LABORATORY USER HANDBOOK

THIS REVISION SUPERSEDES ALL PREVIOUS REVISIONS

CHANGES FROM PREVIOUS REVISION - ADDITIONS

Section	Content
3.4	Add Mr Satish Kumar to Infection Prevention & Control Nurse Specialists
6.3.3	Add CPE swab (molecular) and Oracol Salivary swab (Mumps, Measles, Parvovirus)
8.2.1	Add for viewing microbiology reports to scroll down the report using '+' until ******END OF REPORT****** is displayed
9	Add Weekend Blood Request Form
10.10	Include Gentamicin and Vancomycin fall under the governance of Microbiology
11.12.1	Add second sample rule for blood transfusion
14.1.3	Add Monkeypox, swab in viral transport medium, must be discussed with Consultant Microbiologist in advance of sending Add Eye Swab, swab in viral transport medium
14.1.4	Add 16SrDNA and 18SrDNA
14.2.2	Include new section for NFT Urine Collection system Procedure
Appendix 1	Add Monkeypox to NVRL
Appendix 2	Add Monkeypox, swab in viral transport medium, NVRL Add 16SrDNA and 18SrDNA Add Maturity Onset Diabetes of the Young

CHANGES FROM PREVIOUS REVISION - AMENDMENTS

Section	Content
3.4	Amend telephone extension numbers for Infection Prevention & Control Nurse Specialists and surveillance scientists
6.3.6	Amend container for chlamydia to Aptima collection device
8.2	Remove Virology from the exceptions (available on microbiology LIS)
8.2.1	Amend 'LAB on erhlab' icon to 'Connolly Labs' icon
9.1	Move conjugated bilirubin and lipids to column for 'tests are available as on-call requests but a telephone call to the Chemical Pathology is always required'.
10.2.6	Remove turnaround time for endocrinology tests Fri – Sun

10.4.2	Update to current revision of GP request form
10.9	Amend urea reference range to one decimal place ie. 2.8 -8.1 mmol/L
10.10	Remove typo '773' in uric acid critical values
11.3	Update MBOS to Revision 7 of WI-HV-0007
11.5	Update to current revision of Blood Transfusion request form
11.12.1	Amend blood transfusion sample requirements to 72 hours for all patients. Remove all references to 7 day rule.
12.1.3	Remove platelet function testing
12.3.2	Update to current revision of GP request form
14.1.1	Amend throat swab for influenza and RSV to Nasopharyngeal Swab Amend CPE screen swab type to CPE molecular swab Amend TAT for MSU and CSU microscopy and culture and sensitivity to 48 hours (Mon - Thurs) & 72 hours (Fri-Sun) Amend TAT for CSF to 72 hours Amend TAT for Faeces for Occult bloods to 24 hours Mon-Thurs; 72 hours Fri- Sun Amend TAT for Fluids to 72 hours Amend TAT for Nasopharyngeal swabs for Influenzae A/B/RSV to 12 hours (Before 2pm Mon-Fri & before 10am Sat-Sun) and 24 hours (After 2pm Mon-Fri & after 10am Sat-Sun) Amend TAT for Urine for Legionella & Pneumococcal Antigen to 24 hours (Mon-Thurs) 72 hours (Fri-Sun)
14.2	Amend section to two subheadings: 14.2.1 for blood culture collection procedure and 14.2.2 for NFT urine collection procedure
14.3.2	Update to current revision of GP request form
Appendix 2	Remove platelet function testing Amend specimen transport requirements for cryoglobulins - thermos flask containing water at a temperature between 38-40ºc Remove Beta D Glucagon Amend code for corrected calcium to CORRCA Add Urine Protein Electrophoresis in brackets under Bence Jones Protein Amend all Cytogenetics to Sheffield

1 INTRODUCTION

Welcome to the Connolly Hospital, Blanchardstown Pathology Laboratory user manual.

This user manual is designed to give an overview of services available in the Pathology Laboratory. It is intended as a reference guide for all Pathology users, both within Connolly Hospital, and those from outside agencies. Results of laboratory tests are made available to patients through their Clinicians or General Practitioners. All Pathology services undergo continuous review through quality assurance and audit activities.

The Pathology Laboratory complies with the International Standard ISO 15189 (Ref: INAB - 220MT), the regulations, policies, and terms and conditions of both the Irish National Accreditation Board (INAB) and the Health Products Regulatory Authority (HPRA), Statutory instrument 360 of 2005 which adapts the relevant EU Directives into Irish law, and AML-BB current version titled "Minimum Requirements for Blood Transfusion Compliance with Article 14 (Traceability) and Article 15 (Notification of Serious Adverse Reactions and Events) of EU Directive 2002/98/EC. The scope of accreditation is available on the INAB website under registration number 220MT.

The Pathology Laboratory also complies with the requirements of Infectious Diseases Regulations 1981 (SI No. 390/1981) and Infectious Diseases (Amendment) Regulations 2016 (SI No. 276/2016).

Note:

The Blood Transfusion service is not available for GP patients, with the exception of samples from patients availing of termination of pregnancy services. Contact Blood Transfusion Laboratory, at 646 5302, for specific labelling requirements.

The Haematology and Chemical Pathology Laboratories provide services for patients >16 years old only.

GP samples for Haematology, Chemical Pathology, Immunology and Virology are outsourced to Eurofins until further notice. Eurofins report results directly to GP users.

2 GUIDE TO USING THIS MANUAL

A controlled electronic copy of this manual is available to all clinical areas and general practitioners within the Connolly Hospital catchment area via the Health Service Executive website www.hse.ie in the hospitals section.

Information regarding laboratory tests and profiles can be located in the manual according to the department where the tests are performed.

3 GENERAL INFORMATION

Pathology Laboratory opening hours and telephone numbers are detailed in sections 3.1 and 3.2. Pre-fix (01) 646 for direct access from outside Connolly Hospital. An on-call system operates outside normal hours for emergency work i.e. non-deferrable tests necessary for decisions regarding patient treatment. A limited service is available on Saturday mornings.

3.1 Postal Address

Pathology Laboratory
Connolly Hospital
Blanchardstown
Dublin 15
D15X40D
Ireland

3.2 Location & Directions

Connolly Hospital campus is located off the N3 Dublin to Navan road, near the N3 / M50 interchange. The Pathology Laboratory is located on the Connolly Hospital campus to the rear of the main hospital and beside the Administration building.

From Navan: From the N3 (city bound) take the exit towards Castleknock / Blanchardstown village. Turn left. Take the first exit at the roundabout. Continue straight and turn right at the end of the road. Continue straight to the T junction and turn right. Turn left. The Pathology Laboratory is located to the left.

From Dublin City Centre: Take the first exit towards Navan / N3 from the N3 / M50 interchange roundabout. Continue in the right hand lane and turn right at the traffic lights. Follow the road to the next set of traffic lights and turn right. Take the first exit at the roundabout. Continue straight and turn right at the end of the road. Continue straight to the T junction and turn right. Turn left. The Pathology Laboratory is located to the left.

3.3 Opening Hours and Contact Numbers

Prefix (01) 646 for direct access from outside Connolly Hospital

* A limited service is available on Saturday mornings.

Cut Off Time denotes the deadline for receipt of routine samples.

3.3.1 Out of Hours Laboratory Service

Description	Contact No.	Opening Hours
Medical Scientist On-Call for Chemical Pathology Blood Transfusion Haematology Microbiology	Bleep 158	Outside: 08:00 to 20:00 Monday to Friday 09:00 to 13:00 Saturday

3.3.2 Laboratory Office & Specimen Reception

Description	Contact No.	Opening Hours
Laboratory Office – Result Enquiries	5353 / 5352	9.00-17.00 Mon-Fri
Appointments for GP Patient Blood Testing		**Appointment only:** https://www.swiftqueue.com/
Specimen Reception	5314	8.00-20.00 Mon-Fri; 9.00-13.00 Sat
Laboratory Fax	8207747	

3.3.3 Phlebotomy

Description	Contact No.	Opening Hours
GP Phlebotomy Clinic	5375	**Appointment only:** https://www.swiftqueue.com/

3.3.4 Chemical Pathology

Description	Contact No.	Opening Hours	Cut-Off Time
Main Laboratory	5311/5312/5313	8.00-20.00 Mon-Fri 9.00-13.00 Sat*	16:00 Mon-Fri 12:00 Sat*
Clinical Consultation	Switch	Anytime	

3.3.5 Blood Transfusion & Haemovigilance

Description	Contact No.	Opening Hours	Cut-Off Time
Blood Transfusion	5302	8.00-20.00 Mon-Fri 9.00-13.00 Sat	15:30 Mon - Fri 11:00 Sat
Emergency / Massive Transfusion	5301	Anytime	
Haemovigilance Officer	5307 / Bleep 258	09:00-17:00 Mon-Fri	
Clinical Consultation - Consultant Haematologist Only	Switch	Anytime (shared with Beaumont Hospital)	

3.3.6 Haematology

Description	Contact No.	Opening Hours	Cut-Off Time
Routine Haematology	5305	8.00-20.00 Mon-Fri 9.00-13.00 Sat*	16:30 Mon - Fri 12:30 Sat*
Coagulation	5351		
Clinical Consultation – Haematology SpRs or Consultant Haematologists	5326 / Bleep 456	9.00-17.00 Mon-Fri	
	Switch / Bleep 258 in Beaumont	Out of hours (shared with Beaumont Hospital)	

3.3.7 Histopathology

Description	Contact No.	Opening Hours	Cut-Off Time
Main Laboratory	5304	8.00-18.00 Mon-Fri 9.00-13.00 Sat*	17:30 Mon- Fri 12:30 Sat*
Specimen Reception	5306		
Histopathology Office	5353 / 5352	9.00-17.00 Mon-Fri	
Histopathology SpRs	5395	9.00-17.00 Mon-Fri	

3.3.8 Microbiology

Description	Contact No.	Opening Hours	Cut-Off Time
Routine Laboratory	5303	8.00-20.00 Mon-Fri 9.00-13.00 Sat*	Monday to Friday: 12:30 Antibiotic Assays 17:00 Other Specimens Saturday: 10:30 Antibiotic Assays 11:30 Other Specimens Sunday: 10:30 Antibiotic Assays + Other Specimens
Infection Prevention & Control	5372 / Bleep 191 5374 / Bleep 270	Monday – Friday	
Clinical Consultation	5396 / Switch	9.00-17.00 Mon-Fri	
	Switch	Out of hours	

3.3.9 Mortuary

Description	Contact No.	Hours
Mortuary	5475	9.00 – 17.00 Monday to Friday
PM Room	5426	Bleep 123 out of hours or contact Nursing Administration

3.4 Contact Information

Key members of staff are listed below including their position and contact information. Prefix (01) 646 for direct access from outside Connolly Hospital.

Pathology Administration			
Laboratory Manager	Mr. Joe Feely	5394	joe.feely@hse.ie
Grade IV Clerical Officer	Ms. Anca Chireac	5353	anca.chireac@hse.ie
Quality Officer	Ms. Jessica Mooney	5363	jessica.mccarthy1@hse.ie
Phlebotomy			
Senior Phlebotomist	Ms. Noelle McKiernan	Bleep 117	Noelle.mckiernan@hse.ie
Phlebotomist	Ms. Bernadette Slevin	Bleep 115	
Phlebotomist	Mr. Shiju Nair	Bleep 625	
Phlebotomist	Mr. Rajesh Dina Nath	Bleep 486	
Phlebotomist	Ms. Joann Dunne	Bleep 242	
Phlebotomist	Ms. Slavica Gajic	Bleep 116	
Phlebotomist	Ms. Geraldine O'Keefe	Bleep 611	
Phlebotomist	Ms. Julie Ann Solamo	Bleep 637	
Pathology Reception			
Medical Laboratory Aide	Ms. Valerie Kelly	5314	
Mortuary			
Senior Mortuary Technician	Mr. Paul O'Callaghan	5426 / Bleep 224	
Chemical Pathology			
Consultant Chemical Pathologists	Dr. Saradha Srinivasan	Switch	sharisrinivasan@beaumont.ie
	Dr. Ingrid Borovickova	Switch	ingridborovickova@beaumont.ie
Chief Medical Scientist	Ms. Mairead Hanratty	5311	mairead.hanratty@hse.ie
Senior Medical Scientists	Ms. Sarah Collins		sarah.collins2@hse.ie
	Mr. Henry Akpobasa		henry.akpobasa@hse.ie
	Ms Sophie Cremen		sophie.cremen@hse.ie
	Ms Fiona Murray		fiona.murray6@hse.ie

Histopathology			
Consultant Histopathologists	Prof. Eamon Leen	5397	eamon.leen1@hse.ie
	Dr. Muna Sabah	5398 / Switch	msabah@rcsi.ie
	Dr. Jaipreet Singh	5353 / 5352	jaipreet.singh@hse.ie
Histopathology SpRs		5395	
Chief Medical Scientist	Mr. Jimmy Conheady	5339	jimmy.conheady@hse.ie
Senior Medical Scientists	Ms. Michelle Mullarkey	5304	michelle.mullarkey@hse.ie
	Ms. Claire Maguire	5304	claireg.maguire@hse.ie

Haematology & Blood Transfusion			
Consultant Haematologists	Prof. Patrick Thornton	5322 / Switch	patrickthornton@beaumont.ie
	Dr. John Quinn		johnquinn@beaumont.ie
	Dr. Elizabeth Smyth		elizabethsmyth2@beaumont.ie
	Dr. Jeremy Sargent		jeremysargent@beaumont.ie
Haematology SpRs		Bleep 456 / Switch	
Chief Medical Scientist	Mr. Padraig Kiernan	5366	padraig.kiernan@hse.ie
	Ms. Joanne Atkinson		joanne.atkinson@hse.ie
	Ms. Michelle Burns		Michelle.burns2@hse.ie
	Ms. Janet Tierney	5302	janetm.tierney@hse.ie
	Ms. Marian Lynch		marian.lynch1@hse.ie ie
Haemovigilance Officers	Ms. Adele Maguire	5307 / Bleep 258	adele.maguire@hse.ie
	Ms. Cathy Matthews		cathy.matthews@hse.ie
Microbiology			
Consultant Microbiologists	Dr. Joanne O'Gorman	5396 / Switch	joanne.ogorman2@hse.ie
	Dr Liz Trautt	5396 / Switch	elizabeth.trautt@hse.ie
	Prof Eoghan O'Neill	5671 / Switch	eoneill@rcsi.ie
Chief Medical Scientist	Ms. Carol Tiernan	5368	carol.tiernan@hse.ie
Senior Medical Scientists	Ms. Jennifer McGarry	5303	jennifer.mcgarry@hse.ie
	Ms. Michelle Gaffney		michellemary.gaffney@hse.ie
	Ms. Nikki Kelly		nikki.kelly@hse.ie
	Ms. Fiona Cassidy		fiona.cassidy2@hse.ie
	Ms. Norma Carroll		norma.carroll1@hse.ie
	Ms. Lisa Lennon		lisa.lennon1@hse.ie
Infection Prevention & Control Nurse Specialists	Ms. Antoinette Malone	5376 / Bleep 191	antoinette.malone@hse.ie

	Ms. Madan Sharma	5202 / Bleep 191	madan.sharma@hse.ie
	Ms. Thara Johnson	5374 / Bleep 270	thara.johnson@hse.ie
	Mr Satish Kumar	5372	Satish.kumar@hse.ie
Surveillance Scientists	Ms. Grainne Bowens	6432	grainne.bowens@hse.ie

3.5 Service Users

A log of service users is maintained on the Laboratory Information System (Telepath). General Practitioners and external healthcare facilities can become registered service users by contacting Joe Feely, Laboratory Manager at (01) 646 5394 or joe.feely@hse.ie. 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 Manager.

3.6 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 appropriate laboratory section or email the Pathology Quality Officer, Jessica Mc Carthy at jessica.mccarthy1@hse.ie.

The Pathology Department conducts Pathology Laboratory Service (for internal and external services users) and Blood Transfusion / Haemovigilance Service (for internal service users only) Satisfaction Surveys at 2 yearly intervals on alternate years. Service users may be surveyed at more frequent intervals in response to the implementation of major changes to the service or identification of non-conformities or complaints.

3.7 Patient Information

The following information leaflets explaining clinical procedures are available for patients:

LF-HV-0001 Blood Transfusion Information for Patients and Families

LF-HV-0009 Post-Transfusion Information Leaflet for Day Patients

Leaflets are available in each clinical area within Connolly Hospital or can be downloaded from:

HSE National Intranet – Hospital Staff Hub - Connolly Hospital

Connolly Hospital's X:drive under CHB Information, Haemovigilance

4 SPECIMEN RECEPTION

The specimen reception area in the laboratory provides the following functions:

- Reception of samples from porters, attendants, pneumatic tube system etc.
- Reception of goods inwards.
- Supply of blood culture bottles, CSF containers and specimen bags.

All laboratory request forms, swabs, MSU containers blood bottles and needles can be obtained from the Materials Management Department.

5 ORDERING LABORATORY EXAMINATIONS

Note: Investigations are rarely needed more than once in 24 hours, except in patients receiving intensive therapy.

5.1 Consent

Issues concerning patient consent for laboratory investigations are the responsibility of the requesting doctor. The Pathology 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 with the exception of Microsatellite Instability (section 13.7) and specific tests listed in Appendix No. 2 Specimen Requirements which require signed consent forms.

5.2 Request Form and Specimen Labelling

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

5.2.1 Chemical Pathology, Haematology, Histopathology and Microbiology Labelling Requirements

Chemical Pathology, Haematology, Histopathology and Microbiology		
Labelling Requirements	**Essential Information§**	**Desirable Information**
Specimen * Details must be identical on form and specimen	Patient's full name* Unique healthcare record number and / or date of birth*	Date and time of specimen collection Location (ward) Signature of venipuncturist
Request Form * Details must be identical on form and specimen Each copy of the request form should be labelled.	Patient's full name* Unique healthcare record number and / or date of birth* Name of requesting clinician and destination for report Test request Gender*	Bleep No. or Contact No. Patient's address Clinical details & relevant therapy (antibiotic treatment important for Microbiology) Date and time of specimen collection (timing in relation to antibiotic dose essential for Antibiotic Assays & for some Chemical Pathology tests)
Specimen and / or Request Form In the event that there are samples from multiple sites the specimen type must be stated on the form and sample for all samples.	Specimen type or exact site (for all non-blood biological samples)	
Chemical Pathology, Haematology, Histopathology and Microbiology		
Unidentified Patients	Where unique identification is not available (i.e. patient unconscious or confused on arrival in the hospital), the patient is assigned an 'unknown' name and HCRN in A/E. This is used to register the patient on the LIS. If the patient's DOB is unknown, the default DOB 01-01-1900 is used.	

Gender*- In the event that gender is not stated on the request form laboratory staff must confirm gender from previous records, PAS or by contacting the requesting clinician prior to registration on the LIS. In the event that gender cannot be determined the gender will be recorded as 'U' for unknown on the LIS.

§Refer to section 5.2.3 for unrepeatable samples where essential patient identification information is omitted or incorrect.

5.2.2 Blood Transfusion Labelling Requirements

Note: The Blood Transfusion service is not available for GP patients.

Refer to section 11.8 for Acceptable Methods of Specimen and Form Labelling for Blood Transfusion. Blood Transfusion operates a zero tolerance policy with respect to sample and request form labelling.

5.2.3 Unrepeatable Samples – Minimum Labelling Requirements Not Met

Note: Blood Transfusion samples are <u>not</u> unrepeatable samples.

In the event that minimum patient identification labelling requirements are not met for unrepeatable samples e.g. CSFs, tissue samples, blood cultures taken during temperature spike, certain fluids etc. the clinician or clinical team taking responsibility for labelling the sample will be contacted and requested to come to the laboratory to resolve the labelling anomaly. The clinician taking responsibility for resolving the anomaly must sign the accompanying request form. Requests may be processed but reports withheld until the anomaly is resolved.

5.3 Phlebotomy Services

5.3.1 Procedures for Ordering Phlebotomy for In-Patients

Day	Service	Clinical Area	Cut-Off Time for Ordering Blood Tests
Monday to Friday	Routine	All wards (except ICU & ED)	7:00 am*
		Rowan	1:30 pm*
Saturday	Urgent Requests	Redwood, Laurel, Maple, Beech, CCU, Cypress, Cherry, Elm	7:00 am*

*Staff placing orders after this time must be aware they will not be collected until the next day.

1. Request forms must contain minimum details as described in section 5.2 of this document.
2. If using Blood Track TX or addressograph labels remember to put the addressograph labels on all copies of the request form. If necessary change the location and requesting clinician on the label.
3. All request forms must be left at the agreed location on each ward, usually in a box at the nursing station.

4. If the request is urgent, please state clearly on the request form and it will be given priority. Urgent requests should also be communicated to the relevant laboratory by telephone.
5. If the patient in unavailable for phlebotomy or the phlebotomist is unable to obtain a sample, the phlebotomist will contact the relevant medical team. The relevant team will then decide whether to leave the request until the next day, or to take the sample themselves.
6. When ordering fasting blood tests or other tests that require patient preparation, please state 'fasting' clearly on the request form and ensure that the patient and nursing staff are informed.

5.3.2 Procedures for Ordering Phlebotomy for Out-Patients

1. Request forms must contain minimum details as described in section 5.2 of this document.
2. If using Blood Track TX or PAS addressograph labels remember to put the addressograph labels on all copies of the request form. If necessary change the location and requesting clinician on the label.
3. If the request is urgent, please state clearly on the request form and it will be given priority. Urgent requests should also be communicated to the relevant laboratory by telephone.
4. When ordering fasting blood tests please state 'fasting' clearly on the request form and inform the patient, taking cognisance of the insulin dependent diabetic.

5.3.3 Procedures for Ordering Phlebotomy for Non-Hospital Patients / GP Patients

1. All non-hospital patient / GP patient requests must be made on the Connolly Hospital GP Request Form.
2. Request forms must contain minimum details as described in section 5.2 of this document.
3. If using labels remember to put the label on all copies of the request form.
4. When ordering fasting blood tests please state fasting clearly on the request form and inform the patient, taking cognisance of the insulin dependent diabetic.

5.4 Verbal Requests

All verbal requests for additional tests or request for blood, blood components or products **must** be accompanied by a written request on the appropriate laboratory request form. In emergency situations it may not be practicable to insist on a written request form for blood components / products requested. In such situations blood components / products can be requested by telephone.

6 SPECIMEN COLLECTION

6.1 General Guidelines

Refer to the sections 10 to 14 and Appendix No. 2 of this manual for lists of tests performed. Specimens for some tests must be collected with the patient fasting, in the basal state or with due regard to diurnal variations. Some tests may be performed only after prior arrangement with the laboratory. If in doubt contact the relevant laboratory.

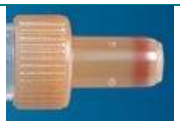
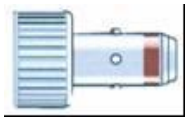
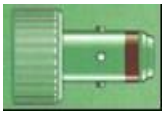
6.2 Personnel Responsible for Primary Specimen Collection

- Phlebotomists, NCHDs, nursing staff in specialist areas, general practitioners and practice nurses are responsible for blood specimen collection.
- Clinical staff are responsible for tissue and fluid specimen collection within Connolly Hospital.
- Urine and faecal sample collection may be performed by the patient.

6.3 Specimen Containers

Please note the images below do not reflect the actual size of the containers.

6.3.1 Blood Containers and Order of Draw

Order	Colour / Bottle	Investigation
1 Blood Culture		Blood Cultures – Blood, Fluids Refer to section 14.2 Blood Culture Collection Procedure
2 Serum Gel (Brown) 4.9ML		Immunology tests referred to Beaumont Immunology Laboratory
3 Serum (White) 7.5ML		Renal (UEC) Profile, Liver (LFT) Profile, Bone Profile, Lipids, Magnesium, Lithium, hsTNT, CK, CRP, Iron , UIBC, Urate, Amylase, TFT, FT3, Ferritin, Vitamin B12, Folate, FSH, LH, Oestradiol, Prolactin, Androgens, Progesterone, SHBG, Cortisol, PSA, Serum Electophoresis (SPEP), IgA, IgG, IgM, IgE, Alpha-1-Anti-Trypsin, ACE, Digoxin, Anti-Epileptic Drugs, Hepatitis Serology, Vitamin D, Drug Screen (Barbiturates, Benzodiazepine, Paracetamol, Salicylate, Tricyclic Antidepressants), Immunology tests referred to centres other than Beaumont hospital
4 Coagulation (Green) 3ML		Coagulation Screen (PT, APTT), INR, Fibrinogen, D-Dimer [all performed on one sample] Thrombophilia Screen [4 tubes required + 1 EDTA] Lupus Screen [1 tube required] Factor Assays [1 tube required per assay] von Willebrand Factor [2 tubes required] All samples must be filled to the mark. The ratio of anticoagulant to blood is critical for these tests.
5 Lithium Heparin (Orange) 7.5ML		Vitamin A, Vitamin B2, Vitamin C – ALL SAMPLES MUST BE LIGHT PROTECTED – MUST BE DELIVERED TO LAB WITHIN 20 MINUTES
6 LH-Trace Metal Analysis (Orange) 7.5ML		Metal analysis using a special metal free tube using a metal free needle e.g. Aluminium, Chromium, Copper, Lead, Mercury, Selenium, Zinc.
7 EDTA (Red) Blood Transfusion 7.5ML		Group & Screen, Group & Crossmatch Specimens must be labelled with Blood Track TX PDA labels or patient details must be handwritten on the specimen bottle. Addressograph labels are never permitted.
8 EDTA (Red) 2.7ML		FBC, ESR, Blood Film, Reticulocyte Count, Infectious Mononucleosis Screen, Malaria Screen, Haemolytic Screen, Sickle Cell Test, Haemoglobinopathy Screen, Direct Antiglobulin Test (DAT), Renin, Aldosterone, PTH, ACTH*, Cyclosporine, Tacrolimus, HbA1c [Must have a dedicated tube] Haemochromatosis Screen [Must have a dedicated tube] *SAMPLE MUST BE ON ICE
9 Fluoride (Yellow) 2.7ML		Glucose, Lactate, Drug Screen (Ethanol / Alcohol).

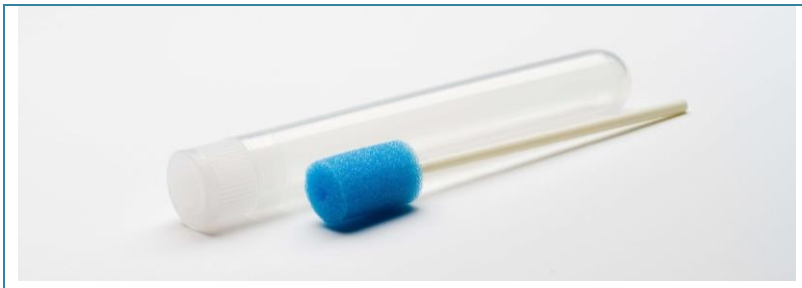
6.3.2 Arterial Blood Gas Syringe

3 ml Heparin Coated Syringe for Arterial Blood Gas - for sampling from arterial line

Arterial blood gas. Mix well by inverting tube 4-5 times. Must be labelled as per criteria in 5.2.1. Analyse immediately in ICU or ED or send to laboratory immediately on ice.

6.3.3 Swab Types

Swabs	Investigations
	Virology
	Respiratory virology
	Routine Culture, MRSA, VRE or CPE screening
	Endocervical and Male Urethral Swabs for Chlamydia
	CPE swab (molecular)

	Oracol Salivary Swab for Mumps, Measles, Parvovirus

6.3.4 24 Hour Urine Containers

Container	Investigations
 **Plain**	Bence Jones Protein, Citrate, Copper, Cortisol, Creatinine Clearance, Iron, Lead, Magnesium, Mercury, Myeloma Screen (for known Myeloma patients only), Phosphate, Potassium, Protein, Protein Electrophoresis, Sodium, Sulphonylurea (GLIB), Thallium, Urate, Urea, Zinc Prophyrin Screen & Porphobilinogen (light protect with tinfoil)
 **Acid**	Calcium, Oxalate, Serotonin, Urinary Catecholamines Urinary Metanephrines
 **Light Protected & Acid**	5HIAA

6.3.5 Histopathology & Cytology Containers

Container	Investigations
 **MSU Container (Sterile)**	Fluids
 **ThinPrep CytoLyt**	Fine Needle Aspirates (FNAs) (Thyroid only)
 **CellStor Pot 10% Neutral Buffered Formalin**	Small Tissue Samples, fluids, Fine Needle Aspirates (FNAs) and Biopsies
 **200ml Clear Container**	Large Tissue Samples
 **Large White Plastic Containers**	Large Tissue Samples

6.3.6 Other Urine & Fluid Containers

Container	Investigations
 **MSU Container (Sterile)**	**Microbiology** Urine, Faeces, Fluids, Sputum, Tips, Tissue **Chemical Pathology** Spot Urines – Alcohol / Ethanol, Amino Acid Screen, Amylase, Drug Screen, Glucose, Microalbumin, Organic Acids, Osmolality, Potassium, Sodium Fluids **Cytology** Fluids
 **Aptima Urine Collection Kit for Chlamydia**	**Microbiology** Urine collection for Chlamydia
 **Universal Container**	**Microbiology** CSF and Fluids
 **Flouirde Tube**	**Chemical Pathology** Glucose

 **3 ml Heparin Coated Syringe**	**ICU / AE / Chemical Pathology** Fluid pH – ANALYSE IMMEADIATELY

6.4 Phlebotomy

6.4.1 Fasting Blood Specimens

Food and drink not allowed except for water and prescribed medication if required. Patients are required to fast for 8 hours prior to sampling for fasting glucose or GTT and / or 12 hours for fasting lipid profile.

6.4.2 Patient Identification

Phlebotomy must not proceed until the phlebotomist is satisfied as to the correct identity of the patient.

Accurate identification of the patient is essential. Patients presenting for phlebotomy should have a valid request with:

- Patients full name.
- Date of birth.
- Date of test.
- Location.
- Doctor's name.
- Tests required.

6.4.2.1 Identifying the Conscious / Coherent Patient

In-Patients

1. Check that the patient is wearing an ID (identification) band.
2. If the patient is not wearing an ID band or there are discrepancies between the information on the ID band and the information from the patient or healthcare record DO NOT PROCEED with specimen collection until a correct ID band is applied.
   Ref.: Connolly Hospital Policy on Patient Identification.

Out-Patients

1. Ask patient to state name.
2. Ask patient to state date of birth.
3. Check all data against the request form. Where any detail is incorrect or unspecific the phlebotomist may need to contact the GP or medical team (for hospital out-patients) to verify the request prior to venepuncture.

6.4.2.2 Identifying the Unconscious / Incoherent Patient

1. Check the Name, date of birth and healthcare record number on the request form against the ID band.
2. Ask the carer, relative or nursing staff to verify details.
3. For the collection of pre-transfusion specimens in emergency situations refer to WI-HV-0005.
   Ref.: WI-HV-0005 Unidentified Patient Policy.

6.4.3 Order of Draw of Samples

Refer to section 6.3.1.

6.4.4 Venepuncture Procedure

Note:
Refer to section 14.2 for blood culture collection procedure.
Do not make more than two attempts to draw blood. Use a sterile needle on each attempt. In the event that the phlebotomy department have been unsuccessful withdrawing the blood from the patient, inform the clinical nurse manager and return the request form.
A latex free single use tourniquet must be used for each patient.

When the patient has been correctly identified:

1. Explain the procedure.
2. Support the patient's arm, keeping it straight, in a downward position, with the wrist extended.
3. Wash Hands / alcohol gel.
4. Wear gloves.
5. Apply tourniquet and choose site.

6. Loosen tourniquet.
7. Clean Skin with alcohol swab, in a clockwise direction from within outwards.
8. Assemble equipment, and let skin air dry completely. This is highly important in the decontamination of the site.
9. Reapply tourniquet for not more than 1 minute.
10. Stretch the skin below the intended site with the free hand to anchor the vein and reduces discomfort.
11. Instruct patient to close fist lightly – no pumping.
12. Expose the needle and inspect. The needle is held at an angle of 15° to 30° to the patient's arm with the bevel of the needle facing upwards and in line with blood flow direction.
13. Warn the patient appropriately.
14. When blood flow commences loosen tourniquet and instruct patient to open fist. If flow is inadequate tourniquet may be lightly reapplied.
15. Fill the tubes in a downward position, using correct order of draw, until vacuum is exhausted and blood flow ceases.
16. Ensure maximum fill, to correct ratio.
17. If using non pre- evacuated tube, withdraw the required amount by suction.
18. A 21g needle is the recommended size for adult blood collection. However a 22g needle or 23g blood collection set may also be used.
19. Avoid changing hands unnecessarily while taking blood as this can displace the needle causing pain and trauma to the patient.
20. Gently mix each tube when blood has been collected, by fully inverting 5 to 8 times (or in accordance of manufacturers instructions) avoiding vigorous shaking of the tube.
    Note: Do not invert serum samples; allow to stand for a minimum of 30 minutes to clot.
21. Release tourniquet fully prior to removing needle
22. Remove the last tube from the holder before the needle is withdrawn from the vein.
23. Place a gauze ball lightly over the site as the needle is withdrawn, with pressure once the needle is fully removed.
24. Immediately engage safety device.
25. Maintain pressure until the bleeding has stopped. The patient may do this if possible.
26. Dispose of sharps immediately in a puncture resistant bin.

