A Users' Guide to Laboratory Services

LOOKING FOR SPECIFIC INFORMATION?

Type the "test name" or a "key word" in the text search box on the tool bar above and press enter
(or use 'Ctrl + F' keyboard shortcut if search box not displayed)

VACUETTE® TUBE GUIDE CHART

and Recommended Order of Draw for Adults

Northern Health and Social Care Trust

Version 2.2 Last updated 18-01-2023

Take Blood Cultures first - then samples in the following Order of Draw

	PPC Code	Draw Vol.	Cap Colour	Tube Type	Tests	Special Instructions
1	KBC000150 KBC000151	2 ml 3 ml	Blue	Sodium Citrate 3.2%	**HAEMATOLOGY:** Coagulation Studies including Anticoagulant drug control.	Tube MUST be filled to within the arrow MINIMUM VOLUME. Invert 4-5 Times
2	KBC000139	4 ml	Red	Serum with Clot Activator. No Gel	**BIOCHEMISTRY:** Specialised Referral Tests See Laboratory Manual / Contact Laboratory **SEROLOGY:** ASOT, Infectious Mononucleosis	Invert 5-10 Times
3	KBC000141 KBC000142	3.5 ml 5 ml	Gold	Serum with Clot Activator and Separation Gel	**BIOCHEMISTRY:** Lithium, Serum Protein Electrophoresis, Immunoglobulins, Referral Tests **IMMUNOLOGY:** All immunology referrals including Serum Free Light Chains **SEROLOGY:** Routine. See Laboratory Manual / Contact Laboratory	Invert 5-10 Times
4	KBC000144	4 ml	Green	Lithium Heparin	**BIOCHEMISTRY:** Specialised Referral Tests, See Laboratory Manual / Contact Laboratory **DO NOT USE FOR ROUTINE TESTS**	Invert 5-10 Times
5	KBC000219	3 ml	Green	Lithium Heparin and Separation Gel	**BIOCHEMISTRY:** Most Routine Tests including Gentamicin, Vancomycin and Teicoplanin	Invert 5-10 Times
6	KBC000148 KBC000149	2 ml 4 ml	Lavender	K3 EDTA	**HAEMATOLOGY:** Full Blood Count including automated DWCC, ESR. **BIOCHEMISTRY:** HbA1c, Ammonia (on ice), PTH, Blood Porphyrins - Protect from light. **SEROLOGY:** Meningococcal PCR. (Paediatric pink top EDTA tubes are acceptable) **BLOOD TRANSFUSION:** Kleihauer, Direct Coombs	Invert 5-10 Times
7	KBC000152	8 ml	Pink	EDTA	**BLOOD TRANSFUSION:** Blood Grouping, Cross Matches.	ADDRESSGRAPH LABELS MUST NOT BE USED ON THE SAMPLE TUBE. Invert 5-10 Times
8	KBC000147	2 ml	Grey	Sodium Fluoride / K3 EDTA	**BIOCHEMISTRY:** Glucose	Invert 5-10 Times
9	KBC000154	8 ml	Dk Blue	Sodium Heparin Trace Elements	**BIOCHEMISTRY:** Trace Metals	Invert 5-10 Times

IMPORTANT INFORMATION

- Where appropriate collect Blood Cultures first: Please refer to the Trust 'Blood Culture Policy for Adults' NHSCT/17/1182 (available in the Staffnet Policy Library).
- If no Blood Culture is required the recommended order of draw is: coagulation, serum, heparin, EDTA, glucose, followed by all other tubes with additives.
- When using a Safety Blood Collection Set, and no Blood Culture is required, please use a DISCARD tube prior to the above order of draw.
- Following blood collection, all tubes should be gently inverted 5-10 times (coagulation tubes 4-5 times). Thorough mixing is necessary to ensure adequate performance of the tube contents (additive) with the blood sample. A full inversion is when the air bubble moves from one end of the tube to the other.
- For test information consult the Laboratory Handbook: Available on **STAFFNET** (Business Areas » Laboratory) and the NHSCT **website** (Services » A-Z Services » Laboratory/Pathology Service)
- PLEASE SEND A SEPARATE SAMPLE AND REQUEST FORM FOR ALL NON-ROUTINE AND REFERRED TEST REQUESTS.

IMPORTANT

Hold tube in place with the thumb until filled to the required level

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Greiner Bio-One Ltd
E-MAIL info-uk@gbo.com

The RIGHT result for the RIGHT patient at the RIGHT time

Step 1. The requesting clinician ensures:

Correct Patient	Correct time	Request the appropriate analysis	Notes patient circumstances appropriate to analysis e.g. fasting

Sample time is an essential piece of information to ensure all analytes are reported and that results appear in the correct order within the patient's record

Step 2. The phlebotomist, nurse or clinician collecting the sample checks and ensures using patient wrist band double checked against request form and specimen label:

The correct patient and correct time	The test requested	The correct specimen taken	Correct & complete labelling	Safe handling & waste disposal

Step 3: The ward, theatre or surgery ensures:

Safe handling & infection control	Secure and appropriate storage	Timely onward transfer**	**By most appropriate means depending upon the urgency

Step 4: The person undertaking sample transport e.g. porter, driver, ATC / SBATS

Reasonable scheduling	Safe Handling	Secure and appropriate carriage	Meeting H&S / ADR regulations	Timely transfer to the laboratory

Step 5: The laboratory checks and ensures:

Patient details on sample and form	The correct specimen received	The correct results / advice given	NB: the laboratory may reject an inappropriately collected or incorrectly labelled specimen or wrong specimen type

Step 6: The responsible clinician checks and ensures:

Receipt of the results / advice	**The correct patient**	**The correct therapeutic action**	**The validity of the patient record**

INTRODUCTION

The Laboratory services for the NHSCT are provided from two sites, one at Antrim Hospital and the other at the Causeway hospital.

Antrim Laboratory is situated at the front of the Antrim Hospital, beside the main visitor car park. It provides a routine and 24-hour emergency laboratory service for the hospitals and General Practitioners within the local catchment area. This service includes Microbiology, Clinical Biochemistry, Haematology and Blood Bank, Cellular and Molecular Pathology and Morturary services.

Clinical Pathology Laboratory
Antrim Hospital
45 Bush Road
ANTRIM
BT41 2RL

Causeway laboratory is situated in the North West corner of the Causeway Hospital site.

Causeway Laboratory
Causeway Hospital
2 Newbridge Rd,
Coleraine
BT52 1TP

It provides a routine and 24-hour emergency laboratory service for the hospitals and General Practitioners within the local catchment area. This service includes Clinical Biochemistry, Haematology and Blood Bank. The Regional Bowel Cancer Screening Laboratory is located in the Causeway laboratory.
Certain tests e.g.: endocrine, immunology, serology are referred to Antrim Area Laboratory or Regional Laboratories. Causeway Laboratory provides a transport link for referrals and records receipt of samples for referral. Reports are issued directly to users from referral laboratories to keep turnaround times to a minimum. Issues with regard to interpretation or reporting times need to be addressed directly to the referral laboratory.

Laboratory consultants advise on the interpretation of results, further investigations, selection of appropriate therapy, monitoring of drug treatment and clinical response. Where appropriate, a direct clinical service to patients is provided.

If there is any additional information which users think might be useful for inclusion in guide please contact Gerry Duffy, Laboratory Clinical Services Manager Gerard.Duffy@northerntrust.hscni.net A copy of this manual will be available on the Trust's Intranet site and the NHSCT website.

SCOPE OF SERVICE

Analytical Service
We have endeavoured to be as comprehensive as possible in detailing the tests and investigations available to clinicians. However, continuing development inevitably leads to the addition of new techniques and amendments or phasing out of out-moded procedures. Users will be circulated with any such new information as required.

Interpretation and Reference Ranges
The ranges quoted in this handbook are applicable to the population served using current methodology. This data should be used in preference to publications from other laboratory services, textbooks or journals as significant differences in interpretation can arise. Interpretation must also take account of any other clinically significant factors, particularly current medication, which may affect the results obtained.

Measurement Uncertainty
The laboratory considers measurement uncertainty when interpreting measured quantity values; estimates of measurement uncertainty are available to users on request from the relevant Head BMS.

Turnaround Times and Assay Frequency
Results for some emergency requests are available within minutes of the sample arriving in the laboratory. Whenever possible, routine requests are reported within one working day of receipt. However, the frequency and turnaround times of some investigations, is of necessity longer. Details are available from each department on request. Additional tests can be added to the original requests on contacting relevant department. Users must be aware that time limits may exist for add-ons due to specimen retention, quality and volume requirement issues.

During normal working hours it is necessary to telephone the relevant laboratory department to arrange emergency requests in order that they may be given priority.

Outside normal working hours,

On-call staff should be contacted as follows: -

Antrim

Clinical Biochemistry	**331241**
Haematology / Blood Bank	**331240**
Microbiology	**331242**
Histopathology / Cytopathology	Contact Antrim Switchboard

Causeway

Clinical Biochemistry	**376046** or Direct Dial 7034 6180
Haematology / Blood Bank	**375178** or Direct Dial 7034 6178

Quality Assurance

It is our aim to maintain the highest professional and service standards possible in the provision of Clinical Laboratory Services to clinicians and patients. Each individual laboratory operates comprehensive Quality Assurance policies and participates in External Quality Assurance programmes in addition to the practice of internal and local quality control and audit procedures. Results of EQA performance are reviewed and discussed at departmental meetings in addition to being displayed within the laboratory. Users can request information from the relevant service manager if required.
All staff undergo regular staff appraisal , medical staff are registered with the GMC and biomedical staff are registered with the HCPC.

Accreditation

The laboratory regularly undergoes inspections by accreditation agencies including UKAS, The Medicines and Health care Products Regulatory Agency (MHRA), and the Human Tissue Authority (HTA). The Cytology department is annually assessed by Public Health via the Young Person and Adult Screening Team.

As Tests are now accredited and not departments , any changes to tests or analyser platforms may result in a test being no longer accredited until it has been assessed. As a result a patient report may contain a mixture of accredited and non-accredited results. NHSCT generated reports will clearly state when the test is not accredited to notify users. Referral laboratory generated reports will be accredited under the scope of the referral laboratory performing the test. Where the referral lab is unaccredited , the laboratory will seek an alternative supplier. If no other referral laboratory is available, the test may be withdrawn or continuined pending a risk assessment, to ascertain if the laboratory is providing reliable results and the user will be notified.

For further information and the scope of tests accredited for each NHSCT laboratory see Northern Health and Social Care Trust Departmental Schedule which has been merged under 8111 for all departments in 2020**.**

The Laboratories at Antrim and Causeway are **UKAS ISO 15189** accredited and registration is annually renewed.
The Blood Transfusion laboratories are compliant with the requirements of the Blood Safety and Quality Regulations as deemed by the **MHRA.**
The mortuary service is compliant with the requirements of the Human Tissue Act and licensed by the **Human Tissue Authority.**

Confidentiality

It is the duty of all staff not to improperly disclose any information to which they have access to, or have obtained in their official capacity, whilst employed in the department or subsequent to leaving employment.

There are appropriate security measures in place to prevent unauthorised access to or alteration, disclosure or destruction of personal data and against accidental loss or destruction of personal data.

Consent

Consent is implied by the receipt of the sample and form from the requesting physician at source . The laboratory must get the service user's informed consent if they are passing on their information, and get express consent, in writing, if they are using the information for reasons which are not related to providing care or services for the service user; (HCPC Confidentiality Guidance for Registrants).

Complaints

We request that users promptly report problems encountered with any aspect of the Services as soon as possible. This would normally be directly to the Head BMS of the department concerned. Where issues of major concern arise, the Clinical Director of Laboratory Services, Clinical Services Manager or Quality Manager should be informed. All complaints are logged and a record retained of actions taken in line with the NHSCT Complaints and Service User Feedback Policy and Procedure NHSCT/20/1422.

Point of Care Testing

We are able to advise on the selection and suitable instrumentation, associated training needs and Quality Control procedures for extra-laboratory testing. In certain circumstances, laboratory staff can provide routine analyser maintenance and Quality Control as well as on-going user training.

The responsibility for individual test results lies with the user and the appropriate Consultant.

Any new POCT proposals must be submitted to the Trust POC committee in the first instance.

Laboratory Supplies

All consumables required for laboratory tests (e.g.: specimen containers, forms etc) for the primary care sector are supplied by the Laboratory Stores Department at Antrim Laboratory. These can be obtained by submitting a completed form from a Laboratory Stores Requisition Book, available on request from the Laboratory Stores Department. A generic email address lab.stores@northerntrust.hscni.net.

NOTE

It is the responsibility of the Users to ensure Blood collection bottles and other containers are within their expiry dates as this may affect sample quality.

Hospital wards and outpatients use the EMM system.

USEFUL TELEPHONE NUMBERS

Antrim Hospital Switchboard Tel: 028 9442 4000
Causeway Hospital Switchboard Tel: 028 7032 7032

Title	Name	Telephone Number Ext.
Clinical Director	Dr S Gidwani	375739 CAU 332102 ANT
Laboratory Clinical Services Manager	Mr G Duffy	336432
Head BMS Biochemistry	Mr N Quinn	334158
Head BMS Haematology	Mrs C Henry	334105
Head BMS Microbiology	Mrs K Shields	334103
Head BMS Blood Transfusion	Miss S Hill	334174
Acting Head BMS CMP/Mortuary	Mrs Gillian Stewart	334866
Quality Manager	Mrs A Holmes	332091
Transport Co-Ordinator	Miss D Fleck	334857
Laboratory Stores	Miss D Fleck/ Mrs K McDowell	334155/334854
Bowel Screening Manager CAU	Mrs R Nicholl	375727
Antrim office Manager	Mrs B Hutchinson	334834
Antrim General enquiries	Mrs G Cairns	334797
Antrim Lab Porters	8am-7pm weekdays 10am -2pm weekend/BH	331424
Causeway office Manager **Causeway Specimen Reception.**	Mrs H Devine -	375740 375749

USEFUL LINK

Belfast Trust Laboratories Handbook - BHSCT Belfast Trust Laboratory User Manual

LABORATORY HOURS

Clinical Biochemistry, Haematology, Blood Transfusion and Microbiology operate a 24-hour emergency service

Service	Opening Hours	Core Specimens
Routine Service Excluding Blood Transfusion	**Mon-Fri 9am-8pm** **Mon-Fri 9am-5pm**	**Routine specimen collections from hospitals and GP Practices.**
Routine Service Saturday, Sunday Public Holidays	**Sat 9am-5pm** **Sun 9am-5pm**	**Routine specimen collections from hospitals and urgent GP samples.**
Emergency only	**Mon-Fri 8pm-9am** **Sat 5pm-9am** **Sun 5pm-9am**	**Emergency specimens from hospitals.**
Cellular and Molecular Pathology	**Mon-Fri 9am-5.15 pm**	**Histology/Cytology specimens**

SPECIMEN COLLECTION

If valid results are to be obtained it is essential that the requirements for individual tests and investigations, detailed in this handbook, are adhered to. Certain tests require particular attention to factors such as patient preparation, collection technique, timing and preservation of sample, and speed of transportation to the laboratory. Please consult the relevant sections of this handbook for details on individual tests and procedures; should clarification or further information be required, contact the appropriate laboratory department directly.

In accordance with best practice guidelines and in line with the requirements of ISO 15189, the Clinical Pathology Laboratory in the Northern Trust has a strict policy in regard to the acceptance or rejection of specimens. This is intended to ensure that the right sample is taken from the right patient and that the right investigation is performed on the right specimen. Primary samples must be labelled in a manner that provides an unequivocal link to the patient from whom they are taken.

It is the responsibility of the requestor to ensure that samples are labelled correctly and request forms are completed at least to these minimum standards. It is essential that the patient is positively identified and that the sample label and request form are completed with all essential patient identifiers (page 18/19) to provide an unequivocal link between the sample and the patient. Blood samples **MUST** be taken in the correct manner and the lid of the sample container **should not** be removed in order to introduce blood.

Request forms and/or specimens with inadequate, inaccurate or illegible information inevitably disrupt laboratory processing causing unnecessary delay. Where there is a possibility of risk of potentially serious error, there is no alternative but to reject the specimen as detailed in the new RSRARPP-2.0 Regional Sample Request, Acceptance & Rejection Policy & Procedure for Pathology Services.

The Health and Care number (HCN) should be the unique identification number used for patients; the local hospital number may be used alongside the HCN but NOT instead of it. The use of the HCN is essential to ensure that the results are attributed to the correct patient on the Laboratory Information System (LIS). Multiple entries may exist for patients on the LIS when inadequate information has been given historically giving rise to difficulties in finding the entry with the current result.

All biological samples present a potential health hazard to healthcare staff. Please ensure that specimens are properly sealed before transportation; syringe needles must be removed from blood gas syringes and replaced by caps. Containers should not be overfilled as they may leak. Leaking or contaminated sample containers cannot be processed. **All samples & request forms, when appropriately labelled, should be placed in the appropriate secondary transport bag.**

High risk specimens from patients known or suspected of being infected with a Hazard Group 3 (Cat 3) pathogen e.g. TB, Hep B, HIV, must have a hazard warning label affixed to the specimen container and the accompanying request form. All high risk specimens should be segregated from routine specimens for transportation (bagged / boxed separately).

For information regarding COVID-19 samples, see discipline specific information in the relevant sections.

CSF Specimen Collection

Antrim Biochemistry Mon – Fri 9am - 5pm ext 334774 at all other times ext 331241.

Antrim Microbiology Mon – Fri 9am - 5pm ext 334494, at all other times ext 331242.

Cellular & Molecular Pathology Mon – Fri 9am - 5pm ext 334488, at all other times please contact switchboard.

- **Details on Collecting CSF are provided in the Lumbar Puncture pack.**
  The insert in the Adult CSF pack that provides detailed information on sample requirements and preparation is reproduced overleaf. Paediatric requests (no pack is made up for these) should follow an equivalent sample requirement.

- **Please Notify the laboratory prior to sending samples to ensure appropriate prioritisation of analysis for each discipline.**

- **DO NOT USE THE PNEUMATIC TUBE SYSTEM.**

- **Send the samples to the lab without delay**
  samples should be received in Antrim laboratory within 1 hour of collection.

- All CSF samples from Causeway site must be dispatched directly from the ward to the Antrim laboratory.

- Please ensure CSF Spectrophotometry is light protected

- CSF Spectroscopy analysis may be complicated and time consuming and is best performed in routine hours when experienced staff are available

- If required, CSF spectrophometry may be analysed out of hours by arrangement with the Chemical Pathologist.

- Cytology specimens need to arrive in the laboratory on ice within an hour of sampling and the cytology laboratory staff need to be phoned beforehand on ext 334184

- If sent out of hours please contact Antrim Hospital switchboard for out of hours Cytology.

Sample/ Order	Sample	Tube	Volume	Test (Colour coding indicates lab form to be used)
1	CSF		1.5ml	Virology Microbiology Form PCR if encephalitis suspected
2	CSF		0.5ml	Glucose & Protein
3	CSF		1.5ml	Microbiology Cell Count, Culture & Gram Stain
4	CSF		0.5ml	CSF Spectrophotometry (optional) Biochemistry Form [1] Protect CSF Spectrophotometry sample from light by placing in envelope provided. Lumbar puncture for CSF Spectrophotometry should only be performed >12hour post event. CSF Spectrophotometry can reliably detect Sub Arachnoid Haemorrhage up to 2 weeks after onset of symptoms, negative results should be treated with caution if > 2 weeks post event.
5	CSF		1ml	Oligoclonal Bands (optional)
6	CSF		1ml	Cytology (optional) Only send if strong clinical suspicion of carcinomatous meningitis
7	BLOOD		5ml	Bilirubin (Liver profile) or Oligoclonal bands
8	BLOOD		2ml	Glucose

Clearly write on the indicated form, the tests required and clinical indication for request and if the differential diagnosis includes meningitis. For CSF Spectrophotometry, state the result of CT scan, Time of onset of symptoms/event, Time of Lumbar Puncture [1](complete the sticky label in the CSF pack). Indicate if the blood staining is uniform or declines for CSF samples 1 - 6.

Do not use Pneumatic tube, transport samples via porter within 30 min for Antrim site or for Causeway send via taxis directly from ward to Antrim Laboratory. Sample **MUST** be received by the lab, centrifuged and stored at 2 - 8°C within 1 h of lumbar puncture.

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TEST REQUESTING

Each laboratory department has colour coded request forms. Whenever possible pre-printed addressograph labels, recording the necessary patient identification details should be used. Take care to use the correct addressograph label for the patient details and do not use a mother's label for a newborn.

Where addressograph labels are used for request forms the patient's location (site and clinical area) and Consultant must be added. On sample containers care must be taken to ensure that the sample in the tube is not totally obscured by the label; Biomedical Scientists in the laboratory often need to see the blood level and consistency in the container.

In the case of an unconscious patient or for reasons of confidentiality coded PID's are acceptable. There will be a delay in the issue of printed reports if the source and location of the request is in doubt. Note that the GP cypher number alone is not sufficient.

The importance of supplying information in a legible form cannot be over-stressed.

It is preferable to supply all of the information below to ensure that the patient is not inconvenienced or put at unnecessary risk due to delay in provision of results. For example serum Potassium rises significantly within 2 hours of sampling whilst other analytes are stable for a longer period; therefore the time of sampling may be essential.

Specimens will not be accepted for analysis where:-

The essential patient identifiers[#] in the Minimum Acceptance Criteria are not met on either the form or the specimen container.
The specimen has been collected inappropriately e.g. unsuitable anticoagulant or preservative.
The integrity of the specimen is in question e.g. leaked in transit, undue delay in transport.
The specimen is unlabelled.
The specimen is incorrectly labelled to such a degree as to compromise reliable identification of the patient

Agreements with the service user:

Each request for examination received by the laboratory is considered an agreement. However, receipt of a request does not constitute acceptance for diagnostic laboratory testing. On receipt of a sample, the laboratory will determine if the sample is suitable for performing the diagnostic test for which it was supplied. The Laboratory is under no obligation to carry out the examination if, in its opinion, the sample is of unsatisfactory quality, or if the minimum data set is not met.

MINIMUM ACCEPTANCE CRITERIA

The Regional Minimum Acceptance Criteria (MAC) for forms and samples as detailed in the the new REGIONAL SAMPLE REQUEST ACCEPTANCE AND REJECTION POLICY & PROCEDURE will be specifically detailed at the start of each discipline. This policy can be found on the Trust Policy Unit Page.

Request forms and / or samples missing MANDATORY information will be rejected.

Sample tubes and other containers should also be clearly labelled, bagged and attached to the request form.

Lack of sufficient relevant clinical details being provided on laboratory request forms can result in the samples being handled at the wrong biological containment level with the resulting health and safety risk to laboratory staff. Where a laboratory sample is considered likely to contain a human pathogen, it is important that the appropriate level of laboratory containment is provided in order to ensure the effective control of the risk of exposure. Provision of relevant clinical details can be used to inform the assessment and further laboratory investigations e.g. specimens from a returning traveller or those associated with an outbreak scenario.

ANTRIM SPECIMEN TRANSPORTATION

Portering Service		**Routine** hospital collections
Monday – Friday	08:30 09:30 11:00 12.:30 14:00 16:00	Each weekday the Lab porter makes six routine specimen collections from wards / clinics in Antrim Hospital. Times for collection of specimens are indicated left. The times listed are the latest times at which specimens should be ready for collection.
Sat / Sun / BH	11:00 12:45	There are two collections of samples from wards in Antrim
Air Tube System		**Emergency and Urgent specimens ONLY**
		Ensure sample and form are secured within the canister Key in destination address on the keypad **2 for Haematology / Blood Bank** **13 for Biochemistry** **14 for Microbiology**
Specimens which would be difficult to repeat e.g. CSF and those from patients known or suspected of having infection with a **Hazard Group 3 (Cat 3) pathogen (e.g. TB, Hep B, HIV etc) are not suitable for transportation in the Air Tube**: contact the hospital portering department. Cellular and Molecular Pathology specimens should not be transported via the air tube system. Estates Department are responsible for the Air Tube system		
Laboratory van transport		**Routine GP** / Health Centres / Mid Ulster / Whiteabbey / Braid Valley / Holywell / Moyle Vans arrive for the collection of samples Mon – Fri **Whiteabbey Hospital at 10am, 1pm, 3 pm &5.30 pm** **Mid-Ulster Hospital at 10am, 1pm, 3pm & 5pm** Van collections are provided each weekday to GPs/Health Centres/ throughout the day, contact the laboratory for specific pick up times.

Emergency GP/Health Centres/ Hospital sites (other than Antrim): when emergency investigation is required, appropriate transport of specimens to the laboratory must be arranged locally.

CAUSEWAY SPECIMEN TRANSPORTATION

Portering Service		**Routine** hospital collections
Monday – Friday Weekends/Bank Holidays	09:00 10:15 12:30 15:30 17:15 10:30	Each weekday the hospital porter makes five routine specimen collections from wards / clinics in Causeway Hospital. Times for collection of specimens are indicated left. The times listed are the latest times at which specimens should be ready for collection.
SBATS (Small Bore Air Tube System)		**Emergency and Urgent** specimens
		Ensure sample and form are secured and fully contained within the carrier and the end caps are closed. Press 0001 or 0002 on the keypad depending on your zone area 1 or 2.
Arrangement should be made with the relevant laboratory department prior to forwarding specimens via the SBATS. Specimens which would be difficult to repeat e.g. CSF and those from patients known or suspected of having infection with a Hazard Group 3 (Cat 3) pathogen (e.g. TB, Hep B, HIV etc) are **not suitable for transportation in the SBATS**: contact the hospital portering department. SBATS failure – contact the hospital portering department.		
Laboratory van transport		**Routine** GP / Health Centres / Dalriada / Robinson Two van collections are provided each weekday. GPs/Health Centres/Dalriada/Robinson are each advised of the latest times at which specimens should be ready for collection. (Some areas will get 4).
Sat / Sun 10:15		Ward to arrange taxi if required

Emergency GP/Health Centres/Dalriada/Robinson: when emergency investigation is required, appropriate transport of specimens to the laboratory must be arranged locally.

LABORATORY REPORTS

Electronic Systems

Laboratory reports are available for electronic recall from Clinical Biochemistry, Haematology, Microbiology and Cervical Cytology. There are several electronic systems available

- **Northern Ireland Electronic Care Record (ECR)**

The ECR accepts electronic reports from the laboratory systems (BSO Labs, LabCentre, MasterLab) across all NI Trusts. *

- **Web based Labs Recall and**
- **Belfast Link Labs – Lab Centre**

For detailed instructions on accessing results follow the link in the Laboratory Business Area of StaffNet.

- **GP Download**

With the exception of Cellular and Molecular Pathology, the majority of Health Centres and General Practitioners receive their reports in electronic format only. GP Download is scheduled to occur several times each workday.

Hard Copy Reports

All Secondary Care laboratory reports are issued in hard copy format; these are delivered on a daily basis. Laboratory van drivers deliver hard copy reports as required to Primary Care.

Urgent Results (Clinical Biochemistry, Haematology and Microbiology)

- Where possible, **electronic recall systems** should be used to minimise the possibility of error in communication.
- Where the laboratory has been notified of an **Urgent Request** we will endeavour to communicate the results to the requestor by phone.
- **Critical Result Communication** (Abnormal results meeting the agreed Phone Out Limits) will be communicated directly to the requestor by the Laboratory.
- Results which are judged to have particular **clinical significance** are also telephoned to the requesting clinician / relevant clinical area and may be brought to the attention of the Laboratory Consultants.

Note * The transfer of electronic reports from BSO Labs or LabCentre to NIECR is dependent on an exact match of the Minimum Dataset referred to earlier.

Telephone requests for results.

- Only where electronic links are not available should the appropriate laboratory Department be contacted by telephone.
- Prior to issuing a result by telephone, laboratory staff are required to establish the requester's identity.
- Enquiries should be made **before 17:00**
- Requests for **urgent analysis** must be telephoned to the appropriate department prior to despatch.)

Cellular and Molecular Pathology - Urgent FNA or Molecular Pathology for information regarding urgent requests as CMP do not generally accept telephoned urgent requests.

CLINICAL BIOCHEMISTRY

Minimum Acceptance Criteria (MAC)

- Mandatory MAC MUST be present on ALL sample bottle(s) / container(s) and request form to assure sample acceptance for Laboratories and LIMS.
- Desirable MAC MUST be considered by the User as part of good patient management / care.

	Mandatory	Desirable
Sample	1. Unique identifier number* 2. Patient Official first Name 3. Surname 4. Date of Birth (dd/mm/yyyy) 5. Date and Time of Sample and Collection ***The Health & Care Number must be used unless**:- a) The patient is not registered with a General Practitioner in Northern Ireland – use the local hospital numbering system. b) An emergency situation – use local hospital EMERGENCY numbering system.	1. Sex (Male/Female/Other) 2. Name of staff member taking the sample.
Request Form	1. Unique identifier number* 2. Patient Official First Name 3. Surname 4. Sex (Male/Female/Other) 5. Date of Birth (dd/mm/yyyy) 6. Date and Time of Sample Collection 7. Requester Name / Code 8. Source (Ward / Clinic /GP) 9. Investigation (test) Required ***The Health & Care Number must be used unless:-** a) The patient is not registered with a General Practitioner in Northern Ireland – use the local hospital numbering system. b) An emergency situation – use local hospital EMERGENCY numbering system. *	1. Relevant Clinical Information 2. Name of staff Member taking the sample

Title	Name	Telephone number ext
Out of hours Antrim	-	331241
Out of hours Causeway	-	376046 or 70346730
Chemical Pathologist	Dr Elinor Hanna	334104
Chemical Pathologist	Dr Sumana Gidwani	334723 CAU (375739)
Speciality Doctor	Dr Andrew Hopper	
Pathologist Secretary	-	334136
Pathologist Secretary (Cau)	-	375741/375740
Head BMS	Nigel Quinn	334158
Deputy Head BMS	Ryan Da Prato	334723 CAU (375738)
Point of Care Co-ordinator	Joanne Jackson	334718
Point of Care Support	Email clinical.biochemistry@northerntrust.hscni.net	334718

AUTOMATED TELEPHONE FOR CLINICAL BIOCHEMISTRY

In office hours, the most efficient method of contacting the Department is to use the Automated Telephone - there are multiple lines to this number.
Do NOT use the Emergency DECT phone number for non-emergencies.

Antrim Automated Telephone 334774 Menu

1	2	3	4	5	6
Emergency	Results	Information	Clinical	POC Team	Voice Mail

Consultant Pathologist advice is available 24/7 via switchboard or on contacting the Department; advice should be available within 60 minutes of making contact

Causeway Automated Telephone 375180 Menu

1	2	3	4	5	6
Emergency	Results	Information	Clinical	POC Team	Voice Mail

Consultant Pathologist advice is available 24/7 via switchboard or on contacting the Department; advice should be available within 60 minutes of making contact

The following sub-sections give specific information on sampling requirements and interpretation of investigations. A **Consultative service** is available to advise further on appropriate investigative strategies, interpretation and clinical management and useful telephone numbers are listed.

1. Haemolysis of Blood Samples

Excessive haemolysis of blood samples may invalidate some results for some analytes. The Haemolytic Index measured with most requests is used to determine which results are valid and can be reported. An acceptable degree of error can still allow clinically valid results to be released in some haemolysed samples.

Haemolysis is the most common reason for invalidating an analysis. In many cases, this can be minimised by adopting appropriate phlebotomy techniques. To minimise delay and avoid fresh venepuncture, do NOT

- Insert a syringe / needle into a Vacutainer. The vacuum will draw in the blood against the syringe plunger, rupturing the cells.
- Squirt the blood through a needle into a Vacutainer. This trauma will rupture the cells.
- Shake the sample. Mix thoroughly by gentle inversion as indicated.
- Expose the sample to excessive temperatures (Room Temperature for blood samples unless otherwise indicated).

The **pneumatic air tube transport system** has been identified as a potential cause of haemolysis. When suspected, please report to Clinical Biochemistry who will investigate with Estates. In Antrim, the system is designed for Urgent sample transport, not bulk samples (as in Causeway), and is not a substitute for routine ward collections.

2. Minimum Retesting Intervals (MRI) – Demand Optimisation

MRI aim to reduce repeated and unnecessary pathology testing, minimize harm to patients and save valuable resources. In the table below, the minimum re-test intervals are listed. Test requests that breach the minimum frequency threshold will not be processed. It is recognized that repeat testing more frequently may be necessary if there is an overriding clinical need. In such cases there is an override procedure which is detailed below.
(d= day; w= week; m= month)

Profiles	MRI		Analyte	MRI
Albumin Creatinine Ratio	**27 d**		**Lipid Profile**	**27 d**
Beta HCG	**27 d**		**LFT**	**3 d**
BNP	**30 d**		**PSA (Total)**	**13 d**
Gynae Hormones	**1 w**		**Thyroid Function**	**27 d**
Immunoglobulin/Immunoprotein	**21 d**		**Vitamin B12 and folate**	**27 d**
Iron Studies	**14 d**		**Lithium**	**1 d**

HbA1c	**60 d**		**HCG**	**48 hr**

Override procedure in the event of urgent clinical need

For Departments intensively managing patients such as Oncology, Renal, Casualty, Neonatal and Intensive Care, MRI rules are not applied for most tests.

Where a test is required within the interval for a particular clinical purpose, **please provide clinical details on the request form** so the laboratory can process these samples, otherwise they will be rejected. **Samples are only held for 2 days**; please contact the laboratory as soon as possible.

For further information please use this link to access the RCPATH National Minimum Retesting Intervals in Pathology

3. Add-On requests

The Add On facility is **a limited service** to clinicians to minimise repeated phlebotomy. It is not recommended where a patient's condition or treatment is rapidly changing. **Do not use the Add On facility for an URGENT request. You must send a fresh sample.**
Requests to add on additional tests to samples already receipted in the Laboratory will be **considered** if the sample is suitable for the Add On request and less than 24 hours old.

Unsuitable sample includes

- wrong sample type
- insufficient sample
- haemolysis
- aged or deteriorated sample
- referral samples, etc.

Requests from the Hospital must be sent **on a request form** giving the **patient details, the sample identifying number, and the Add On request.**

Primary care, please only contact the laboratory between 09:00 and 12:00.

4. Turn-Around-Times

The following turn-around-times are calculated from receipt of sample in the laboratory until the result is available on ward recall for tests in a priority category, i.e. those results affecting immediate patient care.

All emergency samples	**1 hour**
In-patient samples	**4 hours**
Out-patient & Primary Care	**24 hours**

Some requests may take 2-5 working days to report. They may be

- part of a complex series of investigations
- infrequently requested and those performed in batches
- tests only available in routine hours

Other tests are referred to Laboratories in Belfast or Great Britain and take much longer for results to be made available.

Please remember there may be circumstances beyond our control where services may have to be prioritised to emergency and in patient requests.

5. Additional Information

The tests in each profile are interrelated and chosen to provide complimentary information useful in the investigation of the specific organ and biochemical system indicated.

The references ranges stated in the table of tests below are for adults. Age and gender related reference ranges are displayed on the electronic recall report. Contact the Biochemistry Laboratory if you require further information.

Unless otherwise stated, Reference Intervals quoted in the Clinical Biochemistry section are sourced from Manufacturers data.

Reference Interval Sources include

- Cobas Diagnostics
- Pathology Harmony
- Protein Reference Unit (Sheffield)
- Regional Speciality Forum

6. Inconsistent or Discordant results

Assays may be subject to interference from prescribed drugs, antibodies, or substances with similar structure to the analyte being measured. The interference may cause falsely elevated or falsely decreased results.

For diagnostic purposes, the results should always be assessed in conjunction with the patient's medical history, clinical examination and other findings.

Please contact the laboratory if you have any concerns about the validity of results obtained.

7. HbA1c Interpretation Alert

Various factors interfere with HbA1c measurements and lead to misdiagnosis, over diagnosis, or inappropriate treatment decisions for diabetes management.Haemoglobin variants and factors affecting red cell life span are the common pre-analytical factors which interfere with HbA1c measurement (Table 1). In these circumstances, neither the diagnosis of diabetes, nor monitoring of the condition can be made on the basis of HbA1c, but requires the alternative determination (Table 2).

