type:	· In house testing – A nasopharyngeal swab (NPS) is the required sample type · Refer to Procedure for collecting Nasopharyngeal Swabs (NPS) for Respiratory Viruses · **Note**: The charcoal swab (Microbiology) is **unsuitable** for **viral** investigations.
Special requirements and comments:	· The molecular assay used is a Film Array which includes Adenovirus, Coronavirus 229E, Coronavirus HKU1, Coronavirus NL63, Coronavirus OC43, SARS CoV-2, Human metapneumovirus, Human rhinovirus/enterovirus, Influenza A including subtypes H1, H3 and H1-2009, Influenza B, Parainfluenza Virus 1, Parainfluenza Virus 2, Parainfluenza Virus 3, Parainfluenza Virus 4, Respiratory Syncytial Virus. · Testing is available by arrangement following discussion with the Microbiology Clinical team. · This test is available at weekends and public holidays by contacting a member of the 'on call' staff via the Microbiology Laboratory (061 482502). · **Testing for viral clearance is not indicated** · Nasopharyngeal swabs are available from the Laboratory by contacting the Laboratory Porter (see 'Ordering of Laboratory Supplies' in the introduction section of the manual). · Viral swabs should be delivered to the laboratory as soon as possible after collection. · Viral swabs may be refrigerated at 2 - 8°C overnight if same day delivery to the laboratory is not possible. · Recent administration of nasal influenza vaccines (e.g. FluMist) prior to NPS specimen collection could lead to accurate virus detection of the viruses contained in the vaccine, but would not represent infection by those agents. A positive PCR result indicates the presence of viral DNA/RNA. It does not distinguish between viable and non viable virus. Consequently, results must always be interpreted in conjunction with other clinical and laboratory data. A result of DNA/RNA 'not detected' for the biological sample submitted for testing means that: Infection is not present,or infection is present but DNA/RNA are at a low level below the limit of detection of the assay, or the sample was submitted at a very early or late stage of infection therefore DNA/RNA is below the limit of assay detection, or DNA/RNA was not detected due to issues with inadequate/sub-optimal sample collection. If clinical presentation is not consistent with a result of 'DNA/RNA not detected' consider repeat testing or discuss further with the Clinical Microbiology team
Turnaround time:	UHL: 1 working day Urgent requests during routine working hours: TAT= 3hours NVRL: 2 working days

Reference range:	· Results are reported as Detected / Not Detected
Rubella IgG Antibodies	
Specimen type:	Gel Serum (Brown Top);
Special requirements and comments:	The assay used currently for Rubella IgG is the Roche Elecsys IgG assay. Results from assays of other manufacturers cannot be directly compared with one another. Samples should not be taken from patients receiving therapy with high biotin doses (i.e. > 5 mg/day) until at least 8 hours following the last biotin administration
Turnaround time:	1 working day
Reference range:	0 -5 IU/ml - Non Immune 6 -10 IU/ml - Immunity Doubtful >10 IU/ml - Immune Relevant interpretive comments are included on the report.
Repeat testing Interval:	Serology testing post vaccination is not indicated.
Rubella IgM Antibodies	
Specimen type:	Gel Serum (Brown Top);
Special requirements and comments:	Appropriate clinical details are required. Samples should not be taken from patients receiving therapy with high biotin doses (i.e. > 5 mg/day) until at least 8 hours following the last biotin administration. **Note:** Positive/Reactive samples are referred to the *National Virus Reference Laboratory, Dublin for confirmatory testing.* *Tel: 01 716 4414/ 716 4415.*
Turnaround time:	1 working day Turnaround time for Positive / Reactive results: 1 – 2 weeks
Reference range:	Positive / Negative Relevant interpretive comments are included on the report.

Repeat testing Interval:	>1 week
Sapovirus	
Specimen type:	Fresh stool sample collected in a sterile leak-proof universal container (white cap).
Special requirements and comments:	All stool samples sent for the investigation of viral gastroenteritis will have a PCR assay performed for Adenovirus, Rotavirus, Norovirus, Sapovirus and Astrovirus. Samples should be collected during the acute phase of illness. The assay is intended for use with liquid/loose stool samples submitted from symptomatic patients for investigation of viral gastroenteritis. A minimum sample volume of 5g is required. **Notes:** 1. Testing is restricted to the acute hospital, long stay unit and residential unit settings 2. A positive PCR result indicates the presence of viral DNA/RNA. It does not distinguish between viable and non viable virus. Consequently, results must always be interpreted in conjunction with other clinical and laboratory data. 3. A result of DNA/RNA 'not detected' for the biological sample submitted for testing means that: Infection is not present,or infection is present but DNA/RNA are at a low level below the limit of detection of the assay, or the sample was submitted at a very early or late stage of infection therefore DNA/RNA is below the limit of assay detection, or DNA/RNA was not detected due to issues with inadequate/sub-optimal sample collection. If clinical presentation is not consistent with a result of 'DNA/RNA not detected' consider repeat testing or discuss further with the Clinical Microbiology team
Turnaround time:	2 working days
Reference interval:	Detected / Not Detected Relevant interpretive comments are included on the report.
Repeat testing Interval:	Repeat testing to check for viral clearance is not indicated
Schistosomal Antibodies	
Specimen type:	Gel Serum (Brown Top);
Special requirements and comments:	This test is available by arrangement only following discussion with the Consultant Microbiologist. Appropriate clinical details are required. *This test is referred to the BIOMNIS Laboratories, Dublin. Tel: 01 295 8545*

Turnaround time:	2 - 3 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Smooth Muscle Antibodies	
Specimen type:	Gel Serum (Brown Top);
Special requirements and comments:	Requests for anti-smooth muscle antibodies (ASMA) are automatically tested for anti-liver-kidney-microsomes antibodies (LKM), anti-mitochondrial antibodies (AMA) & anti nuclear antibodies (ANA).
Turnaround time:	3 working days
Reference range:	Positive / Negative Relevant interpretive comments are included on the report.
Repeat testing Interval:	Repeat ASMA testing is of limited value – frequency to be determined by clinical context
Sperm Antibodies	
Specimen type:	Gel Serum sample (Brown Top).
Special requirements and comments:	*This test is referred to the BIOMNIS Laboratories, Dublin.* *Tel: 01 295 8545*
Turnaround time:	2 - 3 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Strongyloides Antibodies	
Special requirements and comments:	This test is available by arrangement only following discussion with the Consultant Microbiologist. Please provide relevant clinical details with request. *This test is referred to the BIOMNIS Laboratories, Dublin. Tel: 01 295 8545*
Specimen type:	Gel Serum sample (Brown Top).

Turnaround time:	2 - 3 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Syphilis (Treponema pallidum) Antibodies	
Specimen type:	Gel Serum sample (Brown Top).
Special requirements and comments:	**Note**: Confirmatory testing for positive / reactive Syphilis serology includes the RPR, TPHA and Syphilis IgM tests.
Turnaround time:	1 working day **Note:** An additional 8 days are required for confirmation of positive/reactive samples.
Reference range:	Positive / Negative Relevant interpretive comments are included on the report.
Repeat testing Interval:	>2 weeks
Tetanus Antibodies	
Specimen type:	Gel Serum sample (Brown Top).
Special requirements and comments:	Measurement of specific Tetanus antibodies is clinically useful in two settings: 1. To determine protective status (immunity) of patient. 2. To assess B-cell functionality in a patient with recurrent infection. *This test is referred to the BIOMNIS Laboratories, Dublin.* *Tel: 01 295 8545* **Note:** Tetanus antibody testing is used to check for vaccine related immunity and not for diagnostic purposes.
Turnaround time:	2 - 3 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.

Tissue Transglutaminase (Anti-tTG IgA) - Coeliac Screen	
Specimen type:	Gel Serum sample (Brown Top).
Special requirements and comments:	Tissue Transglutaminase IgA is the appropriate serological screening test for coeliac disease. Equivocal and positive anti-tTG samples will be automatically tested for anti-endomysial antibodies. IgA deficiency is present in approximately 1:30 patients with coeliac disease. If there is a high clinical suspicion of coeliac disease and the Anti-tTG IgA result is negative the patient should be investigated for IgA deficiency. A sample should be sent to the Biochemistry Laboratory for Immunoglobulins and SPEP. Refer to IgG, IgA, IgM The laboratory will identify patients with an IgA deficiency who were TTG IgA negative and will automatically reflex test these for EMA IgG. EMA IgG tests are referred to the Immunology Lab, St. James Hospital, Dublin.
Turnaround time:	3 working days
Reference range:	<20 RU/ml – Negative ≥20 RU/ml – Positive Relevant interpretive comments are included on the report.
Repeat testing Interval:	Negative results: >3 months In diagnosed coeliac patients follow-up IgA tTG can be used to monitor response to a gluten free diet. Adults: Retesting at 6–12 months depending on pretreatment value. Children: Retesting at 6 months in children
Toxocara Antibodies	
Special requirements and comments:	This test is available by arrangement only following discussion with the Consultant Microbiologist. Please provide relevant clinical details with request. *This test is referred to the BIOMNIS Laboratories, Dublin.* *Tel: 01 295 8545*
Specimen type:	Gel Serum sample (Brown Top).
Turnaround time:	2 - 3 weeks

Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Toxoplasma Antibodies (IgM & IgG)	
Specimen type:	Gel Serum sample (Brown Top).
Special requirements and comments:	Please provide relevant clinical details with request. Samples should not be taken from patients receiving therapy with high biotin doses (i.e. > 5 mg/day) until at least 8 hours following the last biotin administration **Note:** Positive / reactive Toxo IgM samples are referred to the National Virus Reference Laboratory and neonatal samples to the Toxoplasma Reference Unit, PHE Laboratory, Swansea, Wales. Tel: +44 1792 285055.
Turnaround time:	1 working day Turnaround time for referred confirmatory / follow up results: 1 - 2 weeks
Reference range:	Negative / Positive
	Relevant interpretive comments are included on the report.
Repeat testing Interval:	Positive IgG results – repeat testing not indicated
Toxoplasma PCR	
Specimen type:	2 x EDTA (Violet Top)
Special requirements andcomments:	Samples should be sent immediately to Serology /Virology. Requests for this test should be sent from Monday to Thursday only. *This test is referred to the Toxoplasma Reference Unit, Swansea. Tel: +44 1792 285055.*
Turnaround time:	2 - 3 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
TPHA Test	

Special requirements and comments:	See Syphilis Antibodies
Trichinella Antibodies	
Specimen type:	Gel Serum sample (Brown Top).
Special requirements and comments:	**Note**: Requests for Trichinella **must** be discussed with the Consultant Microbiologist / Infectious Diseases Consultant prior to requesting the test. Please provide relevant clinical details with request. *This test is referred to the BIOMNIS Laboratories, Dublin.* *Tel: 01 295 8545*
Turnaround time:	2 - 3 weeks
Reference range:	The referral laboratory report provides appropriate reference values.
Varicella Zoster (VZV) Antibodies (IgG)	
Specimen type:	Gel Serum sample (Brown Top)
Special requirements and comments:	· Requests for patients previously reported VZV IgG positive should not be repeated. An appropriate comment will be attached to reports for unprocessed repeat requests for VZV IgG. · VZV IgG serology is not performed as part on the routine antenatal screen · Samples from pregnant patients who have been in contact with varicella zoster are processed urgently and results are available within 24 -48 hours. The request must be marked as 'Urgent' and the laboratory should be contacted (061 482254) prior to sending the sample.
Turnaround time:	7 working days (routine requests) 48 hours (urgent requests)
Reference interval:	Positive / Negative / Borderline Borderline results are referred to NVRL, Dublin. *Tel: 01 716 4414/ 716 4415* Relevant interpretive comments are included on the report.

Repeat testing Interval:	Positive IgG results – repeat testing not indicated. Serology testing post vaccination is not indicated.
Varicella Zoster (VZV) Antibodies (IgM)	
Special requirements and comments:	** Requests for investigation for chicken pox / shingles should be based on direct detection methods by PCR with a viral swab of the vesicular fluid from the lesion. Direct detection of VZV DNA from vesicular fluid is the most sensitive method of detection. Up to 50% of patients with primary acute varicella fail to produce detectable IgM antibodies so a negative IgM does not exclude a diagnosis of chickenpox. Furthermore, VZV IgM testing is not recommended for the diagnosis of shingles (Herpes Zoster) due to the difficulty of result interpretation** VZV IgM testing is still available at the reference lab in cases where swabs of the lesion are not available. Testing will be by arrangement only with the duty Microbiologist.
Viral Culture (Stools)	
Specimen type:	Fresh stool sample collected in a clean, sterile, leak-proof container.
Special requirements and comments:	**Note:** Please specify viral pathogen of interest in the tests required section of the request form. *This test is referred to the National Virus Reference Laboratory, Dublin.* *Tel: 01 716 4415/ 716 4416.*
Turnaround time:	1 - 2 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Viral Culture (Swabs)	
Specimen type:	Viral Transport Swab **Note**: The charcoal swab (Microbiology) is **unsuitable** for **viral** investigations.
Special requirements and comments:	Please provide relevant clinical details with request. **Note:** Viral transport swabs are available from the Laboratory by contacting the Laboratory Porter (see ‘Ordering of Laboratory Supplies’ in the introduction section of the manual).

	Viral transport swabs should be delivered to the laboratory as soon as possible after collection. Viral transport swabs may be refrigerated at 2 - 8°C overnight if same day delivery to the laboratory is not possible. *This test is referred to the National Virus Reference Laboratory, Dublin.* *Tel: 01 716 4414/ 716 4415.*
Turnaround time:	1 - 2 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
West Nile Virus Serology	
Special requirements and comments:	**Note:** Requests for this test requires prior arrangement with the referral laboratory *This test is referred to the National Virus Reference Laboratory, Dublin.* *Tel: 01 716 4414/ 716 4415.*
Specimen type:	Gel Serum sample (Brown Top)
Turnaround time:	Test Availability: By Arrangement
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Widal Test	
Special requirements and comments:	Widal test for Salmonella antibodies is no longer available in the Serology/Virology Laboratory. Please send a stool sample and blood cultures to the Microbiology Laboratory. Refer to: Faeces.
Yersinia Abs	
Specimen type:	Gel Serum sample (Brown Top)
Special requirements and comments:	Indications for testing and clinical information must be provided with the request. *This test is referred to the BIOMNIS Laboratories, Dublin.* *Tel: 01 295 8545*

Turnaround time:	2 - 3 weeks
Reference range:	The referral laboratory report provides appropriate ranges and interpretive comments.
Zika Virus Testing	
Special requirements and comments:	Guidelines for the Laboratory Investigation of Zika Virus can be found on the HPSC website. Please refer to the section 'Guidance for Healthcare professionals' which gives details on who should be tested, the time frame for testing and the sample requirements – www.hpsc.ie It is advised that before submitting sample for Zika virus testing that the Lab should be contacted in advance to discuss indication for testing and sample requirements. Alternatively, the testing laboratory (NVRL, Dublin) may be contacted directly for advice: (01) 716 4414.

C. Biochemistry

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
ABG (Arterial Blood Gas)	Blood	Blood Gas Syringe	See Report	15 mins	UHL	No	Do not use Pneumatic Tube System Expel air, seal syringe and deliver to lab immediately.
ACE (Angiotensin Converting Enzyme)	Blood	Serum (Brown)	See Report	Contact Lab	Referred	Yes	Clinical indication: The main application of ACE testing is monitoring of patients diagnosed with sarcoidosis. However, ACE should not be used as a diagnostic test for sarcoidosis as it lacks sensitivity and specificity. ACE inhibitors e.g. captopril, enalapril may inhibit ACE activity.
ACTH (Adrenocorticotropic Hormone)	Blood	EDTA (Purple)	See Report	Contact Lab	Referred	No	Clinical indication: Second line test for the investigation of the aetiology of corticosteroid excess or deficiency. Patient must attend UHL Phlebotomy for sample collection. Transport immediately to lab.
Acylcarnitine	Blood	Lithium Heparin (Green)	See Report	Contact Lab	Referred	No	4 Blood spots on Metabolic dried blood spot card. Appropriate clinical detail required to process the request.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
AFP (Alpha Fetoprotein)	Blood	Lithium Heparin (Green) or Serum (Brown)	0 - 7.0 ng/mL	1 working day GP: 3 working days	UHL	Yes	Clinical indication: Aid in diagnosis and monitoring of hepatocellular carcinoma and non-seminomatous germ cell tumour. One of the component of 'triple test' for risk assessment of neural tube defect. Appropriate clinical details required. Alpha fetoprotein reference interval is for children >1 year and non-pregnant adults only. Method Used: Roche immunoassay. Biotin may cause some concentration dependent negative interference in this assay if high dose supplements are taken. If suspected, a repeat request 8 plus hours off Biotin is recommended in the first instance.
ALT (Alanine amino-transaminase)	Blood	Lithium Heparin (Green) or Serum (Brown)	Male: 10-50 U/L Female: 10-35 U/L	Urgent: 90 min Routine: 4 Hrs GP: 3 working days	UHL ENNIS NENAGH	Yes	Available as part of the liver profile. Clinical indication: For detection and monitoring of hepatocellular injury Haemolysis may invalidate results. Drug interference: Sulfasalazine, Sulfapyridine, Calcium Dobesilate, Hydroxocobalamin may cause analytical interference and give falsely low results.
Albumin	Blood	Lithium Heparin (Green) or	35-50 g/L	Urgent: 90mins Routine: 4 Hrs	UHL ENNIS NENAGH	Yes	Available as part of the liver and bone test profiles.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
		Serum (Brown)		GP: 3 working days			Clinical indication: Assessment of hydration, nutritional status, protein-losing disorders and liver disease.
Albumin	Fluid	Vacutainer (Brown)	N/A	1 working day	UHL	-	
Albumin: Creatinine Ratio (ACR)	Random Urine	Vacutainer (Brown)	Normal: <3.4 mg/mmol creatinine Moderate albuminuria: 3.4 -34.0 mg/mmol creatinine Clinical albuminuria: >34.0 mg/mmol creatinine	Routine: 24 Hrs GP: 3 working days	UHL	Yes	ACR is a calculated test. Clinical indication: Early detection of diabetic nephropathy; investigation and monitoring of renal disease. If patient has established proteinuria, there is no need to do an ACR Use first morning sample.
Alcohol (Ethanol)	Blood	Lithium Heparin (Green) or Serum (Brown)	0-10 mg/dL	Urgent: 90 mins	UHL	No	Only available to HSE MID WEST Consultants to assist in the clinical management of the patient in acute medical setting and is NOT provided for medico-legal purposes. Clinical indication: To aid in the diagnosis and treatment of alcohol intoxication or poisoning in individuals with suspected exposure. For diagnostic purposes, the results should always be assessed in conjunction with the patient's medical history, clinical examination and other findings.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							Do not use alcohol swabs to clean venepuncture site. Suitable for add-on up to 4 hours post sample collection.
Aldosterone Aldosterone ctd.	Blood	EDTA (Purple) 2 X EDTA samples if aldosterone/renin ratio is required.	See Report	Contact Lab	Referred	No	Clinical indication: For investigation of secondary hypertension such as suspected primary Hyperaldosteronism (Conn's syndrome), which is commonly, but not invariably associated with hypokalaemia. Plasma aldosterone/renin ratio is of greater diagnostic value than either test alone and used as first line screening test for primary hyperaldosteronism. Patient must attend UHL Phlebotomy for sample collection. Blood should ideally be collected after the patient has been seated for 10 minutes. Sample must be transported to lab immediately. Please state posture (i.e. Supine or Erect). Include details of any hypertensive medication as this may affect interpretation of the aldosterone/renin ratio (ARR). Refer to Endocrine Society Guidelines for further information: https://academic.oup.com/jcem/article/93/9/3266/2596343

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
Aldosterone	Urine	24hr Plain Collection	See Report	Contact Lab	Referred	No	Urine collection bottle and request form must be clearly labelled with patient name and hospital number. The date and time of the start and finish of the 24-hour urine collection must be clearly indicated.
ALP (Alkaline Phosphatase) ALP ctd.	Blood	Lithium Heparin (Green) or Serum (Brown)	Children (Male & Female) 0-14D 83-248 U/L 15D - <1Y 122-469 U/L 1Y - <10Y 142-335 U/L 10Y - <13 129-417 U/L Children(Male) 13Y - <15Y 116-468 U/L 15Y - <17Y 82-331 U/L 17Y - <19Y 55-149 U/L Children(Female) 13Y - <15Y 57-254 U/L 15Y- <17Y 50-117 U/L 17Y - <19Y 45-87 U/L Adult (Male) 40-129 U/L Adult (Female) 35-104 U/L	Routine: 4 Hrs GP: 3 working days	UHL ENNIS NENAGH	Yes	Assay is available as part of the liver and bone profiles.
Alkaline Phosphatase isoenzymes	Blood	Serum (Brown)	See Report	Contact Lab	Referred	No	Appropriate clinical details are required. Only available if alkaline phosphatase is raised. Requires prior arrangement with Biochemistry Lab.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
Alpha-1-antitrypsin	Blood	Lithium Heparin (Green) or Serum (Brown)	0.9-2.0 g/L	1 working day GP: 3 working days	UHL	Yes	Clinical indication: Evaulation of COAD, emphysema and liver disease. Alpha 1 Antitrypsin is an acute phase reactant; it may increase with inflammation. This should be considered when interpreting the result. Measurement of A1AT may prompt further testing for A1AT phenotyping, if A1AT level is ≤0.9 g/L. Samples are referred to Alpha One Foundation Ireland for A1AT phenotyping
Alpha-1-antitrypsin phenotyping	Blood	Lithium Heparin (Green) or Serum (Brown)	See Report	Contact Lab	Referred	Yes	Alpha-1-Antitrypsin level required with referral.
Aluminium	Blood	Orange (LiH) Trace Metal Tube. Metal Free Needle	See Report	Contact Lab	Referred	No	Clinical indication: Monitoring renal dialysis patients. The specimen should be collected first if other tests are requested to avoid contamination. Metal free needle and sample tube must be used. This test is restricted to HSE MID WEST consultants only.
Amikacin Antibiotic Assay	Blood	Serum (Brown)	a) Aminoglycoside – Once daily dosing / Extended Interval / Pulse Dosing Trough Amikacin < 5 mg/L	Urgent : 90 mins	UHL	No	Random levels are not recommended by the consultant microbiologist because of difficulty with interpretation