6.4.5 Specimen Labelling

6.4.5.1 Blood Track TX PDA Labels

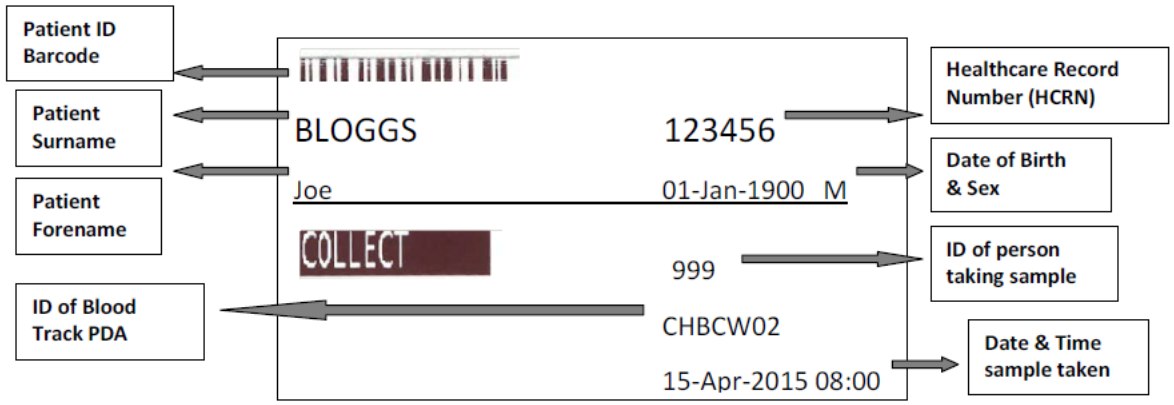
> **Note:** Staff members must use their own ID badge at all times.
> Labels must be generated following venepuncture.

1. Scan your staff ID badge using Blood Track TX PDA (personal digital assistant).
2. Scan the patient's 2D ID band. If the ID band cannot be scanned replace it as per hospital policy. If a fresh armband cannot be applied but patient details are still legible on the armband revert the handwritten labelling procedure as per section 6.4.5.2 below.
3. Verbally confirm the patient's identity and tick the following reminders on the PDA:

   Wristband details correct

   Asked patient to state their name and DOB

   Select NEXT on PDA if details are correct. Where any detail is incorrect an updated ID band must be obtained and applied. The phlebotomist must then start the patient identification checks again using the PDA.
4. Select number of labels you need to print from 1-5 and select print. The following details print:



5. If there is any delay the PDA will ask you to re-scan the patient details.
6. Label the specimen bottles post venepuncture in the presence of the patient.
7. Discard surplus labels immediately.

6.4.5.2 Handwritten Details

> **Addressograph labels are <u>NEVER</u> permitted for Blood Transfusion samples.**

1. Handwrite patient details post venepuncture in the presence of the patient as follows:

Patient's Full Name
Healthcare Record Number
Date of Birth
Phlebotomist's Initials / Signature

Do not label specimen tubes prior to venepuncture.

2. Signature is essential for blood transfusion samples.

6.4.6 Post Venepuncture & Specimen Labelling

1. Place specimens in leak-proof receptacle following any special handling requirements.
2. The arm may be elevated to encourage haemostasis but bending of the arm should be discouraged as it can lead to bruising.
3. Inspect for haemostasis and apply gauze over puncture site.
4. Reassure patient and leave comfortable.
5. Wipe tray with disinfectant wipe; discard if disposable.
6. Remove gloves, wash hands / alcohol rub.
7. Place specimens in collection area.

6.5 24 Hr Urine Collections

6.5.1 Specimen Requirements

Refer to Appendix No. 2 and No. 3 for required specimen containers, additives and collection requirements.

6.5.2 Specimen Collection - Instructions for Patients

Approved containers for the collection of 24 Hr-urine are available from the hospital stores department. Depending on the test requested the container may need an acid preservative added or may need to be light protected as per Appendix No. 2 and No. 3. Do not discard this acid preservative.

1. Just before the timed collection period is due to start the patient should empty his / her bladder. This urine must be discarded.
2. Thereafter, from the start (e.g. at 8am) until the end of the collection period, all urine passed must be added to the container. It is very important that the patient collect all urine passed within an exact 24 hour period. Loss of any urine, or a collection made for

either more or less than 24 hours, will invalidate the test and might lead to an incorrect diagnosis.

3. Patients should be cautioned not to urinate directly into a bottle containing acid preservative but into a suitable clean detergent-free jug and then pour into the 24 hour container.
4. If the specimen container contains preservative, it must be mixed gently each time more urine is added to the collection. Ensure the cap is tightened while mixing.
5. At the end of the timed period (e.g. 8am the next day) the patient should empty his / her bladder. This urine must be included in the timed collection.
6. The period over which the collection was made must be recorded on the container label. If a second container is used ensure each is fully labelled and that the containers are labelled '1 of 2' and '2 of 2'.
7. The container should be stored in a cool environment during urine collection.
8. Ensure that the identification label on the container is completed.
9. The container should be brought to the laboratory on the day the collection is completed.

Important Note: Hydrochloric Acid (fuming liquid) causes burns and is irritating to eyes, skin and respiratory system. If in contact with skin, wash immediately with plenty of water and seek medical advice. Keep out of reach of children.

6.6 Mid Stream Urine (MSU) Collection - Instructions for Patients

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

The aim of collecting a mid stream urine sample is to establish if the patient has a urinary tract infection (UTI). A 'mid-stream' sample is the best sample as the first void of urine passed may be contaminated with bacteria from the skin.

1. The container should be labelled with the patient's full name, date of birth, date / time of collection and the referring doctor's name.
2. The sterile container should not be opened until the patient is ready to collect the sample.
3. The patient should pass some urine into the toilet, then without stopping the flow of urine, catch some urine in the sterile container (approximately half full). The patient should then finish passing urine into the toilet.

4. The patient should ensure that the lid of the container is firmly closed and place the container into the specimen bag attached to the pathology request form. The request form should be labelled with the patient's full name, date of birth, date / time of collection, ward / patient's address and the referring doctor's name.
5. Specimens should ideally be brought to the doctor's surgery or laboratory within 2 hours of collection. If that is not possible the sample should be refrigerated until it can be brought to the doctor's surgery or laboratory.

6.7 Faeces / Stool Sample Collection – Instructions for Patients

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

1. The container should be labelled with the patient's full name, date of birth, date / time of collection and the referring doctor's name.
2. The sterile container should not be opened until the patient is ready to collect the sample.
3. Faeces (a bowel movement) should be collected in the container. It is not necessary to fill the container.
4. The patient should ensure that the lid of the container is firmly closed and place the container into the specimen bag attach to the pathology request form. The request form should be labelled with the patient's full name, date of birth, date / time of collection, ward / patient's address and the referring doctor's name.
5. Specimens should be brought to the laboratory as soon as possible.

7 TRANSPORT OF SPECIMENS TO THE LABORATORY

7.1 Packaging

1. The primary container containing the specimen for examination is placed in a biohazard bag, attached to the request form, which is sealed carefully.
2. The person who sends the specimen ensures that the primary container is appropriate, properly closed and is not externally contaminated by the contents.
3. The secondary sealed biohazard bag and transportation container prevents the contamination of other containers, request forms, the hands of the specimen receptionist and the immediate environment.
4. All unnecessary hand contact with the specimen containers should be limited.

7.2 Specimens From Within Connolly Hospital

7.2.1 Transport Personnel / Porter Service

Request forms and attached biohazard bags must be placed in CHB Laboratory Specimens Transport Bags or in a transport box.

Transport Personnel collect specimens from designated locations in the clinical areas on Monday to Friday at 8:30am.

Specimens are collected by Porters from OPD and Unit 8E at the following times:

Monday		Tuesday		Wednesday		Thursday		Friday	
OPD	**Lab**	**OPD**	**Lab**	**OPD**	**Lab**	**OPD**	**Lab**	**OPD**	**Lab**
9:00	9:20	9:00	9:20	9:00	9:20	9:00	9:20	9:00	9:20
10:00	10:20	10:00	10:20	10:00	10:20	10:00	10:20	10:00	10:20
11:00	11:20	11:00	11:20	11:00	11:20	11:00	11:20	11:00	11:20
12:00	12:20	12:00	12:20	12:00	12:20	12:00	12:20	12:00	12:20
13:30	13:50	13:30	13:50	13:30	13:50	13:30	13:50	13:30	13:50
14:00	14:20	14:00	14:20	14:00	14:20	14:00	14:20	14.00	14.20
15:00	15:20	15:00	15:20	15:00	15:20	15:00	15:20	15:30	15:50
16:15	16:30	16:15	16:30	16:15	16:30	16:15	16:30	N/A	N/A

Porters from other clinical areas collect specimens from designated locations at regular intervals.

7.2.2 Pneumatic Tube System (PTS)

The pneumatic tube system (PTS) is used to transport samples from A/E, Theatre and the wards in the main hospital building. All current blood collection tubes and universal containers are suitable for transport in the PTS.

The following sample types must be hand-delivered to the laboratory and are <u>never</u> sent via the PTS:

- Any containers containing over 100ml fluid
- Arterial blood gas samples
- CSF samples
- Histopathology or Cytology samples
- Blood Components or Products

Note: LDH may be falsely elevated following transport via the PTS.

All specimens are sealed in the bag attached to the request form before loading into the pneumatic tube canister. All urine samples must have a spill absorbent pad in the bag. Brief operating instructions are located on laminated cards WI-GEN-0001 at each PTS station.

Ref.: WI-GEN-0001 Operation of Pneumatic Tube System - Clinical Areas

7.3 Specimens from Outside Connolly Hospital

All specimens transported by road must comply with ADR transport regulations. Specimens should be packaged as per ADR P650 Packaging Instructions. It is the responsibility of the sender to ensure that specimens are transported in accordance with the ADR.

The Health Service Executive's (HSE) Primary, Community and Continuing Care (PCCC) service provides a specimen collection service from surrounding medical centres and practices.

7.4 Transport of Urgent Specimens

Requests for urgent processing of specimens must be communicated to the relevant laboratory, by phone during routine hours or pager 158 out of routine hours, to ensure the specimen is expected and testing of the specimen is prioritised. Urgent specimens can be transported to the laboratory by the following methods:

Origin	Method of Delivery
Connolly Hospital	1. Pneumatic Tube System – with the exception of those specimens detailed in section 7.2.2. 2. Porters 3. Healthcare Attendants 4. Clinical Staff 5. Transport Personnel – Outside routine hours N.B. Arterial blood gases and CSFs must be hand delivered to the laboratory
General Practitioners / External Locations	Specimens should be hand delivered to laboratory staff.

8 REPORTING OF RESULTS

Note: Reports are never given directly to patients.

8.1 Confidentiality

Confidentiality of information is maintained through adherence to hospital policies with regard to patient confidentiality. Each employee is contractually bound to desist from divulging any patient information. Any breaches of this policy will be fully investigated and appropriate censure will be taken.

8.2 Laboratory Information System

All laboratory reports are available remotely via the Laboratory Information system (Telepath), once authorised, with exception of Histopathology, Cytology and Serology. See section 8.7 for information regarding results from referral laboratories.

8.2.1 Chemical Pathology, Haematology and Microbiology

Results are available for Chemical Pathology, Haematology and Microbiology on the Laboratory Information system (Telepath) as soon as they are authorised in the laboratory.

1 Double click on the 'Connolly Labs' icon on PC desktop.

2 Type 'biolab' or 'haelab' or 'micro' to enter lab system.

3 Enter REM as the username and password.

4 Select option 3: 'XENQ Single point request entry'.

5 Enter the patient's HCRN and press return, followed by the first 2 letters of the patient's surname and return. (Alternatively enter K and press return, at the 'Registration / Case No' field, to search by the date of birth. Enter the DOB in the format DDMMYY and press return. Select the number of the patient required, enter N for next screen if required.)

6 Press return at the <EARLIEST> and <LATEST> fields to display test records. Laboratory departments are denoted by the following codes under the heading 'Syst'.

Syst	Department
BBB	Blood Transfusion
HAE	Haematology
BIO	Chemical Pathology

MIC	Microbiology
HIS	Histopathology

7 Select the number of the record to be viewed and press return

8 To view all results select E and return (haematology and chemical pathology) or select X and return (microbiology).

9 If more than one comment is present on haematology or chemical pathology reports select NC to view the next comment(s) until NC is no longer displayed. For microbiology reports scroll down the report using '+' until ******END OF REPORT****** is displayed.

10 To view earlier results on the patient select E or to view later results on the patient select L.

11 To view a single set of haematology or chemical pathology results and associated reference ranges type the number of the test and return, followed by L (for Limits) and return.

8.2.2 Blood Transfusion

Information regarding availability of blood components and products are available from the Blood Transfusion Laboratory. Red cell and platelet availability can also be checked via Blood Track software, accessible in each clinical area.

8.2.3 Histopathology & Cytology

Histopathology and Cytology results are available from the Laboratory Office.

8.3 Healthlink

The National Healthlink Project provides a web-based messaging service which allows the secure transmission of clinical patient information between Hospitals, Health Care Agencies and General Practitioners. Laboratory results are available for Chemical Pathology, Haematology and Microbiology on the Healthlink once they have been authorised in the laboratory.

8.4 Printed Reports

Printed laboratory reports collected by portering staff for delivery to clinical areas twice daily Monday to Friday at 14:00 and 17:00.

8.5 Telephoned Results

Results are telephoned when:

- Previously arranged, e.g. on "Urgent" samples with prior verbal notification;
- Asked to do so on the request form;
- Results may be of relevance to immediate clinical management (see section 8.8 below).

There is a procedure in place to ensure clear and unambiguous results reach an authorised receiver. Results provided verbally are followed by a formal hardcopy report.

8.6 Faxed Reports

Faxed reports are sent only in medical emergencies where there is no alternative and where the recipient is waiting to receive the fax. Confirmation of receipt of the report is required.

8.7 Results from Referral Laboratories

It is the responsibility of the referring laboratory in Connolly Hospital to ensure that referral laboratory results and findings are provided to the service user. Referral laboratory results are reported on the laboratory information system as per departmental procedures:

LP-GEN-0014 Referral of Immunology Samples to External Centres

LP-HAEM-0027 Sample Referral to External Centres

LP-HIS-0025 Referral to External Centres

LP-MICRO-0022 Specimen Referral in the Microbiology Laboratory

LP-BIO-0017 Sample Referral to External Centres from Chemical Pathology

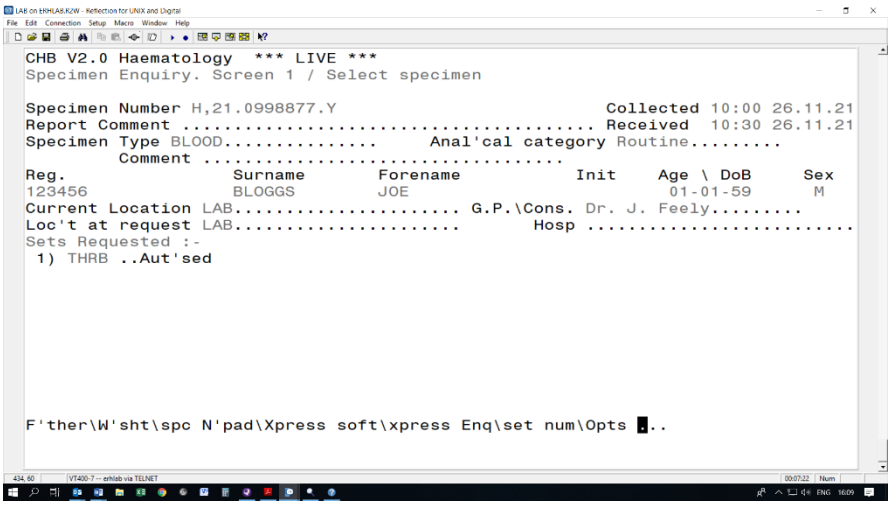
LP-BT-0012 Specimen Referral to the IBTS / Reference Laboratories

8.7.1 DART Viewer F6 function

Referral laboratory results may be available for internal laboratory information system users to view via the DART viewer F6 function as follows:

1. From the main Telepath Menu select Option 3: XENQ Single-point enquiry.
2. Enter the patient's six digit chart number and Return.
3. Confirm the first 2 letters of the patients surname and Return.
4. Return X 2 for <earliest> and <latest>.

5. Locate the referral test code (e.g. THRB for Thrombophilia Screen) and select the corresponding number. The screen below will display



- A date beside a test e.g. 040721 means that this test was reported on 04/07/2021 and report will be available.
- 'Aut'sed' indicates the result is authorised and is available to view.
- 'Out'ng' signifies an outstanding report has yet to be received back/scanned.

6. At this point Press F6. This is the **only screen** F6 currently works from.
7. Reports are displayed in a new 'Dart Viewer' pop up window. It may take a few seconds to load this.
8. If more than one report is available click on the ► icon to move to the next scanned report associated with the specimen number.
9. To print the report to your local printer, select 'Print'.
10. To close the Dart Viewer window select the X in the top right hand corner.

8.7.2 Medibridge

Results from Beaumont Hospital Laboratory and the National Virus Reference Laboratory (NVRL) are available via Medibridge from Connolly Hospital's Laboratory Office and OPD.

If a requesting clinician contacts the laboratory by telephone for a referral result they are requested to email their request to connolly.lab@hse.ie . Clerical staff will obtain the result from LIS or Medibridge, print a copy, scan the copy and email it to the requesting clinician once a secure **health.irl** or **hse.ie** email address has been provided. The printed copy is then disposed in a confidential bin or posted to the clinician, if requested. Verbal referral results are not given by clerical staff.

It is the responsibility of the requesting doctor to contact the referral centre directly if clarification of results or further advice is required. Referral laboratories are listed alongside specimen requirements in Appendices no. 1 and 2.

8.7.3 Critical Results

In the event that Pathology CHB is contacted by a referral laboratory with a critical result, Pathology CHB will convey the result by phone to the requesting clinician / team. **Critical Results**

Department	Test	Result
Blood Transfusion	Antibody Screen	Positive
Microbiology	Blood Culture	Positive – Consultant Microbiologist informed
	CSF	Negative – Team phoned Positive – Consultant Microbiologist informed
	HCG	Positive (ED and in-patient results only)
	Antibiotic Assay	Abnormal results
	C. difficile	Positive (new patients) – Infection Prevention and Control Team (IPCT) notified.
	MRSA	Positive (new patients) - IPCT notified
	VRE	Positive (new patients) - IPCT notified
	CPE	Positive (new patients) - IPCT notified
	ESBL	Positive (new patients) - IPCT notified
	Influenza	Positive - IPCT notified
	Faeces	All clinically significant isolates.
Haematology	Refer to section 12.9	
Chemical Pathology	Refer to section 10.10	

8.8 Reference Ranges

Refer to sections 10.9, 12.8 and 13.5 for reference ranges of tests performed in-house in Chemical Pathology, Haematology and Microbiology respectively. Alternatively see section 8.2.1 to access reference ranges on Telepath Laboratory Information System. Contact the referral laboratory for reference ranges of tests performed externally.

8.9 Measurement Uncertainty

Estimates of measurement uncertainty for measurement procedures are available to service users from the department which performs the measurement upon request. See section 3.3 for contact details.

8.10 Clinical Advice and Interpretation

Medical Scientists with appropriate training are responsible for technical advice. The Consultant Chemical Pathologist, Consultant Microbiologists, Consultant Haematologists, Consultant Histopathologists and their medical teams are responsible for the provision of clinical advice. The Consultant Haematologists are responsible for clinical advice with respect to Blood Transfusion.

Haemovigilance Officers are responsible for the provision of advice on blood component / product administration, traceability and reporting and investigating Serious Adverse Reactions (SAR) and Serious Adverse Events (SAE).

Infection Prevention and Control Nurse Specialists are responsible for the provision of infection prevention and control advice.

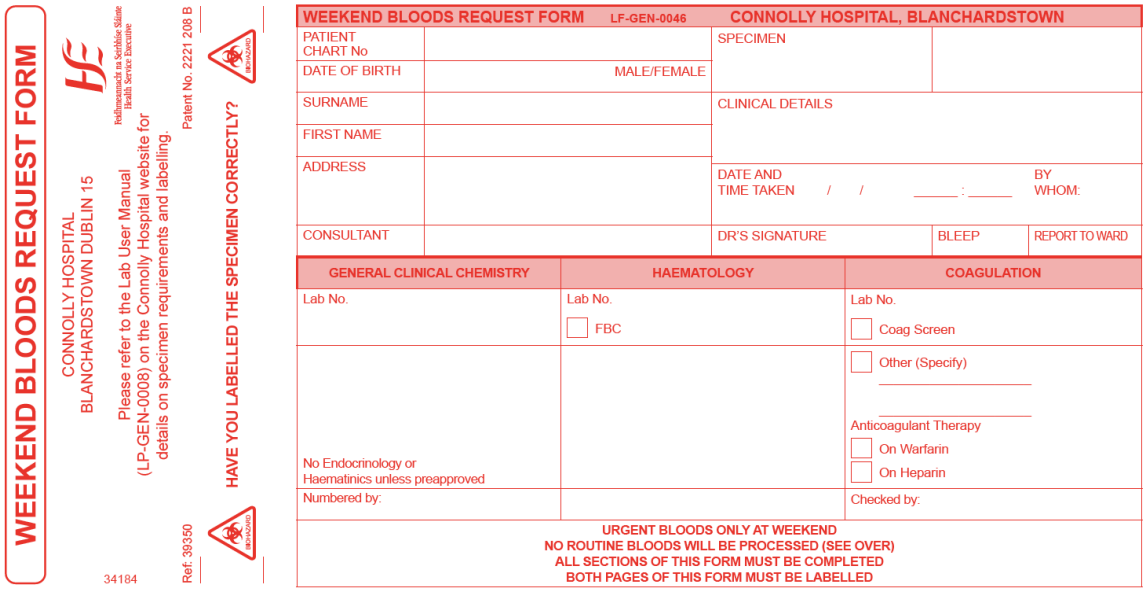
9 ON-CALL SERVICE

Emergency service is available outside of routine working hours for Chemical Pathology, Blood Transfusion, Haematology and Microbiology. This service is restricted to true emergencies. No emergency service is available for Endocrinology or Histopathology.

The out of hours service is manned by a limited number of staff (2 medical scientists) from 8 pm to 8 am weekdays and weekends from 13:00 Saturday through to 08:00 Monday. Please keep the use of the service to a minimum between these times to enable us to provide the most efficient urgent and emergency service in these periods.

Bleep 158	
Monday to Friday	20:00 to 08:00 following day (Monday to Thursday)
Saturday	13:00 to 09:00 following day
Sunday / Bank Holiday	09:00 to 08:00 following day

A Weekend Blood Request Form is available for all **Chemical Pathology** and **Haematology** requests. It is available on all wards alongside the regular request forms except for **ED**, **ICU** and **CCU** (these areas should continue to use the regular blood request forms). Only the tests listed on the form are available at weekends. Any other test request can be approved by contacting the relevant laboratory consultant via the hospital switchboard.



WEEKEND BLOODS REQUEST FORM

CONNOLLY HOSPITAL
BLANCHARDSTOWN DUBLIN 15

Please refer to the Lab User Manual (LP-GEN-0008) on the Connolly Hospital website for details on specimen requirements and labelling.

Patent No. 2221 208 B

HAVE YOU LABELLED THE SPECIMEN CORRECTLY?

34184

Ref: 39350

WEEKEND BLOODS REQUEST FORM LF-GEN-0046 **CONNOLLY HOSPITAL, BLANCHARDSTOWN**

PATIENT CHART No		SPECIMEN	
DATE OF BIRTH	MALE/FEMALE		
SURNAME		CLINICAL DETAILS	
FIRST NAME			
ADDRESS		DATE AND TIME TAKEN / / :	BY WHOM:
CONSULTANT		DR'S SIGNATURE	BLEEP / REPORT TO WARD

GENERAL CLINICAL CHEMISTRY	HAEMATOLOGY	COAGULATION
Lab No.	Lab No. ☐ FBC	Lab No. ☐ Coag Screen
No Endocrinology or Haematinics unless preapproved		☐ Other (Specify) Anticoagulant Therapy ☐ On Warfarin ☐ On Heparin
Numbered by:		Checked by:

URGENT BLOODS ONLY AT WEEKEND
NO ROUTINE BLOODS WILL BE PROCESSED (SEE OVER)
ALL SECTIONS OF THIS FORM MUST BE COMPLETED
BOTH PAGES OF THIS FORM MUST BE LABELLED

Out of hours service

BIOCHEMISTRY		Haematology/Coagulation
ABG	Lipids	Full Blood Count + Differential
Renal Profile	CSF glucose	Prothrombin Time (PT) + INR
LFT Profile	CSF protein	APTT
Bone Profile	Unconjugated bilirubin	Fibrinogen
Glucose		D-Dimer
Lactate		Infectious Mononucleosis Screen
Magnesium		Malaria Screen
Lithium		Sickledex (Patients going for emergency theatre only).
Troponin T		Erythrocyte Sedimentation Rate (Suspected Temporal Arteritis Only)
NT PRO-BNP (ED Registrar only)		
Amylase		
CK		For a list of on-site tests requiring consultant approval, please refer to the lab user handbook.
CRP		
AST		For a list of off-site tests available, please refer to the lab user handbook.
LDH (Haematology Registrar only)		
Iron (suspected overdose only)		
Urate		
Paracetamol		
Carboxy Haemoglobin (Blood Gas Analyser in ED / ICU)		
Methaemoglobin Levels (Blood Gas Analyser in ED / ICU)		
Therapeutic Drugs (requires preapproval)		

Any other tests must be authorised by a Consultant.

WEEKEND BLOODS REQUEST FORM

BAG

REMOVE COVERING STRIP

PLACE SPECIMEN IN BAG

FOLD TOP OVER TO SEAL

9.1 Tests Available On-Call

Blood Transfusion * Requires authorisation by Haematology team	Group & Antibody Screen – from A/E and Theatre Only Group & Crossmatch – Urgent Requests Only Direct Coombs Test – Suspected Haemolysis Only* Transfusion Reaction Investigation – if further RCC transfusion is required during on-call period only.

Haematology	Full Blood Count + Differential Prothrombin Time (PT) + INR APTT Fibrinogen D-Dimer Infectious Mononucleosis Screen Malaria Screen Sickledex – Patients going for emergency theatre only. Erythrocyte Sedimentation Rate (ESR) – Suspected Temporal Arteritis Only
Microbiology	CSF – Microbiology Laboratory must be notified in advance Urine – Microscopy, Culture and / or HCG from ED Only Virology – Urgent requests in cases of Organ Transplantation or Needlestick Injuries; require consultation with Consultant Microbiologist Blood Cultures

Chemical Pathology

The following tests are available 24 hours 7 days per week. If these tests are required urgently, please ring the laboratory. (Requests for tests not listed below and required urgently/out of hours should be telephoned to the laboratory.)	The following tests are available as on-call requests but a telephone call to the Chemical Pathology laboratory is **always** required.	The following tests are available as on-call requests but a telephone call to the Chemical Pathology laboratory is **always** required.
UE LFT Bone profile Magnesium Chloride CRP Glucose Amylase Uric acid CK Troponin T Blood gas LDH- haematology only CSF glucose, CSF protein Paracetamol Iron – suspected overdose only Lactate Lithium NT ProBNP- only ED	<u>On-site tests:</u> Conjugated bilirubin Lipids Creatinine-urine Potassium-urine Sodium- urine Protein- urine Osmolality	<u>Off-site tests:</u> Ammonia Digoxin Salicylate Carbamazepine Theophylline Phenytoin Urinary Amylase

Contacting the Out of Hours Biochemistry Staff
A medical scientist is always available and may be contacted on:

- During normal working hours extension 5311
- Between 8pm and 8am Monday to Friday (24hours at weekends) use bleep 158

<u>All other tests will not be performed in the out of hours service</u> and should be requested within routine hours of the laboratory between 8am to 8pm Monday to Friday.

10 CHEMICAL PATHOLOGY

10.1 Introduction

The Department of Chemical Pathology provides a clinical laboratory service in the areas of core Chemical Pathology and Endocrinology. Specimens received for examinations not performed by the Chemical Pathology Laboratory in Connolly Hospital are referred to the appropriate external laboratory for analysis as per Appendices No. 2 and No. 3.

10.2 Specimen Requirements

10.2.1 Chemical Pathology / Endocrinology Profiles

Refer to Appendix No. 2 for Specimen Requirements

Note: Individual tests should be requested where the complete profile is not required.

Profiles	Constituent Tests	Turnaround Time
Arterial Blood Gas	Base Excess Oxygen Saturation pCO_2 pH pO_2 Standard Bicarbonate Carboxyhaemoglobin# Methaemogloblin#	20 minutes
Bone Profile (Serum)	Albumin Alkaline Phosphatase (ALP) Calcium Phosphate Protein	Urgent: 2 hours Routine: 4 hours
Liver Profile (Serum)	Alkaline Phosphatase (ALP) ALT Bilirubin Total GGT	
Renal Profile (Serum)	Urea Na K Creatinine eGFR	

Available on Blood Gas Analyser in the Emergency Department / ICU. In the event of equipment malfunction a 2.7ml EDTA sample must be sent to Chemical Pathology, Beaumont Hospital.

Profiles	Constituent Tests	Turnaround Time
Iron Studies (Serum)	Iron Unsaturated Iron Binding Capacity (UIBC) Transferrin Saturation	24 hours
Lipid Profile (Serum) *	Cholesterol HDLC LDLC Triglyceride Non-HDLC	
Haematinics (Serum)*	Ferritin Vitamin B12 Folate	Mon – Thurs 48hrs Fri – Sun 96hrs
Thyroid Function Tests (Serum) *	TSH FT4	

* These tests are only available during routine hours.

10.2.2 Serum Chemistry

Refer to Appendix No. 2 for Specimen Requirements

Examination	Turnaround Time
Bilirubin Direct (Conjugated) *	8 hours
Cryoglobulin*	72 hours
Osmolality*	24 hours
Amylase	Urgent: 2 hours Routine: 4 hours
AST (SGOT)	
Bicarbonate	
Cardiac Enzymes (CK)	
Chloride	
Cholesterol	
Creatine Kinase (CK)	
C Reactive Protein (CRP)	
Glucose	
Glucose Tolerance Test*	
Lactate	
LDH (Lactate Dehydrogenase)	
Lithium	
Magnesium	
NT-ProBNP	
Paracetamol	
hsTNT	
Urate	

* These tests are only available during routine hours.

10.2.3 Cerebrospinal Fluid Chemistry (CSF)

Examination	Specimen Requirements	Turnaround Time
CSF Glucose + Protein	CSF – sample obtained from Connolly Microbiology	1 hour

10.2.4 Fluid Chemistry

Examination	Specimen Requirements	Turnaround Time
Fluid Glucose	1 x 2.7 ml Fluoride Tube	Urgent: 2 hours; Routine: 4 hours
Fluid LDH, Protein	1 x 7.5ml Plain Tube	Urgent: 2 hours; Routine: 4 hours
Fluid pH	1 x 3ml Air Free Heparinised Syringe. Labelled. Send down immediately.	20 minutes

10.2.5 Antibiotic Assays (Vancomycin and Gentamicin)

Vancomycin and Gentamicin are the only antibiotics measured in-house. See antibiotic guidelines re: timing of samples in relation to administration of dose. State time of sampling, details of last dose and whether sample is a trough or a peak. Samples must be received in the laboratory before 14.30 Monday - Friday and 10.30 Saturday, Sunday and Public Holidays. Refer to Appendix No. 2 for Specimen Requirements.

Examination	Turnaround Time
Antibiotic Assays	20 hours

10.2.6 Endocrinology

This service is only available **during routine hours**. Refer to Appendix No. 2 for Specimen Requirements.

Examination	Turnaround Time
Cortisol	48 hrs
Free T3	
Free T4	
FSH (Follicle Stimulating Hormone)	
LH (Luteinising Hormone)	
Oestradiol	
Prolactin	
PSA	
Post Fractionation Prolactin (PFPROL)*	
TSH	
HbA1C	
Vitamin D	
Ferritin	Refer to Haematinics 10.2.1
Vitamin B12	
Folate	

* Only done if Prolactin is above reference range.

10.2.7 Urine Chemistry

Refer to Appendix No. 2 for Specimen Requirements. Analysis of 24 hour urine collections is only available during routine hours.

