PATHOLOGY SERVICE – GENERAL PATHOLOGY

PATHOLOGY USERS' HANDBOOK

Revision History		
Version	**Date**	**Purpose of Issue/Description of Change**
000	22/12/06	New document
001	24/07/07	Update meet CPA standards
002	02/02/09	Updates and re-write of Microbiology section
003	02/12/10	Updates to personnel and minor changes
004	03/12/12	Complete re-write
005	23/01/15	Minor updates
006	22/04/15	Inclusion of statement about protection of patient confidentiality on referral to specialist labs. General update
007	07/10/15	Changes to Microbiology service availability
008	29/01/16	Contact number for clinical advice for external users of microbiology service. Factors affecting the performance of serology examinations or the interpretation of results added to table 2, microbiology section..
009	31/07/2018	Updated to include all change requests. Reference laboratories removed as not current – now advice to be sought from laboratory. Addition of how to request further tests for Blood Sciences & Immunology services consolidated at Leeds – handbook changed to reflect this
010	16/01/19	All outstanding CR's included. SU3 ETS finding 213524-02-E01023-001 included for Haematology, Microbiology & a paragraph for Communication of Critical and Unexpected Histopathology Results added. SU3 213524-02-E01467-016 Recommendation – refer to assessment number 8646 also included.
011	10/02/20	Post 2019 UKAS RA findings; clarification of use of UKAS logo and what parts of the service are accredited and inclusion of reference ranges for laboratories. Inclusion of all CR's to date.
012	29/07/22	Post 2021 UKAS SU2 assessment. Update to Histopathology consultant contact details, to Blood Sciences roles and contact details, Quality Manager details and Microbiology consultant details and service times. Remove reference to andrology (semenology) service at HDFT including appendix 2a and 2b. Update blood tube ordering arrangements. Update specimen requirements as required. Update Mortuary information. Update to Haematology and coagulation reference ranges. Update to Biochemistry equipment and reference ranges. Update cervical cytology referral location. Update Histopathology section. Removal of some of the IPC detail as IPC are separate to Microbiology.
013	06/02/23	Addition of comment regarding interpretation of paediatric coagulation. Change in B12 reference range. Spelling corrections in Microbiology section. Addition of instruction in Histopathology section on requests requiring fresh tissue.
014	01/09/23	Update Phlebotomy opening times, update for Phlebotomy at Chain Lane Community Hub. Update contact details for Cross-site Service Leads. Update haematology, blood transfusion and microbiology test lists. Update list of tests that are not accredited to ISO 15189.
015	20/10/23	Update list of tests that are not accredited to ISO 15189 as per UKAS finding.

Review interval	2 years
Location of Copies	QPulse
Associated Working Instructions	None

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GENERAL INFORMATION

Introduction

A comprehensive Pathology Laboratory Service is provided by the Departments of Biochemistry, Haematology/Blood Transfusion, Histopathology and Microbiology[1]. Mortuary Services are provided at Harrogate District Hospital (HDH), and Phlebotomy Services for inpatients on the wards and out-patients in the Blood Test Room. Point of Care testing (POCT) services are supported and managed by the pathology team and are governed by a multidisciplinary POCT committee.

The Pathology Department provides a service for patients at HDH and Ripon Hospitals, GP Practices, Outreach Clinics, Private Hospitals and clinics and other commercial organizations. It also provides a phlebotomy service for local GP patients at Chain Lane Community Hub in Knaresborough.

The pathology service is delivered by Integrated Pathology Solutions LLP (IPS), a joint venture between the Pathology departments of Harrogate and District NHS Foundation Trust, Airedale NHS Foundation Trust and Bradford Teaching Hospitals NHS Foundation Trust.

Quality Statement

The Pathology Quality Policy may be found on the Pathology section of the hospital Website: www.hdft.nhs.uk/our-services/department-service-g-z/pathology/

For the most current UKAS status please visit the UK UKAS website at https://www.ukas.com/ and search under the accreditation number 8646.

The HDFT Pathology Laboratory does not to make reference to UKAS accreditation (or use of the UKAS accreditation symbol) in its reports; where a test is non-accredited it will be listed in the Pathology User Handbook to that effect.

As of the document date of issue stated in the header box above, the following tests are not accredited;

- In house respiratory PCR (micro) – Extension to scope in progress
- Helicobacter pylori antigen (micro)
- Pleural, ascitic and drainage fluids (haem)
- Frozen sections (histo)
- Warthin-Starry stain (histo)
- Shikata Orcein stains (histo)
- H&E on non-gynae specimens (histo)
- Cryoglobulins (biochem)
- Adjusted calcium (biochem)
- Albumin/globulin ratio (biochem)

[1] Where the term Blood Sciences is used in this document it refers to the Biochemistry & Haematology / Blood Transfusion Departments.

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- Fluids all tests (biochem)
- Anion gap (biochem)
- Unconjugated bilirubin (biochem)
- LDL cholesterol (biochem)
- Non HDL cholesterol (biochem)
- Cholesterol/HDL ratio (biochem)
- Albumin/creatinine ratio (biochem)
- Protein/creatinine ratio (biochem)
- AKI 1, 2, 3. (biochem)
- POCT INR (POCT)
- FPP glucose meter used by the renal unit (POCT)
- Abbott NeoH glucose/ketone meter used by HDFT outreach staff, dental staff and community nursing teams (POCT)
- Hologic PeriLynx FFN (POCT)
- Research team Afinion HbA1c (POCT)
- Direct susceptibility testing of urines (Microbiology) – Where susceptibility tests are reported, a mixture of direct and indirect methods are used, depending on individual circumstances

Changes to our accredited scope since the last update to this document are recorded on the Pathology intranet page.

Location of the Laboratories
The Pathology laboratories are housed on two floors in the Fewston Wing at HDH. Access to the department is at the Pathology Reception Area which is on the second floor of the Fewston Wing.

The address of the laboratories is:

Pathology,
Fewston Wing,
Harrogate District Hospital,
Lancaster Park Rd.,
Harrogate,
North Yorkshire, HG2 7SX

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Telephone Extension Numbers of Senior General Pathology Staff
(Numbers of departments, consultants and senior scientific staff may be found under each departmental section. Numbers in **bold** represent the HDH internal extension number)

Lead Pathologist

Dr Daniel Scott	01423 555**635**
Secretary	To be confirmed

Senior Scientific Staff

Mrs Rebecca Parish, Pathology General Manager - IPS Blood Sciences & Harrogate site	01423 55**5842**
Dr Joanne Smullen, Pathology General Manager - IPS Microbiology & Airedale site	joanne.smullen@nhs.net
Dr Hannah Bateson, Pathology General Manager – IPS Service Improvement and Patient Facing Services	07721 108237
Mr Peter Helliwell, Pathology General Manager – IPS Histopathology & Bradford site	Peter.helliwell@nhs.net
Ms Fiona Butcher, Pathology Quality Manager	01423 55**3065**
Mr Charles Flouri, IT Manager	01423 55**3061**
Ms Nicky Hollowood/Ms Emma Jocelyn, POCT Managers	01423 55**5858**

Lead Consultants

Dr Nudar Jassam, Clinical Lead, Blood Sciences	01423 55**3055**
Dr Katharine Scott, Specialty Lead, Microbiology	01423 55**5658**
Dr Catherine LoPolito, Specialty Lead, Histopathology	01423 55**5635**
Dr Sarah Glover, Specialty Lead Point of Care Testing	01423 55**3056**
Dr Claire Hall, Specialty Lead, Haematology	01423 55**3062**

Phlebotomy Services

Ms Emma Jocelyn, Phlebotomy Manger	01423 55**5660**
OPD Phlebotomy	01423 55**3453**
Phlebotomy Service enquiries	01423 55**3409**
Phlebotomy Training	01423 55**3409**
Ward Services	Bleep **3453** / **3454**

Protection of Patient Information and Confidentiality
The laboratory will maintain the confidentiality of patient information by following Trust policy on *Confidentiality and Security of Personal Information* and national guidelines including the Caldicott principles. It will only disclose information on patients to other health care professionals who need to know that information in order to provide effective care and treatment to that patient. The information provided will be the minimum necessary to allow appropriate and effective care.

In cases where a specimen may need to be referred to an external laboratory for specialised testing, patient consent to disclose clinical information and family history

to that laboratory is assumed, as given, as part of the overall consent to take the specimen and perform the test. If the patient does not agree to this position, please contact the laboratory Clinical Lead.

Complaints

Complaints about laboratory services or staff may be made to any member of staff within Pathology (see contact details above) in writing, by email or verbally. The Trust Complaints Procedure (set out in the *Making Experiences Count Policy*) which meets the requirements of The Local Authority Social Services and National Health Service Complaints (England) Regulations 2009 will be followed to investigate the complaint and report on the outcome of the investigation.

If you raise a complaint you will receive an acknowledgement within 3 working days. This may be verbal or in writing but will be followed up with a written letter from the Chief Executive. The investigating officer will contact you to discuss the complaint further. The investigation will be carried out in a timely manner.

SERVICE AVAILABILITY

Clinical Advice

Consultant staff are available 24/7 for clinical advice for Biochemistry, Haematology & Microbiology. At evenings and weekends they are contactable via switchboard.

Histopathology Consultants are available 09:00 to 17:00 Monday – Friday (excluding Public Holidays)

Laboratories

Blood Sciences (Haematology, Biochemistry, Transfusion)			
Time	**Monday to Friday**	**Saturday and Bank Holidays**	**Sunday**
08:00 – 20:00	Normal service*		On call service†
08:00 – 12:30		Restricted service‡	
12:30 – 20:00		On call service†	
20:00 – 08:00	On call service†	On call service†	On call service†

* Normal routine service – Contact ext 3000. NB: Single handed Biomedical Scientist between 17:30 and 20:00.
† Out-of-Hours service. Please bleep Biochemistry on 5116, Haematology & Blood Transfusion on 3066
‡ Restricted service for Priority Requests only, which must be received in the laboratory by 11.00hrs to allow for processing

Microbiology				
Day	**Normal hours of Service***	**Restricted Service‡**	**Covid Testing**	**On Call Service†**
Weekdays	09.00-17.30		08:00 – 21:00	17.30-21.00

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Saturdays		09:00-12.30	08:00 – 21:00	12.30-21.00
Sundays and Public holidays		09.00-12.30	08:00 – 21:00	12.30-21.00

* Normal routine service – Contact ext 5645.
† Out-of-Hours service. On Call Biomedical Scientist: contact can be made via switchboard who will know of their whereabouts. On Call Consultant Microbiologist: contact can be made via switchboard. After 21:00 specified requests (sterile fluids and CSFs) via ICE can be sent for testing at LGI.
‡ Restricted service for Priority Requests only, which must be received in the laboratory by 11.00hrs to allow for processing

Histopathology			
Time	**Monday to Friday**	**Saturday and Bank Holidays**	**Sunday**
08:45 – 17:00	Normal service*	No service	No service
17:00 – 08:45	No service	No service	No service

* Please note that urgent specimens must reach the department before 16:45 unless by prior arrangement with a consultant Histopathologist.

Phlebotomy

Wards			
Time	**Monday to Friday**	**Saturday and Bank Holidays**	**Sunday**
08:00 – 12:00	Normal service*	Restricted service‡	Restricted service‡
13:00 – 16:30	Urgent service†	No service	No service
Blood Room			
08:30 – 16:50	Normal service*	No service	No service
Chain Lane Community Hub			
07:30 – 11:00	Normal am service	No service	No service

* Normal Ward or Blood Room collection
† During the afternoons Monday to Friday there is a roving Phlebotomy service, where a single handed Phlebotomist performs a sweep of the wards for urgent samples and then responds to bleep (3453) requests for urgent requests (e.g. Blood Cultures)
‡ The weekend service is **only for urgent bloods** (e.g. deteriorating / post-op patients) are put out for collection. If we receive excessive requests these will have to be left on the ward.

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Point of Care testing (POCT) Department
Support for POCT devices is provided Monday-Friday 09:00hrs to 17:00hrs. During these times, please contact department on ext 5647, bleep 5647 or email hdft.poct@nhs.net

Outside these hours please leave a message on the answerphone for non-urgent requests or contact the main Pathology laboratory for *urgent* requests and advice.

On Call Test availability – Haematology & Blood Transfusion
This service is intended to provide urgent results, where there is an immediate clinical requirement to inform decision making in patient care.

Do not request any routine group and save or cross match requests during this time as only emergency/urgent transfusions will be performed out-of-hours as per the transfusion policy.

Any reasonable request will be undertaken; however any requests that appear unreasonable will be questioned, and may be referred to the on-call Consultant Haematologist for advice.

On Call Test availability - Biochemistry
Following a discussion between the member of staff "on call" and the requesting doctor or a deputy, the following tests should be available if a case of need has been explained. The majority of these tests are automated and are performed using the Beckman DXI and AU system.

Glucose,
Urea and Electrolyte and Osmolality (serum and urine).
Amylase,
Bone Profile
Liver Function Tests,
Lipids
CK

Magnesium
Calcium and adjusted Calcium.
Total and Conjugated Bilirubin
Serum Iron, Transferrin
Urate
Bile Acids
C Reactive Protein

Simple Drug Assay i.e.
Theophylline
Paracetamol
Digoxin

Salicylates
Alcohol
Lithium

Procalcitonin
Ammonia
Lactate
HCG

CSF Analysis
Cortisol
Troponin I
CSF Xanthochromia

Tests, other than those listed above may be performed but should be first discussed with the Duty Biochemist.