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
			NB: Trough should not exceed above levels. Please refer to the UHL Adult and Paediatric Antimicrobial Guidelines for further details on dosage requirements Post dose/peak levels are rarely required for amikacin. In exceptional circumstance (eg NTM) post-dose/peak levels may be necessary. Refer to prescribing team or pharmacy for advice on the appropriate range for both pre and post dose levels in these patients				Pre-dose (Trough) Level: Blood samples should be taken 18 – 24 hrs after the previous dose. Inactivation of aminoglycosides by ß-lactam antibiotics occurs; as a result, it is recommended that if samples for aminoglycoside estimation cannot be assayed immediately, they should be stored at 0°C - 5°C. See HSE Mid West EOLAS antimicrobial app and antimicrobial guidelines on Intranet (IHUB) for further information. A separate serum sample must be submitted for Amikacin testing. Assay testing will not be performed on routine biochemistry requests
Amino acids	Blood	Lithium Heparin (Green)	See Report	Contact Lab	Referred	No	Appropriate clinical details required to process this request. Sample must be sent to lab immediately.
Amino acids	Urine	Vacutainer (Brown) Or Universal Container	See Report	Contact Lab	Referred	No	Appropriate clinical details required to process this request. Sample must be sent to lab immediately.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
Amino acids	CSF	Universal Container	See Report	Contact Lab	Referred	No	Transport to lab immediately. Do not use pneumatic tube system for CSF sample. Must be accompanied by Lithium Heparin (Green) sample for plasma Amino Acids. Appropriate clinical details required to process this request.
Aminolevulinic acid or delta aminolevulinic acid (ALA)	Urine (random)	Vacutainer (Brown)	See Report	Contact Lab	Referred	No	Protect the sample from light (wrapped in aluminium foil) and keep refrigerated at 4-8°C. Appropriate clinical details are required.
Ammonia	Blood	EDTA (Purple)	µmol/L 0 day – 4 weeks 0.0-100.0 >4 week – 16 years 0.0-50.0 Adult > 16 years 0.0-50.0	Urgent: 90mins	UHL	No	Clinical indication: encephalopathy, suspected inborn error of metabolism Significant hyperammonaemia is usually seen in patients presenting with metabolic decompensation due to urea cycle defects, organic acidaemias, fatty acid oxidation defects and Reye's syndrome. Transport to lab immediately; delay may result in a falsely raised ammonia result. Initial high ammonia result should be confirmed by repeat sample as soon as possible.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							Preterm/sick babies may have ammonia concentration up to 150 umol/L Haemolysis affects reliability of the result. **Not suitable for add-on.**
Amylase	Blood	Lithium Heparin (Green) or Serum (Brown)	28-100 U/L	Urgent: 90mins Routine: 4 Hrs GP: 3 working days	UHL ENNIS NENAGH	Yes	Amylase is now measured instead of Lipase to prevent delay in diagnosis of acute pancreatitis. Lipase not routinely available.
Amylase	Fluid	Vacutainer (Brown)	N/A	1 working day	UHL	-	Clinical indication: Diagnosis of suspected acute pancreatitis. The source of the fluid i.e. pleural, ascitic must be stated on the request form. All effusions should be accompanied by a paired serum sample. Measurement of amylase in fluids has not been validated and is not CE marked
Amylase	Urine (random)	Vacutainer (Brown)	Male: 16-491 U/L Female: 21-447 U/L	Urgent: 90mins Routine: 1 working day	UHL	Yes	Clinical indication: In patient with strong suspicion of acute pancreatitis with normal serum amylase, urine amylase may be measured to identify a delayed presentation.
Amyloid A protein	Blood	Serum (Brown)	See Report	Contact Lab	Referred	No	Appropriate clinical details required
Androstenedione	Blood	Serum (Brown)	See Report	Contact Lab	Referred	Yes	Appropriate clinical details required.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							Clinical indication: Investigation for Hirsutism/virilisation, infertility, precocious puberty and menstrual disorder
Anti-Mullerian Hormone (AMH)	Blood	Lithium Heparin (Green) or Serum (Brown)	See Report	Contact Lab	Referred	No	Clinical indication: For evaluation of ovarian reserve. AMH level remains relatively stable throughout menstrual cycle. Please provide appropriate clinical details. This test is restricted to HSE MID WEST Consultants.
AST (Aspartate amino-transaminase)	Blood	Lithium Heparin (Green) or Serum (Brown)	Male 10-50 U/L Female 10-35 U/L	Urgent: 90 min Routine: 4 Hrs GP: 3 working days	UHL ENNIS	Yes	Clinical indication: Raised in cardiac and skeletal muscle and liver damage. Drug interference: Sulfasalazine or Sulfapyridine and Hydroxocobalamin may cause analytical interference and give falsely low results. Haemolysis invalidates AST result.
Beta-2 microglobulin	Blood	Serum (Brown)	See Report	Contact Lab	Referred	No	
Beta-hydroxy butyrate	Blood	Fluoride oxalate (Grey)	See Report	Contact Lab	Referred	No	Sample must be brought to lab immediately after collection.
Beta Trace protein (Prostaglandin D2 Synthetase)	Nasal or ear fluid	Universal Container	See Report	Contact Lab	Referred	No	Must be accompanied by paired serum sample (Brown)

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							This protein is only present in CSF. Detection of this protein is helpful in suspected CSF leak.
Bicarbonate (Carbon dioxide, TCO_2)	Blood	Lithium Heparin (Green) or Serum* (Brown)	22-29 mmol/L	Urgent: 90mins Routine: 4 Hrs	UHL NENAGH ENNIS*	No	Clinical indication: To evaluate acid base status Blood sample to be received in the laboratory within one hour of collection. *Serum only accepted in Ennis for this test.
Bile Acids	Blood	Serum (Brown)	See Report	1 working day	UHL	No	Clinical indication: Measured in cholestasis of pregnancy. Bile acids are increased after meal therefore **sample should be collected after overnight fast.**
Bilirubin (Total)	Blood	Lithium Heparin (Green) or Serum (Brown)	14Day - Adults 3-21 µmol/L Neonates: Total bilirubin result should be interpreted as per local agreed clinical decision limits and guidelines	Urgent: 90mins Routine: 4 Hrs GP: 3 working days	UHL ENNIS NENAGH	Yes	Clinical indication: Investigation and monitoring of hepatobiliary disease and haemolytic disorders Samples should be protected from light. Haemolysis invalidates result. Also available as a part of liver profile.
Bilirubin (Direct)	Blood	Lithium Heparin (Green) or Serum (Brown)	2-5 µmol/L	Urgent: 90mins Routine: 4 Hrs GP: 3 working days	UHL	Yes	Samples should be protected from bright light. Measurement available when Total Bilirubin is raised. Haemolysis invalidates Direct bilirubin result.
Biotinidase	Blood	Lithium Heparin (Green)	See Report	Contact Lab	Referred	No	The specimen should be brought to the laboratory immediately. Separate and freeze the plasma immediately on receipt.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							Appropriate clinical details are required to process the request.
Bone Profile **(Ca, adjusted Ca, PHOS, ALKP, ALB**	Blood	Lithium Heparin (Green) or Serum (Brown)	See individual tests	Urgent: 90mins Routine: 4 Hrs GP: 3 working days	UHL ENNIS NENAGH	Yes	
BRCA (germline testing)	Blood	EDTA (Purple)	See Report	Contact lab	Referred	No	This test is referred to Beaumont Hospital Molecular Pathology Laboratory, Beaumont Hospital, Dublin 9, D09 V2N0 Please complete appropriate form. Note BRCA tumour testing is processed in Histopathology Department.
C1 esterase inhibitor concentration	Blood	Serum (Brown)	See Report	Contact Lab	Referred	Yes	Clinical indication: Aid in diagnosing Hereditory Angioedema. Transport to lab immediately.
C1 esterase inhibitor: functional assay	Blood	Sodium citrate tube (Blue) + Serum (Brown)	See Report	Contact Lab	Referred	No	Clinical indication: Useful in diagnosing Hereditory Angioedema in patients that have normal or elevated C1 Esterase Inhibitor levels. Transport to lab immediately.
C3 Complement	Blood	Lithium Heparin (Green) or Serum (Brown)	0.9-1.8 g/L	1 working day GP: 3 working days	UHL	Yes	

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
C4 Complement	Blood	Lithium Heparin (Green) or Serum (Brown)	0.10-0.40 g/L	1 working day GP: 3 working days	UHL	Yes	
CA 125 CA 125 (contd)	Blood	Lithium Heparin (Green) or Serum (Brown)	0-35 kU/L	1 working day GP: 3 working days	UHL	Yes	Do not request tumour markers for health screening. Method used: Roche immunoassay. Biotin may cause concentration dependent negative interference in this assay if high dose supplements are taken. If suspected, a repeat 8 plus hours off Biotin is recommended in the first instance Please refer to Ovarian Cancer GP Referral Guidelines for symptomatic women. https://www.hse.ie/eng/services/list/5/cancer/profinfo/resources/gpreferrals/ovarian-cancer-referral-guidelines.pdf
CA 15-3	Blood	Lithium Heparin (Green) or Serum (Brown)	0-35 kU/L	1 working day GP: 3 working days	UHL	Yes	Clinical indication: Not indicated for cancer screening. May be useful to monitor breast cancer recurrence and response to treatment. Appropriate clinical details required. Method used: Roche immunoassay. Biotin may cause concentration dependent negative interference in this assay. If patient is on high dose biotin

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							collect sample at least 8 hours after the last dose.
CA 19-9	Blood	Lithium Heparin (Green) or Serum (Brown)	0-27 kU/L	1 working day GP: 3 working days	UHL	Yes	Clinical indication: As a potential adjunct for diagnosis and monitoring of pancreatic cancer. May be elevated in cholangiocarcinoma, gastric and colorectal carcinoma Do not request tumour markers for health screening. Method used: Roche immunoassay. Biotin may cause concentration dependent negative interference in this assay. If patient is on high dose biotin collect sample at least 8 hours after the last dose.
Caeruloplasmin	Blood	Lithium Heparin (Green) or Serum (Brown)	Males 0.15-0.30 g/L Females 0.16-0.45 g/L	1 working day GP: 3 working days	UHL	Yes	Clinical indication: For investigation of suspected Wilson's disease. Caeruloplasmin is acute-phase glycoprotein, increased levels are observed in inflammation. infection, pregnancy, estradiol containing OCP.
Calcitonin	Blood	Lithium Heparin (Green) or Serum (Brown)	See Report	Contact Lab	Referred	No	Clinical indication: Aid in diagnosis and monitoring of medullary thyroid cancer. Request will not be processed without appropriate clinical details. A fasting specimen is required.Transport to laboratory immediately.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
Calcium (Total)	Blood	Lithium Heparin (Green) or Serum (Brown)	mmol/L 0D - 10D 1.90-2.60 10D - 2Y 2.25-2.75 2Y-12Y 2.20-2.70 12Y - 18Y 2.10-2.55 18Y - 60Y 2.15-2.50 60Y - 90Y 2.20-2.55 > 90Y 2.05-2.40	Urgent: 90mins Routine: 4 Hrs GP: 3 working days	UHL ENNIS NENAGH	Yes	This test is also available as a part of bone profile.
Calcium Adjusted	Blood	Calculated	Adults : 2.20-2.57 mmol/L	Urgent: 90mins Routine: 4 Hrs GP: 3 working days	UHL ENNIS NENAGH	Yes	This test is also available as a part of bone profile. Adjusted calcium equation is locally derived. Adjusted calcium invalid if albumin < 20 g/L and in children <18 years
Calcium Ionised	Blood	Blood Gas Syringe	1.15 - 1.33 mmol/L (arterial) 1.16 - 1.32 mmol/L (venous) Note RI for adult only	15 Minutes	UHL	No	Analyse Immediately on blood gas analyser (do not expose to air)
Calcium	Urine (Random or 24hr)	Vacutainer (Brown) 24hr Acid Collection	No reference interval available for random urine calcium 2.5-7.5 mmol/24 hr	1 working day	UHL	Yes	Clinical indication: For the investigation of hypercalcaemia or renal stones. Urine container and request form must be clearly labelled with patient name, DOB and hospital number. The date and time of the start and finish of the 24-hour urine collection must be clearly indicated. Acid container is available from laboratory reception.
Calcium to Creatinine Ratio	Urine	Vacutainer (Brown)		Routine: 1 working day.	UHL	Yes	Clinical indication: For the investigation of hypercalcaemia or renal stones.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
	(random)		Male 0.04-0.45 mol/mol Female 0.10-0.58 mol/mol	GP: 3 working days			Note this reference interval is for adults only. Appropriate paediatric reference range is provided with results.
Calculus (stone) analysis	Stone(s)	Universal container	See Report	Contact Lab	Referred	Yes	Indicate stone site and provide relevant clinical details.
Calprotectin	Faeces	Universal container	See Report	Contact Lab	Referred	Yes	
Carbamazepine	Blood	Lithium Heparin (Green) or Serum (Brown)	4-12 mg/L	1 working day GP: 3 working days	UHL	Yes	Sample immediately before the next oral dose in a patient at steady state. Time to Steady State: Initiation of therapy: after 3 weeks Change in dose: after 2 to 6 days Carbamazepine induces its own metabolism. High levels observed on initiation of therapy prior to auto-induction of liver enzymes. Half-life is altered by other anti-epileptics.
Carboxy-haemoglobin	Blood	Blood Gas Syringe	<3.0 % (non-smoker) RI for arterial blood only	15 Mins	UHL	No	Clinical indication: Investigation of possible carbon monoxide exposure and poisoning. Sample must be analysed immediately on blood gas analyser. Expel air, seal syringe.
Carnitine (total and free)	Blood	Lithium Heparin (Green)	See Report	Contact Lab	Referred	No	Appropriate clinical details required
	Urine	24hr Acid Collection	See Report	Contact Lab	Referred	Yes	Urine container and request form must be clearly labelled with patient name,

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
Catecholamine and Metabolites		For children random sample is acceptable in vacutainer (Brown)					DOB, and hospital number. The date and time of the start and finish of the 24-hour urine collection must be clearly indicated. Specimen must be brought to lab immediately after collection. Acid container is available from laboratory reception. Some drugs are now known to increase catecholamine and metabolite concentrations, including tricyclic anti-depressant's, selective serotonin reuptake inhibitors, serotonin and noradrenaline reuptake inhibitors, α- and β- adrenergic receptor blockers, calcium channel blockers, monoamine oxidase inhibitors, Levo(L)-Dopa, methyldopa and several stimulant/sympathomimetic drugs. Avoid caffeine, banana, vanilla and chocolate for three days prior to and during urine collection.
CEA Carcinoembryonic antigen	Blood	Lithium Heparin (Green) or Serum (Brown)	Smokers 0-6.5 ug/L Non-smokers 0-5.0 ug/L	1 working day GP: 3 working days	UHL	Yes	Clinical indication: Follow-up and monitoring of patients with colorectal cancer. Not recommended for diagnosis or screening Do not request tumour markers for health screening. Method used: Roche immunoassay. Biotin may cause concentration dependent negative interference in this

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							assay. If patient is on high dose biotin collect sample at least 8 hours after the last dose. Please contact lab for further details.
Chloride	Blood	Lithium Heparin (Green) or Serum (Brown)	95-108 mmol/L	Urgent: 90mins Routine: 4 Hrs GP: 3 working days	UHL ENNIS NENAGH	Yes	Do not take blood from limb with IV infusion. This test is available as a part of Renal Profile.
Chloride	Urine	Random urine in Vacutainer (Brown) or 24hr Plain Collection	Reference interval not available for random urine sample 110-250 mmol/24 h	1 working day GP: 3 working days	UHL	Yes	Clinical indication: To aid in the investigation of hypokalaemia or metabolic alkalosis. Urine collection bottle and request form must be clearly labelled with patient name, DOB and hospital number. The date and time of the start and finish of the 24-hour urine collection must be clearly indicated.
Cholesterol Total	Blood	Lithium Heparin (Green) or Serum (Brown)	Desirable <5.2 mmol/L (NCEP ATP III Lipid Guideline)	Routine: 4 Hrs GP: 3 working days	UHL ENNIS	Yes	Available as part of lipid profile. Fasting is not required for standard lipid profile. Serum triglyceride is subject to increase following meals. A 12-hour fast is essential if previous triglyceride result was >1.7 mmol/L (Refer to Lipid profile information in this table.).

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
Cholesterol Total	Fluid	Vacutainer (Brown)	N/A	1 working day	UHL	No	The source of the fluid i.e. pleural, ascitic must be stated on the request form. All effusions should be accompanied by a paired serum sample for total cholesterol Measurement of cholesterol in fluid samples has not be validated and is not CE marked.
Cholesterol HDL	Blood	Lithium Heparin (Green) or Serum (Brown)	Female >1.7 mmol/L Male >1.5 mmol/L (NCEP ATP III Lipid Guideline)	Routine: 4 Hrs GP: 3 working days	UHL ENNIS	Yes	Available as part of lipid profile. Fasting is not required for the analysis of the standard lipid profile. Refer to Lipid profile information in this table.
Cholesterol LDL	Blood	Lithium Heparin (Green) or Serum (Brown)	Desirable <2.6 mmol/L (NCEP ATP III Lipid Guideline)	Routine: 4 Hrs GP: 3 working days	UHL ENNIS	Yes	LDL-C is measured in UHL (calculated in ENNIS) Available as part of lipid profile. Fasting is not required for the analysis of the standard lipid profile. Refer to Lipid profile information in this table.
Cholesterol Non-HDL	Blood	Lithium Heparin (Green) or Serum (Brown)	<3.4 mmol/L in high risk patients (NCEP ATP III Lipid Guideline)	Routine: 4 Hrs GP: 3 working days	UHL ENNIS	Yes	Non-HDLC is calculated Available as part of lipid profile. Fasting is not required for the analysis of the standard lipid profile. Refer to Lipid profile information in this table.
Cholinesterase activity	Blood	EDTA (Purple)	See Report	Contact Lab	Referred	Yes	Clinical indication: 1) Preoperative screening to detect patients with risk of potential post-operative

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							paralysis following the use of the short reacting muscle relaxant suxamethonium or mivacurium. 2) Intoxication with organophosphorus compounds. Only available by prior arrangement with Biochemistry lab
Cholinesterase genotype	Blood	EDTA (Purple)	See Report	Contact Lab	Referred	No	Only available by prior arrangement with Biochemistry lab
Chromogranin A	Blood	Serum (Brown)	See Report	Contact Lab	Referred	Yes	Clinical indication: 1) Symptoms suggestive of carcinoid and neuroendocrine tumour. 2) Monitoring NETs. Transport to lab immediately Overnight fasting is recommended before the test. Proton pump inhibitors can cause falsely elevated CgAs. Discontinue for two weeks prior to test if possible. Some clinical conditions unrelated to carcinoid or other neuroendocrine tumours such as atrophic gastritis, impaired renal function can lead to elevated CgAs.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
Citrate (Citric acid)	Urine	24hr Plain Collection	See Report	Contact lab	Referred	No	Urine container and request form must be clearly labelled with patient name, DOB and hospital number. The date and time of the start and finish of the 24-hour urine collection must be clearly indicated.
CK (Creatine Kinase)	Blood	Lithium Heparin (Green) or Serum (Brown)	Male 40-320 U/L Female 25-200 U/L	Urgent: 90mins Routine: 4 Hrs GP: 3 working days	UHL ENNIS NENAGH	Yes	Creatine Kinase (CK) activity is greatest in striated muscle, heart tissue, and brain. Serum CK concentrations are reflective of muscle mass. CK may be measured as a non-specific marker to evaluate myopathy and to monitor patients with rhabdomyolysis for acute kidney injury. Strenuous exercise or intramuscular injections may cause transient elevation of CK. Please note newborns can have CK levels twice the adult value.
Copper	Blood	Orange (LiH) Trace Metal Tube. Metal Free Needle	See Report	Contact Lab	Referred	Yes	

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
Copper	Urine	24hr Urine Acid washed Container	See Report	Contact Lab	Referred	Yes	Clinical indication: For investigation of suspected Wilson's disease. Urine container and request form must be clearly labelled with patient name, DOB and hospital number. The date and time of the start and finish of the 24-hour urine collection must be clearly indicated.
Cortisol	Blood	Lithium Heparin (Green) or Serum (Brown)	See notes	1 working day GP: 3 working days	UHL	Yes	Clinical indication: Assessment of adrenal cortical function. Random cortisol is of limited use due to diurnal variation. 09:00 am cortisol may be useful as a first line test in patient with suspected adrenal insufficiency. Indicate on request form if the request is part of a dexamethasone suppression test or ACTH stimulation test. Cortisol result must be interpreted in light of clinical picture. Dynamic function testing should be performed if hypo/hypercortisolism is suspected. Post 250 mcg synacthen cut-off is >450 nmol/L. Method used: Roche immunoassay.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							Biotin may cause concentration dependent negative interference in this assay if high dose supplements are taken. If suspected, a repeat 8 plus hours off Biotin is recommended in the first instance. Please contact lab for further details
Cortisol (Free)	Urine	24hr Plain Collection	See Report	Contact Lab	Referred	No	Clinical indication: Investigation of Cushing's syndrome or disease. Please provide appropriate clinical details
C-peptide	Blood	Serum (Brown)	0.34-1.47 nmol/L Reference interval is for healthy fasting subjects	7 working days	UHL	No	Clinical indication: To assess pancreatic β cell function and to distinguish type 1 from type 2 diabetes. Investigation of hypoglycaemia. Fasting sample is required.Transport to lab immediately. Paired blood sample for glucose is required (Grey Top). Method used: Roche immunoassay. Biotin may cause concentration dependent negative interference in this assay. Please contact lab for further details.
Creatinine	Blood	Lithium Heparin (Green) or	µmol/L 0D - 2M 27-77 2M - 12M 14-34	Urgent: 90mins Routine: 4 Hrs	UHL ENNIS NENAGH	Yes	This test is available as part of Renal Profile. Creatinine measured by Roche enzymatic assay.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
		Serum (Brown)	1Y - <3Y 15-31 3Y - <5Y 23-37 5Y - <7Y 25-42 7Y - <9Y 30-47 9Y - <11Y 29-56 11Y - <13Y 39-60 13Y - <15Y 40-68 Adult (Male) 59-104 Adult (Female) 45-84	GP: 3 working days			Please be aware that N-Acetylcysteine at a plasma concentration above 333 mg/L and the Acetaminophen metabolite N-acetyl-p-benzoquinone imine (NAPQI) independently may cause falsely low creatinine results.
Creatinine	Fluid	Vacutainer (Brown)	N/A	Routine: 4hr	UHL	No	The source of the fluid i.e. pleural, ascitic must be stated on the request form. All effusions should be accompanied by a paired serum sample. Measurement of creatinine in fluids has not been validated and is not CE marked
Creatinine	Urine (Random or 24hr)	Vacutainer (Brown) 24hr Acid or Plain Collection	No reference interval available for random urine creatinine Male 9-19 mmol/24 h Female 6-13 mmol/24 h	1 working day GP: 3 working days	UHL	Yes	Urine collection bottle and request form must be clearly labelled with patient name and hospital number. The date and time of the start and finish of the 24-hour urine collection must be clearly indicated.
Creatinine Clearance	Blood & 24hr Urine	24hr Plain or Acid Collection	66-143 mL/min	1 working day GP: 3 working days	UHL	Yes	

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
		& Serum (Brown)					
C Reactive protein (CRP)	Blood	Lithium Heparin (Green) or Serum (Brown)	0-5 mg/L	Urgent: 90mins Routine: 4 Hrs GP: 3 working days	UHL ENNIS NENAGH	Yes	CRP rises rapidly after onset of an acute phase response, beginning within 6 - 12 hrs and peaking within 24 - 48 hrs. The CRP response may be less pronounced in liver disease.
Cryoglobulins	Blood	2x EDTA (Purple) 2 X Neutral (White)	See Report	Contact Lab	Referred	No	Contact lab in advance Transport in flask at 37^0C Also measure C3 and C4
CTX (Collagen Type 1 Cross-Linked C telopeptide)	Blood	Serum (Brown)	See Report	Contact Lab	Referred	No	Fasting morning sample is preferred Transport to lab immediately.
Cyclosporin	Blood	EDTA (Purple)	See Report	Contact Lab	Referred	Yes	Clinical indication: For monitoring of therapeutic and toxic level. Trough levels should be monitored, i.e. 12-18 hours post oral dose, 12 hours post intravenous dose or immediately prior to the next dose.
Cystine	Urine	24hr Plain Collection	See Report	Contact Lab	Referred	No	Clinical indication: Investigation of renal stones, suspected cystinuria.
Cystine (white cell concentration)	Blood	Lithium Heparin (Green)	See Report	Contact Lab	Referred	No	Clinical indication: For diagnosis of cystinosis. Sample must be delivered to lab immediately. Appropriate clinical details

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							required. Do Not Refrigerate or centrifuge.
7- Dehydro-cholesterol	Blood	Lithium Heparin (Green) or Serum (Brown)	See Report	Contact Lab	Referred	No	Appropriate clinical details required. 7-dehydrocholesterol is used in the diagnosis of Smith-Lemli-Opitz syndrome
Dehydroepi androsterone Sulphate (DHEAS) DHEAS ctd.	Blood	Serum (Brown)	Children: µmol/L < 1W 2.93-16.5 1W - 4 W 0.86-11.70 1M - 12M 0.09-3.35 1Y - 4Y 0.01-0.53 5Y - 9Y 0.08-2.31 Males: µmol/L 10Y - 14Y 0.66-6.70 15Y - 19Y 1.91-13.40 20Y - 24Y 5.73-13.40 25Y - 34Y 4.34-12.20 35Y - 44 Y 2.41-11.60 45Y - 54Y 1.20-8.98 55Y - 64Y 1.40-8.01 65Y - 74Y 0.91-6.76 ≥ 75Y 0.44-3.34 Females: µmol/L 10Y - 14Y 0.92-7.60 15Y - 19Y 1.77-9.99 20Y – 24Y 4.02-11.0 25Y - 34Y 2.68-9.23 35Y - 44Y 1.65-9.15 45Y - 54Y 0.96-6.95 55Y - 64Y 0.51-5.56	1 working day GP: 3 working days	UHL	Yes	Clinical indication: Investigation of female presenting with signs and symptoms of hyperandrogenism and neonates with ambiguous genitalia. Appropriate clinical details required to process this request. Method used: Roche immunoassay. Biotin may cause concentration dependent positive interference in this assay if high dose supplements are taken. If suspected, a repeat 8 plus hours off Biotin is recommended in the first instance. Please contact lab for further details