Table 1 Clinical conditions affecting HbA1c measurement

Increase	**Decrease**	**Variable**
Iron deficiency anaemia	Iron treatment	Haemoglobin Variants
Vitamin B 12 deficiency	Vitamin B12 treatment	
CKD 4 and 5	Liver disease	
Splenectomy	EPO treatment	
	Haemolytic anaemia	
	Splenomegaly	
	Medication: antiretrovirals, ribavirin and dapsone	

For more detailed information please refer to: http://www.nice.org.uk/Guidance/NG28 : 2011 WHO report: Use of Glycated Haemoglobin (HbA1c) in the Diagnosis of Diabetes Mellitus.

On routine analysis in our laboratory when we suspect the presence of a variant that is interfering with the analysis, we will report the suspicion and offer a result from an alternative method, total glycated Haemoglobin. **Please avoid unnecessary repeat HbA1c testing if the patient is not known to have diabetes based on fasting glucose or oral glucose tolerance test results. If a diabetic patient is known to have a haemoglobin variant, please state on the request form so that the appropriate alternative method of analysis can be performed.**

Table 2 NICE recommended alternative glycaemia monitoring methods if HbA1c monitoring is invalid.

Quality-controlled blood glucose profiles using personal glucose meters

- If Haemoglobin variant is suspected, total glycated haemoglobin estimation is recommended (for monitoring known diabetics only).
- Serum fructosamine. Please note there is no local provision for this test. Discuss with the Consultant Chemical Pathologist before requesting.

8. Telephoning Critical Results

Results from patients which fall outside the following range or are not in keeping with established history will be telephoned to source ASAP.

A repeat sample should be sought if not in keeping with patient's condition.
Results should be phoned within one hour unless otherwise stated.

Analyte / Alert	Units	Age Range / Classification	Less than / equal to	Greater than / equal to
AKIN 1 AKIN 2 AKIN 3	Notify Primary Care of new occurrences AKIN1 if K >6.0 Notify Primary Care / DDoc of new occurrences AKIN2 *AKIN3 (new occurrences) within an hour*.			
Ammonia	µmol/L			≥ 100
Amylase	U/L			≥ 500
ALT	U/L			≥ 500
AST	U/L			≥ 500
Bicarbonate	mmol/L		≤ 10	
Bilirubin Direct	µmol/L	Neonates		≥25
Bilirubin Total	µmol/L	≥16yrs <16 yrs		≥ 300 ≥ 250
Calcium Adjusted	mmol/L		≤ 1.8	≥ 3.5
CK	U/L			≥ 5000
Cortisol	nmol/L		≤ 65 if not DST. Consider SST level <250	
Creatinine	µmol/L	≥16yrs <16 yrs		≥ 354 ≥ 200
CRP	mg/L	GPs		≥ 300
Digoxin	ug/L			≥ 2.5
Ethanol	mg/L	>16yrs <16yrs		≥ 4000 ≥ 100
Free T4	pmol/L			> 50
Glucose (not DM)	mmol/L	≥16yrs <16 yrs	≤ 2.5	≥ 25.0 ≥ 15
HbA1c	mmol/ mol			≥ 130
Iron	µmol/L	<16yrs		≥ 55
Lithium	mmol/L			≥ 1.1
Magnesium	mmol/L		≤ 0.4	
Paracetamol	mg/L			≥ 100
Phosphate	mmol/L		≤ 0.3	
Potassium	mmol/L		≤ 2.5	≥ 6.5
Salicylate	mg/L			≥300
Sodium	mmol/L	≥16yrs <16 yrs	≤ 125 ≤ 130*	≥160 ≥160
Theophylline	mg/L			≥ 25
Triglyceride	mmol/L			≥ 20
Troponin-T hs	ng/L	Hospital GPs		≥ 100 ≥ 15
TSH	µIU/mL			>40
Urea (non-renal)	mmol/L	≥16yrs <16 yrs		≥ 30.0 ≥ 10.0

9. MINIMUM REQUIREMENTS FOR PAEDIATRIC REQUESTS

TEST	SAMPLE TYPE -PAEDIATRIC BOTTLES	MINIMUM VOLUME REQUIRED	SPECIAL INSTRUCTIONS / REFERRAL
T&D BIL or CRP only	 **Green Top Lithium Heparin**	0.2mls	
Routine Biochemistry U&E, LFT, Bone, Mg, CRP, Amylase, T&D BIL, Lipids, CK, Uric Acid	 **Green Top Lithium Heparin**	Single request 0.4mls Multiple requests 0.8mls	
Proteins IgA, IgG, IgM RF, Comp	 **Gold Top Clotted**	Single request 0.4mls Multiple requests 0.6mls	
Endocrine TSH, FT4, FT3, B12&Folate, Ferritin, Cortisol, *Thyroid Abs*	 **Green Top Lithium Heparin**	Single request 0.4mls Multiple requests 0.6mls	*Tests in italics forwarded to Biochemistry Dept. Causeway Laboratory*
Drugs Digoxin, Theophylline, Paracetamol,	 **Green Top Lithium Heparin**	Single request 0.4mls Multiple requests 0.6mls	

TEST	SAMPLE TYPE -PAEDIATRIC BOTTLES	MINIMUM VOLUME REQUIRED	SPECIAL INSTRUCTIONS / REFERRAL
Antibiotics Amikacin, Gentamicin, Vancomycin	 **Green Top Lithium Heparin**	0.4mls	*Sample times should be clearly marked i.e. Trough / Peak*
POC Testing **Lactate**, Blood Gas Analysis, Na, K, Glucose, Hb & derivatives	BD dry balanced vented Heparin syringe Protech wet Heparin non-vented syringe Heparinised plastic capillary	Syringe Minimum Fill 0.6ml Scalp pH 37uL Full Profile 140uL	*Parameters may be deselected to reduce volume required*
MISCELLANEOUS TESTS			
HbA1c	 **Pink or Purple Top EDTA**	0.2mls	
Plasma Glucose, (*alternatively, see POC testing*)	 **Grey Top Fluoride EDTA**	0.4mls	
Ammonia	 **Pink or Purple Top EDTA**	Fill Tube >1.3mls (no air)	*Send sample immediately on ice*
PTH	 **Pink or Purple Top EDTA**	0.4mls	
FSH, LH, Prolactin, Progesterone, Oestradiol	 **Green Top Lithium Heparin**	Single request 0.4mls Multiple requests 0.6mls	
HYPOPAK – SEE HYPOPAK PROTOCOL / POC TESTING			

10. MINIMUM REQUIREMENTS FOR PAEDIATRIC REFERRED TESTS

Miscellaneous Test	Sample Type- Paediatric Bottles	Minimum Volume	Instructions/Referral
Coeliac Screen	 **Gold Top Clotted only**	1.3mls	**Immunology RVH** Sample volume can be reduced if samples are sent on the same tube
Anti-nuclear Antibodies	 **Gold Top Clotted only**	1.0mls	
Liver Associated Antibodies	 **Gold Top Clotted only**	1.0mls	
Total IgE	 **Gold Top Clotted only**	1.0mls	
Allergen (specify suspected allergen)	 **Gold Top Clotted only**	1.0mls	
Ig Subclasses	 **Gold Top Clotted only**	1.0mls	Biochemistry, Belfast Laboratory RVH
Alpha-1 Antitrypsin	 **Gold Top Clotted only**	0.6mls	
HCG (tumour marker)	 **Green Top Lithium Heparin**	1.0mls	
Caeruloplasmin	 **Gold Top Clotted only**	1.3mls	
Tacrolimus	 **Pink or Purple Top EDTA**	0.5mls	
Cyclosporin	 **Pink or Purple Top EDTA**	0.5mls	
Phenobarbitone	 **Green Top Lithium Heparin**	0.4mls	
Phenytoin	 **Green Top Lithium Heparin**	0.4mls	
Carbamazepine	 **Green Top Lithium Heparin**	0.4mls	
Copper	 **Trace metals bottle (blue / black cap)**	1.3mls	

17-OH Progesterone	 **Red Top Clotted only**	0.6mls	
Growth Hormone	 **Green Top Lithium Heparin (gel)**	1.3mls	
Zinc	 **Trace metals bottle (blue / black cap)**	1.3mls	Trace Metals, Belfast RVH
Amino Acid Chromatogram	**Green Top Lithium Heparin (gel) or Purple Top EDTA OR Urine (plain bottle)** 	1.0mls (plasma) 2.0mls (Urine)	Paediatric laboratory Belfast RVH

MEDICAL GENETICS (*forms & bottles available from Biochemistry Lab, Antrim x333060)*			
Chromosome Analysis	 **Green Top Lithium Heparin**	5mls	Medical Genetics, BCH
FISH Analysis	 **Green Top Lithium Heparin and**  **Purple Top EDTA**	5mls	
Microdeletion MLPA	 **Purple Top EDTA**	5-10mls	
DNA Testing	 **Purple Top EDTA**	5-10mls	

Please refer to the Belfast Trust laboratories

11. Dynamic Tests

Short Synacthen test for suspected adrenal failure in Adults

See Bulletin in Laboratory Business Area of Staffnet for further details

Dexamethazone Suppression Test

See Bulletin in Laboratory Business Area of Staffnet for further details

Belfast Laboratory Handbook

12. Cascade Testing

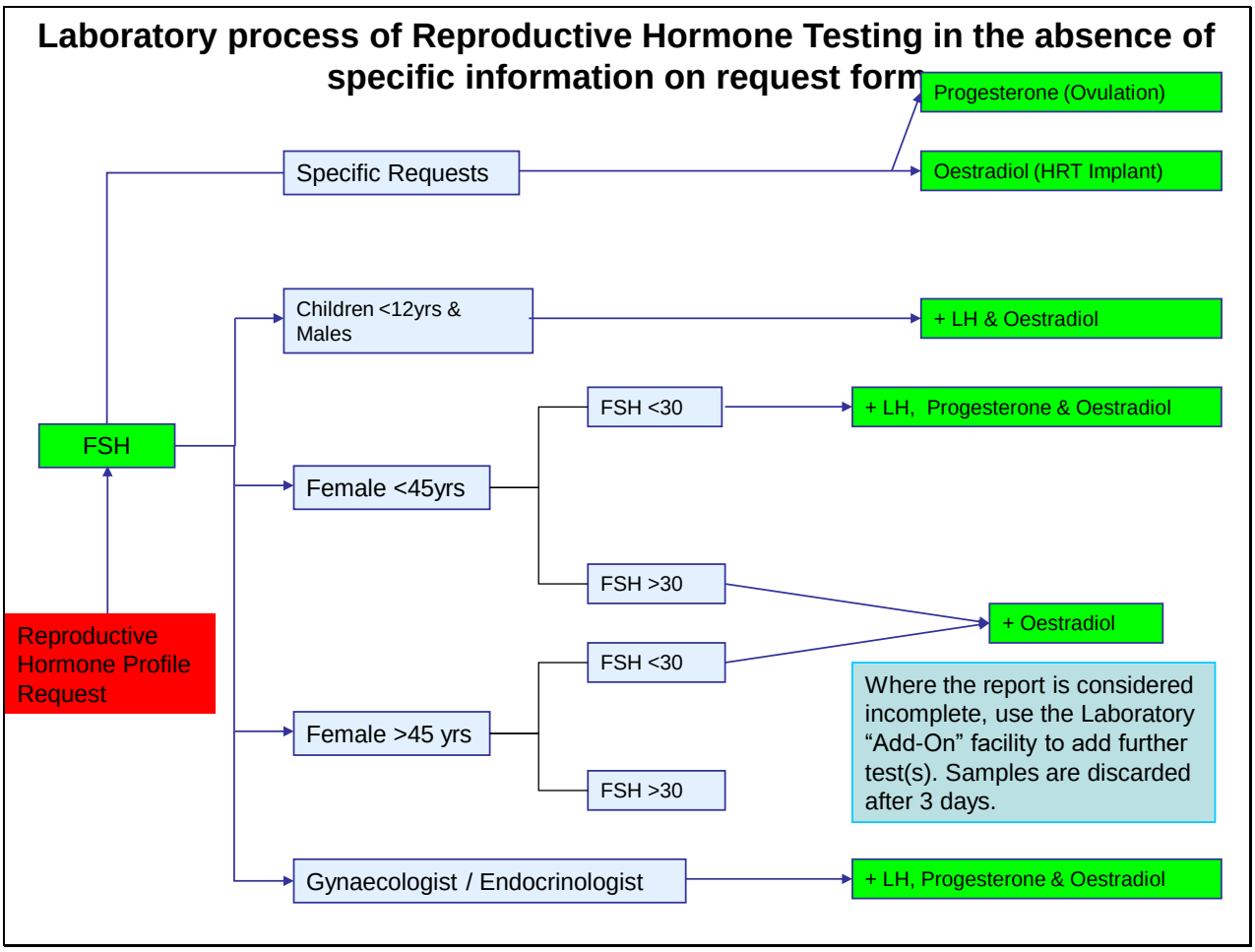
Cascade Testing is employed when Thyroid Function Tests and Reproductive Hormone Profile requests are made. This approach uses evidence based rules to guide testing and significantly reduces costs while maintaining clinical utility.

Thyroid Function Test Cascade Testing

Routine thyroid function testing in NHSCT Laboratories initially measures TSH on all samples, and automatically reflexes free T4 when the TSH is without the reference interval. Free T4 is also added on the basis of clinical information supplied on the request form as outlined below. About 75% of requests are issued without further tests.
Free T3 performed when specifically requested, or when the result might be useful to the clinician. FT3 is only available on Antrim site. Causeway site select and transfer requests to Antrim.

This schematic represents 'automatic' cascade testing, and is programmed into the Middleware laboratory information system. *Consultants with Endocrinology and Haematology specialities* will have FT4 automatically reflexed for each TFT request, regardless of TSH level. Children below 16 years will have FT4 automatically reflexed for each TFT request, regardless of TSH level.

Reproductive Hormone Test Cascade Testing



Where possible, select SPECIFIC tests to answer specific clinical questions rather than Reproductive Hormone Profile requests. See examples above.
Requests for Reproductive Hormone Profile may include FSH, LH, Progesterone and Oestradiol depending on the agreed profile cascade testing above.
The minimum response will be a FSH only (where the female patient is over 45 yrs and the FSH above 30)
Specific requests for Reproductive Hormone Profile from Gynaecologists will be given a full profile only where the Consultant Gynaecologist code is included on the request.

Prolactin requests MUST be made separately (Test Code PROL). Where the Prolactin level is above 700 mIU/L, an estimate of Monomeric Prolactin will be reported.

13. TOXICOLOGY

Most diagnostic problems presented by a patient, who may have ingested a toxin or a drug overdose, are best solved by a thorough history, clinical examination and basic biochemical investigations. The range of toxic compounds which may be implicated is vast. However, with a few important exceptions, the vast majority need not to be positively detected or measured by the laboratory, as patients will most often recover satisfactorily with intensive supportive therapy alone.

The concept of a "toxicology screen" while understandably attractive can only be effectively undertaken in few specialised centres and studies have shown that such a comprehensive approach does not significantly alter patient management or outcome in the acute phase.

The Clinical Biochemistry Department can measure a limited number of drugs and other agents that have been shown to be of value in the prognosis and treatment.

The Drug Screen (Overdose) profile consists of serum ethanol and paracetamol; salicylate **only upon specific request**. Ethanol only available for under 16's if specically requested.

Urine Drugs of Abuse screen is carried out in Belfast Trust Regional Toxicology Centre.

Urgent Urine Drug Screens must be arranged with Belfast RVH Chemical Pathologists. Routine Laboratory transport to Belfast, twice daily at 8am and 1pm, Monday to Friday. Transport outside these arrangements is by taxi, directly from ward. (Ward cost centre approval required.)

Confirmation analysis of positive results may take up to 5 days.

In suspected overdose cases, it is prudent to collect and retain samples of blood, urine and gastric contents and, when available, any samples of the suspected agent. Where the patient makes an uneventful recovery these samples can be discarded but should complications arise analysis can be arranged at an appropriate specialised centre.

14. THERAPEUTIC DRUG MONITORING

Rationale

Measurement of the circulating concentration of certain drugs can be an invaluable aid to patient management in allowing dosage regimes to be tailored to the individual. This approach is useful for only the limited number of drugs where one or more of the following applies:- the therapeutic response correlates better with the circulating level than the dose administered; there is a 'therapeutic range' of concentrations within which the majority of patients experience maximum clinical benefit with the minimum of toxic side effects; that adjustments made on the basis of measured levels derives more benefit for the patient than would be possible by the exercise of sound clinical judgement alone.

The 'therapeutic range' quoted for individual drugs is essentially derived from the 'minimum effective' and the 'maximum safe' concentrations and is best regarded as providing guidance for the interpretation of patient clinical status rather than an absolute range of values which must be attained at all costs. It should be noted that there is much evidence that drugs can be effective at supposed 'subtherapeutic' concentrations and, similarly, it may be necessary, with caution, to exceed the accepted range in order to achieve the desired therapeutic benefit for some individuals.

The majority of drugs do not require concentration monitoring. For example, where therapeutic effect can easily be established by clinical means (e.g., antihypertensives, analgesics, hypnotics), or using laboratory markers of drug action (anticoagulants, hypoglycaemic agents, lipid lowering drugs, hormone preparations).

TDM now has an established place in the individualisation of dosage for drugs which
cannot be readily assessed clinically (e.g: prophylaxis of seizure or mania)
those with a narrow therapeutic index (the range of concentrations between therapeutic and toxic effects)
where there is a risk of undetectable irreversible toxicity (e.g. the aminoglycoside antibiotics).
However, it must be emphasised that clinical and other criteria remain important and TDM should never be the sole basis for individualising therapy.

Sampling

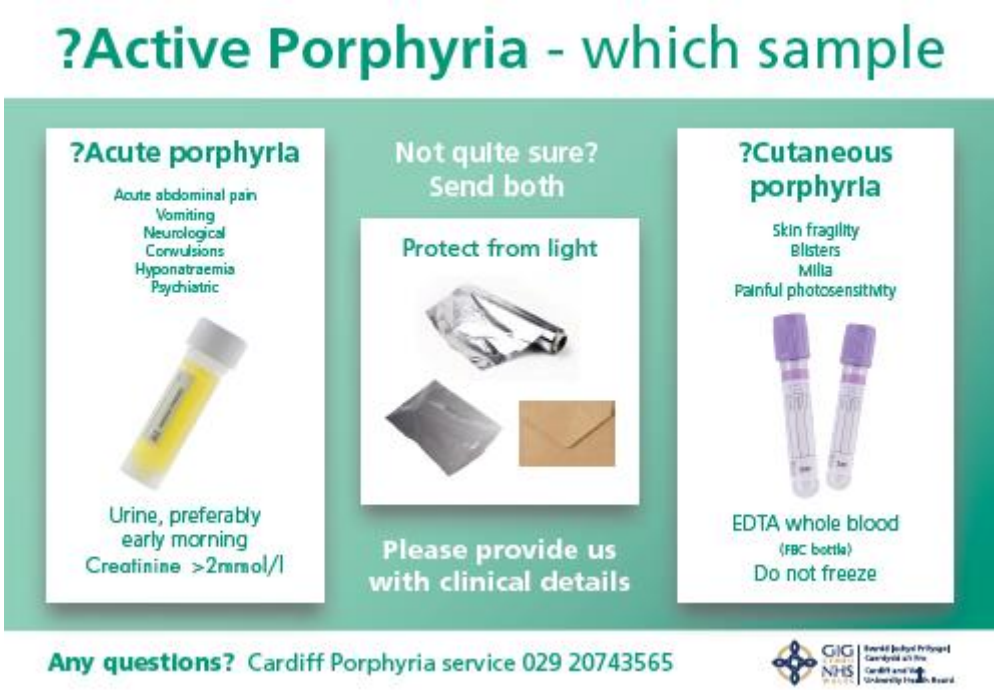
Except where suspected toxicity is being considered, samples should be taken only when the patient is at steady state on the present dose of the drug. The time taken to reach a steady-state is a function of the elimination half life of the drug it takes some five half lives to achieve plateau concentrations. This can be regarded as the optimal sampling time after starting a drug or changing the dose.
It is also important that samples are taken at an appropriate time in relation to dose. The most reproducible time to take measurements is immediately pre-dose (trough concentration) when the lowest level of the cycle is obtained. Peak concentrations are more relevant to the diagnosis of toxicity (except aminoglyoscide antibiotics) but more difficult to predict. Contact the laboratory where any doubts or queries arise.

Refer to NHSCT policy "Antibiotic Therapy (first line empirical) in Hospitalised Adults" for further information. See links below

	Sampling time	Elimination Half Life
Digoxin	Pre dose or at least 6 h post dose	36h
Carbamazepine	Pre dose	10-20h
Lithium	12 hours post dose	10-35h
Phenytoin	Pre dose	6-24h
Theophylline	Pre dose	3-9h
Amikacin	See Staffnet for most recent policy	
Gentamicin		
Vancomycin		
Teicoplanin	Trough level. Not normally repeated within 4 days	
Valproate	Routine monitoring unnecessary. Only to check compliance.	11-17h

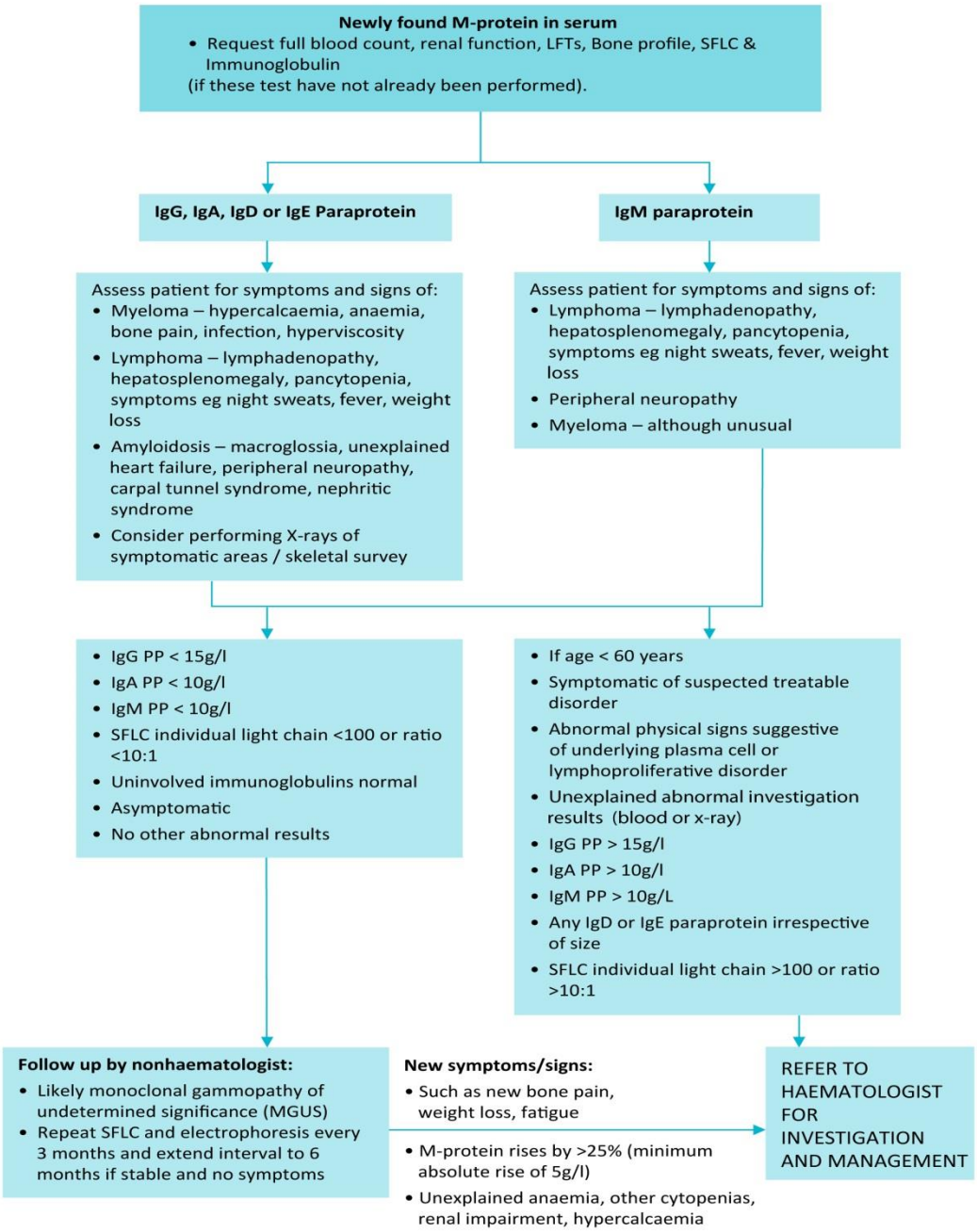
15. Porphyria Investigations

http://www.cardiff-porphyria.org/ is one of two national centres for porphyria investigations. The extract below indicates sample types according to clinical suspicion. Further advice can be found on the website.



16. Newly detected Paraprotein Investigation Algorithm

Algorithm for investigation of a newly detected paraprotein



Adapted from UK Myeloma forum (UKMF) and Nordic Myeloma Study Group guidelines for the investigation of newly detected M proteins and the management of monoclonal gammopathy of undetermined significance, British Journal of Haematology, 147, 22-42

17. NI Regional TFT age related reference ranges

Assay	Male	Female	Age
TSH	0.7-15.2 mIU/L	0.7-15.2 mIU/L	0 - 6 days
	0.72 - 11.0 mIU/L	0.72 - 11.0 mIU/L	>6d ≤3 mth
	0.73-8.35 mIU/L	0.73-8.35 mIU/L	≥3 ≤12 mth
	0.7-5.97 mIU/L	0.7-5.97 mIU/L	>1 ≤6 y
	0.6-4.84 mIU/L	0.6-4.84 mIU/L	≥6 ≤11 y
	0.51-4.3 mIU/L	0.51-4.3 mIU/L	>11 ≤20 y
	0.27 – 4.2 mIU/L	0.27 – 4.2 mIU/L	**Adults**
			Pregnancy
		0.33-4.59 mIU/L	1st trimester
		0.35-4.1 mIU/L	2nd trimester
		0.21-3.15 mIU/L	3rd trimester
FT4	11.0-32.0 pmol/L	11.0-32.0 pmol/L	0 - 6 days
	11.5-28.3 pmol/L	11.5-28.3 pmol/L	>6d ≤3 mth
	11.9-25.6 pmol/L	11.9-25.6 pmol/L	≥3 ≤12 mth
	12.3-22.8 pmol/L	12.3-22.8 pmol/L	>1 ≤6 y
	12.5-21.5 pmol/L	12.5-21.5 pmol/L	≥6 ≤11 y
	12.6-21.0 pmol/L	12.6-21.0 pmol/L	>11 ≤20 y
	12 - 22 pmoL/L	12 - 22 pmoL/L	**Adults**
			Pregnancy
		12.1-19.6 pmol/L	1st trimester
		9.63-17.0 pmol/L	2nd trimester
		8.39-15.6 pmol/L	3rd trimester
FT3	2.7-9.7 pmol/L	2.7-9.7 pmol/L	0 - 6 days
	3.0-9.3 pmol/L	3.0-9.3 pmol/L	>6d ≤3 mth
	3.3-9.0 pmol/L	3.3-9.0 pmol/L	≥3 ≤12 mth
	3.7-8.5 pmol/L	3.7-8.5 pmol/L	>1 ≤6 y
	3.9 - 8.0 pmol/L	3.9 - 8.0 pmol/L	≥6 ≤11 y
	3.9-7.7 pmol/L	3.9-7.7 pmol/L	>11 ≤20 y
	3.1 – 6.8 pmoL/L	3.1 – 6.8 pmoL/L	**Adults**
			Pregnancy
		3.78-5.97 pmol/L	1st trimester
		3.21-5.45 pmol/L	2nd trimester
		3.09-5.03 pmol/L	3rd trimester

PROFILES – Clinical Biochemistry

Profile	Tests	Specimen / Notes
Electrolyte	Sodium Potassium Chloride Bicarbonate (CO2) *in-patient requests* Urea Creatinine eGFR - *calculated*	 Heparin (Gel tube) Potassium unreliable with prolonged contact between cells and serum.
Liver	Total Bilirubin Direct Bilirubin DBIL – *added selectively to paediatric requests or on request.* Alkaline Phosphatase ALP Aspartate Transaminase AST Alanine aminotransferase ALT Gamma-Glutamyl Transferase GGT Total Protein Albumin	 Heparin (Gel tube)
Bone	Calcium Phosphate Alkaline Phosphatase Albumin Adjusted Calcium - *calculated*	 Heparin (Gel tube) Sample should be taken without tourniquet if possible
Lipid	Triglyceride, Total Cholesterol HDL-Cholesterol LDL-Cholesterol - *calculated* Non HDL Cholesterol - *calculated* Cholesterol / HDL Ratio - *calculated*	 Heparin (Gel tube) Fasting >14h sample for Triglyceride LDL cholesterol calculation is not valid when Triglycerides > 4.5mmol/L
Thyroid	TSH FT4 and / or FT3 as requested or indicated.	 Heparin (Gel tube)

TESTS - Clinical Biochemistry

Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
ACTH* **(Adrenocorticotrophic hormone)** **Referral Test**	 4ml blood taken into 2 EDTA tubes. Transport to the laboratory immediately on ice - must be received within 30 minutes of venepuncture. Take sample between 9-10am and before the a.m. dose of steroid (if any). **Record time sample is taken and time and dose of any previous corticosteroid treatment.**		Contact Belfast Trust Endocrine Dept for further information
Alanine Amino-Transferase (ALT)	 Heparin (Gel tube)	Female 5–33 U/L Male 5–41 U/L	Haemolysis invalidates results. Part of Liver profile.
Asparate Amino-Transferase (AST)	 Heparin (Gel tube)	Female 4–32 U/L Male 4-40 U/L	Haemolysis invalidates results. Part of Liver

Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Albumin	 Heparin (Gel tube)	35–50 g/L	Part of Liver and Bone Profiles.
Albumin Creatinine Ratio ACR (Microalbumin)	Random urine sample - Yellow Monovette 	<3.0mg/mmol	Frank haematuria or existing urinary tract infection invalidates test.
Alcohol (Ethanol)	 Heparin (Gel tube)	Not normally detected	Analysed for clinical reasons only. Part of the Overdose profile. This test cannot be added on to a previous request sample. Volatile.
Aldosterone* **Referral Test**	 4mL EDTA blood sample to be sent to the laboratory IMMEDIATELY. Plasma must be separated within <3 hrs. Do **NOT** send on ice Renin may be tested on the same sample		Contact Belfast Trust Endocrine Dept for further information

Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Allergen Requests* **Referral Test**	 Clotted blood (Gel tube)		Contact Belfast Trust Immunology Dept for further information
Alkaline phosphatase (ALP)	 Heparin (Gel tube)	Age related reference values are printed on the report form.	Part of Liver and Bone Profiles.
Alkaline phosphatase (ALP) isoenzyme* **Referral Test**	 Clotted blood (Gel tube)		Contact Belfast Trust Biochemistry Dept for further information
Alpha-fetoprotein* (AFP) **Referral Test**	 Heparin (Gel tube)		Contact Belfast Trust Biochemistry Dept for further information
Alpha-1-Antitrypsin* **Referral Test**	 Clotted blood (Gel tube)		Contact Belfast Trust Biochemistry Dept for further information

Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Alpha-1-Galactosidase* **Referral Test**	 5 ml EDTA sample tube. Send to lab immediately. Must reach lab referral Laboratory within 72 hrs. **Draw samples Mon-Thurs, only, to allow for postage to referral lab.**	Refer to Willink lab handbook at www.mangen.co.uk	Contact Willink Biochemical Genetics Laboratory, Manchester University NHS Foundation Trust. Telephone: 0161 70 12137/8 for further information
Amikacin	 Heparin (Gel tube) Indicate sample type (Peak or Trough).		For clinical advice contact Antrim 334113
Amino acids - Plasma * **Amino acids - Urine *** **Amino acids - CSF *** **Referral Test**	 EDTA sample tube, but  Heparin (Gel tube) acceptable Send to lab immediately. Random urine sample Send to lab immediately.  Sample in sterile universal 		It is important to give full clinical details including diet and any drug treatment. For diagnostic purposes please send both **blood and urine**. Contact Belfast Trust Paed and Metabolic Dept for further information

Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	**COMMENTS**
Ammonia (Antrim Site)	 EDTA sample tube fill to the top to exclude air. Transport to the Lab, on ice, **must** reach lab within 15 mins.	Female 11 – 51µmol/L Male 16 - 60 µmol/L 1 mth-16 yrs <50 µmol/L < 1 mth < 100 µmol/L	Inform Laboratory that assay is being requested prior to taking samples. Haemolysis invalidates result For Paediatric advice consult www.metbio.net
Amylase	**Blood**  Heparin (Gel tube) **Urine** Random sample (Urine Monovette Yellow) or 24hr collection in a plain container 	Plasma 28–100 U/L 24hr Urine 5-410 U/24hr Random Urine 5-460 U/L	

Samples referred to laboratory outside NHSCT - please send separate form and sample
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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Androgen Profile* – Androstenedione DHEAS (Dehydroepiandrosterone sulphate) 17 Hydroxyprogesterone SHBG (sex hormone binding globulin) Testosterone **Referral Test**	 Clotted (no gel), **ESSENTIAL for 17OHP Androstenedione,**  Heparin (Gel tube)		FAI calculation generally included Contact Belfast Trust Endocrine Dept for further information .
Angiotensin converting enzyme (ACE)* **Referral Test**	 Heparin (Gel tube)		Contact Belfast Trust Biochemistry Dept for further information
Anti CCP* **Referral Test**	 Clotted blood (Gel tube)		Contact Belfast Trust Immunology Dept for further information

Samples referred to laboratory outside NHSCT - please send separate form and sample
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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Anti cardiolipin antibody* **Referral Test**	 Clotted blood (Gel tube)		Contact Belfast Trust Immunology Dept for further information
Anti gliadin antibody* **Referral Test**	 Clotted blood (Gel tube)		Contact Belfast Trust Immunology Dept for further information
Anti-glomerular basement membrane antibodies* **Referral Test**	 Clotted blood (Gel tube)		Contact Belfast Trust Immunology Dept for further information
Anti Mullerian Hormone AMH* **Referral Test**	 Clotted blood (Gel tube)		Unfunded Test. This test is only available privately by special arrangement with the laboratory.
Anti-phospholipid antibodies* **Referral Test**	 Clotted blood (Gel tube)		Contact Belfast Trust Immunology Dept for further information

Samples referred to laboratory outside NHSCT - please send separate form and sample
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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Anti-nuclear antibodies* (ANA) **Referral Test**	 Clotted blood (Gel tube)		Contact Belfast Trust Immunology Dept for further information
Bence Jones Protein (BJP)	Random urine sample in a **Yellow Urine Monovette** 	Not normally detected	Contact Antrim 334774 for further information.
Beta Carotene* **Referral test**	 Clotted blood (Gel tube) Protect from light		
Beta 2 Microgobulin* **Referral Test**	 Clotted blood (Gel tube)		Contact Belfast Trust Biochemistry Dept for further information
Bicarbonate (CO2)	 Heparin (Gel tube)	22–29mol/L	Added selectively to all acute patient Electrolyte requests.
Bile Acids * **Referral Test**	 Heparin (Gel tube)	< 14µmol/L	Results are available on NIECR, not on local Laboratory Recall. Contact Ulster Hospital Biochemistry

Samples referred to laboratory outside NHSCT - please send separate form and sample
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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Bilirubin	 Heparin (Gel tube) **Total Bilirubin** **Direct Bilirubin**	2 – 21 μmol/L Newborn 1day 2-137 μmol/L Newborn 1day 2-222 μmol/L Newborn 1day 2-290 μmol/L 2 – 5 μmol/L	Age related DBIL Selectively added to neonatal Total Bilirubin requests or on request. Patients with elevated IGG can have marked increases in measured Bilirubin. Contact laboratory for further advice.
Blood Gas Analysis **Point of Care analysis only.**	Dry Heparinised Syringe Arterial blood	Arterial blood ranges PH 7.35 - 7.45 PO_2 11.0 – 14.4 kPa PCO_2 4.3 – 6.4 kPa Bicarb 22 – 29 mmol/L Total CO_2 22 – 30 mmol/L Base Excess +/-3 mmol/L	See StaffNet Point of Care area or click here for Instructions
Beta Trace Protein (CDT)* **Referral Test**	CSF / Fluid Unhaemolysed fluid in a SMALL 2ml plain tube, **paired with serum sample**	Referral test	Contact laboratory to discuss.