Out-of-Hours Arrangements for Microbiology Hospital Specimens
Weekday evenings, Saturday, Sunday and Bank holiday evenings (until 21:00)

The following samples will be processed:

- Respiratory PCR for in patients
- CSF
- Blood cultures
- Fluid from normally sterile sites
- Urines
- MRSA screening samples (if urgent)
- Pus
- Deep tissue swabs
- All specimens from ITU patients
- Genital samples from maternity patients

The rest of the time is strictly limited to 'on-call' urgent specimens. A telephone request for dealing with such specimens must be made directly to the 'on-call' Biomedical Scientist at Leeds General Infirmary (LGI) and be related to the following:

- CSF
- Joint fluid
- Other fluids from normally sterile sites

All other requests will only be considered after a discussion with the duty Consultant Microbiologist

Routine service for Covid testing 08:00 to 21:00 7 days a week. Priority is given to inpatients and urgent admissions over swabbing team samples for elective admissions.

PATHOLOGY REQUEST FORMS

All Pathology requests need to be made with an appropriate request form. Initial verbal requests for examination will not be accepted until receipt of a request form. For additional examinations please refer to the section 'Requests for Additional Examinations'.

ICE Request Forms

The ICE electronic requesting system is available throughout the hospital and all GP practices. It should be used wherever possible, for the completion of requests for

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Microbiology, Haematology, Transfusion and Biochemistry. ICE may also be used for certain Histopathology and POCT requests. The use of ICE for requests reduces the risk of mislabelling patient samples as well as providing legible information on the patient, which may otherwise be incorrectly recorded within Pathology. Handwritten requests may be used during times of IT failure.

Training is provided by the IT department for all Doctors, Nurses and other clinical staff, who need to use the system at which time individual passwords are issued. There is a helpline available: ext. 3379.

A specimen bag is supplied, which is designed to be attached to the ICE request forms using an adhesive strip. Please ensure this bag is sealed properly using the adhesive strip provided. The ICE form must not be folded and placed in the bag with the specimens as there is a risk of contamination of the form should the specimen container leak and this may obscure important information on the form.

Samples and request forms from GP surgeries must be placed into a secondary polythene bag which must be placed into a padded specimen transport bag prior to transport from GP surgery to the hospital site.

For further details regarding the transportation of samples, copies of the laboratory Standard Operating Procedure may be requested, document reference GP-MP-EXST.

Handwritten Request Forms

In areas where the ICE system is not yet available (or when the system is down) and for the specialities of Histopathology and Non-gynaecological Cytology, pre-printed request forms with attachable specimen bags are available. It is the clinician's duty to complete and sign the form. In those cases where a nurse fills in or signs the forms, the Consultant/GP name, under whose responsibility the request lies must be filled in. It is ESSENTIAL that you write LEGIBLY with a ball-point pen. If printed labels showing patient details are available, ensure that one is attached to the form. In all cases please also ensure that all the relevant details have been included, especially:

- The patient details (forename, surname, date of birth, sex, hospital number or NHS number, home address).
- Whether NHS/Private
- Details of the requestor (requesting doctor's name and name of the consultant responsible for the patient's care)
- Name, address and telephone number or the hospital ward/source to which the report should be returned
- A brief summary of the relevant clinical details.
- The tests requested.

- The specimen date and time (if you are giving a request form to a patient for a test to be taken at some point in the future, please enter time/date unknown as this cannot be confirmed by you).
- The specimen type

An individual form must be completed for each patient request and separate specimens should be submitted for any but the most closely related tests. For fertility tests, please use the name of the patient being tested, not that of their spouse – relationships can be given in the clinical details box.

Please note that the request bags for different Pathology disciplines are colour-coded:

- Blood Transfusion: **RED**
- Clinical Sciences (Haematology & Biochemistry): **GREEN**
- Histology and Non-gynaecological Cytology: **BLACK**
- Microbiology: **BLUE**

Requests for Urgent Specimens
If the specimen requires urgent analysis, then an "Urgent" sticker should be affixed to the request form and the laboratory should be telephoned to alert them that an urgent sample is on its way together with details of the patient, tests required and location of the patient.

High Risk and Danger of Infection Specimens
Pathological specimens and request forms from patients known to be, or suspected of being, infected with pathogens from Hazard Groups 3 and 4 should carry a yellow **'Danger of Infection'** or red **'High Risk'** sticker. In this Trust, the most common agents from these groups are the blood-borne viruses (HIV, hepatitis B, hepatitis C), and *Mycobacterium tuberculosis*. Covid specimens should be double bagged and attached to request forms.

After putting the specimen into its container, affix a yellow 'Danger of Infection' or red 'High Risk' sticker to the container and ensure that caps are secure; contamination of the outside must not occur. Place the container in the plastic bag and close with the adhesive strip (only one specimen per bag). Bags must not be sealed with pins, staples or metal clips, and the request cards should also be labelled with 'Danger of Infection' or 'High Risk' stickers. For large specimens (e.g. histopathology, 24 hour urines) the containers may be enclosed in individual clear plastic sacks tied at the neck. The request form must not be placed in the sack, but should be enclosed in a separate plastic envelope, which is then securely attached with tape to the sack.

Do not use the pneumatic tube system for transporting High Risk and Danger of Infection specimens.

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Where the specimen is to be collected by another healthcare worker (e.g. Phlebotomist), it is the responsibility of the person completing the request forms to affix a yellow 'Danger of Infection' or red 'High Risk' sticker.

It is the responsibility of the person taking a specimen from a patient to ensure that the specimen container is correctly labelled to indicate a danger of infection. Only the 'Danger of Infection' or 'High Risk' sticker need be clearly visible to all who handle the material during delivery and on reception. In this way confidentiality of the clinical information may be maintained.

Samples from patients who are suspected of having viral haemorrhagic fever (e.g. Ebola virus), ***must not*** be transported to the laboratory in the pneumatic tube system. Further advice about management of these patients must be sought from the Infection Prevention & Control team or a Consultant Microbiologist.

If there are any accidents with the specimens, a Consultant Microbiologist must be promptly informed.

SPECIMENS

General Advice

The value of Pathology investigations depends very much on the quality and nature of the specimen. Care should be taken to obtain an adequate, representative specimen, place it in the correct container, complete the documentation and ensure its prompt delivery to the laboratory. The requirements for particular tests are set out in detail in each laboratory speciality.

The proper collection of samples, avoiding contamination, should not be delegated to untrained staff. Further advice may be obtained from senior laboratory staff, as listed above.

Please ensure that all routine work is collected and delivered to the laboratory in good time during working hours on weekdays. If the normal hours are missed the specimens will be stored and delays may be likely to influence the accuracy and clinical usefulness of the results. To avoid unnecessary weekend working for routine tests that take longer-than-average processing times (such as most microbiology tests) please submit these samples early in the week.

Phlebotomy Services

A Phlebotomy service is provided in the Blood Tests Room in the Outpatient Department, Harrogate District Hospital. This service is principally intended for the collection of samples from hospital out-patients and there is opportunity for local GPs to refer patients for blood tests during those hours. To alleviate the pressure on the hospital service there is also a Phlebotomy service provided within Chain Lane Community Hub in Knaresborough. Out patients or GP patients are encouraged to use this extra facility at Chain Lane. Appointments are not required except when

unusual or special tests are needed. Phlebotomy services are provided to all wards on the HDH site during the hours specified above.

Completion of the appropriate Pathology Request remains the responsibility of the requesting clinician and this must be completed prior to the Phlebotomists commencing their rounds. For patients attending the Blood Room at HDH or Chain Lane Community Hub they must bring the completed Pathology request form with them.

Labelling Specimens

Specimen containers must be labelled clearly with the following information:

- Forename
- Surname
- Date of Birth
- Hospital Number and/or NHS Number
- Source of specimen
- Date of specimen

For blood transfusion requests these data must be hand-written. The Trust has a 'zero tolerance' policy on all mislabelled transfusion samples. All transfusion samples must contain; forename and surname spelt correctly, date of birth and hospital number or NHS number and date bled. Any discrepancies in any of these core identifiers will result in the sample being rejected and the patient re-bled.

Addressograph labels must not be used on blood specimen tubes as they obscure the contents and make specimen separation difficult. The containers to be used for particular specimens are detailed in the speciality sections below. Good labelling of both specimens and forms will ensure speedy processing with appropriate tests and return of results to the right place without delay.

Members of staff *must not* submit samples from themselves or their family directly for Pathology testing. Such testing may be done as appropriate via the Occupational Health Department or via the person's own GP.

For a detailed explanation of the Trust sample labelling policy please see the *Policy for the Identification and Acceptance of all Laboratory Samples*. This document is available in the Trust document library.

Rejection of Unacceptable Specimens

In the case of broken, leaking unlabelled and mislabelled specimens a number of risks arise, including:

- Risks of injury or infection to the handlers.
- Risks of contaminated microbiology that may be clinically misleading.
- Risks of results wrongly ascribed to a patient, this may lead to incorrect diagnosis or inappropriate treatment with consequent medico-legal risks.

After receipt in the laboratory, such specimens will normally not be processed (see Trust Policy for the Identification and Acceptance of samples). The requesting doctor, if known, will be contacted and informed of the problem. For samples that are not easily repeated (such as curettings, biopsies, deep aspirates, GP samples etc.) the Consultant or most senior BMS will make a decision on whether testing may be allowed to proceed (usually after discussion with the clinician concerned). With the exception of Blood Transfusion specimens/requests the requestor will usually be given the opportunity to come to Pathology and complete patient information on the specimen or request and sign a disclaimer. If the specimen is tested the report will clearly state the nature of the problem as a comment. Alternatively, the requesting clinician will be asked to send a repeat sample.

Packaging for Transport of Specimens

Each specimen should be placed in an individual plastic transport bag (as supplied integral with or separate from the request form) of an adequate size for containment and closure (by adhesive strip closure). Staples and other sharp items must not be used on the bags as they may cause dangerous injury and inoculation**.** *On no occasion should Pathology specimens be placed in an internal transit envelope.*

Samples need to be transported in the inner polythene bags provided and outer 'Transport Cases' when being sent from areas outside of the main hospital complex. Please contact the laboratory for further details if required. All hospital transport systems will carry the required containment systems for samples.

Ordering Sample Collection Bottles and Pathology Stationery

The wards and clinical areas are responsible for obtaining and maintaining their own stocks of tubes and sample collection vessels. These are ordered electronically from the Stores Department at Harrogate Hospital. These should be regularly checked for sufficient stock levels and expiry dates. Pathology is not responsible for maintaining individual areas. In the case of specialised collection instructions - these are detailed in the tables below for each department.

Enquiries on requisitions can be made directly to: Stores, HDH, Ext 01423-553611,

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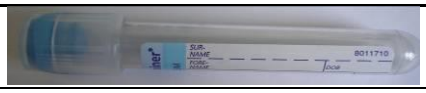
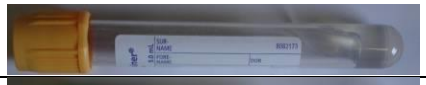
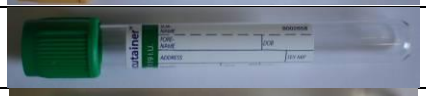
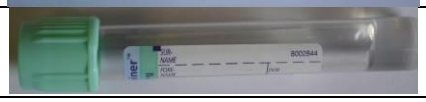
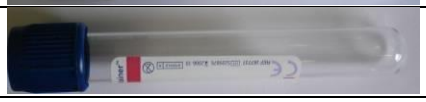
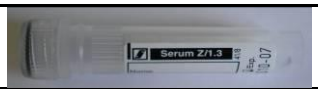
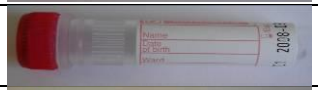
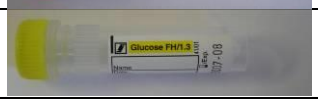
Adult Blood Tube Types

Colour	Tube Type	Other	Draw Volume	Inversions	Tube
Light Blue/Clear	Sodium Citrate		1.8ml	3-4 times	
Red	Serum		6ml	5-6 times	
Gold	Serum	Gel Separator	5ml	5-6 times	
Green	Heparin		4.5ml	8-10 times	
Light Green	Heparin	Gel Separator	4.5ml	8-10 times	
Purple	EDTA		4ml	8-10 times	
Pink	Cross Match		6ml	8-10 times	
Grey	Fluoride Oxalate		2ml	8-10 times	
Royal Blue	Trace Element		7ml	8-10 times	

Paediatric Blood Tube Types

Colour	Tube Type	Other	Draw Volume	Inversions	Tube
Black/Clear	Serum		1.3ml	5-6 times	
Brown	Serum	Gel Separator	0.5ml	5-6 times	
Orange	Heparin		1.3ml	8-10 times	
Red	EDTA		1.3ml	8-10 times	
Yellow	Fluoride Oxalate		1.3ml	8-10 times	

Please note the tubes are in the recommended order of draw. Blood culture bottles should be drawn first but are exempt from this list.