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
			65Y - 74Y 0.26-6.68 ≥ 75Y 0.33-4.18				
Digoxin **Digoxin ctd.**	Blood	Lithium Heparin (Green) or Serum (Brown)	0.6-1.2 ug/L ESC (2021) recommends aiming serum digoxin concentration of <1.2 ug/L for acute and chronic heart failure.	1 working day GP: 3 working days	UHL	Yes	Digoxin samples for monitoring should be taken 7-14 days following the initiation or change in dose, unless there is evidence of toxicity. In end stage renal disease, it may take 15-20 days for steady state to be achieved. A digoxin concentration measured at least 8 hours post last dose may be useful to confirm toxicity or non-adherence. The result should be interpreted in the clinical context as toxicity may occur even within the 'therapeutic range' particularly in the presence of hypokalaemia. Method used: Roche immunoassay. Biotin may cause concentration dependent positive interference in this assay if high dose supplements are taken. If suspected, a repeat 8 plus hours off Biotin is recommended in the first instance. Digoxin concentrations may be falsely elevated if measured in the presence of the antidote until the Fab fragments are eliminated from the body. Therefore, it is recommended to obtain

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							sample for digoxin determination prior to antidote administration.
Dihydropyrrimide Dehydrodgenase (DPD)	Blood @ RT°C (3ml)	Vacutainer (EDTA-Purple top)	Refer to test report for variant analysis results.	Contact lab	Referred	No	**Oncology specialist test only for DPYD variant analysis – Fluoropyrimidine toxicity .** Referred to; Purine Research Laboratory at St Thomas', North Wing - 4th Floor, Westminster Bridge Road,London SE1 7EH, Tel; 020 7188 1266 **Pharmacogenetic variation in the DPYD gene is associated with early, severe toxicity to fluoropyrimidine therapy. Testing should be done prior to the start of therapy and the starting dose adjusted according to DPYD genotype.**
Drug of Abuse Screen: Amphetamine Barbiturate Benzodiazepines Cannabinoids Cocaine, Opiates Methadone	Urine (Random)	Vacutainer (Brown)	Not available (semi-quantitative test)	1 working day	UHL	No	Clinical indication: Screening test for drug overdose in acute clinical setting. Only available for HSE MID WEST consultants. Not for medico-legal or pre-employment clearance.
Estimated glomerular filtration rate (eGFR)	Blood	Lithium Heparin (Green) or Serum (Brown)	See Report	Urgent: 90mins Routine: 4 Hrs GP: 3 working days	UHL ENNIS NENAGH	Yes	eGFR calculated using the CKD-EPI eGFR (2009) formulae with enzymatic creatinine assay traceable to ID-MS. Multiply eGFR by 1.159 for African American Patients.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							eGFR not applicable to patients < 18 years of age, with AKI, pregnancy and patients with extreme of body surface area and muscle mass.
Elastase	Faeces	Universal Container (min 20g)	See Report	Contact Lab	Referred	No	Clinical indication: Assessment of pancreatic exocrine function. Specimen should be sent to the laboratory immediately at ambient temperature. If unavoidable samples can be stored refrigerated overnight. Appropriate clinical details are required.
Estradiol (oestradiol)	Blood	Lithium Heparin (Green) or Serum (Brown)	Male (adult): 41.4-159 pmol/L Female (adult): Follicular 114-332 pmol/L Midcycle 222-1959 pmol/L Luteal 222-854 pmol/L Post-Menopausal <505	1 working day GP: 3 working days	UHL	Yes	Clinical indications: 1) Assessment of gynaecomastia 2) Investigation of precocious/delayed puberty in females 3) Monitoring ovulation induction in assisted reproduction 4) Assessment of women with suspected hypothalamic or pituitary disease. Note: Monitoring of oestrogen therapy is only possible if the drug being administered is estradiol. Not useful for assessing the menopausal state, as variable amounts of oestrogen are secreted in the perimenopausal period

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							Method used: Roche immunoassay. Biotin may cause concentration dependent positive interference in this assay if high dose supplements are taken. If suspected, a repeat 8 plus hours off Biotin is recommended in the first instance
Ferritin	Blood	Lithium Heparin (Green) or Serum (Brown)	Female ng/mL 0D - 1M 150-973 1M - 6M 8.5-580 6M - 15Y 4-101 15Y - 19Y 3.9-114 >19Y 13-150 Male: ng/mL 0D - 1M 150-973 1Y - 6M 8.5-580 6M - 15Y 14-101 15Y - 19Y 20.9-173 >19Y 30-400	Urgent: 90mins Routine: 1 working day GP: 3 working days	Referred	Yes	Indications for ferritin testing: Unexplained anaemia Assessing response to iron therapy Suspected haemochromatosis or unexplained liver disease Assessment of iron stores in patients with suspected iron overload and/or hereditary haemochromatosis.
FIB-4 score	Blood	EDTA (purple top) And Li-hep (green) or serum (brown top)	**Interpretative comments:** Consider referral to Hepatology for fibroscan if FIB-4 >1.3 (aged 35-64) or >2.0 (age >65). Monitor for disease progression: If FIB-4 does not require referral now, please repeat FIB-4 in 1-3 years and	5 working days	UHL ENNIS	Yes	FIB-4 score is calculated using patient age, platelets, ALT and AST. Therefore, when FIB-4 is requested FBC, ALT and AST results will also be reported. Clinical indication: FIB-4 is for patients with NAFLD/NASH to evaluate the risk of advanced liver fibrosis where other causes of chronic liver disease have been excluded by negative liver screen. Limitations:

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
			manage cardiometabolic risk factors. Note: Use with caution in patients < 35 years or in patients with the ALT and/or AST >250 U/L and Platelets >500 x 10^9/L or low platelet from other causes such as platelet clumping, medications, infection, autoimmune disorders etc.				This test should not be performed when there are other causes of liver disease, when there is any acute liver injury from any cause, or when there is any other condition present that may affect the components of the equation. These may include hemolysis or muscle injury (rising AST) or chronic alcohol use or immune thrombocytopenic purpura (reduced platelet count) etc.
FIT (Faecal Immunochemical Testing)	Faeces	FIT Sampling Device	See Report	Contact Lab	Referred	Yes	Samples must be taken into Collection Tube and transported to laboratory ASAP. Liquid or runny faeces are not suitable for analysis. Samples received in Universal Containers will be rejected.
Folate	Blood	Lithium Heparin (Green) or Serum (Brown)	3.0-26.8 ng/ml	1 working day GP: 3 working days	UHL	Yes	Not available as a screening test Fasting samples are recommended. Indications for Measurement: Haematological unexplained anaemia/other cytopenias, unexplained macrocytosis, haemolysis Neurological

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							Subacute combined degeneration of the cord, peripheral neuropathy, dementia, unexplained neurology. Other Glossitis, Pregnancy, Malabsorption, Gastric resection, vegans, alcoholism, dialysis. Medications Metformin therapy, prolonged proton pump inhibitor or H2 receptor antagonist therapy, anticonvulsant therapy, Methotrexate
Free light chains (Kappa & Lambda)	Blood	Serum (Brown)	See Report	Contact Lab	Referred	Yes	Clinical indication: Useful for detecting and monitoring patients with a monoclonal gammopathy due to monoclonal free light chains.
Free T3 (free triiodothyronine) Free T3 ctd.	Blood	Lithium Heparin (Green) or Serum (Brown)	3.1-6.8 pmol/L (reference range is for non-pregnant adult only) Trimester specific reference interval: pmol/L 1st trimester 3.8-6.0 2nd trimester 3.2-5.5 3rd trimester 3.1-5.0 Paediatric reference intervals: pmol/L 0D - ≤6D 2.7-9.7 >6D - ≤3M 3.0-9.3	1 working day GP: 3 working days	UHL	See notes	Clinical indication: For monitoring of T3 replacement therapy and diagnosis of T3 thyrotoxicosis.T3 is reflex added by the laboratory when TSH is suppressed with normal FT4 Provide clinical detail and indicate if patient is on eltroxin, T3 replacement or carbimazole. Method used: Roche immunoassay. Biotin may cause concentration dependent positive interference in this assay if high dose supplements are taken. If suspected, a repeat 8 plus

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
			>3M - ≤12M 3.3-9.0 1Y - ≤6Y 3.7-8.5 7Y - ≤11Y 3.9-8.0 12Y - 18Y 3.9-7.7				hours off Biotin is recommended in the first instance
Free T4 (free thyroxine)	Blood	Lithium Heparin (Green) or Serum (Brown)	10.5-22.8 pmol/L (reference range is for non-pregnant adult only) Trimester specific reference interval: pmol/L 1st trimester 11.8-19.6 2nd trimester 9.6-17.0 3rd trimester 8.4-15.6 Paediatric reference intervals: pmol/L 0D - ≤6D 11-32 >6D - ≤3M 11-29 >3M - ≤12M 11.9-26 1Y - ≤6Y 12-23 7Y - ≤11Y 12-22 12Y - 18Y 12-22	1 working day GP: 3 working days	UHL	Yes	Provide clinical details and medication list Clinical indication: Investigation of thyroid function, as an adjunct to TSH. Monitoring patients on thyroid replacement therapy. Method used: Roche immunoassay. Biotin may cause concentration dependent positive interference in this assay if high dose supplements are taken. If suspected, a repeat 8 plus hours off Biotin is recommended in the first instance
Fructosamine	Blood	Serum (Brown)	See Report	Contact Lab	Referred	Yes	Appropriate clinical details required
FSH (Follicle Stimulating Hormone)	Blood	Lithium Heparin (Green) or Serum (Brown)	Males (>13Y): 1.5-12.4 U/L Females: Follicular Phase 3.5-12.5 U/L Mid-Cycle 4.7-21.5 U/L	1 working day GP: 3 working days	UHL	Yes	FSH in conjunction with LH, testosterone (men) and estradiol (women) useful in the investigation of hypogonadism and menstrual disorders.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
			Mid-Luteal 1.7-7.7 U/L Post-Menopausal 25.8-134.8				FSH and LH are NOT routinely recommended for diagnosing menopause in women over 45 years of age with typical menopause symptoms. Menopause is a clinical diagnosis. Further investigation is only warranted if there are any atypical symptoms. FSH is of no value in women taking combined oestrogen and progestogen contraception or high dose progestogen. In women younger than 45 years, FSH levels may be helpful if premature menopause is suspected. If not on hormonal contraception then raised FSH levels in 2 bloods samples collected 4-6 weeks apart support the diagnosis (NICE guideline [NG23]) Method used: Roche immunoassay Biotin may cause some concentration dependent negative interference in this assay. If patient is on high dose biotin collect sample at least 8 hours after the last dose.
Gastrin	Blood	Serum (Brown)	See Report	Contact Lab	Referred	No	Fasting sample required. Transport to lab immediately. Patient must attend UHL Phlebotomy for sample collection.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
Gentamicin Antibiotic Assay	Blood	Serum (Brown)	a) Aminoglycoside –Once daily dosing / Extended Interval / Pulse Dosing Trough Gentamicin < 1 mg/L **NB: Trough should not exceed above levels.** Please refer to the UHL Adult and Paediatric Antimicrobial Guidelines for further details on dosage requirements For neonates refer to UHL Paediatric Antimicrobial Guidelines on EOLAS App.	Urgent: 90 mins	UHL	No	**Time and date of Sample must be stated on request form.** "Random samples" should not be submitted. Random levels are not recommended by the consultant microbiologist because of difficulty with interpretation Pre-dose (Trough) Level: Blood samples should be taken 18 – 24 hrs after the previous dose. Post Dose (peak level) are not recommended for endocarditis, please discuss with microbiologist as required. Post-dose (Peak) Level: Blood is drawn 1 hour after the start of a 30-minute infusion or 1hour after the administration of a slow intravenous injection. Inactivation of aminoglycosides by ß-lactam antibiotics occurs; as a result, it is recommended that if samples for aminoglycoside estimation cannot be assayed immediately, they should be stored at 0°C - 5°C. See HSE MID WEST EOLAS antimicrobial app and antimicrobial guidelines on Intranet (IHUB) for further information. A separate serum sample must be submitted for Gentamicin testing.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							Assay testing will not be performed on routine biochemistry requests
Glucagon	Blood	EDTA (Purple)	See Report	Contact Lab	Referred	No	Fasting sample required. Patient must attend UHL Phlebotomy for sample collection. Transport to lab immediately.
G-Glutamyl Transferase (GGT)	Blood	Lithium Heparin (Green) or Serum (Brown)	Male 10-71 U/L Female 6-42 U/L	Routine: 4 Hrs GP: 3 working days	UHL ENNIS NENAGH	Yes	Available as a part of Liver profile
Glucose	Blood	Fluoride Oxalate (Grey)	Fasting 4.4-5.5mmol/L Random 3.9-7.8 mmol/L	Urgent: 90mins Routine: 4 Hrs GP: 3 working days	UHL ENNIS NENAGH	Yes	Please state if patient is fasting or not
Glucose	CSF	Universal container or Fluoride Oxalate (Grey)	See Report	90mins	UHL	No	CSF specimens must be hand delivered to Microbiology for initial processing. Microbiology send aliquot to Biochemistry. Paired blood sample for glucose is required. CSF glucose approx. 60% of the plasma glucose concurrently measured.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
Glucose	Fluid	Fluoride Oxalate (Grey)	N/A	1 working day	UHL	No	The source of the fluid i.e. pleural, ascitic must be stated on the request form. All effusions should be accompanied by a paired serum sample. Measurement of glucose in fluids has not been validated and is not CE marked
Glucose tolerance test (OGTT)	Blood	Fluoride Oxalate (Grey)	Appropriate comment provided in the report	1 working day	UHL ENNIS NENAGH	Yes	Please refer to local OGTT protocol in lab med user guide Sample must be correctly labelled See OGTT interpretative comment in Section 26.12
Glutamine	Blood	Lithium Heparin (Green)	See Report	Contact Lab	Referred	No	Contact the Clinical Biochemistry Laboratory before initiating the request so that all collection requirements can be met.
Growth Hormone - GH	Blood	Lithium Heparin (Green) or Serum (Brown)	See Report	Contact Lab	Referred	No	Clinical indication: Random growth hormone level has no diagnostic value in diagnosing GH deficiency or excess. Stimulation or suppression tests are recommended to assess growth hormone disorders.
5 HIAA (5-Hydroxy Indoleacetic acid)	Urine	24hr Acid Collection	See Report	Contact Lab	Referred	Yes	Clinical indication: 5 HIAA is end product of serotonin. It is used for screening, diagnosis and monitoring of carcinoid tumours.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
5 HIAA ctd.							Urine container and request form must be clearly labelled with patient name, DOB and hospital number. The date and time of the start and finish of the 24-hour urine collection must be clearly indicated. Acid container is available from laboratory reception. Foodstuffs to avoid for three days prior to and during the urine collection. The following contain serotonin, the precursor of 5-HIAA, and can cause falsely elevated test results: Aubergines; Avocados; Bananas; Kiwi fruit; Pineapples; Plums; Tomatoes; Walnuts; Health food supplements containing 5-hydroxytryptophan Drugs can interfere with measurement: Drugs that increase 5-HIAA: Paracetamol; Caffeine; Ephedrine (found in some cough medicines); Diazepam; Nicotine; Glyceryl guaiacolate (found in some cough medicines); Phenobarbital. Drugs that decrease 5-HIAA: Aspirin; Alcohol; Imipramine; L-dopa; MAO inhibitors; Heparin; Methyldopa; Phenothiazines; Tricyclic antidepressants

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
Homocysteine	Blood	Lithium Heparin (Green)	See Report	Contact Lab	Referred	No	Sample must be delivered to lab within 15 minutes of collection.
17-Hydroxy progesterone (17-OHP) 17-OHP ctd.	Blood	Lithium Heparin (Green) or Serum (Brown)	See Report	Contact Lab	Referred	No	Clinical indication: Indicated for diagnosis, monitoring and management of congenital adrenal hyperplasia. Specify if for initial CAH diagnosis or monitoring. For investigation of ambiguous genitalia sample must be taken at least 48 hours after birth. Measure in follicular phase of menstrual cycle (first 5 days following menstruation) and off the pill for identification of mild (late-onset, non-classical) CAH.
HCG β Human Chorionic Gonadotrophin	Blood	Lithium Heparin (Green) or Serum (Brown)	Males: 0-2.0 U/L Female: Non-pregnant ≤5.3 U/L Post-menopausal ≤8.3 U/L For pregnant females contact lab if gestation related reference ranges required.	1 working day GP: 3 working days	UHL	Yes	Clinical indication: Early detection and monitoring of pregnancy. Detection and monitoring of hCG producing tumour. Method used: Roche immunoassay. Biotin may cause concentration dependent negative interference in this assay if high dose supplements are taken. If suspected, a repeat 8 plus hours off Biotin is recommended in the first instance. **Not suitable for add-on.**

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
Hypoglycaemia Screen: RFT/LFT/CK Cortisol Ammonia Glucose Lactate bHydroxybutyrate Free fatty Acids **Acylcarnitine** GH/Insulin/C-Peptide Amino Acids Urine Organic Acids*	Blood & Urine	2 x Lithium Heparin (Green) 2 x Fluoride Oxalate (Grey) 2 x Serum (Brown) 1 x EDTA (Purple) 1 x Urine Vacutainer (Brown)	See individual tests	See individual tests	See individual tests	No	Use pre-prepared collection kit & request form distributed from Biochemistry Laboratory. Note: if lab blood glucose level is >2.6 mmol/L, the samples will not be analysed but will be stored for 3 days (Please contact lab the next day after discussion with consultant if you want these samples to be analysed) *For organic acid provide urine sample during hypoglycaemia episode or next urine passed after episode
Immunoglobulin A (IgA)	Blood	Lithium Heparin (Green) or Serum (Brown)	g/L 0D - <1Y <0.14 1Y - <3Y <0.80 3Y - <6Y 0.11-1.42 6Y - <14Y 0.34-2.22 14Y - <19Y 0.40-2.93 Adults 0.70-4.00	1 working day GP: 3 working days	UHL	Yes	The presence of high concentration of paraproteins may impair accurate estimation of respective immunoglobulin. (Roche IFU).
IgE (Allergen Specific)	Blood	Serum (Brown)	See Report	Contact Lab	Referred	Yes	The choice of allergen test request should primarily be clinically led and

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							results should be interpreted within the clinical context. As stipulated by the referral laboratory - Primary care may request these four allergen panels: 1. Animal Danders 2. House Dust Mite 3. Peanut 4. Mixed Grass Pollen
Immunoglobulin E IgE (Total)	Blood	Lithium Heparin (Green) or Serum (Brown)	kUA/L 0D - 1W 0.1-1.5 1W - 2Y 0.1-15 2Y - 6Y 0.1-60 6Y - 10Y 0.1-90 10Y - 16Y 0.1-200 Adults 0.1-100	1 working day GP: 3 working days	UHL	Yes	Measurement of total IgE does not contribute much to an allergy-focused evaluation. Method used: Roche immunoassay. Biotin may cause concentration dependent negative interference in this assay if high dose supplements are taken. If suspected, a repeat 8 plus hours off Biotin is recommended in the first instance
Immunoglobulin G IgG	Blood	Lithium Heparin (Green) or Serum (Brown)	0D - 2W 5.0-17.0 g/L 2W - 6W 3.9-13.0 6W - 12W 2.1-7.7	1 working day GP: 3 working days	UHL	Yes	The presence of high concentration of paraproteins may impair accurate estimation of respective immunoglobulin. (Roche IFU).

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
			3M - 6M 2.4-8.8 6M - 9M 3.0-9.0 9M - 12M 3.0-10.9 1Y - 2Y 3.1-13.8 2Y - 3Y 3.7-15.8 3Y - 6Y 4.9-16.1 6Y - 15Y 5.4-16.1 Adult 6.0-16.0				
Immunoglobulin M IgM	Blood	Lithium Heparin (Green) or Serum (Brown)	g/L 0D – 14D 0.03-0.32 15D - <13 weeks 0.10-0.67 13 weeks - <1Y 0.14-0.82 1Y - <19Y female 0.45-1.78 1Y - <19Y male 0.36-1.44 Adults 0.40-2.30	1 working day GP: 3 working days	UHL	Yes	The presence of high concentration of paraproteins may impair accurate estimation of respective immunoglobulin. (Roche IFU).
IgG (sub-classes)	Blood	Serum (Brown)	See Report	Contact Lab	Referred	No	
Interleukin 6 (IL6)	Blood	Lithium Heparin (Green) or Serum (Brown)	0-7 ng/L	7 working days	UHL	No	**Not suitable for add-on.** Only available to HSE MID WEST Consultants

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
Insulin Insulin ctd.	Blood	Serum (Brown)	18-173 pmol/L Reference interval is for healthy fasting subjects	7 working days	UHL	No	Clinical indication: Investigation of hypoglycaemia and insulin resistance states. Fasting sample is required unless part of dynamic function test, or during spontaneous hypoglycaemic episode. Sample must be transported to lab immediately. Paired plasma sample for glucose is required (Grey Top). Test performed using Roche immunoassay which is relatively specific for Human insulin and does not generally detect Insulin analogues. Haemolysis and high dose biotin could give falsely low values.
Insulin-like Growth Factor 1 IGF-1 (somatomedin C)	Blood	Lithium Heparin (Green) or Serum (Brown)	See Report	Contact Lab	Referred	Yes- if appropriate clinical detail is provided	Appropriate clinical details required. Specimen must be brought to the lab immediately after collection
Insulin-like Growth Factor 1 Binding Protein 3 (IGF-1 BP3)	Blood	Lithium Heparin (Green) or Serum (Brown)	See Report	Contact Lab	Referred	No	Appropriate clinical details required. Specimen must be brought to the lab immediately after collection.
Iron	Blood	Lithium Heparin (Green) or	Male 12-31 µmol/L Female 9-30 µmol/L	Routine: 4 Hrs GP: 3 working days	UHL	Yes	This test is also available as a part of iron studies profile. A fasting specimen is required

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
		Serum (Brown)					This test is used in the investigation of possible iron overload, suspected acute iron overdose (please take sample prior to commencement of desferrioxamine treatment) Serum ferritin is more sensitive and specific test for iron deficiency
Iron Profile (Iron, Transferrin, Transferrin Sat, Total Iron-binding capacity TIBC)	Blood	Lithium Heparin (Green) or Serum (Brown)	See individual tests	Routine: 4 Hrs GP: 3 working days	UHL	Yes	
Lactate	Blood	Fluoride Oxalate (Grey)	0.5-2.2 mmol/L	Urgent: 90mins	UHL	No	Transport to lab immediately. This test is also available at point of care on the blood gas analyser; blood gas sample must be collected in blood gas syringe. **Not suitable for add-on.**
Lactate	CSF	Universal container or Fluoride Oxalate (Grey)	See Report	Urgent: 90mins	UHL	No	CSF specimens must be hand delivered to Microbiology for initial processing. Microbiology send aliquot to Biochemistry.
LDH (Lactate Dehydrogenase)	Blood	Lithium Heparin (Green) or Serum (Brown)	0D - 20D 225-600 U/L 20D - 15Y 120-300 U/L Adult Male 135-225 U/L Adult Female 135-214 U/L	Urgent: 90mins Routine: 4 Hrs	UHL ENNIS NENAGH	Yes	Note: LDH assay is subject to interference from haemolysis.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
				GP: 3 working days			
LDH (Lactate Dehydrogenase)	Fluid	Vacutainer (Brown)	N/A	1 working day	UHL	No	The source of the fluid i.e. pleural, ascitic must be stated on the request form. All effusions should be accompanied by a paired serum sample. Measurement of LDH in fluid samples has not been validated and is not CE marked
Lead	Blood	Orange (LiH) Trace Metal Tube. Metal Free Needle	See Report	Contact Lab	Referred	No	This specimen should be collected first if other tests are requested to avoid contamination. Service is restricted to HSE MID WEST consultants.Appropriate clinical details required to process request.
Lipase	Blood	Serum (Brown)	See Report	Contact Lab	Referred	No	Amylase is now measured instead of Lipase to prevent delay in diagnosis of Pancreatitis. Lipase not routinely available. Service restricted to HSE MID WEST consultants.
Lipid profile (Total Cholesterol, HDL-C, Non-HDLC, LDL-C, Triglyceride)	Blood	Lithium Heparin (Green) or Serum (Brown)	See Individual Tests	Routine: 4 Hrs GP: 3 working days	UHL ENNIS	Yes	Fasting is not required for standard lipid profile. Serum triglyceride is subject to major increases following meals. A 12-hour