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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Brain Natriuretic Peptide pro-BNP	 Heparin (Gel tube)	Refer to NICE Chronic Heart Failure Guidelines http://pathways.nice.org.uk/pathways/chronic-heart-failure	
C1 esterase inhibitor* **Referral Test**	 Clotted blood (Gel tube) Samples must ideally be received in the laboratory within 24 hours of venepuncture.		Contact Belfast Trust Immunology Dept for further information
CA 125* **Referral Test**	 Heparin (Gel tube)		Contact Belfast Trust Biochemistry Dept for further information
CA 19-9* **Referral Test**	 Heparin (Gel tube)		Contact Belfast Trust Biochemistry Dept for further information
Caeruloplasmin* **Referral Test**	 Clotted blood (Gel tube)		Contact Belfast Trust Biochemistry Dept for further information
Calcitonin* **Referral Test**	 4ml Lithium Heparin. Transport immediately on ice, must be received within 2 hours of venepuncture.		Contact Belfast Trust Endocrine Dept for further information

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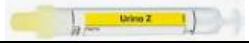
TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Calcium	**Blood**  Heparin (Gel tube) **Urine** Random urine sample in yellow monvette or 24 hour collection. Random sample will be acidified upon receipt. Contact Biochemistry for acidified 24 hour collection bottle. 	**Plasma** Calcium 2.15–2.55 mmol/L **Urine** 24hr 2.5– 7.5 mmol/24hr	Part of Bone Profile. Blood sample should be taken without tourniquet if possible.
Calcium Adjusted	This result is calculated within the NHSCT Laboratory using Pathology Harmonisation guidelines. Results will differ from many on-line calculators	2.2 – 2.6 mmol/L	Part of Bone Profile.
Calcium : Creatinine Ratio	Random Urine sample - yellow Monovette Sample acidified on receipt Calculated result from Urinary Calcium and Creatinine Plain bottle – Acid added in Laboratory upon receipt. 	Adult 0.04 – 0.6 mmol/mmol Paediatrics: - Age related Reference Intervals	

Samples referred to laboratory outside NHSCT - please send separate form and sample
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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Calcium Creatinine Clearance Ratio (CCCR)	 Heparin (Gel tube) **AND** complete 24 hour urine collection Contact Laboratory for acidified container. Calculated result based on Urinary and Serum Calcium and Creatinine measurements.	CCCR >0.01 mmol/mmol excludes FHH CCCR <0.01 mmol/mmol is highly su*ggestive* of FHH	Indications for test – In established hypercalcaemia, Familial Hypocalciuric Hypercalcaemia (FHH). For further details, contact Laboratory.
Carbamazepine* (Tegretol) **Referral Test**	 Heparin (Gel tube)	Single drug regime 4 -12 mg/L Multiple drug regime 4-8 mg/L	Trough sample Contact Belfast Trust Biochemistry Dept for further information
Carboxyhaemoglobin **Point Of Care Test**	Dry Heparinised Syringe	Non-smokers 0–2 % Smokers 2 – 10% Toxic symptoms > 10% NB: Patients treated with oxygen prior to sampling may show normal levels even after severe poisoning.	See StaffNet Point of Care area or click here for Instructions

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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Calprotectin* **Referral Test**	Faeces- approx. 5g 	≥ 16 Years of Age: <50 ug/g – IDB unlikely 50-150 ug/g –Repeat in 4 wks, with patient off NSAID or aspirin, if still 50-150 ug/g refer to GI OPD >150 ug/g – IBD likely, refer to gastroenterologist < 16 Years of Age: Reference ranges in Pediatrics are not well established	Contact Ulster Hospital for further information
Carcinoembryonic Antigen (CEA)* **Referral Test**	  Heparin (Gel tube)		Contact Belfast Trust Biochemistry Dept for further information

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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	**COMMENTS**
Catecholamine* **(Adrenalin, Noradrenalin & Dopamine)** **NB! Metanephrine measurement replaces urine catecholamines.** **Catecholamines* Plasma*** **Paediatric Requests** **Referral Test**	**Urine** 24hr urine with acid preservative, bottle available from the Laboratory. Test not available routinely. Contact Belfast Trust Biochemistry Dept. before performing the test. (Part of clonidine stimulation test) Universal container containing acid obtained from the laboratory.		Sample must be acidified upon collection. Contact Belfast Trust HPLC Dept for further information
Chloride	**Blood**  Heparin (Gel tube) **Urine** Random sample in a yellow urine monovette **or** 24hr urine in a plain container 	95–108 mmol/L 110 – 250 mmol/24hr	Part of Electrolyte Profile. Interpretation depends on associated clinical details
Cholesterol (Total)	 Heparin (Gel tube)	2.8 - 5.0 mmol/L	Part of Lipid Profile.

Samples referred to laboratory outside NHSCT - please send separate form and sample
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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Cholinesterase* activity e.g. investigation of Organophosphate toxicity **Cholinesterase Phenotyping*** **Referral Test**	 EDTA sample tube  Clotted blood (Gel tube) acceptable for Cholinesterase Activity and Phenotyping		Phenotyping For investigation of scoline Apnoea
Chromosome Studies* Request form available from your local laboratory **Referral Test**	 4 ml Lithium Heparin. No Gel		Contact Belfast Trust Molecular Diagnostics for further information.
CK Creatinine Kinase	 Heparin (Gel tube)	Female 25 - 200 U/L Male 40 - 320 U/L	
CK Creatinine Kinase Isoenzyme* **Referral Test**	 Clotted blood (Gel tube)		Contact Belfast Trust Biochemistry Dept for further information

Samples referred to laboratory outside NHSCT - please send separate form and sample
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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Cobalt* **Referral Test**	 Trace metals bottle (blue / black cap).		Contact Belfast Trust Trace Metals Dept for further information
Coeliac Screen* **Referral Test**	 Clotted blood (Gel tube)		Contact Belfast Trust Immunology Dept for further information
Complement analysis (C3 C4)	 Clotted blood (Gel tube)	C3 0.75 – 1.65 g/L C4 0.14 – 0.54 g/L	
Copper * **Referral Test**	**Blood**  Trace metals bottle (blue / black cap). **Urine** 24hr urine collection. Do not use metal bed pan to collect specimen.		Contact Belfast Trust Trace Metals Dept for further information

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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Cortisol	**Blood**  Heparin (Gel tube) NB. Routine method unsuitable for investigation of Congenital Adrenal Hyperplasia. Contact the Laboratory	Morning hours 6-10 a.m 166-507 nmol/L Afternoon hours 4-8 p.m 74-291 nmol/L See Staffnet Laboratory area for interpretation of Synacthen Stimulation Test and Dexamethasone suppression test	Record sample times on forms and bottles. Recent steroid medication may interfere with the test. Indicate if part of a Synacthen stimulation test or Dexamethasone Suppression Test Excessive biotin (Vit B6) supplements may interfere
Cortisol, Urinary Free* **Referral Test**	**Complete** 24hr urine collection (Plain container)		Contact Belfast Trust Endocrine Dept for further information
Creatinine	**Blood**  Heparin (Gel tube) **Urine** 24 hr urine collection in a plain container	Female 45 - 84 µmol/L Male 59 - 104 µmol/L Female 6.3 – 13.4 mmol/24h Male 8.6 – 19.4 mmol/24h	Part of Electrolyte and Renal profiles

Samples referred to laboratory outside NHSCT - please send separate form and sample **Click HERE to access the latest Belfast Trust Laboratory Handbook**			
TEST	SAMPLE / AMOUNT	REFERENCE VALUES	**COMMENTS**
Creatinine Clearance **CRCL**	24 hr urine – plain container **and**  Heparin (Gel tube)	Female 71–121 ml/min Male 59–137 ml/min	Age and body surface area need to be considered when interpreting paediatric results.
C-Peptide* **Referral Test**	 Heparin (Gel tube) Must be separated within 4 hours of sampling		Contact Belfast Trust Endocrine Dept for further information
CRP **(C-Reactive Protein)**	 Heparin (Gel tube)	<1- 5mg/L	
Cryoproteins **(Cryoglobulin and Cryofibrinogen)**	 Clotted (no gel) X 6-8, preheated to 37ºC by laboratory staff- must be present when sample is taken  4ml blood in EDTA bottle X 3		Contact Clinical Chemistry pathologists Dr Elinor Hanna or Dr Sumana Gidwani via email to arrange testing. Available Mon-Fri 09:00-17:00 Reported as Cryoglobulin, allow 14 days for report to be issued .

Samples referred to laboratory outside NHSCT - please send separate form and sample
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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
CSF Glucose	 1ml **CSF** in fluoride EDTA (grey cap) tube and  2ml **blood** in fluoride EDTA (grey cap) tube Also 2ml blood in EDTA /oxalate tube.	Child<3mths 3.3–4.4 mmol/L Adult 2.2–3.9 mmol/L (60–70% of plasma glucose level)	Notify Biochemistry to expect request. Part of CSF Profile See CSF sample collection details – **Do not send by air tube**
CSF Lactate* **Referral Test**	 1ml **CSF** in fluoride EDTA (grey cap) tube	Notify Biochemistry to expect request. Clinical details required. Contact Belfast Trust Biochemistry Dept for further information. **Do not send by air tube**	
CSF Protein	 1ml **CSF** in fluoride EDTA (grey cap) tube or Plain sterile container	0.15 – 0.45g/L	Notify Biochemistry and Microbiology to expect request. Part of CSF Profile. **Do not send by air tube**

Samples referred to laboratory outside NHSCT - please send separate form and sample **Click HERE to access the latest Belfast Trust Laboratory Handbook**			
TEST	SAMPLE / AMOUNT	REFERENCE VALUES	**COMMENTS**
CSF Spectrophotometry (Xanthochromia)	Wait >12hrs post event before sampling. Request CSF bottle pack from laboratory. Plain sterile container with yellow cap. **Protect from light**  Heparin sample required for Protein and Bilirubin. **Do not send CSF by air tube**	Not normally detected.	Notify Biochemistry to expect request. Clinical details required. **Available between 09:00-16:00** **See CSF sample collection details**
CSF (Oligoclonal Band)* **Referral Test**	CSF sample in a plain sterile container with yellow cap **Contemporaneous blood sample essential**  **4mls clotted blood**		Contact Belfast Trust Immunoproteins Dept for further information
Cyclosporin* Trough level **Referral Test**	 4ml blood in EDTA Trough sample although Peak samples are also suitable		Contact Belfast Trust Toxicology Dept for further information

Samples referred to laboratory outside NHSCT - please send separate form and sample
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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Cystic Fibrosis genetic analysis* **Referral Test**	 2 x 5mls blood in EDTA		Contact Department of Medical Genetics, Belfast Trust for further information
Digoxin	 Heparin (Gel tube) 8 - 12 hour post dose	0.9–2.0µg/L	Digibind interferes with assay. Half life is about 1 day. Wait 3 days after discontinuation before measuring digoxin. Excessive biotin (Vit B6) supplements may interfere with this test.
Drug Screen – Overdose Serum:-	 Heparin (Gel tube)	Not normally detected	The default profile is Ethanol and Paracetamol. Salicylate may be added upon request.
Drug Screen – Drugs of Abuse – Urine* **Referral Test**	Random urine sample in a yellow **Urine Monovette** 	Qualitative test Contact Belfast Trust Toxicology Dept for further information	If urgent processing is required, discuss with Belfast (RVH) duty Pathologist. Routine transport to Belfast at 8am and 1pm Mon to Fri. Outside these times please organise taxi transport directly from Ward to Belfast.

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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Estimated GFR **eGFR**	Part of Electrolyte profile Calculated value using MDRD4 equation.	>60mL/m^3	Advise adults not to eat any meat in the 12 hours before having a blood test for eGFR creatinine.
Ethanol (Alcohol)	 Heparin (Gel tube)	Units are **mg/L**	Part of the Drug Overdose Screen. Clinical samples only.
Ethylene glycol* **Referral Test**	 plain clotted	Contact Belfast Trust Toxicology Dept for further information	If urgent processing is required, discuss with Belfast (RVH) duty Pathologist. Routine transport to Belfast at 8am and 1pm Mon to Fri. Outside these times please organise taxi transport directly from Ward to Belfast.
Faecal Immunochemical test [FIT] (symptomatic – RFIT)	 Symptomatic FIT Picker	Please refer to: qFIT for lower GI symptoms | Northern Ireland Cancer Network (hscni.net)	No dietary preparation necessary

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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Ferritin	 Heparin (Gel tube)	**Female** 16-55yrs 13–150 ng/mL >55yrs 13–300 ng/mL **Male** >16yrs 30–400 ng/mL Paediatrics – Age related reference intervals apply.	Patients receiving iron supplementation should be monitored by FBC. Excessive biotin (Vit B6) supplements may interfere with this test.
Fluid Analysis:- **Pleural Fluid: protein, LDH, pH, glucose** **Peritoneal Fluid: albumin, SAAG (serum/ascetic albumin gradient), protein.** **If SAAG is requested a plasma sample taken within 2 hours of fluid is required.**	Plain universal container Please state fluid type – Pleural, peritoneal (ascitic), drain ect.  Heparin (Gel tube) required to aid interpretation.  glucose grey top tube For pH, refer to POC instructions. Write result on lab request form.		Appearance reported on all samples. For other tests please contact lab for advice. NB! These tests are unaccredited. (UKAS)

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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Folic acid	 Heparin (Gel tube)	3.9 – 26.8 ug/L Fasting levels below 3.9 may indicate Folate deficiency	Patients on Folate supplementation should be monitored by FBC Excessive biotin (Vit B6) supplements may interfere with this test.
Follicle Stimulating Hormone (FSH)	 Heparin (Gel tube)	Female Follicular phase 3.5–12.5 U/L Ovulation phase 4.7–21.5 U/L Luteal phase 1.7–7.7 U/L Post Menopause 26–135 U/L Male 1.5–12.4 U/L	Reproductive Hormone Profile Cascade testing protocol – page 38 Contact Laboratory for details
FT4	 Heparin (Gel tube)	12–22 pmol/L Reference interval applies to euthyroid patients NOT on thyroid Treatment. For regional paediatric and pregnancy reference ranges see page 43.	TFT See Cascade testing protocol – page 37 FT4 as indicated or requested.

Samples referred to laboratory outside NHSCT - please send separate form and sample
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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
FT3	 Heparin (Gel tube)	3.1–6.8 pmol/L Reference interval applies to euthyroid patients NOT on thyroid Treatment. For regional paediatric and pregnancy reference ranges see page 43..	See TFT Cascade testing protocol. FT3 as indicated or requested. page 37
Galactose I phosphate uridyl transferase (RBC) (GAL1PUT) screening only* **Referral Test**	 Minimum 0.5 mL blood in Heparin tube – no gel.	Qualitative screen for Classical Galactosaemia Advise contact Metabolic laboratory before sending (tel 02896 151480). Sample must be received within 12 hours of collection	Qualitative screen forwarded to Belfast Trust.
Gastrin* Plasma **Referral Test**	Fasting sample  4 ml blood in an EDTA tube, send on ice	Fasting sample required. Transport to laboratory on ice within 2 hours or nearest lab for separation for transport frozen	Contact Belfast Trust Biochemistry Dept for further information
Gentamicin	 Heparin (Gel tube) Indicate sample type (Peak or Trough).	**Therapeutic** **Toxic** Trough <2mg/L >2mg/L Peak 5-10mg/L >10mg/L	For clinical advice contact Antrim 334113

Samples referred to laboratory outside NHSCT - please send separate form and sample **Click HERE to access the latest Belfast Trust Laboratory Handbook**			
TEST	SAMPLE / AMOUNT	REFERENCE VALUES	**COMMENTS**
Gestational Diabetes Screening	 2ml blood in fluoride EDTA (grey cap) tube Fasting sample and 2hrs post glucose load **For Request form use link below** **http://staffnet.northerntrust.hscni.net/BusinessAreas/139.htm** **Select 'Request Form for Glucose Tolerance Requests'**	Please see link below for diagnostic criteria details http://www.nice.org.uk/guidance/ng3/chapter/1-recommendations#gestational-diabetes-2	
GGT Gamma Glutamyl Transferase	 Heparin (Gel tube)	Female 6 - 42 U/L Male 10 - 71 U/L Paediatrics – Age related reference intervals apply.	Part of Liver Profile.
Globulin (Serum)	 Clotted blood (Gel tube)	18 – 34 g/L (local reference interval)	Part of Immunoprotein Profile Valid sample, SERUM only.
Glucose (Plasma)	 2ml blood in fluoride EDTA (grey cap) tube	8hr fasting 4.0–6.0 mmol/L Random 4.0–7.8 mmol/L	For interpretation of results refer to WHO guidelines for diagnosing diabetes

Samples referred to laboratory outside NHSCT - please send separate form and sample
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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Glycosaminoglycan (MPS) screening only * **Referral Test**	Random urine sample in a yellow **Urine Monovette** 	For the investigation of glycosaminoglycan lysosomal storage disorders. Test includes total glycosaminoglycans quantitation and electrophoresis. Oligosaccharides/sialic acid are not included in this screen.	Contact Belfast Trust Metabolic & Neonatal Screening for further information
Growth Hormone (GH)* **Referral Test**	  Heparin (Gel tube)	Random levels are not useful. Samples should be taken no sooner than 8 hours after a Biotin administration	Contact Belfast Trust Endocrine Dept for further information
Gut and Islet Cell Hormones* :- **(Specify)** **Referral Test**	Fasting sample   EDTA x4 Transport on ice Sample must arrive in the lab within 2 hours		Contact Clinical Biochemistry lab prior to taking samples. Contact Belfast Trust Endocrine Dept for further information

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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
5HIAA* 5-Hydroxy-Indoleacetic Acid No screening available **Referral Test**	24hr sample of urine in a plain container Patient must be on a special diet – contact Biochemistry 334774 for advice Can be done with **5NT (5 Hydroxytryptamine**)	Patient should avoid pineapple, banana, plums, tomatoes, kiwi fruit and walnuts for 3 days before and during the collection period	Contact Belfast Trust Endocrine Dept for further information
Haemochromatosis HFE* **Referral Test**	 4ml blood in EDTA tube. Criteria for selection of patients for HFE gene screening have been established to ensure that the right patients are screened, and to reassure clinicians that other patients do not need to be screened. **Criteria must be clearly written on request form or samples will be rejected**	**Acceptable criteria:** • Diagnosis of haemochromatosis in a first degree relative • Fasting TS >55% male or postmenopausal female • Fasting TS >50% premenopausal female • Specialist physician indicates an exceptional case **Minimum criteria not met**: • No fasting TS results available • Fasting TS results below cut-off Contact Belfast Trust Haematology Dept for further information	
HbA1c	 4ml blood in EDTA tube.	Not diabetes: 20-41 mmol/mol Impaired glucose regulation or prediabetes: 42 - 47 mmol/mol type 2 diabetes: 48 mmol/mol or over	

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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
HCG tumour marker* **Referral Test**	 Heparin (Gel tube)		Contact Belfast Trust Automation Dept for further information
(Quantitative) HCG levels Serum	 Heparin (Gel tube) **HCG requests cannot be added on to processed bloods.**	<7 IU/L Not consistent with pregnancy. 7 – 25 IU/L To confirm pregnancy, HCG result should double in 48 hours. >25 IU/L Consistent with pregnancy.	Contact Antrim 334774 for further information. Not available for routine pregnancy testing. Excessive biotin (Vit B6) supplements may interfere with this test.
(Quantitative) HCG levels* Hydatidiform mole **Referral Test**	 Clotted blood (Gel tube) **and** 25ml urine in a sterile universal container		Samples sent to Charing Cross Hospital for Hydatidiform Mole screening and follow up.
HDL-Cholesterol	 Heparin (Gel tube)	1.0 – 2.5 mmol/L	Part of lipid profile

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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Hormone Profile – Female **FSH, LH,** **Oestrogen, Progesterone,** **Male – FSH, LH, Oestrogen**	 Heparin (Gel tube) When PROFILE selected, cascade testing will be performed. Contact laboratory for details. If particular tests specifically required, please indicate on request form.	See individual analytes	Contact Antrim 334774 for further information. Reproductive Hormone Profile Cascade testing protocol – page 38. Contact Laboratory for details
Ig E* **Referral Test**	 Clotted blood (Gel tube)	Age related – please contact Immunology Belfast Trust	Contact Belfast Trust Immunology Dept for further information
IGF 1* **Insulin-like Growth Factor 1** **Referral Test**	 Heparin (Gel tube)		Contact Belfast Trust Endocrine Dept for further information
Immunoglobulin - IG **IgG IgA and IgM**	 Clotted blood (Gel tube)	IgA 0.8 – 4.0 g/L IgG 6 – 16 g/L IgM 0.5 – 2.0 g/L	Please note, Immunoglobulins are incorporated in a new IP Profile, but may be requested alone.

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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
ImmunoProtein Profile - IP (Including Immunoglobulins and Protein Electrophoresis)	 Clotted blood (Gel tube)		Please note, ONE sample required.
IgG subclasses (IgG 1,2,3) * **Referral Test**	 Clotted blood (Gel tube)		Contact Belfast Trust Immunoproteins Dept for further information
Ionised Calcium Point of Care Test	Dry Heparinised Syringe Arterial blood	1.15 – 1.33 mmol/L	See StaffNet Point of Care area or click here for Instructions
Insulin* **Referral Test**	 Heparin (Gel tube) Take blood for Glucose estimation at same time.		**Must be received in laboratory within 4 hrs - Serum must be separated from cells AND FROZEN within 4 hours** Contact Belfast Trust Endocrine Dept for further information
Iron	 Heparin (Gel tube)	10 - 30 µmol/L	Also see Ferritin and Transferrin

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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
		Paediatrics – Age related reference intervals apply, contact department to discuss. **Overdose Values** >50 mild overdose >90 moderate - severe >180 severe	**Reference values refer to fasting patients not on iron supplements.** Patients receiving iron supplementation should be monitored by FBC.
Lactate **If pyruvate assay is also required, contact the lab**.	Dry Heparinised syringe This assay is ony available on POC Blood Gas analysers	Arterial 0.4 – 0.8 mmol/L Venous 0.6 – 1.4 mmol/L	Avoid use of tourniquet. See StaffNet Point of Care area or click here for Instructions
LDH **Lactate Dehydrogenase**	 Heparin (Gel tube) LDH may also be measured in Pleural Fluid. Unable to add on LDH requests to samples which have been refrigerated.	Female 135 - 214 U/L Male 135 - 225 U/L Child (2-15yrs) 120 – 300 U/L Newborn (4-20 days) 225 – 600 U/L	A small degree of haemolysis may invalidate results. Pleural Fluid LDH is an Unaccredited Test (UKAS)
LDL Cholesterol	Calculated Test. Contact Laboratory for details.	1 – 3 mmol/L	Part of Lipid Profile.

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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
(Calculated)			Result is calculated only if Triglyceride < 4mmol/L
Lead* **Referral Test**	**Blood**  Trace metals bottle (blue / black cap). Random urine sample 		Contact Belfast Trust Trace Metals Dept for further information
Lithium	 Clotted blood (Gel tube) **Heparin tube not suitable**. Take sample 12 hours after previous dose	0.4 – 1.0 mmol/L (<65 yrs) 0.4 – 0.8 (>65yrs)	**The anticoagulant in a green top heparin bottles is lithium.**
Liver Associated Antibodies* **Referral Test**	 Clotted blood (Gel tube)		Contact Belfast Trust Immunology Dept for further information. Specify clinical details
Luteinising Hormone (LH)	 Heparin (Gel tube)	**Female** Follicular phase 2.4 – 2.6 U/L	Part of Reproductive Hormone LH as indicated (cascade

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TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
		Ovulation phase 14 – 95.6 U/L Luteal phase 1.0 – 11.4 U/L Post Menop 7.7 – 58.5 U/L **Male** 1.7 – 8.6 U/L	testing) page 38 or requested. Contact Laboratory for details. Excessive biotin (Vit B6) supplements may interfere with this test.
Magnesium Blood **Magnesium Urine**	 Heparin (Gel tube) **Urine** 24hr collection in acidified 24hr bottle, contact laboratory for container or random sample in yellow Monovette, acidified on receipt 	**Plasma** > 20 yrs 0.7 - 1.0 mmol/L 12-20 yrs 0.7 - 0.91 mmol/L 6-12 yrs 0.7 - 0.86 mmol/L <6yrs 0.7 - 0.95 mmol/L <1mth 0.62 - 0.91 mmol/L **Urine** Random 1.67-5.67 mmol/L 24hour 3-5 mmol/24Hr	Consider in relation to plasma magnesium level, (fractional excretion)
Manganese* **Referral Test**	 Trace metals bottle (blue / black cap).		Contact Belfast Trust Trace Metals Dept for further information

Samples referred to laboratory outside NHSCT - please send separate form and sample **Click HERE to access the latest Belfast Trust Laboratory Handbook**			
TEST	SAMPLE / AMOUNT	REFERENCE VALUES	**COMMENTS**
Mercury* **Referral Test**	 Trace metals bottle (blue / black cap). Random urine sample 		Contact Belfast Trust Trace Metals Dept for further information
Metanephrine **Normetanephrine** **(Catecholamines)** **Referral Test**	**Urine** 24hr urine with acid preservative, bottle available from the Laboratory Paediatric urine acidified Random sample required for Dopamine:Creatinine ratio **Plasma**. NB! Not routinely available. Part of Clonidine Stimulation Test		Contact Belfast Trust HPLC Dept. for further information Note Catecholamine analysis (Adrenalin, noradrenalin and dopamine) has been replaced by Metanephrine analysis
Methaemoglobin	Dry Heparinised syringe This assay is available on POC Blood Gas Analysis analysers	0 – 2.0 %	See StaffNet Point of Care area or click here for Instructions

Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Micronutrient Screen **Trace metals (Selenium, Copper, Zinc)*** **Vitamins A & E*** **Vitamin C*** **All above Referral Tests** **Vitamin B12, Folate, Iron** **Analysed in Antrim**	Send separate form with each sample tube  Trace metals bottle (blue / black cap).  Clotted blood (Gel tube) - **Protect from light**  Clotted blood (Gel tube) **Send to lab within 30 mins of taking sample** **Protect from light**  Heparin (Gel tube)	See individual analytes for reference ranges **VITAMIN SAMPLES SHOULD ALSO BE TAKEN AFTER AN OVERNIGHT FAST**	Contact Belfast Trust Trace metals for further information on trace metal requests. Contact Belfast Trust Endocrine for further information on vitamin A,C and E requests. Contact Antrim/Causeway Biochemistry for further information on vitamin B12, Folate and Iron requests.
Non HDL Cholesterol	 Heparin (Gel tube) Calculated Result		See Lipid Profile
Nuclear Antibody Profile* (Anti-nuclear antibodies) **Referral Tests**	 Clotted blood (Gel tube)		Contact Belfast Trust Immunology Dept for further information.

Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Oestradiol	 Heparin (Gel tube)	**Female** Follicular phase 114-332 pmol/L Ovulation phase 222-1959 pmol/L Luteal phase 222-854 pmol/L Post Menopause <20-505 pmol/L **Male** 41 – 159 pmol/L	Part of Reproductive Hormone Profile Oestradiol as indicated or requested. See cascade page 38 Contact Laboratory for details. Excessive biotin (Vit B6) supplements may interfere with this test.
Osmolality	 Heparin (Gel tube) Random urine in yellow Urine Monovette 	275–295 mOsm/kg 250 –1250 mOsm/kg	Added when serum sodium equal or below 125nmol/L Requested if serum sodium equal or below 125nmol/L
Organic Acids* – investigation of inborn errors of metabolism only **Referral Test**	Random 5 ml urine sample in a yellow Monovette or plain universal.   Samples must be sent to the laboratory as soon as possible.	Qualitative report	It is important to give full clinical details including diet and any drug treatment. Contact Belfast Trust Metabolic & Neonatal Screening Dept.

Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Paracetamol Part of the serum Overdose screen	 Heparin (Gel tube)	You are advised to visit TOXBASE for the most current advice on paracetamol overdose and poisoning Artificially low paracetamol results may be seen if a patient has also taken amitriptyline, imipramine or amphetamines	
Parathyroid Hormone (PTH)	 4ml Blood into an EDTA tube. Bone Profile assay to be done at the same time.	Normocalcaemia 15 – 65 ng/L	Contact Antrim 334774 for further information Excessive biotin (Vit B6) supplements may interfere with this test.
Phenobarbital* **Referral Test**	 Heparin (Gel tube)		Contact Belfast Trust Biochemistry Dept for further information
Phenytoin* **Referral Test**	 Heparin (Gel tube)		Contact Belfast Trust Biochemistry Dept for further information

Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Phosphate	 Heparin (Gel tube) **Urine** 24hr collection in acidified 24hr bottle, contact laboratory for container or random sample in yellow Monovette, acidified on receipt 	1mth 1.3-2.6 mmol/L 1 yr 1.3-2.4 mmol/L 16 yr 0.9-1.8 mmol/L Adult 0.8-1.5 mmol/L 15 - 50 mmol/24h 12.9 – 43.9 mmol/L	
Porphobilinogen * To exclude acute Porphyria **Referral Test**	Fresh urine sample in a yellow Urine Monovette  Contact laboratory before sending sample See Porphyria Investigations table from Cardiff centre		**Protect sample from light – place in an envelope or wrap in tin foil.** All samples will be sent to Cardiff to confirm diagnosis - http://www.cardiff-porphyria.org/

Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Porphyrins* **Referral Test**	**Urine** - Fresh urine sample in a yellow Urine Monovette   **Blood** - EDTA sample **Faeces -** Universal stool sample  Contact lab before sending sample and **protect all samples from light**.		Please provide full clinical information to ensure relevant assays are carried out. http://www.cardiff-porphyria.org/
Potassium	 Heparin (Gel tube) Urine 24 hr collection in plain container or random sample in yellow Monovette 	**Plasma 3.5 – 4.6 mmol/L** (Serum 3.5 – 5.3 mmol/L) **24 Hour Urine** 25 – 125 mmol/24h **Random urine** Interpretation depends on associated clinical details	**Record sample time** Delay in receipt of blood sample may result in pseudo-hyperkalaemia. Samples received at the laboratory more than **6** hours old may not be valid and samples more than **12** hours old will not be reported. Haemolysis invalidates

Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Procalcitonin [PCT]	 Heparin (Gel tube)	**< 0.5 ng/mL** - low risk of severe sepsis and/or septic shock. **> 2.0 ng/mL-** high risk of severe sepsis and/or septic shock.	
Progesterone	 Heparin (Gel tube)	Female Luteal phase 16-28 nmol/L Male <0.159-0.474 nmol/L	Progesterone as indicated or requested. Contact Laboratory for details.See Gynae Cascade page 38 Excessive biotin (Vit B6) supplements may interfere with this test.
Prolactin	 Heparin (Gel tube)	Female 102 – 496 mIU/L Male 86–324 mIU/L	Excessive biotin (Vit B6) supplements may interfere with this test.

Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Prolactin Monomeric	 Heparin (Gel tube) Monoprolactin is only reported if Total Prolactin >700mU/L – monomeric prolactin is the biologically active fraction.	Female 75 – 381 mIU/L Male 63 – 245 mIU/L	Excessive biotin (Vit B6) supplements may interfere with this test.
Prostate Specific Antigen (PSA)	 Heparin (Gel tube)	**Reference Ranges** <49 years 0-2.5 ug/L 49-59 years 0-3.5 ug/L 60-69 years 0-4.5 ug/L 70-79 years 0-6.5 ug/L 80+ years 0-7.5 ug/L	**Referal ranges as per NiCan guidelines** <40 years use Clinical judgement 40-49 years > 2.5ug/L 50-59 years >3.5 ug/L 60-69 years >4.5ug/L 70-79 years >6.5ug/L >79 years use Clinical judgement.

Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Protein	 Heparin (Gel tube) Urine 24 hr collection in plain container or random sample in yellow Monovette 	1day 46 – 70 g/L 1 wk 44 – 76 g/L 1 yr 51 – 73 g/L 15yr 60 – 80 g/L Adult 60 – 80 g/L 24 hr urine 0-0.14 g/24hr Random urine 0-0.15 g/L	
Protein Electrophoresis **See ImmunoProtein Profile**	Blood  Clotted blood (Gel tube)		Incorporates Immunoglobulin A,G & M measurements.
Protein Creatinine Ratio	Random urine sample. 	0 – 14 mg/mmol creatinine	Haematuria invalidates test Hypertension in pregnancy – access link below http://www.nice.org.uk/guidance/CG107

Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Renin (Direct)* **Referral Test**	 4mL EDTA blood sample to be sent to the laboratory IMMEDIATELY. Plasma must be separated within <3 hrs. **Do NOT send on ice**	Aldosterone may be tested on same sample	Contact Belfast Trust Endocrine Dept for further information
Rheumatoid Factor (RF)	 Clotted blood (Gel tube)	<14 IU/mL, reported as NEGATIVE	
Salicylate Please request specifically as it is not a routine test in the overdose profile.	 Heparin (Gel tube) >4h post dose.	0-300mg/L Severe toxicity >700 mg/L	Prognosis cannot be determined from drug concentration alone. NB pH and blood gases
Selenium* **Referral Test***	 Trace metals bottle (blue / black cap).		Contact Belfast Trust Trace Metals Dept for further information

Samples referred to laboratory outside NHSCT - please send separate form and sample **Click HERE to access the latest Belfast Trust Laboratory Handbook**			
TEST	SAMPLE / AMOUNT	REFERENCE VALUES	**COMMENTS**
Serum Free Light Chains * **Referral Test**	 Clotted blood (Gel tube)		Contact Belfast Trust immunoproteins Dept for further information
Sodium	 Heparin (Gel tube) Urine 24 hr collection in plain container or random sample in yellow Monovette	<16 years 133–146 mmol/L Adult 135–145 mmol/L 24 hr urine 0-0.14 g/24hr Random urine - Interpretation depends on associated clinical details	
Sweat Test	Parental consent is MANDATORY prior to booking an appointment for the test on a minor.	Sweat Chloride < 30 mmol/l. Age related result comment is added to each report.	Contact Antrim 334718 to arrange test.
Tacrolimus, FK m506* **Referral Test**	 4ml blood in EDTA bottle. Trough sample	Contact Belfast Trust Toxicology Dept for further information	

Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Teicoplanin	 Heparin (Gel tube) **Trough sample** Please note. Analysis will only be carried out between 9am and 4pm Monday to Sunday.	Trough 20-50mg/L For advice see Current Trust Antibiotic Policy or contact Microbiology Pathologist In normal renal function – trough levels only required if patient is receiving >7 days of therapy. Take first level at day 7 and weekly thereafter. Impaired renal function – trough level prior to the dose on day 5. Re-assay every 5 days if renal function stable or more frequently if unstable	
Testosterone* **Referral Test**	 Heparin (Gel tube)  clotted (no gel) FAI, Androstenedione and 17 OHP MUST be in a RED top gel free bottle	Contact Belfast Trust Endocrine Dept for further information	

Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Thallium* **Referral Test***	 Trace metals bottle (blue / black cap). Random urine sample 		Contact Belfast Trust Trace Metals Dept for further information
Theophylline	 Heparin (Gel tube) Oral : Check 5 days after starting and >3 days after dose adjustment. Sample time should be consistent: ideally trough levels or peak 4–6 hours post-dose. Intravenous : 4–6 hours after starting treatment.	10 – 20 mg/L increased signs of toxicity >20 mg/L	**Oral** : Check 5 days after starting and >3 days after dose adjustment. Sample time should be consistent: ideally trough levels or peak 4–6 hours post-dose. **Intravenous** : 4–6 hours after starting treatment.
Thiopurinemethyl transferase (TPMT)* **Referral Test**	 4ml blood in EDTA bottle		Once only test. Check Labs computer or NIECR for previous entry before requesting.

Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Thyroglobulin* and Tg Ab* **Referral Test**	 Clotted blood (Gel tube)		Thyroglobulin antibody >40 IU/L invalidates thyroglobulin result. Samples should be taken no sooner than 8 hours after a Biotin administration.
Thyroid Antibodies	 Heparin (Gel tube)	Negative 1-34 IU/mL >34 U/mL regarded as significant	Contact Antrim 334774 for further information. Excessive biotin (Vit B6) supplements may interfere with this test.
Thyroid Stimulating Hormone (TSH)	 Heparin (Gel tube)	TSH 0.27 – 4.2 mU/L For regional paediatric and pregnancy reference ranges see page 43.	Thyroid Function Cascade testing – page 37. TSH is the front line test for Thyroid Function. FT4 is measured when indicated by an abnormal TSH, age <16yrs, or special interest Consultant requests.

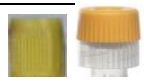
Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Trace metals (Selenium, Copper, Zinc)* **Referral Test**	 Trace metals bottle (blue / black cap).		Contact Belfast Trust Trace Metals Dept for further information
Transferrin **Transferrin Saturation**	 Heparin (Gel tube) Calculation, based on serum iron and transferrin.	2.0-3.6 g/L 30 – 40%	Also see Ferritin and Iron.
Triglyceride	 Heparin (Gel tube) Clotted blood (Gel tube) Fasting (14 hrs) sample	0.40 – 1.70 mmol/L	Part of Lipid Profile.
Troponin-T High Sensitive hsTnT	 Heparin (Gel tube)	AMI unlikely if all TnT < 14ng/L and < 9 ng/L increase @ 3hr	Single sample on admission. Repeat at 3 hrs
Urea	 Heparin (Gel tube)	<1mth 0.8 – 5.5 mmol/L 1mth-1yr 1.0 – 5.5 mmol/L 1yr – 16 yr 2.5 – 6.5 mmol/L Adult 2.5–7.8 mmol/L	Part of Electrolyte Profile

Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Uric Acid	 Heparin (Gel tube) Urine 24 hr collection, plain container	Female 140 - 360 µmol/L Male 200 - 430 µmol/L 1.5 – 4.5 mmol/24hr	
Valproate (Epilim)* **Referral Test**	 Heparin (Gel tube) Trough Sample	Contact Belfast Trust Biochemistry Dept for further information	
Vancomycin	 Heparin (Gel tube)	Trough Levels Therapeutic 10-20 mg/L Toxic >25 mg/L If the patient is seriously ill (severe or deep seated infections) target range is 15 – 20 mg/L.	**Trough vancomycin concentrations >20mg/L may be associated with the onset of nephrotoxicity.** For clinical advice contact Antrim 334113
Vasculitis Screen*	 Clotted blood (Gel tube)		Contact Belfast Trust Immunology Dept for further information

Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	COMMENTS
Vitamin B12	 Heparin (Gel tube)	197 – 771 ng/L	Patients on B12 supplementation should be monitored by FBC Excessive biotin (Vit B6) supplements may interfere with this test.
Vitamin A* & E* **Referral Test**	 Clotted blood (Gel tube) **Protect from light**		Samples should be taken after an overnight fast. Contact Belfast Trust Endocrine Dept for further information
Vitamin C* **Referral Test**	 Clotted blood (Gel tube) **Send on ice and Protect from light** **Send to lab within 30 mins of taking sample**		Contact Belfast Trust Endocrine Dept for further information
Vitamin D* (Total) **Referral Test**	 Clotted blood (Gel tube) Must be received by laboratory within 24hr of venepuncture, fasting sample recommended.		**Clinical justification for request MUST be provided.** Contact Belfast Trust Endocrine Dept for further information

Samples referred to laboratory outside NHSCT - please send separate form and sample
Click HERE to access the latest Belfast Trust Laboratory Handbook

TEST	SAMPLE / AMOUNT	REFERENCE VALUES	**COMMENTS**
Zinc *	 Trace metals bottle (blue / black cap).		Contact Belfast Trust Trace Metals Dept for further information

MICROBIOLOGY

The laboratory offers consultant-lead scientific and clinical advice and interpretation on a comprehensive range of tests for the microbiological investigation of patients.

Our aim is to provide the highest quality of service with prompt delivery of accurate results. Where specific tests are not available locally, they will be referred to colleagues in other centres.
When a test is sent to a reference laboratory, every effort is made to use a PHE recognised laboratory, the details of which will be published with the result received.

The benefit to the patient from examination of specimens and associated reports is primarily dependent on the quality of the request form and of the specimen. In order to obtain best results from the laboratory please submit the most suitable specimen, correctly taken and in the appropriate container with the relevant information on the accompanying request form.

Microbiology Laboratory Hours

Microbiology offers a 24 hour service, 7 days a week, as detailed below:

Routine Service 9.00 am - 5.00 pm Monday to Friday
Weekends & Bank Holidays 9.00 am - 5.00 pm Limited service
Emergency Service 5.00 pm – 9.00 am Emergency specimens ***only***

During emergency service hours, urgent requests for Microbiology testing should be made by **telephoning** the BMS on duty as follows:-
Contact from NHSCT site 331242
Contact from outside Trust via switchboard ask for Microbiology BMS on call

Title	Name	Telephone Number
Consultant Microbiologist/Clinical Lead	Dr D Farren	334119
Consultant Microbiologist	Dr A Nagar	334113
Consultant Microbiologist	Dr E Dorgan	336240
Associate Specialist	Dr S MacFarlane	332022

Microbiology Head BMS	Mrs K Shields	334103
Deputy Head BMS	Mr Derek Smyth	334916
Administration SAA	Mrs B Hutchinson	334834
Enquiries		334873
On call		1242 or 331242 from another site

Clinical Advice and Interpretation

Clinical advice or interpretation of results is available at all times, see contact details on page 12.
During emergency service hours, contact the Consultant Microbiologist via switchboard.

Test Request Forms

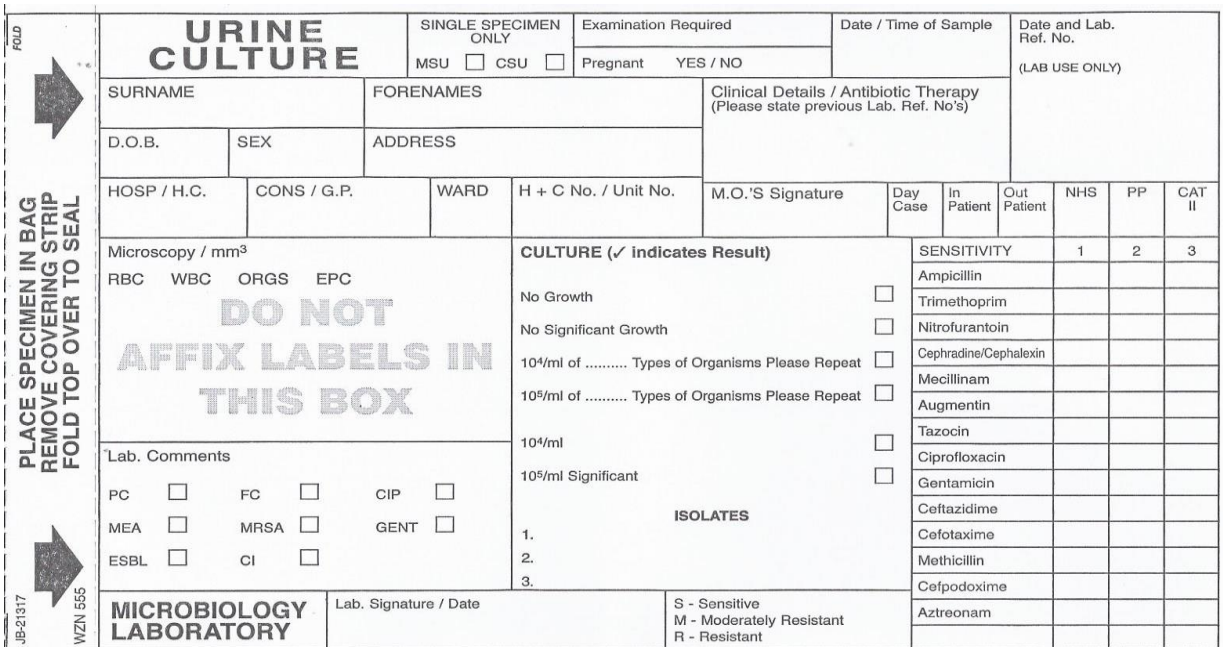
A **completed** Microbiology request form should accompany every specimen. In order to fully identify a patient and send a full report back to the requesting source, the request must contain the minimum acceptance criteria stated.

Minimum Acceptance Criteria (MAC)

- Mandatory MAC MUST be present on ALL sample bottle(s) / container(s) and request form to assure sample acceptance for Laboratories and LIMS.
- Desirable MAC MUST be considered by the User as part of good patient management / care.

	Mandatory	Desirable
Sample	6. Unique identifier number* 7. Patient Official first Name 8. Surname 9. Date of Birth (dd/mm/yyyy) ***The Health & Care Number must be used unless**:- c) The patient is not registered with a General Practitioner in Northern Ireland – use the local hospital numbering system. d) An emergency situation – use local hospital EMERGENCY numbering system. e) Other scenarios such as GUM / Special Clinic (SPC) specimens, SARC (Sexual Assault Rowan Centre) and NSI (needle stick injury). *For Microscope slides:- Patient Official First Name, Surname and Date of Birth written in pencil.	3. Sex (Male/Female/Other)
Request Form	10. Unique identifier number* 11. Patient Official First Name 12. Surname 13. Sex (Male/Female/Other) 14. Date of Birth (dd/mm/yyyy) 15. Date and Time of Sample Collection 16. Requester Name / Code 17. Source (Ward / Clinic /GP) 18. Investigation (test) Required 19. Anatomical site and specimen type ***The Health & Care Number must be used unless:-** c) The patient is not registered with a General Practitioner in Northern Ireland – use the local hospital numbering system. d) An emergency situation – use local hospital EMERGENCY numbering system. e) Other scenarios such as GUM / Special Clinic (SPC) specimens, SARC (Sexual Assault Rowan Centre) and NSI (needle stick injury). *For Microscope slides:- Patient Official First Name, Surname and Date of Birth written in pencil.	3. Relevant Clinical Information 4. Current antibiotics and / or other relevant medication 5. Patient's address, including postcode if possible 6. Hazard Group 3 (Cat3) Sticker if applicable (and appropriate. Patient history) 7. Printed name of sample collector 8. MO signature 9. Pregnancy status 10. Contact number (bleep or extension) of requestor in the event of further communication being required i.e. urgent test request 11. Major incidents – use of 10 digit Mojax number or Major Incident No.

Urine Microbiology form: White with **black print**



FOLD

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

JB-21317 WZN 555

URINE CULTURE

SINGLE SPECIMEN ONLY
MSU ☐ CSU ☐

Examination Required
Pregnant YES / NO

Date / Time of Sample

Date and Lab. Ref. No.
(LAB USE ONLY)

SURNAME | FORENAMES | Clinical Details / Antibiotic Therapy (Please state previous Lab. Ref. No's)

D.O.B. | SEX | ADDRESS

HOSP / H.C. | CONS / G.P. | WARD | H + C No. / Unit No. | M.O.'S Signature | Day Case | In Patient | Out Patient | NHS | PP | CAT II

Microscopy / mm³
RBC WBC ORGS EPC

DO NOT AFFIX LABELS IN THIS BOX

Lab. Comments
PC ☐ FC ☐ CIP ☐
MEA ☐ MRSA ☐ GENT ☐
ESBL ☐ CI ☐

CULTURE (✓ indicates Result)

No Growth ☐
No Significant Growth ☐
10^4/ml of ..... Types of Organisms Please Repeat ☐
10^5/ml of ..... Types of Organisms Please Repeat ☐
10^4/ml ☐
10^5/ml Significant ☐

ISOLATES
1.
2.
3.

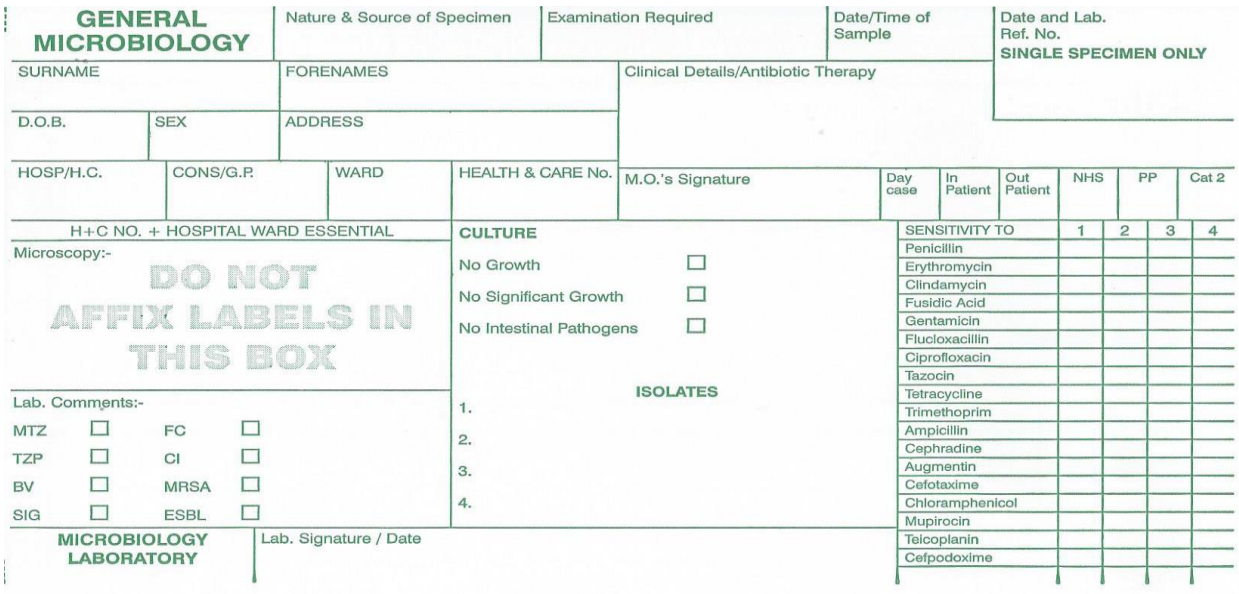
SENSITIVITY	1	2	3
Ampicillin			
Trimethoprim			
Nitrofurantoin			
Cephradine/Cephalexin			
Mecillinam			
Augmentin			
Tazocin			
Ciprofloxacin			
Gentamicin			
Ceftazidime			
Cefotaxime			
Methicillin			
Cefpodoxime			
Aztreonam			

MICROBIOLOGY LABORATORY

Lab. Signature / Date

S - Sensitive
M - Moderately Resistant
R - Resistant

General Microbiology form: White with **green print**



GENERAL MICROBIOLOGY

Nature & Source of Specimen | Examination Required | Date/Time of Sample | Date and Lab. Ref. No. SINGLE SPECIMEN ONLY

SURNAME | FORENAMES | Clinical Details/Antibiotic Therapy

D.O.B. | SEX | ADDRESS

HOSP/H.C. | CONS/G.P. | WARD | HEALTH & CARE No. | M.O.'s Signature | Day case | In Patient | Out Patient | NHS | PP | Cat 2

H+C NO. + HOSPITAL WARD ESSENTIAL

Microscopy:-

DO NOT AFFIX LABELS IN THIS BOX

Lab. Comments:-
MTZ ☐ FC ☐
TZP ☐ CI ☐
BV ☐ MRSA ☐
SIG ☐ ESBL ☐

CULTURE

No Growth ☐
No Significant Growth ☐
No Intestinal Pathogens ☐

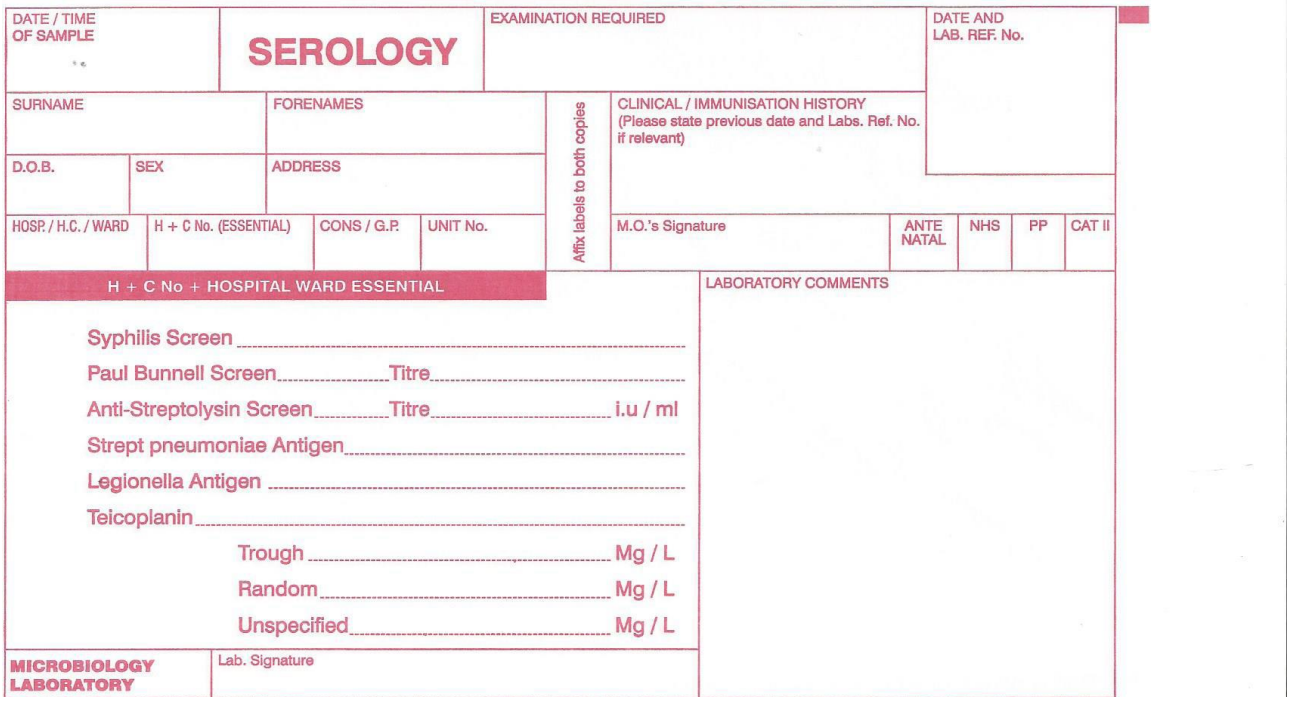
ISOLATES
1.
2.
3.
4.

SENSITIVITY TO	1	2	3	4
Penicillin				
Erythromycin				
Clindamycin				
Fusidic Acid				
Gentamicin				
Flucloxacillin				
Ciprofloxacin				
Tazocin				
Tetracycline				
Trimethoprim				
Ampicillin				
Cephradine				
Augmentin				
Cefotaxime				
Chloramphenicol				
Mupirocin				
Teicoplanin				
Cefpodoxime				

MICROBIOLOGY LABORATORY

Lab. Signature / Date

Serology form: White with **red print**



DATE / TIME OF SAMPLE

SEROLOGY

EXAMINATION REQUIRED

DATE AND LAB. REF. No.

SURNAME | FORENAMES

D.O.B. | SEX | ADDRESS

Affix labels to both copies

CLINICAL / IMMUNISATION HISTORY (Please state previous date and Labs. Ref. No. if relevant)

HOSP. / H.C. / WARD | H + C No. (ESSENTIAL) | CONS / G.P. | UNIT No.

M.O.'s Signature | ANTE NATAL | NHS | PP | CAT II

H + C No + HOSPITAL WARD ESSENTIAL

LABORATORY COMMENTS

Syphilis Screen .....

Paul Bunnell Screen..... Titre.....

Anti-Streptolysin Screen..... Titre..... i.u / ml

Strept pneumoniae Antigen.....

Legionella Antigen .....

Teicoplanin.....

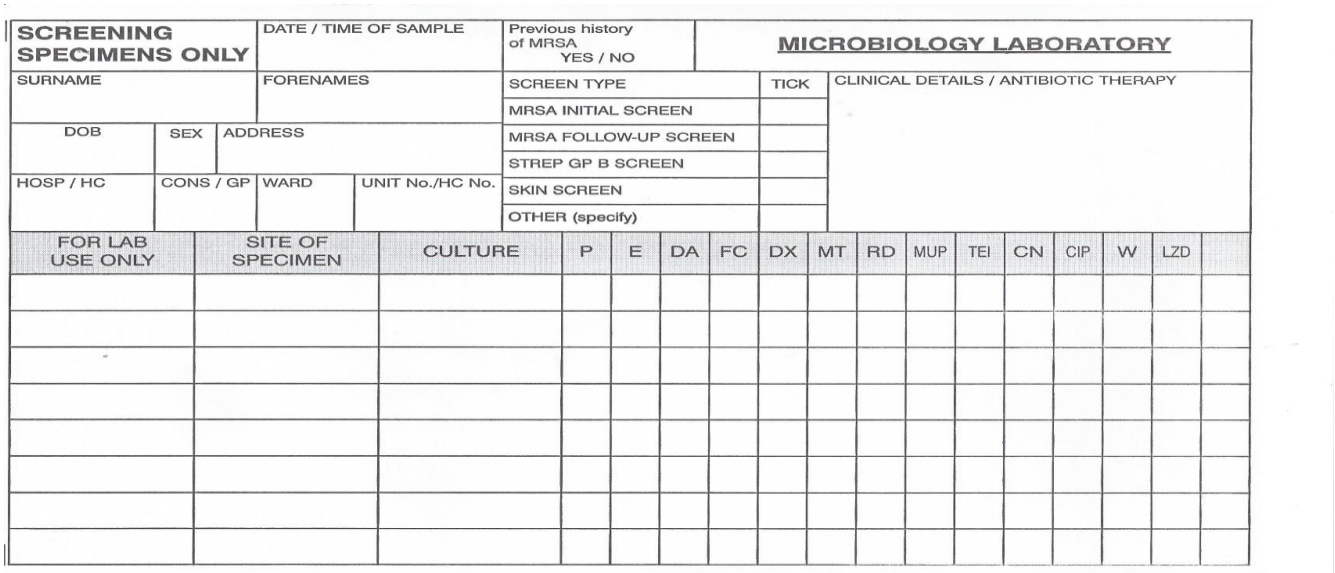
Trough ..... Mg / L

Random..... Mg / L

Unspecified..... Mg / L

MICROBIOLOGY LABORATORY | Lab. Signature

Microbiology Screening form: White with **black print**, with multiple sites section



SCREENING SPECIMENS ONLY

DATE / TIME OF SAMPLE

Previous history of MRSA YES / NO

MICROBIOLOGY LABORATORY

SURNAME | FORENAMES

DOB | SEX | ADDRESS

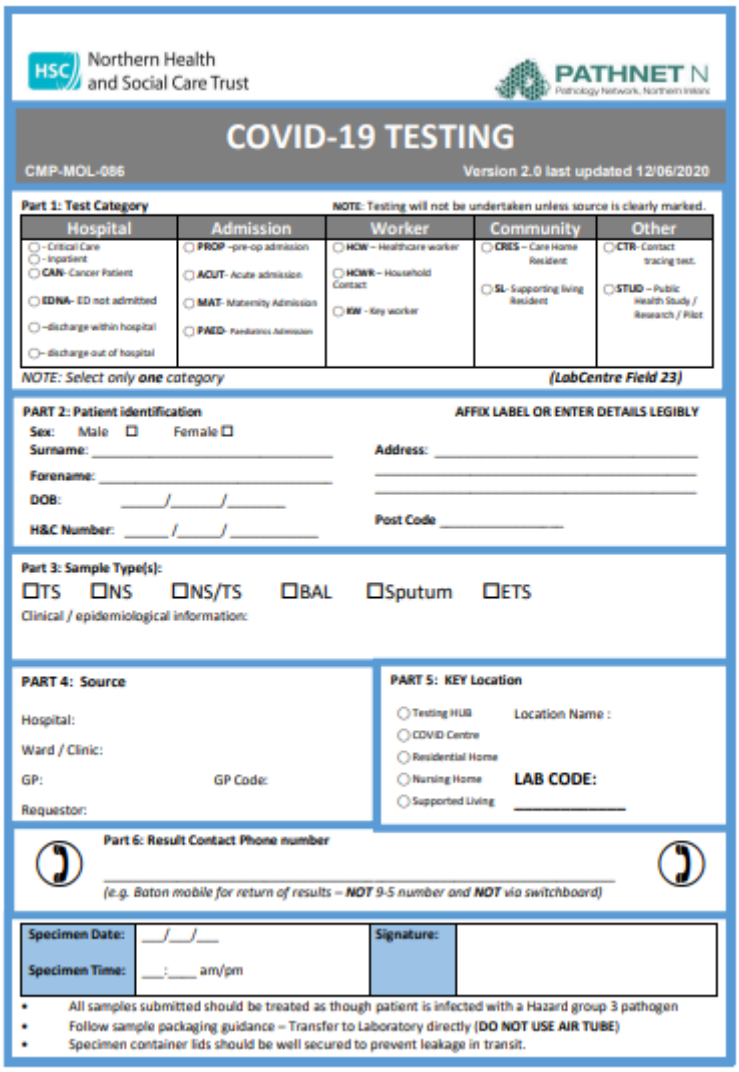
HOSP / HC | CONS / GP | WARD | UNIT No./HC No.

SCREEN TYPE	TICK
MRSA INITIAL SCREEN	
MRSA FOLLOW-UP SCREEN	
STREP GP B SCREEN	
SKIN SCREEN	
OTHER (specify)	

CLINICAL DETAILS / ANTIBIOTIC THERAPY

FOR LAB USE ONLY	SITE OF SPECIMEN	CULTURE	P	E	DA	FC	DX	MT	RD	MUP	TEI	CN	CIP	W	LZD	

Respiratory Screen to include COVID-19 testing
See most up to date version here:
Laboratory-COVID-19-Testing-Request-Form.pdf (hscni.net)



Northern Health and Social Care Trust

PATHNET N

COVID-19 TESTING

CMP-MOL-086 Version 2.0 last updated 12/06/2020

Part 1: Test Category

NOTE: Testing will not be undertaken unless source is clearly marked.

Hospital	Admission	Worker	Community	Other
○ - Critical Care ○ - Inpatient ○ CAN- Cancer Patient ○ EDNA- ED not admitted ○ – discharge within hospital ○ – discharge out of hospital	○ PROP -pre-op admission ○ ACUT- Acute admission ○ MAT- Maternity Admission ○ PAED- Paediatrics Admission	○ HCW – Healthcare worker ○ HCWR – Household Contact ○ KW - Key worker	○ CRES – Care Home Resident ○ SL- Supporting living Resident	○ CTR- Contact tracing test. ○ STUD – Public Health Study / Research / Pilot

NOTE: Select only **one** category (LabCentre Field 23)

PART 2: Patient identification AFFIX LABEL OR ENTER DETAILS LEGIBLY

Sex: Male ☐ Female ☐

Surname: _____

Forename: _____

DOB: ____/____/____

H&C Number: ____/____/____

Address: _____

_____

_____

Post Code _____

Part 3: Sample Type(s):

☐TS ☐NS ☐NS/TS ☐BAL ☐Sputum ☐ETS

Clinical / epidemiological information:

PART 4: Source

Hospital:

Ward / Clinic:

GP: GP Code:

Requestor:

PART 5: KEY Location

○ Testing HUB Location Name :

○ COVID Centre

○ Residential Home

○ Nursing Home LAB CODE:

○ Supported Living _____

Part 6: Result Contact Phone number

_____

(e.g. Baton mobile for return of results – **NOT** 9-5 number and **NOT** via switchboard)

Specimen Date:	__/__/__	Signature:	
Specimen Time:	__:__ am/pm		

- All samples submitted should be treated as though patient is infected with a Hazard group 3 pathogen
- Follow sample packaging guidance – Transfer to Laboratory directly (**DO NOT USE AIR TUBE**)
- Specimen container lids should be well secured to prevent leakage in transit.

See Northern Trust Policy – **NHSCT171100**: Laboratory sample collection, request form completion and sample labelling.

If a sample is unsuitable for testing a report will be sent to the requestor giving the reason.

Sending Specimens from Patients with/suspected of being infected with a Hazard Group 3 Pathogen

Definition of Hazard Group 3 Pathogen

Biological agents have been categorised into four hazard groups by the Advisory Committee on Dangerous Pathogens. These are defined as:

Hazard Group 3 **A biological agent that can cause severe human disease and presents a serious hazard to employees; it may present a risk of spreading to the community, but there is usually effective prophylaxis or treatment available.**

Examples of Hazard Group 3 Pathogens

Bacteria :-	**Viruses** :-
• *Bacillus anthracis* • *Brucella* species • *Escherichia coli*, vero-cytotoxigenic strains(e.g.: 0157: H7 and others) • *Mycobacterium tuberculosis* • Mycobacteria other than tuberculosis (MOTT) • *Salmonella typhi* • *Salmonella paratyphi* • *Shigella dysenteriae* (Type 1)	• All viral hepatitis (except Hepatitis A) • HIV • Severe Acute Respiratory Syndrome (SARS) **Prion Proteins:-** • Transmissible spongiform encephalopathies (TSE) - e.g: the agents of Creutzfeldt-Jacob disease (CJD): variant Creutzfeldt-Jacob disease (vCJD) • Fatal familial insomnia • Gerstman-Straussler-Scheinker syndrome • Kuru

For suspected or known Hazard Group 3 pathogens, hazard warning Hazard Group 3 pathogen labels should be affixed both to the container and the accompanying request form. These labels may be obtained from Antrim Laboratory Stores Department.

Collection of Blood Specimens

Adhere to the following precautions: -

- Complete the laboratory request form and enter details onto the specimen bottle **prior to obtaining specimen.** Care must be taken to protect patient confidentiality.
- Wash hands and dry thoroughly prior to donning gloves.

- Wear appropriate PPE as per Trust policy.
- Special care must be taken to avoid contamination of either the outside of the specimen bottle or laboratory request form.
- Any accidental blood spillage should be decontaminated immediately using the current TRUST approved disinfectant.
- Attach a 'Hazard Warning Hazard Group 3 Pathogen' sticker to the specimen bottle and laboratory request form.
- Put the bottle into the plastic pouch and seal. Do not use pins, staples or metal clips to seal the bag.
- Keep the request form separate from the specimen bottle.

Collection of specimens other than blood

- Wear appropriate PPE as per Trust policy.
- After collection, close container securely and attach a 'Hazard Warning Hazard Group 3 Pathogen' sticker to the container.
- Special care should be taken to avoid contamination of the outside of the specimen container.
- Seal the specimen container in a plastic bag; do not use pins, staples or metal clips.
- Keep the request form separate from the specimen container.
- Label the laboratory request form with a 'Hazard Warning Hazard Group 3 Pathogen' sticker.

Send all Hazard Group 3 specimens in a separate sealed Laboratory Specimen Transport Bag.
To avoid accidental blood spillage transport to the laboratory in a leak-proof pathology transport box.
Do NOT send specimens from patients '**known**' or '**suspected**' to have Hazard Group 3 pathogens via the pneumatic carrier system (air tube system)

Specimen Collection Guidelines and Factors that May Affect the Quality of Results

It is essential to follow the guidelines for proper specimen collection as this can significantly affect the performance of the examination or the interpretation of results.

Guidance on sample collection can be found on the following website:
http://labtestsonline.org.uk/

- Collect an adequate amount of specimen. Inadequate amounts of specimen may yield false-negative results.
- Appropriate and adequate samples should be collected **prior** to commencement of antimicrobial therapy.
- Pus / body fluid is superior to a swab
- Before sampling a dry infected area, moisten swab with sterile water / saline.
- Avoid contamination of the sample by employing aseptic technique and using sterile containers to collect specimens thus preventing the introduction of microorganisms during invasive procedures.
- Inflamed areas should be sampled under direct vision e.g. high vaginal swab (speculum), throat swab (spatula).
- Clinical information is vital to appropriate processing of samples.
- When there is clear evidence of infection, full details should be provided and repeat sampling considered.

A delay in transport to the laboratory may affect sample quality and compromise the results produced. It is essential that the specimens reach the laboratory as soon as possible to allow processing before the sample quality deteriorates.

Transport all samples to the laboratory as soon as possible, Store @ 4 ^{O}C if transport delayed

Laboratory Reports

All laboratory results should be interpreted in conjunction with the clinical state of the patient. If inappropriate results are received, please contact the laboratory and/or repeat the specimen.

Microbiology results are available electronically at ward level immediately after the result is authorised.

The user will be informed, by telephone, of isolates or test results which may require urgent attention e.g.:- **positive blood cultures, enteric pathogens, AAFB seen on direct sputum microscopy, CSF etc.**
Any significant result may be phoned depending on Lab interpretation. If there is an urgent clinical need for results, please inform the laboratory and request priority testing.

Please Note:
The issuing of results of a non-urgent nature over the phone is discouraged and must be kept to an essential minimum in the interests of safety as verbal reports may lead to transcription errors.

If a phone enquiry is necessary, where possible consult the laboratory information system to obtain the on-screen laboratory test request number. This is in order to validate that you are authorised to receive the confidential laboratory report in question and will assist laboratory staff in dealing with your enquiry more efficiently.

If requesting a further test, this should be requested within 48hrs of receiving the original report and will be dependent on specimen retention, quality and volume requirement issues.

Antimicrobial susceptibility testing

If the patient is on a specific antibiotic, or you are considering an antibiotic which is not listed on the Microbiology report, please contact the laboratory for further information.
To allow for increasing levels of antibiotic resistance to standard dosing regimens and in recognition that, for some organisms, low level resistance can be overcome by increasing the dosage of some antibiotics. Antimicrobial susceptibility testing will now be reported as follows:

‘’S” – Susceptible with standard dosing regimen: high likelihood of therapeutic success using a standard dosing regimen.

“I” – Susceptible with increased exposure: high likelihood of therapeutic success using a higher than standard dosing regimen *(see below Table).*

“R” – Resistant: high likelihood of therapeutic failure.

Please note:
You may see an increased number of susceptible results being reported in the **“I” – susceptible with increased exposure** category.
In fact for some organisms (eg. most *Pseudomonas* species) the majority of susceptible results will be reported in the **“I” – susceptible with increased exposure** category.

Antibiotics reported as “I” should be considered viable treatment options.

Guideline on high dose regimens to be used for infections caused by organisms reported as 'I' = Susceptible, increased exposure

Antimicrobial	High dose regimen
Amoxicillin IV	2g 4 hourly
Amoxicillin PO	1g 8 hourly
Co-Amoxiclav IV	1.2g 8 hourly
Co-Amoxiclav PO	625mg 8 hourly
Aztreonam IV	2g 6 hourly
Benzylpenicillin IV	1.2g 4 hourly (if meningitis discuss with microbiologist)
Ceftazidime IV	2g 8 hourly
Ceftriaxone IV	2g 12 hourly
Cefuroxime IV	1.5g 8 hourly
Cefuroxime PO	500mg 12 hourly
Ciprofloxacin IV	400mg 8 hourly
Ciprofloxacin PO	750mg 12 hourly
Clindamycin IV	1.2g 8 hourly
Clindamycin PO	450mg 6 hourly
Doxycycline PO	100mg 12 hourly
Erythromycin PO	1g 6 hourly
Levofloxacin IV	500mg 12 hourly
Levofloxacin PO	500mg 12 hourly
Piperacillin-tazobactam IV	4.5g 6 hourly or by extended infusion
Trimethoprim-sulfamethoxazole	1.44g 12 hourly (if pneumocystis infection discuss with microbiologist)

Frequency of Requesting Microbiology Examinations

The Royal College of Pathologists have published advice on the minimum retesting intervals in pathology: National minimum retesting intervals in pathology

For further advice on the use of the services provided, see repertoire table below or contact the laboratory.

Microbiology Test Repertoire

If the test or specimen type that you require is not listed, please contact the laboratory to discuss clinical requirements.

Bacteriology

Test	Specimen Requirements	Container / Volume	Comments	Turnaround Time
Blood Culture	Adult – set of blood cultures 10mL in each bottle Paediatric – single bottle 4mL blood	FA PLUS (aerobic) – green top FN PLUS (anaerobic) – orange top FP PLUS – yellow top	**For Adult Blood Cultures see Trust Policy: NHSCT/21/1529** • **Do not remove the detachable Barcodes from the bottle(s)- for lab Use only** • Do not cover the barcode with the Patient identifier • Do not stick patient labels on the bottom of the bottle **Results of possible pathogens will be telephoned as a priority.** **If patients have received previous antimicrobial treatment, clinically indicated bacteraemia should be considered even if blood culture results are negative.**	Positive Gram stain results are telephoned the same day to the ward. An interim report of "**Under Test. Lab to Inform**" will be issued immediately. Negative results will be reported in 5 days or 14 days in special circumstances e.g. cases of infective endocarditis.