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Collection and Transport Arrangements

At Harrogate District Hospital

Use the Pneumatic Tube System (PTS) (Pod system) whenever possible for urgent specimens**.** Any specimen may be sent in the PTS with the exception of:

- Specimens with a '*Danger of Infection'* or '*High Risk'* sticker
- Blood cultures
- CSF specimens
- Histopathology samples
- Covid Samples

If the PTS is not available place specimens in the yellow boxes situated at the nurses' station on all wards and theatres (only these will get collected by the porter). Collection times from these positions are as follows:

Routine specimens Monday to Friday:
09:00, 11:00, 13:00, 15:00, 17:00.
Saturday morning: 10 30 am (for delivery to the laboratory by 11:00)

Urgent specimens may be labelled with an 'Urgent' label and sent via the PTS. If the PTS is not available, ward/medical staff *must* contact the porters to request collection of urgent specimens. In order to ensure a timely response from the laboratory, medical staff must telephone the appropriate Pathology discipline prior to sending an urgent request.

Outside of routine hours: If the PTS is not available, for delivery of all urgent specimens for analysis by Pathology on call staff, ward/medical staff must contact the Porters to have such specimens collected.

During the night, non-urgent specimens may be sent via the PTS or can be collected by arrangement with the porter. Biochemistry samples not sent or collected immediately should be stored at room temperature. NB. Blood cultures should be transported without delay to Fewston Wing and placed upright in the special night box provided.

From Ripon Hospital

Place specimens in box in Reception. These specimens are collected by the transport staff at 12:30 hours and 15:00 hours. There is a late collection, by taxi, at 18:00 hours.

Arrangements for Specimen Collection from Sites Outside Hospital

A courier visits the main GP surgeries and other clinics on a daily basis Monday to Friday (except for Bank and Statutory Holidays) to collect specimens. The numbers and times of the pick-up are dependent on location; however most surgeries receive two collections a day Monday – Friday excluding Public Holidays.

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Transport of Histopathology specimens

Please refer to the Trust Policy 'TRANSPORT OF HISTOPATHOLOGY SPECIMENS POLICY'

This is available on the intranet using the following link:

TRANSPORT OF SPECIMENS TO THE HISTOPATHOLOGY DEPARTMENT POLICY

PATHOLOGY REPORTS

We aim to perform the laboratory tests and send interim and final reports out as promptly as possible. Since all reports from Pathology are computer-generated, the quality and legibility of information received on the request forms is critical.

The reference ranges of results for tests are included in the report where appropriate. Reference ranges for each test are shown in the departmental sections below. Results lying outside the reference range are flagged with an asterisk (*). Please contact the Consultants or other senior laboratory staff to discuss any further interpretations or doubts that may arise from the reports.

There are many potential interfering substances which may be referenced on Pathology reports such as haemolysis, icterus, lipaemia, concurrent drug therapy such as antibiotic treatment and many others. The degree to which these interfering substances affect results is very varied, hence a comprehensive list is inappropriate for this handbook. Information can be sought from the laboratory carrying out specific tests as to the nature and significance of any interfering substance.

Each test performed by the laboratory carries with it an inherent level of error known as the uncertainty of the test. Uncertainty is calculated for all of the tests offered by the laboratory and its clinical relevance assessed. Similar to potential interfering substances the uncertainty will not normally be a consideration when interpreting results, however should more information be required this is available at a test level from the specific laboratories carrying out the tests.

Paper Reports

Paper reports are printed for a very limited number of units who do not receive electronic reports. Reports are printed throughout the day on coloured paper specific for each Pathology Department (see above). These are sorted and distributed by the internal mail system or by hospital courier in the case of GP practices. Paper reports are not available for results generated from POCT devices available at the point of care (some POCT devices do provide a paper printout).

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When doctors have taken note of the results they should make sure that all reports, whatever the results, are filed in the patient's case notes to provide a permanent record (this is a formal requirement in the Health Service).

Electronic Reports

Once authorised, Pathology results from all disciplines (with the exception of some POCT results) are available for viewing on the PCs throughout the Hospital using the ICE and WebV system. ICE will also report electronically to GP surgeries. Electronic reports are available significantly sooner than paper reports.

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BIOCHEMISTRY

Laboratory Staff Contact Details

Name	Job Title	Tel.No./Bleep	Email
Mrs Rebecca Parish	Pathology General Manager - IPS Blood Sciences & Harrogate site	01423 55**5842**	rebecca.parish2 @nhs.net
Mr Nazakat Ali	IPS Biochemistry Cross site Lead	01423 55**5618**	Nazakat.ali2@nhs.net
Mr Philip Christy	Advanced BMS	01423 55**3059**	philip.christy@nhs.net
Mr. Zeb Hanif	Advanced BMS	01423 55**3060**	zeb.hanif@nhs.net
Lesley Bridson	Specimen Reception Supervisor	01423 55**3000**	lesley.bridson@nhs.net
Linda Bayes	Blood Sciences Secretary	01423 55**5665**	linda.bayes@nhs.net

Contacts for Advice and Interpretation

Name	Job Title	Tel. No./Bleep	Email
Dr Nudar Jassam	Consultant Clinical Biochemist	01423 55**3055**	n.jassam@nhs.net
Dr Sarah Glover	Consultant Clinical Biochemist	01423 55**3056**	sarah.glover1@nhs.net

Outside routine hours (09:00 – 17:00) Clinical advice and Interpretation of results can be sought from the on-call Consultant Clinical Biochemist via Harrogate switchboard (01423 885959).

Referral Laboratories
Please request information from the Pathology laboratory regarding referral laboratories.

Sample Retention Times
Sample will be retained for 5 days at 4^{o}C.

Requests for Additional Examinations
Requests for additional examinations must be made as soon as possible, following the laboratory's receipt of the specimen. These requests must be made by telephone to the sample reception for General practice or by sending a new ICE request form to the Pathology reception. Depending on the nature of the specimen, and the request made, be aware that it may not be possible to accommodate your request although every effort will be made to do so, if clinically relevant.

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Investigations

The common test profiles outlined below which are analysed on the automated chemistry analyser, can be performed on one full 6ml gold topped serum sample.

Renal Profile:	Sodium, Potassium, Urea, Creatinine.
Bone Profile:	Alkaline Phosphatase, Calcium, Albumin and phosphate
Liver Function Tests (LFT):	Albumin, Alkaline phosphatase, Bilirubin and Alanine aminotransferase.
Lipid Profile:	HDL Cholesterol and triglycerides
Thyroid Function Test (TFT):	TSH (Free T4 where appropriate)

The electronic ICE requesting service guides users on the appropriate samples required and the amount required to perform the selected analyses.

Routinely results for GP samples will be available the next working day.

Interferences on Biochemistry Assays

When the integrity of the sample interferes with the assay this will be reported in the results accordingly.

Where assays are known to have interference with other assays, the laboratory will have reviewed the information as part of the verification process. Where necessary results that could be affected by interference will have been removed or a suitable comment added.

Biochemistry Phone List

These phone levels apply only to unexpected results, that is those who have not had raised levels previously and are not known to have a disease where these levels would be expected.

Test	Value	Group	Episode	Comment
AKI	AKI 2 AKI 3	All – NOT A&E/IT	First episode	On all new occurrences and episodes
Ammonia	≥ 100 µmol/L	All	All	
Amylase	≥ 500 IU/L	All	First episode	First episode only to add on LDH and Ca
ALT	≥ 600 IU/L	OP, GP's, A+E	First episode	
	≥ 1000 IU/L	In patient	First episode	
AST	≥ 700 IU/L	OP, GP's, A+E	First episode	
	≥ 1000 IU/L	In patient	First episode	

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Test	Value	Group	Episode	Comment
Bicarbonate	≤ 10 mmol/L	In Patients and GP only only	First episode	
Bile acids	≥ 14 µmol/L	LW + Mat Ass Unit + ANC + Rip ANC + Pannal + CM	All	Community Midwives (CM) Bile acid results (OOH): Phone the on call biochemist
Bilirubin - Total	≥ 250 µmol/L	Babies < 4 wks	All	
Bilirubin - Conj	≥ 25 µmol/L	< 1 yr	All	
Calcium (Adjusted)	≤ 1.8 mmol/L & ≥ 3.5 mmol/L	All	First episode	
CK	≥ 1000 IU/L	All	First episode	
Cortisol	≤ 50 mmol/L	All	All	Unless Dexamethasone test
Creatinine	≥ 354 µmol/L	All Except renal (dialysis) unit	First episode	No need to phone if there is evidence that a similar high conc. has been previously phoned.
	≥ 200 µmol/L	< 16 yr	First episode	
CRP	≥ 300 mg/L	GP patients	First episode	
Digoxin	≥ 2.5 µg/L		First episode	
Ethanol	≥ 4000 mg/L	All	All	
	≥ 2000 mg/L	<18 yrs	All	
Glucose	≤ 2.5 mmol/L & ≥ 20 mmol/L	NOT if a known diabetic	All	
	≥ 30 mmol/L	if diabetic	All	
	≥ 15 mmol/L	<16 yr old	All	
HbA1c	≥120 mmol/mol	GP only	First episode	Phone results to GP in core hours only. OOH leave on phone list - Phoned by BMS to GP on the following working day
Iron	> 55 µmol/L	All	All	
Lithium	≥ 1.5 mmol/L	All	All	
Magnesium	≤ 0.4 mmol/L	All	First episode	unless drops further
Paracetamol	Any results	All	All	unless undetectable
Phosphate	≤ 0.3 mmol/L		First episode	unless drops further

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Test	Value	Group	Episode	Comment
Potassium	≥ 6.5 mmol/L ≤ 2.5 mmol/L	All	First episode	
Protein	≥100 g/L	All	First episode	
Sodium	≤ 120 mmol/L & ≥ 155 mmol/L	All	First episode	
	<110 mmol/L	All	All	
	≤ 130 mmo/L	<16 yrs	First episode	
	≥ 175 mmol/L	All	First episode	Request an Urgent repeat UE and random sample for urine osmolality and electrolytes.
Salicylates	Any results	All	All	unless undetectable
Theophylline	≥ 25 mg/L		All	
Triglycerides	> 20 mmol/L	All	All	
Troponin I	≥ 17.6 ng/L	GP	All	Between 09:00am - 17:30 to Surg 17:30 - 09:00 to GP OOH
	≥ 17.6 ng/L	OOH ONLY - All In patients	All	NOT A&E AMU ITU CCU
Urate	≥ 340 µmol/L	LW + Mat Ass Unit + ANC + Rip ANC + Pannal + CM	First Episode	Community Midwives (CM) results OOH – leave on phone list - phoned by BMS to CM office on the following working day
Urea	≥ 30 mmol/L	All		Don't need to phone if there is evidence that a high result has been previously phoned
	≥ 10 mmol/L	< 16 yrs		
Vancomycin	≥ 20 mg/L	All	All	

These phone levels apply to all the abnormal results listed. The only exception is results for the renal dialysis unit.

References

1. Kidney disease: Improving global outcomes (KDIGO) acute kidney injury work group. Kidney inter., Suppl. 2012; 2: 1–138.

2. The communication of critical and unexpected pathology results. Advice to pathologists and those that work in laboratory medicine. Royal College of Pathologists October 2017.

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Biochemistry Investigations

The following list of available tests is not exclusive and other tests may be available on request.