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							fast is essential if previous triglyceride result was >1.7 mmol/L.
Lithium	Blood	Serum (Brown)	Therapeutic range: 0.40-1.00 mmol/L Intoxication risk: >1.5mmol/L	1 working day GP: 3 working days	UHL	Yes	Clinical indication: For monitoring lithium therapy. Toxicity may occur within the therapeutic interval in some patients. Patient should be monitored for signs and symptoms of Lithium toxicity. Sample must be taken at least 12 hours after the last dose of lithium (or just before the next dose in a twice daily dosing regimen.
Liver Profile **(Total Protein, Total Bilirubin, Albumin, ALT, GGT, ALP)**	Blood	Lithium Heparin (Green) or Serum (Brown)	See Individual Tests	Urgent: 90mins Routine: 4 Hrs GP: 3 working days	UHL ENNIS NENAGH	Yes	
Luteinising Hormone (LH)	Blood	Lithium Heparin (Green) or Serum (Brown)	Male > 20Y 1.7-8.6 U/L Female (U/L): Follicular Phase 2.4-12.6 Mid-Cycle 14.0-95 Mid-Luteal 1.0-11.4	1 working day GP: 3 working days	UHL	Yes	Clinical indication: To distinguish primary hypogonadism from pituitary/hypothalamic failure (in conjunction with FSH, estradiol (women) and testosterone (men). In children, FSH and LH are used to investigate delayed or precocious (early) puberty.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
			Post-Menopausal 7.7-58.5				Method used: Roche immunoassay. Biotin may cause some concentration dependent negative interference in this assay if high dose supplements are taken. If patient is on high dose biotin collect sample at least 8 hours after the last dose.
Lysosomal white cell enzyme analysis	Blood	Lithium Heparin	See Report	Contact Lab	Referred	No	Appropriate clinical details required. Sample must be brought to lab immediately. Must be taken Monday to Wednesday.
Magnesium	Blood	Lithium Heparin (Green) or Serum* (Brown)	mmol/L 0D - 1M 0.62-0.91 1M - 6Y 0.70-0.95 6Y - 12Y 0.70-0.86 12Y – 18Y 0.70-0.91 Adults 0.7-1.0	Urgent: 90mins Routine: 4 Hrs GP: 3 working days	UHL NENAGH ENNIS*	Yes	*Serum only accepted in Ennis for this test.
Magnesium	Urine (Random or 24hr)	Vacutainer (Brown) 24hr Acid Collection	Not available for random urine 3.0-5.0 mmol/24 h	1 working day GP 3 working days	UHL	Yes	Urine container and request form must be clearly labelled with patient name, DOB and hospital number. The date and time of the start and finish of the 24-hour urine collection must be clearly indicated. Acid container is available from laboratory reception.
Manganese	Blood	Orange (LiH) Trace Metal Tube. Metal Free Needle	See Report	Contact lab	Referred	No	Appropriate clinical details required. Available to HSE MID WEST consultants only.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
Metanephrines	Blood	EDTA (Purple)	See Report	Contact Lab	Referred	No	Transport to lab immediately Patient should avoid caffeine and nicotine for 24 hrs prior to blood sampling. Avoid catecholamine-rich foods (e.g. bananas, plums, pineapples, walnuts, tomatoes, avocados, kiwi, aubergines, alcoholic drinks, vinegar, vanilla). If 3-Methoxytyramine (dopamine metabolite) is being assessed, a fasting sample is required. Avoid stress as this may cause false positive results. Patients should be seated for 15 minutes prior to blood being taken. Indicate if the patient was supine or erect at time of sampling. Some drugs (such as tricyclic antidepressants, selective serotonin reuptake inhibitors, serotonin and noradrenaline reuptake inhibitors, α- and β- adrenergic receptor blockers, calcium channel blockers, monoamine oxidase inhibitors, Levo Dopa, methyldopa and several stimulant/sympathomimetic drugs) are known to increase the likelihood of false-positive results
Metanephrines	Urine	24hr Acid Collection	See Report	Contact Lab	Referred	Yes	Urine collection bottle and request form must be clearly labelled with patient name and hospital number. The date and time of the start and finish of

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							the 24-hour urine collection must be clearly indicated. Acid container is available from laboratory reception. Avoid consumption of catecholamine rich food for 3 days prior to and during urine collection (see plasma metanephrines notes) See plasma metanephrines for details of drug interferences
Methotrexate	Blood	Lithium Heparin (Green) or Serum (Brown)	See Report	Contact Lab	Referred	No	Contact Lab in advance to arrange Details of timing of dose, specimen collection, dosage regimen and mode of administration must be included with request.
Muco-polysaccharides	Urine	Universal Container (min 20ml)	See Report	Contact Lab	Referred	No	Appropriate clinical details required. Transport to lab immediately
Mycophenolate	Blood	EDTA (Purple)	See Report	Contact Lab	Referred	Yes	Trough (pre-dose) sample required. Sample must be transported to lab ASAP. The date and time of specimen collection and the date, time and dosage of the last mycophenolate dose must be recorded on the request form.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
NT pro Brain natriuretic peptide (NT Pro BNP)	Blood	Lithium Heparin (Green) or Serum (Brown)	See report	1 working day GP: 3 working days	UHL	CDM only	Be aware Obesity, African or African-Caribbean family origin, or treatment with diuretics, ACE inhibitors, beta blockers, ARBs, or MRAs can reduce levels of serum natriuretic peptides. High levels can have causes other than heart failure (for example, age > 70, LVH, ischaemia, tachycardia, right ventricular overload, hypoxaemia (including PE), renal dysfunction, sepsis, COPD, diabetes, or liver cirrhosis). Source reference: https://www.bmj.com/content/362/bmj.k3646 Biotin may cause some concentration dependent negative interference in this assay if high dose supplements are taken. If this is suspected, a repeat request 8 plus hours off Biotin is recommended in the first instance.
Oligoclonal IgG banding (CSF)	CSF	Universal Container Serum (Brown)	See Report	Contact Lab	Referred	No	Clinical indication: The diagnosis of Multiple Sclerosis (MS) can be supported by the presence of oligoclonal bands in the CSF. CSF must be accompanied by paired serum (Brown) sample. Do not use pneumatic tube system for CSF sample.
Organic Acids	Random urine	Vacutainer (Brown)	See Report	Contact lab	Referred	No	Transport to lab immediately. Appropriate clinical details required.
Osmolality	Blood	Lithium Heparin (Green) or	275 – 295 mmol/kg	Urgent: 90mins Routine: 4 Hrs	UHL	Yes	Please contact lab in advance if performing water deprivation test

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
		Serum (Brown)		GP: 3 working days			
Osmolality	Urine	Vacutainer (Brown)	N/A	Urgent: 90mins Routine: 4 Hrs GP: 3 working days	UHL	Yes	Please contact lab in advance if performing water deprivation test Urine osmolality results should be interpreted in conjunction with the, serum osmolality, sodium, patient's renal function hydration status and clinical condition.
Osteocalcin	Blood	Serum (Brown)	See Report	Contact lab	Referred	No	Fasting morning sample is preferred. Transport to lab immediately.
Oxalate	Urine (Random or 24hr)	Vacutainer (Brown) or 24-hr plain container	See Report	Contact lab	Referred	No	Clinical indication: Diagnosis of primary or secondary hyperoxaluria in patients with renal calculi. Urine collection bottle and request form must be clearly labelled with patient name, DOB and hospital number. The date and time of the start and finish of the 24-hour urine collection must be clearly indicated. Sample must be immediately transported to lab. Note sample acidify on receipt to a pH of 2-3
Paracetamol (Acetaminophen)	Blood	Lithium Heparin (Green) or Serum (Brown)	See Report	Urgent: 90mins	UHL	No	In suspected paracetamol overdose, take sample more than 4 hours post ingestion. Caution: In Paracetamol (acetaminophen) overdose, its metabolite NAPQI and antidote N Acetylcysteine may interfere with

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							Roche enzymatic, trinder-based assays, potentially causing falsely low results for plasma/serum creatinine, lactate, uric acid, total CHOL, LDLC, HDL and Triglycerides.
Phenobarbitone	Blood	Lithium Heparin (Green) or Serum (Brown)	10-40 mg/L	1 working day GP: 3 working days	UHL	Yes	Take sample prior to next dose (at steady state). Time to Steady State: 3 weeks after initial therapy or change in dose.
Phenytoin	Blood	Lithium Heparin (Green) or Serum (Brown)	5-20 mg/L	1 working day GP: 3 working days	UHL	Yes	Pre dose (Trough) sample is recommended however, this is not critical.
Phosphate	Blood	Lithium Heparin (Green) or Serum (Brown)	Adult: 0.8-1.5 mmol/L Appropriate age and gender specific RI provided with results. Levels in children higher than adult	Urgent: 90mins Routine: 4 Hrs GP: 3 working days	UHL ENNIS NENAGH	Yes	Haemolysis overestimates phosphate result. Plasma concentrations are higher if separation is delayed. Concentration is affected by dietary factors.
Phosphate	Urine (Random or 24hr)	Vacutainer (Brown) or 24hr Acid Collection	No reference interval available for random urine 13.0-42.0 mmol/24 h	1 working day	UHL	Yes	Clinical indication: Assessment of renal phosphate handling may be indicated in a variety of pathological conditions associated with hypophosphatemia. Urine container and request form must be clearly labelled with patient name and hospital number. The date and time of the start and finish of the 24-hour urine collection must be clearly indicated.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							Acid container is available from laboratory reception.
Porphyrin screen (urine prorphyrin, faecal porphrin, plasma porphyrin and red cell porphyrin)	Blood Urine Faeces	2 X Lithium Heparin (Green) 2 X EDTA (Purple) Vacutainer (Brown) for random Urine Universal Container for (Faeces)	See Report	Contact Lab	Referred	Yes- only with prior discussion with lab	Appropriate clinical details required. All samples are required and must be protected from light (wrap in aluminium foil).
Porphobilinogen (PBG)	Urine (random)	Vacutainer (Brown)	See Report	Contact Lab	Referred	Yes	Clinical indication: Diagnosis of acute hepatic porphyria. Protect from light and transport to lab ASAP. Optimal time for collection is during suspected acute porphyria attack. Appropriate clinical details, current medication, and family history (if known) are required.
Potassium	Blood	Lithium Heparin (Green) or	3.5-5.3 mmol/L	Urgent: 90mins Routine: 4 Hrs	UHL ENNIS NENAGH	Yes	This test is available as part of the Renal Profile Falsely elevated values can occur if there is a delay in sample separation.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
		Serum (Brown)		GP: 3 working days			Do not refrigerate whole blood. Do not take blood from a limb with an IV infusion. Please clearly mention time and date of sample collection on the request form. For primary care requests the Potassium test must be clearly written on the request form.
Potassium	Urine (Random or 24hr)	Vacutainer (Brown) 24hr Plain Collection	No reference interval available for random urine potassium 25-125 mmol/24 h	1 working day GP 3 working days	UHL	Yes	Urine collection bottle and request form must be clearly labelled with patient name, DOB and hospital number. The date and time of the start and finish of the 24-hour urine collection must be clearly indicated.
Procalcitonin	Blood	Lithium Heparin (Green) or Serum (Brown)	> 2.0 ug/L consistent with high risk of severe sepsis	Urgent: 1hr Routine: 4hr	UHL	No	**Not suitable for add-on** Method used: Roche immunoassay Biotin may cause some concentration dependent negative interference in this assay if high dose supplements are taken. If this is suspected, a repeat request 8 plus hours off Biotin is recommended in the first instance.
Procollagen 1 N-terminal peptide (P1NP)	Blood	Serum (Brown)	See Report	Contact Lab	Referred	No	Bone turnover marker Fasting morning sample is preferred Transport to lab immediately.
Procollagen peptide Type 3 (P111NP)	Blood	Serum (Brown)	See Report	Contact Lab	Referred	No	Transport to lab immediately

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
Progesterone	Blood	Lithium Heparin (Green) or Serum (Brown)	Male: <0.474 nmol/L Female (nmol/L): Follicular 0.159-0.616 Mid-Cycle 0.175-13.2 Mid-Luteal 13.1 - 46.3 Post Menopause <0.401	1 working day GP: 3 working days	UHL	Yes	Clinical indication: Detection of ovulation and evaluation of the function of the corpus luteum. A serum progesterone of 30 nmol/L or greater when measured 7 days before the next predicted menstruation (e.g. day 21 of a 28 day cycle) is suggestive of ovulation. Method used: Roche immunoassay Biotin may cause some concentration dependent positive interference in this assay if high dose supplements are taken. If this is suspected, a repeat request 8 plus hours off Biotin is recommended in the first instance.
Prolactin (total)	Blood	Lithium Heparin (Green) or Serum (Brown)	Male 86-325 mU/L Female 102-496 (Non-Pregnant)	1 working day GP: 3 working days	UHL	Yes	Clinical indication: Assessment of patients with a suspected pituitary tumour; investigation of infertility, amenorrhoea, galactorrhoea and impotence. Raised prolactin levels may result from normal pregnancy and lactation, many drugs, particularly the anti-psychotic agents that act via dopamine metabolism or dopamine receptors, renal failure, stress, including that associated with venepuncture, exercise, seizures, hypothyroidism. Method used: Roche immunoassay Biotin may cause some concentration dependent negative interference in this

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							assay if high dose supplements are taken. If this is suspected, a repeat request 8 plus hours off Biotin is recommended in the first instance.
Monomeric (Bioactive) prolactin	Blood	Lithium Heparin (Green) or Serum (Brown)	Male 63-245 mU/L Female 75-381 mU/L (Non-pregnant)	5 working days	UHL	Yes	Monomeric prolactin is automatically added on all total prolactin results >700 mU/L on first presentation or patients who have screened negative within the last 3 years for macroprolactin, but whose total prolactin levels have increased significantly (> 50%).
PSA (Prostate Specific Antigen, total)	Blood	Lithium Heparin (Green) or Serum (Brown)	<50 Y 0-1.90 ug/L 50Y - 59Y 0-2.90 ug/L 60Y - 69Y 0-3.90 ug/L >70Y 0-4.90 ug/L	1 working day GP: 3 working days	UHL	Yes	Clinical indication: Diagnosis and monitoring of prostrate cancer. See NCCP GP referral guideline 2018: https://www.hse.ie/eng/services/list/5/cancer/profinfo/resources/gpreferrals/gp-prostate-referral-form-and-guideline.html Specimen should reach laboratory within eight hours of venipuncture. Method used: Roche immunoassay Biotin may cause some concentration dependent negative interference in this assay if high dose supplements are taken. If this is suspected, a repeat request 8 plus hours off Biotin is recommended in the first instance.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
Protein (Total)	Blood	Lithium Heparin (Green) or Serum (Brown)	60-80 g/L	Routine: 4 Hrs GP: 3 working days	UHL ENNIS NENAGH	Yes	This test is available as part of liver profile.
Protein (Total)	CSF	Universal Container	0.15-0.45 g/L	Urgent: 90mins	UHL	No	CSF specimens must be hand delivered to Microbiology for initial processing. Microbiology send aliquot to Biochemistry. Blood Stained sample - Unsuitable
Protein (Total)	Urine (Random or 24hr)	Vacutainer (Brown) 24hr Plain Collection	0.00-0.14 g/24 h	1 working day GP: 3 working days	UHL	Yes	Urine collection bottle and request form must be clearly labelled with patient name and hospital number. The date and time of the start and finish of the 24-hour urine collection must be clearly indicated. Levodopa, methyldopa,sulfasalazin and Na2 cefoxitin cause artificially high total protein results at the therapeutic drug level. Phenazopyridine and calcium dobesilate cause artificially low protein results at the therapeutic drug level (source ROCHE IFU). Sulfasalazine may cause false high results
Protein to Creatinine Ratio	Urine (Random)	Vacutainer (Brown)	0-15 mg/mmol creat	Urgent: 90mins	UHL	Yes	Early morning urine is preferred

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
				Routine: 3 working days			
Protein (Total)	Fluid	Vacutainer (Brown)	Not available	1 working day	UHL	No	Sulfasalazine may cause false high results The source of the fluid i.e. pleural, ascitic must be stated on the request form. All effusions should be accompanied by a paired serum sample Measurement of Protein in fluid samples has not be validated and is not CE marked.
Protein Electrophoresis (SPEP)	Blood	Serum (Brown)	See Report	Contact Lab	Referred	Yes	For requests from primary care, specimen may be sent for serum free light chain analysis if new paraprotein is identified. Please refer to UHL Guidance on Management of MGUS in Primary Care. https://www.hse.ie/eng/services/list/3/acutehospitals/hospitals/ulh/staff/resources/pppgs/uhl-guidance-management-of-mgus-in-primary-care-edition.pdf
Protein Electrophoresis (UPEP) Bence Jones Protein	Early morning urine	Universal Container (Minimum 20ml)	See Report	Contact Lab	Referred	Yes	

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
PTH (Parathyroid Hormone)	Blood	EDTA (Purple)	17-60 ng/L	1 working day GP: 3 working days	UHL	Yes	Clinical indication: Useful in investigating the cause of hyper- and hypo-calcaemia and monitoring patients with CKD. Paired sample (Green or Brown Top) for calcium should be requested if investigating for hypo or hypercalcaemia. Labile analyte, sample must be transported to the lab immediately. Method used: Roche immunoassay. Biotin may cause concentration dependent negative interference in this assay if high dose supplements are taken. If suspected, a repeat 8 plus hours off Biotin is recommended in the first instance
Renal profile – Primary Care (UHL: urea, Na, Cl, creatinine, eGFR; Ennis urea, Na, K, Cl, creatinine, eGFR)	Blood	Lithium Heparin (Green) or Serum (Brown)	See Individual Tests	GP: 3 Working days	UHL ENNIS	Yes	
Renal profile – Inpatient **(Urea, Na, K, Cl, creatinine, eGFR)**	Blood	Lithium Heparin (Green) or Serum (Brown)	See Individual Tests	Urgent: 90 mins Routine: 4hr	UHL NENAGH ENNIS	No	
Renin	Blood	EDTA (Purple)	See Report	Contact Lab	Referred	No	Patient must attend UHL Phlebotomy for sample collection.Blood should ideally be collected after the patient

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
		2 X EDTA renin/aldosterone ratio					has been seated for 10 minutes. Transport to lab immediately. Please state posture (i.e. Supine or Erect). Include details of any hypertensive medication as this may affect results. Two EDTA samples are required if renin/aldosterone ratio is requested. https://academic.oup.com/jcem/article/93/9/3266/2596343
Salicylate	Blood	Lithium Heparin (Green) or Serum (Brown)	See Report	Urgent: 90mins Routine: 4hr	UHL	No	Clinical indication: Aid in the identification and management of salicylate intoxication along with medical history and clinical features in acute medical setting.
Sex Hormone Binding Globulin (SHBG)	Blood	Lithium Heparin (Green) or Serum (Brown)	nmol/L Male 20Y - 40Y 18-54 Male >50Y 21-77 Female 20Y - 40Y 32-128 Female >50Y 27-128	1 working day GP: 3 working days	UHL	Yes	Method used: Roche immunoassay Biotin may cause some concentration dependent negative interference in this assay if high dose supplements are taken. If this is suspected, a repeat request 8 plus hours off Biotin is recommended in the first instance.
Sirolimus	Blood	EDTA (Purple)	See Report	Contact Lab	Referred	Yes	Special request form for immune-suppressant drug monitoring should be used. The date and time of specimen collection and the date, time and

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							dosage of the last dose must be recorded on the request form.
Sodium	Blood	Lithium Heparin (Green) or Serum (Brown)	133-146 mmol/L	Urgent: 90mins Routine: 4 Hrs GP: 3 working days	UHL ENNIS NENAGH	Yes	Do not take blood from limb with IV infusion. This test is available as a part of Renal Profile
Sodium	Urine (Random or 24hr)	Vacutainer (Brown) Or 24hr Plain Collection	Reference interval not available for random urine Na 40-220 mmol/24 h	1 working day GP: 3 working days	UHL	Yes	Urine collection bottle and request form must be clearly labelled with patient name, DOB and hospital number. The date and time of the start and finish of the 24-hour urine collection must be clearly indicated.
Steroid profile	Urine (Random or 24hr)	Vacutainer (Brown) 24hr Plain Collection	See Report	Contact Lab	Referred	No	Urine collection bottle and request form must be clearly labelled with patient name and hospital number. The date and time of the start and finish of the 24-hour urine collection must be clearly indicated. Appropriate clinical details required to process the request.
Sweat Chloride Test	Sweat	Sweat collection device	Appropriate reference interval and interpretative comments provided with results	4 Hrs	UHL	No	Sample collection performed by Phlebotomy Bookings for sweat tests may be made with Phlebotomy Department UHL.(contact via switch)
Tacrolimus (FK506)	Blood	EDTA (Purple)	See Report	Contact Lab	Referred	Yes	Special request form for immune-suppressant drug monitoring should be

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							used. Trough (pre-dose) sample required. The date and time of specimen collection and the date, time and dosage of the last dose must be recorded on the request form.
Testosterone Testosterone ctd.	Blood	Lithium Heparin (Green) or Serum (Brown)	nmol/L Male 20Y - 49Y 8.6-29.0 Male ≥50Y 6.7-25.7 Female 20Y - 49Y 0.3-1.7 Female ≥50Y 0.1-1.4	1 working day GP: 3 working days	UHL	Yes	Clinical indication: Assessment of hyperandrogenism in females. Investigation of testicular failure, erectile dysfunction in men or precocious/delayed puberty in male children In males, 09:00 am sample is preferred due to effects of diurnal variation. SHBG will be added to all female testosterone requests. Method used: Roche immunoassay. Biotin may cause some concentration dependent positive interference in this assay if high dose supplements are taken. If this is suspected, a repeat request 8 plus hours off Biotin is recommended in the first instance.
Testosterone Free (Calculated)	Blood	Lithium Heparin (Green) or	See Report	1 working day GP: 3 working days	UHL	Yes	Reflex added by laboratory IT rule and calculated using Vermeulen formula based on pt. sex, age and testosterone result.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
		Serum (Brown					
Theophylline	Blood	Lithium Heparin (Green) or Serum (Brown)	10-20 mg/L	1 working day GP: 3 working days	UHL	Yes	Sample Pre dose (Trough). For urgent request contact lab
Thiopurine S-Methyl transferase activity (TPMT)	Blood	2 x EDTA (Purple)	See Report	Contact Lab	Referred	No	Appropriate clinical details required
Thyroid function test (TFT) (FT4 & TSH)	Blood	Lithium Heparin (Green) or Serum (Brown)	See Individual Tests	1 working day GP: 3 working days	UHL	Yes	
Thyroid stimulating hormone (TSH)	Blood	Lithium Heparin (Green) or Serum (Brown)	0.30-4.20 mU/L (reference interval for non-pregnant adult) Trimester specific reference interval: 1st trimester 0.1 – 3.1 mU/L 2nd trimester 0.2 – 3.3 mU/L 3rd trimester 0.4 – 3.6 mU/L	1 working day GP: 3 working days	UHL	Yes	Clinical details and all current medication are required. Method used: Roche immunoassay Biotin may cause some concentration dependent negative interference in this assay if high dose supplements are taken. If this is suspected, a repeat request 8 plus hours off Biotin is recommended in the first instance.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
			Paediatric reference intervals (mU/L): 0D - 6D 0.70-15.2 >6D - ≤3M 0.72-11.0 >3M - ≤12M 0.73-8.35 1Y - ≤6Y 0.70-5.97 7Y - ≤11Y 0.60-4.84 12Y - 18Y 0.51-4.30				
Thyroglobulin and Anti-Thyroglobulin Antibody	Blood	Serum (Brown)	See Report	Contact Lab	Referred	No (only available for monitoring of patients with thyroid cancer)	Available for monitoring of patients with diagnosis of thyroid cancer. Please provide appropriate clinical details. Measurement of Anti-Thyroglobulin Antibodies should only be requested in patients with thyroid carcinoma to aid the interpretation of Thyroglobulin concentrations.
TSH receptor antibody (TRAB)	Blood	Serum (Brown)	See Report	Contact Lab	Referred	Yes	Clinical indication: TRAb are used in the diagnosis and monitoring of Graves' hyperthyroidism and Graves orbitopathy. Appropriate clinical details required
Thyroid peroxidase antibody (TPO)	Blood	Lithium Heparin (Green) or Serum (Brown)	0-34 kU/L	1 working day GP: 3 working days	UHL	Yes	For diagnosis of autoimmune thyroiditis: Measure TPO Antibodies on one occasion, there is no value of serial monitoring. DO NOT test for TPO antibodies when TFTs are normal. Method used: Roche immunoassay Biotin may cause some concentration dependent positive interference in this

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							assay if high dose supplements are taken. If this is suspected, a repeat request 8 plus hours off Biotin is recommended in the first instance. Please contact lab for further details
TIBC (Total Iron Binding Capacity – calculated)	Blood	Lithium Heparin (Green) or Serum (Brown)	41-77 µmol/L	1 working day GP: 3 working days	UHL	Yes	TIBC is calculated and available as a part of Iron studies profile.
Tobramycin Antibiotic Assay	Blood	Serum (Brown)	Aminoglycoside Onc daily dosing / Extended Interval / Pulse Dosing Trough Tobramycin < 1 mg/L **NB: Trough should not exceed above levels.** Please refer to the UHL Adult and Paediatric Antimicrobial Guidelines for further details on dosage requirements	Urgent: 90 mins	UHL	No	Random levels are not recommended by the consultant microbiologist because of difficulty with interpretation Pre-dose (Trough) Level: Blood samples should be taken 18 – 24 hrs after the previous dose. Inactivation of aminoglycosides by ß-lactam antibiotics occurs; as a result, it is recommended that if samples for aminoglycoside estimation cannot be assayed immediately, they should be stored at 0°C - 5°C. See HSE Mid West EOLAS antimicrobial app and antimicrobial guidelines on Intranet (IHUB) for further information. A separate serum sample must be submitted for Tobramycin testing. Assay testing will not be performed on routine biochemistry requests