Examination	Turnaround Time
Amylase	Urgent: 2 hours; Routine: 4 hours
Creatinine	
Potassium	
Sodium	
Calcium	20 hours
Creatinine Clearance	
Magnesium	
Osmolality	
Phosphate	
Protein, Total	
Urate	
Urea	

10.2.8 Therapeutic Drug Monitoring and Toxicology

Refer to Appendix No. 2 for Specimen Requirements

Tests required during the On-Call / Out of Hours period require consultation with the appropriate laboratory in Beaumont Hospital. The medical scientist on call should be contacted directly by the requesting clinician through the switch in Beaumont at (01) 8093000.

- Peripheral blood samples are required unless otherwise stated.
- Turnaround times are available from the relevant referral laboratory.

10.2.9 Tests Processed by External Referral Laboratories

Refer to Appendices No.1 and No. 2. These tests should only be requested during routine hours.

10.3 Analyte Stability

10.3.1 Analyte Stability in Blood, Serum or Plasma

After centrifugation, the serum or plasma should be analysed within the time as recommended for whole blood, if the sample is stored without using a separating gel or a filter separator in primary tubes.

Decreased ↓ or increased ↑ values may be measured in comparison to recommended samples.
Blank field means no data were found in literature.
min=minutes h=hour d=day w=week m=months y=year

Analyte Name	Stability in Blood @ RT (15-25ºc)
ALT	1d
Albumin	10w
ALP	7d
Amylase	7d
AST	4d
Bicarbonate	6h (if tube unopened)
Bilirubin Direct	2d
Bilirubin Total	1d
Blood Gases	<15min↓ pO2; <30min pH,pCO2; <60min on ice
Calcium (Total)	No add on.
Chloride	7d
Cholesterol	12h
Direct HDL	12h
Cortisol	24h
CRP	11d
Creatinine	7d
CK	2d
Ferritin	24h
FSH	No stability data available.
Folate	2h
Gentamicin	No stability data available.
Glucose	3d
γGT	7d
HbA1C	24h or (3-4d@4-8ºc
Iron	1h
Lactate	No add on.
LDH	No add on.
LH	5d @ 20-25°c
Lithium	1d
Magnesium	7d
NT-proBNP	3d
Oestradiol	12h
Osmolality	No stability data available.

Analyte Name	Stability in Blood @ RT (15-25ºc)
Paracetamol	No stability data available.
Phosphate	24h
Potassium	No add on.
Prolactin	5d
PSA	1d
Total Protein	6d
Sodium	14d
Free T4	5d
Free T3	No stability data available.
TSH	8d
Unsaturated Iron Binding Capcity (UIBC)	4d
Troponin T	2h
Triglyceride	12h
Urea	7d
Urate	3d
Vancomycin	48h
Vitamin B12	2h
Vitamin D	8h (if >2h comment added to 'Interpret with caution')

10.3.2 Analyte Stability in Urine

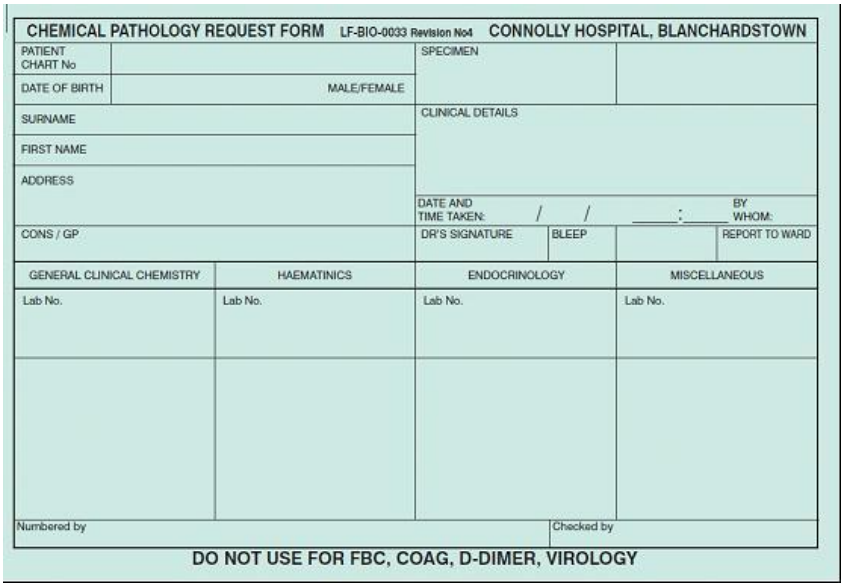
Analyte Name	Stability in Urine @ 20-25ºc
Albumin	7d
Amylase	2d
Calcium	2d
Creatinine	2d
Glucose	2h↓
Magnesium	3d
Osmolality	3h
pH	Unstable
Phosphate	6m 2-8ºc
Potassium	14d
Protein	1d
Sodium	14d
Urea	2d
Urate	4d (if NaOH added)

10.4 Request Form

All test requests must be accompanied by a fully completed request form. Refer to section 5 of this document. Requests for lipids must state if the patient is fasting or non-fasting as different reference ranges apply.

10.4.1 Chemical Pathology Request Form

All hospital in-patient and out-patient requests must be made on the Chemical Pathology request form.



CHEMICAL PATHOLOGY REQUEST FORM LF-BIO-0033 Revision No4 CONNOLLY HOSPITAL, BLANCHARDSTOWN

PATIENT CHART No | SPECIMEN

DATE OF BIRTH | MALE/FEMALE

SURNAME | CLINICAL DETAILS

FIRST NAME

ADDRESS

DATE AND TIME TAKEN: / / : BY WHOM:

CONS / GP | DR'S SIGNATURE | BLEEP | REPORT TO WARD

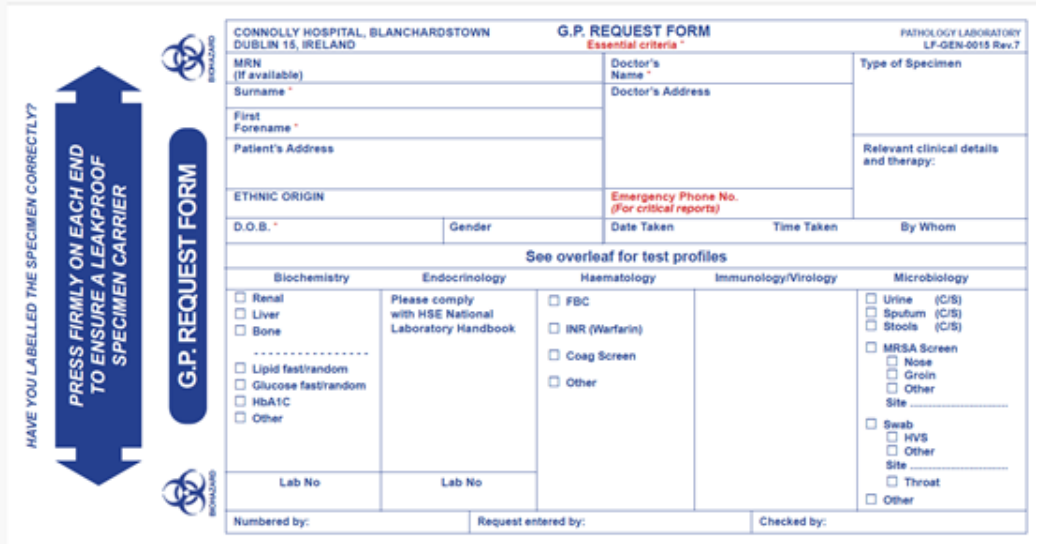
GENERAL CLINICAL CHEMISTRY	HAEMATINICS	ENDOCRINOLOGY	MISCELLANEOUS
Lab No.	Lab No.	Lab No.	Lab No.

Numbered by | Checked by

DO NOT USE FOR FBC, COAG, D-DIMER, VIROLOGY

10.4.2 GP Request Form

All non-hospital / GP patient requests must be made on the GP request form.



HAVE YOU LABELLED THE SPECIMEN CORRECTLY?

PRESS FIRMLY ON EACH END TO ENSURE A LEAKPROOF SPECIMEN CARRIER

G.P. REQUEST FORM

CONNOLLY HOSPITAL, BLANCHARDSTOWN
DUBLIN 15, IRELAND

G.P. REQUEST FORM
Essential criteria *

PATHOLOGY LABORATORY
LF-GEN-0015 Rev.7

MRN (If available) | Doctor's Name * | Type of Specimen

Surname * | Doctor's Address

First Forename *

Patient's Address | Relevant clinical details and therapy:

ETHNIC ORIGIN | Emergency Phone No. (For critical reports)

D.O.B. * | Gender | Date Taken | Time Taken | By Whom

See overleaf for test profiles

Biochemistry	Endocrinology	Haematology	Immunology/Virology	Microbiology
☐ Renal ☐ Liver ☐ Bone ☐ Lipid fast/random ☐ Glucose fast/random ☐ HbA1C ☐ Other	Please comply with HSE National Laboratory Handbook	☐ FBC ☐ INR (Warfarin) ☐ Coag Screen ☐ Other		☐ Urine (C/S) ☐ Sputum (C/S) ☐ Stools (C/S) ☐ MRSA Screen ☐ Nose ☐ Groin ☐ Other Site ..... ☐ Swab ☐ HVS ☐ Other Site ..... ☐ Throat ☐ Other
Lab No	Lab No			

Numbered by: | Request entered by: | Checked by:

10.5 Urgent Requests

10.5.1 Urgent Requests - Routine and Out of Hours

To request that any specimen is processed urgently, please contact the relevant laboratory, by phone during routine hours or pager 158 out of routine hours, to ensure the specimen is expected and testing of the specimen is prioritised.

10.5.2 Urgent Out of Hours Toxicology and Therapeutic Drug Monitoring Requests

Urgent urine toxicology screens can be performed in the Emergency Department on the Biosite analyser.

Urgent Carboxy-Haemoglobin and Methaemoglobin can be performed in the Emergency Department or ICU on the blood gas analysers. In the event the blood gas analysers are down urgent Carboxy-Haemoglobin and Methaemoglobin requests are forwarded to the Chemical Pathology Laboratory Beaumont Hospital.

Urgent blood toxicology and TDM are forwarded to the Chemical Pathology Laboratory Beaumont Hospital.

The medical scientist on call should be contacted directly by the requesting clinician through the switch in Beaumont at (01) 8093000.

10.6 Storage of Examined Specimens

Sample Types	Retention Period
Chemical Pathology & Endocrinology samples (excluding ABG)	6 days
Arterial Blood Gas Samples	Discarded after analysis

10.7 Requesting Additional Examinations

Subject to individual analyte stability, further tests on a specimen that is already in the laboratory can be requested by sending a request form stating the patient's details and additional tests required. Requests should be signed by the requesting doctor and contain the doctor's bleep number. Note, however, that for most routine analytes, stability concerns prevent addition of tests where the blood sample is more than 7 hours old.

10.8 Analytical Failure

Analytical failure may be caused by specimens which are:

Insufficient

Haemolysed

Grossly Lipaemic

In such cases repeat specimens may be requested.

10.9 Reference Ranges

Chemistry	Reference Range	Units	Comments
Albumin	39.7-49.4	g/L	
ALK Phos	40-130	U/L	Male
	35-105	U/L	Female
ALT	0-41	U/L	Male
	0-33	U/L	Female
Amylase	28-100	U/L	
AST	0-40	U/L	Male
	0-32	U/L	Female
Actual Bicarboante	22-29	mmol/L	
Bilirubin Direct	0-5	µmol/L	
Bilirubin Total	0-21	µmol/L	
Calcium	2.10-2.55	mmol/L	
Chloride	98-107	mmol/L	
Cholesterol: fasting Cholesterol: non-fasting	<5.0	mmol/L	
Creatine Kinase (CK)	39-308	U/L	Male
	26-192	U/L	Female
Creatinine	59-104	µmol/L	Male
	45-84	µmol/L	Female
CRP	0-5	mg/L	
eGFR	>90	ml/min	
γGT	10-71	U/L	Male
	6-42	U/L	Female
Glucose	3.5-5.9	mmol/L	
HDLC: fasting HDLC: non fasting	>1.00	mmol/L	
Iron	5.83-34.5	µmol/L	
Lactate	0.5-2.2	mmol/L	
Lithium	0.6-1.2	mmol/L	Therapeutic range
LDH	135-250	U/L	
LDLC: fasting LDLC: non-fasting	<3.00	mmol/L	
Magnesium	0.66-1.07	mmol/L	21-59 yrs
	0.66-0.99	mmol/L	60-90 yrs
	0.70-0.95	mmol/L	>90 yrs
Non HDLC: fasting Non HDLC: non fasting	<3.80	mmol/L	
Sodium	136-145	mmol/L	

Chemistry	Reference Range	Units	Comments
Phosphate	0.81-1.45	mmol/L	
Pro BNP	<85.8	ng/L	18-44 yrs Male
	<130	ng/L	18-44 yrs Female
	121	ng/L	45-54 yrs Male
	<249	ng/L	45-54 yrs Female
	<210	ng/L	55-64 yrs Male
	<287	ng/L	55-64 yrs Female
	<376	ng/L	65-74 yrs Male
	<301	ng/L	65-74 yrs Female
	<486	ng/L	≥75 yrs Male
	<738	ng/L	≥75 yrs Female
Pro BNP - Patients with Acute Dyspnea	<300	ng/L	Rule Out Cut Point All Patients
	>450	ng/L	Rule In Cut Point < 50 yrs
	>900	ng/L	Rule In Cut Point 50 -75 yrs
	1800	ng/L	Rule In Cut Point >75 yrs
Potassium	3.5-5.1	mmol/L	
Total Protein	64-83	g/L	
Transferrin Saturation	20-50	%	
Triglycerides: fasting Triglycerides: non-fasting	<1.70 <2.00	mmol/L	
hsTNT	<14	ng/L	
Urate	202-417	µmol/L	Male
	143-339	µmol/L	Female
Urea	2.8-8.1	mmol/L	
UIBC (Unsaturated Iron Binding Capacity)	22.3-61.7	µmol/L	Male
	24.2-70.1	µmol/L	Female

Note: National Laboratory Handbook Recommendations for the Testing and Reporting of Lipids in Clinical Diagnostic Laboratories within the Republic of Ireland is available @ https://www.hse.ie/eng/about/who/cspd/ncps/pathology/resources/lab-testing-for-lipids111.pdf

Acid-Base	Range	Units	Comments
pH	7.38-7.42		
pCO_2	4.7-6.0	kPA	
Base Excess	+/-2.5	mmol/l	
Actual Bicarbonate	22-29	mmol/l	
Std. Bicarbonate	21-25	mmol/l	
pO_2	11-15	kPA	

Endocrinology	Range	Units	Comments
Cortisol*	166-507	nmol / L	6-10am
	74.1-291	nmol / L	4-8pm
Free T4*	12-22	pmol / L	
Free T3*	3.1-6.8	pmol / L	
FSH*	3.5-12.5	U / L	Follicular Phase
	4.7-21.5	U / L	Ovulation
	1.7-7.7	U / L	Luteal
	25.8-134.8	U / L	Postmenopausal
	1.5-12.4	U / L	Male
HbA1C	20-42	mmol/mol	IFCC
LH*	2.4-12.6	U / L	Follicular Phase
	14.0-95.6	U / L	Ovulation
	1.0-11.4	U / L	Luteal
	7.7-58.5	U / L	Postmenopausal
	1.7-8.6	U / L	Male
Oestradiol*	114-332	pmol/L	Follicular Phase
	222-1959	pmol/L	Ovulation
	222-854	pmol/L	Luteal
	<18.4-505	pmol/L	Postmenopausal
	41.4-159	pmol/L	Male
TSH*	0.270-4.20	mU / L	
Prolactin*	86-324	mU / L	Male
	102-496	mU / L	Female
PSA*	<2	µg/L	<50 yrs
	<3	µg/L	50-59 yrs
	<4	µg/L	60-69 yrs
	<5	µg/L	≥70 yrs
Vitamin D	>50	nmol/L	Sufficient

Haematinics	Range	Units	Comments
Ferritin*	30-400	ng / ml	Male
	13-150	ng / ml	Female
Folate*	3.9-26.8	µg / L	
Vitamin B12*	197-771	ng / L	

***High doses of biotin may interfere with assay results. Interpret with caution.**

Osmolality	Range	Units	Comments
Plasma Osmolality	280 – 290	mosmol / Kg	
Urine Osmolality	400 – 1000	mosmol / Kg	

Urine Levels	Range	Units	Comments
Creatinine	9000 - 19000	µmol / 24Hr	Male
	6000 - 13000	µmol / 24Hr	Female
Protein	< 0.14	g / 24 hr	
Calcium	2.5 - 7.5	mmol / 24 hr	
Phosphate	12.9 - 42.0	mmol / 24 hr	
Sodium	40 - 220	mmol / 24 hr	

Urine Levels	Range	Units	Comments
Potassium	25 -125	mmol / 24 hr	
Urea	428 - 714	mmol / 24 hr	
Amylase	16 - 491	IU/L	Male
	21 - 447	IU/L	Female
Urate			
	1.48 – 4.46	mmol / 24 hr	Average diet
Mg	3.0 - 5.0	mmol / 24Hr	

10.10 Critical Values

Analyte	Units	Action Limits	
		Lower	Upper
ALT	U/L		615- male 495- female
AST	U/L		600- male 480- female
Amylase	U/L		500
Bicarbonate	mmol/L	10; does not need to be phoned to ED / ICU	
Bilirubin	umol/L		257
Calcium adjusted	mmol/L	1.8	3
Chloride (plasma)	mmol/L	75	125
Cortisol	nmol/L	50	
Cortisol (SST 30 min)	nmol/L	250	
Creatinine	umol/L		354 200 if < 16 yrs
Creatine Kinase (CK)	U/L		5000
CRP	mg/L		300
eGFR	mL/min	15	
Ferritin	ng/mL		5000
Folate	ug/L	1.5	
Free T4	pmol/L		50
Glucose	mmol/L	2.5	25 (15 if <16 yrs)
Lactate	mmol/L		2 4 - ED patients
Magnesium	mmol/L	0.4	5
Osmolality	mOsm/kg H2O	240	330
Osmolar gap	mOsm/kg H2O		10
Phosphate	mmol/L	0.45	3
Potassium	mmol/L	2.5 2.9 in outpatients	6
Prolactin	mU/L		3000

Analyte	Units	Action Limits	
		Lower	Upper
Protein	g/L		100
PSA	ug/L		20
Sodium	mmol/L	120 125 in outpatients Children <16 yrs 130	150
Testosterone female	nmol/L		>5 in <55yrs >3 in >55 yrs
Triglycerides	mmol/L		20
Troponin T	ng/L		14 (99th percentile) 20 - ED patients
TSH	mU/L		30
Urea	mmol/L		30 10 if < 16 yrs
Uric acid (urate)	umol/L		> upper reference limit in pregnancy (if known/indicated on the form)
Vitamin B12	pg/L	100	
pH		7.2	7.6
pCO2	kPa	2.5	8
pO2	kPa	5.7	
Anion gap	mmol/l	-	20
Paracetamol	mg/L		All reportable levels
Lithium	mmol/L		1.5
Gentamicin*	mg/L	2	-
Vancomycin*	mg/L	25	-
Urine test strip		Strongly positive for glucose/ketones	
Urine PCR	mg/mmol		30 in pregnancy (if known/indicated on the form)
Urine drug screen		All drugs positive results in urine to be phoned	
CSF Lactate	mmol/L		2.2
CSF Glucose CSF protein	mmol/L g/L	all to be reported all to be reported	
Ammonia	mmol/L		40
Bile Acids	umol/L		10 in pregnancy (if known/indicated on the form)
CSF Xanthochromia		All positive results to be phoned as per Beaumont laboratory policy	

Analyte	Units	Action Limits	
		Lower	Upper
Ethanol	mg/dL	Results to be phoned as per Beaumont/referral laboratory policy	
Hypogamma-globulinaemia	g/L	IgG<3	
Paraprotein	g/L		IgE & IgD any level IgG 15 IgA 10 IgM 10
Porphobilinogen	umol/mmol creat		Any positive result

*Gentamicin and Vancomycin fall under the governance of Microbiology

10.11 Interference

Many laboratory tests are subject to interference by endogenous or exogenous factors which may alter the true concentration of a substance within the body, or cause an analytical interference giving a potentially erroneous or misleading result.

All samples are routinely checked for Haemolysis, Lipaemia and Icterus which can interfere with laboratory tests to varying extents. Significant levels of any of these may affect the quality of some test results which will be highlighted and/or removed from the individual report.

Test results should be interpreted in conjunction with clinical findings and if interference is suspected please contact the laboratory where further information on each test method is available.

10.12 Drug Interference

Please contact the laboratory for a list of important drug interferences and their nature. Please note that for diagnostic purposes, results should always be assessed in conjunction with the patient's medical history, clinical examination and other findings.

10.13 Biotin Interference

Immunoassays are commonly used in the laboratory for measurement of hormones and Troponin. These assays are based on a streptavidin-biotin reaction.

Biotin (Vitamin B7) is a water soluble vitamin found in many dietary products. Normal dietary intake or low dose biotin supplementation appear not to have a significant effect on many immunoassays. However, high dose biotin supplementations used for hair, skin and nail growth (5-10mg) and prescription doses (up to 300mg) for diseases such

as Multiple Sclerosis and some metabolic disorders, have the potential to cause analytical interference resulting in falsely elevated or reduced results.

Extreme care should be taken in the interpretation of Troponin T results, where high concentrations of biotin can cause inappropriately low results. Clinicians should enquire re use of biotin supplementations, prior to sampling for Troponin T.

For other tests, **manufacturer recommendation (Roche Diagnostics) is that samples should not be taken from patients receiving therapy with high dose biotin (>5mg/day) until at least 8hours following the last dose of biotin administered, however published literature recommend the discontinuation of biotin supplementation for 48hours before phlebotomy.**

Biotin interference should be considered when results are discordant or do not correlate with clinical findings. Please contact the laboratory as it may be possible to send samples for testing using alternative methods (where available).

11 BLOOD TRANSFUSION

Note: The Blood Transfusion Service is only available to users within Connolly Hospital

The Blood Transfusion Department incorporates the Blood Transfusion laboratory, the Haemovigilance and Traceability functions, and the clinical transfusion consultancy service. The Blood Transfusion Department is accredited by the Irish National Accreditation Board (INAB) and is compliant with the International Standard titled "Medical Laboratories Requirements for Quality and Competency" (ISO 15189:2012) and competent to comply with Articles 14 and 15 of EU Directive 2002/98/EC (S.I. No. 360 of 2005 and S.I. No. 547 of 2006).

The administration of Blood Components and Products involves more than 70 steps and each of these may be subject to error. Standard protocols for the administration of these Components and Products are essential to minimise the potential for error and are outlined in this User Handbook.

These are the recommended guidelines for use in Connolly Hospital Blanchardstown but cannot cover every situation. They are not meant to supersede clinical judgement.

11.1 Services and Blood Components / Products Available from Connolly Hospital Blood Transfusion Department

Service / Component / Product	When Available	Specimen Required	Special Requirements	Turnaround Times
Group & Screen (G&S) also known as: Group & Save Group & Hold Type & Screen Note: This is not a request for red cell units.	Routine Requests Mon-Fri 08.00 to 15.30 Sat 09.00 to 11.00 Urgent requests at any time. For elective cases, G&S should be received in laboratory by 15.30 on last routine day before surgery	7.5ml Specimen bottle labelled: "EDTA KE - FOR BLOOD TRANSFUSION" for Group & Screen	Minimum volume of 2.5ml for adults.	Non-Urgent Requests 4 hours (if received before 15.30 Monday to Friday or 11.00 Saturday) Urgent Requests 1 hour 30 minutes
Crossmatched Red Cells	Routine Requests Mon-Fri 08.00 to 15.30 Sat 09.00 to 11.00 Urgent / emergency requests at any time	Group & Screen Specimen (a minimum of 2 samples required for electronic crossmatch*)	Routine Requests Must be received in the laboratory before: 15.30 Monday to Friday or 11.00 Saturday Outside routine hours requests for red cells must be made by Consultant / Registrar	2 hours (post authorisation of Group & Screen) 10 minutes for electronic issue following authorisation of group and screen specimen*
			Urgent Requests Phone urgent requests to Blood Transfusion Laboratory to ensure prioritisation.	1 hour 30 minutes 10 minutes for electronic issue following authorisation of group and screen specimen*

			Emergency Requests At any time.	40 minutes 10 minutes for electronic issue following authorisation of group and screen specimen*
			Patients with identified antibody(ies) - G&S required at least 24 hours before Red Cells are required.	Turnaround time dependent on the complexity of the case.
Uncrossmatched Red Cells	Urgent	Group & Screen Specimen	All requests for uncrossmatched red cells must be communicated by phone to the Blood Transfusion Laboratory.	No G&S sample available Group O Red Cells available within 10 minutes
				Valid G&S sample in lab Group specific Red Cells available within 10 minutes
Platelets	Routine & Urgent	Group & Screen Specimen	Phone request and send request form well in advance of time required. Only 1 adult dose of platelets should be ordered at a time by a Registrar / Consultant. Only ordered from NBC (National Blood Centre) on named patient basis as required.	Non-Urgent Requests 2 hours
				Urgent Requests <1 hour
SD Frozen Plasma	Routine & Urgent	Group & Screen Specimen	Phone request & send request form at least 30 minutes before plasma is required.	30 minutes / 4 units
Prothrombin Complex Concentrate	Routine & Urgent	None	Phone request & send request form in advance. Reference to Haemovigilance Guidelines or discussion with Haematology Team if necessary.	10 minutes

Fibrinogen Concentrate	Routine & Urgent	None	Phone request & send request form in advance.	10 minutes (if ordered on it's own) 20 minutes (as part of major bleeding protocol)
Specific Coagulation Factors	Routine & Urgent	None	Discussion with Haematology Medical Team required. Phone request & send request form in advance.	There is an emergency stock of von Willebrand Factor, Factor VII, Factor VIII and Factor IX on site. Otherwise specific coagulation factor concentrates are ordered from external suppliers as required. Turnaround times vary.
Albumin	Routine & Urgent	None	Phone request & send request form in advance.	10 minutes
Direct Antiglobulin Test	Routine Mon-Fri 08.00 to 15.30 Sat 09.00 to 11.00 Urgent requests at any time	7.5ml Specimen bottle labelled: "EDTA KE - FOR BLOOD TRANSFUSION" or 2.7ml EDTA Tube	Non-Urgent Requests Must be received in the laboratory before: 15.30 Monday to Friday or 11.00 Saturday Urgent Requests Urgent out-of-hours requests must be made through the Haematology team.	2 hours 20 minutes

Note: The default method of choice for Group & Screen and Direct Antiglobulin Test is the automated method via the Biorad IH-500 (BT-067).

11.2 Medical Indications, Appropriate Selection and Administration of Available Blood Components / Products

For information on medical indications, appropriate selection and administration of available Blood Components / Products and other relevant information refer to Haemovigilance Procedures:

LP-HV-0001 Administration of Blood Components and Blood Products

LP-HV-0002 Management of Serious Adverse Events and Reactions

LP-HV-0004 Guidelines for the Use of Blood Components and Blood Products

LP-HV-0006 Management of a Massive Transfusion in the Clinical Area

LP-HV-0008 Clinical Management of the Blood Track System at the Theatre Satellite Fridge

LP-HV-0009 Clinical Management of Blood Transferred with a Patient to Another Hospital

LP-HV-0010 Guidelines for Patients who Refuse Blood Transfusion

LP-HV-0012 Guidance on the Management of Surgery, Bleeding and Overdose in Patients on Novel Oral Anticoagulants (NOACs)

LP-HV-0013 Guidance on the Use and Administration of Specific Clotting Factors

available in the Haemovigilance Folder on all wards and on the internet via link:
http://hsenet.hse.ie/Hospital_Staff_Hub/Connolly/Haemovigilance.html

The maximum blood ordering schedule (MBOS) (refer to section 11.3) should be adhered to for routine / elective surgery unless the clinical situation suggests otherwise. It is the responsibility of the doctor requesting the pre-operative group and screen to check the patient's Hb result at least 2 hours prior to scheduled surgery. If cross-matched blood is required for the patient the request should be communicated to the blood transfusion laboratory immediately, followed by a sample if required or a completed blood transfusion request form if there is a valid sample in the laboratory, to ensure that red cells are issued and ready for transport to theatre fridge prior to the patient arriving in theatre.

11.3 Maximum Blood Ordering Schedule (MBOS)

Procedure	MBOS	Procedure	MBOS
ALL LAPAROSCOPIC PROCEDURES	**T/S**	**Gynaecology**	
Orthopaedic		Bi Salpingo-Oopherectomy	T/S
Above/Below Knee Amputation	T/S	Lap Oopherectomy	T/S
ORIF Femur	1	Myomectomy	T/S
ORIF Humerus	T/S	Ovarian Cystectomy	T/S
Austin Moore's Prosthesis	T/S	Subtotal Abdominal Hysterectomy	T/S
DHS	T/S	TAH	T/S
Hemiarthroplasty **(Hb >10 g/dl)**	T/S	Vaginal Hysterectomy	T/S
Hemiarthroplasty **(Hb <10g/dl)**	1		
Fasciotomy for Lower Limb Ischemia	T/S	**General**	
Fasciotomy for Upper Limb Ischemia	T/S	Endoscopic Banding of Oesophageal Varices	T/S
Decompression Fasciotomy Calf / Forearm	T/S	Total Gastrectomy	T/S
External Fixation of # Pelvis	T/S	Subtotal Gastrectomy	T/S
IM Nailing Femur	1	Oesophagogastrectomy	T/S
Total Hip Replacement	T/S	Oesophagectomy	T/S
Total Knee Replacement	T/S	Subtotal Thyroidectomy	T/S
Revision of Hip	1	Thyroidectomy	T/S
		Parathyroidectomy	T/S
Colorectal Surgery		Lap Cholecystectomy	T/S
Abdominal Perineal Resection	2	Open Cholecystectomy	T/S
Colostomy	T/S	Nissen Fundoplication	T/S
Hartmans Procedure	2	R/O Diaphragmatic Hernia	T/S
Reversal of Hartmans Procedure	T/S	Repair of Incarcerated Hernia	T/S
Ileorectoral Anastomosis	T/S	Simple Mastectomy	T/S
Jejunocolic Anastomosis	T/S	Splenectomy	2
Lt Hemicolectomy	T/S	Hellers Myotomy	T/S
Rt Hemicolectomy	T/S	Adrenalectomy	T/S
Rectopexy	T/S	Varicose Veins	T/S
Subtotal Colectomy	T/S		
Sigmoid Colectomy / High Anterior Resection	2	**Urology**	
Low Anterior Resection with TME	2	Nephrectomy	2
		TURP	T/S
Cardio Thoracic Surgery		TURBT	T/S
Thoracotomy	2		

11.4 Information for Patients

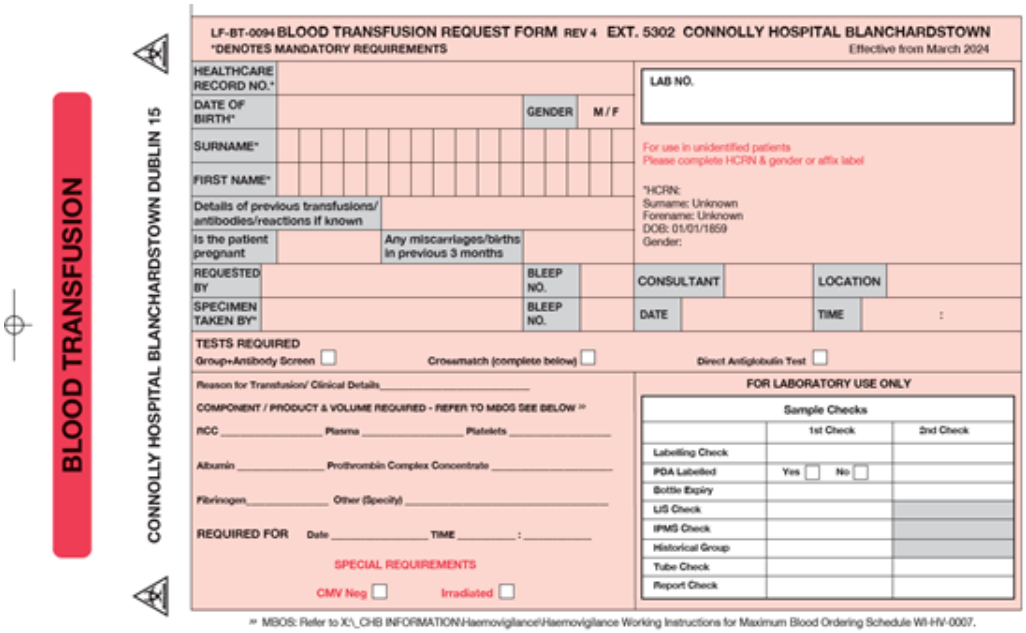
For information and instructions provided to patients in relation to their own preparation before specimen collection, refer to leaflet LF-HV-0001 Blood Transfusion Information for Patients and Families, available on all wards. The information leaflet is available in English, however, interpreters are engaged where required. It must be recorded on LF-HV-0002 Blood Transfusion Record Form whether or not the patient receives the information leaflet.