Blood Biochemistry	Container	Turnaround Times		Reference Ranges	Variables	Units	Retention Time	Test performed	Special Conditions
		Routine	Urgent						
ACE	1 x gold	1-2 week	N/A	See Report		U/L	N/A	YORK	
Albumin	1 x gold	24 h	3 h	See Report		g/L	5 days	IN HOUSE	
Alcohol (ethanol)	1x grey	24 h	3 h	See Report	Detection Range	mg/L	5 days	IN HOUSE	
Alkaline Phosphatase	1 x gold	24 h	3 h	See Report	FEMALE	IU/L	5 days	IN HOUSE	Large age variation
Alkaline Phosphatase	1 x gold	24 h	3 h	See Report	MALE	IU/L	5 days	IN HOUSE	Large age variation
Alkaline Phosphatase iso enzymes	1 x gold	7 days	N/A	See Report		N/A	5 days	IN HOUSE	
ALT	1 x gold	24 h	3 h	See Report		IU/L	5 days	IN HOUSE	
Aluminium	1x dark blue	1-2 week	N/A	See Report		µmol/L	N/A	LEEDS SJUH	
Amylase	1 x gold	24 h	3 h	See Report		IU/L	5 days	IN HOUSE	
AST	1 x gold	24 h	3 h	See Report	FEMALE	IU/L	5 days	IN HOUSE	
AST		24 h	3 h	See Report	MALE	IU/L	5 days	IN HOUSE	
Bicarbonate	1 x gold	24 h	3 h	See Report		mmol/L	5 days	IN HOUSE	
Bilirubin (direct/conjugated)	1 x gold	24 h	3 h	See Report		µmol/L	5 days	IN HOUSE	
Bilirubin (total)	1 x gold	24 h	3 h	See Report		µmol/L	5 days	IN HOUSE	
Blood Gases	Heparinised Syringe	N/A	N/A	See Report		SEE REPORT	N/A	IN HOUSE	POCT DEVICE
B Natriuretic Peptide (BNP)	1 x green	8 days	N/A	See Report	Age and sex related	kU/L	5 days	AIREDALE	
Calcium	1 x gold	24 h	3 h	See Report	Paed Range Applies	mmol/L	5 days	IN HOUSE	
Adjusted Calcium	1 x gold	24 h	3 h	See Report		mmol/L	5 days	IN HOUSE	
Calcium ionised	Heparinised Syringe	N/A	N/A	See Report		mmol/L	5 days	IN HOUSE	POCT DEVICE

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Blood Biochemistry	Container	Turnaround Times		Reference Ranges	Variables	Units	Retention Time	Test performed	Special Conditions
		Routine	Urgent						
Chloride	1 x gold	24 h	3 h	See Report		mmol/L	5 days	IN HOUSE	
Cholesterol	1 x gold	24 h	3 h	See Report	Age Dependent Range	mmol/l	5 days	IN HOUSE	
Creatinine kinase (CK)	1 x gold	24 h	3 h	See Report		IU/L	5 days	IN HOUSE	
Copper	1x dark blue	2 weeks	2 weeks	See Report		µmol/L	N/A	LEEDS SJUH	
Covid-19 antibodies	1 x gold	24 h	3 h	See Report		N/A	5 days	IN HOUSE	
Creatinine	1 x gold	24 h	3 h	See Report	Age and Gender Dependant Range	mmol/L	5 days	IN HOUSE	
D3 Hydroxybutyrate	1x gold or 1x grey	2 weeks	2 weeks	See Report		mmol/L	N/A	LEEDS ST.JAMES'	
Ferritin	1 x gold	48 h	5 h	See Report		ng/mL	5 days	IN HOUSE	
Fluids	Plain universal	24 h	3 h	See Report		Test dependant	5 days	IN HOUSE	
Folate	1 x gold	48 h	5 h	See Report		ng/mL	5 days	IN HOUSE	
Free Fatty Acids	1 x gold	3 weeks	3 weeks	See Report		mmol/L	N/A	LEEDS ST.JAMES'	
GGT	1 x gold	24 h	3 h	See Report		IU/L	5 days	IN HOUSE	
Globulin	1 x gold	48 h	5 h	See Report		g/L	5 days	IN HOUSE	
Glucose	1x grey	24 h	3 h	See Report		mmol/L	5 days	IN HOUSE	FASTING SAMPLE
HbA1C	1x purple	48 h	24 h	See Report	Diabetic Related	mmol/mol	5 days	IN HOUSE	
HDL Cholesterol	1 x gold	24 h	5 h	See Report		mmol/L	5 days	IN HOUSE	FASTING SAMPLE
Iron	1 x gold	24 h	5 h	See Report		µmol/L	5 days	IN HOUSE	
Lactate Dehydrogenase (LDH)	1 x gold	24 h	3 h	See Report		IU/L	5 days	IN HOUSE	
Lead	2x purple	24 h	3 h	See Report	ADULT RANGE	µmol/L	5 days	IN HOUSE	
Lithium	1 x gold	24 h	3 h	See Report	Trough Level	mmol/L	5 days	IN HOUSE	
Magnesium	1 x gold	24 h	3 h	See Report		mmol/L	5 days	IN HOUSE	
Osmolality	1 x gold	24 h	3 h	See Report		mOsm/kg	5 days	IN HOUSE	
Phosphate	1 x gold	24 h	3 h	See Report	Age Related	mmol/L	5 days	IN HOUSE	

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Blood Biochemistry	Container	Turnaround Times		Reference Ranges	Variables	Units	Retention Time	Test performed	Special Conditions
		Routine	Urgent						
Potassium	1 x gold	24 h	3 h	See Report		mmol/L	5 days	IN HOUSE	
Procalcitonin	1 x gold	24 h	3 h	See Report		Ug/L	5 days	IN HOUSE	
Rheumatoid factor	1 x gold	48 h	5 h	See Report		mmol/L	5 days	IN HOUSE	
Selenium	1x dark blue	1-2 Weeks	1-2 Weeks	See Report		µmol/L	N/A	LEEDS SJUH	
Sodium	1x gold	24 h	3 h	See Report		mmol/L	5 days	IN HOUSE	
Troponin	1x gold	24 h	3 h	See Report		ng/L	5 days	IN HOUSE	Baseline sample and repeat 3 hours later
Total Protein	1 x gold	24 h	3 h	See Report		g/L	5 days	IN HOUSE	
Triglycerides	1 x gold	24 h	3 h	See Report		mmol/L	5 days	IN HOUSE	FASTING
Urea	1 x gold	24 h	3 h	See Report	Age and Sex Related	mmol/L	5 days	IN HOUSE	DIET RELATED
Uric Acid	1 x gold	24 h	3 h	See Report	Age and Sex Related	mmol/L	5 days	IN HOUSE	
Vitamin A	1 x green	2 weeks	N/A	See Report	ADULT RANGE	µmol/L	N/A	LEEDS SJUH	Protect from light
		2 weeks	N/A	See Report	PAED RANGE	µmol/L	N/A	LEEDS SJUH	
Vitamin E	1 x green	2 weeks	N/A	See Report	ADULT RANGE	µmol/L	N/A	LEEDS SJUH	
		2 weeks	N/A	See Report	PAED RANGE	µmol/L	N/A	LEEDS SJUH	
Vitamin B12	1 x gold	48 h	5 h	See Report		ng/L	5 days	IN HOUSE	
Vitamin D	1 x gold	5 days	N/A	See Report		nmol/L	N/A	IN HOUSE	
Xanthochromia (CSF)	1 x plain universal	24 h	3 h	See Report		See report	5 days	IN HOUSE	
Zinc	1x dark blue	120 h	N/A	See Report	Sex related	µmol/L	N/A	LEEDS SJUH	

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Urine Biochemistry	Container	Turnaround Times			Variations	Units	Retention Time	Test performed	Special Conditions
		Routine	Urgent						
5HIAA	24hrs + 50ml 30%HCl	2-3 Weeks	N/A	See Report		µmol/24h	N/A	HULL	
Amino Acid(quantitative)	Plain, random	1-2 Weeks	N/A	See Report		SEE REPORT	N/A	LEEDS SJUH	
Amino Acid (screen)	Plain, random	1 week	2-3 days	See Report		SEE REPORT	N/A	LEEDS ST. JAMES	
Alcohol	Plain, random	24 h	3 h	See Report		mg/L	5 days	IN HOUSE	
Bence Jones protein	Plain	5 days	N/A	See Report		SEE REPORT	5 days	IN HOUSE	Early morning urine
Calcium	24hrs + 50ml 30%HCl	48 h	5 h	See Report	FEMALE	mmol/24h	5 days	IN HOUSE	
		48 h	5 h	See Report	MALE	mmol/24h	5 days	IN HOUSE	
Catecholamines	Contact Lab for procedure	2 weeks	N/A	See Report		N/A	N/A	SCARBOROUGH	
Creatinine	24hrs plain	48 h	5 h	See Report	FEMALE	mmol/24h	5 days	IN HOUSE	**Random for paeds**
					MALE	mmol/24h		IN HOUSE	
Creatinine Clearance	24hrs+ 1 x gold	48 h	5 h	See Report	Special interpretation for paeds	mL/min	5 days	IN HOUSE	
Cortisol	24hrs, plain	2 weeks	N/A	See Report		nmol/24h	N/A	YORK	
Cysteine	24hrs, plain	2-3 Weeks	N/A	See Report		N/A	N/A	LEEDS SJUH	
Albumin Creatinine Ratio (ACR)	Plain, random	4 h	5 h	See Report		mg/L	5 days	IN HOUSE	
Metabolic Screen	Plain, random	2 weeks	N/A	See Report		N/A	N/A	LEEDS SJUH	

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Urine Biochemistry	Container	Turnaround Times			Variations	Units	Retention Time	Test performed	Special Conditions
		Routine	Urgent						
Mucopolysaccharides	Plain, random	2 weeks	N/A	See Report		N/A	N/A	LEEDS SJUH	
Oxalate	24hrs+ 50ml 30%HCl	2-3 Weeks	N/A	See Report	FEMALE	µmol/24h	N/A	LONDON (UCL)	
Oxalate	24hrs+ 50ml 30%HCl	2-3 Weeks	N/A	See Report	MALE	µmol/24h	N/A	LONDON (UCL)	
Porphyrins	fresh 24hr urine kept in dark	2 weeks	N/A	See Report		N/A	N/A	CARDIFF	
	faeces sample	2 weeks	N/A	See Report		N/A	N/A	CARDIFF	
	1 x gold blood	2 weeks	N/A	See Report		N/A	N/A	CARDIFF	
Potassium	24hrs plain	48 h	5 h	See Report	Diet related	mmol/24h	5 days	IN HOUSE	Random for paeds
Protein	24hrs, plain	48 h	5 h	See Report		g/L	5 days	IN HOUSE	Random for paeds
Sodium	24hrs, plain	48 h	5 h	See Report	Diet related	mmol/24h	5 days	IN HOUSE	Random for paeds
Urea	24hrs, plain	48 h	5 h	See Report		mmol/24h	5 days	IN HOUSE	Random for paeds

Blood Endocrinology	Container	Turnaround Times		Reference Ranges	Variables	Units	Retention Time	Test performed	Special Conditions
		Routine	Urgent						
17 Hydroxyprogesterone	1 x gold	1-2 Weeks	N/A	See Report	FEMALE	nmol/L	N/A	LEEDS LGI	Sample taken at 9am
		1-2 Weeks	N/A	See Report	MALE	nmol/L	N/A	LEEDS LGI	
		1-2 Weeks	N/A	See Report	Neonates (stressed)	nmol/L	N/A	LEEDS LGI	

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Blood Endocrinology	Container	Turnaround Times		Reference Ranges	Variables	Units	Retention Time	Test performed	Special Conditions
		Routine	Urgent						
		1-2 Weeks	N/A	See Report	Neonates(unstressed)	nmol/L	N/A	LEEDS LGI	
ACTH	1 purple	1-2 Weeks	N/A	See Report		ng/L	N/A	LEEDS LGI	Sample taken at 9am
Aldosterone	1x green (heparin)	2 weeks	N/A	See Report		pmol/L	N/A	LEEDS SJUH	
AFP	1 x gold	24 h	5 h	See Report		kU/L	N/A	SHEFFIELD (RH)	
Beta HCG	1 x gold	24 h	5 h	See Report		IU/L	N/A	SHEFFIELD (RH)	
Cortisol	1 x gold	24 h	5 h	See Report	AM SAMPLE	nmol/L	N/A	IN HOUSE	
		48 h	5 h	See Report	PM SAMPLE	nmol/L	N/A	IN HOUSE	
Dehydroepiandrosterone (DHEA)	1 x gold	1-2 Weeks	N/A	See Report		SEE REPORT	N/A	LEEDS SJUH	
Dihydrotestosterone (DHT)	1 x gold	5 weeks	N/A	See Report	FEMALE	nmol/L	N/A	LEEDS LGI	
		5 weeks	N/A	See Report	MALE	nmol/L	N/A	LEEDS LGI	
DHA Sulphate (DHAS)	1 x gold	2 weeks	N/A	See Report	FEMALE	µmol/L	N/A	LEEDS LGI	
		2 weeks	N/A	See Report	MALE	µmol/L	N/A	LEEDS LGI	
Free T3 (FT3)	1 x gold	24 h	5 h	See Report		pmol/L	5 days	IN HOUSE	
Free T4 (FT4)	1 x gold	24 h	5 h	See Report		pmol/L	5 days	IN HOUSE	
FSH	1 x gold	24 h	5 h	See Report	Follicular	IU/L	5 days	IN HOUSE	
		48 h	5 h	See Report	MALE	IU/L	5 days	IN HOUSE	
Gastrin	CONTACT LAB	48 h	5 h	See Report		pmol/L	5 days	HAMMERSMITH	OVERNIGHT FAST
Glucagon	CONTACT LAB	2-3 weeks	N/A	See Report		pmol/L	N/A	HAMMERSMITH	OVERNIGHT FAST
Growth Hormone	1 x gold	1 week	N/A	See Report		mg/L	N/A	LEEDS SJUH	
Gut Hormones	CONTACT LAB	2-3 Weeks	N/A	See Report		N/A	N/A	HAMMERSMITH	OVERNIGHT FAST
Human Chorionic Gonadotropin (HCG)	1 x gold	48 h	5 h	See Report		IU/L	5 days	IN HOUSE	