Test	Specimen Requirements	Container / Volume	Comments	Turnaround Time
Bone Marrow	As large a sample as possible	FA PLUS (aerobic) – green top FN PLUS (anaerobic) – orange top	Use aseptic technique for collection and inoculation of bottles	5 days
CSF Culture	Min 1mL collected using aseptic technique	Sterile universal container	***Inform Laboratory by phone when sending*** **Transport to lab immediately Do NOT send samples via the airtube system** Please mark container and form clearly to indicate CSF sample	5 days
Expressed Breast Milk	Min 1mL expressed milk	Sterile universal container	Culture and sensitivity testing should only be considered in the following circumstances: • No response to antibiotic treatment • Recurrent mastitis • Hospital acquired infection • Severe and unusual cases	6 days

Test	Specimen Requirements	Container / Volume	Comments	Turnaround Time
Faeces Enteric pathogens	Min 1mL – Max 15mL Samples for parasites other than Cryptosporidium & Giardia will only be tested on request AND in the presence of appropriate clinical history.	Blue top universal container with plastic spoon	• Samples are screened for Salmonella, Shigella, Campylobacter, Verotoxigenic E.coli, Cryptosporidium and Giardia. • Include relevant clinical history e.g. travel • Cryptosporidium and Giardia positive samples are reported on the basis of PCR screen only. • Other positive screen samples are further investigated by culture methods. • Mucoid samples are unsuitable for PCR testing.	3 days
Faeces Laboratory evidence of *Clostridium difficile* infection (CDI)	Min 1mL – Max 15mL Diarrhoeal samples which flow to assume the shape of the container	Blue top universal container with plastic spoon	a) All samples meeting the testing criteria will initially be screened by PCR for C difficile toxin gene. • Positive screen samples will be further tested for toxin production. • Patients >65years old who fulfil the criteria will routinely be tested. • Patients 2-65 years old will only be tested on request. • Testing for patients <2 years old is only on Consultant Paediatrician request. • CDI testing is limited to one negative test per patient in any seven day period. • A positive result should not be repeated within 28 days. • Mucoid samples are unsuitable for PCR testing. • Dry, formed stools will not be tested.	16 hours

Test	Specimen Requirements	Container / Volume	Comments	Turnaround Time
Fluid - Ascites Suspected Spontaneous Bacterial Peritonitis (SBP)	Min 1 mL fluid and / or 10mL pre-inoculated blood cultures	Sterile universal container EDTA blood tube – purple top FA PLUS (aerobic) – green top FN PLUS (anaerobic) – orange top	***Inform Laboratory by phone*** Transport to lab soon as possible	5 days
Fluid – Continuous ambulatory peritoneal dialysis (CAPD)	10 – 50mL CAPD and / or 10mL into each bottle	Sterile universal container FA PLUS (aerobic) – green top FN PLUS (anaerobic) – orange top	**CAPD fluids >25ml must not be forwarded to Laboratory via air-tube system as 150ml containers are not suitably robust.**	5 days

Test	Specimen Requirements	Container / Volume	Comments	Turnaround Time
Fluid – Sterile Aspirate Joint. Pleural, Pericardial	Min 1mL Fluid Min 1mL Fluid	Sterile universal container EDTA blood tube	**Inform Laboratory by phone If sample from Prosthetic Joint** EDTA prevents clotting and allows valid cell count	5 days
Fluid – Non-sterile Incl. - Abscess, Antral washout, Drain fluid, Gastric aspirate, Pus	Min 1mL fluid	Sterile universal container	Any volume of aspirate is preferable to a swab. Recovery of anaerobes is compromised if the transport time exceeds 3hr.	6 days
Intravascular Line Tip Incl. - CVP, Hickman line, cannula	4cm length of tip Swab	Sterile universal container Blue cap	b) Peripheral lines are not suitable specimens for cultures and should not normally be sent to the laboratory for testing. c) Intravascular line tips should only be sent if line related sepsis is suspected and should be accompanied by peripheral blood cultures d) Urinary catheter tip is not an appropriate sample and will be rejected.	5 days

Test	Specimen Requirements	Container / Volume	Comments	Turnaround Time
Respiratory Culture Bronchoalveolar lavage, Bronchial washings Bronchial brushing	As large a sample as possible A few drops of sterile saline may be added	Sterile universal container	**IMPORTANT**: **A separate specimen and form MUST be sent for each of the following if required:** • Routine bacterial culture • Fungal studies • Mycobacterial investigations **Referral of specimens may be required.**	3 days 5 days for Fungal studies
Respiratory Culture Sputum Endotracheal tube specimens	Min 1mL volume	Sterile universal container	• If patients are Immunocompromised, have bronchiectasis or are in ICU it must be clearly stated on the request from. • If clinical details states immunocompromised, bronchiectasis or ICU fungal cultures will be performed. • For all other circumstances fungal culture will be on request only. For patients with a history of foreign travel, where unusual mould infections are suspected, must have detailed information clearly stated on the request from.	3 days

Test	Specimen Requirements	Container / Volume	Comments	Turnaround Time
Screening swab - MRSA	Swabs Urine	Blue cap swab Sterile universal container or 10mL Starstedt monovette	e) Inpatient MRSA screens are processed 24/7. f) Site specific screens will only be processed if they are pre / post-decolonisation or pre-surgery is clearly stated on the request form g) Community MRSA screens will only be processed if they are pre / post-decolonisation or pre-surgery is clearly stated on the request form	3 days
Screening swabs – Carriage of Group B Streptococci Maternal	Maternal low vaginal swab AND Anorectal Swab Combined maternal vaginal / rectal swab	Blue cap swab	• If ONLY a maternal low vaginal swab is received or ONLY an anorectal swab is received, the specimen will be rejected as "UNPROCESSED". • Maternal high vaginal swabs should not be collected as these have a lower sensitivity. • **It is essential to include "Group B Strep in previous pregnancy" in clinical details.** • Attach yellow sticker as decided by Maternity Services.	6 days
Screening swabs – Carriage of Group B Streptococci Baby Screen	Various sites	Blue cap swab		6 days
Seminal Fluid – Culture	Min 1mL fluid	Wide neck sterile universal container		6 days

Test	Specimen Requirements	Container / Volume	Comments	Turnaround Time
Swab - Ear		Blue cap swab.		6 days
Swab – Eye Conjunctiva		Blue cap swabs.	Avoid contamination by skin flora or eyelid.	6 days
Swab – Genital Tract Culture	Swab	Blue cap swab Black cap Charcoal swab		6 days
Swab – Genital Tract Bacterial vaginosis (Female only)	Pencil labelled air dried smear	Frosted slide sent in plastic container	Slide must be labelled with pencil. Do not apply an adhesive label to slide.	6 days
Swab - Genital Tract Trichomonas vaginalis	High vaginal swab Urethral swab	Trichomonas media	Do not refrigerate. Allow trichomonas media to reach room temperature before inoculation. Wipe away excessive amounts of discharge. Swab posterior vaginal fornices with sterile swab. Consider in chronic urethritis or sexual contact of infected female. Use separate request form. Test of cure only for those whose symptoms persist after treatment.	6 days
Inter Uterine Contraceptive Device	IUCD	Sterile container	It is essential to state relevant clinical details	6 days

Test	Specimen Requirements	Container / Volume	Comments	Turnaround Time
Swab – N gonorrhoeae screen (GUM) Endocervical, Urethra, Rectum, Throat	Pencil labelled air dried smear Swab	Frosted slide in plastic container Black Cap Charcoal swab	Direct microscopy only of value in male urethral specimens. Slide must be labelled with pencil. Do not apply an adhesive label to slide. HVS swab unsuitable for N gonorrhoeae culture. Insert swab 2.5cm into urethral lumen. Rotate swab and leave in place for at least 2 seconds.	6 days
Swab - Throat	Swab	Blue cap swab	• Sample posterior pharynx, tonsils and inflamed areas. • If Vincent's angina is suspected request microscopy. • If Diphtheria is suspected inform the laboratory.	6 days
Swab – Skin and Wounds Incl. - Abscess, Bites, Burns, Skin, Wounds	Site of wound must be stated	Blue cap swab	Before sampling, remove debris with sterile saline or water.	6 days
Tissue	Sterile water should be added to small samples to prevent them drying out.	Sterile container	Specimens received in formol-saline are not suitable for culture.	6 days
Tissue - Bone	Multiple (4-5) intra-operative samples	Sterile container	Minimum size and number of specimens depends on the number of investigations requested.	6 days

Test	Specimen Requirements	Container / Volume	Comments	Turnaround Time
Urine - Culture MSSU	10mL Urine 5mL Paediatric Boric Acid Container	Sarstedt Monovette Tube (Boric acid) Paediatric Boric Acid Container 	**It is essential to fill Boric acid containers to the correct level to avoid sample rejection.** Samples received in yellow Sarstedt Monovette bottles may be rejected. Female -Thoroughly clean urethral area with soap and water. Rinse area with wet gauze. While holding labia apart, begin voiding. Collect midstream portion without stopping flow of urine. Male - Clean glans with soap and water. Rinse area with wet gauze. While holding foreskin retracted, begin voiding. Collect midstream portion without stopping flow of urine. Do not cleanse with antiseptic as bacteria may be inhibited. **For urine samples please document clinical symptoms and signs of UTI on request form to enable appropriate testing.**	2 days

Test	Specimen Requirements	Container / Volume	Comments	Turnaround Time
Urine - Culture CSU	See MSSU	See MSSU	Do not collect from drainage bag. Clamp the drainage tubing below the sampling port and aspirate sample with sterile needle and syringe. Unclamp. **Transient "in & out" catheterisation:-** must be clearly indicated on request form to ensure appropriate processing & reporting.	2 days
Urine - Culture Supra Pubic Aspiration (SPA)	See MSSU	See MSSU		2 days
Urine - Culture Neuropathic Bladder	See MSSU	See MSSU	Should only be attempted if there is a clinical indication for antimicrobial therapy. A catheter should be passed per urethra or stoma.	2 days
Urine - Culture Ileal conduit or Urostomy	See MSSU	See MSSU	Obtained via catheter passed aseptically into the stomal opening after removal of the external appliance. Results may be difficult to interpret.	2 days
Urine - Culture Adhesive bag specimens from infants (Clean Catch Specimen)	See MSSU	See MSSU	Wash genitalia with tap water and mild detergent 3 times then dry. Do not cleanse with antiseptic Place a sterile bag over the genitalia and remove once urine is spontaneously voided. If infant fails to void within 45 minutes, remove bag, 're-prep' and apply new sterile bag. Entire sample is collected and an aliquot sent for testing	2 days

Test	Specimen Requirements	Container / Volume	Comments	Turnaround Time
Urine - Culture Pad collection of Urine	See MSSU	See MSSU	**Note:- clean catch has been shown to be more accurate than nappy pad samples in young children** Wash the nappy area thoroughly Place pad in nappy. Avoid faecal soiling. Push the tip of syringe into pad & withdraw urine. Transfer sample to container. Alternatively insert wet fibres into syringe barrel & squeeze directly into container using syringe plunger.	2 days

Mycobacteria

Test	Specimen Requirements	Container / Volume	Comments	Turnaround Time
Mycobacteria - culture CSF Fluid – non-sterile / sterile Gastric contents Respiratory samples Swabs	Min 6mL fluid 2 swabs	Sterile conatiner Blue cap swab	Currently, culture remains the gold standard for laboratory diagnosis of mycobacterial disease. Early a.m. sputum after deep cough with or without physiotherapy on 3 consecutive days. Alternatively, early morning gastric washings or laryngeal swabs.	Microscopy - 24hrs Culture reported in 8 weeks Results of possible pathogens will be telephoned as a priority
Urine	150mL First voided specimen in the morning	150mL large sterile container	First voided specimen of urine in the morning, on 3 consecutive days. Direct microscopy is not performed on urine samples.	Culture reported in 8 weeks Results of possible pathogens will be telephoned as a priority
Mycobacteria - PCR	As for culture	As for culture	**On Microbiology Consultant Request only** Samples are sent to Northern Ireland Mycobacterial Reference Laboratory for processing. Only those samples in which mycobacteria are visualized on direct microscopy are forwarded for PCR testing.	

Test	Specimen Requirements	Container / Volume	Comments	Turnaround Time
			Sputum: The primary purpose of the PCR test for Mycobacteria in sputum is to ***rapidly confirm*** the presence of ***Mycobacterium tuberculosis*** complex which has already been seen as acid and alcohol fast bacilli (AAFB) on direct microscopy. A negative result, however, does not exclude the presence of ***Mycobacterium tuberculosis*** complex. Sputum samples contaminated with blood will not be processed. CSF: **In practice, successful diagnosis is highly compromised by inadequate material.** 2ml CSF is recommended and multiple specimens preferable. A minimum of 0.5 ml CSF is required for any PCR testing. **N.B.** Blood stained samples will not be tested	
Mycobacteria - Blood cultures, Bone marrow	Max 5mL sample	Bactec MycoF/Lytic Culture vials	Bottles are sent to Northern Ireland Mycobacterial Reference Laboratory for processing. Clinicians sending sterile site samples (e.g. blood, bone marrow) for mycobacterial culture should include the following details on the request form where relevant:	

Test	Specimen Requirements	Container / Volume	Comments	Turnaround Time
			• History of cardiac surgery OR • Under investigation for possible disseminated Mycobacterium chimaera infection A separate slide of bone marrow should also be sent if an auramine slide is required. MycoF/Lytic bottles are available on request from Microbiology.	

Serology

Test	Specimen Requirements	Container / Volume	Comments	Turnaround Time
ASOT	Min 2mL blood Filled bottle	Clotted blood bottle Paediatric blood bottle	Haemolytic, lipaemic and turbid sera are unsuitable for testing.	3 days
Urine –Antigen Test *Legionella pneumophilia* *Streptococcus pneumoniae*	10mL urine	Sterile universal container Sarstedt Monovette conatiner	**Please state relevant clinical details on form to prevent specimen rejection** Note: Legionella testing Only samples with the following clinical details will be tested: • From ICU patients • CURB score-65 score of 2-5 or Severe CAP • Part of a Legionella outbreak • Special risk factor, e.g. travel abroad. • Exposure to water- systems Requests without relevant details will be sent out as Not Tested and stored for 7 days.	3 days

Molecular

Test	Specimen Requirements	Container / Volume	Comments	Turnaround Time
Chlamydia trachomatis / Neisseria gonorrhoeae PCR Urine Swabs Conjunctival, Rectal, Throat, Others	Fill Urine between the 2 black lines at the top of the tube One swab broken at score line in PCR media	cobas® PCR Urine tube cobas® PCR swab tube	See CT/NG section at end of table for sample collection information. * NB: First catch urine samples from women may be less sensitive than endocervical swabs for detection of *C. trachomatis and N. gonorrhoeae*. Excess **contamination with faeces, blood and mucus** on CT/NG swabs may interfere with the reaction and will not be tested by the laboratory. Symptoms strongly suggestive of gonorrhoea :- Please also send a charcoal swab in transport medium for culture (endocervical, urethral, rectal or pharyngeal as appropriate) Please note Conjunctival swabs, Unspecified swabs are not validated by the manufacturer and are outside the laboratory UKAS Accreditation Scope.	5 working days
MRSA – PCR Nasal swab ONLY	Swab	Red cap Copan Dual Swab	ICU patients are screened routinely. All other wards by Consultant request only. Samples processed Mon – Fri (8am – 4pm).	24 hours

Test	Specimen Requirements	Container / Volume	Comments	Turnaround Time
Respiratory Virus Screen SARS-CoV-2, Flu A, Flu B Respiratory syncytical virus (RSV) **Screening** Nose, Throat, Combined nose/throat swab	Single swab	cobas® PCR media	Testing is for inpatient samples only. Samples from Primary care should be forwarded to the Regional Virology lab for testing. This test is not validated by the manufacturer for saliva specimens This test is outside the laboratory UKAS Accreditation Scope	24 hours
Rapid Nose, Throat, Combined nose/throat swab	Single swab	cobas® PCR media	Testing is for inpatient samples only. Testing is on Consultant Microbiologist recommendation as per most up-to-date testing criteria (available from Microbiology Lab). **Additional testing outside of the above is only performed on direct request from the Clinical Medical Microbiologist(s).**	2 hours
Sputum, Bronchoalveolar lavage	Min 5mL specimen	Sterile container	Samples are forwarded to the Regional Virology Laboratory for testing.	2 days

All NAATs (Nucleic Acid Amplification Tests) can be affected by interfering substances present on the specimens. Below is a list of **some** of the substances known to interfere with the PCR reaction:-

- **Mucus may give false negative** results
- **Urine** specimens stabilised in the cobas PCR media containing **>0.35% (v/v) Blood** and **Swab** specimens stabilised in the cobas PCR media containing **>5% (v/v) Blood may give false negative results.**
- **Urine** specimens stabilised in cobas PCR media containing **>1x10^6 PBMC** (peripheral blood mononuclear) **cells/ml** and swab specimens containing **> 1x10^5 PBMC cells**/ml **may give false negative results**
- Urine specimens taken from patients who have used the over-the-counter product **Replens®** (**vaginal moisturiser**) **may give false negative or invalid results**.
- **Nasal secretions** may interfere with the PCR reaction.
- **Decongestant** and substances occasionally used to relieve nasal dryness
- **Carbomer(s)** containing products have been shown to generate fasle negative and invalid results in urogenital specimens – see table below for examples:

Examples of Carbomer Containing Products

Clindamycin Phosphate Vaginal cream	Monistat 3 Vaginal Antifungal Combination Pack	Summer's Eve Feminine Deodorant Spray
CVS Tioconazole 1 (Equate tioconazole 1)	Monistat Complete Care Itch Relief Cream	VCF – Vaginal Contraceptive Foam
Equate Vagicaine Anti-Itch Cream	Norforms Suppositories	Yeast Gard Advanced
Estrace	Premarin	Azo Standard (urine only)
K-Y Ultra Gel (Replaces K-Y Silk E)	Replens Long-Lasting Vaginal Moisturizer	RepHresh Odor Eliminating Vaginal Gel
Metronidazole Vaginal Gel		

Chlamydia trachomatis & Neisseria gonorrhoeae Sample Collection Information

Specimen Collection:

The NAATs platform will detect both *Neisseria gonorrhoeae & Chlamydia trachomatis*. Dual NAATs can be used with a range of genital samples taken invasively and non-invasively. **Please note :- No test is 100% sensitive or specific**.

NB: Treat all samples as infectious

Recommended Specimens:

Patient Group	Specimen Type
Men	**First catch urine** in NAATs Cobas PCR Urine Sample Collection Kit is the specimen of choice. (**Urine:** MRT 230: Cobas® PCR Urine Sample Kit)
***Women not undergoing speculum examination**	First catch *urine in NAATs Cobas PCR Urine Sample Collection Kit **(Urine:** MRT 230: Cobas® PCR Urine Sample Kit)
Women undergoing speculum examination	Endocervical or vaginal swabs (in NAATs Cobas PCR Female Swab Collection Kit) is the specimen of choice. Cervical swabs – **NOT VALIDATED** (**Swab:** MRT 220: Cobas® PCR Female Swab Sample Kit)
Extra-genital Sites except Throat and Rectal swabs	Swabs may be collected for extra genital sites (as detailed below) and will be tested and reported accordingly by the laboratory. These sites are not validated by the manufacturer and are outside the laboratory UKAS Accreditation Scope.

ENDOCERVICAL SWAB SPECIMEN COLLECTION

WARNING: DO NOT PRE-WET SWAB IN cobas® PCR MEDIA BEFORE COLLECTION!

1. **CLEAN:** Using the woven swab, remove excess mucus from the cervical os and surrounding mucosa. **Discard the swab after cleaning**. **NOTE:** Cleaning excess mucus from the cervical os is required to ensure an adequate sample is obtained for processing.
2. **COLLECT:** To collect the specimen, hold flocked swab with the scoreline above your hand and insert into the endocervical canal. Gently rotate the swab 5 times in one direction in the endocervical canal. Do not over-rotate. Carefully withdraw the swab, avoiding any contact with the vaginal mucosa.
3. **ALIGN:** Remove the cap from the **cobas**® PCR Media Tube and lower the swab specimen into the tube until the visible scoreline on the swab shaft is aligned with the tube rim. The bud of the swab should not be submerged into the liquid prior to breaking the shaft.
4. **BREAK:** Carefully leverage the swab against the tube rim to **break the swab shaft at the scoreline.**
5. **CLOSE: Tightly** re-cap the **cobas®** PCR Media Tube. The specimen is now ready for transport. Discard the top portion of the swab.

VAGINAL SWAB SPECIMEN- CLINICIAN COLLECTION

WARNING: DO NOT PRE-WET SWAB IN cobas® PCR MEDIA BEFORE COLLECTION!

1. **COLLECT :** In one hand, hold the woven swab with the scoreline above your hand and insert the swab about 5 cm (2 inches) into the vaginal opening. Gently turn the swab for about 30 seconds while rubbing the swab against the walls of the vagina. Withdraw the swab carefully. Do not let the swab touch any surface before placing it into the collection tube.
2. **ALIGN:** Remove the cap from the **cobas®** PCR Media Tube and lower the swab specimen into the tube until the visible scoreline on the swab is aligned with the tube rim. The bud of the swab should not be submerged into the liquid prior to breaking the shaft.
3. **BREAK:** Carefully leverage the swab against the tube rim to **break the swab shaft at the scoreline.**
4. **CLOSE: Tightly** re-cap the **cobas®** PCR Media Tube. The specimen is now ready for transport. Discard the top portion of the swab.

VAGINAL SWAB SPECIMEN- SELF-COLLECTION IN A CLINICAL SETTING

WARNING: DO NOT PRE-WET SWAB IN cobas® PCR MEDIA BEFORE COLLECTION!

1. **POSITION:** In one hand, hold the woven swab with the scoreline above your hand and with the other hand separate the folds of skin around the vaginal opening (labia).
2. **COLLECT:** Insert the swab about 5 cm (2 inches) into the vaginal opening. Gently turn the swab for about 30 seconds while rubbing the swab against the wall of the vagina. Remove the swab carefully. Do NOT touch the swab to any surface before placing into the collection tube.
3. **OPEN TUBE:** While holding the swab in the same hand, remove the cap from the tube.
4. **ALIGN:** Lower the swab into the tube until the visible scoreline on the shaft is lined up with the tube rim. The bud of the swab should not be submerged into the liquid prior to breaking the shaft.
5. **BREAK:** Carefully lean the swab against the tube rim to **break the swab shaft at the scoreline**.
6. **CLOSE: Tightly** close the **cobas®** PCR Media Tube. Return the sample to the healthcare provider as instructed. Discard the top portion of the swab.

URINE SPECIMEN COLLECTION

1. **COLLECT**: Prior to sampling, the patient should not have urinated for at least one hour. Given that collection of larger volumes of urine may reduce test sensitivity, please direct patient to provide first-catch urine (approximately 10 to 50 mL of the initial urine stream) into a urine collection cup (not provided). ***NOTE: For best results, female patients should not cleanse the labial area prior to collection.***
2. **PIPETTE**: Immediately transfer the urine into the cobas PCR media tube using the provided disposable pipette. **NOTE:** If the urine specimen cannot be transferred immediately it can be stored at 2-30^{o}C for up to 24 hours.
3. **TRANSFER:** The correct volume of urine has been added when the fluid level is between the two black lines on the tube label.
4. **CAP**: Tightly recap the cobas PCR media cap.
5. **MIX**: Invert the tube 5 times to mix. The specimen is now ready for transport.

RECTAL SWAB SPECIMEN COLLECTION

WARNING: DO NOT PRE-WET SWAB IN cobas® PCR MEDIA BEFORE COLLECTION!

1. **COLLECT : Collect using the woven swab only.** To collect the specimen, hold the woven swab with the scoreline above your hand and insert the swab about 3 to 5 cm into the anal canal. Gently turn the swab for about 5-10 seconds while running the swab against the walls of the rectum. If the swab is grossly contaminated with faeces, discard and repeat the collection. Withdraw the swab carefully. Do not let the swab touch any surface before placing it into the collection tube.
2. **ALIGN**: Remove the cap from the cobas® PCR Media Tube and lower the swab specimen into the tube until the visible scoreline on the swab is aligned with the tube rim. The tip of the swab should not be submerged into the liquid prior to breaking the shaft.
3. **BREAK:** Carefully leverage the swab against the tube rim to **break the swab shaft at the scoreline.**
4. **CLOSE**: Tightly re-cap the cobas® PCR Media Tube. The specimen is now ready for transport. Discard the top portion of the swab.

THROAT SWAB SPECIMEN COLLECTION

WARNING: DO NOT PRE-WET SWAB IN cobas® PCR MEDIA BEFORE COLLECTION!

1. **COLLECT**: To collect the specimen, hold the swab with the scoreline above your hand and insert the swab into the mouth and collect the specimen from the bilaterial posterior pharynx, both tonsils and the uvula. Withdraw the swab carefully. Do not let the swab touch any surface before placing it into the collection tube.
2. **ALIGN**: Remove the cap from the cobas® PCR Media Tube and lower the swab specimen into the tube until the visible scoreline on the swab is aligned with the tube rim. The tip of the swab should not be submerged into the liquid prior to breaking the shaft.
3. **BREAK**: Carefully leverage the swab against the tube rim to **break the swab shaft at the scoreline.**
4. **CLOSE**: Tightly re-cap the cobas® PCR Media Tube. The specimen is now ready for transport. Discard the top portion of the swab.

Note:

- **Only one swab per specimen tube**
- Swabs that are not broken at the score line and hence are not the appropriate length (usually too long) **will not be tested**.
- Store the specimen at room temperature.
- Transport to the laboratory at room temperature.
- For rectal swabs avoid gross faecal contamination.

Tests sent to Referral Laboratories

Samples should be sent to the laboratory at ambient temperatures where they will be stored, and referred as appropriate.
Requests should include as much relevant clinical history as is available, in particular the date of onset of illness.
Referral facilities may not carry out tests which are accompanied by insufficient clinical information to support the relevant diagnosis
Separate samples and forms must be sent for all individual test requests.

Regionally Referred Tests

Results for regionally referred tests are issued by the testing laboratory and can be viewed on the HSC NIECR system. See site specific user manuals for specific sample requirements, turn around times etc.

Belfast Trust: BHSCT Laboratory User Manual	
Virology	
Antibiotic Assays	Tobramycin only
Atypical pneumonia	*Legionella pneumophilia* *Mycoplasma pneumoniae* *Bordatella pertussis* *Pneumocystis jiroveci/carinii*
Bordetella pertussis PCR	best used within first 2 weeks of symptom onset Recommended as the preferred test for all age groups
Extrinsic Alveolitis	
Leptospirosis	
Mycology	particularly Dermatophyte culture (Skin, Hair and Nails)
Q-fever PCR	
Quantiferon	Please use QuantiFERON®-TB Gold Plus collection set volume of blood must be within the black fill line, **any over/under filled bottles will be rejected.** Samples can be sent Monday – Thursday excluding Bank Holidays. Please note that as specimens are incubated overnight for 16hrs, they cannot be received the day prior to the Bank Holiday.
Syphilis serology	
Toxoplasmosis	
South Eastern Trust: SEHSCT Laboratory User Manual	
Helicobacter pylori	Faecal antigen testing.

UK Referred Test

The accompanying serology request form should include as much relevant clinical history as is available, especially the date of onset of illness. **All information which would support a diagnosis of the relevant disease**, must be stated on the request form as tests may not be carried out if the information required is lacking.
Results will be returned within 21 days.

Test	Specimen Requirements	Container / Volume	Reference Lab	Comments
Antifungal Drug Assays Amphotericin, Fluconazole, Fluctosine, Itraconazole, Posaconazole, Voriconazole	1-2mL Serum	Clotted blood bottle	Mycology Reference Laboratory, Bristol	Contact Consultant Microbiologist for advice prior to sample collection. Do not use gel separator tubes for azole drugs.
Antimicrobial Assay Streptomycin, Daptomycin, Linezolid, Rifampicin, Rifabutin, Levofloxacin, Cycloserine, Moxifloxacin, Aciclovir, Granciclovir, Chloramphenicol, Co-trimoxazole, Colistin	5mL Serum	Clotted blood bottle	Antimicrobial Reference Laboratory, Bristol	Please contact Consultant Microbiologist for advice prior to sample collection
Bordetella pertussis Serology	≥ 400µL serum	Clotted blood bottle	Respiratory and Vaccine Preventable Bacteria Reference Unit (RVPBRU)	NOT for immune status ≥ 2 week history of cough

Test	Specimen Requirements	Container / Volume	Reference Lab	Comments
Borrelia burgdorferi (Lyme Disease)	2mL Serum	Clotted blood bottle	Rare and Imported Pathogens Laboratory (RIPL)	
Candida Serology	1–2mL Serum	Clotted blood bottle	Mycology Reference Laboratory, Bristol	
Diptheria antibodies	Min 1mL Serum	Clotted blood bottle	Vaccine Evaluation Unit, Manchester	
Helicobacter pylori	Gastric Biopsy	Sterile saline in sterile container	Gastrointestinal Bacteria Reference Unit (GBRU)	Contact Microbiology Laboratory prior to sample collection. Samples can only be sent Monday – Thursday.
Histoplasmosis antibodies	1-2mL Serum	Clotted blood bottle	Mycology Reference Laboratory, Bristol	
Meningococcal PCR	Min 400µL blood (EDTA) Min 400µL CSF	EDTA blood bottle Sterile universal container	Meningococcal Reference Unit, Manchester	If CSF microscopy fails to identify Neisseria meningititis in a suspected case, part of the remaining specimen can, if requested be submitted for PCR investigation.

Test	Specimen Requirements	Container / Volume	Reference Lab	Comments
Mycology Serology Aspergillus antibodies, Aspergillus Antigens (Galactomannan), ß1-3 Glucan Antigen	1-2mL Serum	Clotted blood bottle	Mycology Reference Laboratory, Bristol	
Parasitology Serology	5mL serum	Clotted blood bottle	Hospital for Tropical Diseases, London	
Pneumococcal antibodies	Min 1mL Serum	Clotted blood bottle	Vaccine Evaluation Unit, Manchester	Vaccine antibody status ONLY
Pneumococcal PCR	Min 400µL blood (EDTA) Min 400µL CSF	EDTA blood bottle Sterile universal container	Meningococcal Reference Unit, Manchester	
Special Pathogens Dengue Fever, Haemorrhagic Fever, Rickettsia, West Nile Fever, Yellow Fever, Zika Virus	1.5mL Plasma / Serum	Clotted blood bottle EDTA blood bottle	Rare and Imported Pathogens Laboratory (RIPL)	

Test	Specimen Requirements	Container / Volume	Reference Lab	Comments
Tetanus antibodies	Min 1mL Serum	Clotted blood bottle	Vaccine Evaluation Unit, Manchester	
Tropheryma whipplei (Whipples Disease)	≥ 200µL blood	EDTA blood bottle	Great Ormond Street, London	

For tests that do not appear on the list, please refer to the Specialist and reference microbiology: laboratory tests and services guidance:

Specialist and reference microbiology: laboratory tests and services - GOV.UK (www.gov.uk)

Post-Vasectomy Seminal Analysis

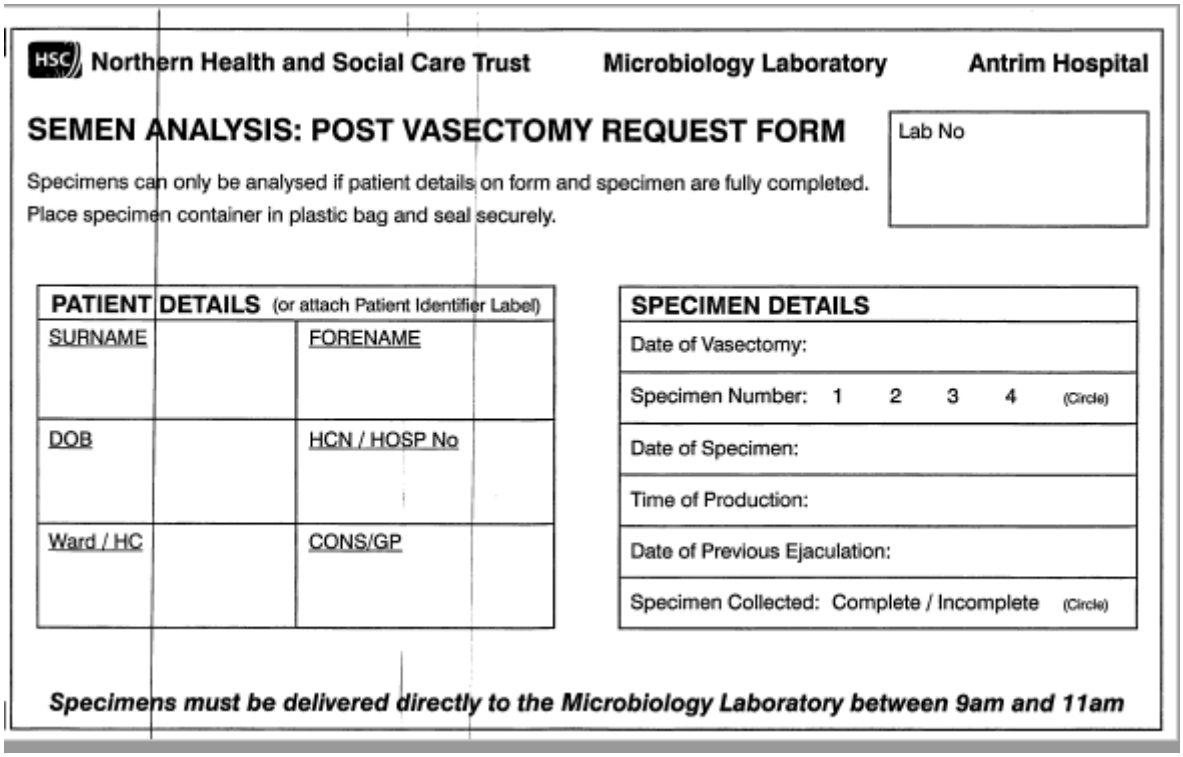
Specimens will only be processed when an appointment has been made through the Microbiology Department, Antrim Hospital. Tel 9442 4873

Following vasectomy, the patient is not immediately sterile and therefore must continue taking precautions until otherwise informed.

- Hospital vasectomy patients – an initial sample should be examined, a minimum of 3 months post-surgery. The result of the initial sample will determine if additional testing is required.
- GP federation vasectomy patients – one sample sent 7 months post-surgery.

As semen analysis is time consuming, only a limited number of specimens are processed each day, therefore it is important that appointments are kept as this time has been reserved for the test.

Specimen Request Form



HSC Northern Health and Social Care Trust — Microbiology Laboratory — Antrim Hospital

SEMEN ANALYSIS: POST VASECTOMY REQUEST FORM

Lab No

Specimens can only be analysed if patient details on form and specimen are fully completed.
Place specimen container in plastic bag and seal securely.

PATIENT DETAILS (or attach Patient Identifier Label)			
SURNAME		FORENAME	
DOB		HCN / HOSP No	
Ward / HC		CONS/GP	

SPECIMEN DETAILS
Date of Vasectomy:
Specimen Number: 1 2 3 4 (Circle)
Date of Specimen:
Time of Production:
Date of Previous Ejaculation:
Specimen Collected: Complete / Incomplete (Circle)

Specimens must be delivered directly to the Microbiology Laboratory between 9am and 11am

All sections of the request form should be filled in to ensure correct sample processing is performed. Any form received with incomplete details will result in the specimen not being processed.