11.5 Blood Transfusion Requests

All Blood Components / Products or DAT requests must be ordered on a Blood Transfusion Request Form.

Ref.: LF-BT-0094 Blood Transfusion Request Form

Patient details on the request form are taken from the patient's Healthcare Record which are confirmed at the bedside with the patient's ID band and also confirmed with the conscious / coherent patient.


BLOOD TRANSFUSION

CONNOLLY HOSPITAL BLANCHARDSTOWN DUBLIN 15

LF-BT-0094 BLOOD TRANSFUSION REQUEST FORM REV 4 EXT. 5302 CONNOLLY HOSPITAL BLANCHARDSTOWN

*DENOTES MANDATORY REQUIREMENTS

Effective from March 2024

HEALTHCARE RECORD NO.* | LAB NO.

DATE OF BIRTH* | GENDER M / F

SURNAME*

FIRST NAME*

For use in unidentified patients
Please complete HCRN & gender or affix label

*HCRN:
Surname: Unknown
Forename: Unknown
DOB: 01/01/1859
Gender:

Details of previous transfusions/ antibodies/reactions if known

Is the patient pregnant | Any miscarriages/births in previous 3 months

REQUESTED BY | BLEEP NO. | CONSULTANT | LOCATION

SPECIMEN TAKEN BY* | BLEEP NO. | DATE | TIME :

TESTS REQUIRED

Group+Antibody Screen ☐ Crossmatch (complete below) ☐ Direct Antiglobulin Test ☐

Reason for Transfusion/ Clinical Details_____

COMPONENT / PRODUCT & VOLUME REQUIRED - REFER TO MBOS SEE BELOW »

RCC _____ Plasma _____ Platelets _____

Albumin _____ Prothrombin Complex Concentrate _____

Fibrinogen_____ Other (Specify) _____

REQUIRED FOR Date _____ TIME _____ : _____

SPECIAL REQUIREMENTS

CMV Neg ☐ Irradiated ☐

FOR LABORATORY USE ONLY

Sample Checks	1st Check	2nd Check
Labelling Check		
PDA Labelled	Yes ☐ No ☐	
Bottle Expiry		
LIS Check		
IPMS Check		
Historical Group		
Tube Check		
Report Check		

» MBOS: Refer to X:_CHB INFORMATION\Haemovigilance\Haemovigilance Working Instructions for Maximum Blood Ordering Schedule WI-HV-0007.

Telephone requests for crossmatched red cells, platelets, frozen plasma etc. must be accompanied by a transfusion request form before blood components / products can be issued to the patient, with the exception of requests made in emergency situations. The clinician requesting the blood component / product should complete and sign the transfusion request form.

11.6 Identification of Patient

- Check that the patient is wearing an ID band. Patients who can communicate must be asked to state their surname, first name and date of birth.
- If the patient is not wearing an ID band or there are discrepancies between the information on the ID band and the information from the patient or healthcare record DO NOT PROCEED with specimen collection until a correct ID band is applied.
  Ref: Connolly Hospital Policy on Patient Identification.
- In emergency situations where patients lack 3 identifiers refer to Haemovigilance procedures WI-HV-0005.
  Ref.: WI-HV-0005 Unidentified Patient Policy

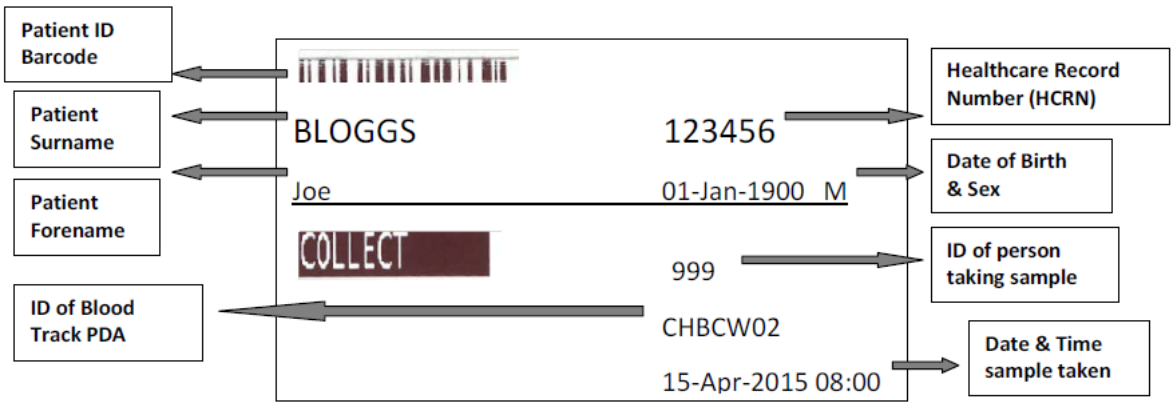
11.7 Specimen Collection

Refer to sections 6.4.4 and 6.4.5 for venepuncture and specimen labelling procedures (including use of Blood Track TX PDA).

11.8 Acceptable Methods of Specimen & Form Labelling

Addressograph labels <u>are NEVER acceptable</u> on pre-transfusion samples (even if details are also hand-written on the sample). They do not contain a patient identification barcode or the ID of the person taking the sample. These labels are pre-printed and therefore cannot be used to confirm patient identity.

1. Blood Track PDA labels <u>are acceptable</u> on pre-transfusion samples and request forms. They are generated at the time of patient venepuncture and meet specimen and form labelling requirements.



2. The sample and request form do not have to be signed by the person who has drawn the sample as all permanent members of staff and long term agency staff have a unique blood track ID that is printed on the label as shown above.
3. The request form must be signed by the person requesting the test in the 'Requested By' section.

11.8.1 Handwritten Details on Specimen and Forms

Handwritten details <u>are acceptable</u> on pre-transfusion samples and request forms, however, the sample and request form <u>must</u> be signed by the person who has drawn the sample.

11.8.2 Addressograph Labels on Request Forms Only

1. Addressograph labels are acceptable on request forms <u>only.</u>
2. The request form must be signed by the person who has drawn the sample.
   Note: Addressograph labels are <u>not</u> permitted on pre-transfusion specimen bottles in any circumstances even if the details are also handwritten on the specimen bottle.

11.8.3 Specimen and Form Labelling Requirements

Blood Transfusion		
3 Identifiers Available (full name, DOB, HCRN)		
Labelling Requirements	**Essential Information**	**Desirable Information**
Specimen **Blood Track PDA labels should be used for specimen labelling. Otherwise details <u>must</u> always be handwritten.** The information **<u>must</u>** be identical to that on the patient's ID band.	**Surname / family name (correctly spelt)** **First name(s) (correctly spelt), no abbreviations** **Healthcare Record Number** **Date of birth** **Identity of the person taking the blood specimen** **Date sample was drawn (on form and / or specimen)**	Ward Time of sampling
Request Form Blood Track PDA labels can be used to label the request form. Alternatively details can be handwritten or an addressograph label used. The information **<u>must</u>** be identical to that on the specimen.	**Surname / family name (correctly spelt)** **First name(s) (correctly spelt), no abbreviations** **Healthcare Record Number** **Date of birth** **Identity of the person taking the blood specimen** **Gender*** **Date sample was drawn (on form and / or specimen)**	Ward, Consultant, Test required Contact number of person taking the blood sample Name, signature and bleep no. of requester No. and type of blood component(s) / product(s) required Date and time required Time of sampling Indications for request Patient diagnosis Any special requirements e.g. CMV seronegative, gamma irradiated. Previous transfusion +/- obstetric history

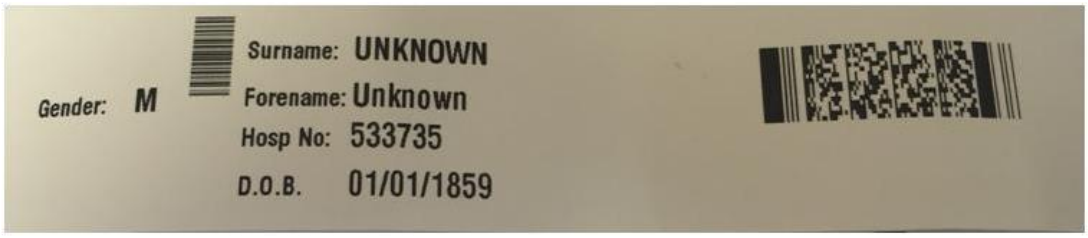
Gender*- In the event that gender is not stated on the request form (of patients where all other patient details are available) laboratory staff must confirm gender from previous records, PAS or by contacting the requesting clinician prior to registration on the LIS. In the event that gender cannot be determined the gender will be recorded as 'U' for unknown on the LIS.

3 Identifiers Not Available e.g. Unidentified Patients, PAS system downtime in emergency situations	
Specimen Blood Track PDA labels should be used for specimen labelling. Otherwise details **must** always be handwritten.	**Unique HCRN** **Any available patient details. If the surname, forename and / or DOB are unavailable they should be substituted by the following as required:** **Surname = Unknown** **Forename = Unknown** **D.O.B. = 01.01.1859** **Identity or signature of person taking the blood sample**
Form Blood Track PDA labels can be used to label the request form.	**As above.** **Include gender.**

The default date of birth for unidentified patients is 01.01.1859.

Labelling Requirements for Pre-Transfusion Samples from Unidentified Patients (Patients Lacking 3 Identifiers)

Patient ID Band



PDA Pre-Transfusion Labelling

Handwritten Pre-Transfusion Labelling

11.9 Specimen Transport

Refer to section 7 of this manual.

11.10 Storage of Examined Samples

Primary Samples are stored in the Blood Transfusion laboratory fridge at 4ºC for a minimum 14 days.

11.11 Reports

Results are telephoned as per section 8 of this manual. Results are available on the LIS in clinical areas.

11.11.1Issuing of Reports during Normal Opening Hours

Results are entered manually or transmitted to the laboratory information system (Telepath) from the IH500 and authorized upon completion.

Results of requests which have been accepted as urgent and results requiring clinical attention are phoned to the relevant clinical area or requesting clinician. A copy of the report is printed, checked and placed in 'Reports Out' tray for sorting and distribution by the Laboratory Office Staff and Transport Personnel respectively. Hospital reports are delivered twice a day (Mon-Fri) at 14:00 and 17:00.

11.11.2Issuing of Reports On-Call

Results are entered manually or transmitted to the laboratory information system (Telepath) from the IH500 and authorized upon completion.

Results of requests which have been accepted as urgent and results requiring clinical attention are phoned to the relevant clinical area or requesting clinician. A copy of the report is printed and left for checking and distribution by routine staff.

11.12 Requesting Additional Examinations

All additional requests for blood components / products must be communicated to the blood transfusion laboratory via phone and must be accompanied by a Blood Transfusion Request Form as per section 11.5 of this handbook. In emergency situations it may not be practicable to insist on a written request form for blood components / products requested. In such situations blood components / products can be requested by telephone.

11.12.1Time Limits for Requesting Additional Examinations

As per BCSH guidelines the following requirements apply:

	Sample Valid For (from time of sampling*)	Specimen must be
All patients	72 hr	≤72 hours old, at the projected time of transfusion completion
* If the time of sampling is not provided the laboratory will assume that the sample was taken at 00:01 on the date taken. In this way the 72 hour rule for sample validity will not be compromised. If there is no date of sample collection on either the sample or request form the sample must be rejected as there is no definitive way of knowing when the sample was taken.		
Second sample rule		
First time patient	A second sample is required for confirmation of the ABO group* The laboratory will request the sample from the clinical area if required	
Previous group on record	No second sample is required	
*The provision of blood components / products will not be delayed due to a second sample requirement		

- Patients who are readmitted to the hospital, from home or another hospital (with the exception of patients attending Cherry Day Ward or OPD Assessment Unit where the ID band is in situ), and require blood or blood components, must have a new pre-transfusion sample taken. This sample acts as verification of patient identity and is safer than relying on a previously held sample or a historical group to issue blood components.
- Group specific frozen plasma or platelets may be issued if the patient has a sample valid for red cell transfusion or if the patient has been previously grouped on 2 separate pre-transfusion samples. If these requirements are not met a new pre-transfusion sample is required before group specific components can be issued.
- A valid pre-transfusion sample is not required for the issue of non-group specific blood products e.g. albumin, prothrombin complex concentrate, fibrinogen or factor concentrates.

11.12.2 Repeat Examinations

Specimens are stored in the Blood Transfusion laboratory fridge at 4ºC for at least 14 days to facilitate additional serological testing; including where indicated investigation of a suspected

transfusion reaction.

In certain circumstances a repeat Group & Screen specimen may be required for additional serological investigations.

Analytical failure may be caused by specimens which are:

- Insufficient
- Haemolysed
- Grossly Lipaemic

In such cases a repeat Group & Screen specimen may be requested.

11.13 Major Bleeding Guideline

Refer to WI-HV-0019 Management of Major Bleeding Guideline

11.14 Major Emergency Plan

MP-GEN-0025 Pathology Major Emergency Plan details laboratory's strategy in the event of an exercise or an implementation of the Hospital Major Emergency Plan. MP-GEN-0025 is available to internal service users via:

1. HSE National Intranet – Hospital Staff Hub - Connolly Hospital under the link for Pathology Major Emergency Plan.
2. Connolly Hospital's X:drive under CHB Information, Lab

11.15 Services Provided by Referral Laboratories for Connolly Hospital Blood Transfusion Department

1. Request forms are available from the Blood Transfusion Laboratory.
2. All specimens should be labelled as per section 11.8. When a patient / donor cannot be identified an accident and emergency unique number or code may be used.
3. All specimens should be accompanied by the appropriate request form completed by the requesting doctor.
4. Specimen requirements are listed below:

Test	Sample Type	When Available	Referral Lab
Red Blood Cell Investigations			
Antibody Investigation	7.5ml EDTA	Routine only	Crossmatch NBC IBTS
Antibody Investigation + Crossmatch			
ABO + Rh D Group Confirmation			
DNA Typing - *Heparin must not be used as it interferes with DNA tests.*			

Test	Sample Type	When Available	Referral Lab
HLA B27 Typing	7.5ml EDTA	Routine only (Samples must arrive in the lab before 10am Monday to Friday)	NHIRL IBTS
HLA Class I & II Typing of Transplant Patients and Family Members			
HLA and Disease Association HLA A, B, C, DR, DQ or DR			
HLA Class I Typing for HLA Matched Platelets			
HPA – Human Platelet Antigen Typing			
Leucocyte / Platelet Alloimmune Investigations			
Screening for HLA Antibodies	7.5 ml Clotted	Routine only (Samples must arrive in the lab before 10am Monday to Thursday)	NHIRL IBTS
Screening for Platelet Alloantibodies			
Platelet Refractoriness	5-10ml Clotted + 7.5ml EDTA		
Adverse Transfusion Reaction Investigations			
Post Transfusion Purpura (PTP)	7.5 ml clotted + 7.5ml EDTA Discuss with IBTS Consultant / Haemovigilance	Routine only (Samples must arrive in the lab before 10am Monday to Friday)	NHIRL IBTS
Transfusion – Related Acute Lung Injury (TRALI)	3 x 7.5 ml clotted + 7.5ml EDTA Discuss with IBTS Consultant / Haemovigilance	Routine only (Samples must arrive in the lab before 10am Monday to Friday)	NHIRL IBTS
Platelet Immunology			
Drug Related Thrombocytopenia	7.5 ml clotted + sample of drug(s)	Routine only (Samples must arrive in the lab before 10am Monday to Thursday)	NBS Bristol
Autoimmune Thrombocytopenia The platelet count of the patient should be <100 x 10^9/l	2 x 7.5 ml EDTA + 7.5 ml clotted		
Thromboasthenias	Contact the NBS Bristol before referring samples		
Granulocyte Immunology			
Adult Autoimmune Neutropenia The neutrophil count of the patient should be < 2 x10^9/l	7.5ml clotted	Routine only (Samples must arrive in the lab before 10am Monday to Thursday)	NBS Bristol
Drug Induced Antibody Mediated Neutropenias	7.5 ml clotted + sample of drug(s)		

12 HAEMATOLOGY

12.1 Service Provision

Refer to Appendix No. 2 for Specimen Requirements. Peripheral blood samples are required unless otherwise stated.

12.1.1 Routine Haematology

Examination	Availability	Turnaround Time
Full Blood Count (FBC)	Routine samples (including GP samples Urgent samples	4 hours 1 hour* *provisional results available at least
ESR	Routine Hours On-Call in cases of suspected Temporal Arteritis only	4 hours 1 hour
Blood Film Examination	Routine samples Urgent samples (including malaria blood film examination& parasite count).	2 working days 4 routine working hours
Malaria Parasite Rapid Diagnostic Kit	Anytime	2 hours
Monospot (infectious mononucleosis screen)	Anytime Routine Hours On-Call	 8 hours 2 hours
Reticulocyte Count	Routine Hours	8 hours
Haptoglobin	Routine Hours	56 hours
Sickle cell screen ***For Haemoglobinopathy screens refer to Appendix No. 2***	Anytime Urgent samples (e.g. pre-op requests)	 1 hour
1 x 2.7ml EDTA specimen is sufficient to perform all of the above examinations		
Haemolytic Screen: FBC, Reticulocytes, Haptoglobins, Direct Antiglobulin Test	Routine Hours	56 hrs

12.1.2 Coagulation

*****N.B. Please fill the specimen bottle to the mark. The ratio of anticoagulant to blood is critical for coagulation examinations.*****

Please state if patient is on anticoagulant therapy.

Examination	When Available	Turnaround Time
Prothrombin Time (PT)	Anytime Routine samples Urgent samples	4 hours 1 hour
INR		
Activated Partial Thromboplastin Time (APTT)		
Coagulation Screen (PT, INR + APTT)		
Fibrinogen (Clauss)		
D-Dimer		
1 x 3ml Sodium Citrate Sample is sufficient to perform all of the above examinations		

12.1.3 Specimen Requirements – Special Haematology

Examination	Specimen Type	When Available	Turnaround Time
Blood Film review by Haematology Team	Blood film prepared from 1 x 2.7ml EDTA Tube.	Routine referral by medical scientist or request by clinician: Routine Hours only Urgent referral by medical scientist or request by clinician for suspected haematological emergency: Anytime (out of hours will be sent to Beaumont for review)	1 week 4 hours
Bone Marrow Aspirate	Bone Marrow in RPMI – Contact Haematology for RPMI specimen containers.	Routine Hours in consultation with Haematology team only	1 week

12.2 Specimen Requirements – Specimen Referred to External Laboratories

12.2.1 Special Haematology and Coagulation

Refer to Appendix No. 2 for Specimen Requirements

- Special Coagulation tests may only be ordered in consultation with the Haematology team.
- Specimen requirements are listed in Appendix No. 2.

- Request / consent forms are available from the Haematology Laboratory.

12.2.2 Immunocytochemistry, Flow Cytometry and Genetic Analysis on Peripheral Blood

Refer to Appendix No. 2 for Specimen Requirements

These tests may only be ordered by the Haematology team or on the advice of the Haematology team.

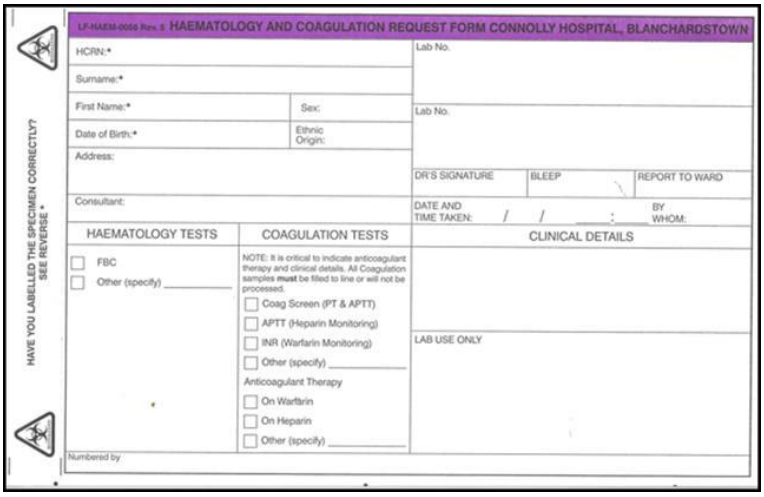
12.2.3 Immunocytochemistry, Flow Cytometry and Genetic Analysis on Samples other than Peripheral Blood

Refer to Appendix No. 2 for specimen requirements. Tests may only be ordered by the Haematology team or on advice of the Haematology team. Specimens for these tests should only be sent to the laboratory during routine hours.

12.3 Request Forms

12.3.1 Haematology and Coagulation Request Form

All hospital in-patient and out-patient requests must be made on the Haematology and Coagulation request form.


HAEMATOLOGY AND COAGULATION REQUEST FORM CONNOLLY HOSPITAL, BLANCHARDSTOWN

HCRN:*
Surname:*
First Name:*
Sex:
Date of Birth:*
Ethnic Origin:
Address:
Consultant:
Lab No.
Lab No.
DR'S SIGNATURE
BLEEP
REPORT TO WARD
DATE AND TIME TAKEN: / / : BY WHOM:

HAEMATOLOGY TESTS
- FBC
- Other (specify) _____

COAGULATION TESTS
NOTE: It is critical to indicate anticoagulant therapy and clinical details. All Coagulation samples must be filled to line or will not be processed.
- Coag Screen (PT & APTT)
- APTT (Heparin Monitoring)
- INR (Warfarin Monitoring)
- Other (specify) _____

Anticoagulant Therapy
- On Warfarin
- On Heparin
- Other (specify) _____

CLINICAL DETAILS

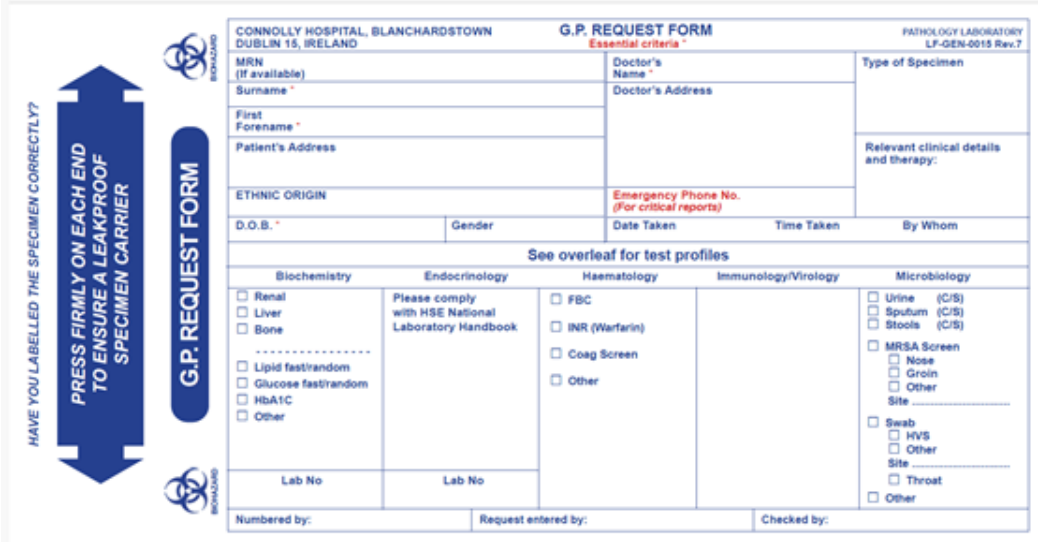
LAB USE ONLY

Numbered by

HAVE YOU LABELLED THE SPECIMEN CORRECTLY? SEE REVERSE *

12.3.2 GP Request Form

All non-hospital / GP patient request must be made on the GP request form.



12.4 Urgent Requests

To request that any specimen is processed urgently, please contact the laboratory to ensure the specimen is expected and testing of the specimen is prioritised.

12.5 Storage of Examined Specimens

FBC and coagulation samples are discarded on day 8. Bone marrow films are retained permanently and blood films are retained for 6 months.

12.6 Requesting Additional Tests

Subject to individual analyte stability, further tests on a specimen that is already in the laboratory can be requested by sending a request form stating the patient's details and additional tests required. Requests should be signed by the requesting doctor and contain the doctor's bleep number. The outer time limits from time of sample collection to processing are detailed below.

Test	Time Limit from Sample Collection to Processing
Full Blood Count (FBC)	≤24 hours
Reticulocytes	≤24 hours
ESR	≤4 hours
PT	≤24 hours
APTT	≤4 hours
Fibrinogen	≤4 hours
D-Dimer	≤4 hours
Blood film review for malaria parasites	≤4 hours
Rapid diagnostic tests for malaria	Fresh samples (<4 hours) to ensure optimal results ≤3 days old

Sickledex	≤8 hours (7 days if stored @ 2-8°C)
Monospot	≤4 hours (Separated plasma can be stored @ 2-8°C for 3 days)
Haptoglobin	≤8 hours

12.7 Analytical Failure

Analytical failure may be caused by specimens which are:

Clotted

Insufficient

Haemolysed

Grossly Lipaemic

In such cases repeat specimens may be requested.

12.8 Reference Ranges

12.8.1 References Ranges for Tests Performed in Haematology, Connolly Hospital

Full Blood Count	Range	Units	Comments
White Blood Cells (WBC)	3.7-9.5	$x10^9/L$	Male
	3.9-11.1	$x10^9/L$	Female
RBC Red Blood Cells (RBC)	4.32-5.66	$x10^{12}/L$	Male
	3.88-4.99	$x10^{12}/L$	Female
Haemoglobin (Hb)	13.3-16.7	g/dL	Male
	11.8-14.8	g/dL	Female
Packed Cell Volume (PCV) Haematocrit (Hct)	0.39-0.50	L/L	Male
	0.36-0.44	L/L	Female
Mean Cell Volume (MCV)	82-98	fL	
Mean Cell Haemoglobin (MCH)	27.3-32.6	Pg	
Mean Cell Haemoglobin Concentration (MCHC)	31.6-34.9	g/dL	
Red Cell Distribution Width (RDW)	9.5-15.5	%	
Platelets (PLT)	144-328	$x10^9/L$	Male
	137-347	$x10^9/L$	Female
Neutrophils (Neut)	1.7-6.1	$x10^9/L$	Male
	1.7-7.5	$x10^9/L$	Female
Lymphocytes (Lymph)	1.0-3.2	$x10^9/L$	
Monocytes (Mono)	0.2-0.6	$x10^9/L$	
Eosinophils (Eos)	0.03-0.46	$x10^9/L$	
Basophils (Baso)	0.02-0.09	$x10^9/L$	

Full Blood Count – African Patients*	Range	Units	Comments
White Blood Cells (WBC)	2.8 – 7.2	$x10^9$ / L	Male
	3.0 – 7.4	$x10^9$ / L	Female
Neutrophils	0.9 – 4.2	$x10^9$ / L	Male
	1.3 – 3.7	$x10^9$ / L	Female
Platelets	115 – 290	$x10^9$ / L	Male
	125 – 342	$x10^9$ / L	Female

***These ranges have not been validated by Haematology, CHB.**

Routine Haematology	Range	Units	Comments
ESR	1-20	mm/hour	
Reticulocytes (Retics)	16-79	$x10^9$/L	
Infectious Mononucleosis Screen	Negative	N/A	
Malaria Screen	Negative	N/A	
Sickledex Screen	Negative	N/A	

Coagulation	Range	Units	Comments
Prothrombin Time (PT)	9.6-11.8	secs	
INR	NA		
APTT	20.8-30.8	secs	
Fibrinogen (Clauss)	1.9-3.5	g/L	
D-Dimer	0-232	ng/mL	

12.8.2 Reference Ranges for Tests Performed by External Referral Laboratories

Please contact the relevant referral laboratory. Referral Laboratories are listed in Appendices No. 1 and No. 2.

12.9 Critical Values

Test	Result
Haemoglobin (Hb) (g/dl)	<8.0 (initial presentation or sudden decrease)
Platelets ($x10^9$/L)	<100 or >1000 (initial presentation)
WBC ($x10^9$/L)	<2.0 or >30 (initial presentation)
Neutrophils ($x10^9$/L)	<1.0 x or >20 (initial presentation)
Lymphocytes ($x10^9$/L)	0.0 or >7.0 (initial presentation)
Eosinophils ($x10^9$/L)	>2.0
Sickledex	Positive
Infectious Mononucleosis	Positive

Test	Result
Malaria Screen	Positive
PT (secs)	>14.2 seconds (not on Warfarin)
INR	<1.5 or >5.0 (on Warfarin)
APTT (secs)	>37 seconds (not on heparin) and >108 seconds (on heparin)
Fibrinogen (g/L)	<1.5
D-Dimer (ng/ml)	>1000

13 HISTOPATHOLOGY

13.1 Introduction

The Histopathology Department provides an extensive Histopathology service to Connolly Hospital Blanchardstown and Our Lady's Hospital Navan. Cytology (Non-Gynae) including a Fine Needle Aspirate Service, Multi-disciplinary meetings and an Autopsy Service are also provided by the Histopathology Laboratory. Special and immunohistochemical stains are performed within the department as required. Molecular tests, where necessary, are referred to Histopathology, Beaumont Hospital.

13.2 Materials Supplied by Histopathology Laboratory

The following may be obtained from the Histopathology laboratory:

- Specimen containers – various sizes
- 10% Neutral Buffered Formalin (in 5L containers)
- Pre-filled 60ml and 180ml 10% Neutral Buffered containers
- Histopathology transport bags
- Slides and slide containers with fixative for Fine Needle Aspirates (FNAs)
- Slides
- Slide holders
- Spray Fixative
- ThinPrep 30ml Cytolyt solution
- Coplin jars of alcohol (Fixing FNA smears)
- Histopathology / Cytology request cards
- Biohazard bags

SAFETY: Formalin is a potent eye and nasal irritant and can cause respiratory distress and allergic dermatitis. Gloves, goggles and aprons should be used when dealing with formalin. Contact the Histopathology Laboratory for any additional information that may be required and if a formalin spillage should occur.

13.3 Specimen Requirements

The techniques that are performed on fresh tissue are affected by the length of time that the tissue is removed from the patient before it is received for analysis. It is imperative that all tissue samples required to be sent fresh should be done so immediately.

Note: The turn around time of specimens for Histopathology will vary depending on the nature of the specimen. The following is an outline of estimated turn around time for different specimen types from time of receipt in the laboratory. This is only a guideline and the complexity of a case and the requirement for further investigations may lengthen the turn around time.

13.3.1 Histopathology

Tissue Type	Fixative Required	Special Requirements	Turnaround Time
Specimens for DIF	Where possible, send two specimens – one in 10% Neutral Buffered Formalin and one wrapped in saline moistened gauze.	Please supply relevant clinical details. Samples must be sent to the Histopathology Laboratory, Connolly Hospital by 2.30pm for dispatch to Beaumont Immunology Laboratory.	Contact Immunology Laboratory, Beaumont Hospital.
All other tissue	Send in 10% Neutral Buffered Formalin	An adequate volume of formalin in a specimen container of suitable size is essential for proper fixation. The volume of formalin used should be at least twice the volume of the tissue to be fixed. Large specimens should not be sectioned or opened.	GI Biopsies - 80% are reported by Day 7 Other Biopsies – 80% are reported by Day 5 Resection specimens – 80% are reported by Day 7
Muscle Biopsy	Send wrapped in saline moistened gauze	Please supply relevant clinical details. Samples must be sent to the Histopathology Laboratory, Connolly Hospital by 3.30pm, as they must be in Neuropathology laboratory in Beaumont by 4.30pm.	Contact Neuropathology Laboratory Beaumont

Tissue Type	Fixative Required	Special Requirements	Turnaround Time
Urgent Specimens	As above	Other urgent specimens are dealt with on an individual basis. The laboratory should be contacted directly with these requests in order to ensure that they are handled appropriately.	Urgent biopsies <24 hours Urgent surgicals <5 days

Note: Turnaround times may be longer in complex cases or cases requiring immunohistochemistry.

13.3.2 Cytology

Note: The turnaround time of specimens for Cytology is 80% reported by Day 5.

Specimen	Specimen Collection
Bronchial Brushings	Place material in an MSU container.
Sputum	Take a deeply coughed early morning specimen into an MSU container.
Fluids (Pleural, Ascitic, BAL etc)	Place material in an MSU container.
Urine	Place in an MSU container. Total voided specimen is required for cytology. The first morning specimen is not suitable.
Crystals for Cytology	Specimen must be collected in an MSU container.
Cerebrospinal Fluid for Cytology	Specimen must be collected in an MSU container.
*****All the above cytology preparations will be made by laboratory staff*****	
Fine Needle Aspirates (FNA) for Cytology	• Consultant Histopathologists will perform FNAs on request. Contact the Histopathology Office. • Smears made from FNA material received from clinics **must** be clearly labelled with the patient's name and at least one other form of ID (Healthcare record number or DOB) **in pencil**. • FNA samples should be smeared by the clinician performing the FNA.
FNA Non-Thyroid	1. Prepare the smears and label the slides with the patient's identifiers.