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Blood Endocrinology	Container	Turnaround Times		Reference Ranges	Variables	Units	Retention Time	Test performed	Special Conditions
		Routine	Urgent						
Insulin(and C-Peptide)	1 x gold	3-5 weeks	N/A	See Report		SEE REPORT	N/A	NEWCASTLE	
Insulin like growth factor	1 x gold	2 weeks	N/A	See Report		nmol/L	N/A	YORK	
LH	1 x gold	24 h	5 h	See Report	Follicular	IU/L	5 days	IN HOUSE	
		24 h	5 h	See Report	MALE	IU/L	5 days	IN HOUSE	
Oestradiol	1 x gold	24 h	5 h	See Report	Pre-menopausal	pmol/L	5 days	IN HOUSE	
		24 h	5 h	See Report	MALE	pmol/L	5 days	IN HOUSE	
PTH	1 x purple	24 h	5 h	See Report		pmol/L	5 days	IN HOUSE	
Progesterone	1 x gold	24 h	5 h	See Report	Mid Luteal	nmol/L	5 days	IN HOUSE	
Prolactin	1 x gold	24 h	5 h	See Report	FEMALE	mIU/L	5 days	IN HOUSE	
		24 h	5 h	See Report	MALE	mIU/L	5 days	IN HOUSE	
Renin	Lithium Heparin	Variable		See Report		nmol/L/h	N/A	LEEDS SJUH	Random sample to lab quickly
SHBG	1 x gold	2 weeks	N/A	See Report	FEMALE	nmol/L	N/A	IN HOUSE	
		2 weeks	N/A	See Report	MALE	nmol/L	N/A	IN HOUSE	
Testosterone (male)	1 x gold	24 h	5 h	See Report	MALE	nmol/L	5 days	IN HOUSE	
Testosterone (female)	1 x gold	1-2 Weeks	N/A	See Report	FEMALE	nmol/L	N/A	LEEDS SJUH	
Thyroglobulin	1 x gold	2-3 weeks	N/A	See Report		µg/L	N/A	NEWCASTLE	
Thyroid Stimulating Hormone (TSH)	1 x gold	24 h	5 h	See Report		mIU/L	5 days	IN HOUSE	

Drugs	Container	Turnaround Times		Reference Ranges	Variables	Units	Retention Time	Test performed	Special Conditions
		Routine	Urgent						
Caffeine	1 x gold	48 h	5 h			mg/L	2 days	Sheffield	
Carbamazepine	1 x gold	3 weeks	N/A	See Report	Trough	mg/L	5 days	AIREDALE	
Digoxin	1 x gold	24 h	5 h	See Report	6-8HR POST DOSE	µg/L	5 days	IN HOUSE	
Lithium	1 x gold	24 h	5 h	See Report	12HR POST DOSE	mmol/L	5 days	IN HOUSE	

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Drugs	Container	Turnaround Times		Reference Ranges	Variables	Units	Retention Time	Test performed	Special Conditions
		Routine	Urgent						
Paracetamol	1 x gold	24 h	5 h	See Report	>4HR POST DOSE	mg/L	5 days	IN HOUSE	
Phenobarbitone	1 x gold	1 week	N/A	See Report	Trough	mg/L	N/A	LEEDS SJUH	
Phenytoin	1 x gold	3 weeks	N/A	See Report	Trough	mg/L	5 days	AIREDALE	
Salicylate	1 x gold	24 h	5 h	See Report		mg/L	5 days	IN HOUSE	
Theophylline	1 x gold	24 h	5 h	See Report	Trough	mg/L	5 days	IN HOUSE	
Urine Drugs of abuse	Random plain urine	1 week	N/A	See Report		SEE REPORT	5 days	LEEDS SJUH	
Valproic Acid	1 x gold	1 week	N/A	See Report	Trough	mg/L	N/A	LEEDS SJUH	
Vancomycin	1 x gold	24 h	5 h	See Report		mg/L	5 days	IN HOUSE	TAKE PRIOR TO NEXT DOSE

Immunology	Container	Turnaround Times		Reference Ranges	Variables	Units	Retention Time	Test performed	Special Conditions
		Routine	Urgent						
Alpha 1-antitrypsin	1 x gold	2-3 weeks	N/A	See Report	Age Related	g/L	N/A	SHEFFIELD (RH)	
Anti-cardiolipin antibodies	1 x gold	1 week	N/A	See Report		GPLU/L	N/A	LEEDS LGI	
Anti-Thyroid Peroxidase Antibody (ATPO)	1 x gold	24 h	5 h	See Report		IU/mL	5 days	IN HOUSE	
Antistreptolysin Titre (ASO)	1 x gold	1 week	N/A	See Report		IU/mL	N/A	LEEDS LGI	
Beta 2-microglobulin	1 x gold	24 h	5 h	See Report		ng/mL	5 days	IN HOUSE	
C1-esterase inhibitor	1 x gold	1 week	N/A	See Report		g/L	N/A	SHEFFIELD (RH)	
C3 Complement	1 x gold	24 h	N/A	See Report		g/L	5 days	IN HOUSE	
C4 Complement	1 x gold	24 h	N/A	See Report		g/L	5 days	IN HOUSE	
CA125	1 x gold	24 h	5 h	See Report		U/mL	5 days	IN HOUSE	
CA153	1 x gold	24 h	5 h	See Report		kU/L	5 days	IN HOUSE	
CA19-9	1 x gold	24 h	5 h	See Report		kU/L	5 days	IN HOUSE	

PATHOLOGY SERVICE – GENERAL PATHOLOGY

Immunology	Container	Turnaround Times		Reference Ranges	Variables	Units	Retention Time	Test performed	Special Conditions
		Routine	Urgent						
Carcinoembryonic Antigen (CEA)	1 x gold	24 h	5 h	See Report		µg/L	5 days	IN HOUSE	
Caeruloplasmin	1 x gold	2 weeks	N/A	See Report		g/L	N/A	LEEDS (LGI)	
Cholinesterase Antibodies	1 x gold	2 weeks	N/A	See Report		IU/L	N/A	BRISTOL	
Cryoglobulins	1 x gold	7 Days	N/A	See Report		N/A	5 days	IN HOUSE	
Immunoglobulin E	1 x gold	48 h	N/A	See Report		IU/mL	5 days	LEEDS (LGI)	
Immunoglobulin Sub-Classes	1 x gold	2 weeks	N/A	See Report		**SEE REPORT**	N/A	SHEFFIELD (RH)	
NSE	1 x gold	2 weeks	N/A	See Report		µg/L	N/A	SHEFFIELD (RH)	
Prostate Specific Antigen (PSA)	1 x gold	24 h	5 h	See Report	Age Related	ng/mL	5 days	IN HOUSE	
Immunoglobulin (IgG)	1 x gold	1 week	N/A	See Report	Age Related	N/A	5 days	IN HOUSE	
Immunoglobulin A (IgA)		1 week	N/A	See Report	Age Related	N/A	5 days	IN HOUSE	
Immunoglobulin M (IgM)		1 week	N/A	See Report	Age Related	N/A	5 days	IN HOUSE	
Transferrin	1 x gold	24 h	5 h	See Report		g/L	5 days	IN HOUSE	

Dynamic Function Tests	Container	Turnaround Times		Reference Ranges	Variables	Units	Retention Time	Test performed	Special Conditions
		Routine	Urgent						
Glucose Tolerance Test (GTT)	CONTACT LAB	24 h	3 h	See Report		mmol/L	5 days	IN HOUSE	
Sweat Test	CONTACT LAB	24 h	N/A	See Report		SEE REPORT	N/A	IN HOUSE	
Synacthen Test (short)	CONTACT LAB	24 h	5 h	See Report		nmol/L	5 days	IN HOUSE	

Tests on Faeces	Container	Turnaround Times			Variables	Units	Retention Time	Test performed	Special Conditions
		Routine	Urgent						
Faecal Elastase	Plain	2 weeks	N/A	See Report		ugEl/g stool	N/A	YORK	

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Common Reference Intervals (reference ranges)

Analyte	Unit	Reference Interval	Source
AFP	kU/L	0-6	Scottish Clinical Biochemistry Network (SCBN)
Albumin	g/L	0-1yr: 30-45, 1 - 17 yrs: 30-50, >17yrs: 35 - 50	Harmony (Pathology Harmony.co.uk - Harmonisation of Reference Intervals)2011
Albumin/Creatinine Ratio	mg/mmol	Female 0-3.5 Male 0-2.5	Annals of Clin Biochem 2013:50(4):297-299.
Alcohol	mg/L	Age related paediatric reference range 0-2000, Adult reference range 0-4000	RCPath
ALP	IU/L	Adult 30 - 130 & Paediatric age related ranges	Pathology Harmony 2011. Paed ranges from caliper study.
ALT	IU/L	Females 0-30, Male 0-40	WYAAT Consensus
Ammonia	mmol/L	0 - 4 weeks < 100. 4 weeks - 16 years < 50. > 16 yrs 18-72	Paediatric: Pathology Harmony 2011. Adult Beckman IFU 2022
Amylase	IU/L	28 -100	Beckman IFU 2022
AST	IU/L	Female 0-30, Male 0-36	WYAAT consensus
Bile Acid	umol/l	<14	Beckman IFU & WYAAT consensus
Bicarbonate total	mmol/L	22-29	Harmony (Pathology Harmony.co.uk - Harmonisation of Reference Intervals) 2011
BMG	mg/L	Age 0 - 60: 0.8 - 2.4. Age > 60: < 3.0	Beckman IFU 2022
Complement C3	g/L	0.9-1.8	Beckman IFU 2022
Complement C4	g/L	0.1-0.4	Beckman IFU 2022

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Analyte	Unit	Reference Interval	Source
Ca125	u/ml	<35	Nationally consensus cut-off
Ca15-3	Ku/L	<23.5	Beckman IFU 2022
Ca19-9	ku/L	<35	Beckman IFU 2022
Calcium (Adjusted)	mmol/L	Age related <1 month old 2.00-2.700, 1 month old -16years 2.20-2.70, > 16 2.20-2.60 years	Jassam N, Luvai A, Hayden K, Dearman R, et al. Albumin and calcium reference interval using healthy individuals and a data-mining approach. Ann Clin Biochem 2020; 57(5):.373-381
Calcium (Total)	mmol/L	2.2-2.6	Jassam N, Luvai A, Hayden K, Dearman R, et al. Albumin and calcium reference interval using healthy individuals and a data-mining approach. Ann Clin Biochem 2020; 57(5):.373-381
CEA	ug/L	0.0-5.0	Scottish Clinical Biochemistry Network (SCBN)
Cholesterol	mmol/L	Age and sex related - (clinical cut off is appropriate cut off for an individual is determined clinically based on patient risk factors)	International cut off historical / Tietz NW Fundamentals of Clinical Chemistry version 5
Creatine Kinase (CK)	IU/L	Female 25 - 200. Male 40 - 320	Pathology Harmony and Yorkshire Ref Range Study
Chloride	mmol/L	95-108	Harmony (Pathology Harmony.co.uk - Harmonisation of Reference Intervals) 2011
Conjugated Bilirubin	nmol/L	0-5	WYAAT consensus
Cortisol	nmol/L	No reference range quoted	
Creatinine	umol/L	Age and gender related. Adult F: 49 - 90. Adult M: 64 - 104	Paed: Caliper Study. Adult Beckman IFU
C-Reactive Protein (CRP)	mg/L	0-10	WYAAT consensus

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Analyte	Unit	Reference Interval	Source
CSF Glucose	mmol/L	No reference range quoted	
CSF Protein	mg/L	0.2-0.4	Tietz NW Fundamentals of Clinical Chemistry Version 3
Digoxin	ug/L	Target range: 0.5-2.0 Target range in heart failure: 0.5-1.0 For digoxin monitoring: sample must be taken at least 6 hour post dose.	Harmony (Pathology Harmony.co.uk - Harmonisation of Reference Intervals) 2011
Ferritin	ng/ml	10 - 337	Locally derived & WYAAT consensus
Folate	ug/L	5.0-19.0	Locally derived (Yorkshire RR study, WYAAT consensus)
FSH	IU/L	Male: 1.2 - 19.3. Female cycle Dependant, ranges given in associated comments.	Beckman IFU & WYAAT consensus
FreeT3	pmol/L	3.5 - 6.8	WYAAT consensus
FreeT4	pmol/L	7.8 - 18	Lower Limit: Beckman IFU 2022. Upper limit locally derived from verification data versus previous method.
Gamma GT	IU/L	Female 0-40, Male 0-70	WYAAT consensus
Glucose	mmol/L	Fasting 3.5 – 6.0	WYAAT consensus
HbA1c	mmol/mol	cut off	Internationally consensus cut off

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Analyte	Unit	Reference Interval	Source
HCG (Pregnancy)	IU/L	<5	WYAAT consensus & SCBN
HCG (Tumour)	IU/L	<5	WYAAT consensus & SCBN
HDL-Cholesterol	mmol/L	0.9-2.2	International cut off
Haptoglobin	g/L	0.3 – 2.0	Beckman IFU 2022
IgA	g/L	0.7 – 4.0	PRU Protein Reference Units Sheffield Teching Hospitals (https://www.immqas.org.uk)
IgG	g/L	6 - 16	PRU Protein Reference Units Sheffield Teching Hospitals (https://www.immqas.org.uk)
IgM	g/L	0.4 – 2.3	PRU Protein Reference Units Sheffield Teching Hospitals (https://www.immqas.org.uk)
Iron	umol/L	Female: 10.7 - 32.2. Male: 12.5 - 32.2	Beckman IFU 2022
Potassium (Plasma)	mmol/L	3.4-4.5	Beckman IFU 2022
Potassium (Serum)	mmol/L	0-5 wks: 3.4 - 6.0. 5wk - 2 yr: 3.5 - 5.7, 2yr - 17 yr 3.5 - 5. > 17 3.5 - 5.3.	Harmony (Pathology Harmony.co.uk - Harmonisation of Reference Intervals) 2011. WYAAT Consensus
Lactate	mmol/L	0.5-2.0	WYAAT Consensus
LDH	IU/L	Adult Female < 247, male < 248. Paediatric age related.	Beckman IFU 2022
LH	IU/L	Male: 1.2 - 8.6. Female cycle Dependant, ranges given in associated comments.	Beckman IFU & WYAAT Consensus