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
Transferrin	Blood	Lithium Heparin (Green) or Serum (Brown)	2.0-3.6 g/L	1 working day GP: 3 working days	UHL	Yes	This test is available as a part of Iron studies profile.
Transferrin saturation	Blood	Lithium Heparin (Green) or Serum (Brown)	15-45 %	1 working day GP: 3 working days	UHL	Yes	Transferrin saturation is calculated and available as a part of Iron studies profile.
Triglyceride	Blood	Lithium Heparin (Green) or Serum (Brown)	0.3-1.7 mmol/L	Routine: 4hr GP: 3 working days	UHL ENNIS	Yes	Available as part of lipid profile. Fasting is not required for the initial analysis of the standard lipid profile. Serum triglyceride is subject to major increases following meals. A 12-hour fast is essential if previous triglyceride result was >1.7 mmol/L. Triglyceride of >10 mmol/L is associate with a risk of acute pancreatitis.
Triglyceride	Fluid	Vacutainer (Brown)	N/A	1 working day	UHL	No	The source of the fluid i.e. pleural, ascitic must be stated on the request form. All effusions should be accompanied by a paired serum sample Measurement of Triglyceride in fluid samples has not be validated and is not CE marked
		Lithium Heparin (Green) –	0-14 ng/L	Urgent: 90 Mins Wards: 4hr	UHL ENNIS NENAGH	No	For acute medical setting only.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
Troponin T (hsTnT) Troponin T (hsTnT) ctd.	Blood	UHL& Nenagh Serum (Brown) Ennis		Urgent Ennis: 120 min			Haemolysis can produce falsely low Troponin T result. Interpret results in context of clinical presentation, risk score, ECG findings as per local agreed chest pain pathway. Method used: Roche immunoassay. Biotin may cause some concentration dependent negative interference in this assay if high dose supplements are taken. If you suspect biotin interference, please notify the laboratory and we will have the specimen analysed on a platform that does not use biotin-based technology where possible.
Tryptase	Blood	EDTA sample preferred (purple top) Serum (Brown top) also acceptable.	See report	Contact lab	Referred	No	Useful for assessing mast cell activation as a result of anaphylaxis. Investigating patients for Systemic Mastocytosis or Mast Cell Activation Syndrome. The first sample should be taken as soon as possible after commencement of the reaction and ideally within the first 30 minutes. Further samples

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							should be taken 3, and 24 hours after reaction. Full documentation incl. history, drugs administered and FBC result (if available) is required to process request. Sample must be transported to the lab immediately.
Urate/Uric Acid	Blood	Lithium Heparin (Green) or Serum (Brown)	Male 200-430 µmol/L Female 140-360 µmol/L	Routine: 4 Hrs GP: 3 working days	UHL ENNIS NENAGH	Yes	Please be aware Rasburicase may cause falsely low uric acid result if sample processing is delayed. Transport sample immediately to lab and indicate if patient on Rasburicase.
Urate/Uric Acid	Fluid	Vacutainer (Brown)	N/A	1 working day	UHL	Yes	The source of the fluid must be stated on the request form. Measurement of Uric Acid in fluid samples has not be validated and is not CE marked.
Urate/Uric Acid	Urine (Random or 24hr)	Vacutainer (Brown) or 24hr Plain Collection	Reference interval not available for random urine sample 1.2-5.9 mmol/24 h	3 working days	UHL	Yes	Do not refrigerate container Urine collection bottle and request form must be clearly labelled with patient name, DOB and hospital number. The date and time of the start and finish of the 24-hour urine collection must be clearly indicated
Urea	Blood	Lithium Heparin (Green) or	2.5-7.8 mmol/L	Urgent: 90mins Routine: 4 Hrs	UHL ENNIS	Yes	Urea is available as part of Renal Profile

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
		Serum (Brown)		GP: 3 working days	NENAGH		
Urea	Fluid	Vacutainer (Brown)	N/A	1 working day	UHL	No	The source of the fluid i.e. pleural, ascitic must be stated on the request form. All effusions should be accompanied by a paired serum sample Measurement of Urea in fluid samples has not be validated and is not CE marked
Urea	Urine	Vacutainer (Brown) or 24hr Plain Collection	Reference interval not available for random urine sample 428-714 mmol/24 h	1 working days GP: 3 working days	UHL	Yes	Urine collection bottle and request form must be clearly labelled with patient name and hospital number. The date and time of the start and finish of the 24-hour urine collection must be clearly indicated
Valproate (Valproic acid, Epilim®)	Blood	Lithium Heparin (Green) or Serum (Brown)	50-100 mg/L	1 working day GP: 3 working days	UHL	Yes	Clinical indication: Serum levels may be useful to assess compliance. Sample prior next oral dose in a patient at steady state. Routine therapeutic monitoring not recommended. Clinical response is more reliable
Vancomycin Antibiotic Assay	Blood	Serum (Brown)	Glycopeptides Trough Peak Vancomycin 15–20 mg/L (Complicated infections such as bacteraemia, endocarditis, osteomyelitis, meningitis and hospital-acquired pneumonia caused by *S. aureus.)*	Urgent: 90 mins	UHL	No	**Time and date of Sample must be stated on request form**. “Random samples” should not be submitted. Random levels are not routinely recommended by the consultant microbiologist because of difficulty with interpretation

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
			Pre-dose levels of 15-20mg/L are appropriate in bacteraemia, endocarditis, osteomyelitis, meningitis, hospital acquired pneumonia and MRSA infections or where advised by Microbiology or ID services. Pre-dose levels of 10-20mg/L are appropriate for other infections e.g. skin/soft tissue infection without MRSA involvement. **NB: Trough should not exceed above levels.** Please refer to the UHL Adult and Paediatric Antimicrobial Guidelines for further details on dosage requirements Vancomycin Continuous Infusion in Adult ICU patients ONLY Therapeutic Range 20-25mg/L Please follow Vancomycin Continuous Infusion Guideline for dose adjustment.				Pre-dose (Trough) Level: Blood sample is drawn 30 mins before the dose is due to be given. See HSE Mid West Eolas antimicrobial app and antimicrobial guidelines on Intranet (IHUB) for further information. A separate serum sample must be submitted for Vancomycin testing. Assay testing will not be performed on routine biochemistry requests.
Vasoactive intestinal polypeptide (VIP)	Blood	EDTA (Purple)	See Report	Contact lab	Referred	No	Appropriate clinical details required Fasting sample required. Transport sample to lab immediately. Patient must attend UHL Phlebotomy for sample collection

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
Very long chain fatty acids (VLCFA)	Blood	EDTA (Purple) or Lithium Heparin (Green)	See Report	Contact Lab	Referred	No	Appropriate clinical details required. Transport to lab immediately Monday-Wednesday only
Vitamin A	Blood	Serum (White)	See Report	Contact Lab	Referred	No	Non Gel, light protected sample required. Transport to lab immediately.
Vitamin B6 (pyridoxine)	Blood	EDTA (Purple)	See Report	Contact Lab	Referred	No	Light protected Transport to lab immediately. Appropriate clinical details required
Vitamin B12 Vit B12 ctd.	Blood	Lithium Heparin (Green) or Serum (Brown)	197-771 pg/mL	Routine: 4 Hrs GP: 3 working days	UHL	Yes	Fasting samples are recommended. Not available as screening test. Pregnancy, OCPs or Metformin can cause falsely low levels. B12 stores last over three years. If B12 result is normal in the previous six months, repeat test is not indicated. Patients on parenteral B12 replacement do not require repeat vitamin B12 measurement unless blood counts or neurological symptoms fail to improve. Minimum retest interval is 90 days. Indications for Measurement: Haematological:unexplained anaemia/other cytopenias, unexplained macrocytosis, haemolysis Neurological: Subacute combined degeneration of the cord, peripheral

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							neuropathy, dementia, unexplained neurology. Other: Glossitis, Pregnancy, Malabsorption, Gastric resection, vegans, alcoholism, dialysis. Medications: Metformin therapy, prolonged proton pump inhibitor or H2 receptor antagonist therapy, anticonvulsant therapy, Methotrexate
Vitamin D (25-hydroxy vitamin D)	Blood	Lithium Heparin (Green) or Serum (Brown)	Sufficient: ≥ 50 nmol/L	1 working day GP: 3 working days	UHL	Yes	Screening not indicated in asymptomatic individuals. Refer to HSE Indications for Measurement of Vitamin D Levels: https://www.hse.ie/eng/about/who/cspd/lsr/resources/indications-for-measurement-of-vitamin-d-levels.pdf Separate sample and mandatory clinical information form to be completed for GP requests. Download form here: https://assets.hse.ie/media/documents/Supplementary_Vitamin_D_Request_Form.pdf Serum 25-(OH)D is an unreliable biomarker of vitamin D status after acute inflammatory insult. Please consider requesting after such insults

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Lab Location	Routinely Available to Primary Care	Notes
							Method used: Roche immunoassay Biotin may cause some concentration dependent positive interference in this assay if high dose supplements are taken. If this is suspected, a repeat request 8 plus hours off Biotin is recommended in the first instance.
Vitamin E (Tocopherol)	Blood	Serum (White)	See Report	Contact Lab	Referred	No	Non Gel light protected. Transport immediately to lab.
Xanthochromia	CSF	Universal Container (1 ml minimum)	See Report	Contact Lab	Referred	No	Sample must be light protected and transported to lab immediately. Do not use pneumatic tube system. Appropriate clinical and requester details required. Appropriate request form (LF-L-BIO-CSFREQ) must be completed (available from Biochemistry Lab)

D. Haematology

For Haematology reference interval tables refer to section 28.2 & 28.3

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
Activated Protein C Resistance (APC-R)	Blood	2 x Citrated plasma (Blue) and 1 x EDTA (Violet) or if ordered as part of a thrombophilia screen 4 x Citrated plasma (Blue) and 1 x EDTA (Violet).	120-300 sec	4W	UHL	No	Generally requested as part of a thrombophilia screen. Thrombophilia screening requests must be sanctioned by the UHL Haematology team and as such must include relevant clinical details. Thrombophilia screening is not performed on patients receiving warfarin and/or unfractionated heparin or novel anticoagulants. Sample must be sent to laboratory ASAP; time of collection must be noted on request form and/or samples. Samples received in laboratory >4hrs post collection will be rejected.
Anti Xa Level (Low molecular weight (LMWH) Heparin only)	Blood	Citrated plasma (Blue)	N/A	1W	UHL	No	Requests should be received by the laboratory within 1 hour of phlebotomy. Routine weekly anti Xa levels should be sent on Monday mornings. Specimen should be taken 3 hours post dose. The time of the last heparin dose must be stated on the request form.
Antithrombin III (ATIII)	Blood	2 x Citrated plasma (Blue)	80-120 U/dl	4W	UHL	No	Generally requested as part of a thrombophilia screen. Thrombophilia screening requests must be sanctioned by the UHL Haematology team and as such must include relevant clinical details. Thrombophilia screening is not performed on patients receiving warfarin and/or unfractionated heparin or novel anticoagulants.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
							Sample must be sent to laboratory ASAP; time of collection must be noted on request form and/or samples. Samples received in laboratory >4hrs post collection will be rejected. Antithrombin III levels are affected by pregnancy
APTT (Activated Partial Thromboplastin Time)	Blood	Citrated plasma (Blue)	See Table	Urgent: 1H Non GP: 4H GP: 8H	UHL Ennis	Yes	APTT requests for heparin dosage assessment should be received by the laboratory within 2 hours of phlebotomy. Samples for patients who are not on heparin must be received by the laboratory within 8 hours of phlebotomy. Out of hour/urgent requests for this test originating from external sources to UHL must include clinician's direct contact details and advance notice to the laboratory is advised.
Blood Film	Blood	EDTA (violet)	N/A	3D	UHL Ennis	Yes	Sample must be received within 2 hours of phlebotomy to avoid EDTA changes on the blood film. Please include relevant clinical details. Blood films will be made, examined and reported on patients' FBC results which satisfy the criteria laid in laboratory guidelines.
Bone Marrow Aspirate (BMA) Processing	Bone marrow	Bone marrow spread on glass slides.	N/A	14D	UHL	Yes	All BMA requests should be accompanied by an EDTA (FBC) sample. FBC/film should be requested on a separate form. Bone marrow slides should be hand delivered to the laboratory without delay, or should be fixed in methanol. **Slides must be labelled on frosted side using a lead pencil and accompanied by UHL haematology request form.** Identification details should include:

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
							Patients full name. PID / Chart number and/or DOB. Specimen date.
C282Y Mutation (Haemochromatosis Gene)	Blood	2 x EDTA (violet))	N/A	45 D	Referred	Yes	Refer to H63D Mutation (Haemochromatosis Gene)
CALR exon 9 mutations	Fluid	Peripheral blood (or bone marrow) sample taken into EDTA (Violet)	N/A	60D	Referred	No	Prior arrangement with UHL laboratory (061 482258). Review of clinical details and authorisation by a consultant haematologist/registrar. Consultant Haematologist signature/approval required on request form. Referred to Cancer Molecular Diagnostics (CMD), St James Hospital. Tel.: 01 410 3575
CD 4/8 Count (Flow Cytometry)	Blood	2 x EDTA (violet))	See Report	7D	UHL	No	Prior arrangement with laboratory, contact 061 482258. Flow cytometry requests will only be processed if the clinical details are consistent with appropriate requesting guidelines, e.g. known HIV patient on HAART therapy, ? lymphoproliferative disorder (requesting restricted to haematology consultants only). CD19 counts are processed once a week. Pre booking is essential. Samples must arrive in the laboratory before 09:30am on day of processing and may be collected for overnight storage in the laboratory the evening before the day of processing.
Coagulation Factor Assay	Blood	3 x Citrated plasma (Blue)	See Report	3W	UHL	No	1-2 factor assays require 2 samples; 3-4 factor assays require 3 samples; more than 4 factor assays require 4 samples

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
							Prior arrangement with the coagulation department, contact 061 482851. Refer to specific factor assays for special requirement details.
Coagulation Screen	Blood	Citrated Plasma (Blue)	See Table	Urgent:1 H Non GP: 4H GP: 8H	UHL Ennis	Yes	Profile includes PT, INR (for patients on warfarin) and APTT. Details of anticoagulant therapy required. Do not refrigerate INR samples. Out of hour/urgent requests for this test originating from external sources to UHL must include clinician's direct contact details and advance notice to the laboratory is advised.
CSF (Cytopsin for Haematology/Oncology patients Only)	CSF	Universal container	N/A	14D	UHL	No	Appropriate clinical details required. All CSF samples should be hand delivered without delay and be accompanied by UHL haematology request form. Volume: 200ul minimum CSF
CSF Immunophenotyping (Flow Cytometry)	CSF	CSF in RPMI	See Report	14D	Referred	No	See Notes Below:
Notes: Clinical Details required and referral authorised following consultation with Consultant Haematologist. Separate specimen required to avoid unnecessary delay in transport to referral lab. Take further samples for Microbiology, Biochemistry, Histology tests as required. Prior arrangement with UHL laboratory; contact 061 482258. Consultant signature/approval required on request form. Monday to Friday only - Requests should be received by the laboratory before 11:00 hours to facilitate same day transport to referral laboratory. Referred to MLL, Muncih, Germany							

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
D-Dimer (UHL)	Blood	Citrated Plasma (Blue)	See Tables For patients over 70 years who have a D-dimer value below 1 ug/ml with low probability Wells clinical score, thrombosis can be considered excluded and no further investigation is required.	Urgent: 2H Routine: 4H	UHL ENNIS*	Yes	See Notes Below:
Notes: D-Dimer is validated for Out Patient Assessment only **In–patient requests**: D-Dimer requests that are not accompanied by the 'Suspected DVT/PE' request form, do not meet the appropriate Wells Score, or from a location not approved by the Haematology Team, will be rejected for testing. **Repeat D-Dimer requesting within 72 hours requires Haematology Team approval.** **External requests.** All requests must include the relevant clinical details (QPE/QDVT /Wells Score) or be communicated directly to the Medical Scientist in Coagulation. D-Dimer testing should only be carried out in the community when assessing patients with low risk based upon a clinical score of a thrombosis (Well's criteria for DVT assessment). If the patients risk assessment indicates a high risk of thrombosis, the D dimer should not be requested and the patient should be referred into the Medical Assessment Unit for further investigation. Requests should be received by the laboratory within 8 hours of phlebotomy. Lipaemic or haemolysed plasmas not suitable for analysis. Out of hour/urgent requests for this test originating from external sources to UHL must include clinician's direct contact details and advance notice to the laboratory is advised.							
D-Dimer (Nenagh)	Blood	Citrated Plasma (Blue)	See Tables For patients over 70 years who have a D-dimer value below 1	2H	Nenagh	No	**Note : D-Dimer is validated for Out Patient Assessment only** **In-patient requests**: D-Dimer requests should be accompanied by the 'Suspected

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
			ug/ml with low probability Wells clinical score, thrombosis can be considered excluded and no further investigation is required.				DVT/PE' request form. If form unavailable please ensure relevant clinical details (QPE/QDVT /Wells Score) are provided. Requests which do not meet the appropriate Wells Score, will be rejected for testing. **Repeat D-Dimer requesting within 72 hours requires Haematology Team approval.** Requests should be received by the laboratory within 8 hours of phlebotomy. Lipaemic or haemolysed plasmas not suitable for analysis
Erythropoietin (EPO) Levels	Blood	2 x Serum (Brown)	See report	14D	Referred	No	Restricted to patients attending renal/haematology departments. Test not available to general practice patients or other specialties. Requests should be received by the laboratory within 24 hours of phlebotomy. Consultant signature / approval required on request form. Review of clinical details and authorisation by a consultant haematologist/registrar. Referred to Haematology Lab, St James Hospital Tel: 01 416 2943 / 416 2944 (09.00 to 17.00)
ESR (Erythrocyte Sedimentation Rate) UHL	Blood	EDTA (Violet)	Male /Y (mm/h) 0-17 5 ± 12 17-50 5 ± 12	Urgent specimens <3 hours (when	UHL Ennis	Yes	See Notes Below:

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
			51-60 6 ± 10 >60 10 ± 10 Female /Y (mm/h) 0-17 5 ± 12 17-50 8 ± 10 51-60 14 ± 6 >60 14 ± 8	laboratory informed) Routine ward specimens: 8 hours, GP specimens: 2 days			
Notes: Due to specimen volume requirements, this specimen must be provided in addition to the Sarstedt S Monovette EDTA specimen required for FBC/HbA1c requests. Please fill the bottle to the mark to ensure sufficient volume for testing. The plunger of the EDTA must be fully withdrawn as per standard phlebotomy protocol. Hand written or Blood track labels can be used if placed precisely over manufacturer's label. The use of larger addressograph labels can interfere with sample analysis and result in sample rejection. Samples received not meeting the defined criteria will be rejected Requests should be received by the laboratory within 8 hours of phlebotomy. Both ESR and CRP are biomarkers for inflammation with CRP a more sensitive and accurate reflection of the acute phase of inflammation. ESR testing will only be facilitated in addition to CRP if the following criteria are provided on the Blood Sciences request form. ESR testing can only be facilitated on same day specimens. 1. Giant cell arteritis 2. Temporal arteritis 3. Polymyalgia rheumatic 4. Hodgkin's lymphoma 5. Rheumatology patients							
ESR (Erythrocyte Sedimentation Rate) Nenagh	Blood	EDTA (Violet)	Male /Y (mm/h) 0-17 5 ± 12 17-50 5 ± 12 51-60 6 ± 10	Non urgent requests: 24H Urgent requests: 3H	Nenagh	No	See Notes Below:

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
			>60 10 ± 10 Female /Y (mm/h) 0-17 5 ± 12 17-50 8 ± 10 51-60 14 ± 6 >60 14 ± 8				
Notes: Please fill the bottle to the mark to ensure sufficient volume for testing. The plunger of the EDTA must be fully withdrawn as per standard phlebotomy protocol. Hand write or PDA labels can be used if placed precisely over manufacturer's label. The use of larger addressograph labels can interfere with sample analysis and result in sample rejection. Special requirements: Requests should be received by the laboratory within 8 hours of phlebotomy. Both ESR and CRP are biomarkers for inflammation with CRP a more sensitive and accurate reflection of the acute phase of inflammation. ESR is recommended for testing in the following circumstances; 1. Giant cell arteritis 2. Temporal arteritis 3. Polymyalgia rheumatic 4. Hodgkin's lymphoma 5. Rheumatology patients Samples received not meeting the defined criteria will be rejected							
Factor II (Prothrombin)	Blood	Citrated plasma (Blue).	70-120 u/dl	3W	UHL	No	Requests should be received by the laboratory within 2 hours of phlebotomy. Details of anticoagulant therapy required.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
							1-2 factor assays require 2 samples; 3-4 factor assays require 3 samples; more than 4 factor assays require 4 samples.
Factor V	Blood	Citrated plasma (Blue).	70-120 u/dl	3W	UHL	No	Requests should be received by the laboratory within 2 hours of phlebotomy. Details of anticoagulant therapy required. 1-2 factor assays require 2 samples; 3-4 factor assays require 3 samples; more than 4 factor assays require 4 samples.
Factor V Leiden (FVL)	Blood	2 x EDTA (Violet)	N/A	4W	Referred	No	Positive APCR / relevant family history required. Test must be sanctioned by UHL haematology team. Referred for analysis to: Haemostasis Molecular Genetics, St Thomas' Hospital, London. Tel: +44-207-188 2779
Factor VII	Blood	Citrated Plasma (Blue)	70-130 u/dl	3W	UHL	No	Requests should be received by the laboratory within 2 hours of phlebotomy. Details of anticoagulant therapy required. Do not refrigerate samples. 1-2 factor assays require 2 samples; 3-4 factor assays require 3 samples; more than 4 factor assays require 4 samples.
Factor VIII: C	Blood	Citrated Plasma (Blue)	60-150u/dl	3W	UHL	No	Requests should be received by the laboratory within 2 hours of phlebotomy. 1-2 factor assays require 2 samples; 3-4 factor assays require 3 samples; more than 4 factor assays require 4 samples.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
Factor IX	Blood	Citrated Plasma (Blue)	60-150 u/dl	3W	UHL	No	Requests should be received by the laboratory within 2 hours of phlebotomy. Details of anticoagulant therapy required. 1-2 factor assays require 2 samples; 3-4 factor assays require 3 samples; more than 4 factor assays require 4 samples.
Factor X	Blood	Citrated Plasma (Blue)	70-120 u/dl	3W	UHL	No	Requests should be received by the laboratory within 2 hours of phlebotomy 1-2 factor assays require 2 samples; 3-4 factor assays require 3 samples; more than 4 factor assays require 4 samples.
Factor XI	Blood	Citrated Plasma (Blue)	60-140 u/dl	3W	UHL	No	Requests should be received by the laboratory within 2 hours of phlebotomy. 1-2 factor assays require 2 samples; 3-4 factor assays require 3 samples; more than 4 factor assays require 4 samples.
Factor XII	Blood	Citrated Plasma (Blue)	60-140 u/dl	3W	UHL	No	Requests should be received by the laboratory within 2 hours of phlebotomy. 1-2 factor assays require 2 samples; 3-4 factor assays require 3 samples; more than 4 factor assays require 4 samples.
Factor XIII	Blood	Citrated Plasma (Blue)	See Report	4W	Referred	No	Requests should be received by the laboratory within 2 hours of phlebotomy. Monday to Friday only. Requests should be received by laboratory before 10:00 hours to facilitate same day transport to testing laboratory.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
							Referred to the National Centre for Hereditary Coagulation Disorders, St James. Tel.: 01-4162956 1-2 factor assays require 2 samples; 3-4 factor assays require 3 samples; more than 4 factor assays require 4 samples.
Full Blood Count (FBC) (UHL) White Cell Count Red Cell Count Haemoglobin Haematocrit MCV MCH MCHC Platelet Count Neutrophils Lymphocytes Monocytes Eosinophils Basophils	Blood	EDTA (Violet)	See Table	Urgent: 1 H. Non GP: 4 H GP: 24 hours	UHL Ennis	Yes	See Notes Below
Notes: Blood samples should be analysed within 8 hours, if not samples must be stored from 2ºC to 8ºC and processed within 24 hours of phlebotomy Please fill the bottle to the mark to ensure sufficient volume for testing. The plunger of the EDTA must be fully withdrawn as per standard phlebotomy protocol							