Specimen	Specimen Collection
	2. Spray half of the slides immediately with cytological fixative and allow the other half to air dry. 3. If there is only one slide, fix it immediately. Cytological fixative is available from the Histopathology Laboratory. 4. Rinse the needle is in a universal container containing formalin. 5. Label the container with at least two identifiers and the specimen description.
FNA Thyroid	1. Prepare 2 smears and label each slide with the patient's identifiers. 2. Allow slides to air dry for MGG staining by the Histopathology laboratory. 3. Divide the remaining FNA material equally between the ThinPrep CytoLyt and Formalin CellStor Pots (displayed below):   4. Wash the needle out at the end in the CytoLyt container to ensure all the material is retrieved. 5. Label the container with at least two identifiers and the specimen description.

13.4 Completion of the Request Form

For completion of the Histopathology Request Form please refer to section 5.2.1.

For Cytology specimens the number of slides, fixative and risk of infection should be stated on the request form. Each copy of the request form (i.e. including back copies) must be completed with patient demographics.

If there is sufficient material cytology may be performed on fluids from other departments, Microbiology or Biochemistry, however, this must be clearly indicated on the request form.

13.5 Labelling of Specimens

13.5.1 Labelling of Specimen Containers

Regardless of the tissue type the following essential information **MUST** be supplied LEGIBLY on the body of the specimen container:

- Name of patient (as per request form)
- Date of Birth / Healthcare Record Number (as per request form)
- Anatomical location of the specimen
- If multiple specimens are taken for a given patient, each specimen container must be individually labelled as to the site of origin e.g. A, B, C, D etc.

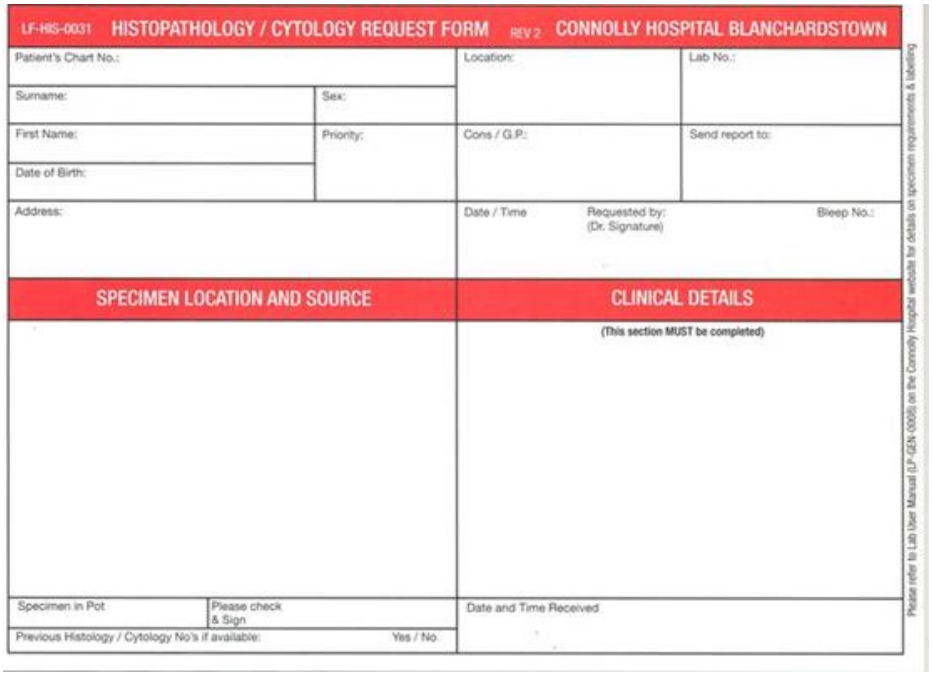
The requesting clinician is responsible for the correct labelling of specimens. Incorrectly or inadequately labelled specimens are not accepted by the laboratory and will be returned to the source of origin with **LF-HIS-0098 Histopathology Specimen / Request Form Amendment Report** for completion. This will also result in a delay to the processing of the specimen.

13.5.2 Labelling of Smears

Smears made from Fine Needle Aspirate (FNA) material must be clearly labelled with the patient's name and at least one other form of ID (Healthcare Record Number / DOB) in pencil.

13.6 Request Forms

All histopathology and cytology requests must be accompanied by a Histopathology and Cytology Request Form labelled as per section 5.2.1.



LF-HIS-0031 HISTOPATHOLOGY / CYTOLOGY REQUEST FORM REV 2 CONNOLLY HOSPITAL BLANCHARDSTOWN

Patient's Chart No.: | Location: | Lab No.:

Surname: | Sex:

First Name: | Priority: | Cons / G.P.: | Send report to:

Date of Birth:

Address: | Date / Time | Requested by: (Dr. Signature) | Bleep No.:

SPECIMEN LOCATION AND SOURCE | CLINICAL DETAILS

(This section MUST be completed)

Specimen in Pot | Please check & Sign | Date and Time Received

Previous Histology / Cytology No's if available: Yes / No

Please refer to Lab User Manual (LP-GEN-0008) on the Connolly Hospital website for details on specimen requirements & labelling

13.7 Transport of Specimens

13.7.1 Transport of Specimens from within Connolly Hospital

- The laboratory operates a collection service from Theatre at 10.00 and 16.00.
- Specimens from other areas of the Hospital are delivered by Hospital porters.
- Urgent specimens delivered to the laboratory should be accompanied by a log book which must be signed by the recipient.

13.7.2 Transport of Specimens from General Practitioners and Our Lady's Hospital Navan

Specimens can be delivered directly to the Pathology Specimen reception or posted to the Histopathology Department. If diagnostic specimens in 10% formalin are posted the following guidelines and instructions must be adhered to.

1. The specimen should be placed in watertight containers containing 10% Neutral Buffered Formalin (volumes larger then 125ml should not be transported by post but hand delivered to the laboratory), the lid must be securely closed to avoid leakages. Patient's details entered on container and request form as above. Specimens must be packaged in a UN-approved packaging system (UN3373/4GU/Class 6.2/05 GB) which consists of three layers:

   a) Primary Receptacle: a labelled primary watertight, leak-proof receptacle containing the specimen. The receptacle is wrapped in enough absorbent material to absorb all fluid in case of breakage.

b) Secondary Receptacle: A second durable, watertight leak-proof container to enclose and protect the primary receptacle(s). Several wrapped primary receptacles may be placed in one secondary receptacle. Sufficient additional absorbent material must be used to cushion multiple primary receptacles.

c) Outer Packaging: The secondary container is placed in an outer shipping package which protects its contents from outside influences such as physical damage and water while in transit. Specimens should be addressed to the Histopathology Department.

2. Both the recipient's and the sender's name and address must be shown on the packaging so that contact can be made in the event of a leakage.
3. If the specimen is deemed urgent, please mark this on the outer packaging.

13.8 Retention Times for Specimens

The Histopathology and Cytology Departments retains Specimens, Blocks and Slides in accordance with the Royal College of Pathologists Guidelines (Royal College of Pathologists and Institutes of Biomedical Science. The retention and storage of pathological records and archives, 5th Ed 2015. Available from: www.rcpath.org).

Storage of examined histopathology specimens is as follows:

1. Cytology specimens retained for a maximum of 8 weeks (e.g. crystals) from receipt of specimen;
2. Formalin fixed surgical and biopsy specimens retained for a minimum of 4 weeks from authorisation;
3. Frozen tissue retained as formalin fixed paraffin (FFPE) block for a minimum of 30 years.

Before tissue is discarded the Histopathology Laboratory confirms that the case has been fully authorised.

13.9 Requesting Additional Tests

Requests for additional histopathology and cytology examinations are made by the Consultant Histopathologists, Histopathology Registrars and Clinicians.

13.10 Compromised Samples

Where compromised samples (e.g. specimen received with no formalin) are accepted the final report will indicate the nature of the problem and if applicable that caution is required when interpreting the results.

13.11 Reports

Printed authorised reports are sent to the Clinical Consultant or source (wards / OPD). GP reports are emailed to the requesting GP. Reports are available by phoning the Histopathology Office at 5352 / 5353 Monday to Friday 9.00-17.00. Reports are **NOT** available in the Histopathology laboratory. Unauthorised reports and any issues of clinical concern can be discussed with the registrar or consultant involved in the case.

13.12 Autopsy Services (Post Mortems)

The Histopathology Departments provides an autopsy service. Autopsies may be performed at the request of the clinical staff responsible for the care of the patient or under the direction of the Coroner.

Written consent from the next of kin on the appropriate post-mortem examination consent form is required for non-Coroner cases (i.e. "Hospital" or "House" cases) before an autopsy is performed.
In Coroner's cases the Post Mortem Information form detailing the nature of the procedure and giving the name and number of a family member must be completed.

If an autopsy is required, the clinical staff must inform the Mortuary Technician at extension 5475 / 5426 / Bleep 224. Policies relating to obtaining consent for autopsy are outlined in the Mortuary Policies document. For "consented" autopsies (so called non-Coroners or "House Cases") it is the responsibility of the individual who requests the autopsy to ensure the completed consent form, patient case notes and a concise clinical summary are delivered to the Mortuary in order for the autopsy to be performed. In the case of deaths outside normal working hours, the individual who obtained consent for autopsy must ensure that the relevant documentation is given to the Mortuary Technician the following morning.
In Coroner's cases it is the responsibility of the clinical team to notify the Coroner and to ensure that the "Information Form" is completed.

13.13 Death Which Must be Reported to the Coroner

Refer to the Coroner Service website at www.coroners.ie for details.

13.14 Consent for Limb Disposal

Policy for Care and Handling of Specimens in the Theatre Department must be adhered to. Contact the Histopathology Laboratory. **LF-HIS-0012 Consent for Limb Disposal**

(available from the Histopathology Laboratory) must be completed by the Surgical team before sending the limb for disposal to the Histopathology laboratory. Limbs sent for diagnostic purposes do not require a consent form.

13.15 Procedures for Conferences

Details are outlined below of the conferences, their frequency and where they are held. Names for the conferences must be forwarded to the Histopathology registrar at 5395 or faxed to the laboratory at 8207747 at least 2 working days before the date of the conference.

Meetings:

- Lower GI Clinicopathology meeting:
  Monday 7.30-9.00 am in Beaumont Hospital.
- Oncology Colorectal Clinicopathology meeting:
  Thursday 7.30-9.00 am in Beaumont Hospital.
- Upper GI Clinicopathology meeting:
  Thursday 12.30-2.00 pm in the Endoscopy Unit.
- Haematology / Histopathology meeting:
  Thursday 10.00-10.30 in the Haematology Laboratory in the Pathology Department.
- Lymphoma meeting:
  Beaumont Hospital – 1st Thursday of every month 8am
- Thyroid meeting:
  Every second Tuesday at 12:30pm in The Endoscopy Unit.
- Dermatology meeting:
  Every second Thursday at 16:30 in Beaumont Hospital.

14 MICROBIOLOGY

14.1 Specimen Requirements

- Note: Only Urines for Microscopy, Culture and Sensitivity, Blood Cultures and CSFs are processed outside routine hours.
- Microbiology results depend critically on the type and quality of the material received. Therefore material sent for microbiological examination should be both representative and fresh.
- Specimens must be sent to the laboratory as soon as possible after collection. Non-urgent specimens, other than blood cultures, taken out of laboratory hours may be refrigerated prior to delivery.
- All specimen container lids must be securely tightened prior to transportation to ensure safe arrival in the laboratory. Containers should be checked for cracks or faults before use. Never overfill containers.
- All samples must be packaged in zip lock bags or other sealed plastic bags and must be kept separate from the request form.
- Sample containers, request forms or plastic transport bags which are contaminated with any biological material will not be accepted for processing by the laboratory.

14.1.1 Examinations Performed in Microbiology, Connolly Hospital

Note: Turnaround time will be extended in cases where fastidious organisms or poor growth is observed or additional investigative procedures are required.

Examination	Container / Swab Type Required	Specimen Collection & Transport Recommendations	Turnaround Time*
Biopsy Tissue	Sterile MSU container	Keep specimen moist e.g. in sterile gauze moistened with sterile water. Transport rapidly to laboratory. (Do not use formalin or other preservative).	72 hours
Blood Cultures	Aerobic + Anaerobic blood culture bottles.	Bottles are supplied in sets of two – one blue (aerobic) & one purple (anaerobic) from the microbiology laboratory. Cleanse top of culture bottles with 2% chlorhexidene in 70% isopropyl alcohol impregnated swab (Clinell or equivalent). Place 10mls of blood aseptically into each of culture bottles, taking care not to introduce contamination. Do not change needles to inoculate second bottle. Transport to laboratory ASAP. Do not refrigerate.	5 days
Bronchoalveolar Lavage (BAL)	Sterile MSU container	Use sterile container.	72 hours
Central Line Tips	Sterile MSU Container	Remove aseptically. Cut distal 4cm off.	48 hours
Cerebrospinal Fluid (CSF) **Note: Out of hours specimens are processed by Microbiology, Beaumont** **CSF Cell Count Microscopy**	Sterile Universal Containers x 3	At least 1-2 ml required. Take sample into three sterile universal containers, clearly marked 1, 2, and 3 in order of sampling. Notify laboratory in advance when a lumbar puncture is planned and send specimens immediately when taken. Samples must be hand delivered to the laboratory. Do not send via pneumatic tube system. Collect a blood glucose at the same time – see Appendix no. 2 Specimen Requirements	72 hours <2 hours
CPE Screen Rectal Swab	CPE molecular swab	See MDRO policy. Swab must contain visible faecal material.	48 hours
Ear Swab - Bacterial	Transystem transport swab		48 hours

Examination	Container / Swab Type Required	Specimen Collection & Transport Recommendations	Turnaround Time*
Early Morning Urine (EMU) (Pregnancy) (HCG)	Sterile MSU container	Transport to laboratory promptly. Refrigerate if delay in transport is likely. Minimum volume: 1ml	2-3 hours
Eye Swab - Bacterial	Transystem transport swab		48 hours
Faeces for Bacteriology or Virology (Rota / Adeno / Norovirus available in defined circumstances).	Sterile MSU container	Transport immediately. If any delay in transport anticipated, refrigerate specimen.	48 hours
Faeces for Clostridium difficile toxin.	Sterile MSU container	Fresh specimen required. Refrigerate if delay in transport to laboratory anticipated. Testing for C. difficile toxin is not indicated in formed or semi-formed faeces. Minimum volume: 2-3 ml loose / liquid specimen	24 hours (Mon – Thurs) 72 hours (Fri – Sun)
Faeces for Occult Bloods	Sterile MSU container	This test is carried out on the wards. OPD and GP patient samples processed in laboratory.	24 hours (Mon – Thurs) 72 hours (Fri – Sun)
Fluids	Sterile MSU container. Also send EDTA sample if cell count and differential is required.	Transport rapidly to laboratory. Minimum volume: 1ml	72 hours
High Vaginal Swab	Transystem transport swab	MUST be received during routine hours, otherwise unsuitable for wet prep microscopy & other results questionable	48 hours
Midstream (MSU) or Catheter (CSU) urine – Microscopy, Culture and Sensitivity	Sterile MSU container.	Transport to laboratory promptly. Refrigerate if delay in transport is likely. Minimum volume: 1ml	48 hours (Mon – Thurs) 72 hours (Fri – Sun)
MRSA Screens	Transystem transport swab	See MRSA Policy.	48 hours (Mon - Thurs) 72 hours (Fri – Sun)

Examination	Container / Swab Type Required	Specimen Collection & Transport Recommendations	Turnaround Time*
Nasopharyngeal swab for SARs CoV-2	Nasopharyngeal and oropharyngeal swabs (combined)	Optimal Time for specimen collection is as soon as possible after onset of symptoms. 1 swab should be taken per patient or as per ICT / Consultant Microbiologist. Samples should be transported without delay to the laboratory.	12 hours (Before 2pm Mon-Fri & before 10am Sat-Sun) 24 hours (After 2pm Mon-Fri & after 10 am Sat-Sun)
Nasopharyngea Swab - Influenza A and B RSV	Nasopharyngeal and oropharyngeal swabs (combined) Viral Transport swab	Swabs available from Microbiology. In house testing available only during Influenza season. Testing is restricted to CHB patients. Specimens must be received before 2pm Monday to Friday. Non-CHB patient and out of season samples are referred to NVRL.	12 hours (Before 2pm Mon-Fri & before 10am Sat-Sun) 24 hours (After 2pm Mon-Fri & after 10 am Sat-Sun)
Nose Swab - Bacterial	Transystem transport swab		48 hours
Pus	Sterile MSU container.	Transport rapidly to laboratory. Minimum volume: 1ml	72 hours
Sputum - Routine Bacteriology	Sterile MSU container	Note: Salivary or mucosalivary samples are not suitable for routine culture except from ICU or immunosuppressed patients. Please send only purulent or mucopurulent samples. Minimum volume: 1ml	48 hours
Throat Swab - Bacterial	Transystem transport swab	Swab areas of purulence or ulceration. Specify if looking for diphtheria or pertussis.	48 hours
Umbilical Swab	Transystem transport swab		48 hours
Urethral / Endocervical Swab (Bacterial)	Transystem transport swab		48 hours
Urinary Catheter Tips	N/A	Unsuitable for culture, send MSU or CSU as appropriate.	N/A
Urine for Legionella or Pneumococcal Antigen	Sterile MSU container	Minimum volume: 1ml	24 hours (Mon – Thurs) 72 hours (Fri – Sun)

Examination	Container / Swab Type Required	Specimen Collection & Transport Recommendations	Turnaround Time*
VRE Screen – Rectal Swab	Transystem transport swab	Swab must contain visible faecal material.	48 hours
Vomitus	N/A	Unsuitable for culture.	N/A
Vulval Swab	Transystem transport swab		48 hours
Wound Drain Tips	N/A	Not recommended for culture. Needle aspirate of fluid or abscess preferred.	48 hours
Wound Swabs for Culture and Sensitivity	Transystem transport swab	Ensure there is adequate material on the swab. Pus is the preferred sample when available – see above.	48 hours

14.1.2 Examinations Performed in Microbiology, Beaumont Hospital

Examination	Container / Swab Type Required	Specimen Collection & Transport Recommendations
CSF for Xanthochromia	1ml in darkened brown tube available from Microbiology.	Must be protected from light.
Early Morning Urine (EMU) for Mycobacteria	Sterile MSU containers	Collect full void of Early Morning Urine, then send a 20 – 50 ml aliquot of this in a sterile MSU container
Samples from High Risk Patients e.g. TB	See individual sample types	See individual sample types
Sputum for TB	Sterile MSU container	For optimal diagnosis, the first specimen on 3 consecutive mornings is preferred. Separate specimens and request forms are required for routine culture and TB testing. Minimum volume: 1ml

14.1.3 Examinations Performed in the National Virus Reference Laboratory (NVRL)

Refer to: www.ucd.ie/nvrl

An On-call Serology & Virology testing service is available for urgent needlestick or organ donation investigations

Examination	Container / Swab Type Required	Specimen Collection & Transport Recommendations
CSF for Viral PCR	Aliquot taken from primary sample. No additional sample required.	As per CSF requirements in section 14.1.1.
Eye swab	Swab in viral transport medium	
Faeces Enteric Viral PCR	Sterile MSU container	Use sterile container

Examination	Container / Swab Type Required	Specimen Collection & Transport Recommendations
Faeces Enterovirus (including Coxsackie viruses)	Sterile MSU container	Use sterile container
Monkeypox	Swab in viral transport medium	Must be discussed with Consultant Microbiologist in advance of sending
***Needlestick Injury Follow-up**	*Contact Occupational Health	
Respiratory Virus Swab	Nasopharyngeal and oropharyngeal swabs (combined) or Viral Transport swab	Swabs available from Microbiology
Serology (Antibody Studies) & Virology Testing on blood samples - all tests except those marked	Refer to Appendix No. 2 for specimen requirements	
Sputa / BAL for Molecular Respiratory Screen including PCP PCR & Mycoplasma	Sterile MSU container	Use sterile container
Sputa / BAL / Nasopharyngeal Aspirate for Respiratory Viral PCR +/- Immunofluorescence	Sterile MSU container	Use sterile container.
Throat or other Swab (Viral)	Nasopharyngeal and oropharyngeal swabs (combined) or Viral Transport swab	Swabs available from Microbiology
Urethral / Endocervical Swab (Chlamydia)	Aptima Chlamydial collection device	Must be sent in chlamydial collection device available with instructions from the Microbiology laboratory. Follow collection instructions carefully.
Urine for Chlamydia	Aptima Chlamydia collection device	Collect first 10-15ml of first catch urine (first part of the stream). Transport to laboratory within 24 hrs of collection.

14.1.4 Examination Performed by Other Referral Laboratories

Examination	Container / Swab Type Required	Specimen Collection & Transport Recommendations	Analysing Laboratory
Bone Graft Swabs	Transystem transport swab	Use Cappagh Hospital request forms	Cappagh Hospital

Examination	Container / Swab Type Required	Specimen Collection & Transport Recommendations	Analysing Laboratory
Faeces – Blood Stained (High Risk)	Sterile MSU container	Transport immediately. If any delay in transport anticipated, refrigerate specimen. Minimum quantity: 1-2 g	Public Health Laboratory, Cherry Orchard Hospital
Faeces for Worms	Sterile MSU container	Transport immediately. If any delay in transport anticipated, refrigerate specimen. Minimum quantity: 1-2 g	Central Veterinary Laboratory, Celbridge
Faeces for Ova / Parasites	Sterile MSU container	Transport immediately. If any delay in transport anticipated, refrigerate specimen. Testing for Ova / Parasite is not indicated for in-patients except in cases of recent foreign travel. Contact laboratory in advance if sending fresh stool for Entamoeba. Minimum quantity: 1-2 g	Biomnis Laboratory
Sellotape Slides for Threadworm	Glass slide	Tape sellotape to slide then place in a specimen bag.	
Skin scrapings, nail and hair clippings for Fungal Culture	Dedicated transport system if available; otherwise sterile container	Scrape skin at active edge of lesion, place in a dedicated transport system or sterile container. Protect specimen from light.	
Meningococcal PCR	Refer to Appendix No. 2 for specimen requirements		CUH, Temple St.
16SrDNA PCR	Sterile Universal container	Following discussion with Consultant Microbiologist	Bacterial Reference Department, UK HAS Collindale, London
18SrDNA PCR	Sterile Universal container	Following discussion with Consultant Microbiologist	Bacterial Reference Department, UK HSA Collindale, London

14.2 Sample Collection Procedure

14.2.1 Blood Culture Collection Procedure

Step 1: Gather and prepare all materials required before beginning the procedure (clinical room).

- Use a clean procedure tray with integrated sharps bin and disposable tourniquet
- Butterfly needle and blood culture bottles with adaptor, other blood bottles if required
- Clinell wipe (minimum 3 wipes), or equivalent* (*2% chlorhexidine in 70% isopropyl alcohol swab)
- Latex or Nitrile gloves and appropriate sterile dressing
- **Blood culture bottles. Ensure bottles are fully intact and within date and use both an aerobic and an anaerobic bottle.**

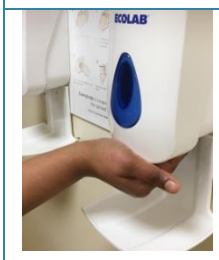
Step 2: Prepare bottles for inoculation (patient bedside).

- Wash hands with soap and water or use alcohol hand rub
- Remove the plastic 'flip-caps' from the blood culture bottle, avoid touching rubber septum, disinfect the tops of culture bottles (septum) for 15 seconds with a 2% chlorhexidine in 70% isopropyl alcohol impregnated swab (**Clinell or equivalent**)
- Use a fresh swab for each bottle
- Allow the bottle tops to dry in order to fully disinfect.

Step 3: Prepare venepuncture site.

- **Blood cultures should not be taken from new / existing peripheral venous cannulae.**
- Confirm the patient's identity and obtain consent.
- Clean any visibly soiled patient's skin with soap and water, then dry.
- Apply a **disposable tourniquet** and palpate to identify a vein.
- Wash hands with soap and water or use alcohol hand rub.
- Disinfect the skin, in the chosen area, for 30 seconds with a 2% chlorhexidine in 70% isopropyl alcohol impregnated swab (Clinell or equivalent) and allow to dry. **Do not palpate the site again after disinfection in order to prevent contaminating the puncture site.**

Step 4: Sample collection using a butterfly needle and adaptor (patient bedside).





- Wash and dry hands again or use alcohol hand rub, and put on latex / nitrile gloves (sterile gloves are not necessary).
- Open butterfly needle and blood culture adaptor, and attach together.
- Insert butterfly needle into vein. **Remember do not palpate the site again after initial disinfection in step 3 above.**
- Collect sample into blood culture bottles via adaptor and release tourniquet (up to 10ml blood is required for **each** bottle). Inoculate anaerobic blood culture bottle first.
- If blood is being collected for other tests, **always inoculate the blood culture bottles first.**
- Discard butterfly needle / adaptor into the sharps container, dispose of blood stained items into clinical waste bag and decontaminate tray according to department practice.
- Cover the puncture site with an appropriate sterile dressing.
- Remove gloves and decontaminate hands.
- Record the procedure with indication for culture, time, site of venepuncture and any complications in the patient's record along with name (and bleep number) of person who performed the procedure.

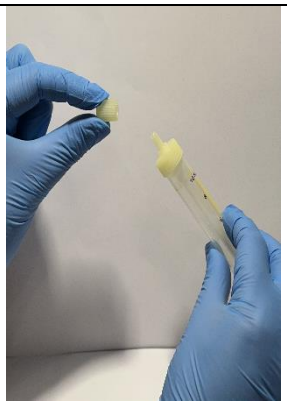
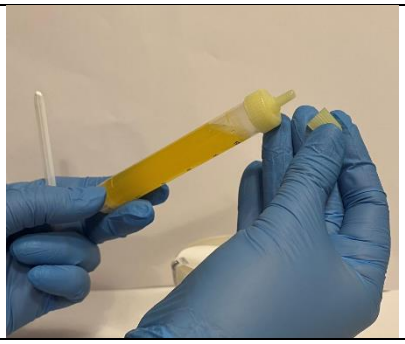
Step 5: Sample management

- Label bottles with appropriate patient information or use hospital addressograph label. Ensure that barcodes on the bottles are not covered by additional labels
- **Do NOT cover or remove peel-off barcode labels. These are vital and for Laboratory use only**
- Microbiology request form and relevant sections should be completed
- Place blood culture bottles in a sealed plastic specimen bag with the request form in the pouch
- **Blood cultures should be transported to the laboratory as soon as possible after collection**

Collection of Blood Cultures – Important Points to Note

1. Blood cultures are taken to identify patients with bacteraemia. It is imperative that blood cultures are taken correctly to avoid contamination of the specimen from skin flora, which may result in a positive blood culture that may not be clinically significant.
2. There are many signs and symptoms in a patient which may suggest bacteraemia and clinical judgement is required, but the SIRS criteria and associated clinical signs (which may be subtle in the very young, the elderly, those on steroids or immuno-compromised) should be taken into account when assessing a patient for signs of bacteraemia or sepsis.
3. Only take blood for culture when there is a clinical need to do so and not as routine.
4. Blood cultures should be taken after identification of possible bacteraemia or sepsis and before the administration of antibiotics. If a patient is already on antibiotics, blood cultures should ideally be taken immediately before the next dose is due.
5. Blood cultures should not be taken from peripheral venous cannulae due to the increased likelihood of contamination.
6. Obtain the correct blood volume for culture to increase sensitivity of the procedure; i.e. minimum 20mls with 10mls in each bottle.
7. Two sets of blood cultures are recommended in the setting of sepsis to increase the sensitivity of the culture process.
8. 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 (Clinell or equivalent) and allow to dry
9. All blood cultures should be documented in the patient's medical notes. Documentation should include date, time, site (peripheral, central line, lumen, etc.), indication for blood culture and the name and bleep number of the person performing the procedure.

14.2.2 NFT Urine Collection System Procedure

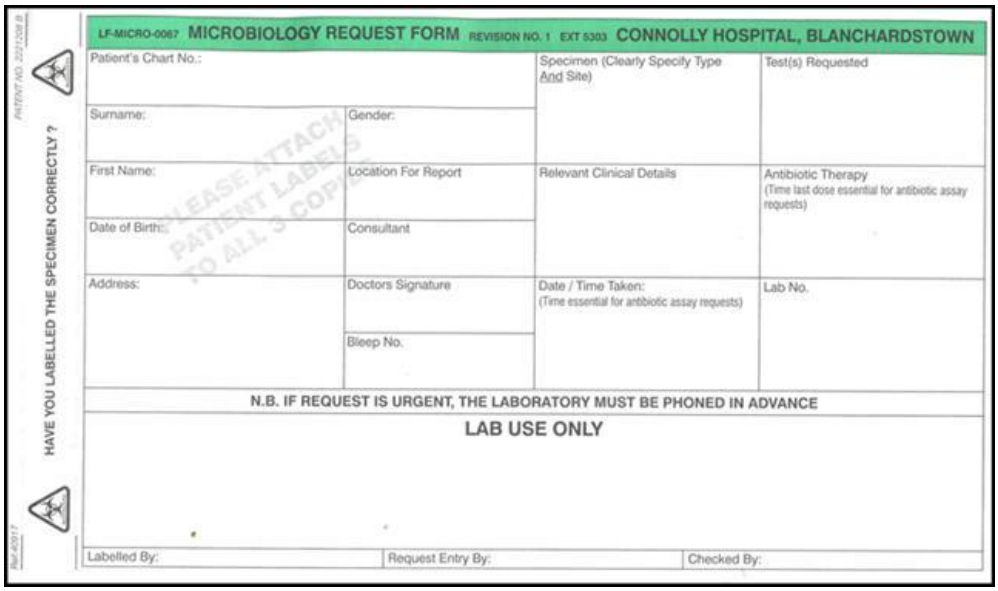
1	2
Remove the safety label from the transfer unit Remove the urine stopper from the urine monovette	Insert the urine monovette into the transfer unit. With slight pressure the urine monovette penetrates the NFT membrane, where it is now seated securely for the collection process
 	
3	4
By pulling on the plunger, the urine flows gently into the monovette	Close the monovette with the stopper and break off the plunger.
	
5	6
When the urine monovette is removed, the NFT urine cup is immediately, tightly and hygienically sealed again. Further samples can be taken from the NFT cup.	Label the request form and the monovettes with the patient name and at least 1 other identifier (MRN / DOB). Send to the laboratory.

14.3 Request Forms

Where several examinations are requested, separate request forms and samples are required for each type. Relevant clinical information, antimicrobial therapy, details of foreign travel may be essential for the accurate microbiological assessment. It is essential to specify clearly the specimen site – failure to do this may mean that the specimen cannot be processed.

14.3.1 Microbiology Request Form – see 14.3.3. for molecular microbiology

All hospital in-patient and out-patient requests for (non- molecular) microbiological examination must be made on the Microbiology request form LF-MICRO-0067.



LF-MICRO-0067 MICROBIOLOGY REQUEST FORM REVISION NO. 1 EXT 5303 CONNOLLY HOSPITAL, BLANCHARDSTOWN

HAVE YOU LABELLED THE SPECIMEN CORRECTLY ?

Patient's Chart No.:		Specimen (Clearly Specify Type And Site)	Test(s) Requested
Surname:	Gender:		
First Name:	Location For Report	Relevant Clinical Details	Antibiotic Therapy (Time last dose essential for antibiotic assay requests)
Date of Birth:	Consultant		
Address:	Doctors Signature	Date / Time Taken: (Time essential for antibiotic assay requests)	Lab No.
	Bleep No.		