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Analyte	Unit	Reference Interval	Source
Lithium	mmol/L	0.4-1.0	Harmony (Pathology Harmony.co.uk - Harmonisation of Reference Intervals) 2011
LDL		No reference range quoted	
Magnesium	mmol/L	0.7-1.0	Harmony (Pathology Harmony.co.uk - Harmonisation of Reference Intervals) 2011
Sodium	mmol/L	133-146	Harmony (Pathology Harmony.co.uk - Harmonisation of Reference Intervals) 2011
Oestradiol	pmol/L	Male: < 150. Female cycle Dependant, ranges given in associated comments.	Beckman IFU 2022 & WYAAT Consensus
Osmolality (serum)	mOsm/Kg	275-295	Harmony (Pathology Harmony.co.uk - Harmonisation of Reference Intervals) 2011
Paracetamol	mg/L	No range should be quoted	
Phenytoin	mg/L	5-20	Harmony (Pathology Harmony.co.uk - Harmonisation of Reference Intervals) 2011
Phosphate	mmol/L	Age related ≤ 28 days- 1.30-2.60, 28 day-12 months 1.30-2.4, 1- 16 years 0.9-1.80, >16 years 0.8-1.50	Harmony (Pathology Harmony.co.uk - Harmonisation of Reference Intervals) 2011
Prolactin	miu/L	F: 70 - 566. M: 55 - 278	Beckman IFU 2022
Progesterone	nmol/L	Mid Luteal: 16.4 - 59.0	Beckman IFU 2022
Procalcitonin	ug/L	0-0.1	Beckman IFU and consensus with previous method

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Analyte	Unit	Reference Interval	Source
PSA	ng/ml	Age related < 49 years < 2.5, 50-59: < 3.5, 60-69 <4.5, >70: < 6.5	WYAAT consensus, NICE guidance NG12
PTH (plasma)	pmol/L	1.3 - 9.3	Beckman IFU 2022
Rheumatoid Factor	IU/mL	<14	Beckman IFU 2022
SHBG	nmol/L	Age and gender related: F 20 - 46: 18 - 136. F Age > 47 17 - 125. M: 13 - 90	Beckman IFU 2022
Total Bilirbin	umol/L	0-21	Harmony (Pathology Harmony.co.uk - Harmonisation of Reference Intervals) 2011
Testosterone (Male)	nmol/L	10-26	Derived in-house
Theophylline	mg/L	Therapeutic range 10.0-20.0	Harmony (Pathology Harmony.co.uk - Harmonisation of Reference Intervals) 2011
Transferrin	g/L	2.00-3.60	Beckman IFU 2022
Troponin I	ng/L	Cut-off ≥18	Beckman IFU 2022
Total Protein	g/L	60 - 80	WYAAT consensus
TPO antibodies	IU/L	< 9	Beckman IFU 2022
Triglycerides	mmol/L	<1.7	Beckman IFU 2022
TSH	mIU/L	0.2-4.3	WYAAT consensus
Uric Acid	umol/L	Female: 140 - 360. Male: 200-430	WYAAT consensus
Urine Calcium	mmol/24hrs	2.5-7.5	WYAAT consensus

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Analyte	Unit	Reference Interval	Source
Urine Creatinine (24hr)	mmol/L	No range should be quoted	No range should be quoted
Urine Potassium	mmol/L	No range should be quoted	No range should be quoted
Urine Sodium	mmol/L	No range should be quoted	No range should be quoted
Urine Phosphate	mmol/24 hrs	12.9-42.0	Beckman IFU & WYAAT
Urine Uric Acid	mmol/day	1.5-4.4	Tietz NW Fundamentals of Clinical Chemistry version 7
Urea	mmol/L	Paed Age related - Adults 2.5 - 7.8	WYAAT consensus & Pathology Harmony
Vitamin B12	ng/L	110-900	Derived in-house
Vitamin D	nmol/L	Cut-offs: Deficiency <30, Insufficiency 30-50, Sufficient >50	Derived in-house

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HAEMATOLOGY & BLOOD TRANSFUSION

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Haematology Phone List

These phone levels apply only to unexpected results, that is those who have not had raised levels previously and are not known to have a disease where these levels would be expected

Parameter	Telephone trigger	Notes
Hb	Less than 70g/L Greater than 190 g/L and /or HCT above 0.55	also provide MCH & MCV results
Neuts	< 1.0 x 10^9/L	
Platelets	< 30 x 10^9/L > 1000 x 10^9/L	
Film	Blast cells or film suggestive of CML	**Contact Consultant Haematologist**
Malaria	Any positive results	
Sickle solubility	All results	For all in house testing
INR	> 5.0	**All high results even if previously abnormal.**
INRD	>6.0	**Pharmacy INR ONLY**
APTT ratio	> 5.0	
DD	>230ng/ml (age related cut off of year in age*5 ng/ml if patient is over 50 years)	Phone all over range DD results to GP surgeries, unless the patient is on Rivaroxaban.
FIB C	<1.5g/L	With major blood loss
ESR	>50mm/h	Unexplained or with clinical details? TA/Giant cell arteritis
All AE Problem codes	All AE problem codes e.g. clotted/ unlabelled/insufficient etc.	All problem sample codes should be telephoned to AE and details added to the TR function on the patient sample record.

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Haematology, Immunology & Blood Transfusion Investigations

The following list of available tests is not exclusive and other tests may be available on request.

Investigation	Specimen required	Turnaround times		Reference Range	Comments, Special precautions.	Specimen retention time	Performed at
		Routine	Urgent				
Adrenal Abs	1 x gold	14 days	n/a	Positive or Negative		n/a	LGI
Activated Partial Thromboplastin time (APTT) *	1 x blue	4 hours	1 hour	21 - 32 s		24 hours	HDH
APTT Ratio – Heparin monitoring	1 x blue	4 hours	1 hour	(Therapeutic range 1.5 – 2.0 or 1.5 – 2.5 depending upon indication)	Not for monitoring LMWH	24 hours	HDH
Acetylcholine receptor Antibodies	1 x gold	14 days	n/a	Neg: < 5 x 10^{-10} mol/L Low Positive: 5-10 x 10^{-10} mol/L Positive: > 10 x 10^{-10} mol/L		n/a	ORH
Anticardiolipin Abs	1 x gold	14 days	n/a	0 – 19.9 GPL Units / mL		n/a	LGI
Anti DNA – now part of ANA Screen (Leeds)	1 x gold	14 days	n/a	TBC	Request ANA Screen (Leeds) on ICE	N/A	LGI

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Investigation	Specimen required	Turnaround times		Reference Range	Comments, Special precautions.	Specimen retention time	Performed at
		Routine	Urgent				
Anti-neutrophil cytoplasmic Abs (Screen plus MPO, PR3 and pattern if applicable)	1 x gold	14 days	(2 days)	Positive or Negative for screen, numerical report for ANCA MPO and PR3 (Ref range TBC)	Request ANCA Screen (Leeds) on ICE	N/A	LGI
Antinuclear Abs	1 x gold	2 weeks 4 weeks (Titre)	n/a	Pattern if appropriate	Request ANA Screen (Leeds) on ICE	N/A	LGI
Apixaban (anti-Xa)	1 x blue	4 hours	1 hour	No range quoted		24 hours	HDH
Ascitic Fluid WBC/Differential	1 x purple	4 hour	1 hour		Differential not possible on WBC counts under 1.0×10^9/L	24 – 48 hours	HDH
Blood Film	**Consultant advice required**	1 day	1 hour	Descriptive report issued	**Consultant advice required**	7 days	HDH

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Investigation	Specimen required	Turnaround times		Reference Range	Comments, Special precautions.	Specimen retention time	Performed at
		Routine	Urgent				
Antibody investigation	2 x pink (6 ml)	2 weeks	8 hour	Descriptive report issued	**Ensure fully labelled with 3 points of ID Time/date and signature**	N/A	NHSBT Barnsley
Blood Group and Screen / Cross match	1 x pink (6 ml)	1 day	1 hour	Descriptive report issued for Group and Screen	**Ensure fully labelled with 3 points of ID Time/date and signature**	14 days	HDH
Bone marrow aspirate & trephine	**Consultant advice required**	1 week	1 week	Descriptive report issued	**By prior arrangement only**	n/a	HMDS
Cyclic Citrullinated Peptide (CCP) Abs.	1 x gold	48 hours	n/a	0<16 U/mL		5 Days	LGI
Coagulation Screen (PT & APTT)	1 x blue	4 hours	1 hour	See PT & APTT		24 hours	HDH
D-dimers	1 x blue	4 hours	1 hour	<230ng/ml	<230 ng/mL (or < age adjusted cut off) is a negative predictor for VTE.	24 hours	HDH

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Investigation	Specimen required	Turnaround times		Reference Range	Comments, Special precautions.	Specimen retention time	Performed at
		Routine	Urgent				
					Results NOT suitable as a positive indicator for VTE. Age adjusted cut off (over 50s only) = Age in years x 5.		
Direct Coombs Test	1 x pink (6 ml) or purple (4 ml)	1 day	1 hour	Negative / Positive (IgG +/- C3d)		2 days	HDH
Endomysial Abs.	1 x gold	14 days	n/a	Negative / Positive IgA class	Only tested on Positive TTGs	NA	LGI
EPO	1 X gold	4 weeks	n/a			n/a	LGI
Erythrocyte Sedimentation rate (ESR)	1 x purple	48 hours	90 minutes	Females: 0-14mm/h Males: 0-10mm/h	Samples must reach the blood science laboratory within 4 hours of collection	48 hours	HDH
Extractable Nuclear Antigens – Request ANA Screen (Leeds)	1 x gold	4 weeks	n/a		Now included in ANA Screen (Leeds) on ICE	N/A	LGI

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Investigation	Specimen required	Turnaround times		Reference Range	Comments, Special precautions.	Specimen retention time	Performed at
		Routine	Urgent				
Fetal Rh(D) Screening	1 x pink	14 days	n/a	Positive/Negative/ Inconclusive	**Fully labelled with at least 3 points of ID Sign and date/time sample. EDD from scan must be on request form**	N/A	IBGRL
Fibrinogen *	1 x blue	4 hours	1 hour	1.5 – 4.5g/L		24 hours	HDH
Full Blood Count	1 x purple	4 hours	1 hour	See report		24 - 48 hours	HDH
Glandular fever Screen	1 x purple or gold 1 x gold	24 hours	1 hour	Positive / Negative		24 hours	HDH
Glutamic Acid Decarboxylase Abs. (GAD)	1 x gold	4 weeks	n/a	0 – 5 U/mL		n/a	ORH
Glomerular Basement Membrane Abs. (GBM)	1 x gold	2 Weeks	2 hrs once sample received at LGI.	< 0.9 AI = Negative > 1.0 AI = Positive	Urgent samples by prior arrangement only	n/a	LGI
Glucose-6-phosphate dehydrogenase (G6PD)	2 x purple	2 weeks	1 week			n/a	SJUH

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Investigation	Specimen required	Turnaround times		Reference Range	Comments, Special precautions.	Specimen retention time	Performed at
		Routine	Urgent				
Haemoglobin Electrophoresis	1 x purple	5 days	3 days	See report		n/a	SJUH
Heparin Induced Thrombocytopenia Screen (HIT-type II)	1 x gold 1 x blue	4 days	1 day	Negative / Positive	**By prior arrangement only**	n/a	SJUH
HLA B27	2 x purple (2 x 4 ml)	2 Weeks	n/a	Ag Negative / Ag Positive	Ensure fully labelled with at least 3 points of ID	n/a	NBS
HLA for Narcolepsy	2 x purple (2 x 4 ml)	2 Weeks	n/a	Negative / Positive	Ensure fully labelled with at least 3 points of ID	n/a	NBS
INR (Warfarin monitoring)	1 x blue	4 hours	1 hour	Therapeutic Range Depends upon indication		24 hours	HDH
Intrinsic Factor Abs.	1 x gold	14 days	NA	Positive / Negative / Equivocal	TBC	n/a	SJUH
JAK 2	**Contact laboratory (3068)**	6 weeks	5 weeks	See report	**By prior arrangement only**	n/a	HMDS
Kleihauer	2 x pink	1 day	n/a	Neg = <2mL	**Fully labelled with at least 3 points of**	14 days	HDH