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
After 24 hours, WBC differential and red cell indices are affected by EDTA changes. WBC differential, haemoglobin and red cell indices are affected by pregnancy. Hyponatremia may interfere with MCV/MCHC results. Ensure samples are not taken from a drip site as this results in haemodilution of the sample. Clotted EDTA samples will not be processed. If platelet clumping has been reported in FBC analysis or Blood smear review, please contact the Haematology Laboratory directly for advice on how to proceed. It is not technically possible to process cord blood, pleural, ascites, CSF fluid etc. on a haematology analyser. Automated white cell/red cell counts cannot be provided on such fluids. Out of hour/urgent requests for this test originating from external sources to UHL must include clinician's direct contact details and advance notice to the laboratory is advised.							
Full Blood Count (FBC) (Nenagh) White Cell Count Red Cell Count Haemoglobin Haematocrit MCV MCH MCHC Platelet Count Neutrophils Lymphocytes Monocyte	Blood	EDTA (Violet)	See Table	2H	Nenagh	No	See Notes Below

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
Eosinophils Basophils							
Notes: Please fill the bottle to the mark to ensure sufficient volume for testing. Blood samples should be analysed within 8 hours, if not samples must be stored from 2ºC to 8ºC and processed within 24 hours of phlebotomy After 24 hours, WBC differential and red cell indices are affected by EDTA changes. Hyponatremia may interfere with MCV/MCHC results. Ensure samples are not taken from a drip site, as this results in haemodilution of the sample. Clotted EDTA samples will not be processed. Please note that the review of blood film morphology is performed in UHL. If platelet clumping has been reported in FBC analysis or Blood smear review, please contact the Haematology Laboratory directly for advice on how to proceed.							
Fibrinogen	Blood	Citrated Plasma (Blue)	2.0 – 4.0 g/l	Urgent: 2H Routine: 4H	UHL	Yes	Requests should be received by the laboratory within 8 hours of phlebotomy. Out of hour/urgent requests for this test originating from external sources to UHL must include clinician's direct contact details and advance notice to the laboratory is advised. See also coagulation screen
Free Protein S	Blood	2 x Citrated plasma (blue), or, if ordered as part of a thrombophilia screen, 4 x Citrated plasma (Blue)	57-122 u/dl	4W	UHL	No	Requests should be received by the laboratory within 4 hours of phlebotomy. Details of anticoagulant therapy required. Generally requested as part of a thrombophilia screen. Thrombophilia screening requests must be sanctioned by the UHL Haematology team and as such must include relevant clinical details.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
		and 1 x EDTA (Violet).					Thrombophilia screening is not performed on patients receiving warfarin and/or unfractionated heparin.
Glucose 6 Phosphate Dehydrogenase (G6PD)	Blood	2 x EDTA (Violet)	See Report	30D	Referred	No	Authorisation by Consultant Haematologist/Registrar Referred for analysis to: Haemolytic Anaemia Laboratory, St James. Tel.: 01 416 2394 Samples must be refrigerated if held overnight.
H63D Mutation (Haemochromatosis Gene)	Blood	2 x EDTA (Violet)	N/A	45D	Referred	Yes	Accompanied by completed Consent Form for Haemochromatosis Genetic Testing. Referred to Biomnis Ireland, Three Rock Rd, Sandyford Business Estate, Sandyford, D18 Tel: 01 295 8545 Referrals for genetic testing will only be accepted with a clear indication of the reason for testing. The patient must either have a fasting transferrin saturation > 45% or a first degree relative who is currently being venesected for haemochromatosis. Sample stability Whole blood in EDTA at room temperature: 3 days. Whole blood in EDTA at 2-8°C: 1 year Note the Haemochromatosis genetic test (HFE) should not be performed on patients under 16 years of age. This aligns with HSE and international recommendations on genetic testing under the age of consent

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
Haemoglobin A2 (Hb A2)	Blood	EDTA (Violet)	See Report	42D	Referred	No	Accompanied by UHL haemoglobinopathy request form. Refer to: **Haemoglobinopathy Screen**
Haemoglobin F (Hb F)	Blood	EDTA (Violet)	See Report	42D	Referred	No	Accompanied by UHL haemoglobinopathy request form. Refer to: **Haemoglobinopathy Screen**
Haemoglobin S (Hb S)	Blood	EDTA (Violet)	See Report	42D	Referred	No	Accompanied by UHL haemoglobinopathy request form. Refer to: **Haemoglobinopathy Screen**
Haemoglobinopathy Screen	Blood	1 x Serum (Brown) 2 x EDTA (Violet)	See Report	42D	Referred	Yes	See Notes Below:
Notes: Accompanied by UHL haemoglobinopathy request form Includes Haemoglobin A, A2, F & S etc. Adult samples (>16 years) are referred to Haematology Lab, St James. Tel.: 01 416 2909. Paediatric samples (<16 years) are referred to Haematology Lab, OLHSC, Crumlin. Tel.: 01 409 6432 Requests for Adult, Paediatric and Cord blood Haemoglobinopathy screening from HSE Mid West locations must be ordered on the Haemoglobinopathy form. For Adult and Paediatric screening 2 x EDTAs and 1 serum (brown top) and Cord Blood screening 2 EDTAs are required. Requests and separate samples for FBC/B12/Folate/Ferritin must be placed on the Blood Sciences (PURPLE) request form and not on the Haemoglobinopathy form. Whole blood specimens are stable for 7 days when stored at 2-8 C or 48 hours at ambient temperature (22-24 C). Samples may not be referred for analysis if red cell indices are suggestive of iron deficiency in the absence of a serum ferritin result. Alpha thalassaemia trait cannot be excluded where iron deficiency exists.							
Haptoglobin NB: Requests for Haptoglobin require prior approval by	Blood	Serum (Brown)	See report	14D	Referred	No	Monday to Friday only. Requests should be received by the laboratory before 13:00 hours within 24 hours of phlebotomy. Haemolysis of the

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
Haematology Consultant or Haematology SpR							sample will affect the reliability of the result. Referred to Biomnis Ireland, Sandyford, Dublin 18. Tel: 01 2958545
HBA1c	Blood	EDTA (Violet)	See report	4 working days	UHL	Yes	Requests should be received by the laboratory within 24 hours of phlebotomy The plunger of the EDTA must be fully withdrawn as per standard phlebotomy protocol. HbA1c traceable to IFCC Reference Measurement Procedure. Hba1c of 48mmol/mol or greater is consistent with diabetes provided red cell turnover is normal. Diagnostic thresholds for diabetes in non-pregnant individuals (provided erythrocyte turnover is normal): • HbA1c ≥ 48 mmol/mol consistent with diabetes • HbA1c 42 – 47 mmol/mol indicates prediabetes. • HbA1c may give false indication of glycaemia if red cell turnover rate is abnormal. Alternate glycaemic markers for diagnosis and monitoring of diabetes should be considered in these patients. Clinical advice for this test is provided by the Chemical Pathologist

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
							Note: Any medical condition that increases or shortens red cell survival can affect HbA1c. HbA1c may not be reliable in conditions such as splenectomy, haemolytic anaemia, haemoglobinopathies, iron deficiency anaemia, B12 treatment, CKD, chronic liver disease and medicines such as dapsome and antiretrovirals.
Heparin Induced Thrombocytopaenia (HIT) Screen	Blood	2 x Serum (Brown)	N/A	30D	Referred	No	Prior arrangement with the UHL Coagulation Department. Contact 061 482851. St James NCHCD request form must be completed by requesting source Fresh specimens must be received before 10.00 a.m. Referred to Coagulation Laboratory, National Centre for Hereditary Coagulation Disorders, St James' Hospital. Tel: 01-4162956 / 4103569.
Hereditary Spherocytosis Screen (Flow cytometry)	Blood	2 x EDTA (Violet)	See report	30D	Referred	No	Prior arrangement with Consultant Haematologist and Laboratory, contact 061 482258. Consultant signature / approval required on request form. All requests must be accompanied by FBC, Reticulocyte Count, Blood Film and Bilirubin reports as specified by the Referral Laboratory. Referred to National Centre for Medical Genetics, Cytogenetics Laboratory, Our

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
							Lady's Hospital for Sick Children, Crumlin Tel: 01-409 6432 Sample must be <72hrs old on testing. Samples must be received by 10.00 a.m. to ensure same day delivery to Dublin.
Infectious Mononucleosis Screen (Monospot)	Blood	EDTA (Violet)	Negative or Positive	2D	UHL Ennis	Yes	Samples are stable for up to 3 days at 4°C **False negative results can occur**. Suggest correlate clinically. Repeat IM screen, and refer serum sample for EBV serology that is more sensitive in detecting early stage EBV infection. It has been reported that up to 10-20% of infected adults and 50% of children under 4 years of age may fail to produce any IM heterophile antibody at all. High IgM levels are known to cause false negative results.
INR (International Normalised Ratio)	Blood	Citrated Plasma (Blue)	N/A	Non GP: 4 H GP: 24H	UHL Ennis	Yes	PT / INR requests for Warfarin dosage assessment must be received by the laboratory within 24 hours of phlebotomy. Details of anticoagulant therapy required. **Do not refrigerate INR samples** Out of hour/urgent requests for this test originating from external sources to UHL must include clinician's direct contact details and advance notice to the laboratory is advised.
Iron Stain (Perls Prussian Blue Stain) (Cytochemical Stain)	Bone Marrow Aspirate	Spread on glass slides	N/A	1W	UHL	No	All BMA requests should be accompanied by a FBC sample. FBC/Film should be requested on a separate form.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
							Bone marrow slides, must be hand delivered to the laboratory without delay, or be fixed in methanol. Slides must be labelled on frosted side using a lead pencil, include: Patients full name. PID / Chart number and/or DOB. Specimen date. Accompanied by UHL haematology request form.
Janus Kinase 2 mutation (JAK2 V617F)	Blood	9ml EDTA (Violet)	N/A	45D	Referred	No	Prior arrangement with UHL laboratory (061 482258). Review of clinical details and authorisation by a consultant haematologist/registrar. Consultant signature/approval required on request form. Referred to Cancer Molecular Diagnostics (CMD), St James Hospital. Tel.: 01 410 3575 Requests must be completed on CMD request forms including adequate clinical details e.g. ? PPP, ET, CML, etc. Samples for molecular testing should arrive in the laboratory as soon as possible post collection. Samples should be refrigerated at 4°C until dispatch. Bone Marrow samples must be received by 10.00am to ensure same day delivery to Dublin.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
							Note: CMD routinely reject JAK2 requests on patients who have been previously tested and may not issue a report to that effect.
Leucocyte Esterase (Cytochemical Stain)	Bone Marrow Aspirate	Spread on glass slides	See report	45D	Referred	No	Prior arrangement with Consultant Haematologist and Laboratory (061 482258). This test will only be processed with authorisation by a consultant haematologist / registrar. Bone marrow slides, must be hand delivered to the laboratory without delay. Referred to St James Hospital for pre-analytical staining.
Lupus Like Anticoagulant (LLA)	Blood	3 x citrated plasma (Blue)	N/A	4W	UHL	No	Requests should be received by the laboratory within 4 hours of phlebotomy. Details of anticoagulant therapy required. Unless requested by: A Neurologist A Rheumatologist Miscarriage clinic Gynaecologist for investigation of recurrent miscarriage/fertility treatment Lupus screening requests must be sanctioned by the haematology team. Lupus screening is not performed on patients receiving warfarin and/or unfractionated heparin or novel anticoagulants.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
Lymphocyte Transformation Test (LTT)	Blood	20mls blood taken in EDTA (Violet)	See report	1M	Referred	No	See Notes Below:
Notes: Test referred to Prof K.P Ringel's diagnostic laboratory in Germany. Letter of clinical history and drugs required for testing. Samples sent Monday to Thursday only. Sample should reach referral lab within 24 hours. Test sensitivity 60-70%, specificity 85%. Lymphopenia can affect the result. Test must be done < 1 week for SIS/TEN or morbilliform drug eruptions. DRESS should be done 5-8 weeks after rash develops. Approval by Consultant Dermatologist and Haematologist required. Volume: 20mls of blood taken in EDTA bottles							
Malaria Screen	Blood	EDTA (Violet)	N/A	2D	UHL	Yes	See Notes Below:
Notes: A fresh EDTA sample is required and preferably should be obtained when the patient is at the peak of a febrile attack. Thick and thin blood films are made and examined on ALL malaria samples. These must be made within 3-4 hours of sample collection. Travel history and clinical details, including medication details are essential. The malaria screen includes Malaria antigen Test for the qualitative detection of Plasmodium Falciparum, Plasmodium Vivax, Plasmodium Malariae and Plasmodium Ovale and a blood film stained for malaria parasites. If the Malaria antigen test is negative a malaria molecular assay is performed. This assay targets a region of the Plasmodium genome that is conserved across Plasmodium falciparum, Plasmodium vivax, Plasmodium ovale, Plasmodium malariae, and Plasmodium knowlesi. Thick and thin blood films are stained with a Giemsa stain for malaria. Negative films do not exclude a diagnosis of Malaria. Repeat films should be requested after 12-24 hours and again after a further 24 hours if clinically indicated							

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
Mixing Studies	Blood	Minimum 2 x Citrated plasma (Blue)	N/A	4H	UHL	No	Blood samples must be collected with a minimum of trauma and stasis and processed within 2 hours.
MPL Exon 10 mutation	Blood/ Bone Marrow Aspirate	Peripheral blood (or bone marrow) sample taken into EDTA (Violet)	N/A	60D	Referred	No	Prior arrangement with UHL laboratory (061 482258). Review of clinical details and authorisation by a consultant haematologist/registrar. Consultant Haematologist signature/approval required on request form. Samples for molecular testing should arrive in the laboratory as soon as possible post collection. Samples should be refrigerated at 4°C until dispatch. Referred to Cambridge Molecular Malignancy Laboratory / Haemato-Oncology Diagnostics Service (HODS)
Oxidative Burst Test	Blood	2 x EDTA (Violet)	See report	30D	Referred	No	This test will only be processed with authorisation by a consultant haematologist. Consultant signature/approval required on request form. Prior arrangement with laboratory also required (061 482258). Referred to Haematology Lab, OLHSC, Crumlin. Tel.: 01 409 6432. Samples must be in receipt of referral laboratory within 4 hours of phlebotomy.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
							Referrals accepted Monday – Wednesday.
Plasma Viscosity	Blood	EDTA (Violet)	1.13-1.27mPa@37 ºC	3D	UHL	No	This test is only available if one of the following applies: Patients with a significant paraprotein (IgG >30g/l; IgA>20g/l; IgM>15g/l). Patients having plasmapheresis for a lymphoproliferative disorder Patients where the test has been discussed with, and authorised by a haematology registrar/consultant haematologist Requests should be received by the laboratory within 6 hours of phlebotomy. Samples MUST NOT be refrigerated.
PNH (Paroxysmal Nocturnal Haemoglobinuria) By Flow Cytometry	Blood	3 x EDTA (violet)	See report	30D	Referred	No	Prior arrangement with Consultant Haematologist and laboratory, contact 061 482258. Consultant signature / approval required on request form. Samples must be within receipt of laboratory by 10:00 hours. Samples referred for PNH analysis Monday to Thursday only. Analysis must be performed within 48 hours of venepuncture. Referred for analysis to: Haematology Lab, St James. Tel.: 01 416 2909.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
Protein C	Blood	2x Citrated plasma (Blue). Or, if ordered as part of a thrombophilia screen, 4 x Citrated plasma (Blue) and 1 x EDTA (Violet).	70 -130u/dl	4W	UHL	No	Generally requested as part of a thrombophilia screen. Thrombophilia screening requests must be sanctioned by the UHL Haematology team and as such must include relevant clinical details Thrombophilia screening is not performed on patients receiving warfarin and/or unfractionated heparin or novel anticoagulants Requests should be received by the laboratory within 4 hours of phlebotomy. Urgent requests must be approved by a Consultant Haematologist. Details of anticoagulant therapy required.
Protein S	Blood	2x Citrated plasma (Blue). Or, if ordered as part of a thrombophilia screen, 4 x Citrated plasma (Blue) and 1 x EDTA (Violet).	60-140u/dl	4W	UHL	No	Protein S levels are affected by pregnancy Generally requested as part of a thrombophilia screen. Thrombophilia screening requests must be sanctioned by the UHL Haematology team and as such must include relevant clinical details. Thrombophilia screening is not performed on patients receiving warfarin and/or unfractionated heparin or novel anticoagulants Requests should be received by the laboratory within 2 hours of phlebotomy. Urgent requests must be approved by a Consultant Haematologist. Details of anticoagulant therapy required.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
Protein S Profile	Blood	2x Citrated plasma (Blue)	Protein S: 65-140 u/dl, Free Protein S: 57-122 U/dl	4W	UHL	No	Requests should be received by the laboratory within 2 hours of phlebotomy. Details of anticoagulant therapy required. Test includes Protein S & Free Protein S.
Prothrombin Time (PT)	Blood	Citrated Plasma (Blue)	See Table	Urgent 1 H: Non GP 4H: GO 24H	UHL Ennis	Yes	PT / INR requests for Warfarin dosage assessment must be received by the laboratory within 24 hours of phlebotomy. Details of anticoagulant therapy required. Do not refrigerate PT samples. Out of hour/urgent requests for this test originating from external sources to UHL must include clinician's direct contact details and advance notice to the laboratory is advised.
Red Cell Folate	Blood	2 x EDTA (Violet) + Gel Serum (Brown)	See report	30D	Referred	No	Monday to Friday only. Requests should be received by the laboratory before 13:00 hours and within 3 hours of phlebotomy. Referred to Biomnis Ireland, Sandyford, Dublin 18 Tel: 01 2958545
Red Cell Membrane Analysis for Hereditary Spherocytosis	Blood	2 x EDTA (Violet).	See Report	30D	Referred	No	Prior arrangement with Consultant Haematologist and Laboratory, contact 061 482258. Requests should be received by the referral laboratory within 48 hours of phlebotomy. Consultant signature / approval required on request form. All requests must be accompanied by FBC, Reticulocyte Count, Blood Film and

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
							Bilirubin reports as specified by the Referral Laboratory. Referred to Haematology Laboratory, Our Lady's Hospital for Sick Children, Crumlin Tel: 01-409 6432 Samples must be received by 10.00 a.m. to ensure same day delivery to Dublin.
Reptilase	Blood	Citrated plasma (Blue)	12-20 s	30D	UHL	Yes	Requests should be received by the laboratory within 8 hours of phlebotomy. Results for this test are not released but are available for interpretative use if required by Consultant Haematologist.
Reticulocyte Count	Blood	EDTA (Violet).	See Table	4H	UHL Ennis	Yes	Please fill the bottle to the mark to ensure sufficient volume for testing. Requests should be received by the laboratory within 12 hours of phlebotomy.
Reticulocyte Count (Nenagh)	Blood	EDTA (Violet).	See Table	2H	Nenagh	No	Please fill the bottle to the mark to ensure sufficient volume for testing. Requests should be received by the laboratory within 12 hours of phlebotomy.
Ristocetin Co-Factor (RiCOF)	Blood	3 x citrated plasma (Blue)	See report	4W	UHL	No	Prior arrangement with Consultant Haematologist and laboratory, contact 061 482851. Requests should be received by the laboratory within 2 hours of phlebotomy
Sickle Screen (Sickledex)	Blood	1 x Gel Serum (Brown), 2 x	Positive or Negative	3D	Referred	No	Urgent pre-operative specimens only. Accompanied by UHL haemoglobinopathy request form.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
		EDTA (Violet).					Blood samples stored at 1 °C to 10 °C for up to 45 days may be used for testing. All Sickledex requests are referred for Haemoglobinopathy Screen for confirmatory analysis.
Sudan Black B (Cytochemical Stain)	Blood	Bone Marrow Aspirate Slides, FBC sample (Violet)	N/A	45D	Referred	No	Prior arrangement with Consultant Haematologist and Laboratory, contact 061 482258. This test will only be processed with authorisation by a consultant haematologist. Bone marrow slides, must be hand delivered to the laboratory without delay. Referred to St James Hospital for pre-analytical staining.
T cell subsets, CD 4/8 Count (Flow Cytometry)	Blood	2 x EDTA (Violet)	See report	7D	UHL	No	See Notes Below:
Notes: Prior arrangement with laboratory, contact 061 482258. Flow cytometry requests will only be processed if the clinical details are consistent with appropriate requesting guidelines, e.g. known HIV patient on HAART therapy? Lymphoproliferative disorder (requesting restricted to haematology consultants only). T cell subsets and CD4/CD8 counts are processed once a week. Pre booking is essential. Samples must arrive in the laboratory before 09:30am on day of processing and may be collected for overnight storage in the laboratory the evening before the day of processing.							
Thalassaemia	Blood	1 x Gel Serum sample (Brown), 2 x EDTA (Violet).	See report	42D	Yes	Yes	See Notes Below:

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
Notes: Accompanied by UHL haemoglobinopathy request form Includes Haemoglobin A, A2, F & S etc. Adult samples (>16 years) are referred to the Haematology Lab, St James. Tel.: 01 416 2909. Paediatric samples (<16 years) are referred to the Haematology Lab, OLHSC, Crumlin. Tel.: 01 409 6432 Requests for Adult, Paediatric and Cord blood Haemoglobinopathy screening from HSE Mid West locations must be ordered on the Haemoglobinopathy form. For Adult and Paediatric screening 2 x EDTAs and 1 serum (brown top) and Cord Blood screening 2 EDTAs are required. Requests and separate samples for FBC/B12/Folate/Ferritin must be placed on the Blood Sciences (PURPLE) request form and not on the Haemoglobinopathy form. Whole blood specimens are stable for 7 days when stored at 2-8 ^{o}C or 48 hours at ambient temperature (22-24^{o}C) Samples may not be referred for analysis if red cell indices are suggestive of iron deficiency in the absence of a serum ferritin result. Alpha thalassaemia trait cannot be excluded where iron deficiency exists.							
Thrombin Time (TT)	Blood	Citrated Plasma (Blue)	14-21 S	30D	UHL	No	Requests should be received by the laboratory within 2 hrs for investigation of hep contamination/mixing studies and 8 hrs for investigation dysfibrinogenaemia. Details of anticoagulant therapy required.
Thrombophilia Screen	Blood	4 x Citrated plasma (Blue), 1 x EDTA (Violet).	N/A	4W	UHL	No	See Notes Below:
Notes: Screen Includes: PT/INR, APTT, Fibrinogen, ATIII, Protein C, Protein S, Free Protein S, APC-R, Lupus Like Anticoagulant Requests should be received by the laboratory within 4 hours of phlebotomy. Clinical details required. Please provide patient and family history. Appropriate for: Confirmed thrombotic event in persons <50 years if no clear precipitating factor; 1st degree relatives of patients with proven thrombophilia about to commence oral contraception or scheduled for surgery. Testing should not be done during acute thrombotic period or while the patient is on anticoagulant therapy.							

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
Consultant signature / approval required on request form. Prior UHL Haematology Team approval required with the exception of miscarriage clinic patients, rheumatology and neurology patients. **In the event of reduced APC-R +/- UHL consultant Haematologist approval, samples are referred to Haemostasis Molecular Genetics, St Thomas' Hospital, London for FV Leiden PCR/PGM for analysis. <u>These samples must be accompanied by completed Consent form for genetic analysis (Thrombophilia mutation analysis) which will be provided by the Haematology laboratory.</u>**							
Urinary Haemosiderin	Urine	Universal container	N/A	3-5D	UHL	Yes	A fresh early morning specimen is preferable. Review of clinical details and authorisation by a consultant haematologist/registrar. Consultant signature / approval required on request form.
vWF:Ag (von Willebrand Factor Antigen)	Blood	Citrated Plasma (Blue)	60-150u/dl	28D	UHL	No	Requests should be received by the laboratory within 2 hours of phlebotomy. 60-150 u/dl VWF levels are approximately 25% lower in blood group O individuals than in non O (Gill et al, 1987). Gill, J.C., Endres-Brooks, J., Bauer, P.J., Marks, Jr, W.J. & Montgomery, R.R. (1987) The effect of ABO blood group on the diagnosis of von Willebrand disease. Blood, 69, 1691–1695
vWF Screen (von Willebrand Factor Screen)	Blood	6 x Citrated Plasma (Blue)	See specific tests included in screen for ranges – FVIII:C, RICOF, VWF:ag	28D	UHL	No	Requests should be received by the laboratory within 2 hours of phlebotomy. Consultant signature/approval required on request form.