PLEASE ATTACH PATIENT LABELS TO ALL 3 COPIES

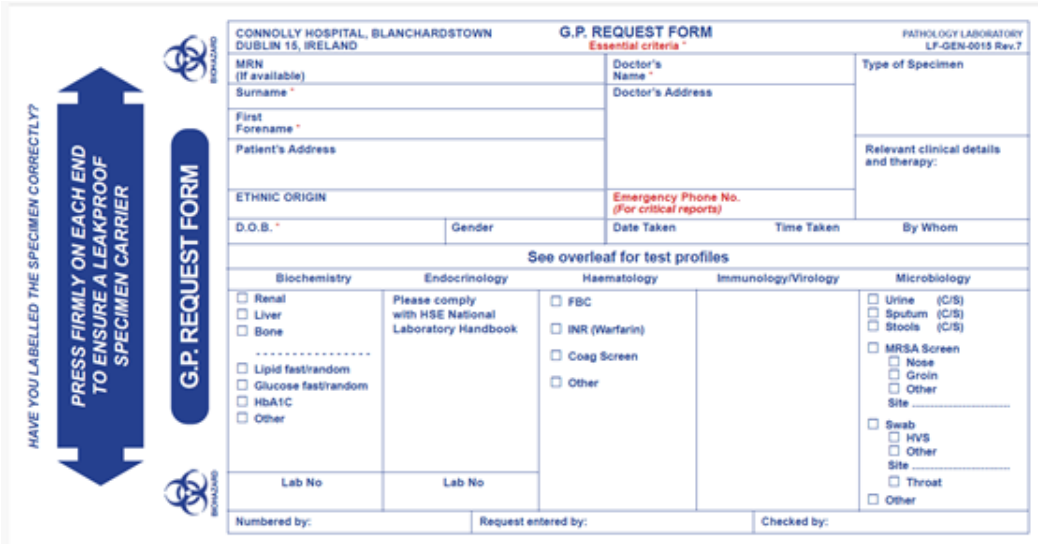
N.B. IF REQUEST IS URGENT, THE LABORATORY MUST BE PHONED IN ADVANCE

LAB USE ONLY

Labelled By: | Request Entry By: | Checked By:

14.3.2 GP Request Form

All non-hospital / GP patient requests must be made on the GP request form.



HAVE YOU LABELLED THE SPECIMEN CORRECTLY?

PRESS FIRMLY ON EACH END TO ENSURE A LEAKPROOF SPECIMEN CARRIER

G.P. REQUEST FORM

CONNOLLY HOSPITAL, BLANCHARDSTOWN
DUBLIN 15, IRELAND

G.P. REQUEST FORM
Essential criteria *

PATHOLOGY LABORATORY
LF-GEN-0015 Rev.7

MRN (If available)	Doctor's Name *	Type of Specimen
Surname *	Doctor's Address	
First Forename *		
Patient's Address		Relevant clinical details and therapy:
ETHNIC ORIGIN	Emergency Phone No. (For critical reports)	
D.O.B. * / Gender	Date Taken / Time Taken / By Whom	

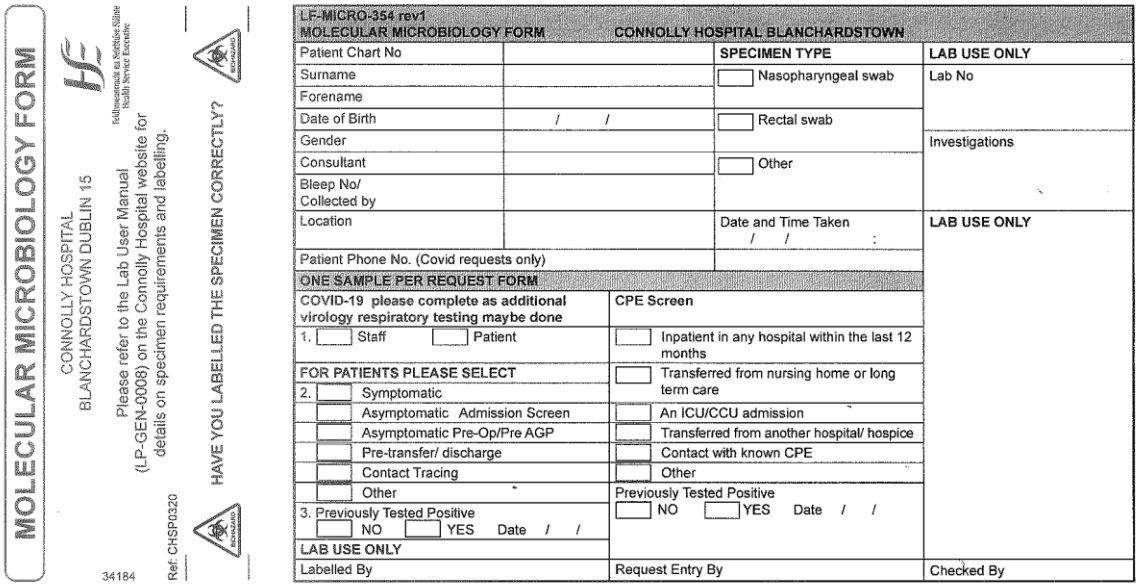
See overleaf for test profiles

Biochemistry	Endocrinology	Haematology	Immunology/Virology	Microbiology
☐ Renal ☐ Liver ☐ Bone ☐ Lipid fast/random ☐ Glucose fast/random ☐ HbA1C ☐ Other	Please comply with HSE National Laboratory Handbook	☐ FBC ☐ INR (Warfarin) ☐ Coag Screen ☐ Other		☐ Urine (C/S) ☐ Sputum (C/S) ☐ Stools (C/S) ☐ MRSA Screen ☐ Nose ☐ Groin ☐ Other Site ..... ☐ Swab ☐ HVS ☐ Other Site ..... ☐ Throat ☐ Other
Lab No	Lab No			

Numbered by: | Request entered by: | Checked by:

14.3.3 Molecular Microbiology Form

All hospital in-patient and out-patient requests for molecular microbiological examination must be made on the Microbiology request form LF-MICRO-0354.



MOLECULAR MICROBIOLOGY FORM

CONNOLLY HOSPITAL
BLANCHARDSTOWN DUBLIN 15

Please refer to the Lab User Manual (LP-GEN-0008) on the Connolly Hospital website for details on specimen requirements and labelling.

HAVE YOU LABELLED THE SPECIMEN CORRECTLY?

Ref: CHSP0320

34184

LF-MICRO-354 rev1
MOLECULAR MICROBIOLOGY FORM — CONNOLLY HOSPITAL BLANCHARDSTOWN

Patient Chart No		SPECIMEN TYPE	LAB USE ONLY
Surname		☐ Nasopharyngeal swab	Lab No
Forename			
Date of Birth	/ /	☐ Rectal swab	
Gender			Investigations
Consultant		☐ Other	
Bleep No/ Collected by			
Location		Date and Time Taken / / :	LAB USE ONLY
Patient Phone No. (Covid requests only)			

ONE SAMPLE PER REQUEST FORM

COVID-19 please complete as additional virology respiratory testing maybe done	CPE Screen
1. ☐ Staff ☐ Patient	☐ Inpatient in any hospital within the last 12 months
FOR PATIENTS PLEASE SELECT	☐ Transferred from nursing home or long term care
2. ☐ Symptomatic	☐ An ICU/CCU admission
☐ Asymptomatic Admission Screen	☐ Transferred from another hospital/ hospice
☐ Asymptomatic Pre-Op/Pre AGP	☐ Contact with known CPE
☐ Pre-transfer/ discharge	☐ Other
☐ Contact Tracing	Previously Tested Positive
☐ Other	☐ NO ☐ YES Date / /
3. Previously Tested Positive ☐ NO ☐ YES Date / /	
LAB USE ONLY	
Labelled By	Request Entry By

Checked By

14.4 Urgent Requests

To request that any specimen is processed urgently, please contact the laboratory to ensure the specimen is expected and testing of the specimen is prioritised. The Microbiology Laboratory must always be notified, at Ext 5303 during routine hours or Bleep 158 out of hours, in advance when planning to take a CSF (lumbar puncture) sample. Please specify a bleep number on all urgent requests.

If cell counts and / or gram stains are required urgently, the Microbiology Laboratory must be notified in advance to request that these results are phoned.

14.5 Reference Ranges

Sample Type	Parameter	Normal Range
Urine	White Cell Count	< 40 WBC/ul
CSF	White Cell Count	≤5/cmm

14.6 Storage of Examined Specimens

Sample Type	Retention Period
Primary samples (excluding urines, CSFs and blood cultures)	7 days
Blood cultures	5 days
CSFs	28 days
Urines	3 days

14.7 Requesting Additional Tests

Requests for add-on HCG, urine Legionella or Pneumococcal antigen may be added within 48 hours by phone and an additional request form must be sent to the laboratory. Requests for other further investigations are made in consultation with the Consultant Microbiologist.

14.8 Analytical Failure

In the event of analytical failure a repeat specimen may be requested where practicable.

15 APPENDICES

15.1 Appendix No. 1 Referral Laboratories

Beaumont – Chemical Pathology	
ACTH	Monoclonal Bands
Aldosterone	Myeloma Screen
Alpha 1 Anti-Trypsin Levels	Noradrenaline
Adrenaline	Paraprotein
Androgens – Androstenedione, DHEAS,	Parathyroid Hormone (PTH)
Testosterone	Plasma Metanephrines
Aminophylline	Progesterone
Anti-Epileptic Drugs	Protein Electrophoresis (SPEP) (Serum)
Bence Jones Protein (BJP) (Urine)	Protein Electrophoresis (Urine)
C Peptide	Renin
Cyclosporine	Renin / Aldosterone Ratio
DHEAS	Salicylate
Digoxin	Sex Hormone Binding Globulin (SHBG)
Dopamine (Urine)	Sirolimus
Growth Hormone	Tacrolimus
5-Hydroxy-indole Acetic Acid (5HIAA)	Theophylline
(Urine)	Urinary Catecholamines
Insulin	Urinary Metanephrines
IGF-1	Xanthochromia
Immunoglobulin - IgA, IgG, IgM	
Microalbumin (ACR)	

Beaumont – Haematology	
Acute leukaemia screen	MPN Panel JAK2
Anti-Thrombin III (AT3)	Mixing Studies (Correction Tests)
APCR (Activated Protein C Resistance)	Natural Killer (NK) Cells
B cell lymphoproliferative screen	PNH screen
CAL-R (Calreticulin)	Protein C (for Meningococcal Septicaemia)
Factor Assays - FVIIIC, FXIC	Protein S
FXII, FX, FXI, FII, FV, FVII, FX	Prothrombin Gene Mutation
Factor V Leiden	T, B and NK cell enumeration
Flow Cytometry - Diagnostic	T cell panel
Haemochromatosis HFE Gene, C282Y, H63D	Thrombophilia Screen
Lupus Anticoagulants	(Antithrombin III, Protein C, Protein S, Lupus
MPN Panel CAL-R	Anticoagulant, Activated Protein C Resistance
	(APCR), Factor VIII)
	von Willebrand Factor

Beaumont – Immunology

***** Immunology tests require their own serum gel 4.9ml tube (brown) – tubes for chemical pathology testing cannot be split to accommodate immunology tests*****

***** Up to 5 tests can be performed on a single 4.9ml brown tube*****

ACA (Anti-Centromere Antibodies)	Anti-NMDA Antibodies
Acute Renal Failure Screen - Includes: ANF,	Anti-Phospholipid Antibodies
ANCA, GBM, C3/C4 & ASOT	Anti-PR3 Antibody (PR3)
Adrenal Antibodies (ADR)	Anti-Ribosomal-P-Protein Antibodies
Allergy Testing	Anti-RNP
ANCA	Anti-Ro
ANF (Anti-Nuclear Factor)	Anti-Scl-70
Anti-Cardiolipin Antibodies	Anti-Scleroderma Antibodies
Anti-CCP	Anti-Skin Antibodies
Anti-Centromere Antibodies	Anti-Sm
Anti-dsDNA Antibodies	Anti-Smooth Muscle Antibodies
Anti-Endomysial (IgA) Antibodies (EMA)	Anti-Thyroid Peroxidase (TPO)
Anti-Endomysial (IgG) Antibodies (EMA)	Anti-Tissue Transglutaminase Antibody (tTG)
Anti-Extractable Nuclear Antibodies (ENA) -	ASOT
Includes anti-Ro, La, RNP, Sm, Jo-1 & Scl-70	Autoimmune Encephalitis Screen (NMDA,
Anti-Gastric Parietal Cell Antibodies	LGI1, CAPSR2, DPPX, AMPA, GABA)
Anti-GBM (Glomerular Basement Membrane)	Autoimmune liver screen
Antibodies	Avian Antibodies
Anti-Histone Antibodies	Beta-2-Microglobulin
Anti-Intrinsic Factor Antibodies	C3 and C4 esterase
Anti-Jo-1	cANCA
Anti-La	CH50
Anti-LKM (Liver-Kidney Microsomal)	Coeliac Screen
Antibodies	Complement C3
Anti-Mitochondrial Antibodies (including M2	Complement C4
subtyping)	Complement CH50
Anti-MPO (Myeloperoxidase) Antibodies	CTD (Connective Tissue Disease)
Anti-Neuronal Antibodies (Anti-Hu, Yo)	

Beaumont – Immunology ***** Immunology tests require their own serum gel 4.9ml tube (brown) – tubes for chemical pathology testing cannot be split to accommodate immunology tests***** ***** Up to 5 tests can be performed on a single 4.9ml brown tube*****	
Immunoglobulin – IgA (when requested with tTG)	pANCA (Perinuclear Anti-Neutrophil Cytoplasmic Antibodies)
Immunoglobulin – IgE	Paraneoplastic Screen (Hu, Yo, Ri, Ma, Amphiphysin, CRMP5/CV2, Tr,)
Inflammatory Arthritis Antibodies - Includes RF, CCP, ANF	Pneumococcal Antibody
Liver antibodies	RAPA
Liver Autoantibodies - Includes ANF, Anti-Smooth Muscle, Anti-Mitochondrial, Anti-LKM	Rheumatoid Factor
Myosistic Panel	Thyroid Antibody
NMDA Receptor (N-methyl-D-aspartate receptor)	Vasculitis Screen - Includes ANF, ANCA, RF, C3/C4, DNA, ENA

Beaumont – Toxicology	
Barbiturates	Methanol
Benzodiazepine (Frisium)	Tricyclic Antidepressants
Drug Screen (Alcohol / Ethanol)	

Biomnis	
Adalimumab (Humira)	Lamictal
ADH (Anti-diuretic hormone)	Lead (Serum)
Adenosine d-Aminase	Lead (Urine)
AFP (Alpha Feto Protein)	Legionella Serology (Screen)
Alkaline Phosphatase Isoenzymes	Lipase
Aluminium	Mercaptopurine
Anti-Carbonic Anhydrase Antibodies	Mercury (Blood)
Anti-Neutrophil Antibody	Mercury (Urine)
Anti-TNF alpha levels and Antibodies	MTHFR
Azothioprine (Imuger, Imuran)	Pancreatic Polypeptide
Bartonella (Cat scratch)	Parathyroid Related Protein (PTH-RP)

Biomnis	
CA125	Placental Alkaline Phosphatase (PALP)
CA15.3	Procalcitonin
CA19.9	Procollagen 3
CA50	Proinsulin
Calcium, Ionised	Pyruvate
Calculi	Rivotril
Campylobacter Serology (for Guillain-Barré Syndrome)	Selenium
	Serotonin (Serum / Plasma)
Carcinoembryonic Antigen (CEA)	Serotonin (Urine)
CDT (Carbohydrate-Deficient Transferrin)	Somastatin
Chlamydia Antibodies	Stone Analysis
Chlamydia Serology	Strongeloides serology
Chromium	Sulphonylurea (GLIB)
Chromogranin B	6-Thioguanine Nucleotide Methyl-6- Oxalate (Urine)
Citrate (Urine)	
Copper (Serum)	Teicoplanin
Copper (Urine)	Thallium (Serum)
Cortisol (Urine)	Thallium (Urine)
Coxsackie Virus Serology	Tropheryma whipplei (Whipples Disease)
Deoxypyridinoline	VIP (Vasoactive Intestinal Polypeptide)
Faecal Calprotectin	Vitamin A
Faecal Ova/Parasites	Vitamin B1 (Thiamine)
Flecainide	Vitamin B2 (Riboflavin)
Fungal culture	Vitamin B3 (Niacin / Vitamin PP)
Furosemide	Vitamin B6
Gabapentin (Neurontin)	Vitamin C
Glucagon	Vitamin E
HE4 (Human Epididymis Protein 4)	Vitamin K1
Hydroxyproline (Total) (Urine)	Voriconazole
Infliximab	Zarontin (Ethosuximide)
Iron (Urine)	Zinc - Serum
	Zinc - Urine

National Centre for Medical Genetics	
Cystic Fibrosis Genotyping Delta 508	Flip-1 PDGRF Mutation Study
Cytogenetics / FISH (Haematology / Oncology)	Fragile X
Familial Adenomatous Polyposis Coli (FAP)	Mitochondrial DNA Analysis
Familial Hypocaliuric Hypercalcaemia	

National Virus Reference Laboratory	
Atypical Pneumonia (Mycoplasma only)	HTLV1
Borrelia	Leptospirosis Serology
CMV PCR (Qualitative)	Measles Serology
CMV PCR (Viral Load - Quantitative)	Monkeypox
CMV (Cytomegalovirus) Serology	Mumps Serology
CSF viral screen	Mycoplasma
EBV PCR (Viral Load)	Mycoplasma serology
EBV (Epstein Barr Virus)Serology	Mycoplasma PCR
Enterovirus culture	Needlestick Injury Follow Up
Hepatitis A Serology	PCP (Pneumocystis Pneumonia) PCR
Hepatitis B Serology	Respiratory virus screen
Hepatitis C PCR (Viral Load)	Rubella Serology
Hepatitis C Serology	Syphilis Serology
Hepatitis E Serology	TORCH (Toxoplasma, Rubella, CMV &
HIV PCR (Viral Load)	Herpes)
HIV Serology	Toxoplasma Serology
HSV (Herpes Simplex Virus) Serology	Varicella Serology

Full details of tests provided by the NVRL are available at: http://nvrl.ucd.ie/usermanual

St James's - Biochemistry	
ACE (Angiotensin Converting Enzyme)	Porphyrin Screen / Erythrocyte Porphyrins
Faecal Elastase	Porphobilinogen
Methotrexate	Thyrotropin Receptor Antibodies (TRAb)

St James's – Cancer Molecular Diagnostics	
BCR-ABL	PML-RARA (Diagnostic & MRD)
JAK2 Mutation	

St James's - Endocrinology	
Beta hCG	Gastrin
Calcitonin	17-Hydroxprogesterone
Chromogranin A	Thyroglobulin Antibody

St James's – Haematology CPL	
Erythropoietin (EPO)	Methaemoglobin – Dapsone Therapy
Flow Cytometry (MRD)	Plasma Viscosity
G6PD (Glucose-6-phosphate dehydrogenase)	
Hereditary Spherocytosis	
Homocysteine	

St James's – Immunology *** Immunology tests require their own 7.5ml plain tube – tubes for chemical pathology testing cannot be split to accommodate immunology tests***	
Alpha Gliadin	CD8
Alzheimer's Biomarkers (Amyloid-β_{42}, Total Tau and Phospho Tau)	GAD (Glutamic Acid Decarboxylase)
	IL-6 and IL-8
Beta-2 Glycoprotein	Mast cell tryptase
C1 Esterase Inhibitor	Neutrophil Function Test
Ceruloplasmin	Oligoclonal Bands
Cholinesterase Inhibitor	Serum Free Light Chains
CD4	Tryptase

St James's – National Centre for Hereditary Coagulation Disorders	
Anti-Factor Xa Levels	HIT Screen

15.2 Appendix No. 2 Specimen Requirements

Peripheral blood samples are required unless otherwise stated.

The tests listed below are colour coded according to the Pathology Departments in Connolly Hospital which are responsible for processing or referring specimens. Samples should be stored at room temperature prior to dispatch to the laboratory unless other specific storage instructions are listed below.

CHB LAB Code	CHB Laboratory Responsible for Referral	Ext
BT	Blood Transfusion	5302
CP	Chemical Pathology	5311 / 5312
HAE	Haematology	5305 / 5351
MIC	Microbiology	5303

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
ABL	See BCR-ABL		HAE
ACA (Anti-Centromere Antibodies)	1 x 4.9ml Brown Tube	Beaumont – Immunology	MIC
ACE (Angiotensin Converting Enzyme)	1 x 7.5ml Plain Tube	SJH – Biochemistry	CP
Acetylcholine Receptor Antibodies (Anti-AchR)	1 x 7.5ml Plain Tube	Churchill Hospital, Oxford	MIC
ACR (Albumin Creatinine Ratio)	See Microalbumin		CP
ACTH	2 x 2.7ml EDTA Tube – on ice Send down immediately	Beaumont – Chem Path	CP
Acute leukaemia screen	1 x 2.7ml EDTA	Beaumont - Haematology	HAE
Acute Renal Failure Screen Includes: ANF, ANCA, GBM, C3/C4 & ASOT	1 x 4.9ml Brown Tube	Beaumont – Immunology	MIC
Adalimumab	1 x 7.5ml Plain Tube Send down immediately	Biomnis	CP
ADAMTS13	2 x 3ml Sodium Citrate Tubes 1 x 7.5 ml Plain Tube	Haemostasis Research Centre – London	HAE
Adenosine d-Aminase	1 x 7.5ml Plain Tube Mon-Wed only	Biomnis	CP
Adenosine d-Aminase (Pleural Fluid)	Pleural Fluid Mon-Wed only	St Thomas' Hospital, London	CP
ADH (Anti-diuretic hormone)	1 x 5ml EDTA + Aprotinin (bottles available from Chem Path). Send down immediately	Biomnis	CP
Adrenal Antibodies (ADR)	1 x 4.9ml Brown Tube	Beaumont – Immunology	MIC
AFP (Alpha Feto Protein)	1 x 7.5ml Plain Tube	Biomnis	CP
Albumin (also part of Bone Profile)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Alcohol (Ethanol)	1 x 2.7ml Fluoride Tube and / or Spot Urine	Beaumont - Toxicology	CP
Aldolase	Assay no longer available. Do CK + AST	N/A	CP
Aldosterone	2 x 2.7ml EDTA Tube Send down immediately	Beaumont – Chem Path	CP
Alkaline Phosphatase (ALP) (also part of Bone and Liver profiles)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Alkaline Phosphatase Isoenzymes	1 x 7.5ml Plain Tube Send down immediately	Biomnis	CP
Allergy Testing (RAST)	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Alpha 1 Anti-Trypsin Levels	1 x 7.5ml Plain Tube	Beaumont – Chem Path	CP
Alpha 1 Anti-Trypsin Phenotyping	1 x 7.5ml Plain Tube	Dept of Respiratory Med RCSI Beaumont	CP

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Alpha Beta Chain Ratio (Beta Thalassaemia)	3 x 2.7ml EDTA	Red Cell Centre – Molecular Diagnostics Laboratory Kings College Hospital, London	HAE
Alpha galactosidase	2 x 2.7ml EDTA Mon-Wed only Send immediately	Royal Manchester Hospital – Willink Biochemical Unit	CP
ALT (SGPT) (also part of Liver profile)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Aluminium	1 x 7.5ml Lithium Heparin Metal Free Tube taken with metal free needle. Bottles available from Chemical Pathology	Biomnis	CP
Alzheimer's Biomarkers (Amyloid-β_{42}, Total Tau and Phospho Tau)	**Please phone lab for protocol** 1 x CSF 1 x Referral Form Must arrive within 2 hours (centrifuged and frozen x2 aliquots)	SJH - Immunology	MIC
AMA	See Anti-Mitochondrial Antibodies		MIC
AMH (Anti-Mullerian Antibodies)	Test not available.		NA
Amikacin Levels	1 x 7.5ml Plain Tube	MMUH - Microbiology	MIC
Amino Acid Screen	1 x 7.5ml Lithium Heparin Tube and / or Spot Urine	Temple Street – Clinical Biochemistry	CP
Aminophylline	1 x 7.5ml Plain Tube	Beaumont – Chem Path	CP
Ammonia	2 x 2.7ml EDTA Tubes – on ice. Send to laboratory immediately.	AMNCH – Clinical Chemistry	CP
Amoebiasis Antibodies	1 x 7.5ml Plain Tube	Hospital for Tropical Diseases, London	MIC
Amylase (Serum)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Amylase (Urine)	Spot Urine	CHB – Chem Path	CP
Amyloid-β_{42}	See Alzheimer's Biomarkers		MIC
ANA	See ANF		MIC
ANCA	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anaplastic lymphoma kinase (ALK)	1 x 2.7ml EDTA Tube	NCMG - Crumlin	HAE
Androgens - Androstenedione, DHEAS, Testosterone	3 x 7.5ml Plain Tube	SJH – Endocrinology	CP
Androstenedione	See Androgens		CP
ANF (Anti-Nuclear Factor)	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-21 Hydroxylase	1 x 7.5ml Plain Tube	Churchill Hospital, Oxford	MIC
Anti-AMPA (alpha-amino-3-hydroxy-5-methylisoxazole-4-propionic acid)	1 x 4.9ml Brown Tube **and** 1 x CSF	Beaumont - Immunology	MIC
Anti-Carbonic Anhydrase Antibodies	1 x 7.5ml Plain Tube	Biomnis	MIC
Anti-Cardiolipin Antibodies	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Anti-AQP4 (Anti-aquaporin 4)	1 x 7.5ml Plain Tube	Department of Immunology, Churchill hospital, Oxford	MIC
Anti-CCP	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-Centromere Antibodies	1 x 4.9ml Brown Tube	Beaumont – Immunology	MIC
Anti-CRMP5/CV2	See Paraneoplastic Neurological Syndrome Markers		MIC
Anti-Cytotoxic Antibodies	1 x 7.5ml Plain Tube Separate sample required.	Beaumont – Histocompatibility & Immunogenetics	MIC
Anti-dsDNA Antibodies	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-Endomysial (IgA) Antibodies (EMA)	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-Endomysial (IgG) Antibodies (EMA)	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-Epileptic Drugs	1 x 7.5ml Plain Tube	Beaumont – Chem Path	CP
Anti-Extractable Nuclear Antibodies (ENA) includes anti-Ro, La, RNP, Sm, Jo-1 & Scl-70	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-Factor Xa Levels	2 x 3ml Sodium Citrate Tubes 4 Hours Post Inohep Send to laboratory immediately. Must arrive in lab before 12md Mon - Fri only	SJH - NCHCD	HAE
Anti-Fungals	1 x 7.5ml Plain Tube	Mycology Reference Lab, Bristol	MIC
Anti-$GABA_AR$ (gamma-aminobutyric acid A receptor)	1 x CSF or 1 x 7.5ml Plain Tube	Churchill Hospital, Oxford	MIC
Anti-Ganglioside Antibodies (Anti-GD1a, Anti-GD1b, Anti-GM1, Anti-GQ1b)	1 x 7.5ml Plain Tube	Doctor's Laboratory, London (Churchill Hospital, Oxford – Neurology samples)	MIC
Anti-Gastric Parietal Cell Antibodies	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-GBM (Glomerular Basement Membrane) Antibodies	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-GD1a	See Anti-Ganglioside Antibodies		MIC
Anti-GD1b	See Anti-Ganglioside Antibodies		MIC
Anti-Gliadin	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-Glycine Receptor Antibodies	1 x CSF or 1 x 7.5ml Plain Tube	Churchill Hospital, Oxford	MIC
Anti-GlyR	See Anti-Glycine Receptor Antibodies		MIC
Anti-GM1	See Anti-Ganglioside Antibodies		MIC
Anti-GQ1b	See Anti-Ganglioside Antibodies		MIC
Anti-Histone Antibodies	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-HMG-CoA Reductase Antibody	1 x 7.5ml Plain Tube	Churchill Hospital, Oxford	MIC
Anti-Intrinsic Factor Antibodies	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-Islet Cell Antibodies	1 x 7.5ml Plain Tube	Doctor's Laboratory, London	MIC

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Anti-Jo-1	see Anti-Extractable Nuclear Antibodies (ENA)		MIC
Anti-La	see Anti-Extractable Nuclear Antibodies (ENA)		MIC
Anti-LKM (Liver-Kidney Microsomal) Antibodies	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-MAG (Myelin-associated Glycoprotein) Antibodies	1 x CSF or 1 x 7.5ml Plain Tube	Churchill Hospital, Oxford	MIC
Anti-Mitochondrial Antibodies (including M2 subtyping)	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-MOG (Myelin Oligodendrocyte Glycoprotein) Antibodies	1 x CSF or 1 x 7.5ml Plain Tube	Churchill Hospital, Oxford	MIC
Anti-MPO (Myeloperoxidase) Antibodies	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-MuSK Antibodies	1 x CSF or 1 x 7.5ml Plain Tube	Churchill Hospital, Oxford	MIC
Anti-Neuronal Antibodies (Anti-Hu, Yo)	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-Neutrophil Antibody	1 x 7.5ml Plain Tube (centrifuged and frozen)	Biomnis	MIC
Anti-NMDA (N-methyl-D-aspartate) Antibodies	1 x 4.9ml Brown Tube **and** 1 x CSF	Beaumont - Immunology	MIC
Anti-Ovarian Antibodies	1 x 7.5ml Plain Tube	Doctor's Laboratory, London	MIC
Anti-Parathyroid Antibody	1 x 7.5ml Plain Tube	Immunology - Northern General Hospital, Sheffield	MIC
Anti-Parietal Cells	See Anti-Gastric Parietal Cell Antibodies		MIC
Anti-Phospholipid Antibodies	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-PLA 2R (Phospholipase A2 Receptor) Antibody	1 x 7.5ml Plain Tube	Dept of Immunology, Northern General Hospital, Sheffield	MIC
Anti-PR3 Antibody (Protinease 3)	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-Purkinje Cell Antibodies	See Paraneoplastic Neurological Syndrome Markers		MIC
Anti-Ri	See Paraneoplastic Neurological Syndrome Markers		MIC
Anti-Ribosomal-P-Protein Antibodies	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-RNP	See Anti-Extractable Nuclear Antibodies (ENA)		MIC
Anti-Ro	See Anti-Extractable Nuclear Antibodies (ENA)		MIC
Anti-Scleroderma Antibodies	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-Scl-70	See Anti-Extractable Nuclear Antibodies (ENA)		MIC
Anti-Skin Antibodies	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-Sm	See Anti-Extractable Nuclear Antibodies (ENA)		MIC
Anti-SMA	See Anti-Smooth Muscle Antibodies		MIC
Anti-Smooth Muscle Antibodies	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-SPGP Antibodies	See Anti-MAG Antibodies		MIC
Anti-Thrombin III (AT3)	1x 3ml Sodium Citrate Tube Send to laboratory immediately.	Beaumont - Haematology	HAE
Anti-Thyroid Peroxidase (TPO)	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Anti-Tissue Transglutaminase Antibody (tTG)	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Anti-TNF alpha levels and Antibodies	1 x 7.5ml Plain Tube Frozen within 4 hours (Trough)	Biomnis	MIC
Anti-Topoisomerase (Anti-Scl-70)	See Anti-Extractable Nuclear Antibodies (ENA)		MIC
Anti-Tr	See Paraneoplastic Neurological Syndrome Markers		MIC
Anti-TSH Receptor Antibodies	See Thyrotropin Receptor Antibodies (TRAb)		CP
APCR (Activated Protein C Resistance)	1 x 3ml Sodium Citrate Tube Send down immediately.	Beaumont - Haematology	HAE
Apixaban level	2 x 3ml Sodium Citrate Tube	SJH - Haematology	HAE
APTT (Activated Partial Thromboplastin Time)	1 x 3ml Sodium Citrate Tube Sample must be < 4 hours old	CHB - Haematology	HAE
Aquaporin Antibodies	1 x CSF or 1 x 7.5ml Plain Tube	Churchill Hospital, Oxford	MIC
Aquaporin 4	See Aquaporin Antibodies		MIC
Arterial Blood Gas Includes: Base Excess, Oxygen Saturation, pCO2, pH, pO2, Standard Bicarbonate	1 x 3ml Air-Free Heparinised Syringe – Arterial Blood should be collected anaerobically. Labelled & on ice. Do not send in PTS.	CHB – Chemical Pathology	CP
ASOT	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Aspergillus	1 x 7.5ml Plain Tube	Beaumont - Microbiology	MIC
AST (SGOT)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Atypical Pneumonia (Mycoplasma only)	1 x 7.5ml Plain Tube (for patients <20 years old only)	NVRL	MIC
Autoimmune Encephalitis Screen (NMDA, LGI1, CAPSR2, DPPX, AMPA, GABA)	1 x 4.9ml Brown Tube **and** 1 x CSF	Beaumont - Immunology	MIC
Autoimmune Liver Screen	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Avian Antibodies	1 x 4.9ml Brown Tube	Beaumont – Immunology	MIC
Azothioprine (Imuger, Imuran)	2 x 7.5ml Lithium Heparin* Send down immediately. Mon-Wed only	Biomnis	CP
Barbiturates	1 x 7.5ml Plain Tube	Beaumont - Toxicology	CP
Bartonella (Cat scratch)	1 x 7.5ml Plain Tube	Biomnis	MIC
Base Excess	See Arterial Blood Gas		CP
B cell lymphoproliferative screen	1 x 2.7ml EDTA Tube	Beaumont - Haematology	HAE
BCR-ABL	1 x 2.7ml EDTA Tube Blood or 1 x RPMI Bone Marrow. CMD request form must be completed.	SJH – CMD	HAE
Bence Jones Protein (BJP) (Urine Protein Electrophoresis)	Plain 24 Hr Urine	Beaumont – Chem Path	CP
Benzodiazepine	1 x 7.5ml Plain Tube	Beaumont - Toxicology	CP
Beta-D-Glucan	1 x 7.5ml Plain Tube	SJH - Virology	MIC
Beta hCG	1 x 7.5ml Plain Tube	SJH – Endocrinology	CP