Specimen Requirements

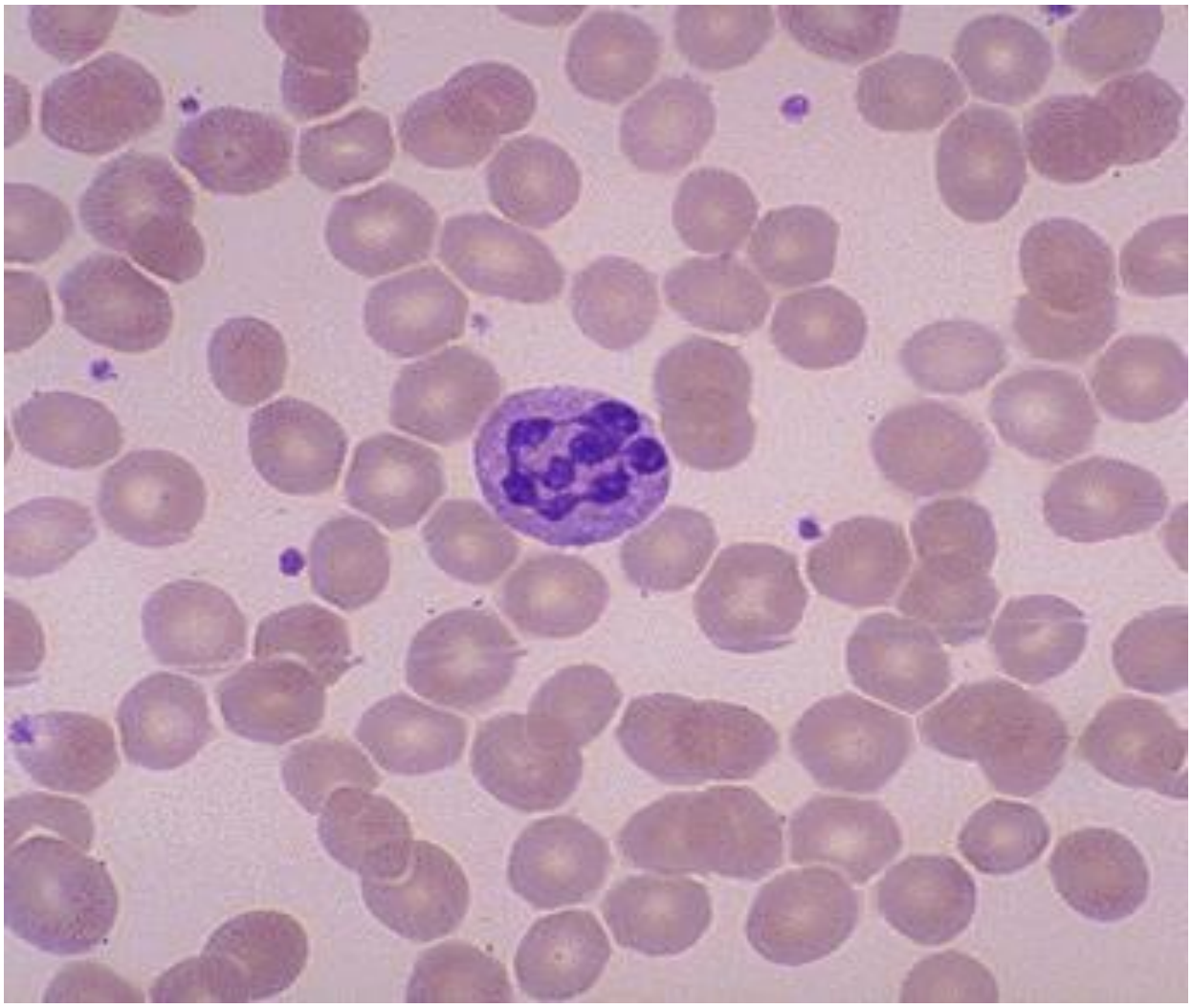
- Specimens should be obtained on the morning of examination.
- Intercourse should be avoided for 2-7 days before bringing each specimen.
- Sample is most easily produced by masturbation into the wide-necked sterile container provided. Only samples received in containers provided by the laboratory will be processed.
- Please ensure the lid of the container is secured to prevent leakage. Do not over tighten.
- **DO NOT use a condom / sheath.**
- Specimens should be delivered to the Microbiology Department in Antrim Area Laboratory between **09:00 and 11:00 on the morning of the date arranged**.
    - Initial samples should be produced less than 4hrs before arrivial.
    - Repeat samples should be produced less than 1hr before arrival.

Specimen Results

The results of the analysis will be forwarded to the GP or Consultant surgeon the following day.

If you have any queries or require further instructions, please contact the Microbiology Department, Antrim Area Laboratory, 45 Bush Road, Antrim. Tel: 9442 4873

HAEMATOLOGY & BLOOD TRANSFUSION



HAEMATOLOGY AND BLOOD TRANSFUSION

Title	Name	Telephone number Ext
Consultant Haematologist	Dr S McCloskey	332186
Secretary		334765
Consultant Haematologist	Dr J Murdock	332173
Secretary		334115
Consultant Haematologist	Dr A Niblock	334849
Secretary		334115
Consultant Haematologist	Dr S McPherson	332041
Secretary		334765
Consultant Haematologist	Dr B Merron	332184
Secretary/Clinical Lead		334144
Consultant Haematologist	Dr P Windrum	332172
Secretary		334795
Haematology Head BMS	Mrs C Henry	334105
Blood Transfusion Head BMS	Miss S Hill	334174
Deputy Head/Causeway Haematology/Quality Lead	Mr A Mullan	375737
Enquiries- Haematology **Antrim** **Causeway**		334949 direct dial 94424949 375178 direct dial 70346178
Enquiries-Blood bank **Antrim** **Causeway**		 332044 375733
Enquiries- on call **Antrim** **Causeway**		**331240** **375178 or direct dial 70346178**
Haemoviligance Practioner **Antrim** **Causeway**		 334965 375740 haemovigilance@northerntrust.hscni.net

NB: During on-call periods, the BMS in Haematology also covers Blood Transfusion

Consultant Pathologist advice is available 24/7 via switchboard or on contacting the Department; advice should be available within 60 minutes of making contact. (Use of uncertainties associated with the test performed are considered when giving clinical advice)

Minimum Acceptance Criteria (MAC)-Haematology

- Mandatory MAC MUST be present on ALL sample bottle(s) / container(s) and request form to assure sample acceptance for Laboratories and LIMS.
- Desirable MAC MUST be considered by the User as part of good patient management / care.

	Mandatory	Desirable
Sample	1. Unique identifier number* 2. Patient Official first Name 3. Surname 4. Date of Birth (dd/mm/yyyy) 5. Date and Time of Sample and Collection ***The Health & Care Number must be used unless**:- a) The patient is not registered with a General Practitioner in Northern Ireland – use the local hospital numbering system. b) An emergency situation – use local hospital EMERGENCY numbering system.	1. Sex (Male/Female/Other) 2. Name of staff member taking the sample.
Request Form	1. Unique identifier number* 2. Patient Official First Name 3. Surname 4. Sex (Male/Female/Other) 5. Date of Birth (dd/mm/yyyy) 6. Date and Time of Sample Collection 7. Requester Name / Code 8. Source (Ward / Clinic /GP) 9. Investigation (test) Required ***The Health & Care Number must be used unless:-** a) The patient is not registered with a General Practitioner in Northern Ireland – use the local hospital numbering system. b) An emergency situation – use local hospital EMERGENCY numbering system. *	1. Relevant Clinical Information 2. Name of staff Member taking the sample

Tests and Sample Bottle Details for Haematology

The table below lists the sample type requirements for Haematology

TEST	SAMPLE / AMOUNT	STORAGE / CONTAINER	VIABILITY / REF. RANGES	COMMENTS
Anti-Cardiolipin Antibodies	1 x 6 ml Blood	Red Cap (Clotted sample)		RVH Immunology
Anti-Thrombin (AT) (Part of Thrombophilia Screen)	1 x 3.5 ml Blood	Blue Cap (Coagulation bottles)	70-128%	Fill to mark and mix well. Haematology – Antrim
Anti-Xa	1 x 3.5 ml Blood	Blue Cap (Coagulation bottles)		BCH Haemostasis Lab
APC – Resistance (APC-R) (Part of Thrombophilia Screen)	1 x 3.5 ml Blood	Blue Cap (Coagulation bottles)	Negative 2.6-3.5 Equivocal 2.1-2.5 Positive <2.0	Fill to mark and mix well. Haematology – Antrim
Activated Partial Thromboplastin Time APTT (Heparin Control)	1 x 3.5 ml Blood	Blue Cap (Coagulation bottles)	20.5 – 32.1 secs	Fill to mark and mix well. Test as part of coagulation screen
BCR-ABL	4 x 4 ml Blood (form available on BLL Haem user manual)	Purple Cap (FBC Bottle		BCH Haem/Oncology Lab
Blood Count FBC (inc/ automated DWCC)	*Adult* 1 x 4 ml Blood *Child* 0.5 ml Blood	Purple Cap (FBC Bottle) Paediatric Bottle Pink Cap	See Reference ranges section	Fill to mark and mix well. Fill to mark and mix well.
CALR/ MPL/ EXON 12 mutation	1 x 4 ml Blood (form available on BLL Haem user manual)	Purple Cap (FBC Bottle)		BCH Haem/Oncology Lab
Coagulation Screen (PT, APTT, TT & Fibrinogen)	*Adult* 1 x 3.5 ml Blood *Paediatric* 1 x 1.3 ml Blood	Blue Cap (Coagulation bottles) Green Cap (no gel) (Coagulation bottles)	See Reference ranges section Variable ranges for paediatrics – see reference ranges section	Fill to mark and mix well. Fill to mark and mix well.

TEST	SAMPLE / AMOUNT	STORAGE / CONTAINER	VIABILITY / REF. RANGES	COMMENTS
D-Dimer (P.E and D.V.T)	1 x 3.5 ml Blood	Blue Cap (Coagulation bottle)	<250ng/ml	Fill to mark and mix well.
ESR (Erythrocyte Sedimentation Rate)	2 ml Blood	Purple Cap (FBC bottle)	Male 2 –14mm/hr Female 3 – 20mm/hr	Fill to mark and mix well. (not processed routinely out of hours unless specifically requested)
EMA Binding (Hereditary Spherocytosis)	*Adult* 1 x 4 ml Blood *Child* 0.5 ml Blood	Purple Cap (FBC Bottle) Pink Cap Paediatric Bottle		BCH Haem/Oncology- arrange with lab in advance
Factor V Leiden	1x 4 ml Blood	Purple Cap (FBC bottle)		Fill to mark and mix well. BCH Coagulation
Factor VIII (8) Assay	1 x 3.5 ml Blood	Blue Cap (Coagulation bottle)	50-150% 0.5-1.5 iu	Fill to mark and mix well.
Factor IX (9) Assay	1 x 3.5 ml Blood	Blue Cap (Coagulation bottle)	65-150% 0.65-1.5 iu	Fill to mark and mix well.
Fibrinogen	1 x 3.5 ml Blood	Blue Cap (Coagulation bottle)	1.6 – 4.7 g/l	Fill to mark and mix well. Test as part of coagulation screen
G6PD	1 x 4 ml Blood	Purple Cap (FBC bottle)	To arrive in the laboratory before 12 noon	BCH Red Cell Lab- arrange with lab in advance
Gene rearrangements (Ig/ TCR/ IGHV)	1 x 4 ml Blood (form available on BLL Haem user manual)	Purple Cap (FBC bottle)		BCH Haem/Oncology Lab
Granulocyte Immunology	Samples dependant on clinical history (see form 3E http://tinyurl.com/h-i-forms)		To arrive in laboratory before 12 noon	H&I Diagnostics Filton,Bristol

TEST	SAMPLE / AMOUNT	STORAGE / CONTAINER	VIABILITY / REF. RANGES	COMMENTS
Haemoglobin Electrophoresis (Hb variants eg. HbS)	1 x 4 ml Blood	Purple Cap (FBC bottle)	To arrive in the laboratory before 12 noon	BCH Red Cell Haematology
Haemoglobin A, A2, and F Thalassaemia Screen)	1 x 4 ml Blood	Purple Cap (FBC bottle)	To arrive in the laboratory before 12 noon	BCH Red Cell Haematology
Haptoglobin	1 x 6 ml Blood	Red Cap (serum bottle)	0.45 – 1.99g/l	Fill to mark. Haematology – Antrim
HITT Screen	1 x 6 ml Blood	Red Cap (serum bottle)		BCH Haemostasis Lab HITT score required, contact Haem Antrim for forms
JAK2	1 x 4 ml Blood (form available on BLL Haem user manual)	Purple Cap (FBC Bottle)		BCH Haem/Oncology Lab
Peripheral Blood Markers	1 x 4ml Blood 1 x tray of slides	Purple Cap (FBC Bottle)	To arrive in the laboratory before noon	BCH Haem/Oncology Lab
Lupus Anticoagulant / Inhibitor	4 x 3.5 ml Blood	Blue Cap (Coagulation bottle)	To arrive in the laboratory before noon	Fill to mark and mix well. BCH Coagulation
Lymphocyte subsets (for immunodeficiency/ Ocrevus work up)	1 x 4 ml Blood	Purple Cap (FBC Bottle)	To arrive in the laboratory before noon	RVH Immunology
Malarial Parasites	1 x 4 ml Blood to coincide with fever peaks.	Purple Cap (FBC bottle)	Send urgently as sample viability is time critical	Contact Lab in advance, record full history & clinical details (including prophylaxis) on request form.

TEST	SAMPLE / AMOUNT	STORAGE / CONTAINER	VIABILITY / REF. RANGES	COMMENTS
Molecular rearrangements (TP53, MYD88, MALT etc)	1 x 4 ml Blood (form available on BLL Haem user manual)	Purple Cap (FBC bottle)		BCH Haem/Oncology Lab
Monospot	1 x 4 ml Blood	Purple Cap (FBC bottle) or Red cap or Gold cap (serum)		Fill to mark and mix well.
NPM1 and FLT3 (AML mutations)	1 x 4 ml Blood (form available on BLL Haem user manual)	Purple Cap (FBC bottle)		BCH Haem/Oncology Lab
Paroxysmal Nocturnal Haemoglobinuria CD59	1 x 4 ml Blood up to 24hrs	Purple Cap (FBC bottle) **Do not store in fridge**	To arrive in the laboratory before noon	BCH Haem/Oncology
Plasma Viscosity	1 x 4 ml blood	Purple Cap (FBC bottle)		Sent by taxi to Ulster Hospital Haematology
Platelet Aggregation Studies	2 x 10 mls Platelet Aggregation Studies or 5 x 3.5 ml Citrate sample (fresh samples)	**Do not store in fridge**	To arrive in the laboratory before noon	BCH Coagulation
Platelet Antibodies	Dependent on suspected condition - contact Lab.	Dependent on suspected condition - contact Lab.	To arrive in the laboratory before noon	Dependent on suspected condition - contact Lab.
Platelet derived growth factor receptor (PDGFR)	Sample numbers depends on WBC count	Purple Cap (FBC bottle)	Contact 028 95040913 for number of samples required	BCH Haem/Oncology Lab
Platelet Function Tests	1 x 3.5ml sodium citrate 1 x 4 mls EDTA (fresh samples)	Blue Cap Purple Cap		BCH Haemostasis laboratory- arrange with lab in advance

TEST	SAMPLE / AMOUNT	STORAGE / CONTAINER	VIABILITY / REF. RANGES	COMMENTS
PML- RARA	1 x 4 ml Blood (form available on BLL Haem user manual)	Purple Cap (FBC bottle)		BCH Haem/Oncology Lab
Prothrombin Time (PT)	1 x 3.5 ml Blood	Blue Cap (Coagulation bottle)	PT 9.6 - 13.6s	Fill to mark and mix well. Test part of coagulation screen
Protein C Part of Thrombophilia Screen	2 x 3.5 ml Blood	Blue Cap (Coagulation bottle)	0.65 – 1.35 iu/ml	Fill to mark and mix well. Haematology – Antrim
Protein S Part of Thrombophilia Screen	2 x 3.5 ml Blood	Blue Cap (Coagulation bottle)	Female 0.55 – 1.16 iu/ml Male 0.7- 1.3 iu/ml	Fill to mark and mix well. Haematology – Antrim
PT20210A	1 x 4ml Blood	Purple Cap (FBC bottle)		BCH Haemostasis Lab
Pyruvate kinase	1 x 4ml Blood	Purple Cap (FBC bottle)	To arrive in the laboratory before 12 noon	BCH Red Cell Lab- arrange with lab in advance
Reticulocyte Count	1 x 4 ml Blood	Purple Cap (FBC bottle)	<2.5%	Fill to mark and mix well.
Sezary cell screening	4 x 4 ml Blood (4 for BCH and 1 for RVH Histo)	Purple Cap (FBC bottle)	RVH must be arranged by contacting 07870456031.Processed only on Wed or Thurs.	BCH Haematology and RVH Histopathology
Sickle Screen	1 x 4ml Blood	Purple Cap (FBC bottle)	To arrive in the laboratory before 12 noon	Fill to mark and mix well.
Thrombin Clotting Time (TT)	1 x 3.5 ml Blood	Blue Cap (Coagulation bottle)	TT 11.0 – 16.4s	Fill to mark and mix well. Test as part of coagulation screen
Thrombophilia Screen (Protein C, Protein S, AT + APC-R)	4 x 3.5 ml Blood	Blue Cap (Coagulation bottle)	Batched for processing send in as early in day as possible	Fill to mark and mix well. Haematology – Antrim

TEST	SAMPLE / AMOUNT	STORAGE / CONTAINER	VIABILITY / REF. RANGES	COMMENTS
Urinary Haemosiderin	10 ml urine	Plain universal container	To arrive in the laboratory before 12 noon	Haematology – Antrim
Variant CML (e8q2 for RQ-PCR)	4 x 4ml blood and accompanying form	Purple Cap (FBC bottle)	To arrive in the laboratory before 12 noon Mon-Thurs only	West Midlands Regional Genetics Lab,Birminghams Women and Childrens H
Von Willebrands Disease	2 x 3.5ml Blood	Blue Cap (Coagulation bottle)	To arrive in the laboratory before 12 noon	Fill to mark and mix well. BCH Coagulation
Add on tests may only be accepted within the limits of sample viability (dependent on test profile), otherwise an additional sample and form are required.				

Notes

Sample integrity:
The quality of results will be affected by sample integrity. Factors such as haemolysis, lipaemia, presence of clots in anti-coagulated samples will affect the validity of results. In some cases no results will be issued or a comment will be added to reports alerting requestor that results may be inaccurate and need repeating to confirm accuracy.

Hazard Group 3 (Cat 3) samples:
Hazard stickers should be attached to request forms to alert staff to CAT III or suspected CAT III samples (**Identify the nature of high risk for handling / disposal purposes)**. The laboratory should be informed before blood is sent for laboratory investigations.

Specialist Haematology tests:
Will only be processed by BCH Haematology-Oncology laboratory if deemed appropriate and authorised by a Consultant Haematologist. Please state the name of the approving Consultant Haematologist and clinical information on the test form.

Note: The above referral test repertoire is not exclusive. Contact the Haematology laboratory ext 44975 for any further information or consult Belfast Link Laboratory Handbook @ https://belfasttrust.hscni.net/service/laboratory-services/

Oral Anticoagulation

Refer to the following NHSCT policies available in the Policy Library

Oral Anticoagulant Guidelines	NHSCT/12/575
Dabigatran Reversal Guidance	NHSCT/14/763
Rivaroxaban and Apixaban Reversal Guidance	NHSCT/14/764

Thrombophilia Screening

Indicated In:

•Patients with a venous thrombosis **<40 years of age**, who have a strong first-degree family history (2 or more family members) of unprovoked venous thrombosis.

•Patients with an unprovoked venous thrombosis at an early age **(<40 years)** with no family history should be tested for antiphospholipid antibodies and lupus anticoagulant.

•Adults with skin necrosis associated with vitamin K antagonists e.g. warfarin should be tested for Protein C & Protein S deficiency **only** post vitamin K antagonist withdrawal.

•Neonates and Children with Purpura Fulminans should be tested urgently for Protein C and Protein S deficiency and discussed with Haematology Consultant as further specialist assays may be needed.

•Individuals with arterial thrombosis at a young age **(<40)** should be tested for antiphospholipid antibodies and lupus anticoagulant **only**.

•Women with history of recurrent miscarriage, pre-eclampsia before 34 wks of pregnancy, intrauterine growth retardation before 34 wks of pregnancy or intrauterine death should be screened for the presence of antiphospholipid antibodies and lupus anticoagulant **only**.

Thrombophilia screening is NOT indicated in:

•Case finding of asymptomatic relatives for the Factor V Leiden or Prothrombin Gene Mutations is not recommended.

•Case finding of asymptomatic relatives with high risk thrombophilia such as Antithrombin, Protein C and Protein S deficiency should only be considered in selected thrombosis prone families & only after the risks, benefits and limitations of testing has been discussed.

•Thrombophilia screening should not be performed in asymptomatic patients considering use of oestrogen-based contraception. If these patients have a strong first-degree family history of thrombosis (2 or more family members) then alternative contraception (*e.g.* Progesterone only pill, Progesterone depot injection / implant, intrauterine contraceptive devices) should be considered.

•Thrombophilia screening should not be performed in asymptomatic patients considering use of HRT. If these patients have a strong first-degree family history of thrombosis (2 or more family members) then use of transdermal HRT should be considered as this represents a lower thrombotic risk.

•Thrombophilia screening should not be performed in asymptomatic patients planning pregnancy. If these patients have a strong first-degree family history of thrombosis (2 or

more family members) it may be appropriate to consider 6 weeks of post-partum thromboprophylaxis but this decision should be made on clinical grounds alone.

•Women who have suffered a VTE in a previous pregnancy or with use of oestrogen-based contraception may be given thromboprophylaxis in a subsequent pregnancy. This decision should be made on clinical grounds alone.

•Unselected patients with travel – provoked venous thrombosis.

•Unselected patients presenting with a first episode of venous thrombosis.

•Unselected patients with upper limb thrombosis or intra-abdominal thrombosis.

•Patients with central venous catheter related venous thrombosis or retinal vein occlusion.

Timing of testing.
Thrombophilia results may be affected by acute thrombosis, pregnancy and oral contraceptives. Avoid testing in these situations if possible.

Warfarin affects protein C, protein S and APC resistance. Patients should be off Warfarin for **at least 2 weeks** before thrombophilia screening.

Lupus Inhibitor and Anticardiolipin Antibodies are indicated in:
Spontaneous VTE in < 50 years

Arterial occlusive events in < 50 years

Recurrent early miscarriage or intrauterine death after 20 weeks gestation

Patients with SLE - part of routine assessment

Samples and clinical details

Indication for Thrombophilia Screening or Lupus Inhibitor testing is **essential** on Request form

	Samples	Request Form
Basic screen : AT, PC, PS, FV Leiden, Prothrombin 20210	4× INR/Coag. Bottles 1× FBC bottle	Coagulation
Lupus Inhibitor:	2×INR/Coag. bottles	Coagulation - **Lupus inhibitor**
	1× Clotted bottle	Biochemistry - **Anticardiolipin antibodies**
Basic screen + Lupus Inhibitor	6× INR/Coag. Bottles 1× FBC Bottle	Coagulation - **Thrombophilia Screen and Lupus inhibitor**
	1× Clotted	Biochemistry - **Anticardiolipin antibodies**

Normal Ranges

	At birth (full term)	Day 3	Day 7	Day 14	1 month	2 months	3 – 6 months	1 yr	2 – 6 yrs	6 – 12 years	Adult Men	Adult Women
RBC (10^{12}/L)	5.0 – 7.0	4.0 – 6.6	3.9 – 6.3	3.6 – 6.2	3.0 –5.4	3.1 – 4.3	4.1 – 5.3	3.9 –5.1	4.0 – 5.2	4.0 – 5.2	4.5 – 5.5	3.8 – 4.8
Hb (g/L)	140 – 220	150 – 210	135 – 215	125 – 205	115 – 165	94 – 130	111 – 141	111 – 141	110 – 140	115 –155	130 – 170	120 –150
PCV	0.45 – 0.75	0.45 – 0.67	0.42 – 0.66	0.31 – 0.71	0.33 – 0.53	0.28 – 0.42	0.3 – 0.4	0.3 –0.38	0.34 – 0.4	0.35 – 0.45	0.40 – 0.50	0.36 – 0.46
MCV (fl)	100 -120	92 - 118	88 – 126	86 – 124	92 – 116	87 – 103	68 – 84	72 - 84	75 – 87	77 – 95	83 –101	83 – 101
MCH (pg)	31 -37	31 -37	31 – 37	31 – 37	30 – 36	27 - 33	24 – 30	25 – 29	24 – 30	25 – 33	27 – 32	27 – 32
MCHC (g/L)	300 – 360	290 – 370	280 – 380	280 – 380	290 – 370	285 – 355	300 – 360	320 – 360	310 – 370	310 – 370	315 – 345	315 – 345
Retic. (%)	2.4 – 5.7	1.25 – 5.3	1.28 – 1.59	1.39 – 1.61	0.67 – 1.11	0.97 – 1.16	0.98 – 1.89	0.77 – 1.96	0.75 – 1.92	0.75 – 1.92	1.11 – 1.81	1.2 – 2.08
WBC ($x10^9$/L)	10 - 26	7 - 23	6 – 22	6 – 22	5 - 19	5 – 15	6 – 18	6 – 16	5 – 15	5 – 13	4 – 10	4 – 10
Platelets ($x10^9$/L)	100 – 450	210 – 500	160 - 500	170 – 550	200 – 500	210 – 650	200 – 550	200 – 550	200 – 490	170 – 450	150 – 410	150 – 410
Neutrophils $x10^9$/L)	4 - 14	3 -5	3 – 6	3 – 7	3 – 9	1 – 5	1 – 6	1 - 7	1.5 – 8.0	2 – 8	2 - 7	2 - 7
Lymphocytes $x10^9$/L)	3 – 8	2 - 8	3 – 9	3 – 9	3 – 16	4 – 10	4 – 12	3.5 – 11	6 – 9	1 – 5	1 – 3	1 – 3
Monocytes $x10^9$/L)	0.5 – 2.0	0.5 - 1	0.1 – 1.7	0.1 – 1.7	0.3 – 1.0	0.4 – 1.2	0.2 – 1.2	0.2 – 1.0	0.2 – 1.0	0.2 – 1.0	0.2 – 1.0	0.2 – 1.0
Eosinophils $x10^9$/L)	0.1 - 1	0.1 – 2.0	0.1 – 0.8	0.1 – 0.9	0.2 – 1.0	0.1 – 1.0	0.1 – 1.0	0.1 – 1.0	0.1 – 1.0	0.1 – 1.0	0.02 – 0.5	0.02 – 0.5
Basophils $x10^9$/L)	0.02 – 0.1	0.02 – 0.1	0.02 – 0.1	0.02 – 0.1	0.02 – 0.1	0.02 – 0.1	0.02 – 0.1	0.02 – 0.1	0.02 – 0.1	0.02 – 0.1	0.02 – 0.1	0.02 – 0.1

Erythrocyte Sedimentation Rate (ESR)

Test	17-50 Years	50-61 Years	61-70 Years	>70 Years
ESR (male) mm/hr	≤ 10	≤ 12	≤ 14	≤ 30
ESR (female) mm/hr	≤ 12	≤ 19	≤ 20	≤ 35

Haptoglobin (g/L) 0.45 – 1.99

Dacie and Lewis: Practical Haematology, 12th Edition.

NORMAL RANGES COAGULATION (ADULT)

Prothrombin Time**	9.6- 13.6 secs
APTT	20.5-32.1 secs
Fibrinogen (Clauss)	1.6- 4.7 g/L
Thrombin Time	11.0-16.4 secs
D- Dimer	< 250 ng/mL

Note: All coagulation parameters should be reviewed when evaluating DOAC patient results.

NORMAL RANGES COAGULATION (PAEDIATRIC)

	Premature infants 30-36 weeks	1 week	1 month	6 months
PT (secs) (mean)	10 – 16.2	10.9 – 14.4	10.6 – 13.1	11.5 – 13.1
APTT(secs) (mean)	26.9 - 79.4	34.0 – 51.2	33.0 – 47.8	31.8 – 39.2
Fibrinogen g/L (mean)	1.5 – 4.2	2.3 – 3.9	2.4 – 3.9	1.8 – 3.2

Adult values for coagulation are reached by 6 months of age (BJH, 2002, 119:295-309)

Normal Ranges for Thrombophilia Screens

Protein C	0.65 – 1.35 IU (65- 135%)
Free Protein S	0.70 – 1.30 IU (75- 145%) Male 0.55 – 1.16 IU (55- 125%) Female
Antithrombin	70 – 128%
APC- R Ratio	2.6- 3.5 negative 2.1- 2.5 equivocal <2.0 Positive

Measurement Uncertainty (MU)

Depending on their relative values, measurements of a given parameter (measureand) often cannot be meaningfully compared with each other or with a clinical decision value without knowledge of their uncertainty. Measurement results are generally interpreted by comparison with other values. Such comparisons are for the purpose of either assessing whether the two values are measurably different by the procedure used, or whether they are not only measurably different but also biologically different. For both types of assessment, knowledge of the measurement uncertainty of the patient result is necessary. The value with which a patient result is compared is usually either a previous result for the same patient, or is a clinical decision value. Departmental MU data is as follows:

Parameter	Measurement Uncertainty
Hb	±4 (g/L)
PCV	±0.05
RBC	±0.26($x10^{12}$/L)
WBC	±0.4 ($x10^{9}$/L)
Platelets	±24 ($x10^{9}$/L)
Prothrombin Time (PT) secs	± 0.54
APTT (routine) secs	± 3.0
APTT (alternate) secs	± 1.11
Fibrinogen (g/l)	± 0.5
Thrombin Time (TT) secs	± 1.2
D-Dimer (ng/ml)	± 94
Factor VIII (8) %	± 26
Factor IX (9) %	± 26
Antithrombin activity (%)	± 19
Protein C activity (IU/ml)	±1.05
Free Protein S (IU/ml)- combined male and female values	± 1.25
Activated Protein C Resistance (APC-R) (Ratio)	± 0.7

Criteria for telephoning results

Results from patients which fall outside the following range or not in keeping with established history will be telephoned to source ASAP. A repeat sample should be sought if not in keeping with patient's condition.

Full Blood Count parameters			
Parameter	Unit	Level	Comment
Hb	g/l	<70	
	g/l	>190	Excluding new born infants
White cell count			
neuts	$X10^9$/l	<0.5	
	$X10^9$/l	>50	
lymph	$X10^9$/l	>50	
platelets	$X10^9$/l	<30	
	$X10^9$/l	>1000	
PT >20.0 SECS (coagulation screen)			
APTT >50 SECS (coagulation screen)			
APTT>120 SECS (on heparin)			
FIB <1.0g/l			
Blood film			
Presence of blasts or diagnosis Suggestive of chronic myeloid leukaemia			Discuss with the covering haematologist urgently
Malaria parasites			positive
Coagulation			
INR	>5.0		For patients on warfarin

The BMS will consider various parameters prior to phoning results e.g. is previous recent result similar? and/or take into account patient's age, sex, clinical condition, and information provided on request form.

Abnormal D-dimer results are not routinely telephoned to GP health centres or DAL Doc (out of hrs GP service). If a GP requires a D-dimer result out of hours they need to provide Dal Doc with the clinical information and ask them to phone the laboratory for a result.

Haematology Laboratory Routine Turnaround Times

Test	Turnaround Time
Group and Hold	24hrs
Routine Crossmatch	14 hrs
Emergency Crossmatch	45 mins
Emergency Crossmatch (MUH,WHA Hospitals)	1.5hrs (after receipt of patient's sample)
Full Antibody Investigation	4 hrs (referral to NIBTS upto 24hrs)
Kleihauer estimation	24 hrs
Direct Antiglobulin Test	24 hrs
Cold Agglutinin Test	8 hrs
Fresh Frozen Plasma for Antrim, Causeway, MUH,WHA Hospitals	1.5 hrs (after receipt of patient's sample)
Platelets (Group Specific) for Antrim, Causeway, MUH,WHA Hospitals	2hrs (up to 8 hrs depending on availability of type)
Filtered Cells	1.5hrs (after receipt of patient's sample)

Sickle Cell Screen	48 hrs
Haptoglobin	48 hrs
Urinary haemosiderin	4 days
Iron Stain	4 days
Malaria Parasites (diagnosis)	48 hrs
Malaria Screening Test (Serology)	24hrs
Monospot	48 hrs
Thrombophilia Screen	2-3 weeks

	GP	Acute
Full Blood Picture	24 hrs	4 hrs
Differential	24 hrs	4 hrs
Erytrocyte Sedimentation Rate	24 hrs	4 hrs
Reticulocyte Count	24 hrs	4 hrs
Coagulation Screen	24 hrs	4 hrs
INR	24 hrs	4 hrs
D-Dimer	24 hrs	4 hrs

The above turn-around-times are for routine tests and are calculated from receipt of sample in the laboratory until the result is available on ward recall or GP links.

Emergency samples should be analysed within an hour, 90 minutes for coagulation samples. If analysis of emergency samples are likely to be delayed due to analyser or system failures the user will be informed as to the expected delay and alternatives

discussed (forwarding sample to another laboratory for analysis etc.) Some specialist tests will have longer turn-around times.
If Clinicians wish to discuss the appropriateness of these published times please contact a Laboratory Consultant or BMS management staff.

Turnaround time audits are carried out annually and information will be provided on request.

Common Referral Laboratories

Belfast Link Laboratories(BLL) BCH site	Haematology dept, Belfast City Hospital Lisburn Road, Belfast, BT12 6BA 02895040987
BLL RVH site	Royal Victoria Hospital Grosvenor Road, Belfast
Northern Ireland Blood Transfusion Service (NIBTS)	Belfast City Hospital Complex Lisburn Road, Belfast, BT9 7TS
PHLS Malaria Reference Laboratory	London School Of Hygiene & Tropical Medicine Keppel Street (Gower Street) London WC1E 7HT tel. 020 79272427, 020 79272435
FMH flow cytometry:	Dr Mark Williams/Rob Webster Special Investigation Department National Blood Service Leeds Blood Centre Bridle Path Leeds LS15 7TW Tel. 01132148600
Ulster Hospital	Haematology Laboratory, Ulster Hospital, Upper Newtownards Road, Dundonald. 028 90484511 ext 88532
Filton, Bristol Hospital	H&I Diagnostics Filton 500 North Bristol Park, Northway, Filton, Bristol, BS34 7QH 0117 921 7372
West Midlands Regional Genetics laboratories	Birmingham Womens and Childrens NHS Trust, Edgebaston, Birmingham B15 2TG Tel (0121)3358036

Tests referred to Reference Laboratories have a turnaround time from a few days to a few weeks depending on the type of investigation. If the results are required urgently, please ring the Laboratory.

Minimum Acceptance Criteria (MAC)-Blood Bank

- Mandatory MAC MUST be present on ALL sample bottle(s) / container(s) and request form to assure sample acceptance for Laboratories and LIMS.
- Desirable MAC MUST be considered by the User as part of good patient management / care.

	Mandatory	Desirable
Sample	1. Unique identifier number* 2. Patient Official first Name 3. Surname 4. Sex (Male/Female/Other) 5. Date of Birth (dd/mm/yyyy) 6. Date and Time of Sample and Collection 7. Signature of staff member taking the sample ***The Health & Care Number must be used unless**:- a) The patient is not registered with a General Practitioner in Northern Ireland – use the local hospital numbering system. b) An emergency situation – use local hospital EMERGENCY numbering system.	1. Full address
Request Form	1. Unique identifier number* 2. Patient Official First Name 3. Surname 4. Sex (Male/Female/Other) 5. Date of Birth (dd/mm/yyyy) 6. Date and Time of Sample Collection 7. Requester Name / Code 8. Source (Ward / Clinic /GP) 9. Investigation (test) Required 10. Signature of staff member taking the sample ***The Health & Care Number must be used unless:-** 11. The patient is not registered with a General Practitioner in Northern Ireland – use the local hospital numbering system. 12. An emergency situation – use local hospital EMERGENCY numbering system. *	1. Blood Group (if known) 2. Previous transfusion/obstetric history (including the presence of antibodies) 3. Date of most recent transfusion (if applicable) 4. Reason for Test request 5. Indication for red cell transfusion 6. Full address 7. Prophylactic anti-D administration information 8. NIBTS- Previous NIBTS number (if applicable) 9. NIBTS- For male partners the other partner's details must also be included in the relevant section.