Analyte/Profile	Specimen Type	Container	Reference Interval	TAT	Laboratory	Routinely Available to Primary Care	Notes
Warfarin assay (PIVKA – Protein induced by Vitamin K absence antagonist)	Blood	Serum (Brown)	See Report	28D	Referred	No	Prior arrangement with the UHL coagulation department. Contact: 061-482851. Consultant signature / approval required on request form. Details of anticoagulant therapy required. Referred for analysis to Centre for Haemostasis & Thrombosis, Guy's & St Thomas' Hospital, London. Tel.: +44-207-401 3125

E. Blood Transfusion Tests

Antenatal group and antibody screen	
Sample Type	7.5 ml EDTA
Request form	Blood Bank 2
Turnaround time	Next routine working day after receipt except for samples received on Friday, which will be tested on Monday.
Comments	Minimum recommendation for antenatal testing:
	• First antenatal visit (i.e. at about 12 weeks' gestation) • Repeated again at 28 weeks' gestation • If anti-D, c or K (or clinically significant antibodies with titre >32) are found, tests should be repeated at monthly intervals up to 28 weeks and every 2 weeks thereafter to monitor antibody levels. Paternal testing may also be required. • If the antibody concentration is increasing, referral to a specialist unit is indicated. • The blood transfusion laboratory will provide advice on the report regarding the frequency of testing for all clinically significant antibodies The blood transfusion report will inform the clinician responsible for patient care of the likely significance of the antibody (ies) with respect to the development of HDN and transfusion problems. Note: If a patient has an antibody, a repeat group and screen sample needs to be taken if patient admitted to hospital.
Routine Group and antibody screen	
Sample Type	7.5 ml EDTA
Request form	Blood Bank 1
Turnaround time	Same day
Comments	
Antenatal antibody titration	

Sample Type	7.5 ml EDTA
Request form	Blood Bank 2
Turnaround time	7days.
Antenatal anti-D quantitation	
Sample Type	7.5 ml EDTA
Request form	Blood Bank 2
Turnaround time	7 days - anti-D quantitations are performed on Monday, Wednesday and Friday by the National Blood Centre, Dublin.
Antenatal anti-c quantitation	
Sample Type	7.5 ml EDTA
Request form	Blood Bank 2
Turnaround time	8-10 days - anti-D quantitations are performed on Monday, Wednesday and Friday by the National Blood Centre, Dublin.
Antibody identification	
Sample Type	7.5 ml EDTA
Request form	Blood Bank 1 or 2 as appropriate
Turnaround time	1 day depending on priority
Comments	A second sample may be required for complex antibody identifications.
Antibody investigation referrals to reference laboratory	

Sample Type	7.5 ml EDTA
Request form	Blood Bank 1 or 2 as appropriate
Turnaround time	1 week depending on priority.
Comments	
Cold agglutinins	
Sample Type	7.5 ml EDTA maintained at 37ºC
Request form	Blood Bank 1
Turnaround time	Approximately 7 working days from receipt at referral laboratory
Comments	Titres above 64 are considered elevated. Haemolytic anaemia due to cold reactive agglutinins rarely occurs unless the titre is >512.
Direct antiglobulin test	
Sample Type	7.5ml EDTA for adults, 2.7 ml EDTA for paediatrics
Request form	Blood Bank 1
Turnaround time	Same day
Fetal RHD Screen from Maternal Blood (For women who do not have anti-D or anti-G present)	
Sample Type	Mother: Minimum 6ml EDTA and 7.5 ml EDTA from the putative father. Fill to mark. Please send Monday to Wednesday. The sample must reach IBGRL, Bristol within 48hrs of venepuncture.
Request form	IBGRL referral form (F104) and Blood Bank 1
Turnaround time	10 working days - test is performed in the IBGRL, Bristol, UK.
Comments	Samples MUST reach the IBGRL within 7 days of venepuncture

	At least ≥ 11+2 weeks gestation by dating scan Samples MUST be kept at room temperature, at all times
Fetomaternal haemorrhage (FMH) assessment	
Sample Type	N/A
Request form	N/A
Turnaround time	N/A
Comments	Flow cytometry is suitable for estimation of fetomaternal haemorrhage in RhD negative mothers who have delivered RhD positive infants. Kleihauer Betke (KB) Slide is the acid elution test used when the blood group of the fetus is unknown (See below).
FMH using Kleihauer Betke (KB) slide (Acid Elution)	
Sample Type	7.5 ml EDTA
Request form	Blood Bank 1
Turnaround time	< 72hours
Comments	Not clinically indicated for RhD positive patients, except for >20 weeks' gestation with IUD.
FMH using flow cytometry	
Sample Type	7.5 ml EDTA
Request form	Blood Bank 1
Turnaround time	2 Days – test performed by Rotunda Hospital Laboratory, Dublin.
HLA Class I & II typing of transplant patients and family members	

Sample Type	5-10ml EDTA/ citrate
Request form	Blood Bank 1
Turnaround time	3 weeks (but may take longer depending on sample DNA concentration) - test is performed in the NHIRL, National Blood Centre, Dublin.
Comments	The BT255 request form is completed by laboratory staff and forwarded with a copy of the Blood Bank 1 request form to the NHIRL in the National Blood Centre.
Mother and baby samples from RhD negative mothers at delivery	
Sample Type	7.5 ml EDTA from mother and 7.5 ml EDTA cord sample
Request form	Blood Bank 1
Turnaround time	Same day
Comments	The maternal sample for FMH should be taken when sufficient time has elapsed to allow the fetal cells to be distributed within the maternal circulation following delivery, manual removal of placenta or sensitising event. A period of 30-45 minutes is considered adequate.
	All samples must arrive in the transfusion laboratory at 10.00hrs for testing. Samples arriving after this time will be tested the following day.
Neonatal alloimmune thrombocytopenia investigation	
Sample Type	Mother 20ml clotted and 7.5ml EDTA
	Father 20ml EDTA Neonate 2.7ml EDTA
Request form	Blood Bank 1
Turnaround time	2 weeks depending on priority (sent to the National Blood Centre, Dublin)
Comments	Discuss request with the consultant haematologist.

Parental phenotype	
Sample Type	7.5 ml EDTA
Request form	Blood Bank 1
Turnaround time	1 day
Comments	If a pregnant woman has antibodies, sample from the putative father will be required to determine the probability of the fetus carrying the relevant antigen.
Platelet alloantibody testing	
Sample Type	5 ml serum
Request form	Blood Bank 1
Turnaround time	2 weeks depending on priority (sent to the National Blood Centre, Dublin).
Comments	Discuss request with the Consultant Haematologist. Samples will only be accepted Monday - Thursday as the referral centre in Dublin require them within 48hrs of testing
Platelet antigen testing	
Sample Type	7.5 ml EDTA
Request form	Blood Bank 1
Turnaround time	2 weeks depending on priority (sent to the National Blood Centre, Dublin)
Comments	This test is of no value in investigation or management of thrombocytopenia. Discuss request with the Consultant Haematologist. Samples will only be accepted Monday - Thursday as the referral centre in Dublin require them within 48hrs of testing

Red cell phenotype	
Sample Type	7.5 ml EDTA
Request form	Blood Bank 1 or 2
Turnaround time	Same day
Transfusion reaction investigation	
Sample Type	7.5 ml EDTA
Request form	Blood Bank 3
Turnaround time	Serological testing is performed on the same day of receipt.
	Blood culture where indicated may take up to 10 days before a report is authorized. Positive cultures are phoned immediately. In cases of suspected TACO or TRALI, turnaround time may take several weeks.
Comments	Component pack with giving set attached. Urine sample x 2 (immediately and 6 hours post reaction) FBC Coagulation screen U&E, creatinine, bilirubin Pre- and post-transfusion samples for BNP (B-type naturetic peptide), in cases of suspected TACO or TRALI - samples should be taken within 2 hours of suspected TACO or TRALI reaction. IgA levels in cases of suspected allergic reaction Blood cultures (if fever is documented) Reporting of transfusion reactions to the National Haemovigilance Office is mandatory. Refer to the relevant chapter of the blood transfusion manual for guidance on the clinical management and reporting of transfusion reactions.
Group and serological crossmatch	
Sample Type	7.5 ml EDTA. For an additional crossmatach request, the laboratory requires a new 7.5ml EDTA group and screen sample after 72 hours.

Request form	Blood Bank 1
Turnaround time	1 – 2 hours after receipt
Comments	A serological crossmatch will be performed on patients that have no historic blood group and antibody screen and patients that have antibodies*. The blood laboratory need to be informed of the clinical conditions of the patients including sickle cell disease, thalassaemia and auto immune haemolytic anaemia. Ultimately the laboratory will decide patient suitability for serological/electronic crossmatch.
	*See section “Crossmatch in the presence of a positive antibody screen”. A blood group and an antibody screen will be performed on the sample and the sample will be serologically crossmatched for the number of units requested, or in the case of surgical patients, the number of units specified in the Maximum Surgical Blood Order Schedule (MSBOS). Any deviation from the agreed MSBOS needs to be clearly documented on the request form.
Group and electronic crossmatch	
Sample Type	7.5 ml EDTA
Request form	Blood Bank 1
Turnaround time	Maximum of 1hr from receipt of sample.
Comments	Applies to patients who have had more than one group and screen sample processed and have no history of antibodies. Auto immune haemolytic anaemia patients are ineligible for electronic crossmatch. The laboratory will decide if the patient fulfils suitability according to predefined criteria.
Group and crossmatch for massive haemorrhage	
Sample Type	7.5 ml EDTA
Request form	Blood Bank 1
Turnaround time	Prioritised once a massive haemorrhage is declared.
Comments	When a patient presents with potential major haemorrhage, the doctor must inform the transfusion laboratory immediately.
	The medical scientist will immediately order platelets and thaw four to six units of solvent detergent plasma.

	· Group specific, uncrossmatched red cell concentrates may be released, if time doesn't allow for a full crossmatch. · One individual needs to be identified as a liaison person to communicate with the transfusion laboratory until the haemorrhage is under control. · Please refer to the relevant guideline in the Blood Transfusion Manual. Fibrinogen concentrate may also be required if the fibrinogen is <1.0 gm/l.
Emergency O RhD negative uncrossmatched red cells	
Sample Type	Original sample
Request form	A new Blood Bank 1 form, delivered or emailed to the laboratory.
Turnaround time	5-30minutes
Comments	Previous sample must be <72 hours old. Blood crossmatched from the sample must be used within 72 hours of sample collection time.
Crossmatch in the presence of a positive antibody screen	
Sample Type	7.5 ml EDTA
Request form	Blood Bank 1
Turnaround time	90 minutes to several hours, depending on the antibody present*.
Comments	If blood is needed before compatibility testing is completed, haemolysis may occur, but transfusion should not be withheld if deemed absolutely necessary. A decision on whether to transfuse or /wait for fully crossmatched blood may need to be discussed with a haematology consultant/registrar.
	* Transport time not included

F. Blood Transfusion Products

Platelets	
Sample type	7.5 ml EDTA. No sample is required if there is a current blood group on the laboratory information system.
Availability time	An emergency platelet concentrate is routinely held in the blood transfusion laboratory. However, requests should be placed in advance (if time permits) as it takes 2 hours for platelets to be delivered from Cork or 4 hours for platelets to be delivered from Dublin. Communication with the laboratory is essential if special requirements are being considered such as washed or HLA matched platelets. Platelets can be issued (if already in the blood transfusion laboratory) within 15 minutes, if there is a patient blood group on file or within 25 minutes if there is no patient blood group on file.
Risk and comments	Refer to the HG-A-BTR-PLATELET guideline available on Q Pulse ISSACUTE and/or the hard copy blood transfusion manual.
Solvent detergent plasma	
Sample type	7.5 ml EDTA. No sample is required if a sample for blood group has been received in the past three months.
Request form	Blood Bank 1
Availability time	30 minutes (for 3 units), if there is a blood group on file in the transfusion laboratory; one hour if blood group is not on file.
Risk and comments	Refer to the HG-A-BTR-SDPLASMA guideline available on Q Pulse ISSACUTE and/or the hard copy blood transfusion manual.
Anti-D	
Sample type	7.5 ml EDTA.
Request form	Blood Bank 1
Availability time	< 72hours
Risk and comments	Refer to the HG-A-BTR-ANTID guideline available on Q Pulse ISSACUTE and/or the hard copy blood transfusion manual.

Albumin Blood Product	
Note	250ml 5% albumin and 100ml 20% albumin are available.
Sample type	None.
Request form	Blood Bank 1
Availability time	Same day
Risk and comments	Refer to the HG-A-BTR-ALBUMIN guideline available on Q Pulse ISSACUTE and/or the hard copy blood transfusion manual.
Factor concentrate	
Sample type	None.
Request form	Blood Bank 1
Availability time	Same day
Risk and comments	Refer to the HG-A-BTR-rFVIIa guideline available on Q Pulse ISSACUTE and/or the hard copy blood transfusion manual. Refer to the product SPC for appropriate information on administration. Refer all requests to the consultant haematologist for appropriate use and dose.
Prothrombin complex concentrate	
Sample type	None
Request form	Blood Bank 1
Availability time	Same day
Risk and comments	Prothrombin complex concentrate's (PCCs) should only be prescribed in accordance with the guideline HG-A-BTR-PCC available on Q Pulse ISSACUTE and/or the hard copy blood transfusion manual. Any requests not falling within the guideline will be referred to a consultant haematologist.
Praxbind® (idarucizumab)	
Sample type	None

Request form	Blood Bank 1
Availability time	Same time
Risk and comments	Praxbind® (idarucizumab) is indicated in patients treated with Pradaxa (Dabigatran etexilate) when reversal of the anticoagulant effects of Pradaxa (Dabigatran etexilate) is needed and presecribed with the advice of the consultant haematologist. For emergency surgery / urgent procedures. In life-threatening or uncontrolled bleeding.
Fibrinogen concentrate	
Sample type	None
Request form	Blood Bank 1
Availability time	Same day
Risk and comments	Fibrinogen concentrate should only be prescribed in accordance with guideline HG-A-BTR-FIBN available on Q Pulse ISSACUTE and/or the hard copy blood transfusion manual. Any requests not falling within the guideline will be referred to the consultant haematologist.
Intravenous Immunoglobulins	
Sample type	None
Request form	Blood Bank 1
Availability time	Same day
Risk and comments	10% Flebogammadiff and 10% Kiovig are routinely stocked. Pentaglobin is not routinely stocked but available from Intrapharma on request. Refer to the HG-A-BTR-IVIG guideline available on Q Pulse ISSACUTE and/or the hard copy blood transfusion manual.
Ondexxya® (Andexanet alfa)	
Sample type	None
Request form	Blood Bank 1

Availability time	Same day
Risk and comments	Ondexxya is used as a reversal agent for adult patients treated with a FXa inhibitor (apixaban or rivaroxaban), the product is used when reversal of anticoagulation is needed due to life-threatening or uncontrolled bleeding. Approval from consultant haematologist is required to release this product. HG-A-BTR-REVERS guideline on the use of reversal agents.

G. Histology

Histology Turnaround Summary with P codes.		
Code	**Expanded Explanation**	**Turn Around Times**
P01 (SBx)	**Small Biopsy:** Core / needle biopsies. These include but are not limited to liver, bronchial, lung, prostate and breast cores.	10 working days
P02 (GIBX)	**Endoscopic GI Biopsies:** Endoscopic biopsies from oesophagus to anus	25 working days
P03 (CANRES)	**Cancer Resections:** wide local excisions and excisions of entire organs with a known cancer diagnosis	10-15 working days
P04 (NBX)	**Non-Biopsy**: All other specimens which are neither small biopsies / cancer resections or Gastrointestinal Biopsies.	25 working days
P05 / P06/P07	**Non Gynaecological Cytology**	10 -14 working days
Procedure codes (P codes) reflect the complexity of specimens and need for different turnaround times. The P01 and P02 codes are allocated irrespective of the final diagnosis, benign or malignant. The P03 and P04 codes differentiate between oncological/cancer resections and non-oncological /non-cancer resections.		

Analyte/Profile **Test/tissue type**	**Container/ Fixative/ Volume**	**TATS**	**Processing Laboratory**	**Routinely Available to Primary Care**	**Notes**
Brain Histopathology	Large Container 5L-15L 10% Formalin		Referred to Neuropathology Lab CUH	No	Contact CUH Department of Neuropathology prior to dispatch with referral letter enclosed. Dr. Niamh Bermingham 021-4922520

Analyte/Profile Test/tissue type	Container/ Fixative/ Volume	TATS	Processing Laboratory	Routinely Available to Primary Care	Notes
					021-4922519
BRAF mutations	FFPE Block	10 days	Referred to St James	No	Contact details: Cancer Molecular Diagnostics (CMD), St. James Hospital; Tel: 01 4103576
Bowel screen (Colon Biopsies)	Histopots 40-250ml 10% Formalin	5 Days	UHL	No	
Bone Marrow Biopsies	Histopots 40-250ml 10% Formalin	10 Days	UHL	No	
Breast Histopathology-Breast Biopsies	Histopots 40-250ml Biopsies safe cell Cassettes within Histopot (needle biopsies) 10% Formalin	10 Days	UHL	No	
Breast Histopathology Biopsies Brevera breast biopsies	Specialised Brevera Container 10% Formalin	10 days	UHL	No	Areas of Calcifications must be indicated on the request form and corresponding container carousel.
Breast Histopathology Resections	Large Container 5L-15L 10% Formalin	10 Days	UHL	No	Samples must be orientated according to MAS (Medial Anterior Superior)
Breast Histopathology Radioactive samples	Large Container 5L-15L 10% Formalin	10 Days	UHL	No	Request forms must be clearly marked that samples are radioactive.

Analyte/Profile Test/tissue type	Container/ Fixative/ Volume	TATS	Processing Laboratory	Routinely Available to Primary Care	Notes
Breast Histopathology DDISH Testing	Formalin fixed paraffin tissue	10 Days	UHL	No	
Breast Histopathology Oncotype DX	Formalin fixed paraffin tissue	20 Days	Referred to Genomic Health	No	
Breast Histopathology PDL1	Formalin Fixed paraffin tissue	20 Days	Referred to Poundbury UK	No	
Core Biopsies Histopathology	Safe cell cessettes within Histopot 40-250ml) 10% Formalin	10 days	UHL	Yes	
Cervical Check (CX biopsies/LLETZ specimens from Cervical Check	Histopots 50-250ml 10% Formalin	10 Days (CxBx) 14 Days (LLETZ)	UHL	Yes	
CSF for Cytology	Universal Container >1ml no fixative	10-14 Days	Referred to Cytology Lab CUH	No	Clinical Details and time taken are essential Sample to transported to the Cytology Laboratory in Cork University Hospital (via Histology UHL) must be <24hours old Separate specimen required to avoid unnecessary delay in transport to referral lab. Take further samples for Microbiology, Biochemistry, Haematology tests as required.
Cytology Diagnostic Fluids- Ascites	Universal Container 20-70mls No Fixative	10-14 Days	Referred to Cytology Lab CUH	Yes	If other tests are also required on the sample, the non Cytology tests will need to be performed first. Some of these tests may affect the sample quality. For this reason, it

Analyte/Profile Test/tissue type	Container/ Fixative/ Volume	TATS	Processing Laboratory	Routinely Available to Primary Care	Notes
					is recommended that a separate sample be sent for Cytology.
Cytology Diagnostic Fluids- Bronchial Aspirate / BAL/Washings	Universal Container(s) 40-60ml container, 25 - 30mls Cytolyt Fixative	10-14 Days	Referred to Cytology Lab CUH	Yes	High risk patients must be identified e.g. suspected TB etc If other tests are also required on the sample, the non Cytology tests will need to be performed first. Some of these tests may affect the sample quality. For this reason, it is recommended that a separate sample be sent for Cytology.
Cytology Diagnostic Fluids- Bilary Brushings	Universal Container Cytolyt 10-15mls	10-14 Days	Referred to Cytology Lab CUH	No	Cut brush off and place in Cytolyt Fixative
Cytology Diagnostic Fluids- CSF	Universal Container >1ml No Fixative	10-14 Days	Referred to Cytology Lab CUH	No	Histo Staff to prepare 1 x cytospin slide for referral to CUH and the neat sample to be topped up with 10mls of Cytolyt by Histology Staff only. CSFs greater than 24 Hours old cannot be used
Cytology Diagnostic Fluid-Cyst	Universal container Cytolyt 10-15 mls	10-14 Days			If other tests are also required on the sample, the non Cytology tests will need to be performed first. Some of these tests may affect the sample quality. For this reason, it is recommended that a separate sample be sent for Cytology.
Cytology Diagnostic Fluids- Fine Needle Aspirates	Expel aspirate and rinse needle in 10mls Cytolyt Fixative	10-14 Days	Referred to Cytology Lab CUH	No	One air dried slide can be submitted in addition to needle rinse in Cytolyt. Multiple slides are not to be submitted Aspirate / FNA Slides must be labelled using pencil with patient name, Chart no and Date of Birth. It is important to label the slide prior to spray fixation. If the label is written over the fixative film, processing will remove it.
Cytology Diagnostic Fluids – Breast FNA Cystic lesions only.	Universal Container Cytolyt Fixative 10-15mls	10-14 Days	Referred to Cytology Lab CUH	No	

Analyte/Profile Test/tissue type	Container/ Fixative/ Volume	TATS	Processing Laboratory	Routinely Available to Primary Care	Notes
					Note: Breast tumour lesions should be a core biopsy as per HIQA guidelines
Cytology Diagnostic Fluids- EBUS FNA	Universal Container 40-60ml container 25 - 30mls Cytolyt Fixative	10-14 days	Referred to Cytology Lab CUH	No	
Cytology Diagnostic Fluids- Joint Knee Fluid/Aspirates	Universal Container 1-20mls No fixative	10-14 days	Referred to Cytology Lab CUH	No	If other tests are also required on the sample, the non Cytology tests will need to be performed first. Some of these tests may affect the sample quality. For this reason, it is recommended that a separate sample be sent for Cytology.
Cytology Diagnostic Fluids- Needle aspirate	Universal Container Cytolyt 10-15 mls	10-14 Days	Referred to Cytology Lab CUH	No	
Cytology Diagnostic Bronchial/Nasal Brushings	Container supplied by referral Laboratory 5mls Glutaraldehyde fixative	As stated in Referral Laboratory User Manual	Referred to Southampton General Hospital	No	Contact Patricia Goggin Southampton Contact Barry Linnane UHL
Cytology Diagnostic Fluids- Peritoneal Fluid	Universal Container 20-70mls No fixative	10-14 days	Referred to Cytology Lab CUH	No	A sample of large aspirate must be transferred to a universal container for Cytology. Mix well before taking sample. A Cytology request (purple) form is used for Cytology Requests. Please tick the Cytology Box on the request form. Request forms must be appropriately labelled with patient details and sample type and location details Store fluid cytology in a fridge if collected 'out of hours'
Cytology Diagnostic Fluids –Pleural Fluids	Universal Container 20-70mls No fixative	10-14 Days	Referred to Cytology Lab CUH	No	A sample of large aspirate must be transferred to a universal container for Cytology. Mix well before taking sample. A Cytology request (purple) form is used for Cytology Requests. Please tick the Cytology Box on the

Analyte/Profile Test/tissue type	Container/ Fixative/ Volume	TATS	Processing Laboratory	Routinely Available to Primary Care	Notes
					request form. Request forms must be appropriately labelled with patient details and sample type and location details Store fluid cytology in a fridge if collected 'out of hours'
Cytology Diagnostic Fluids- Serous Fluid	Universal Container 20-70mls No fixative	10-14 days	Referred to Cytology Lab CUH	No	A sample of large aspirate must be transferred to a universal container for Cytology. Mix well before taking sample. A Cytology request (purple) form is used for Cytology Requests. Please tick the Cytology Box on the request form. Request forms must be appropriately labelled with patient details and sample type and location details Store fluid cytology in a fridge if collected 'out of hours'
Cytology Diagnostic Fluids- Urine	Universal Container 20 mls No Fixative	10-14 days	Referred to Cytology Lab CUH	No	Cork University Hospital have advised that one urine specimen per specimen is deemed sufficient as a screening tool, multiple urines will not be processed **Note: Samples in Boric acid will not be accepted**
Cytology Diagnostic Fluids-Thyroid FNA	Universal container Cytolyt 10-15mls	10-14 days	Referred to Cytology Lab CUH	No	
Cytology Diagnostic Fluids –Ovarian Cyst Fluid	Universal Container Cytolyt 10-15mls	10-14 days	Referred to Cytology Lab CUH	No	
Cytology Diagnostic Fluids –Miscellaneous	Universal container Cytolyt 10-15 mls	10-14 days	Referred to Cytology Lab CUH	No	If In doubt Contact Histology laboratory on 2856 or Cytology CUH 021 4922511
DIF Direct immunoflouressence 2 separate skin samples.	Histopot x1 50-250mls 10% Formalin (H/E) Glass Container x1	As stated in Referral Laboratory User Manual	Referred to St James Hospital	No	Pre-booking with the Histology Laboratory essential on 2856 *Samples for DIF always in Zeus Fixative never Formalin. If Zeus is not available deliver to lab fresh on a moist gauze.