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Beta Hydroxybutyrate	1 x 2.7 ml Fluoride Tube - on ice	Sheffield	CP
Beta-2 Glycoprotein	1 x 7.5ml Plain Tube	SJH - Immunology	CP
Beta-2-Microglobulin	1 x 4.9ml Brown Tube	Beaumont - Immunology	CP
Bicarbonate (Serum)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Bilirubin Direct (Conjugated)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Bilirubin Total	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Blastomycosis (Blastomyces dermatitidis)	1 x 7.5ml Plain Tube	Mycology Reference Lab, Bristol	MIC
Blood Cultures	Aerobic + Anaerobic blood culture bottles	CHB - Micro	MIC
Blood Film	1 x 2.7ml EDTA Tube Contact laboratory if urgent.	CHB - Haematology	HAE
Bone Biomarkers	Contact Chemical Pathology	SVUH – Chem Path	CP
Bone Profile (Albumin, Alkaline Phosphatase, Calcium, Phosphate, Protein)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Borrelia	1 x 7.5ml Plain Tube	NVRL	MIC
Brucella	1 x 7.5ml Plain Tube	Liverpool Clinical Laboratories	MIC
Bullous Pemphigus	See Anti-Skin Antibodies		MIC
Bullous Pemphigus Epitope/Antigen (Indirect Immunofluorescence)	1 x Referral Form 1 x 7.5ml Plain Tube	Immunodermatology Lab, St Thomas' Hospital, London	MIC
C Peptide	1 x 7.5ml Plain Tube Send down immediately.	Beaumont – Chem Path	CP
C1 Esterase Inhibitor	1 x 7.5ml Plain Tube	SJH - Immunology	CP
C1q Inhibitor	1 x 7.5ml Plain Tube	Sheffield	CP
C3 and C4 Esterase	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
C12	1 x 7.5ml Plain Tube	Doctor's Laboratory, London	MIC
CA125	1 x 7.5ml Plain Tube	Biomnis	CP
CA15.3	1 x 7.5ml Plain Tube	Biomnis	CP
CA19.9	1 x 7.5ml Plain Tube	Biomnis	CP
CA50	1 x 7.5ml Plain Tube	Biomnis	CP
Calcitonin	1 x 7.5ml Plain Tube Send down immediately.	SJH – Endocrinology	CP
Calcium (Serum) (also part of Bone Profile)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Calcium (Urine)	24 Hr Urine with acid added	CHB – Chem Path	CP
Calcium, Ionised	Contact Chemical Pathology for details	Biomnis	CP
Calculi	Renal Stones	Biomnis	CP
CAL-R (Calreticulin)	1 x 2.7ml EDTA Tube Blood or 1 x RPMI Bone Marrow Send laboratory immediately.	Beaumont - Haematology	HAE
Campylobacter Serology (for Guillain-Barré Syndrome)	1 x 7.5ml Plain Tube	Biomnis	MIC
cANCA	1 x 4.9ml Brown Tube	Beaumont – Immunology	MIC

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Carbamazepine	See Anti-Epileptic Drugs		CP
Carboxy Haemoglobin	1 x 3ml Air-Free Heparinised Syringe – Arterial Blood	CHB – Emergency Dept / ICU	N/A
	If blood gas analyser in ED & ICU is out of order 1 x 2.7ml EDTA tube required.	Beaumont – Chem Path	CP
Carcinoembryonic Antigen (CEA)	1 x 7.5ml Plain Tube	Biomnis	CP
Cardiac Enzymes	See Creatine Kinase		CP
Catecholamines	See Urinary Catecholamines		CP
Cat Scratch	see Bartonella		MIC
CD4	1 x 2.7ml EDTA Tube	SJH - Immunology	MIC
CD 8	1 x 2.7ml EDTA Tube	SJH - Immunology	MIC
CDT (Carbohydrate-Deficient Transferrin)	1 x 7.5ml Plain Tube	Biomnis	CP
Centromere Antibodies	See Anti-Centromere Antibodies		MIC
Ceruloplasmin	1 x 7.5ml Plain Tube	SJH - Immunology	CP
CH50	1 x 4.9ml Brown Tube Send to Lab immediately. Indicate clearly on request form.	Beaumont – Immunology	MIC
Chimerism	2 x 2.7ml EDTA Tube Blood	SJH - Haematology	HAE
Chlamydia Serology	1 x 7.5ml Plain Tube	Biomnis	MIC
Chloride (Cl)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Cholesterol (also part of Lipid Profile)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Cholinesterase Inhibitor	1 x 7.5ml Plain Tube	SJH - Immunology	CP
Chromium	1 x 7.5 ml Lithium Heparin Metal Free Tube taken with metal free needle. Bottles available from Chemical Pathology	Biomnis	CP
Chromogranin A	1 x 7.5ml Plain Tube	SJH - Endocrinology	CP
Chromogranin B	1 x 5ml EDTA + Aprotinin Tube Must arrive in laboratory within 1 hr of sample collection.	Biomnis	CP
Chromosome Analysis	1 x 7.5 ml Lithium Heparin Monday to Wednesday only. Consent form must be completed.	Manchester Centre of Genomic Medicine	CP
Citrate (Urine)	Plain 24 Hr Urine - must be refrigerated during collection	Biomnis	CP
CJD (Creutzfeldt-Jakob Disease)	See Protein 14.3.3		MIC
cKIT	2 x 2.7ml EDTA Tube Blood	Wessex Regional Genetics Lab, Wiltshire	HAE
Chlamydia Antibodies	1 x 7.5ml Plain Tube	Biomnis	MIC
Clozapine	2 x 2.7ml EDTA	Biomnis	CP

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
CMV (*Cytomegalovirus*) PCR (Qualitative)	1 x Stool sample	NVRL	MIC
CMV (Cytomegalovirus) PCR (Viral Load - Quantitative)	1 x 2.7ml EDTA Tube Must arrive within 6 hours of venepuncture.	NVRL	MIC
CMV Serology	1 x 7.5ml Plain Tube	NVRL	MIC
CO_2, serum (total / venous)	See Bicarbonate		CP
Cysteine	Urine 24 hour collection No additive	Biochemistry - Temple Street	CP
Colistin Levels	1 x 7.5ml Plain Tube	Antimicrobial Reference Laboratory, Bristol	MIC
Complement C2	1 x 7.5ml Plain Tube	Dept of Immunology, Northern General Hospital, Sheffield	MIC
Coagulation Screen (PT, INR, APTT)	1 x 3ml Sodium Citrate Tube Sample must be < 4 hours old	CHB - Haematology	HAE
Coccidiomycoses (Coccidioides Serology)	1 x 7.5ml Plain Tube	Mycology Reference Lab, Bristol	MIC
Coeliac Screen	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Colistin Levels	1 x 7.5ml Plain Tube	Antimicrobial Reference Laboratory	MIC
Complement C3	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Complement C4	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Complement CH50	1 x 4.9ml Brown Tube Send down immediately. Indicate clearly on request form.	Beaumont - Immunology	MIC
Copper (Serum)	1 x 7.5 ml Lithium Heparin Metal Free Tube taken with metal free needle. Bottles available from Chemical Pathology	Biomnis	CP
Copper (Urine)	Plain 24 Hr Urine Container	Biomnis	CP
Corrected Calcium / CORRCA (Serum)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Cortisol (Serum)	1 x 7.5ml Plain Tube	CHB – Endo	CP
Cortisol (Urine)	Plain 24 Hr Urine Container	Biomnis	CP
Coxiella burnettii (Q Fever)	1 x 7.5ml Plain Tube	PHE Rare and Imported Pathogens Laboratory	MIC
Coxsackie Virus Culture	See *Enterovirus* Culture		MIC
Coxsackie Virus Serology	1 x 7.5ml Plain Tube	Biomnis	MIC
C-Reactive Protein (CRP)	1 x 7.5ml Plain Tube Contact Chem Path Lab if result >90 to request dilution for exact value.	CHB – Chem Path	CP
Creatine Kinase (CK)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Creatinine (Serum) (also part of Renal Profile)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Creatinine (Urine)	Spot Urine	CHB – Chem Path	CP
Creatinine Clearance	Plain 24 Hr Urine Serum creatinine must be sent during 24hr collection for calculation.	CHB – Chem Path	CP
Cross Linked Collagen (CTX)	Contact Chemical Pathology for details. Part of a screen.	SVUH - Metabolic Lab	CP
Cryoglobulin	1 x 7.5ml Plain Tube Send at 37ºC (in a thermos flask containing water between 38-40°C – use thermometer) to lab immediately.	CHB – Chem Path	CP
Cryptococcal Antigen	1 x 7.5ml Plain Tube	MMUH - Micro	MIC
CSF Flow Cytometry (for malignancy)	5ml CSF drawn directly into 10ml RPMI (CSF must be added into RPMI within 1 hour. RPMI available in HAEM). Sample may be fridged for 18 hours.	SJH – Immunophenotyping, Haematology 01-4162048	MIC
CSF Neurodegeneration Biomarker Assay	See Alzheimer's Biomarkers		MIC
CSF Orexin levels	1 x CSF	Churchill Hospital, Oxford	MIC
CSF Viral Screen (*Herpes simplex* 1 & 2, *Varicella zoster*, *Enterovirus*. – *CMV, EBV* may also be requested additionally)	1 x CSF	NVRL	MIC
CTD (Connective Tissue Disease)	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Cyclosporine	1 x 2.7ml EDTA Tube	Beaumont – Chem Path	CP
Cystatin C	1 x 7.5ml Plain Tube	Biomnis	CP
Cystic Fibrosis Genotyping Delta 508	2 x 2.7ml EDTA Tube Send down immediately. NCMG patient form to be completed.	NCMG	CP
Cytogenetics (FISH)	1 x RPMI Bone Marrow. Contact Haematology Laboratory for RPMI tubes. Sheffield Request form must be completed	Sheffield Diagnostic Genetics Service	HAE
Dabigatran	2 x 3ml Sodium Citrate Tube	SJH - Haematology	HAE
D-Dimer	1 x 3ml Sodium Citrate Tube Sample must be < 4 hours old	CHB – Haematology	HAE
delta-ALA (Aminolevulinic Acid)	See Porphyrin Screen		CP
Deoxypyridinoline	Contact Chemical Pathology for details	Biomnis	CP

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Dexamethasone Suppression Test	See Cortisol (serum)		CP
DHEAS	See Androgens		CP
Digoxin	1 x 7.5ml Plain Tube	Beaumont – Chem Path	CP
Diphtheria	1 x 7.5ml Plain Tube	PHE RVPBRU	MIC
Direct Antiglobulin Test (DAT / Direct Coombs Test / DCT)	1 x 2.7ml EDTA Tube	CHB – Blood Transfusion	BT
Direct Immunofluorescence (DIF) on Skin Biopsies	1 x Skin biopsy transported to lab on damp gauze	Beaumont - Immunology	MIC
Dopamine (Urine)	See Urinary Catecholamines		CP
Drug Screen	1 x 7.5ml Plain Tube 1 x 2.7ml Fluoride Tube Spot Urine	Beaumont - Toxicology	CP
EMA (hereditary spherocytosis)	1 x 2.7ml EDTA Blood	Kings College London	HAE
EBV (Epstein Barr Virus) PCR (Viral Load)	1 x 2.7ml EDTA Centrifuge within 24hrs and freeze	NVRL	MIC
EBV Serology	1 x 7.5ml Plain Tube	NVRL	MIC
Echinococcus	1 x 7.5ml Plain Tube	Parasitology Lab, Liverpool School of Tropical Medicine	MIC
eGFR (also part of Renal Profile)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
ELANE (ELA2)	2 x 2.7ml EDTA Tubes	Great Ormond St	HAE
Electrophoresis	See Protein Electrophoresis (Serum / Urine)	CP	
	See Haemoglobin Electrophoresis	HAE	
Entamoeba histolytica Serology	1 x 7.5ml Plain Tube	Liverpool School of Tropical Medicine	MIC
Enterovirus Culture	1 x Stool	NVRL	MIC
Enterovirus PCR CSF	See CSF viral screen		
Enterovirus (Polio Virus / Coxackie Virus / Echo Virus)	1 x 7.5ml Plain Tube	Biomnis	MIC
Epanutin	See Anti-Epileptic Drugs		CP
Epilum	See Anti-Epileptic Drugs		CP
EPO	See Erythorpoietin Levels		HAE
ERIC	1 x 2.7ml EDTA Tube Blood or 1 x RPMI Bone Marrow (Contact Haematology for RPMI tubes.)	Molecular Haematology Lab, Belfast City Hospital	HAE
Erythrocyte Porphyrins	See Porphyrin Screen		CP
Erythropoietin (EPO)	1 x 7.5ml Plain Tube	SJH - Haematology	HAE
ESR (Erythrocyte Sedimentation Rate)	1 x 2.7ml EDTA Tube Sample must be < 4hrs old	CHB - Haematology	HAE
Ethambutol Levels	**Please phone Microbiology Lab for protocol.** 1 x 2.7ml EDTA Tube or 1 x 7.5ml Plain Tube 2 hrs and 6 hrs post dose	Cardiff Toxicology Laboratories, Penarth	MIC

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Ethanol	See Alcohol		CP
Ethylene Glycol	1 x 7.5ml Plain Tube	Toxicology Laboratory, City Hospital, Birmingham	CP
Exon 12 Mutation	See JAK2 Exon 12 Mutation		HAE
Extrinsic Allergic Alveolitis Screen	See Farmer's Lung		MIC
Fabrys Disease	2 x 2.7ml EDTA Tube Mon-Wed only	Royal Manchester Hospital - Willink Biochemical Unit	CP
Factor Assays FVIIIC, FXIC FXII, FX, FXI, FII, FV, FVII, FX	1 x 3ml Sodium Citrate Tube per factor assay; Maximum of 4 x 3ml Sodium Citrate Tubes required. Send to laboratory immediately.	MedLab Pathology	HAE
Factor V Leiden	1 x 2.7ml EDTA Tube if APCR is abnormal (If APCR result is unknown 1 x 3ml Sodium Citrate Tube also required)	Beaumont - Haematology	HAE
Faecal Calprotectin	1 x Stool	Biomnis	MIC
Faecal Elastase	Random Faeces	SJH - Biochemistry	CP
Faecal Ova/Parasites	1 x Stool	Biomnis	MIC
Familial Adenomatous Polyposis Coli (FAP)	2 x 2.7ml EDTA Tubes Send to laboratory immediately. Mon-Thurs only	NCMG	CP
Familial Hypocaliuric Hypercalcaemia	2 x 2.7ml EDTA Tubes	NCMG	CP
Fanconi anaemia screen	2 x 5ml lithium Heparin Kings College request form must be completed	Molecular diagnostics - Kings College Hospital	HAE
Farmer's Lung	1 x 7.5ml Plain Tube	Biomnis	MIC
FBC (Full Blood Count)	1 x 2.7ml EDTA Tube	CHB - Haematology	HAE
Ferritin (also part of Haematinics)	1 x 7.5ml Plain Tube	CHB – Endo	CP
Fibrinogen, Clauss	1 x 3ml Sodium Citrate Tube	CHB – Haematology	HAE
FISH	See Cytogenetics		HAE
FK506	See Tacrolimus		CP
Flecainide	1 x 7.5ml Plain Tube Send to laboratory immediately.	Biomnis	CP
Flip-1 PDGRF Mutation Study	1 x RPMI Bone Marrow or 1 x 7.5ml Lithium Heparin Tube. Contact Haematology Lab for tubes. NCMG Request for Genetic Analysis must be completed.	NCMG	HAE
Flow Cytometry - Diagnostic	1 x 2.7ml EDTA Blood or 1 x RPMI Bone Marrow (contact Haematology Lab for tubes). Clinical details essential.	Beaumont - Haematology	HAE

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Flow Cytometry – MRD (Minimal Residual Disease) CLL	2 x 2.7ml EDTA Blood or 1 x RPMI Bone Marrow (contact Haematology Lab for tubes). Clinical details essential.	SJH - Haematology	HAE
Flu	See Influenza A and B		MIC
Folate (also part of Haematinics)	1 x 7.5ml Plain Tube	CHB – Endo	CP
Fragile X	1 x 7.5ml Lithium Heparin Tube + 2 x 2.7ml EDTA Tube. Send to laboratory immediately. Mon-Thurs only Lithium Heparin Bottles available from Chemical Pathology	NCMG	CP
Francisella tularensis	1 x 7.5ml Plain Tube	PHE - RIPL	MIC
Free Light Chains	See Serum Free Light Chains		
Free T3 (Triiodothyronine)	1 x 7.5ml Plain Tube	CHB – Endo	CP
Free T4 (FT4) (also part of Thyroid Function Tests)	1 x 7.5ml Plain Tube	CHB – Endo	CP
Frisium	See Benzodiazepine		CP
Fructosamine	1 x 7.5ml Plain Tube	Coombe - Chem Path	CP
FSH (Follicle Stimulating Hormone)	1 x 7.5ml Plain Tube	CHB – Endo	CP
Fungal Culture	1 x Skin Scrapings, Nail, Hair etc	Biomnis	MIC
Fungal Serology	1 x 7.5ml Plain Tube	Mycology Reference Laboratory, Bristol	MIC
Furosemide	1 x 7.5ml Plain Tube	Biomnis	CP
G6PD (Glucose-6-phosphate dehydrogenase	1 x 2.7ml EDTA Tube	SJH - Haematology	HAE
Gabapentin (Neurontin)	1 x 7.5ml Plain Tube Send to laboratory immediately.	Biomnis	CP
GAD (Glutamic acid decarboxylase)	1 x 7.5ml Plain Tube	SJH – Immunology (Churchill Hospital – Neurology samples)	MIC
Galactomannan Antigen	1 x 7.5ml Plain Tube or BAL	SJH - Virology	MIC
Ganglioside Antibodies	See Anti-Ganglioside (Anti-GD1a, Anti-GD1b, Anti-GM1, Anti-GQ1b)		MIC
Gastrin	1 x 7.5ml Plain Tube - on ice. Patient must be fasting 16 hrs. No water allowed.	SJH – Endocrinology	CP
Gentamicin	1 x 7.5ml Plain Tube State if sample is Peak or Trough and Last Dose details on request form.	CHB – Chem Path	CP
GGT (also part of Liver Profile)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Giardia Antibody	1 x 7.5ml Plain Tube	Liverpool School of Tropical Medicine	MIC

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Glivec (Imatinib) Level	1 x 5 ml Heparin	Centre Hospitalier Pellegrin-Tripode, France	HAE
Glucagon	1 x 5ml EDTA + Aprotinin Send to laboratory immediately.	Biomnis	CP
Glucocerebrosidase (Gaucher Disease Testing)	2 x 2.7ml EDTA	St Marys Hospital - Manchester	HAE
Glucose (Plasma)	1 x 2.7 Fluoride Tube	CHB – Chem Path	CP
Glucose (Urine)	Spot Urine	CHB – Chem Path	CP
Glucose Tolerance Test	Fasting & 2 Hr Post Prandial 1 x 2.7 Fluoride Tube for each	CHB – Chem Path	CP
Granulocyte Antibodies	Refer to Section 11.14. NBS request form required. Contact BT Lab	NBS - Bristol	BT
Growth Hormone	1 x 7.5ml Plain Tube	Beaumont – Chem Path	CP
Group & Crossmatch	1 x 7.5ml EDTA Tube	CHB – Blood Transfusion	BT
Group & Screen (Group & Save, Group & Hold, Type & Screen)	1 x 7.5ml EDTA Tube	CHB – Blood Transfusion	BT
5-Hydroxyindole Acetic Acid (5HIAA)	24 Hr Urine Light Protected Container + Acid Obtain from Chemical Pathology Lab.	Beaumont – Chem Path	CP
21-Hydroxylase antibodies	See Anti-21-Hydroxylase		MIC
17-Hydroxyprogesterone	1 x 7.5ml Plain Tube	SJH – Endocrinology	CP
Haematinics Includes: Ferritin, Folate, Vitamin B12	1 x 7.5ml Plain Tube	CHB – Endocrinology	CP
Haemochromatosis HFE Gene, C282Y, H63D	2 x 2.7ml EDTA Tubes Separate samples required. Consent form must be signed by patient – available from Haematology CHB	Beaumont – Haematology	HAE
Haemoglobinopathy Screen (Haemoglobin Electrophoresis)	1 x 2.7ml EDTA Tube	MMUH - Haematology	HAE
Haemolytic Screen (FBC, Reticulocytes, Haptoglobins, Direct Antiglobulin Test)	2 x 2.7ml EDTA Tubes Patient must not have been transfused in past 3 months	CHB - Haematology	HAE
Ham Test	See PNH		HAE
Haptoglobin	1 x 2.7ml EDTA Tube	CHB - Haematology	HAE
HAX1	2 x 2.7ml EDTA Tubes	Great Ormond St	HAE
Hb H disease (alpha thalassaemia)	1 x 2.7ml EDTA Tube	Red cell centre – Kings College Hospital	HAE
HbA1c	1 x 2.7ml EDTA Tube	CHB – Chem Path	CP
HDLC (also part of Lipid Profile)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
HE4 (Human epididymis protein 4)	1 x 7.5ml Plain Tube – on ice. Must arrive in the laboratory within 30 mins of specimen collection.	Biomnis	CP

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Heinz Bodies	1 x 2.7ml EDTA Tube	MMUH - Haematology	HAE
Hepcidin Gene	1 7.5ml Plain Tube	MedLab Pathology	HAE
Hepcidin levels	2 x 2.7mL EDTA	MedLab Pathology	HAE
Hepatitis A Serology	1 x 7.5ml Plain Tube	NVRL	MIC
Hepatitis B Serology	1 x 7.5ml Plain Tube	NVRL	MIC
Hepatitis C PCR (Viral Load)	1 x 7.5ml Plain Tube **or** 1 x 2.7ml EDTA Centrifuge and freeze within 24hrs	NVRL	MIC
Hepatitis C Serology	1 x 7.5ml Plain Tube	NVRL	MIC
Hepatitis E Serology	1 x 7.5ml Plain Tube	NVRL	MIC
Hereditary Spherocytosis	1 x 2.7ml EDTA Tube	SJH – Special Haematology	HAE
Histoplasma Serology	1 x 7.5ml Plain Tube	Mycology Reference Lab, Bristol	MIC
HIT Screen (Heparin Induced Thrombocytopenia)	2 x 3ml Sodium Citrate Tubes 1 x 7.5ml Plain Tube Only requested if HIT Score >4 Must arrive in lab before 12md Mon - Fri only	SJH - NCHCD	HAE
HIV PCR (Viral Load)	1 x 2.7ml EDTA **and** 1 x 7.5ml Plain Tube Centrifuge and freeze within 24hrs Verbal consent must be obtained and documented in patient notes	NVRL	MIC
HIV Serology	1 x 7.5ml Plain Tube Verbal consent must be obtained and documented in the patient notes.	NVRL	MIC
HLA B27	1 x 7.5ml EDTA Tube NHIRL request form required. Contact BT Lab.	NHIRL - IBTS	BT
HMG-CoA Reductase Antibody	See Anti- HMG-CoA Reductase Antibody		MIC
Homocysteine	2 x 2.7ml EDTA Tubes - on ice. Send to laboratory immediately.	SJH - Haematology	CP
H. pylori Antigen	1 x Stool <72 hours old	Biomnis	MIC
HSV (Herpes Simplex Virus) Serology	1 x 7.5ml Plain Tube + DNA - swab	NVRL	MIC
HTLV1 (Human T-Lymphotropic Virus 1)	Serology: 1 x 7.5ml Plain Tube PCR: 1 x 2.7ml EDTA Tube	NVRL	MIC
Humira	See Adalimumab		CP
Hydatid cyst	See Echinococcus		MIC
Hydroxyproline (Total)	Fasting Spot or Early Morning Urine. Diet restrictions. Send to laboratory immediately.	Biomnis	CP
IGF1	1 x 7.5ml Plain Tube Send to laboratory immediately.	Beaumont – Chem Path	CP
IGF11	1 x 7.5ml Plain Tube	Royal Surrey County Hospital, Guilford	CP

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
IGRA (Interferon-Gamma Release Assay)	See Quantiferon		MIC
IgVH Mutation Analysis (immunoglobulin gene)	1 x 2.7ml EDTA Tube	Molecular Haematology - Belfast City Hospital	HAE
IL-4 and IL-5	1 x 7.5ml Plain Tube frozen (Research)	FAO Dr. Dossinger, Principle Clinical Scientist, Dept Biochemistry and Immunology, Level 4, Addenbrookes Hospital, Cambridge, CB2 OQQ 0044-1223348145	MIC
IL-6 and IL-8	1 x 7.5ml Plain Tube Frozen within 6 hours	St James's - Immunology	MIC
Immunoglobulin – IgA (when requested with tTG)	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Immunoglobulin - IgA, IgG, IgM	1 x 7.5ml Plain Tube	Beaumont – Chem Path	CP
Immunoglobulin - IgE	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Immunoglobulin Gene Rearrangements	1 x 2.7ml EDTA Tube Blood or 1 x RPMI Bone Marrow (Contact Haematology for RPMI tubes.)	Molecular Haematology Lab, Belfast City Hospital	HAE
Infectious Mononucleosis Screen (Monospot)	1 x 2.7ml EDTA Tube Contact laboratory if urgent.	CHB - Haematology	HAE
Inflammatory Arthritis Antibodies Includes: RF, CCP, ANF	2 x 4.9ml Brown Tube Both bottles at least 50% full	Beaumont - Immunology	MIC
Infliximab	1 x 7.5ml Plain Tube Send to laboratory immediately.	Biomnis	CP
Influenza A and B	1 x *Influenza* Swab (available from Micro). Nasopharyngeal.	CHB – Micro during Flu season NVRL all other times	MIC
Inhibin A+B	1 x 7.5ml Plain Tube Send to laboratory immediately.	Super Regional Protein Ref. Unit – Sheffield	CP
INR	1 x 3ml Sodium Citrate	CHB - Haematology	HAE
Insulin	1 x 7.5ml Plain Tube – on ice. Send to laboratory immediately.	Beaumont – Chem Path	CP
Insulin Antibodies	1 x 7.5ml Plain Tube	Doctor's Laboratory, London	MIC
Interferon alpha, gamma (INF-α, INF-γ)	1 x 7.5ml Plain Tube	Biomnis (France)	MIC
Interferon beta (INF-β)	1 x 7.5ml Plain Tube (frozen)	Biomnis (France)	MIC
Interferon gamma production	See Quantiferon		MIC
Intrinsic Factor	See Anti-Intrinsic Factor Antibodies		MIC
Ionised Calcium	Bottle available from Chemical Pathology. Sample must reach the laboratory within 30 mins of sample collection.	Biomnis	CP

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Iron (Serum) (also part of Iron Studies)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Iron (Urine)	Plain 24Hr Urine	Biomnis	CP
Iron Saturation	See Unsaturated Iron Binding Capacity		CP
Iron Studies (Iron, Unsaturated Iron Binding Capacity (UIBC), Transferrin Saturation)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Islet Cell Antibodies	See Anti-Islet Cell Antibodies		MIC
Isoniazid Levels	**Please phone Microbiology Lab for protocol.** 1 x 2.7ml EDTA Tube or 1 x 7.5ml Plain Tube 2 hrs and 6 hrs post dose	Cardiff Toxicology Laboratories, Penarth	MIC
Itraconazole Levels	See Anti-Fungals		MIC
JAK2 Mutation (MPN panel)	1 x 2.7ml EDTA Tube Blood or 1 x RPMI Bone Marrow	Beaumont - Haematology	HAE
JAK2 Exon 12 Mutation	4 x 2.7ml EDTA Tubes – Blood or 1 x RPMI Bone Marrow	Addenbrookes Hospital Cambridge	HAE
JC Virus	**Please phone lab for request form and blood sampling bottle** (send out instructions for lab on request form)	Unilabs Nygaardsvej 32 DK -2100 Copenhagen Denmark	MIC
Kappa Lambda Ratio (KLR)	See Serum Free Light Chains		CP
Karyotyping	See Chromosome Analysis		CP
Kleihauer test	1 x 2.7ml EDTA Tube Ideally taken >30mins <4hrs post sensitising event	Maternity hospital patient normally attends	HAE
Lactate	1 x 2.7ml Fluoride Tube	CHB – Chem Path	CP
Lamictal	1 x 7.5ml Plain Tube	Biomnis	CP
LDH	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
LDLC (also part of Lipid Profile)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Lead (Serum)	1 x 7.5ml Lithium Heparin Metal Free Tube taken with metal free needle. Bottles available from Chemical Pathology	Biomnis	CP
Lead (Urine)	Plain 24Hr Urine	Biomnis	CP
Legionella Serology (Screen)	1 x 7.5ml Plain Tube	Biomnis	MIC
Legionella Serology (Confirmation)	1 x 7.5ml Plain Tube	PHE RVPBRU	MIC
Legionella (Urine)	Spot Urine	CHB - Microbiology	MIC
Leishmaniasis Serology	1 x 7.5ml Plain Tube	Liverpool School of Tropical Medicine	MIC
Leishmaniasis (Tissue)	Please refer to Leishmania sampling protocol www.lstmed.ac.uk/CDPL	Liverpool School of Tropical Medicine	MIC
Leptospirosis Serology	1 x 7.5ml Plain Tube	NVRL	MIC

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
LH (Leutinising Hormone)	1 x 7.5ml Plain Tube	CHB – Endo	CP
Lipase	1 x 7.5ml Plain Tube	Biomnis	CP
Lipid Profile Includes: Cholesterol, HDL, LDL, Triglyceride	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Lipoprotein A	1 x 7.5ml Plain Tube	AMiNHC – Clin Chem	CP
Lithium	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Liver Antibodies	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Liver Autoantibodies Includes: ANF, Anti-Smooth Muscle, Anti-Mitochondrial, Anti-LKM	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Liver Profile (Alkaline Phosphatase, ALT, Total Bilirubin, GGT)	1x 75ml Plain Tube	CHB Chem Path	CP
Lupus Antibodies	See Anti-dsDNA, ANF, Anti-RNP, Anti-Sm, Anti-Ro, Anti-La		MIC
Lupus Anticoagulants	1 x 3ml Sodium Citrate Tube Send to laboratory immediately.	Beaumont - Haematology	HAE
Lyme Disease	See Borrelia		MIC
Lymphocyte transformation test	20ml EDTA	Immunologische Laboratorien Germany	HAE
M2 Antibodies	See Anti-Mitochondrial Antibodies		MIC
Magnesium (Serum)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Magnesium (Urine)	Plain 24Hr Urine	CHB – Chem Path	CP
Malaria Parasite Count (*P. falciparum, P. knowlesi* species only)	1 x 2.7ml EDTA Tube Sample must be < 4hrs old.	CHB - Haematology	HAE
Malaria Screen	1 x 2.7ml EDTA Tube Sample must be < 4hrs old Contact laboratory with patient history	CHB - Haematology	HAE
Mast Cell Tryptase	1 x 7.5ml Plain Tube	St James's - Immunology	BIO
Maturity Onset Diabetes of the Young (MODY)	2 x 2.7ml EDTA Tube Royal Devon and Exeter request form to be completed	Royal Devon and Exeter NHS Trust	BIO
Measles Serology	1 x 7.5ml Plain Tube	NVRL	MIC
Meningococcal PCR	1 x 2.7ml EDTA Tube + 1 x 7.5ml Plain Tube	Meningitis & Meningococcal Reference Lab, Temple St.	MIC
Mercury (Blood)	1 x 5ml EDTA Tube taken with metal free needle	Biomnis	CP
Mercury (Urine)	Plain 24Hr Urine	Biomnis	CP
Metabolic Screen (Urine): Calcium, Oxalate Citrate, Sodium, Creatinine, and Urate	24 Hr Urine with acid added. Plain 24Hr Urine + Refrigerate during collection	CHB – Chem Path & Biomnis	CP
Metanephrines	See Urinary Metanephrines or Plasma Metanephrines		CP