The requirements of the NPSA SPN 14 “Right patient, right blood” competency 1 “Obtaining a venous sample for pre-transfusion testing” must be adhered to. The details on the request form and specimen container must tally with the details on the patient’s wristband.

BLOOD BANK TESTS

TEST	SAMPLE / AMOUNT	STORAGE / CONTAINER	COMMENTS
Blood Group, Antibody Screen and Crossmatch	1 x 6 ml Blood	Pink Cap EDTA Bottle	Sample tube must be handwritten and signed.
Further Antibody investigations for NIBTS	2 x 6 ml Blood	Pink Cap EDTA Bottle	Non-urgent Group and Crossmatch samples not processed after 4pm.
Cold Agglutinins	1 x 6ml Blood	Red Cap Clotted sample	By prior arrangement with Lab - Samples sent at 37ºC in thermos flask before 2.00pm.
Cord Blood Group and DAT	1 x 4 ml Blood	Purple Cap EDTA Bottle	Fill to mark and mix.
Direct Antiglobulin test	1 x 4 ml Blood	Purple Cap EDTA Bottle	Fill to mark and mix.
Kleihauer	1 x 4 ml Blood	Purple Cap EDTA Bottle	Fill to mark and mix.

Suspected Haemolytic Transfusion Reaction	a) Suspected Blood Pack b) 1 x 6 mls Blood c) FBC sample d) Coag sample e) 10 ml Urine f) Biochem profile g) Blood cultures	Pink Cap EDTA Purple Cap EDTA Blue Cap Urine monovette (yellow) Gel samples Blood culture bottles	Please telephone Blood Bank to arrange investigation.

BLOOD BANK Requirements

All clinical staff participating in blood transfusion processes MUST hold valid Right Patient Right Blood (RPRB) training.
For more comprehensive information regarding the Blood Transfusion process please refer to the NHSCT Blood Transfusion Manual, located in the Policy Library of the NHSCT Intranet site.

NI Hospital Transfusion Request Forms **MUST** include the minimum patient identifiers – see Regional NI Pathology MAC Policy: -

Antibody status
Previous transfusions
Obstetric history
Product requirement (including any special requirements)
Reason for transfusion / clinical details
Date/Time required

Patient identification details on the sample tube must be handwritten.
A checked addressograph may only be used on the request form.

It is the responsibility of the person taking the specimen to hold valid Right Patient Right Blood training. This person must complete the patient identification details on the sample bottle and request form, signing both as the sample taker.

Group and Antibody Screen / Group and Hold, indicates that ABO/Rhesus D typing will be performed and that the serum has been tested for atypical antibodies i.e.: NO BLOOD IS CROSSMATCHED

Blood component / blood product request can be completed on the request form at the time of patient sampling or if Blood Bank have already received a sample, via telephone request.**.**

Request forms and samples that do not meet the minimum criteria will be rejected and not tested. The ward will be informed of the reason for rejection, a repeat sample requested and the sample error logged. All sample / request form errors are trended and investigated by Haemovigilance Practitioners; staff who continue to make sample errors will be re-trained and re-assessed in the competency by the Haemovigilance Practitioners.

Requests for routine blood transfusion ‘top-ups’ should be made before 4.00pm

Please ensure that blood bottles being used have not expired.

Hazard Group 3 (Cat 3) samples
Hazard stickers should be attached to request forms to alert laboratory staff to confirmed or suspected CAT 3 samples. Inform the laboratory prior to dispatching the sample.

Crossmatch sample timings as follows, from the date and time of sampling:

Patient Category	Sample Validity
Patient transfused within last 3 months	Sample valid for 72 hours
Patient pregnant within last 3 months	Sample valid for 72 hours
Patient currently pregnant	Sample valid for 72 hours
If no patient history is available/provided	Sample valid for 72 hours
Patient transfused > 3months ago	Sample valid for 7 days
Patient pregnant > 3 months ago	Sample valid for 7 days
All other patient categories	Sample valid for 7 days

Transfusion of Blood Components (Red cells, Platelets, Fresh Frozen Plasma and Cryoprecipitate)

Only units for immediate transfusion should be ordered and removed from Blood Bank. If the transfusion is not going to commence within 30 minutes of dispatch from Blood Bank, Blood Bank must be contacted and the blood component must be returned immediately to Blood Bank to avoid wastage.
If blood has been removed from the blood fridge for longer than 30 minutes (or the coolbox seal has been broken for more than 30 minutes), the blood component may be wasted. Do not dispose of any unused blood components on the ward, always contact Blood Bank and promptly return unused components.

Once removed from temperature controlled storage, red cell transfusions must be completed within 4 hours.

Blood ordering policies should adhere closely to the Maximum Surgical Blood Ordering Schedule where appropriate – please refer to NHSCT Blood Transfusion Manual.

Paediatric Transfusion

In cases where neonates are to be transfused, the laboratory requires a sample from the infant. An additional sample from the mother may be required upon request from Blood Bank. Where an antigen/antibody incompatibility exists between mother/infant due to

maternal antibody, the blood pack for the infant will be crossmatched against the maternal sample.

Blood Products (Albumin, Anti-D, Octaplex)

These products must be stored and administered in accordance with the manufacturer's instructions in the product insert leaflet and are issued on a named patient basis. In order to minimise wastage of these products it is recommended that any excess stock / unused products should be returned to Blood Bank immediately to ensure optimum storage conditions are maintained.

Reporting of transfusion related incidents
Any adverse events in the transfusion process, including suspected transfusion reactions, must be reported to Blood Bank, Haemovigilance and on Datixweb.

Requests for autologous transfusion should be directed to NIBTS

As per the Regional NI Pathology MAC Policy –

Blood Transfusion MAC

- Mandatory MAC **MUST** be present on **ALL** sample bottle/container and request form to assure sample acceptance for Laboratories and LIMS.
- Desirable MAC **MUST** be considered by the **User** as part of good patient management / care.

	Mandatory	Desirable
Sample	1. Unique identifier Number * 2. Patient Official First Name 3. Surname 4. Sex (Male/Female/Other) 5. Date of Birth (dd/mm/yyyy) 6. Date and time of sample collection 7. Signature of staff member taking the sample * The Health & Care Number must be used unless:- a) The patient is not registered with a General Practitioner in Northern Ireland – use the local hospital numbering system. b) An emergency situation – use the local hospital EMERGENCY numbering system.	1. Full Address
Request form	1. Unique identifier Number * 2. Patient Official First Name 3. Surname 4. Sex (Male/Female/Other) 5. Date of Birth (dd/mm/yyyy) 6. Requestor Name/Code 7. Source (Ward/Clinic/GP) 8. Investigation (test) Required 9. Date ad Time of Sample Collection 10. Signature of staff member taking the sample * The Health & Care Number must be used unless:- a) The patient is not registered with a General Practitioner in Northern Ireland – use the local hospital numbering system.	1. Blood group (if known) 2. Previous transfusion / obstetric history (including presence of antibodies) 3. Date of most recent transfusion (if applicable) 4. Reason for test request 5. Indication for red cell transfusion 6. Full Address 7. Prophylactic anti-D administration information 8. NIBTS – Previous NIBTS number (if applicable)

	b) An emergency situation – use the local hospital EMERGENCY numbering system.	9. NIBTS – For male partners, the other partner's details must also be included in the relevant section.

Cellular and Molecular Pathology

Location of Laboratory

The Department of Cellular & Molecular Pathology is located in the Northern Health and Social Care Trust, Antrim Area Hospital Site, Laboratory building. Please follow overhead signs once inside the laboratory building. As this is a secure facility please telephone ahead to make an appointment to gain access.

Clinical Services Offered

The department of Cellular & Molecular Pathology offers a range of clinical services.

Histopathology
Cervical Cytology
Non-Cervical Cytology
Immunocytochemistry & and Specials
Molecular Pathology

Hours of Opening

Core Hours:

Monday to Friday Core Hours: 09.00 – 17.00 hrs
(excluding bank holidays and weekends)

Bank Holiday Service:

A Consultant Pathologist and Biomedical Scientists are on Stand-By. If required, please contact Antrim Switchboard. Ext:0 or 028 94 42 4000.

Out of Hours Service:

Urgent specimens can be reported at the weekend, subject to arrangements with the Pathologist on-call. Contact Laboratory Ext 334184/334881 before 17.00 hrs on Friday, outside of core hours contact Pathologist on-call through Antrim Hospital switchboard Ext:0 or 028 94 42 4000.

In the event of an emergency, contact the Consultant Pathologist on-call via Antrim Switchboard. Ext:0 or 028 94 42 4000.

NB: The Antrim switchboard has a telephone list of all BMS staff which can be used at any time in an emergency.

MORTUARY HOURS OF OPENING (ANTRIM HOSPITAL)

Weekdays 09.00 – 17.15 hrs
Mortuary is open during the above hours. After 17.15 hrs the Mortuary Technicians are on-call and can be contacted through the Antrim switchboard.

Weekends (Saturday and Sunday)
Mortuary is open from 09.00 – 13.00 hrs during which time routine work is carried out. After 13.00 hrs the Mortuary Technicians are on-call until 09.00 hrs on Monday and can be contacted through the Antrim switchboard.

Public Holidays
Mortuary Technicians are on-call and can be contacted through the Antrim switchboard.

Contact Details

Departmental Staff

Contact	Telephone (external)	Telephone (internal)	Email
Gillian Stewart Head Biomedical Scientist	02894426477	336477	Gillian.Stewart@northerntrust.hscni.net
Jackie Jamison Cervical Screening Lead	02894424100	334100	Jackie.Jamison@northerntrust.hscni.net
Mari Paul Lead BMS for Cytopathology	02894424866	334866	Mari.Paul@northerntrust.hscni.net
General / Office enquires	02894424488	334488	N/A
Molecular Pathology	02894424488	332078	Molecular.Pathology@northerntrust.hscni.net
Archive enquires	02894424488	332028	Archive.CMP@northerntrust.hscni.net

Medical Staff

Contact	Telephone (external)	Telephone (internal)	Email
Dr Fionnuala Hinds Consultant Pathologist	0289442 4030	334030	Fionnuala.Hinds@northerntrust.hscni.net
Dr Ciaran O'Neill Consultant Pathologist	0289442 2117	332117	Ciaran.ONeill@northerntrust.hscni.net
Dr Kelly Elliott Consultant Pathologist	0289442 4109	334109	Kelly.Elliott@northerntrust.hscni.net
Dr Graeme O'Hara Consultant Pathologist	0289442 4108	334108	Graeme.OHara@northerntrust.hscni.net
Dr Lisa Smith Staff grade-Speciality Doctor	0289442 4817	334817	Lisa.Smith@northerntrust.hscni.net

Minimum Acceptance Criteria (MAC)-CELLULAR PATHOLOGY

- Mandatory MAC MUST be present on ALL sample bottle(s) / container(s) and request form to assure sample acceptance for Laboratories and LIMS.
- Desirable MAC MUST be considered by the User as part of good patient management / care.

	Mandatory	Desirable
Sample	1. Unique identifier number* 2. Patient Official first Name 3. Surname 4. Date of Birth (dd/mm/yyyy) ***The Health & Care Number must be used unless**:- a) The patient is not registered with a General Practitioner in Northern Ireland – use the local hospital numbering system. b) An emergency situation – use local hospital EMERGENCY numbering system.	
Request Form	1. Unique identifier number* 2. Patient Official First Name 3. Surname 4. Sex (Male/Female/Other) 5. Date of Birth (dd/mm/yyyy) 6. Date and Time of Sample Collection 7. Requester Name / Code 8. Source (Ward / Clinic /GP) 9. Investigation (test) Required 10. Clinical information 11. Anatomical site and specimen type ***The Health & Care Number must be used unless:-** 12. The patient is not registered with a General Practitioner in Northern Ireland – use the local hospital numbering system. 13. An emergency situation – use local hospital EMERGENCY numbering system. *	

Instruction for Completion of Request Forms

See each specimen section for instruction of accurate completion of request forms.

Urgent Requests

See Hours of Opening for information on requesting Urgent specimens out of core hours.

Within core hours please telephone the General Enquires number Ext 334488 or 02894 42 4488.

All urgent specimens should be discussed with a Consultant Pathologist ; Reason for urgent nature and appropriate clinical information will be required.

1. **Phone the Laboratory (Ext 334488) giving details of –**
   a) patient's name, DOB and Hospital No/HCN
   b) type of biopsy
   c) name and contact number of person requiring result

2. **Arrange for biopsy to get to the Laboratory before 17.00 hrs**
   This will involve:
   h) contacting laboratory porter to collect specimen, **or**
   i) ensuring the biopsy is on a hospital transport van **which is coming to the Laboratory that day, or**
   j) arrange for a taxi to bring the biopsy direct to the Laboratory
   Note: *It is the sender's responsibility to make sure the specimen arrives to the laboratory within core hours, all delays or issues with transport should be notified to the department ASAP.*

3. **Mark the request form 'urgent'**, give the name and telephone number of the Doctor to whom the result is to be given.

   The result will be phoned the next day by the reporting consultant.

   Note: The Histology laboratory is closed at the weekends.
   Urgent specimens sent to the Laboratory on Friday will not normally be reported until Monday morning. If a report is needed earlier for clinical management, this is to be arranged with the Consultant Pathologist on-call.

   Note: Urgent reporting will need to be agreed by one of the departments Consultant Pathologists.

Turnaround Times

CMP Clinical Service	TAT Target	Comment
Histopathology Specimens – Minors	>95% within 14 days	*As the complexity of cases increase, this will require the department to undertake additional procedures and tests such as immunocytochemistry or seeking specialist second opinions, this may lead to additional time to report.* *Diagnostic accuracy should not be compromised for timeliness.*
Histopathology Specimens – Majors	>95% within 28 days	
Frozen Section	within 30 minutes	
Rapid H&E	within 6 hours	
Cervical Cytology Specimens	80% within 14 days	
HPV Testing (Triage/TOC) as part of the NI Cervical Screening Programme	>95% within 3 days	
HPV genotype Testing	>95% within 14 days	
Non-Cervical Specimens – Miscellaneous	>95% within 14 days	
Respiratory Specimens	>95% within 14 days	
Fluid Specimens	>95% within 14 days	
Urine Specimens	>95% within 14 days	
Fine Needle Aspirates	>95% within 14 days	

Referral Laboratories

The Department of Cellular & Molecular Pathology will occasionally require the assistance of an outside laboratory or consultant to perform a service that the department itself does not routinely provide. The following approved referral laboratories are used (correct at date of activation):

Referral Laboratory	Service provided
Institute of Pathology Grosvenor Road Belfast BT12 6BA	Placentae Medical liver biopsies
Health Services Laboratories (HSL) Advanced Diagnostics 1st Floor, Rockefeller Building 21 University Street, London. WC1E 6JJ	ALK FISH + Interpretation HER2 FISH EBER
Regional Molecular Diagnostic Service (RMDS) 97 Lisburn Road, Belfast BT9 7AE	HER2 testing in gastric and oesophageal cancer PDL1 testing in breast and lung) MSI ROS1 NGS
Haematological Malignancy Diagnostic Service (HMDS) Level 3, Bexley Wing Leeds Teaching Hospital NHS Trust St James's University Hospital Beckett Street Leeds West Yorkshire LS9	Immunophenotyping EBER B-CELL and T-CELL CLONALITY TCR T14:18 MYC CMYC BCL2 BCL6 MALT1 MYD88 IGH rearrangement
North West Genomic Laboratory Hub,	BRCA

Centre for Genomic Medicine, St Mary's Hospital, Oxford Road Manchester	PDL1 Lung NGS NTRK1,2,3 ROS1
Poundbury Caner Institute Newborough House 3 Queen Mother Square Poundbury Dorchester Dorset	PDL1 Breast
University Hospitals Birmingham The Molecular Pathology Diagnostic Service Clinical Laboratory Services, Level -1 Birmingham, West midlands	HER2 MSI PDL1 (Lung, Breast, head&neck, gastric, UGI) NGS
Exact Sciences UK Ltd (formerly Genomic Health Sciences) Genomic Health Inc. 501 Galveston Drive 94063 Redwood City California USA	Oncotype Dx Breast Cancer Assay
Molecular Haematology Laboratory C Floor Tower Block Belfast City Hospital BT9 7AB	MYD88

Specimen Instructions

Please see individual specimen instructions for details on sample requirements, volumes, containers, preservation and labelling.

Specimens and/or Request Forms, which are not properly labelled, will be returned to sender for correction and/or confirmation as per policy.

Health & Safety

All biological samples represent a potential health hazard to healthcare staff. Please ensure that specimens are properly sealed before transportation. Syringe needles must be removed and replaced by caps, containers should not be overfilled as they will tend to leak and obviously leaking or contaminated sample containers must under no circumstances be sent to the laboratory.

High-risk specimens

Specimens from patients known or suspected to contain a Hazard Group 3 (Cat 3) pathogen, for example, *Mycobacterium tuberculosis*, Hepatitis B virus or HIV, must be clearly identified with a hazard warning 'Hazard Group 3 (Cat 3) Pathogen' label affixed to both specimen container and the accompanying request form. These specimens must be kept separate to clearly identify them from routine samples.

Urgent Specimens

If an urgent result is required, phone the Laboratory and request to speak to a member of the consultant staff to discuss details of clinical urgency. Advice will be given regarding the transport of the specimen and of the reporting time. A contact number must be given and recorded on the request form.

Consultative service

Advice on the interpretation of results, further investigation and management is available. Requests by clinicians for further, more complex investigations must be made within 3 days of receipt of the specimen in the laboratory.

Once the specimen has been placed in the appropriate transport medium, the specimen container and request form should then be placed in separate pockets of the plastic specimen transport bag (specimen in sealed section). The specimen transport bag should then be placed in the Histology and Cytology secondary protective carrier bag and dispatched immediately to the laboratory.

Large fluid specimens that have been collected into IV bags, once place in the secondary protective carrier should also be dispatched in a solid outer container, such as a histology specimen bucket.

Histopathology Specimens

Name of Test	**Histology Specimens**
Samples Required	Tissue removed as per clinical determination.
Primary sample volume	All removed tissue for diagnosis should be submitted to the laboratory for examination.
Container Type	**60ml Formalin Container** Specimen Containers with 60ml of 10% formalin fixative suitable for small specimens; biopsies and smaller resection specimens. **Medium Specimen Buckets 200-500ml** Specimen containers must be of suitable size i.e.: they should hold at least three times volume of fixative in ratio to the size of a specimen to ensure adequate fixation. Opaque containers should be used for products of conception. **Large Specimen Buckets** **1ltr KBB000001**, **2.5ltr KBB000002**, **5ltr KBB000004**, **20ltr KBB000004** Specimen containers must be of suitable size i.e.: they should hold at least three times volume of fixative in ratio to the size of a specimen to ensure adequate fixation. Opaque containers should be used for products of conception. **Preservative requirements** Routine biopsies should be sent to the laboratory fixed in 10% buffered formalin. All items listed above are available via FPL eProcurement catalogue or via laboratory stores.

Patient preparation / Sample Collection

-

Sample Labelling

Specimens must be accompanied by a Histopathology request form. Please take time to fill the form in properly and check all specimens are labelled. A duplicate form is now used to trace all biopsies sent to the lab. This should be completed and sent with each biopsy.

- PINK form kept at ward level
- GREEN form to send with specimen to lab

Essential Patient Information on specimen

Full Name
Date of Birth

Other significant information

Health & Care Number (HCN)
Date & Time of specimen collection
Destination for report.

Completion of request form

Essential Patient Information

- Full Name
- Date of Birth
- Health & Care Number (HCN)
- Gender
- Patients Location (Site / Clinical Area)
- Patients Consultant (GP, Requesting practitioner)
- PAS code of consultant
- Relevant Clinical history
- Type of sample (origin of sample)

Other significant information

- Name of sample Taker
- Patients address
- Additional copy reports, (Name, location, PAS Code)

Transportation of samples

Routine biopsies should be sent to the laboratory fixed in 10% buffered formalin.

Special Handling	N/A	Sample storage conditions	Routine histology samples should be placed in 10% formalin and transported to the laboratory at room temperature.
Factors know to affect performance	Poor and incomplete fixative. Delays in transportation.	For Clinical advice	Please telephone the laboratory on 334488

Red Flag Requests

Any red flag cases should have a red flag sticker placed on the Histopathology Request Form by the clinician. If no stickers are available, "RED FLAG SPECIMEN" should be written clearly at the top of the request form.

Specialist Biopsies- Temporal artery and Peripheral nerve biopsies

Name of Test	**Specialist Biopsies- Temporal artery and Peripheral nerve biopsies**
Samples Required	Tissue removed as per clinical determination.
Primary sample volume	All removed tissue for diagnosis should be submitted to the laboratory for examination.
Container Type	**60ml Formalin Container –** Specimen Containers with 60ml of formalin fixative suitable for small specimens; biopsies and smaller resection specimens. Specimen containers must be of suitable size i.e.: they should hold at least three times volume of fixative in ratio to the size of a specimen to ensure adequate fixation. Opaque containers should be used for products of conception. **Preservative requirements** Routine biopsies should be sent to the laboratory fixed in 10% buffered formalin. All items listed above are available via FPL eProcurement catalogue or via laboratory stores.

Patient preparation / Sample Collection

Temporal artery and Peripheral nerve biopsies MUST be placed on thin card in a longitudinal manner prior to fixative. This ensures the specimens are fixed as straight as possible.

Sample Labelling

Specimens must be accompanied by a Histopathology request form. Please take time to fill the form in properly and check all specimens are labelled. A duplicate form is now used to trace all biopsies sent to the lab. This should be completed and sent with each biopsy.

- PINK form kept at ward level
- GREEN form to send with specimen to lab

Essential Patient Information on specimen

Full Name
Date of Birth

Other significant information

Health & Care Number (HCN)
Date & Time of specimen collection
Destination for report.

Completion of request form

Essential Patient Information

Full Name
Date of Birth
Health & Care Number (HCN)
Gender
Patients Location (Site / Clinical Area)
Patients Consultant (GP, Requesting practitioner)
PAS code of consultant ?
Relevant Clinical history
Type of sample (origin of sample)

Other significant information

Name of sample Taker
Patients address
Additional copy reports, (Name, location, PAS Code)

Transportation of samples

Routine biopsies should be sent to the laboratory fixed in 10% buffered formalin.

Special Handling	N/A	Sample storage conditions	Routine histology samples should be placed in 10% formalin and transported to the laboratory at room temperature.
Factors know to affect performance	Not fixing on card in longitudinal manner. Poor and incomplete fixative. Delays in transportation.	For Clinical advice	Please telephone the laboratory on 334488

Specialist Histology – Frozen sections

Please note this is not included in current UKAS scope

Name of Test	**Specialist Histology – Frozen sections**
Samples Required	Tissue removed as per clinical determination.
Primary sample volume	All removed tissue for diagnosis should be submitted to the laboratory for examination.
Container Type	Specimen containers must be of suitable size. **Preservative requirements** DO NOT place in 10% formalin but send to the laboratory fresh. If small, wrap in a piece of gauze which has been dampened in saline to ensure tissue does not dry out.

Patient preparation / Sample Collection

The Clinician should telephone to arrange a frozen section examination with a Consultant Pathologist. The turnaround time relates to the interval between receipt of the urgent specimen within the laboratory and issuing of a verbal/telephone result. In practice, most small/diagnostic biopsies received in formalin and marked **'urgent'** can be paraffin processed for reporting and telephoning through a verbal result before 10.00 hrs on the day following receipt.

1. On taking tissue for a frozen section: -

a) **DO NOT** place in 10% formalin but send to the laboratory fresh. If small, wrap in a piece of gauze which has been dampened in saline to ensure tissue does not dry out.
b) place the tissue in a sealed, labelled bag or container. Ensure the request form is marked **'frozen section'**
c) insure the person who delivers the specimen to give it to a BMS in the Cellular & Molecular Pathology Laboratory and to say it is a frozen section.

A result will be phoned within 30 minutes of receiving the biopsy.

Sample Labelling

Specimens must be accompanied by a Histopathology request form. Please take time to fill the form in properly and check all specimens are labelled. A duplicate form is now used to trace all biopsies sent to the lab. This should be completed and sent with each biopsy.

- PINK form kept at ward level
- GREEN form to send with specimen to lab

Essential Patient Information on specimen

Full Name
Date of Birth

Other significant information

Health & Care Number (HCN)
Date & Time of specimen collection
Destination for report.

Completion of request form

Essential Patient Information

- Full Name
- Date of Birth
- Health & Care Number (HCN)
- Gender
- Patients Location (Site / Clinical Area)
- Patients Consultant (GP, Requesting practitioner)
- PAS code of consultant
- Relevant Clinical history
- Type of sample (origin of sample)

Other significant information

- Name of sample Taker
- Patients address
- Additional copy reports, (Name, location, PAS Code)

The request form should contain details of the clinical query and a contact phone number for discussing the result of the frozen section.

Transportation of samples

This is an urgent sample type- It is the sender responsibility to arrange urgent transport to the laboratory, inform the person who delivers the specimen to give it to a BMS in the Cellular & Molecular Pathology Laboratory and to say it is a frozen section.

Special Handling	DO NOT use formalin.	Sample storage conditions	This sample must NOT be stored at ward level and should be urgently delivered to the laboratory.
Factors know to affect performance	If small volume of tissue piece of gauze dampened in saline. Delays in transportation. Use of any fixative.	For Clinical advice	Please telephone the laboratory on 334488

Biopsies are sent to Regional Laboratories in Belfast, these are: -

1. **Skin biopsies** which require **immunofluorescence** studies usually for investigation of bullous disorders and possible Lupus Erythematosus. Contact RVH Ext 2534

2. **Muscle and peripheral nerve biopsies** for investigation of neuromuscular disorders. This should be discussed with the Regional Neuropath Laboratory before taking the biopsy. Contact RVH Ext 2119.

3. **Needle Kidney biopsies** for investigation of medical renal disease. These biopsies are usually done at BCH Renal Unit. Contact the Renal clinicians on BCH Ext 2574.

4. **Medical Livers** for investigations into liver disease caused by hepatitis , autoimmune disorders . contact RVH ext 2534

Note: Most of these require specialised treatment, if in doubt check before taking the biopsy.

Cervical Cytology Samples

Name of Test	**Cervical Cytology Samples**
Samples Required	The Department of Cellular & Molecular Pathology uses the Hologic ThinPrep System for preparation of cervical specimens. The protocol for taking liquid based cervical samples must be adhered to. Training for all smear takers has been provided. If you require any advice please contact Jacqueline Jamison on **028 9442 4101**.
Primary sample volume	Broom sampled cells from the cervix as per protocol rinsed in Hologic ThinPrep Vial. (21ml of PreservCyt)
Container Type	ThinPrep PreservCyt Solution (Note expiry date on sample collection vial. ***Do not use expired vials***) Cervix Brushes
	Preservative requirements ThinPrep PreservCyt Solution. Do not use lubricant.
	Ordered via established account Screenlink Healthcare, Unit H, Center Point Business Park Oak Drive, Dublin 12, Republic of Ireland
	Orders: orders@screenlink.net **General enquires:** info@screenlink.net
	Phone: +353-(0)1-4605270 **Fax:** +353-(0)1-4605248

Patient preparation / Sample Collection

General test preparation; women should refrain from intercourse, douching, using tampons or using intravaginal medication for at least 48 hours before the examination. In addition patients should avoid scheduling appointments during heavy menstrual bleeding.

Protocol for taking liquid based cervical (LBC) samples
Prepare all equipment before starting the procedure:

- Note expiry date on sample collection vial. ***Do not use expired vials.***
  Ensure the entire plastic seal is removed from the lid of the vial and discarded.
- Complete patient details on both the request form and the vial. ***Specimens may be returned if details are missing from the vial or form***.
- Remove the lid from the vial before taking the sample.
- **Refrain from using any lubricant.**
- If lubrication of the speculum is required a little warm water or a small amount of a water-soluble lubricant may be used. It is important to avoid contaminating the cervix with lubricant as this may cause the sample to be unsatisfactory. Care must be taken not to place the lubricant at the **tip** of the speculum.

Guidelines for General Practitioners and smear takers

HPV guidance documents available from the Northern Ireland Public Health Agency:
https://cancerscreening.hscni.net/cervical-screening/programme-guidance/

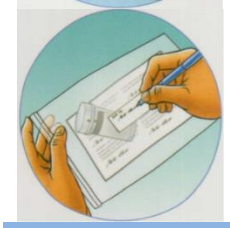
PLEASE DO NOT USE LUBRICANT ON SPECULUM

RECORD the patient's full name and date of birth on the vial.
... the patient information and medical history on the cytology requisition form.

OBTAIN an adequate sample from the cervix using a Cervix Brush (broom-like device). Insert the central bristles of the brush into the endocervical canal deep enough to allow the shorter bristles to fully contact the ectocervix. Push gently, and rotate the brush in a clockwise direction five times.

RINSE the Cervix Brush immediately into the PreservCyt Solution vial by pushing it into the bottom of the vial 10 times, forcing the bristles apart. As a final step, swirl the brush vigorously to further release material. Visually inspect the Cervix Brush to ensure that no material remains attached. Discard the collection device.
Do not leave the head of the Cervix Brush in the vial.

TIGHTEN the cap so that the black torque line on the cap passes the black torque line on the vial. Do not over-tighten.



PLACE the vial and requisition in a specimen bag for transportation to the laboratory.

Sample Labelling

Specimens must be accompanied by a request form. Please take time to fill the form in properly and check all specimens are labelled.

Essential Patient Information for acceptance of specimen

Full Name
Date of Birth and Health & Care Number

Other significant information

Date & Time of specimen collection
Information on visualisation and condition of cervix
Location of sender.

Completion of request form

Patient and source information must be clearly printed, in black biro pen, or an addressograph label placed onto the request form; refer to minimum data set for information required. The patient LMP, whether the cervix was visualised or not, relevant clinical findings, details of any on-going therapy and details of any previous Cytopathology, Histology or molecular investigations should be noted. The patient's Health and Care (H&C) number must be included. Cervical specimen requests received without a H&C number may be returned to the sender for amendment.

Essential Patient Information

- Full Name
- Date of Birth
- Health & Care Number (HCN)
- Gender
- Patients Location (Site / Clinical Area)
- Patients Consultant /GP
- Code for sender
- Relevant Clinical history
- Patients address

Other significant information

Name of sample Taker
Additional copy reports
(Name, location, Code)

Transportation of samples

Make sure the vial lid is tight and the two torque lines align.
Place in specimen bag, Place form in document pocket.
Place all cervical cytology samples in an outer transport bag

Special Handling	N/A	Sample storage conditions	Samples should be placed in the Hologic ThinPrep Vial and transported to the laboratory at room temperature.
Factors know to affect performance	Lubricant contamination of the ThinPrep Vial Inappropriate sampling.	For Clinical advice	Please telephone the laboratory on 334488

Name of Test	**HPV Testing (Triage/TOC) as part of the NI Cervical Screening Programme**
Samples Required	This protocol outlines the required steps to correctly send Liquid Based Cytology vials for High Risk HPV testing, which will comply with local and regional packaging requirements, and will not adversely affect the specimen for High Risk HPV testing.
Primary sample volume	Broom sampled cells from the cervix as per protocol rinsed in Hologic ThinPrep Vial. (21ml of PreservCyt)
Container Type	ThinPrep PreservCyt Solution Cervix Brushes
	Preservative requirements ThinPrep PreservCyt Solution (Note expiry date on sample collection vial. ***Do not use expired vials***)
	Ordered via established account Screenlink Healthcare, Unit H, Center Point Business Park Oak Drive, Dublin 12, Republic of Ireland **Orders:** orders@screenlink.net **General enquires:** info@screenlink.net **Phone:** +353-(0)1-4605270 **Fax:** +353-(0)1-4605248

Patient preparation / Sample Collection

For guidance with regards HPV testing in the NI Cervical Screening Programme please visit the Public Health Agency, Cancer Screening Website.

Sample Labelling

Specimens must be accompanied by a packing list. Please take time to fill the list in properly and check all specimens are labelled.

Essential Patient Information on specimen

Laboratory Number

Other significant information

Full Name
DOB
Health & Care Number (HCN)
Date & Time of specimen collection
Location of sender taker.

Completion of request form

Email the Molecular Pathology department with a list of samples for testing before transporting. Laboratory Number is molecular.pathology@northerntrust.hscni.net

Place this sample list in the transport box.

Transportation of samples

Using gloved hands - Ensure that each vial is tightly closed.

Place each vial in a specimen bag, with a press lock seal.

Put the specimen bags into the large Pathology Transport Bag. This outer bag should contain an absorbent pad.

Seal the top of the Pathology Transport Bag, ensuring that the top edge is folded over and sealed correctly

Place the Pathology Transport Bag into the HPV specimens transport box.

Place a contents list into the HPV specimen transport Box, mark on the contents list the ID number from the security tag.

Close the HPV specimen transport box, seal the box with a security tag.

Ensure the destination details are clearly marked / labelled.

Send the box via the agreed transport network to the HPV testing lab.

NOTE: A number of transport boxes are available for sending LBC vials to and from the HPV testing laboratory. To maintain the distribution of these transport boxes an empty box must be picked up when a full box is delivered.

NOTE: Sending Laboratories should maintain a record of all specimens referred and a record of dispatch dates.

Cervical specimens collected in cobas PCR Cell Collection media, PreservCyt Solution and SurePath Preservtive Fluid can be transported at 2-30oC.

Transportation of specimens for HPV testing must comply with IATA packing instruction 650 and UN3373 regulations for transport of diagnostic specimens.

Special Handling	**Preservative requirements** ThinPrep PreservCyt Solution (Note expiry date on sample collection vial. ***Do not use expired vials***)	Sample storage conditions	Cervical specimens collected in cobas PCR cell Collection Media or PreservCyt Solution may be stored at 2-30^{o}C for up to 6 months after date of collection.
Factors know to affect performance	Reliable results are dependent on adequate specimen collection, transport, storage and processing. Rare mutations with the highly conserved regions may result in failure to detect the presence of the virus. Concentrations of whole blood exceed 2% (dark red or brown colouration) in PerservCyt Solution increases likelihood of obtaining a false negative result.	For Clinical advice	Please telephone the laboratory on 334488

Name of Test	HPV Testing Genotyping
Samples Required	More than 100 different human papillomavirus (HPV) genotypes have been identified and described in the scientific literature. These genotypes are frequently identified in cervical cancers and have been segregated by those with a low-risk (LR) and those with a high-risk (HR) oncogenic potential. Molecular testing for HPV or HR-HPV DNA may aid in the diagnosis or management of the patients with cervical or other abnormalities. The Seegene Anyplex™ II HPV 28 Detection assay is a qualitative in vitro test for the detection of HPV using real-time polymerase chain reaction (RT-PCR) methodology and high resolution melt curve analysis. The assay can detect up to 28 low and high risk HPV genotypes (6, 11, 16, 18, 26, 31, 33, 35, 39, 40, 42, 43, 44, 45, 51, 52, 53, 54, 56, 58, 59, 61, 66, 68, 69, 70, 73 and 82) and provides semi-quantitative analysis of HPV viral load based on detection at PCR plate reading steps 8 (<30 cycles), 14 (31-39 cycles) and 20 (>40-50 cycles). The overall process is based upon four major processes: sample preparation, extraction, RT-PCR and report generation. This assay is unique in providing multiplexing capabilities and TOCE™ technology. It has been internally verified for the detection of HPV in liquid based cervical (LBC) samples (ThinPrep) and validated for the detection of HPV in formalin fixed paraffin embedded (FFPE) tissue of gynaecological and non-gynaecological origin.
Primary sample volume	**Liquid Based Cytology** – At minimum of 1ml of PreservCyt Solution is required to complete the testing. **Formalin Fixed Paraffin Embedded Tissue** – Send Block with representative tissue for testing. If a specific area of interest within the tissue is required for be tested, please submit an H&E slide with the area of interest marked on the stained slides with a marker pen. Use the letter “T” to indicate the area to be tested.
Container Type	ThinPrep PreservCyt Solution (Note expiry date on sample collection vial. ***Do not use expired vials***)

Patient preparation / Sample Collection

N/A

Sample Labelling

Specimens must be accompanied by a a completed request form. Please take time to fill the list in properly and check all specimens are labelled.