Analyte/Profile Test/tissue type	Container/ Fixative/ Volume	TATS	Processing Laboratory	Routinely Available to Primary Care	Notes
	Zeus Fixative (DIF)*				
Frozen Sections -Fresh Tissue	Universal container no Fixative	<20 mins per specimen	UHL	No	Frozen Sections must be pre-booked with the Histology Laboratory. Frozen Section reports will be phoned by the reporting Histopathologist to either the Consultant Surgeon or staff at the given contact phone number. Frozen Sections will not be processed on patients with Covid-19, TB, Hepatitis B, C or HIV. If a suspicion of such infection exists, clinical staff must inform the laboratory. Contact the Laboratory directly at 061-727218 Samples must be sent in a dry container – no Please write contact number for phoned report Frozen Section reports will be phoned by the reporting Histopathologist to either the Consultant Surgeon or staff at the given contact phone number. It is important to cancel a frozen section if it is no longer required as Laboratory Staff will be on hold awaiting its arrival.
Endoscopic Biopsies (GI-Colon)	Histopots 50-250ml 10% Formalin	25 Days	UHL	No	
GI Testing FISH/DDISH Insitu Hybrdisation Testing Gastric	FFPE Block	10 Days	Referred to Biomnis France	No	
Gynae Histopathology (Uterus fibroids)	Large Containers 5L-15L 10% Formalin	Cancer Resections: 10-15 days	UHL	No	Ensure container is large enough for specimen and adequate formalin is added

Analyte/Profile Test/tissue type	Container/ Fixative/ Volume	TATS	Processing Laboratory	Routinely Available to Primary Care	Notes
		Non-biopsies: 25 days			
Oncomine Testing	FFPE block	As stated in Referral Laboratory User Manual	Referred to CMD St James	No	
Lung Histopathology	Large Containers 5L-15L 10% Formalin Biopsies safe cell Cassettes within Histopot (needle biopsies) 10% Formalin	10 Days	UHL	No	Ensure container is large enough for specimen and adequate formalin is added
Lung Molecular Panel (EGFR)	Formalin fixed paraffin tissue	As stated in Referral Laboratory User Manual	Referred to St James Hospital Dublin	No	Contact details: Cancer Molecular Diagnostics (CMD), St. James Hospital; Tel: 01 4103576
Muscle -Fresh Tissue Enzyme Histochemistry	Fresh Muscle Biopsy wrapped in cling film No Fixative	As stated in Referral Laboratory User Manual	Referred to Department of Neuropathology, Cork University Hospital	No	**NOTE: Pre-booking required:** Contact CUH Department of Neuropathology prior to dispatch with details of booking and expected time of delivery. Dr. Niamh Bermingham 021-4922520 or 021-4922519
MMR testing **(Immunohistochemsitry performed in-house)**	Formalin fixed paraffin tissue	As stated in Referral Laboratory User Manual	Referred to Beaumont Hospital	No	

Analyte/Profile Test/tissue type	Container/ Fixative/ Volume	TATS	Processing Laboratory	Routinely Available to Primary Care	Notes
MSI & MLH1 Methylation testing referred					
PDL1 Lung	Formalin fixed paraffin tissue	As stated in Referral Laboratory User Manual	Referred to St James Hospital Dublin	No	Contact details: Cancer Molecular Diagnostics (CMD), St. James Hospital; Tel: 01 4103576
Placenta Histopathology	Large Container 5L-15L Formalin	25 Days	UHL CUH*	No	Placentas to be delivered in grey boxes with no other pathology samples *Placentas for perinatal pathology are referred to CUH Contact Dr. Brendan Fitzgerald PNP Team Tel: 087 3691513
Prostate Needle biopsies	Histopots 50-250ml Biopsies safe cell Cassettes within Histopot (needle biopsies) 10% Formalin	10 days	UHL	No	Transperineal biopsies taken in Ennis are processed in house in HSE Mid West Limerick Prostate Needle Biopsies may be sent to the laboratory using Lumea Chips in the Histology red cap specimen formalin containers.
Prostate Histopathology (Resections)	Large Container 5L-15L Formalin	Cancer Resections: 10-15 days Non-biopsies: 25 days	UHL	No	Ensure container is large enough for specimen and adequate formalin is added
Renal Histopathology - Fresh Tissue	Fresh Renal Biopsy delivered to lab by renal team Unfixed renal biopsy	As stated in Referral Laboratory User Manual	Referred to Department of Renal Pathology, Beaumont Hospital, Dublin 9	No	Renal Biopsy must be pre-booked with the Histology Laboratory

Analyte/Profile Test/tissue type	Container/ Fixative/ Volume	TATS	Processing Laboratory	Routinely Available to Primary Care	Notes
Resections Histopathology	Large Container 5L-15L 10% Formalin	Cancer Resections: 10-15 days Non-biopsies: 25 days	UHL	No	Ensure container is large enough for specimen and adequate formalin is added
Tissue Histopathology Misc	Histopots 50-250ml 10% Formalin Large Container 5L-15L 10% Formalin	Cancer Resections: 10-15 days Non-biopsies: 25 days	UHL	No	Contact the Histology laboratory on 061482856 if any queries

Appendices

Appendix 1: User Guide Laboratory Information System (iLAB)

1. Logging on to the iLAB system from a PC

- Double click on iLAB Icon. 
- **Username:** enter your username
- **Password:** enter your password (User must change every 90 days).
- **Terminal I.D.** If requested enter ZLN (must be typed in uppercase).
- Note the system should be configured so that the user is not required to type ZLN.
- **Login:** If prompted for a login you must enter APEX - you will then be prompted for a username/password

2. Changing your password

For security reasons user passwords are set to expire after 90 days. The username does not change.

When entering a new password, you will be prompted to confirm it by re-entering it as outlined below.

- Current Password: enter <your current password>
- Password (1st entry): enter <new password>
- Password (2nd entry): enter <new password> as above, validation check.
- Password expires on view only field.

Password Criteria

Password must be:

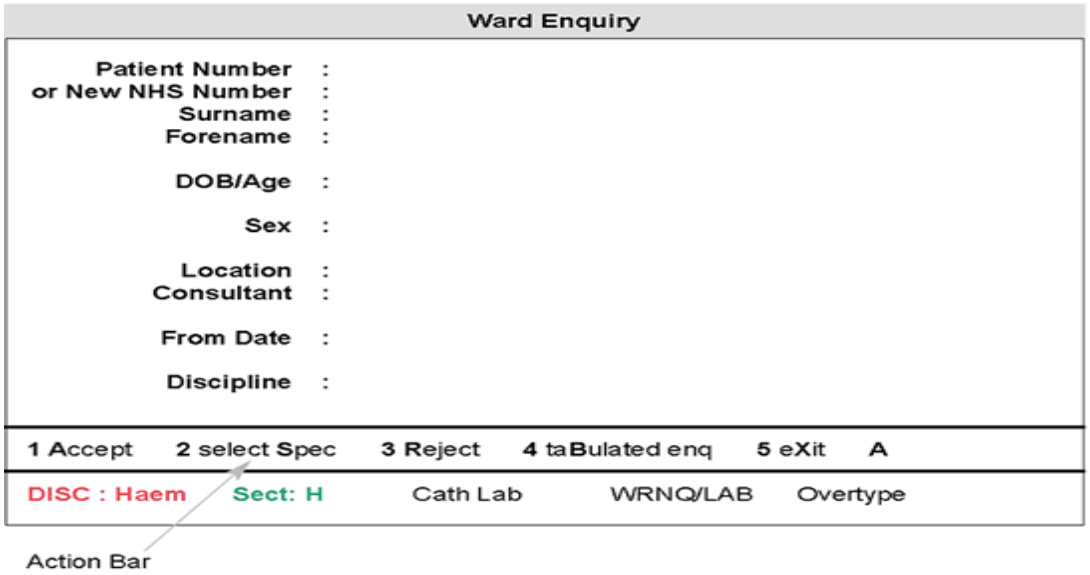
- At least 8 characters. Usernames and passwords are not case sensitive.
- Must have at least 1 alpha character
- Must have at least 1 numeric character
- Cannot have more than 2 repeating characters i.e., password containing 22 is OK but 222 is not.
- A password can be repeated after 3 changes.

Passwords must be changed every 90 days. The system will alert you on the 89th day that your password is due to expire the following day. You have a further 30 days to change your password after which time your account will be locked.

3. Looking up patient results using Ward Enquiry (WRNQ)

Having logged onto the Ward enquiry menu, select/type 1 or WRNQ.

The following screen is then displayed:



4. WARD ENQUIRY (WRNQ)

Pathology results are provided on individual patients and results are grouped by patient. Initially the patient is identified by supplying one of the following:

1. The PID/Chart number, plus at least the first two letters of the surname.
2. For an unknown PID/Chart number enter U in the Patient Number field and the patient's surname or date of birth, plus any other details if known.

NB

Use option (b) if searching by the PID/Chart number fails to return the required patient or set of results.

Use option (b) if on entering a PID, the system crashes; this is usually caused by a corrupt PID. These results can usually be retrieved by searching by DOB and surname rather than using the PID. Please notify the laboratory if such a crash occurs.

ACTION BAR OPTIONS:

1. **Accept:** Accept or reject selected details.
2. **Select specs:** The Select Specimens option provides a snapshot list of all specimens and tests requested, by date and specimen type, enabling rapid access to a specific result.
   Each line displays:
   - Specimen No.
   - Collection Date/Time
   - Specimen Type
   - Location Tests
   - Result availability
3. **Reject:** Clear selection criteria.
4. **Tabulated Enquiry:** Enter appropriate enquiry code. (Use F11 to list options)
5. **Exit:** Exit the Ward Enquiry.

IDENTIFY THE PATIENT

OPTION A

1. **Patient Number**
   Enter either the PID/Chart Number - the cursor moves to the Surname field.

2. New NHS Number
   This is not used.

3. Surname
   Enter a minimum of the first two characters of the surname. iLAB searches for the patient registration number (PRN) and uses the surname (or whatever part has been entered) as a check.
   If the PRN and surname match only one patient, then full details are displayed on the screen.
   Note: The Forename, Date of Birth/Age, Sex, Ethnic Group, Location and Consultant fields on this screen are for display-only and not for data input.

4. **Forename**
   This field displays the patient's forename(s).

5. **Date of Birth/Age**
   The patient's date of birth is displayed. If registered by age rather than date of birth, then iLAB calculates the year of birth and displays "January 1st" of that year, eg. 01/01/1956*.

6. **Sex**
   The patient's sex is displayed as M, F, or U (unknown).

7. **Location**
   The current location is displayed. This is the most recent location from which a specimen has been ordered on iLAB.

8. **Consultant**
   The current consultant is displayed. This is the requesting clinician responsible for the most recent specimen ordered on iLAB.

9. **From Date**
   iLAB searches from the date displayed in this field, up to the present. This may be changed manually using the Change option.

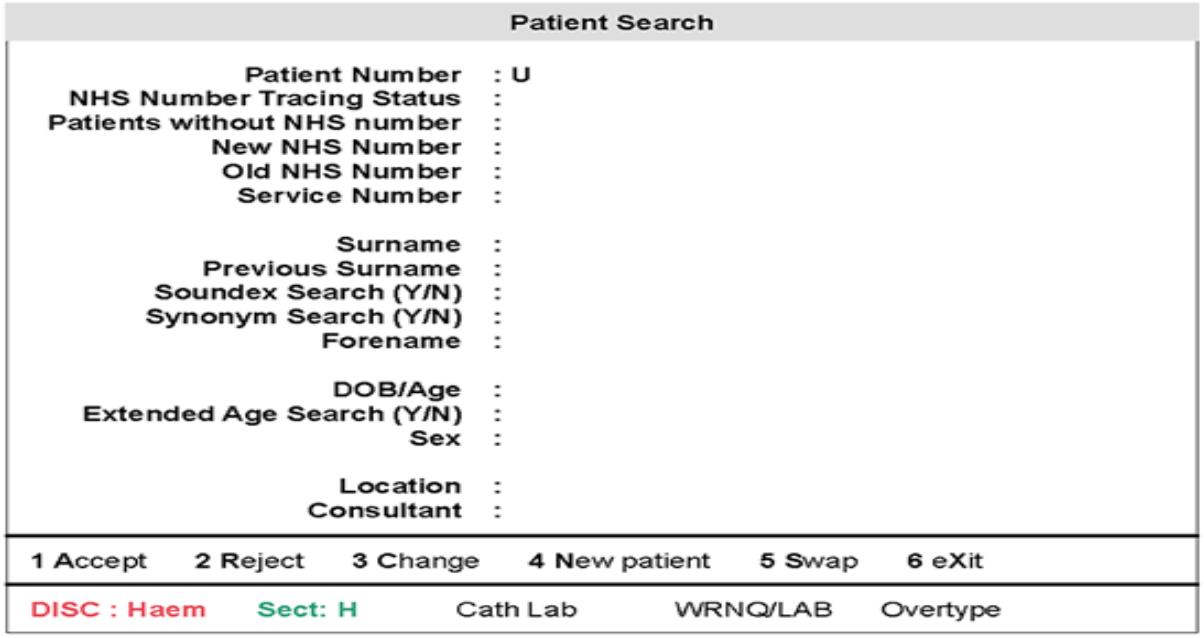
10. **Discipline**
    This option may or may not be present depending on your specific Menu configuration. If this option is available use the <Space bar> to remove the discipline short code, enabling a search across ALL disciplines. Alternatively, the search may be restricted by entering a discipline short code. Up to 3 may be selected.

Discipline short codes are as follows: B(Biochemistry), H(Haematology), M(Microbiology), S(Serology) and T(Blood Bank/Transfusion).

OPTION B

If the patient PRN/Chart number is unknown to APEX enter U in the Patient Number field and press ↵, this will allow an extended search via the Patient Search screen. The Patient Search Screen opens.

5. PATIENT SEARCH SCREEN



1. **Patient Number (PRN)**
   iLAB performs a search for all patients whose details match those entered on this screen. Entering as much information as possible about the patient, reduces the number of matching patients to a minimum. However, this advice should be followed only when all details are known to be correct. Entering the minimum data, produces a larger choice.

   The MINIMUM required, is either the surname (or at least the first 2 characters) or date of birth. (The patient's gender should also be included so as to reduce the numbers of records the system must retrieve)

   iLAB displays U by default.

2. **NHS Number Tracing Status**
   Not Used

3. **Patients without NHS number**
   Not used.

4. **New NHS Number**
   Not used.

5. **Old NHS Number**
   Not used.

6. **Service Number**
   Not used.

7. **Surname**
   Enter a minimum of the first two characters of the Surname, or press ↵. The surname, or part of it, is accepted as a minimum entry, enabling the remaining fields on this screen to be skipped. MC GONAGALL, MC GON, SMITH, SM, etc.

8. **Previous Surname**
   Not used.

9. **Soundex Search (Y/N)**
   Not used.

10. **Synonym Search (Y/N)**
    Not used.

11. **Forename**
    Enter any number of characters, or press ↵. D, DA, DAVID, etc.

12. **Date of Birth/Age**
    Enter a valid date or age (numeric, in years). The date of birth, is accepted as a minimum entry, enabling the remaining fields on this screen to be skipped. 23 12 67, 03/4/48, 28), etc.

13. **Extended Age Search (Y/N)**
    The search may be extended to include patients with a date of birth or age, two years either side of that entered, by entering Y.

14. **Sex**
    Enter either M, F or U. (The patient's gender should be included in all searches where the patient's PID is unknown)

15. **Location**
    Enter a location code. Press F11 to list options. The search is not restricted to this location. However, if a match is found to the patient, but from a different location, then the patient's record is not amended.

16. **Consultant**
    Enter a clinician code. Press F11 to list options. The search is not restricted to this clinician. However, if a match is found to the patient, but from a different clinician, then the patient's record is not amended.

PATIENT SEARCH SCREEN OPTIONS AVAILABLE FROM THE ACTION BAR

- **Accept:** Searches for any patients matching criteria, if none found (therefore no results available), prompts - No matches found.
- **Reject:** Clears the screen, enabling re-entry of data.
- **Change:** Enables any field entry to be changed.
- **New Patient:** Not used.
- **Swap** Two of the most common errors in entering search data is either to mix up the surname and the forename, or, in the case of a hyphenated surname, to enter the two halves of the name in the wrong order. This facility corrects such faults automatically.
    - Swap Surname/Forename Swaps surname with forename.
    - Swap Hyphenated Reverses hyphenated names.

6. SUBJECT SEARCH SCREEN

Subject Search Options

If the "unknown" search criteria match more than one patient, then the Subject Search screen displays a list of possible patients. Use the <cursor down>/<cursor up> keys to locate the required patient.

Note: Full demographics are displayed in the patient window at the bottom of the screen.

Three options are available from the action bar.

- **Accept:** Confirms correct patient and returns to first screen. The Confirm acceptance Y prompt, confirms this. N cancels acceptance, enabling an alternative election.
- **Details:** Displays full patient details as confirmation. The Confirm details Y prompt, confirms this. N cancels the "details" selection.
- **Quit:** Rejects the search, enabling re-entry of details. The Confirm Quit Y prompt, confirms this, returning to the Result Enquiry screen, and displays full patient details. N cancels the "quit" selection.

The following codes are used to designate the availability of results.

- **N/K:** The authorization stati of the tests on this specimen are unknown.
- **Requested:** Requested but results not yet available.
- **In Progress:** Test results may be present, not yet authorized to the viewing level of the enquirer.
- **Avlbl:** Results available to the level of the enquirer.

Select the required specimen using the <cursor up/down> and ↵ keys.

7. Results Screen Display

PATIENT/SPECIMEN DEMOGRAPHICS

The top three lines display patient and specimen information relevant to the specimen number currently viewed on screen.

The fourth line displays the specimen number and testing discipline:

Specimen No. HR000341Y (Haematology) <PgUp/PgDn> for more

Below this, in the specimen bar, are the collection date/time and specimen type.

The main body displays each test, result, test status and normal range, highlighting low and high values (specific colours on colour screens) and including any coded or free text comments. Results outside reference ranges are marked with an asterisk on hard copy and Healthlink reports and are highlighted in colour on the iLAB electronic report.

<Cursor down> if the report extends beyond the bottom of the screen.

8. RESULTS SCREEN OPTIONS

1. **Date**
   Enter a valid date. Any results from that date are displayed. Note the date refers to the specimen collection date.

   - Earliest Displays the earliest results according to the search criteria entered. <Page down> ↓ for later results.
   - Latest Displays the latest results according to the search criteria entered. <Page up> ↑ for later results.

2. **Report Sequence**
   Not used.

3. **DFT**
   Not available.

4. **Matches**
   When an "unknown" patient number search has been performed, another patient may be selected from the Subject Search screen, using this option.

5. **Spec Displays** Specimen related details. Press to return to previous screen.

6. **Verbose** Verbose display for Blood Transfusion only.

7. **Cumulative Results** Test results are displayed over a period of time. The screen displays up to six previous specimens in a vertical format. The specimens are displayed with the current one on the left and the previous ones to the right. They are displayed with the date, time, and specimen number in the header. The tests are listed in the left-hand column in test priority order with the relevant results displayed under their specific specimen numbers.

   Note: Only tests which were present in the original specimen are displayed in Cumulative Enquiry. The current selected specimen is highlighted.

8. **Cumulative Results Options**

   - <Cursor Down> Scrolls the screen down to display further tests.

- <Cursor Up> Scrolls the screen up to display further tests.
- <Cursor Right> Scrolls the screen to the right to display older specimens.
- <Cursor Left> Scrolls the screen left to display the more recent specimens.
- <Tab> Moves the highlight bar to the next specimen.
- View Displays results from the current selected specimen.
- Graph Prompts for single test to be graphed and displays the Graph Screen.

9. **Select Test to Graph**
   Enter the test code of the test to graph. The graph of the selected test is shown. The format of the graph depends on the type of terminal or monitor being used. The graph is either a bar chart or a line graph. The test being displayed is listed in the lower left corner of the screen. The left axis is "concentration", with intervals decided upon by iLAB. The right axis is "date/time" with the date being displayed. The following options are displayed.

   - Print Not available.
   - Zoom Allows selection of a concentration range to be graphed. Two prompts are displayed in order, Upper Limit, then Lower Limit. Once this data is entered, the graph is re-displayed with the new scale.
   - Unzoom Returns the scale to the original format and redraws the graph.

10. **Telephone**
    Not Used.

11. **Baby's result**
    Available for Blood Transfusion samples only.

9. FUNCTION KEYS/SHORTCUTS AVAILABLE IN ILAB

- <f6> Abort
- <f7> Short Help
- <f8> Long Help
- <f9> Refresh Screen

- <f10> Move to Next Mandatory Field
- <f11> Code List
- <f12> Supplementary Window - indicated by a caret >
- <pg up> Scroll up code list.
- <pg dn> Scroll down code list
- <space bar> Remove field entry.
- < > Move between fields
- ? Find text.
- # Flip code list
- {Abort
- } Return to logon menu.
- X Log off - back to sign-on screen

Shortcuts in Date fields:

- T Today's date (Current system date)
- Y Yesterday's date
- n- Current date minus n days

10. Screen Printing

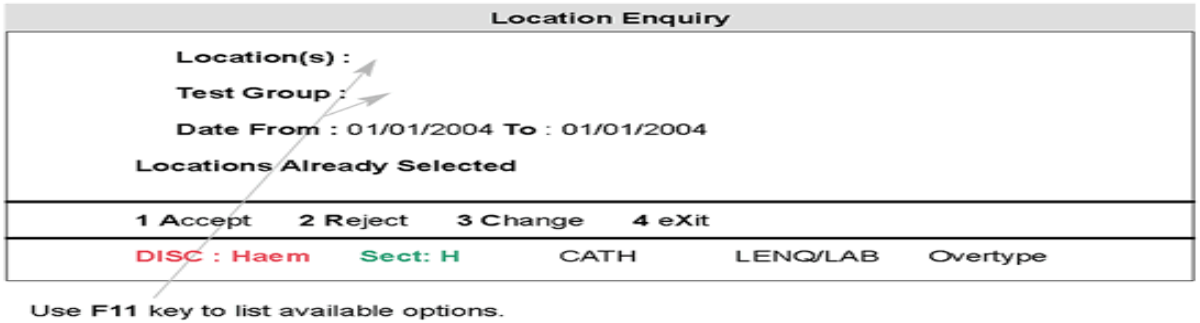
It is recommended that the "Print Screen" function is not used and that "hard copy" reports received from the Laboratory are read and filed.

The Pathology Department cannot be held responsible for the accuracy or completeness of laboratory results printed via the "Print Screen" function.

11. Location Enquiry (LENQ)

This module is used to retrieve a set of tabulated results from patients from one location for a specified period of time. The table may contain test results from one or more Pathology Departments.

Having logged onto the Ward enquiry menu, select/type3 or LENQ. The following screen is then displayed.



Use **F11** key to list available options.

1. **Location:**
   Enter a location code such as AE, AKU and ICU etc. Use theF11 function key to list available locations, press ↵
2. **Test Group:**
   Enter a cumulative table code such as UE, CHOL and CREAT etc., Use the F11 function key to list available locations, press ↵
3. **From:**
   Enter the start date. The default date is the current systems date. This is an inclusive date of specimen requests, press ↵

4. **To:**

   Enter the finish date. The default date is the current clock date. This is an inclusive date of specimen requests, press ↵

12. iLAB FAQs

Question 1: When logging onto iLAB I get the following error message “3004-007 You entered an invalid login name”.
Answer 1: **If prompted for a login** you must enter APEX – you will then be prompted for a Username/Password.

Question 2: The system crashes when I enter the patient's PID or Chart Number.
Answer 2: This is usually due to a corrupt PID/Chart Number pointer. The issue should be logged with IT support, in the meantime search for the patient using DOB and not PID/Chart number.

Question 3: The system says, "Patient number & not known to APEX”.
Answer 3: For a variety of reasons the details entered on iLAB may not match what you have. Try modifying your search criteria, instead use U as the PID and enter the patients surname and DOB.

Question 4: The system is "Unable to obtain a valid answerback" and looks for "Please enter Terminal ID (Answerback)".
Answer 4: A valid answerback or terminal id is "ZLN", which must be typed in uppercase. Each computer can be configured with an automatic answerback, contact IT support if this is required.

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