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Methaemoglobin – Dapsone Therapy	1 x 2.7mls EDTA Tube	SJH – Haematology	CP
Methaemoglobin – Level	Venous Blood Gas	CHB – Emergency Dept / ICU	CP
Methaemoglobin	1 x 2.7mL EDTA	Biochemistry Dept – Belfast city Hospital	HAE
Methanol	1 x 7.5ml Plain Tube	Beaumont – Toxicology	CP
Methotexate	1 x 7.5ml Plain Tube	SJH – Chem Path	CP
Microalbumin	Spot Urine	Beaumont – Chem Path	CP
Micropolyspora faeni	See Farmer's Lung		MIC
Minimum residual disease	**1 RPMI or 1 x 2.7mL EDTA**	SJH - Haematology	HAE
Mitochondrial DNA Analysis	2 x 2.7ml EDTA Tubes or Muscle Biopsy	NCMG	HAE
Mitochondrial diabetes (mitochondrial mutations / MELAS)	2 x 2.7ml EDTA Mon-Wed only Oxford request form to be completed	Oxford University Hospitals, Genetics Laboratories The Churchill	CP
Mixing Studies (Correction Tests)	4 x 3ml Sodium Citrate Tubes Send down immediately. Must arrive in lab before 12md Mon - Fri only	Beaumont - Haematology	HAE
Monkeypox (MPox)	Swab in viral transport medium	NVRL	MIC
Monoclonal Bands	1 x 7.5ml Plain Tube	Beaumont – Chem Path	CP
Monospot	see Infectious Mononucleosis Screen		HAE
MPN Panel CAL-R	1 x 2.7ml EDTA Tube Blood or 1 x RPMI Bone Marrow (Contact Haematology for RPMI tubes.)	Beaumont - Haematology	HAE
MPN Panel Exon 12	1 x 2.7ml EDTA Tube Blood or 1 x RPMI Bone Marrow (Contact Haematology for RPMI tubes.)	Addenbrooks	HAE
MPN Panel (JAK2, CAL-R, MPL)	1 x 2.7ml EDTA Tube Blood or 1 x RPMI Bone Marrow (Contact Haematology for RPMI tubes.)	Beaumont – Molecular Diagnostics	HAE
MTHFR	2 x 2.7ml EDTA Tubes	Biomnis	HAE
Mumps Serology	1 x 7.5ml Plain Tube	NVRL	MIC
Mycoplasma	1 x 7.5ml Plain Tube	NVRL	MIC
Mycoplasma Serology (< 20 years old)	1 x 7.5ml Plain Tube	NVRL	MIC
Mycoplasma PCR (>20 years old)	1 x Respiratory fluid	NVRL	MIC
Mycoplasma pneumonia Ab	1 x 7.5ml Plain Tube	Biomnis	MIC
Myeloma Screen	1 x 7.5ml Plain Tube + Plain 24Hr Urine Collection or EMU Must be early morning sample & for screen only; known Myeloma patients require 24Hr urine collection.	Beaumont – Chem Path	CP
Myoglobin (Urine)	No longer available – request CK		CP
Myosistic Panel (Myositis immunoblot)	1 x 4.9ml Brown Tube	Beaumont – Immunology	MIC

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Natural Killer Cells (NK)	1 x 2.7ml EDTA Tube	Beaumont – Haematology	HAE
Needlestick Injury Follow Up	Contact Occupational Health Contact Emergency Dept after routine hours	NVRL	MIC
Neutrophil Alkaline Phosphatase (NAP) score	10 fresh blood films made at bedside	Mater - Haematology	HAE
Neutrophil Function Test	1 x 2.7ml EDTA Tube By prior arrangement only.	SJH - Immunology	HAE
NMDA Receptor (N-methyl-D-aspartate receptor)	1 x 4.9ml Brown Tube **and** 1 x CSF	Beaumont - Immunology	MIC
NMO Antibody	See Aquaporin 4 Antibodies		MIC
Non-HDLC (also part of Lipid Profile)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
NOTCH1	2 x 2.7ml EDTA Tubes	Molecular Haematology Lab, Belfast City Hospital	HAE
NT-proBNP	1x 75ml Plain Tube Should only be requested by Cardiology, Respiratory or Emergency Medicine during routine hours.	CHB Chem Path	CP
NTX	Contact Chemical Pathology for details. Part of a screen	SVUH - Metabolic Laboratory	CP
Oestradiol	1 x 7.5ml Plain Tube	CHB – Endo	CP
Oligoclonal Bands	CSF + 1 x 7.5ml Plain Tube	SJH - Immunology	CP
Organic Acids	Spot Urine. Send to lab immediately	Temple Street – Clinical Biochemistry	CP
Osmolality (Serum)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Osmolality (Urine)	Spot Urine	CHB – Chem Path	CP
Ostecalcin	See Bone Biomarkers		CP
Oxalate (Urine)	24 Hr Urine with acid added.	Biomnis	CP
Oxygen Dissociation Curve for High Affinity Haemoglobins	3 x 2.7ml EDTA By prearrangement with the referral laboratory only.	Special Haematology Department at Guy's and St Thomas' Hospital	HAE
Oxygen Saturation	See Arterial Blood Gas		CP
p-ANCA (Perinuclear Anti-Neutrophil Cytoplasmic Antibodies)	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
PACP	See Bone Profile		CP
Pancreatic Polypeptide	1 x 7.5ml Plain Tube – on ice.	Biomnis	CP
Paracetamol	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Paraneoplastic Antibodies	Refer to Anti-Extractable Nuclear Antibodies and Anti-Neuronal Antibodies		MIC
Paraneoplastic Screen (Hu, Yo, Ri, Ma, Amphiphysin, CRMP5/CV2, Tr,)	1 x CSF **or** 1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Paraneoplastic Neurological Syndrome Markers (Ri, Ma, Amphiphysin, CRMP5/CV2, Tr)	1 x CSF or 1 x 7.5ml Plain Tube	Churchill Hospital, Oxford	MIC

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Paraprotein	1 x 7.5ml Plain Tube	Beaumont – Chem Path	CP
Parathyroid Antibodies	See Anti-Parathyroid Antibodies		MIC
Parathyroid Hormone (PTH)	2 x 2.7ml EDTA Tube (Separate from FBC) Send to laboratory immediately.	Beaumont – Chem Path	CP
Parathyroid Related Protein (PTH-RP)	Contact Chemical Pathology for details	Biomnis	CP
PBC Assay (Primary Biliary Cirrhosis)	See Anti-Mitochondrial Antibody and M2 Subtyping		MIC
pCO_2	See Arterial Blood Gas		CP
PCP (Pneumocystis Pneumonia) Serology	No longer available. Send BAL / Sputum to Histopathology for Grocott's Stain.		MIC
PCP (Pneumocystis Pneumonia) PCR	1 x Respiratory Sample (BAL / Sputum)	NVRL	MIC
Pemphigous (Bullous pemphigoid)	See Anti-Skin Antibodies		MIC
PEP	See Protein Electrophoresis (SPEP)		CP
Pertussis Culture & PCR	1 x Pernasal Swab or 1 x Nasopharyngeal Aspirate	OLHC, Crumlin – Micro	MIC
Pertussis Serology	1 x 7.5ml Plain Tube	OLHC, Crumlin – Micro	MIC
pH (arterial blood or fluid)	See Arterial Blood Gas		CP
Phenylalanine	1 x 7.5ml Lithium Heparin Tube. Send to laboratory immediately.	Temple Street – Clinical Biochemistry	CP
Phenobarbitone	See Anti-Epileptic Drugs		CP
Phenytoin	See Anti-Epileptic Drugs		CP
Phosphate (Serum) (also part of Bone Profile)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Phosphate (Urine)	Plain 24Hr Urine	CHB – Chem Path	CP
Placental Alkaline Phosphatase (PALP)	1 x 7.5ml Plain Tube	Biomnis	CP
Plasma Metanephrines (Plasma Metaneprhines + Plasma Normetanephrines)	2 x 2.7mls EDTA Tubes – on ice.	Beaumont – Chem Path	CP
Plasma Activator Inhibitor (PAI-1)	2 x 3ml sodium citrate Collect on ice and send immediately	Royal Free Hospital London	
Plasma Viscosity	2 x 2.7ml EDTA Tube 1 – Pre-plasmapheresis 1 – Post-plasmapheresis	SJH - Haematology	HAE
Platelet Antibodies	Refer to Section 11.14 NBS request form required. Contact BT Lab.	NBS - Bristol	BT
Platelet Derived Growth Factor Alpha (PDGFR-α)	See Flip-1 PDGRF Mutation Study		HAE

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
PML- RARA (Diagnostic & MRD)	4 x 2.7ml EDTA Tube. CMD request form must be completed.	SJH – Cancer Molecular Diagnostics	HAE
Pneumococcal Antibody	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Pneumococcal Antigen	Spot Urine	CHB - Microbiology	MIC
PNH Screen (Paroxysmal Nocturnal Haemoglobinuria)	1 x 2.7ml EDTA Tube	Beaumont - Haematology	HAE
pO_2	See Arterial Blood Gas		CP
Porphobilinogen	24 Hr Urine. Must be light protected with tinfoil.	SJH – Biochemistry	CP
Porphyrin Screen	24 Hr Plain Urine - Refrigerate during collection 2 x 2.7ml EDTA Tube 1 x 7.5ml Lithium Heparin Tube Random Faeces All must be light protected with tinfoil. If screen positive, individual tests are carried out for Porphobilinogen, Erythrocyte Porphyrins, Urinary Porphyrins and delta-Aminolevulinic Acid	SJH – Biochemistry	CP
Post Fractionation Prolactin (PFPROL)	1 x 7.5ml Plain Tube	CHB – Endo	CP
Potassium (Serum) (also part of Renal Profile)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Potassium (Urine)	Plain 24Hr Urine or Spot Urine	CHB – Chem Path	CP
Procalcitonin	1 x 7.5ml Plain Tube Send frozen.	Biomnis	CP
Procollagen 3	1 x 7.5 ml Plain Tube - on ice. Send to laboratory immediately.	Biomnis	CP
Progesterone	1 x 7.5ml Plain Tube Note day of cycle on request form.	Beaumont – Chem Path	CP
PROGRAF	See Tacrolimus		CP
Proinsulin	1 x 7.5ml Plain Tube Send frozen.	Biomnis	CP
Prolactin	1 x 7.5ml Plain Tube	CHB – Endo	CP
Pro-BNP	See NT-Pro-BNP		CP
Protein (Serum) (also part of Bone Profile)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Protein (Urine)	Plain 24Hr Urine	CHB – Chem Path	CP

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Protein 14.3.3 (CJD)	**Please contact Micro Lab for protocol** 1 x CSF – Send to lab immediately 1 x Questionnaire	Beaumont – Neuropathology	MIC
Protein C (for Meningococcal Septicaemia)	1 x 3ml Sodium Citrate Tube Send to laboratory immediately.	Beaumont - Haematology	HAE
Protein Electrophoresis (Serum) (SPEP)	1 x 7.5ml Plain Tube	Beaumont – Chem Path	CP
PTH	See Parathyroid Hormone		CP
Protein Electrophoresis (Urine)	Plain 24Hr+ Urine or EMU Spot urine not acceptable. +24Hr collection required for known Myeloma patients.	Beaumont – Chem Path	CP
Protein S	1 x 3ml Sodium Citrate Tube Send to laboratory immediately.	Beaumont - Haematology	HAE
Proteinase 3 Antibodies	See Anti-PR3 Antibody		MIC
Prothrombin Gene Mutation	1 x 2.7ml EDTA Tube	Beaumont - Haematology	HAE
PSA (Prostate Specific Antigen)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
PT (Prothrombin Time)	1 x 3ml Sodium Citrate Tube	CHB - Haematology	HAE
Pyruvate	Lactate must be elevated. Contact Chemical Pathology for details.	Biomnis	CP
Pyruvate Dehydrogenase Antibodies	See Anti-Mitochondrial Antibodies		MIC
Q Fever	See Coxiella burnettii		MIC
Quantiferon	Contact Microbiology CHB for specimen containers (x4): grey (x1), green (x1), yellow (x1) and purple(x1). Collect 1ml samples in the following order: grey, green, yellow, purple. **Mon-Thurs only**. Send to laboratory immediately.	MMUH – Micro	MIC
RAPA	1 x 4.9ml Brown Tube	Beaumont – Immunology	MIC
RAST	See Allergy Testing		CP
Red Cell Folate	Test no longer available		N/A
Reducing Substances	No longer handled. Please contact CUH Temple St.		
Remicade	See Infiximab		CP
Renal Profile (Urea, Sodium, Potassium, Creatinine, eGFR)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Renin	Resting:2 x 2.7ml EDTA Tube Standing: 2 x 2.7ml EDTA Tube (OPD patients considered ambulatory) Send to laboratory immediately.	Beaumont – Chem Path	CP

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Renin / Aldosterone Ratio	4 x 2.7ml EDTA Tube. Patient must be seated for 15 mins prior to specimen collection. Send to laboratory immediately.	Beaumont – Chem Path	CP
Respiratory Virus Screen	1 x Viral Swab (Nasopharyngeal/Throat)	NVRL	MIC
Reticulocyte Count	1 x 2.7ml EDTA Tube	CHB - Haematology	HAE
Rheumatoid Factor	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
Rickettsia	1 x 7.5ml Plain Tube	PHE Rare and Imported Pathogens Lab	MIC
Rifampicin (only)	**Please contact Micro Lab for protocol** 2/3 x 7.5ml Plain Tube Pre-does and 1 hr post IV **or** 3 x 7.5ml Plain Tube post oral dose (1, 2 and 4hrs recommended).	Antimicrobial Reference Laboratory, Bristol	MIC
Rifampicin Levels (with Isoniazid)	**Please contact Micro Lab for protocol** 1 x 2.7ml EDTA Tube or 1 x 7.5ml Plain Tube 2 hours post dose, light protected**.**	Cardiff Toxicology Laboratories, Penarth	MIC
Ristocetin Cofactor (RCF)	See von Willebrand Screen		HAE
Rivaraxaban	2 x 3ml sodium citrate	Beaumont - Haematology	HAE
Rivotril	1 x 7.5ml Plain Tube Dosage + Time of last dose must be given. Send to laboratory immediately.	Biomnis	CP
Rubella Serology	1 x 7.5ml Plain Tube	NVRL	MIC
Salicylate	1 x 7.5ml Plain Tube	Beaumont – Chem Path	CP
Salivary Gland Antibodies	1 x 7.5ml Plain Tube	Northern General Hospital, Sheffield - Immunology	MIC
Schistomiasis Serology	1 x 7.5ml Plain Tube	Hospital for Tropical Diseases, London	MIC
Selenium	1 x 7.5ml Lithium Heparin Metal Free Tube taken with metal free needle Bottles available from Chemical Pathology	Biomnis	CP
Serotonin (Serum / Plasma)	Heparinised Whole Blood. Send down immediately. 48 Hrs before collection do not eat: bananas, chocolate, tomatoes, grapefruit, nuts, avocado, pineapple, plums, citrus fruits, tea, coffee	Biomnis	CP
Serotonin (Urine)	24 Hr Urine with acid added. Same diet restrictions apply as listed under serum serotonin.	Biomnis	CP
Serum Free Light Chains	1 x 7.5ml Plain Tube	SJH – Immunology	CP

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Sex Hormone Binding Globulin (SHBG)	1 x 7.5ml Plain Tube	Beaumont – Chem Path	CP
SGPT (serum glutamic-pyruvic transaminase)	See ALT		CP
SGOT (serum glutamic oxaloacetic transaminase)	See AST		CP
Sickle Cell Screen	1 x 2.7ml EDTA Tube Contact lab if patient is for theatre	CHB - Haematology	HAE
Sirolimus	1 x 2.7ml EDTA Tube	Beaumont – Chem Path	CP
Sjogren's Antibodies	See Anti-Extractable Nuclear Antibodies (ENA)		MIC
Smooth muscle antibody	See Anti-Smooth Muscle Antibody		MIC
Sodium (Sodium) (also part of Renal Profile)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Sodium (Urine)	Plain 24Hr Urine or Spot Urine	CHB – Chem Path	CP
Somastatin	1 x 5ml EDTA + Aprotinin – on ice. Send to laboratory immediately.	Biomnis	CP
SPEP	See Protein Electrophoresis (Serum)		CP
Standard Bicarbonate	See Arterial Blood Gas		CP
Stelera (Ustekinumab) level	1 x 7.5ml Plain tube Send immediately Freeze	Biomnis	CP
Stone Analysis	Renal Stones	Biomnis	CP
Strongeloides Serology	1 x 7.5ml Plain Tube	Biomnis	MIC
Sulphonylurea (GLIB)	Plain 24Hr Urine	Biomnis	CP
SynACTHen	1 x 7.5ml Plain Tube - for Cortisol Time 0, 30min, 60min	CHB – Endo	CP
Syphilis Serology	1 x 7.5ml Plain Tube	NVRL	MIC
6-Thiopurine Methyltransferase (Purines / Pyrmidines) / TPMT	2 x 2.7ml EDTA Tube Send to laboratory immediately. (must arrive at referral lab within 48hrs of sampling). Mon-Wed only	Purine Research Lab. St Thomas's Hospital, London	CP
6-Thioguanine Nucleotide Methyl-6-Mercaptopurine	2 x 7.5ml Lithium Heparin Tube @ 4°C. Send to laboratory immediately, by early afternoon.	Biomnis	CP
Tacrolimus	1 x 2.7ml EDTA Tube	Beaumont – Chem Path	CP
Tau (Total and Phospho)	See Alzheimer's Biomarkers		MIC
TB	1 x Respiratory sample, CSF, urine etc	Beaumont - Micro	MIC
T, B and NK cell enumeration	1 x 2.7ml EDTA Tube	Beaumont - Haematology	HAE
T cell panel	1 x 2.7ml EDTA Tube	Beaumont - Haematology	HAE
TCO2	See Bicarbonate		CP
TCR (T Cell Receptors) Gene Rearrangements	1 x 2.7ml EDTA Tube Blood or 1 x RPMI Bone Marrow (Contact Haematology for RPMI tubes.)	Molecular Haematology Laboratory, Belfast City Hospital	HAE
Teicoplanin	1 x 7.5ml Plain Tube	Biomnis	MIC
Tegretol	See Anti-Epileptic Drugs		CP

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Telomere length analysis	2 x 2.7ml EDTA Tube	Kings College Hospital London	HAE
TERC / TERT Mutation	4 x 2.7ml EDTA Tubes	Queen Mary UL	HAE
Testosterone	See Androgens		CP
Tetanus	1 x 7.5ml Plain Tube	PHE RVPBRU	
Thalassaemia Screen	See Haemoglobinopathy Screen		HAE
Thallium (Serum)	1 x 7.5ml Plain Tube	Biomnis	CP
Thallium (Urine)	Plain 24 Hr Urine	Biomnis	CP
Theophylline	1 x 7.5ml Plain Tube	Beaumont – Chem Path	CP
Thrombophilia Screen (Antithrombin III, Protein C, Protein S, Lupus Anticoagulant, Activated Protein C Resistance (APCR), Factor VIII)	4 x 3ml Sodium Citrate Tube 1 x 2.7ml EDTA Tube. Obtain request / consent form from Haematology laboratory. Must be approved by Haematology Team. Send samples to laboratory immediately following collection.	Beaumont - Haematology	HAE
Thyroglobulin (TG) Antibody	1 x 7.5ml Plain Tube	SJH - Endocrinology	CP
Thyroid Antibody	1 x 4.9ml Brown Tube (in addition to Plain Tube for Routine Biochemistry)	Beaumont – Immunology	MIC
Thyroid Function Test (TSH, FT4)	1 x 7.5ml Plain Tube	CHB – Endo	CP
Thyrotropin Receptor Antibody (TRAb)	1 x 7.5ml Plain Tube	SJH – Biochemistry	CP
TIBC	See Iron studies		CP
TORCH (Toxoplasma, Rubella, CMV & Herpes)	1 x 7.5ml Plain Tube	NVRL	MIC
Toxocara	1 x 7.5ml Plain Tube	PHE National Parasitology Reference Laboratory	MIC
Toxoplasma Serology	1 x 7.5ml Plain Tube	NVRL	MIC
TPHA	See Syphilis Serology		MIC
TPMT	see 6-Thiopurine Methyltransferase		CP
TPO (Thyroid Peroxidase)	See Anti-Thyroid Peroxidase Antibodies		MIC
Transferrin Saturation	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Treponema pallidum	See Syphilis Serology		MIC
Trichinella spiralis Serology	1 x 7.5ml Plain Tube	Hospital for Tropical Diseases, London	MIC
Tricyclic Antidepressants	1 x 7.5ml Plain Tube	Beaumont - Toxicology	CP
Triglyceride (also part of Lipid Profile)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Tropheryma whipplei (Whipples Disease)	1 x BAL – 4°C 1 x 2.7ml EDTA Tube – 4°C 1 x Biopsy – 4°C 1 x CSF - frozen	Biomnis	MIC
Troponin (hsTNT)	1 x 7.5ml Plain Tube **Not routinely available for GP patients.**	CHB – Chem Path	CP

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Trypanosoma cruzi	1 x 7.5ml Plain Tube	Hospital for Tropical Diseases, London	MIC
Trypsinogen	See Faecal Elastase		CP
Tryptase	1 x 7.5ml Plain Tube at: 1Hr Post Anaphylactic Shock 3-6 Hrs Post 24 Hr Post	SJH – Immunology	CP
TSH (also part of Thyroid Function Test / TRAP)	1 x 7.5ml Plain Tube	CHB – Endo	CP
tTG	See Anti-Tissue Transglutaminase Antibody (tTG)		MIC
Tularensis	See Fracisella tularensis		MIC
Unsaturated Iron Binding Capacity (UIBC)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Urate (Serum)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Urate (Urine)	Plain 24Hr Urine	CHB – Chem Path	CP
Urea (Serum) (also part of Renal Profile)	1 x 7.5ml Plain Tube	CHB – Chem Path	CP
Urea (Urine)	Plain 24Hr Urine	CHB – Chem Path	CP
Ureaplasma	1 x 7.5ml Plain Tube	PHE RVPBRU	MIC
Urinary Catecholamines (Noradrenaline, Adrenaline, Dopamine)	24Hr Urine with acid added	Beaumont – Chem Path	CP
Urinary Metanephrines (Total Metanephrines + Total Normetanephrines)	24 Hr Urine with acid added	Beaumont – Chem Path	CP
Valporate	See Anti-Epileptic Drugs		CP
Vancomycin	1 x 7.5ml Plain Tube State if sample is Peak or Trough and Last Dose details on request form.	CHB – Chem Path	CP
Varicella Serology	1 x 7.5ml Plain Tube	NVRL	MIC
Vasculitis Screen Includes: ANF, ANCA, RF, C3/C4, DNA, ENA	1 x 4.9ml Brown Tube	Beaumont - Immunology	MIC
VDRL	See Syphilis Serology		MIC
VIP (Vasoactive Intestinal Polypeptide)	1 x 5ml EDTA + Aprotinin Send to laboratory immediately.	Biomnis	CP
Vitamin A	1 x 7.5ml Lithium Heparin Tube / Serum Tube - on ice. Protect from light with tinfoil. Send to laboratory immediately.	Biomnis	CP
Vitamin B1 (Thiamine)	1 x 2.7ml EDTA Tube - on ice Protect from light with tinfoil. Send to laboratory immediately.	Biomnis	CP
Vitamin B2 (Riboflavin)	1 x 7.5ml Lithium Heparin or EDTA Tube. Protect from light with tinfoil.	Biomnis	CP

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Vitamin B3 (Niacin / Vitamin PP)	1 x 2.7ml EDTA Tube. Protect from light with tinfoil. Send to laboratory immediately. Mon-Thurs only	Biomnis	CP
Vitamin B6	1 x 2.7ml EDTA Protect from light with tinfoil.	Biomnis	CP
Vitamin B12 (also part of Haematinics)	1 x 7.5ml Plain Tube	CHB – Endocrinology	CP
Vitamin C	1 x 7.5ml Lithium Heparin Tube - on ice. Protect from light with tinfoil. Send to laboratory immediately (within 20 mins of sample collection).	Biomnis	CP
Vitamin D (25-Hydroxycholecalciferol)	1 x 7.5ml Plain Tube	CHB – Endocrinology	CP
Vitamin E	1 x 7.5ml Plain Tube Protect from light with tinfoil. Send to laboratory immediately.	Biomnis	CP
Vitamin K1	1 x 7.5ml Plain Tube - on ice. Protect from light with tinfoil. Send to laboratory immediately. Approval from consultant haematologist required.	Biomnis	CP
VLCFA (Very long chain fatty acids)	4 x 2.7mls EDTA Tube Mon-Wed only	Willink Biochemical Genetics Unit –Manchester	CP
Voltage Gated Calcium Channel Antibodies (Eaton Lambert Syndrome)	1 x CSF or 1 x 7.5ml Plain Tube	Doctor's Laboratory, London (Neurology samples sent to Churchill Hospital, Oxford)	MIC
Voltage Gated Potassium Channel Antibodies	1 x CSF or 1 x 7.5ml Plain Tube	Doctor's Laboratory, London (Neurology samples sent to Churchill Hospital, Oxford)	MIC
von Willebrand Factor	2 x 3ml Sodium Citrate Tubes Send to laboratory immediately.	MedLab Pathology	HAE
Voriconazole Levels	**Please contact Micro Lab for protocol** 1 x 2.7ml EDTA Tube Centrifuge and freeze within 4hrs	Biomnis	MIC
Weils Disease	See Leptospirosis Serology		MIC
Whipple Disease	See Tropheryma whipplei		MIC
White Cell Lysozyme Enzymes	2 x 2.7mls EDTA Tube Mon-Wed only	St Marys Hospital – Manchester	HAE

Examination	Specimen Requirements	Analysing Laboratory	CHB LAB
Worms	1 x Stool	FAO Dr Tom Murphy, Parasitology Selection, Central Vetinary Ref Lab (CVRL) Backweston, Celbridge, Co. Kildare	MIC
Xanthochromia	1 x CSF, light-protected (dark tubes available from lab – please fill up to line)	Beaumont - Biochemistry	MIC
Yersinia Serology	1 x 7.5ml Plain Tube	ESYV unit, Health Protection Agency, 61 Colindale Avenue, London NW9 5HT	MIC
Zap70	1 x 2.7 EDTA Tube	Southampton – Cancer Science Division	HAE
Zarontin (Ethosuximide)	1 x 7.5ml Plain Tube	Biomnis	CP
Zinc - Serum	1 x 7.5ml Lithium Heparin Metal Free Tube taken with metal free needle Bottles available from Chemical Pathology	Biomnis	CP
Zinc - Urine	Plain 24Hr Urine	Biomnis	CP
16SrDNA PCR	Sterile Universal container	Bacterial Reference Department, UK HSA Collindale, London	MIC
18SrDNA PCR	Sterile Universal container	Bacterial Reference Department, UK HSA Collindale, London	MIC

AMNCH = Adelaide Meath incorporating the National Children's Hospital; CHB = Connolly Hospital Blanchardstown; IBTS = Irish Blood Transfusion Service; MMUH = Mater Misericordiae University Hospital; NBS = National Blood Service (UK); NCMG = National Centre for Medical Genetics; NCHCD = National Centre for Hereditary Coagulation Disorders; NHIRL= National Histocompatibility and Immunogenetics Reference Laboratory; NVRL = National Virus Reference Laboratory; PHE RIPL = Public Health England, Rare and Imported Pathogens; PHE RVPBRU = Public Health England, Respiratory and Vaccine Preventable Bacteria Reference Unit; RCSI = Royal College of Surgeons in Ireland; SJH = St James' Hospital; SVUH = St Vincent's University Hospital

Appendix No. 3 Urine Specimen Requirements

Test	Specimen Requirements	Referral Centre	CHB Lab
Albumin / Creatinine Ratio (ACR)	See Microalbumin		CP
Alcohol	Spot Urine	Beaumont Tox	CP
Amino Acid Screen	Spot Urine	CUH CB	CP
Amylase	Spot Urine	CHB CP	CP
Bence Jones Protein (BJP)	24 hr Urine Plain	Beaumont CP	CP
Calcium	24 hr Urine + Acid	CHB CP	CP
Citrate	24 hr Urine Plain + Refrigerate during collection	Biomnis	CP
Copper	24 hr Urine Plain	Biomnis	CP
Cortisol	24 hr Urine Plain	Biomnis	CP
Creatinine Clearance	24 hr Urine Plain	CHB CP	CP
Drug Screen	See Alcohol		CP
Ethanol	See Alcohol		CP
Glucose	Spot Urine	CHB CP	CP
5HIAA (5 Hydroxyindole Acetic Acid)	24 hr Urine + Acid + light protected	Beaumont CP	CP
Hydroxyproline (Total)	Spot Urine or EMU Fasting + Diet Restrictions	Biomnis	CP
Iron	24 hr Urine Plain	Biomnis	CP
Lead	24 hr Urine Plain	Biomnis	CP
Legionella Antigen	Spot Urine	CHB MIC	MIC
Magnesium	24 hr Urine Plain	CHB CP	CP
Mercury	24 hr Urine Plain		CP
Metabolic Screen: Citrate, Creatinine, Sodium, Urate Calcium, Oxalate	 24 hr Urine Plain + Refrigerate during collection 24 hr Urine + Acid	 CHB CP SJH BIO Biomnis	CP
Microalbumin	Spot Urine	Beaumont CP	CP

Test	Specimen Requirements	Referral Centre	CHB Lab
Myeloma Screen	EMU for screening only 24 hr Urine Plain for known Myeloma patients	Beaumont CP	CP
Organic Acids	Spot Urine	CUH CB	CP
Osmolality	Spot Urine	CHB CP	CP
Oxalate	24 hr Urine + Acid	Biomnis	CP
Phosphate	24 hr Urine Plain	CHB CP	CP
Pneumococcal Antigen	Spot Urine	CHB MIC	MIC
Porphyrin Screen	24 hr Urine Plain, Refrigerate during Collection + Light Protect with Tinfoil	SJH BIO	CP
Porphobilinogen	24 hr Urine Plain + Light Protect with Tinfoil	SJH BIO	CP
Potassium	24 hr Urine Plain or Spot Urine	CHB CP	CP
Protein	24 hr Urine Plain	CHB CP	CP
Protein Electrophoresis	24 hr Urine Plain	Beaumont CP	CP
Serotonin	24 hr Urine + Acid + Diet Restrictions	Biomnis	CP
Sodium	24 hr Urine Plain or Spot Urine	CHB CP	CP
Sulphonylurea (GLIB)	24 hr Urine Plain	Biomnis	CP
Thallium	24 hr Urine Plain	Biomnis	CP
Urate	24 hr Urine Plain	CHB CP	CP
Urea	24 hr Urine Plain	CHB CP	CP
Urinary Catecholamines (Noradrenaline, Adrenaline & Dopamine)	24 hr Urine + Acid	Beaumont CP	CP
Urinary Metanephrines (Total Metanephrines + Total Normetanephrines)	24 hr Urine + Acid	Beaumont CP	CP
Zinc	24 hr Urine Plain	Biomnis	CP

Appendix No. 4 Guide to Number of Specimens Required for Test Profiles Chemical Pathology

7.5ml Plain Tube (white) specimens are required unless otherwise specified. Refer to specimen requirements table above. Each Group requires a separate specimen. Groups 1, 2 and 3 which can go on the same green card, but each other Group 4 requires a separate request card. Tests not specified below require an additional request card and specimen.

Group 1 **Routine Chemical Pathology, Endocrinology & Haematinics (Plain Tube)**		**Group 2** **Glucose & Lactate (Fluoride Tube)**
Renal Profile (RFT) Liver Profile (LFT) Bone Profile CK Lipids Urate LDH AST Iron / UIBC / Transferrin Saturation Lithium Amylase Magnesium CRP	Paracetamol hsTNT NT-proBNP Thyroid Function (FT4.TSH) FSH / LH Oestradiol Prolactin Vitamin B12 Folate Ferritin FT3 PSA Cortisol	Glucose Lactate
Group 3 **Diabetes (EDTA Tube)**	**Group 4** **Miscellaneous Chemical Pathology**	
HbA1C (Separate from FBC sample)	Send separate sample for each of the following: Therapeutic Drugs Drug Screen (Fluoride specimen for Alcohol) Hormones not listed in Group 3 Vitamin D Thyroid Antibodies	

Immunology

Additional 7.5ml Plain Tube (white) or 4.9ml serum gel (brown) tube are required unless otherwise specified. In general a single sample is required for each referral laboratory; up to 5 tests can be performed on a single tube. Beaumont hospital will only accept 4.9ml serum gel (brown) tubes from May 20th 2021. Refer to Appendix No. 2.

Virology

Additional 7.5ml Plain Tube or EDTA tube required for virology testing. Refer to Appendix No. 2 for specific requirements.

Appendix No. 5 Request Forms for Selected Referral Laboratories

The following request forms are available at the links listed below:

Cancer Molecular Diagnostics

Contact the Haematology Laboratory for request forms.

Chromosome Analysis / Karyotyping - Manchester Centre for Genomic Medicine

For cytogenetic (chromosomal) and molecular (DNA) testing please complete the joint referral form available from Chemical Pathology.

Cystic Fibrosis Genotyping Delta 508 and Genetic Analysis - National Centre for Medical Genetics

Request forms available online at Department of Clinical Genetics, Children's Health Ireland at Crumlin website:

https://www.olchc.ie/Services/Departments-A-Z/Department-of-Clinical-Genetics/Information-Leaflets-Forms/Cystic-Fibrosis-Genetic-Testing-Questionnaire.pdf

Platelet Antibodies and Granulocyte Antibodies – NBS Bristol

Contact the Blood Transfusion Laboratory for request forms.

Haemochromatosis Screen

Contact the Haematology Laboratory for request forms.