Essential Patient Information on specimen

Laboratory Number
Full Name
DOB

Other significant information

Health & Care Number (HCN)
Date & Time of specimen collection
Location of sender taker.

Completion of request form

Essential Patient Information

Full Name
Date of Birth
Health & Care Number (HCN)
Gender
Patients Location (Site / Clinical Area)
Patients Consultant (GP, Requesting practitioner)
PAS code of consultant
Relevant Clinical history
Type of sample (origin of sample)

Other significant information

Name of sample Taker
Patients address
Additional copy reports, (Name, location, PAS Code)

Email the Molecular Pathology department with a list of samples for testing before transporting.
molecular.pathology@northerntrust.hscni.net

Transportation of samples

- Make sure the vial lid is tight and the two torque lines align.
- Place in specimen bag, Place request form in document pocket.
- Place all cervical cytology samples in an outer transport bag

If from an external source Place item in packaging to comply with IATA packing instruction 650 and UN3373 regulations for transport of diagnostic specimens.

Addressed to: Molecular Pathology, Department of Cellular & Molecular Pathology, Antrim Area Hospital, 45 Bush Road, Antrim, Co. Antrim, BT41 2RL.

Special Handling	N/A	Sample storage conditions	Cervical specimens collected in cobas PCR cell Collection Media or PreservCyt Solution may be stored at 2-30^{o}C for up to 6 months after date of collection.
Factors know to affect performance	Over fixation in formalin and age of tissue is known to reduce the quality yield of DNA from FFPE tissue samples.	For Clinical advice	Please telephone the laboratory on 334488

Name of Test	**Non-Cervical Specimens – Common Bile Duct (CBD) Brushings**
Samples Required	The distal 5-10cm of the disposable brush with wire stem cut, placed into a labelled ThinPrep PreservCyt vial. ***Do not re-sheath brush.***
Primary sample volume	Brush should be placed in Hologic ThinPrep Vial. (21ml of PreservCyt)
Container Type	ThinPrep PreservCyt Solution for non-cervical cytology. (Note expiry date on sample collection vial. ***Do not use expired vials***)
	Ordered via laboratory **Ext:334488**
	Preservative requirements ThinPrep PreservCyt Solution for non-cervical cytology.

Patient preparation / Sample Collection

-

Sample Labelling

Specimens must be accompanied by a non-cervical cytology request form. Please take time to fill the form in properly and check all specimens are labelled.

Essential Patient Information on specimen

- Full Name
- Date of Birth

Other significant information

- Health & Care Number (HCN)
- Date & Time of specimen collection
- Destination for report.

Completion of request form

Essential Patient Information

- Full Name
- Date of Birth
- Health & Care Number (HCN)
- Gender
- Patients Location (Site / Clinical Area)
- Patients Consultant (GP, Requesting practitioner)
- PAS code of consultant
- Relevant Clinical history
- Type of sample (origin of sample)

Other significant information

- Name of sample Taker

Patients address
Additional copy reports, (Name, location, PAS Code)

Transportation of samples

- Place container in specimen bag, Place request form in document pocket.
- Place this specimen bad in a Pathology specimen transport bag.
- Use Laboratory transport network to transport the specimen to the laboratory.
- If the specimen is urgent please follow the urgent specimen protocol in this handbook.

Special Handling	As most non-cervical specimens are fresh, please follow local H&S protocols for safe handling.	Sample storage conditions	Samples should not be stored and should be submitted immediately to the laboratory.
Factors know to affect performance	Delays in transportation. Use of inappropriate fixatives.	For Clinical advice	Please telephone the laboratory on 334488

Respiratory Specimens

Non-Cervical Specimens – Sputum

Name of Test	**Non-Cervical Specimens – Sputum**
Samples Required	3 specimens should be collected on consecutive days in the early morning, deep cough specimen. Collection should take place before patient has eaten or brushed teeth. ***Send specimens each day as received, do not hold and batch.***
Primary sample volume	Whole early morning, deep cough specimen.
Container Type	CONTAINER UNIVERSAL CLEAR PLASTIC ASEPTICALLY MANUFACTURED 30ML LEAKPROOF SCREW CAP WITH LABEL - **KBC000009** CONTAINER ASEPTICALLY MANUFACTURED 60ML CLEAR PLASTIC WITH PLASTIC CAP LEAKPROOF AND PRINTED LABEL - **KBC000124** **Preservative requirements** No preservative should be used. Transport fresh to the laboratory. Item(s) listed above are available via FPL eProcurement catalogue.

Patient preparation / Sample Collection

Guidance should be given to the patient on producing a deep cough sample. A salivary sample is inadequate for cytology.
The whole of the expectorated sample should be submitted.

x3 consecutive early morning, deep cough specimens, collected before patient has eaten or brushed teeth.
Where a patient is unable to produce a satisfactory specimen, physiotherapy may be of help. As a last resort, a deep cough specimen may be induced by an aerosol.

Sample Labelling

Specimens must be accompanied by a non-cervical cytology request form. Please take time to fill the form in properly and check all specimens are labelled.

As a series of sputum are required it is best practice to label each sample 1, 2, and 3.

Essential Patient Information on specimen

- Full Name
- Date of Birth

Other significant information

- Health & Care Number (HCN)
- Date & Time of specimen collection
- Destination for report.

Completion of request form

Essential Patient Information

Full Name
Date of Birth
Health & Care Number (HCN)
Gender
Patients Location (Site / Clinical Area)
Patients Consultant (GP, Requesting practitioner)
PAS code of consultant
Relevant Clinical history
Type of sample (origin of sample)
Number of specimen within series 1,2,3

Other significant information

Name of sample Taker
Patients address
Additional copy reports, (Name, location, PAS Code)

Transportation of samples

- Place container in specimen bag, Place request form in document pocket.
- Place this specimen bad in a Pathology specimen transport bag.
- Use Laboratory transport network to transport the specimen to the laboratory.
- Once each specimen of the series is collected they MUST be transported to the laboratory, do not storage all specimen until the series is completed, transport on day of collection. DO NOT accumulated over the three days.

Special Handling	As most non-cervical specimens are fresh, please follow local H&S protocols for safe handling. Pneumocystis analysis see below	Sample storage conditions	Samples should not be stored and should be submitted immediately to the laboratory.
Factors know to affect performance	Delays in transportation. Use of inappropriate fixatives.	For Clinical advice	Please telephone the laboratory on 334488

Non-Cervical Specimens – Bronchoscopy Specimens

Name of Test	**Non-Cervical Specimens – Bronchoscopy Specimens - Trap Sputa/Bronchial washings/Bronchoalveolar lavage**
Samples Required	Specimens collected during bronchoscopy.
Primary sample volume	Maximum of 25 mls collected per specimen container, placed in a 30ml leakproof aseptically manufactured container.
Container Type	CONTAINER UNIVERSAL CLEAR PLASTIC ASEPTICALLY MANUFACTURED 30ML LEAKPROOF SCREW CAP WITH LABEL - **KBC000009** **Preservative requirements** No preservative should be used. Transport fresh to the laboratory. Item(s) listed above are available via FPL eProcurement catalogue.

Patient preparation / Sample Collection

-

Sample Labelling

Specimens must be accompanied by a non-cervical cytology request form. Please take time to fill the form in properly and check all specimens are labelled.

If more than one specimen is collected per patient, mark all containers with a number in series; detail these numbers on the accompanying request form.

Essential Patient Information on specimen

- Full Name
- Date of Birth

Other significant information

- Health & Care Number (HCN)
- Date & Time of specimen collection
- Destination for report.

Completion of request form

Essential Patient Information

- Full Name
- Date of Birth
- Health & Care Number (HCN)
- Gender
- Patients Location (Site / Clinical Area)
- Patients Consultant (GP, Requesting practitioner)
- PAS code of consultant
- Relevant Clinical history
- Type of sample (origin of sample)

Number of specimen within series 1,2,3

Other significant information
Name of sample Taker
Patients address
Additional copy reports, (Name, location, PAS Code)

Transportation of samples

- Place container in specimen bag, Place request form in document pocket.
- Place this specimen bad in a Pathology specimen transport bag.
- Use Laboratory transport network to transport the specimen to the laboratory.
- If more than one specimen is collected per patient, mark all containers with a number in series; detail these numbers on the accompanying request form.

Special Handling	As most non-cervical specimens are fresh, please follow local H&S protocols for safe handling. Pneumocystis analysis see below	Sample storage conditions	Samples should not be stored and should be submitted immediately to the laboratory.
Factors know to affect performance	Delays in transportation. Use of inappropriate fixatives.	For Clinical advice	Please telephone the laboratory on 334488

Non-Cervical Specimens – Bronchoscopy Specimens - Bronchial brushings

Name of Test	**Non-Cervical Specimens – Bronchoscopy Specimens - Bronchial brushings**
Samples Required	Bronchial brush specimens collected during bronchoscopy.
Primary sample volume	The distal 5-10cm of the disposable brush with wire stem cut, placed into a labelled ThinPrep PreservCyt vial. ***Do not re-sheath brush.*** Brush should be placed in Hologic ThinPrep Vial. (21ml of PreservCyt)
Container Type	ThinPrep PreservCyt Solution for non-cervical cytology. (Note expiry date on sample collection vial. ***Do not use expired vials***) Ordered via laboratory Ext:334488 **Preservative requirements** ThinPrep PreservCyt Solution for non-cervical cytology.

Patient preparation / Sample Collection

-

Sample Labelling

Specimens must be accompanied by a non-cervical cytology request form. Please take time to fill the form in properly and check all specimens are labelled.

If more than one specimen is collected per patient, mark all containers with a number in series; detail these numbers on the accompanying request form.

Essential Patient Information on specimen

- Full Name
- Date of Birth

Other significant information

- Health & Care Number (HCN)
- Date & Time of specimen collection
- Destination for report.

Completion of request form

Essential Patient Information

- Full Name
- Date of Birth
- Health & Care Number (HCN)
- Gender
- Patients Location (Site / Clinical Area)

Patients Consultant (GP, Requesting practitioner)
PAS code of consultant
Relevant Clinical history
Type of sample (origin of sample)
Number of specimen within series 1,2,3

Other significant information
Name of sample Taker
Patients address
Additional copy reports, (Name, location, PAS Code)

Transportation of samples

- Place container in specimen bag, Place request form in document pocket.
- Place this specimen bad in a Pathology specimen transport bag.
- Use Laboratory transport network to transport the specimen to the laboratory.
- If more than one specimen is collected per patient, mark all containers with a number in series; detail these numbers on the accompanying request form.

Special Handling	As most non-cervical specimens are fresh, please follow local H&S protocols for safe handling. Pneumocystis analysis see below	Sample storage conditions	Samples should not be stored and should be submitted immediately to the laboratory.
Factors know to affect performance	Delays in transportation. Use of inappropriate fixatives.	For Clinical advice	Please telephone the laboratory on 334488

Respiratory Specimens - Requests for Pneumocystis analysis

This test will only be provided by the Regional Virology Laboratory in Belfast.

If this test is required with a specimen for cytological investigation, cytology will be undertaken and the residue sample sent to the Regional Virology Laboratory.

If any clinical advice is required in relation to Pneumoncystis jirovecii this can be sought from the Duty Virologist.

Fluid Specimens
Non-Cervical Specimens – Fluid Specimens- Serous Effusions

Name of Test	**Non-Cervical Specimens – Fluid Specimens- Serous Effusions**
Samples Required	Serous Effusions
Primary sample volume	Clinicians should submit as much Pleural, Peritoneal or Pericardial effusion from the patient as is possible. Examination of larger volumes of fluid greatly enhances the specificity and sensitivity of this test. Volumes of under 50 ml may be unreliable for detection of malignancy. The specimen should be collected in a suitably sized and previously labelled sterile container. Large volumes of fluid should be submitted in 2500ml 24-urine containers. **Do not divide specimens into smaller containers.**
Container Type	CONTAINER ASEPTICALLY MANUFACTURED 60ML CLEAR PLASTIC WITH PLASTIC CAP LEAKPROOF AND PRINTED LABEL - **KBC000124** CONTAINER PLASTIC SPECIMEN ASEPTICALLY MANUFACTURED WITH LEAKPROOF SCREW CAP 150ML CAPACITY WITH LABEL - **KBC000005** CONTAINER PLASTIC SPECIMEN ASEPTICALLY MANUFACTURED WITH LEAKPROOF SCREW CAP 250ML CAPACITY WITH LABEL- **KBD000236** CONTAINER SPECIMEN LEAKPROOF PLASTIC 24 HR URINE 2.5 LITRE WITH LABEL AND GRADUATED. WADDED SCREWCAP FOR SAMPLE CONTAINMEN - **KBC000004** **Preservative requirements** No preservative should be used. Transport fresh to the laboratory. Item(s) listed above are available via FPL eProcurement catalogue.

Patient preparation / Sample Collection

-

Sample Labelling

Specimens must be accompanied by a non-cervical cytology request form. Please take time to fill the form in properly and check all specimens are labelled.

Essential Patient Information on specimen

Full Name

Date of Birth

Other significant information

Health & Care Number (HCN)
Date & Time of specimen collection
Destination for report.

Completion of request form

Essential Patient Information

Full Name
Date of Birth
Health & Care Number (HCN)
Gender
Patients Location (Site / Clinical Area)
Patients Consultant (GP, Requesting practitioner)
PAS code of consultant
Relevant Clinical history
Type of sample (origin of sample)

Other significant information

Name of sample Taker
Patients address
Additional copy reports, (Name, location, PAS Code)

Transportation of samples

- Place container in specimen bag, Place request form in document pocket.
- Place this specimen bad in a Pathology specimen transport bag.
- Use Laboratory transport network to transport the specimen to the laboratory.

DO NOT use drainage bags
DO NOT send specimen in sharps or burn bins
(these will not be opened by laboratory staff)

Special Handling	As most non-cervical specimens are fresh, please follow local H&S protocols for safe handling.	Sample storage conditions	Samples should not be stored and should be submitted immediately to the laboratory.
Factors know to affect performance	Delays in transportation. Use of inappropriate fixatives.	For Clinical advice	Please telephone the laboratory on 334488

Name of Test	**Non-Cervical Specimens – Fluid Specimens- Cyst or other fluids**
Samples Required	Cyst or other fluids
Primary sample volume	Clinicians should submit as much fluid from the patient as is possible. Examination of larger volumes of fluid greatly enhances the specificity and sensitivity of this test. The specimen should be collected in a suitably sized and previously labelled sterile container. **Do not divide specimens into smaller containers.**
Container Type	CONTAINER ASEPTICALLY MANUFACTURED 60ML CLEAR PLASTIC WITH PLASTIC CAP LEAKPROOF AND PRINTED LABEL - **KBC000124** CONTAINER PLASTIC SPECIMEN ASEPTICALLY MANUFACTURED WITH LEAKPROOF SCREW CAP 150ML CAPACITY WITH LABEL - **KBC000005** CONTAINER PLASTIC SPECIMEN ASEPTICALLY MANUFACTURED WITH LEAKPROOF SCREW CAP 250ML CAPACITY WITH LABEL- **KBD000236** **Preservative requirements** No preservative should be used. Transport fresh to the laboratory. Item(s) listed above are available via FPL eProcurement catalogue.

Patient preparation / Sample Collection

-

Sample Labelling

Specimens must be accompanied by a non-cervical cytology request form. Please take time to fill the form in properly and check all specimens are labelled.

Essential Patient Information on specimen

- Full Name
- Date of Birth

Other significant information

- Health & Care Number (HCN)
- Date & Time of specimen collection
- Destination for report.

Completion of request form

Essential Patient Information

- Full Name
- Date of Birth
- Health & Care Number (HCN)
- Gender
- Patients Location (Site / Clinical Area)

Patients Consultant (GP, Requesting practitioner)
PAS code of consultant
Relevant Clinical history

Type of sample (origin of sample)
Other significant information
Name of sample Taker
Patients address
Additional copy reports, (Name, location, PAS Code)

Transportation of samples

- Place container in specimen bag, Place request form in document pocket.
- Place this specimen bad in a Pathology specimen transport bag.
- Use Laboratory transport network to transport the specimen to the laboratory.

DO NOT use drainage bags
DO NOT send specimen in sharps or burn bin
(these will not be opened by laboratory staff)

Special Handling	As most non-cervical specimens are fresh, please follow local H&S protocols for safe handling.	Sample storage conditions	Samples should not be stored and should be submitted immediately to the laboratory.
Factors know to affect performance	Delays in transportation. Use of inappropriate fixatives.	For Clinical advice	Please telephone the laboratory on 334488

Name of Test	**Non-Cervical Specimens – Fluid Specimens- Joint fluids**
Samples Required	Joint fluid
Primary sample volume	At least 1ml of synovial fluid required.
Container Type	Fluids requiring crystal analysis must be sent in 1.3mL container (Lithium heparin bullet bottle). **Preservative requirements** Lithium heparin bullet bottle. Item(s) listed above are available via FPL eProcurement catalogue.

Patient preparation / Sample Collection

-

Sample Labelling

Specimens must be accompanied by a non-cervical cytology request form. Please take time to fill the form in properly and check all specimens are labelled.

Essential Patient Information on specimen

Full Name
Date of Birth

Other significant information

Health & Care Number (HCN)
Date & Time of specimen collection
Destination for report.

Completion of request form

Essential Patient Information

Full Name
Date of Birth
Health & Care Number (HCN)
Gender
Patients Location (Site / Clinical Area)
Patients Consultant (GP, Requesting practitioner)
PAS code of consultant
Relevant Clinical history
Type of sample (origin of sample)

Other significant information

Name of sample Taker
Patients address
Additional copy reports, (Name, location, PAS Code)

Transportation of samples

- Place container in specimen bag, Place request form in document pocket.
- Place this specimen bad in a Pathology specimen transport bag.
- Use Laboratory transport network to transport the specimen to the laboratory.

Special Handling	As most non-cervical specimens are fresh, please follow local H&S protocols for safe handling.	Sample storage conditions	Samples should not be stored and should be submitted immediately to the laboratory.
Factors know to affect performance	Delays in transportation. Use of inappropriate fixatives.	For Clinical advice	Please telephone the laboratory on 334488

Name of Test	**Non-Cervical Specimens – Fluid Specimens- Cerebrospinal fluids (CSF)**
Samples Required	Cerebrospinal fluid The laboratory must be informed by telephone that a sample is en route.
Primary sample volume	At least 1ml of cerebrospinal fluid required.
Container Type	CONTAINER UNIVERSAL CLEAR PLASTIC ASEPTICALLY MANUFACTURED 30ML LEAKPROOF SCREW CAP WITH LABEL - **KBC000009** **Preservative requirements** No preservative should be used. Transport fresh and on ice to the laboratory. Item(s) listed above are available via FPL eProcurement catalogue.

Patient preparation / Sample Collection

-

Sample Labelling

Specimens must be accompanied by a non-cervical cytology request form. Please take time to fill the form in properly and check all specimens are labelled.

Essential Patient Information on specimen

Full Name
Date of Birth

Other significant information

Health & Care Number (HCN)
Date & Time of specimen collection
Destination for report.

Completion of request form

Essential Patient Information

Full Name
Date of Birth
Health & Care Number (HCN)
Gender
Patients Location (Site / Clinical Area)
Patients Consultant (GP, Requesting practitioner)
PAS code of consultant
Relevant Clinical history
Type of sample (origin of sample)

Other significant information

Name of sample Taker
Patients address

Additional copy reports, (Name, location, PAS Code)

Transportation of samples

- Place container in specimen bag, Place request form in document pocket.
- Place the specimen bag on ice and place in Pathology transport bag.
- Telephone the laboratory to inform them the sample is en route (334488)
- Use Laboratory transport network to transport the specimen to the laboratory, transport the sample to the laboratory ASAP.

Special Handling	The laboratory must be informed by telephone that a sample is en route. 334488 Dispatched on ice to the laboratory. As most non-cervical specimens are fresh, please follow local H&S protocols for safe handling.	Sample storage conditions	Samples should not be stored and should be submitted immediately to the laboratory.
Factors know to affect performance	Delays in transportation. Use of inappropriate fixatives.	For Clinical advice	Please telephone the laboratory on 334488

Urine Specimens

Name of Test	**Non-Cervical Specimens – urine**
Samples Required	The optimal specimen type for cytological examination of urine samples is the full stream mid-morning urine specimen. If possible, do not use the first void in the morning. A series of 3 specimens should be sent immediately after collection on consecutive days, and not retained over successive days for sending as a batch.
Primary sample volume	Full mid-morning urine specimen.
Container Type	CONTAINER ASEPTICALLY MANUFACTURED 60ML CLEAR PLASTIC WITH PLASTIC CAP LEAKPROOF AND PRINTED LABEL - **KBC000124** CONTAINER PLASTIC SPECIMEN ASEPTICALLY MANUFACTURED WITH LEAKPROOF SCREW CAP 150ML CAPACITY WITH LABEL - **KBC000005** CONTAINER PLASTIC SPECIMEN ASEPTICALLY MANUFACTURED WITH LEAKPROOF SCREW CAP 250ML CAPACITY WITH LABEL- **KBD000236** CONTAINER SPECIMEN LEAKPROOF PLASTIC 24 HR URINE 2.5 LITRE WITH LABEL AND GRADUATED. WADDED SCREWCAP FOR SAMPLE CONTAINMEN - **KBC000004** **Preservative requirements** No preservative required. Do not use other urine specimen containers, such as those with added boric acid, for urine cytology samples. Item(s) listed above are available via FPL eProcurement catalogue.

Patient preparation / Sample Collection

x3 consecutive full stream mid-morning urine specimen, collected daily.

DO NOT use first morning urine.

Sample Labelling

Specimens must be accompanied by a non-cervical cytology request form. Please take time to fill the form in properly and check all specimens are labelled.

Essential Patient Information on specimen

- Full Name
- Date of Birth

Other significant information

- Health & Care Number (HCN)
- Date & Time of specimen collection
- Destination for report.

Completion of request form

Essential Patient Information

Full Name
Date of Birth
Health & Care Number (HCN)
Gender
Patients Location (Site / Clinical Area)
Patients Consultant (GP, Requesting practitioner)
PAS code of consultant
Relevant Clinical history
Type of sample (origin of sample)

Other significant information

Name of sample Taker
Patients address
Additional copy reports, (Name, location, PAS Code)

Transportation of samples

- Place container in specimen bag, Place request form in document pocket.
- Place this specimen bad in a Pathology specimen transport bag.
- Use Laboratory transport network to transport the specimen to the laboratory.

Special Handling	As most non-cervical specimens are fresh, please follow local H&S protocols for safe handling.	Sample storage conditions	Samples should not be stored and should be submitted immediately to the laboratory.
Factors know to affect performance	Delays in transportation. Use of inappropriate fixatives.	For Clinical advice	Please telephone the laboratory on 334488

Combined Haematological Reporting Service

Name of Test **Samples Required**	**Haematological Malignancy Referral** CHRS has been created within the Molecular Laboratory of the Cellular and Molecular Pathology (CMP) Department to manage the provision of equipment and reagents to Laurel House, the Haematology Oncology Outpatient's Unit located within Antrim Area Hospital (AAH) and the Haematology Laboratory, Causeway (CAU) Hospital. The remit of CHRS is to also oversee the handling and processing of all bone marrow specimens once received into the laboratory. As part of the investigation of patients with a known or suspected haematological disorder, it is often necessary to perform a Bone Marrow Aspirate (BMA) and trephine biopsy procedure. It may also be necessary to take a peripheral blood (PB) sample.
Primary sample volume	**Bone Marrow Aspirate**: **1.Smeared Air-Dried Slides**- the first pull of 0.5-1ml of aspirate should be used to produce bone marrow aspirate slides. These are prepared at the patient's bedside using pink frosted glass slides and labelled with two unique identifying pieces of information. Slides should be sent to the laboratory in plastic slide mailers. **2.Fresh Bone Marrow Aspirate:** At least 2-3ml should be aliquoted into the following containers and mixed by inverting. Send immediately to the laboratory. Aliquot 1- Cytogenetics labelled container with BLUE sticker on lid containing cytogenetics media. Aliquot 2- Flow labelled container with RED sticker on lid containing flow media. **Bone Marrow Trephine:** Biopsies should be immediately placed into a HistoPot of 10% buffered formalin. Care should be taken to limit the exposure of Formalin to the operator, only remove lid when placing biopsy in container and immediately close and seal lid. Do not breathe in the formalin vapour. **Peripheral Blood:** If required, peripheral blood should be drawn directly into an EDTA blood collection tube with PURPLE lid. **Peripheral blood is usually only requested in the case of suspected MPN.**
Container Type	Specified above.

Patient preparation / Sample Collection

On request, The Molecular Pathology Laboratory will provide sampling packs. These will contain a guidance poster (see attached copy below) for reference. Please note, cytogenetics and flow media are not provided within these packs as they must remain refrigerated. These must be requested in addition to the packs.

Sample Labelling

Specimens must be accompanied by a a completed request form. Please take time to fill the list in properly and check all specimens are labelled.

Essential Patient Information on specimen

Laboratory Number
Full Name
DOB

Other significant information

Health & Care Number (HCN)
Date & Time of specimen collection
Location of sender taker.

Completion of request form

Essential Patient Information

Full Name
Date of Birth
Health & Care Number (HCN)
Gender
Patients Location (Site / Clinical Area)
Patients Consultant (GP, Requesting practitioner)
PAS code of consultant
Relevant Clinical history
Type of sample (origin of sample)

Other significant information

Name of sample Taker
Patients address
Additional copy reports, (Name, location, PAS Code)

Email the Molecular Pathology department with a list of samples for testing before transporting.
molecular.pathology@northerntrust.hscni.net

Transportation of samples

- Make sure all lids are tight and secure to prevent leakage.
- Ensure all slides are placed securely in a slide tray and secured with an elastic band.
- Place in sample pack bag provided alongside request form.
- Immediate transportation to Molecular Pathology Laboratory.

If from an external source Place item in packaging to comply with IATA packing instruction 650 and UN3373 regulations for transport of diagnostic specimens.

Addressed to: Molecular Pathology, Department of Cellular & Molecular Pathology, Antrim Area Hospital, 45 Bush Road, Antrim, Co. Antrim, BT41 2RL.

Special Handling	As bone marrow specimens are fresh, please follow local H&S	Sample storage conditions	Samples should not be stored and should be

Factors know to affect performance	protocols for safe handling. Inappropriate fixation. Delays in transportation.	For Clinical advice	submitted immediately to the laboratory. Please telephone the laboratory on 332078

Fine Needle Aspirates

The FNA technique allows direct sampling of a suspect “lump” or thickening, which may have been clinically or radiologically detected. Breast, lymph node, thyroid, salivary gland and other palpable subcutaneous swellings are the most common sites for samples, although the technique is adaptable to a variety of deep anatomical sites using radiological imaging and guidance. A 22 gauge needle and 10ml syringe are normally used to obtain the specimen. Patient information leaflets detailing the FNA procedure are available from the Department of Cellular & Molecular Pathology (Contact Laboratory Ext 334131).

If requested a Consultant Pathologist is available to perform the FNA on the Antrim Hospital site, at ward level or, on Thursday afternoons in Laurel House. BMS cover is also available on site at Antrim Hospital for assistance with FNA smear preparation (afternoon appointments are preferred). Telephone Ext 334131 for an appointment.

White microscope slides should be labelled using a hard lead pencil, giving the patients name, date of birth and mode of fixation to be used for that slide. The laboratory prefers samples of both air-dried and wet-fixed material, with optimally 3 cellular smears of each type. If the aspirate is scanty, the preparation of the air-dried smears should take preference. Rapid fixation of the cellular sample is crucial for wet fixed smears. These should be fully immersed immediately in Cytology Fixative. Air-dried slides should be vigorously waved in the air to facilitate rapid air-drying.

Note: Any remaining material in the needle should be flushed into a PreservCyt vial, which should be labeled and sent to the lab with the slides. Details of the anatomical site sampled should be noted on the container.

Slides should be placed in a labelled plastic slide mailer. The request form, slides and needle washings should then be immediately dispatched to the Department of Cellular & Molecular Pathology

Completion of the request form

Yellow Cytopathology request forms should include patient and source information (refer to minimum data set for information required) and site sampled. All relevant clinical details, radiological findings and details of on-going or recent therapy should be noted on the request form. Full details of any previous Cytopathology, Histology or molecular investigations should be noted.

Urgent FNA specimens can be processed and reported on the day of reception, if one of the pathologists has been previously contacted before the specimen has been dispatched to the laboratory (Contact Laboratory Ext 334131).

Breast Screening Unit (BSU)

From the introduction of the Breast Screening Programme, Consultant Pathologists and Biomedical Scientists have supported Breast Clinics, investigating patients referred to the Breast Care Unit and from the mobile mammography unit. At the Breast Care Unit, the Consultant Pathologist and Biomedical Scientist liaise with Consultant Surgeons, Radiologists, Radiographers and Nursing staff to maximise patient care.

FNAs can be prepared at various locations in the Breast Unit eg, Pathology room, Clinical rooms, Ultrasound suites. Regardless of location the technique for slide preparation is the same. Ideally a maximum of four air-dried slides are prepared and the remainder of the aspirated material thoroughly flushed out of the needle/ syringe into ThinPrep PreservCyt solution.

At Breast Clinics a diagnosis is arrived at after careful consideration of clinical, radiological, and cytological findings.

Completion of the request form

Request forms should include all patient details, source information (refer to minimum data set for information required) and site sampled. All relevant clinical details, radiological findings and details of on-going or recent therapy should be noted on the request form.

BSU specimen requests must be made using the following form:

Tissues from Miscarriage

Every miscarriage case (POC, ectopic pregnancy etc.) sent to the Department of Cellular & Molecular Pathology **must** be accompanied by a CONSENT FORM FOR HISTOPATHOLOGICAL EXAMINATION AND DISPOSAL OF EARLY MISCARRIAGES*. This form is in addition to the standard Histopathology Request Form.

This consent form enables the laboratory to be aware of the patient's choices in regard to:

- Examination of any incidentally found Fetus and
- The subsequent burial of the Fetus and unprocessed products of conception.

By law, the laboratory must follow the patient's choices in this area, therefore any early miscarriage cases not accompanied by this consent form will be returned to the source.

** This form applies where any Fetus present is below 12-week size (less than Crown Rump Length 6 cm)*

Note . If a pathological examination is required on a Fetus 12 week's size and above, or greater than 6cm Crown Rump Length, the Fetus and pregnancy tissues should be sent to the Department of Paediatric Pathology RVH via the Antrim Mortuary with the relevant completed documentation i.e. "**Consent form for a hospital post mortem examination of a baby"**

Container and Preservative requirements: 500ml white opaque histopathology specimen container with a spill and leak proof lid. Fixation in 10% buffered formalin (unless genetic testing requested by user – see below).

Medical genetics testing of recurrent miscarriage

Early miscarriage <12 weeks - Ward Level Sampling

Introduction:
This Standard Operating Procedure (SOP) is to be used as a guide for handling miscarriage tissue for medical genetics testing in Belfast HSC Trust.

Recurrent Miscarriage: In line with the Royal College of Obstetricians and Gynaecologists Green-Top Guideline No.17 (2011) "The investigation and treatment of couples with recurrent first-trimester and second trimester miscarriage", the preferred testing strategy is by the genetic analysis of products of conception (POC) using molecular techniques to detect chromosome imbalance in the third or subsequent consecutive miscarriage. Parental testing is now advised only when an unbalanced structural chromosomal abnormality is found in the POC. Full POC samples must be sent to the referring hospital's pathology laboratory, which will then send appropriate tissue samples to the Regional Cytogenetics laboratory.
Note: For instruction on sending tissue for histopathological examination not including medical genetics please refer to the NHSCT Laboratory User Handbook- available via staffnet.

Forms:
Complete the following forms with all patient details*, test and consent information requested.
*follow laboratory guidelines on patient minimum dataset information requirements for completing Histopathology request forms.

Forms Required:

a) **Northern HSC Trust Histopathology Request form** – for histology examination of the remaining material. MUST include: specimen tracking sheet – detailing number of specimen containers submitted and evacuation, curettage including whether fetus was identified at ward/theatre level or not.

b) **Northern HSC Trust Regional Consent form** – for histological examination of fetal remains and handling / disposal of tissue after examination.

c) **Belfast HSC Trust Regional Medical genetics Request form** – for Medical genetics testing of recurrent miscarriages. (Consent included in request form). – Details of the patient and number of miscarriages should be recorded on a Genetics Referral Form. The form MUST detail which clinician to send medical genetics results to. (forms provided from Belfast HSC Trust Regional Medical Genetics department).

Note: For additional information 1) on the completion of the consent for histopathological examination of early pregnancy loss form; 2) issues regarding who can witness the consent form (staff type and grade); 3) information leaflet about miscarriages; 4) the choices between family return/burial and hospital burial; 5) guidance on choices regarding disposal of residual tissue from other examination; should be directed to the NHSCT Area Bereavement Coordinator.

Packaging Tissue:

1. Place miscarriage material into a suitable container – a 500ml white opaque histopathology specimen container with a spill and leak proof lid will be suitable for this tissue type, this container MUST be clearly labelled with the patient information which matches the request and consent form.

2. Do **NOT** use formalin- the tissue should NOT be placed in formalin fixative, the tissue can be sent dry within core laboratory hours or a small amount of saline can be used if the tissue must be stored in the fridge overnight until able to send to the laboratory.

3. The specimen should be submitted to the laboratory on the same day, if this is not possible it MUST be stored in a fridge until it can be submitted to the laboratory within core operating hours.

Transport

1. Telephone the laboratory to inform them that this tissue is en route. EXT: 332080 – (Core operating hours Monday-Friday 09:00-17:00).

2. Telephone the hospital porters and request an urgent transport directly to laboratory. (The specimen MUST arrive to the laboratory within the stated core operating hours).

3. If the tissue will not arrive within core operating hours of the department (Monday to Friday 09:00 - 17:00), place specimen in a fridge and hold for transport. If the specimen is to be stored refrigerated it should be keep moist with a small amount of sterile saline.

4. Transport to the department as soon as possible when delivery within core hours is possible. – it is the responsibility of the sender to make sure the specimen is transported in accordance with this procedure.

CHECKLIST:

- NHSCT Histopathology Request form – Completed and signed
- Regional Consent form – completed and signed (for histological examination of foetal remains and disposal of tissue)
- BHSCT Medical Genetics Request form – completed and signed
- Specimen (fresh)

NOTE: Failure to complete request or consent forms correctly will result in delays to reporting.

If any POC material is sent directly from ward level to Regional Medical Genetics laboratory, they will be rejected and returned to the Histopathology lab, this will result in a delay or failure to produce a report.

Material which does not arrive in the department within core hours may not be suitable for testing.

It is the responsibility of the sender to make sure the specimen is collected, stored and transported in accordance with this procedure

Mortuary Service

Antrim Hospital 02894 424000 Ext 334549

Mortuary Technician	Healthcare Assistants
Ryan McGhee	Jolene Kennedy
	Stacey McCaughan

Arranging transport of the body to the Mortuary:
Request the hospital porters to transfer the body.

PLEASE NOTE: Remember to forward the completed Medical Certificate of Cause of Death (MCCD) to the General Registry Office (GRO). Any delay in this can delay the release of the body from the mortuary for burial.

Infectious Diseases
The Clinicians must inform or alert the Mortuary Technician to the possibility of infectious diseases.
In high risk infectious cases, ensure that the deceased is put into a body bag and that this is labelled clearly on the outside with 'Danger of Infection' tape. The Senior Nurse Infection Control can give valuable advice on high-risk infectious disease cases and is worthwhile contacting.

Requesting an Autopsy
The mortuary no longer offers a post-mortem service. All cases will be referred to the Royal Victoria Hospital, Belfast. Babies above the legal age of viability (24 weeks gestation) will be referred on to the Royal Victoria Hospital, Belfast and then on to Alder Hay Children's' Hospital in Liverpool for examination.

Foetuses under the gestational age of 12 weeks are examined in Antrim Laboratory. The appropriate form for examination of foetuses before legal age of viability must be completed.

Amputation of a Limb
Amputated limbs may be disposed of via the Hospital Clinical Waste Management system or can be removed by the patient or relatives for burial. If the latter is required, please ensure that the appropriate form is signed by the patient before surgery and is sent with the limb to the Mortuary.