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Investigation	Specimen required	Turnaround times		Reference Range	Comments, Special precautions.	Specimen retention time	Performed at
		Routine	Urgent				
					ID Sign and date/time sample		
Liver Antibody Screen	1 x gold	2 weeks	n/a	Negative / Positive	**For AMA, SMA, LKM and GPC antibodies**	N/A	LGI
Low molecular weight heparin (anti-Xa)	1 x blue	4 hours	1 hour	No range quoted		24 hours	HDH
Malarial Parasites	1 x purple	4 hours	2 hours	Negative / Positive (plus species identification)	Record **country visited** & **any prophylaxis** on request form		HDH
Pemphigus Abs.	1 x gold	14 days	n/a	Negative / Positive (+ titre)		n/a	LGI
Pemphigoid Abs.	1 x gold	14 days	n/a	Negative / Positive (+titre)		n/a	LGI
Plasma Viscosity	1 x purple	72 hours	5 hours	1.5 – 1.72 mPa/s			SJUH
Platelet Abs.	**Contact laboratory (3068)**	7 – 10 days	3 days	Descriptive report issued	**By prior arrangement only**	n/a	NBS

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Investigation	Specimen required	Turnaround times		Reference Range	Comments, Special precautions.	Specimen retention time	Performed at
		Routine	Urgent				
Pleural Fluid WBC/Differential	1 x purple	4 hours	1 hour		Differential not possible on WBC counts under $1.0x10^9$/L		HDH
Prothrombin time (PT) *	1 x blue	4 hours	1 hour	9.0 – 14.0 s	(For Warfarin monitoring request INR)	24 hours	HDH
Paraneoplastic Neurological Syndrome antibodies (PNSS)	1 x gold	14 days (screen) 28 days (profile)	n/a	Positive, Negative or Equivocal	Full Profile will be performed on Positive and equivocal screens	n/a	LGI
Reticulocytes	1 x purple	4 hours	1 hour	30-100 x 10^9 / L		24 hours	HDH
Rivaroxaban (anti-Xa)	1 x blue	4 hours	1 hour	No range quoted		24 hours	HDH
Sickle Cell Screen	1 x purple	5 days	2 hours	Positive / Negative (All samples sent to SJUH for confirmation)		24 – 48 hours	HDH/SJUH
Thrombophilia / Lupus anticoagulant screen	**Contact laboratory (3068) to arrange**	6 weeks	5 weeks	See report for reference ranges.	**By prior arrangement only**	n/a	YDH

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Investigation	Specimen required	Turnaround times		Reference Range	Comments, Special precautions.	Specimen retention time	Performed at
		Routine	Urgent				
Tissue Transglutaminase	1 x gold	14 days	n/a	Negative Weak Positive/Positive		NA	LGI
Tissue Typing (full)	**Contact laboratory to arrange**	2 weeks	n/a	Descriptive report issued	**By prior arrangement only**	n/a	SJUH
Transfusion Reaction Investigation	1 x pink, 1 X red top (no gel, plain tube)						HDH

***** Some components of the haemostatic system are influenced by hormonal and other factors and change during childhood, not reaching adult values unitl late teenage years. Other components are at adult levels, or even above adult levels from birth. Interpreting the results of haemostatic testing must always be done in the light of the clinical setting and the result alone must not be the only consideration when results are reviewed and reported.

Reference Intervals (Reference ranges)

Adult reference ranges from 12 years old

FBC parameter	Units	Reference range
Haemoglobin - male	g/L	130-180
Haemoglobin - female	g/L	120-160

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White blood count (WBC)	$X10^9/L$	3.6-11
Platelets (PLT)	$X10^9/L$	140-425
Red blood count (RBC) – male	$X10^{12}/L$	4.5-6.5
Red blood count (RBC) – female	$X10^{12}/L$	3.8-5.8
Haematocrit (HCT) – male	Ratio	0.40-0.54
Haematocrit (HCT) – female	Ratio	0.37-0.49
Mean cell volume (MCV)	fL	81-101
Mean cell haemoglobin (MCH)	pg	27-32
Mean cell haemoglobin concentration (MCHC)	g/L	320-370
Red cell distribution width (RDW)	%	10.0-16.0
Reticulocytes (Absolute)	$X10^9/L$	30-100
Reticulocyte haemoglobin	pg	>28
Neutrophils	$X10^9/L$	1.8-8.0
Lymphocytes	$X10^9/L$	1.0-4.0
Monocytes	$X10^9/L$	0.3-0.9
Eosinophils	$X10^9/L$	0.04-0.5
Basophils	$X10^9/L$	0.00-0.1
Nucleated red blood count (nRBC)	$X10^{\wedge 9}/L$	0.00-0.00

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Normal Infants and children's reference range

		Age of infant (up to)							
FBC parameter	**Units**	**1 Day**	**14 Days**	**2 Months**	**6 Months**	**1 Year**	**2 Years**	**6 Years**	**12 Years**
Hb	g/L	149-237	134-198	94-130	114-141	114-141	115-135	115-135	115-155
WBC	$X10^9$/L	10-26	6-21	6-18	6-17.5	6-17.5	5-17	4.5-14.5	4.5-13
PLT	$X10^9$/L	140-400	140-425	140-425	140-425	140-425	140-425	140-425	140-425
RBC	$X10^{12}$/L	3.7-6.5	3.9-5.9	3.1-4.3	3.9-5.5	4.0-5.3	4.0-5.3	4.0-5.2	4.1-5.2
HCT	Ratio	0.47-0.75	0.41-0.65	0.28-0.42	0.33-0.41	0.33-0.41	0.33-0.41	0.35-0.40	0.35-0.40
MCV	fL	90-115	90-115	85-105	85-105	73-85	72-83	74-91	77-89
MCH	pg	25-29	25-29	25-29	25-29	25-29	24-28	25-30	25-30
MCHC	g/L	320-370	320-370	320-370	320-370	320-370	320-370	320-370	320-370
RDW	%	10-16	10-16	10-16	10-16	10-16	10-16	10-16	10-16
Neutrophils	$X10^9$/L	2.7-14.4	1.8-5.4	1.2-7.5	1.0-8.5	1.5-8.5	1.5-8.5	1.5-8.5	1.8-8.0
Lymphs	$X10^9$/L	2.0-7.3	2.0-9.0	2.0-9.0	2.0-9.0	4.0-10.0	4.0-10.0	3.0-9.5	1.5-6.5
Monocytes	$X10^9$/L	0.5-1.9	0.3-1.4	0.3-1.4	0.3-1.4	0.3-1.4	0.3-1.4	0.7-1.5	0.3-0.9
Eosinophils	$X10^9$/L	0-0.84	0-0.84	0.1-0.8	0.3-0.8	0.3-0.8	0.3-0.8	0.1-0.5	0.1-0.5
Basophils	$X10^9$/L	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Retics	$X10^9$/L	100-250	100-250	20-80	20-80	20-80	20-80	20-80	20-80
nRBC	$X10^9$/L	0-0.01	0-0.01	0-0.01	0-0.01	0-0.01	0-0.01	0-0.01	0-0.01

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Adding on extra tests

Add on requests for D-Dimer, APTT and Fibrinogen can be requested up to 4 hrs after the original request has been received in the laboratory. Add on requests for Reticulocytes or blood films for morphology can be requested up to 24 hours after the original request has been received in the laboratory.

To add on extra tests please call specimen reception on ext 3000 and send an add on ICE request.

Factors affecting test performance

1. Wrong container used
2. Wrong sample type for investigation required
3. Delay in transportation and transport conditions
4. Volume of specimen
5. Poor quality specimens

Reference Laboratory Addresses

Please request information from the Pathology laboratory regarding referral laboratories.

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BLOOD TRANSFUSION

Blood Transfusion Requests

The appropriate samples should be accompanied by the Blood Transfusion Request Form; an ICE request form should be used whenever possible.

Blood Transfusion Practitioner Role

The blood transfusion practitioners are based in the transfusion department and have primary responsibility for the education and competency assessment in accordance with the National Patient Safety Agency (NPSA) of key clinical staff involved in the transfusion process. Other fundamental aspects of the post involve improving transfusion safety and ensuring appropriate blood use. This is achieved by audit, investigation of incidents, production of policies and protocols and acting as a resource in transfusion matters for clinical staff. An important function of the post is to act as liaison between the clinical areas and the transfusion department to facilitate communication between the two areas.

Assistant Transfusion Practitioner Role

The Assistant Transfusion Practitioner primarily assists the Transfusion Practitioner in traceability of blood products, performing audit, administrative support and performs the competency assessments of clinical staff. They also act as a resource for the clinical staff where possible in the absence of the transfusion practitioner.

HARROGATE HEALTH CARE BLOOD TRANSFUSION POLICY

Sample Collection and Request

Requests for blood and blood products should be made on the ICE requesting system or on Blood Transfusion request forms Sample tubes should be hand-written on the bottle with all necessary identification **by the bedside.** Sample bottles must contain the following details in order to comply with guidelines set down by the British Committee for Standards in Haematology

1. **FULL NAME** (Spelt Correctly)
2. **DATE OF BIRTH** (NOT AGE)
3. **UNIQUE HOSPITAL NUMBER / NHS number**

A full name and D.O.B. or Hospital / NHS number are **minimum** acceptable requirements for sample labelling. If a sample is to be used for crossmatching there MUST also be a date and time bled on the specimen.

Unknown Patients

If the patient details are unknown or the patient is unwilling to give their identity a temporary patient identity should be used. This will ensure that a

patient can be positively identified in situations where two or more unknown patients are present.

Patients MUST be allocated with:

- A hospital number
- A first name and surname from the phonetic alphabet
- An estimated DOB
- A patient gender

The surname will be prefixed by a unique number on the wristband e.g. BLT3475Bravo

The patient ID must also be on the wristband allowing Blood and Blood Products to be checked prior to infusion.

Blood Storage
Blood should only be stored in monitored blood bank refrigerators, NEVER in domestic or drug fridges on wards. Monitored blood bank refrigerators can be found at the following sites.

- Blood Transfusion Dept, Fewston Wing
- SROMC
- Delivery Suite

Transfusion of Blood on Wards and in Theatres
All transfusions must be undertaken using the transfusion care pathway documentation. This contains the protocol for transfusion administration. **Prior** to commencement of transfusion, two registered staff (Medical staff, ODP, midwife, registered nurse) must check the following details:

PATIENTS FULL NAME
PATIENTS DATE OF BIRTH
PATIENT HOSPITAL NUMBER & NHS number
PATIENTS BLOOD GROUP
BLOOD GROUP OF DONOR BAG
DONATION NUMBER OF BAG
EXPIRY DATE OF BLOOD/PRODUCT

They must be checked against:
THE BLOOD BAG LABELS
THE BLOOD BAG ITSELF
PATIENT ID FROM THE MEDICAL NOTES
THE PATIENTS IDENTIFICATION BRACELET
VERBAL CONFIRMATION OF THE PATIENTS NAME AND DATE OF BIRTH WHERE POSSIBLE

It is the responsibility of the qualified member of staff to ensure these checks are carried out at the **patient's bedside** and that the unit of blood / product is then commenced immediately for transfusion

REMEMBER! TRANSFUSION OF THE WRONG BLOOD COULD KILL
Blood should never be heated unless a doctor in charge of the case considers that it is necessary using controlled blood warming apparatus. Never add drugs or other substances to blood or blood products.

Emergency Group O Rh (D) Negative Blood & O Rh(D) Positive Blood
Emergency units of blood are available at the following sites:

- Two O Rh(D) negative units in the Fewston Blood Transfusion fridge
- Two O Rh(D) negative units in the Delivery Suite Blood Bank fridge.
- One O Rh(D) negative paediatric unit in the Delivery Suite Blood Bank fridge.
- Two units O Rh(D) positive units are available in the Blood Transfusion Department and will be released for suitable patients by the lab staff.

The emergency units should only be used in severe cases of bleeding where there is insufficient time to await for blood from the laboratory. A group and save sample must always be taken from the patient prior to transfusion and dispatched to the laboratory as soon as possible.

Transfusion Reactions (see Blood Transfusion care pathway)
If a patient appears to have had a severe transfusion reaction, the care pathway transfusion reaction flow chart should be followed and a Datix incident form must be completed at the earliest opportunity. The blood bag should be sealed to prevent leakages and returned to the Blood Transfusion Department. The samples required for investigating a transfusion reaction are found on ICE under 'Transfusion reaction'.

Transport of Blood
When blood is taken to another hospital outside HDFT e.g. to, Leeds or York, it is important that documentation shows how long the blood has been out of a blood bank refrigerator. The blood must remain in cold storage during transit. Blood is always transported in a designated insulated box. Contact the laboratory on ext 3069 or bleep 3066 out of hours, so that the blood can be packed with all the correct documentation. The documentation must be completed before despatch and on reaching the destination Blood Bank.

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Blood Products

The following blood products are available on request from the Blood Transfusion Department

Fresh Frozen Plasma (FFP) and Cryoprecipitate

(See the FFP & Cryo guidelines, HDFT document library)
FFP and Cryoprecipitate are used to correct clotting factor deficiencies. Usually a clotting screen is required before issue. Advice or permission from a Consultant Haematologist may be required in some cases before these products are issued. FFP and Cryo do not require cross matching, but a sample will be required to ascertain the patients' blood group if it has not already been done. These products take up to 40 minutes to thaw and should be used as soon as possible to give maximum effect. FFP should not be used for the reversal of Warfarin overdose (see Trust policy Guidelines for reversal of oral anticoagulant drugs (warfarin, dabigatran and rivaroxaban)

Platelet Concentrate (See Trust policy: Trust Platelet Transfusion Guidelines and Guidelines for the use of red cell and platelet transfusions in Haematology and Oncology patients).

Advice and permission for the use of platelet concentrates will normally come from a Consultant Haematologist. Platelets do not need cross matching, but a valid sample will be required. Platelets are obtained as required from the Regional Blood Transfusion Centre, Barnsley. This usually takes 1-2 hours. They should be transfused immediately for maximum effect. If not for immediate transfusion they should be kept in the laboratory at room temperature on a platelet agitator. Platelets may be obtained in an emergency from the NHSBT in Barnsley and transported here under a blue light. However the requesting consultant's name is required by the NHSBT for authorisation. Platelets should NEVER be stored in a refrigerator.

Prothrombin Complex Concentrate (PCC/Beriplex)

This is available, after consultation with a Consultant Haematologist, for the treatment of life-threatening bleeding related to warfarin overdose. See the Trust policy: Guidelines for reversal of oral anticoagulant drugs (warfarin, dabigatran and rivaroxaban). Strict criteria for the use of PCC must be adhered to. The Emergency Department additionally holds a stock of PCC for Emergency Use.

Activated Factor Seven (NovoSeven)

An emergency supply is available for use in extreme circumstances where there is life-threatening bleeding and a specific platelet or coagulation defect cannot be detected and reversed. This is an unlicensed indication for the use

of this product and can only be prescribed with the agreement of a consultant haematologist.
Novoseven is licensed for use in patients with factor VIII inhibitors but such patients will usually be treated at St James's University Hospital, Leeds.

Human Albumin Solutions (HAS)
4.5% HAS can be supplied in 500ml volumes. They can be obtained on request from the Blood Transfusion Department HDH. Bulk stocks of 20% HAS are also available from the Blood Transfusion Department.

PATHOLOGY SERVICE – GENERAL PATHOLOGY

MICROBIOLOGY

Includes microbiology, serology, and virology.

Scope of work

The ranges of tests include bacteriology, molecular microbiology, parasitology, mycology, serology and virology.

Introduction

All microbiology specimens should be submitted to the Microbiology Department at HDH. In this way a record of results can be held here, whether the specimens are examined locally or sent away to reference laboratories. This is important to allow the Consultant Microbiologist to maintain an overview of IPC issues or unusual patterns of antimicrobial resistance.

The repertoire of tests performed in our laboratory is under continual review, with the intention of developing the service appropriately according to the scale of demand and as circumstances and funding permit. The comments on specimens and tests (see tables 1 and 2*)* are intended to be a helpful guide to good use of the laboratory. They do not show the full extent of the laboratory repertoire, which is subject to alteration from time to time.

Location

The Microbiology laboratory is located on the 2nd floor of Fewston Wing at Harrogate District Hospital. The laboratory can only be accessed through a coded security system, so visits must be arranged with the laboratory in advance.

Department contact details

Name	Tel.no./ bleep	Email
Microbiology Reception and Enquiries	01423 55**3078**	
Dr Katharine Scott Consultant Microbiologist & Specialty Lead	01423 55**5658** Bleep 5658	katharine.scott1@nhs.net
Dr Lauren Heath Consultant Microbiologist & Infection Control Doctor	01423 55**4616**	lauren.heath8@nhs.net
Dr Richard Hobson Consultant Microbiologist	01423 55**5674**	richardhobson@nhs.net
Dr Sarah Drake Consultant Microbiologist	01423 55**3077**	sarah.drake3@nhs.net
Janet Bingham PA to Consultant Microbiologists/ Secretary	01423 55**5663**	janet.bingham@nhs.net

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Name	Tel.no./ bleep	Email
Dr Joanne Smullen Pathology General Manager - IPS Microbiology & Airedale site	01423 55**3076**	joanne.smullen@nhs.net
Mr Ninan Obasi IPS Microbiology Service Lead		ninan.obasi2@nhs.net

Clinical Advice
The Consultant Microbiologists are happy to discuss investigation, diagnosis and treatment of patients with suspected infection. A Duty Consultant Microbiologist (Consultant and/or Registrar) is available on-site between 9am and 5pm (bleep 5656). Switchboard (01423 885959) can advise both external and internal users which Microbiologist is on duty.

Antibiotic treatment and prophylaxis guidelines are available via the MicroGuide™ app.

Out-of-Hours Service
There is 24 hour year round availability of microbiology clinical advice. A Consultant Microbiologist can be contacted via switchboard (01423 885959) for both external and internal users.

Urgent specimens: should be discussed with the on-call Biomedical Scientist (BMS) if urgent processing is required. In the case of blood cultures, these should be delivered to the Blood Sciences Specimen Reception, Fewston Wing.

The on-call BMS may be contacted via the hospital switchboard (01423 885959) up until 9pm weekdays and weekends. Urgent work is usually restricted to the following samples:

- CSF
- Joint fluid
- Other fluids from normally sterile sites
- Deep tissue abscess
- Paediatric urine microscopy on children <3 months.

From 21:00 until 09:00 there is no on-site BMS. During this time specific requests (e.g. for sterile fluids and CSF) can be made on ICE for sending to LGI overnight for testing.

Rectal swabs for CPE testing are not processed out of hours. CPE requests can be processed until 16.30 Monday - Friday and 11.00 Saturday, Sunday and bank holidays.

Faeces for *C. difficile* testing are not tested during out of hours. Ward *C. difficile* requests can be processed until 17.30 Monday-Friday and 11.00 Saturday, Sunday and bank holidays.

All other requests will only be considered after a discussion with the on-call Consultant Microbiologist.

Specimen requests
Clinicians should try to ensure that laboratory tests are only requested when a result is likely to make a difference to the management of a patient. Unnecessary tests can waste much laboratory, nursing and portering time and can lead to unnecessary antibiotic treatment if results are not assessed critically.

To obtain maximum diagnostic value from the specimen submitted, it is essential to provide adequate information about the patient, the clinical findings and current or proposed antibiotic treatment. Incomplete data may result in significant delays and/ or inappropriate processing. When received in the laboratory, each specimen is judged on its merits and examined according to the information supplied.

Factors affecting test performance

1. Wrong container/swab used
2. Wrong sample type for investigation required
3. Delay in transportation resulting in incorrect storage – see 'transportation of specimens'.
4. Volume of specimen - see table starting on page 69
5. Timing of specimen
    a. prior administration of antimicrobials (if possible send specimens before commencing antimicrobial therapy)
    b. antibiotic assays (see link in 'antibiotic assays' section)
6. Poor quality specimens e.g. blood cultures contaminated with skin flora due to inadequate skin disinfection, submission of saliva rather than sputum.

Specimen Type
When there is doubt about which tests to request, which specimens to take and which containers to use, please contact the laboratory. In difficult or unusual cases the Microbiologists would be pleased to advise on differential diagnosis, further investigations and antibiotic therapy.

Transportation of specimens
All specimens must be received in appropriate containers, sealed in a plastic bag with the request form in a separate compartment. Rapid transportation of microbiology specimens to the laboratory usually results in greater likelihood

of recovering pathogens. In normal working hours, this is achieved by prompt transportation to the laboratory by the van collection (for those off the hospital site), or by the PTS or portering staff (for those on the hospital site).

NB: Do not use the PTS for blood cultures or CSF specimens.

If transport delay to the laboratory is expected, refrigeration is preferable to storage at ambient temperature.

Sample retention times
The following sample retention times are given to indicate the time limits for requesting additional examinations on specimens.

Sample	Retention time
Cerebrospinal fluid	3 months
Tissues and biopsies	3 months
Joint fluid	3 months
Mycology samples	1 month
Other microbiology samples	1 week
Culture plates	1 week
Covid samples	1 day
Serology samples	See serology section

Specimens not processed by the Microbiology Laboratory
The laboratory does not perform the microbiological examination of foods, milk or water, other than *Pseudomonas* testing of hospital water outlets in augmented care units. It does not process environmental samples without discussion with a Consultant Microbiologist in advance.

The laboratory does not perform the forensic examination of any specimens.

Antibiotic susceptibility tests
Antibiotic susceptibility tests are performed routinely when organisms of possible clinical significance are isolated. The range of antimicrobials tested and reported is limited to those likely to be of clinical value and, for hospital practice, those normally stocked in Pharmacy. The request form should state which antibiotic the patient is receiving (or intended); the susceptibility to that agent will usually be included in the report. If clinicians wish to know the susceptibility to new or unusual agents please request this on the form and we will usually be able to help. Such tests may be performed in selected cases by special request to the Consultant Microbiologist.

Antibiotic assays: Teicoplanin, vancomycin and gentamicin
3 -10 mL of clotted blood is required. Teicoplanin levels are sent away for testing and vancomycin and gentamicin levels are processed by Blood

Sciences. Detailed prescribing guidelines, timing of assays and reference ranges for aminoglycosides and glycopeptides are available on MicroGuide™.

Request for examination of specimens from nursing and residential homes in the community

Specimens are **only accepted under the authority of a doctor,** whose name must be stated on the form. This will usually be the patient's GP, occasionally a designated Medical Officer or, in community-based outbreaks, sometimes the Consultant for Communicable Disease Control or the Chief Environmental Health Officer acting on his behalf. Reports on the specimen will be returned to that doctor. Request forms **must show full details** of the patient, age, location, date, clinical information including indication for test, specimen type, test required and details of any current antibiotic treatment.

Request for investigation of specimens for *Mycobacterium* spp.

Specimens should be collected before the start of antimicrobial therapy where possible.

For sputum specimens the material required is expectorated from the lower respiratory tract by deep coughing. Physiotherapy may be required for some patients. For sputum samples ideally a minimum of 5.0 mL is required.

Saliva and postnasal secretions are not suitable.

Bronchoalveolar Lavage (BAL), pleural fluids and associated specimens need specialist collection according to local clinical protocols.

Urine samples should be early morning specimens (EMU) and should be taken on 3 consecutive days into a plain bottle. Boric acid bottles are not acceptable.

For other specimens a 30 mL sterile universal container should be filled to the 30 mL line.

Specimens should be transported and processed as soon as possible.

If processing delay is unavoidable, refrigeration is preferable to storage at ambient temperature. Delays over 48 hours are not acceptable.

SEROLOGY/VIROLOGY

Most requests require a single 3 – 10 mL sample of clotted blood. Detection of a ≥4 fold rise or fall in titre of specific antibody indicates current or recent infection. Detection of specific IgM antibody in the serum is also indicative of acute infection in many conditions.

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The containers, turnaround times, specimen retention times and laboratories where serological tests are performed are shown in the table starting on page 78.

Human immunodeficiency virus (HIV) serology
A 3-10mL sample of clotted blood is required. The laboratory uses a HIV Ag/Ab combination assay for simultaneous qualitative detection of antibodies to HIV type 1 and/or type 2, and HIV p24 antigen. Blood should be sent for diagnostic HIV tests only after the patient has undergone counselling for the test. The reference laboratory at LGI will perform any further confirmatory testing for HIV as appropriate e.g. HIV viral load.

Sexual Health Clinic
They specifically wish to have their samples sent to Micropathology for HCV viral loads and genotyping, HIV viral loads and resistance markers.

Ante-natal serology
A 5-10 mL of clotted blood is typically required to allow for confirmatory testing and other diagnostic tests where necessary. HIV, syphilis antibodies and hepatitis B surface antigen should be requested, with appropriate pre-test counselling. Positive results for HIV, syphilis or hepatitis B and negative results will be communicated to the antenatal screening coordinator by the laboratory.

Turnaround times are in accordance with standards set by the UK National Screening Committee. Initial screening tests are performed in Harrogate. Positive results require confirmatory testing by the reference laboratory. The time for reporting screen positive specimens may be up to 8 working days to take into account of the time taken to transport the specimen and receive the referral laboratory report.

Blood for polymerase chain reaction (PCR) testing
The majority of PCR tests require 2- 4mL in EDTA-containing tubes. PCR has been developed to an increasing range of viruses to detect and measure the amount of viral nucleic acid in clinical specimens. Quantitative versions of these tests are called viral loads and may be used to assess a person's infection status and to monitor treatment. The commonly requested PCR tests are given in the table starting on page 78.

Swabs and vesicle fluid for virology
Vesicle fluid from rashes may be sent for viral PCR after discussion with the laboratory. On safety grounds, syringes and needles are no longer acceptable for submission to the laboratory. A viral swab should be used to collect fluid and material from the base of a lesion and submitted promptly in viral transport medium. Viral transport media is available from Stores during routine working hours.

Faeces for virology
A walnut-sized sample should be sent in a faeces pot with spoon as soon as possible in the course of the illness; no transport medium is required. Please provide details of the illness and date and time of onset on the request form. Children under 5 years are routinely screened for rotavirus and adenovirus. Testing for norovirus is only performed during outbreaks.

INFECTION PREVENTION & CONTROL

IPC contact details and policies are available on the intranet via the following link:

https://nww.hdft.nhs.uk/long-term-and-unscheduled-care/infection-prevention-control-tb-service/

Out-of-hours IPC advice is provided by the Consultant Microbiologist on-call.

Inoculation ('needlestick') and other sharp injuries
The procedure for urgent assessment and management of inoculation ('needlestick' and other body fluid) exposures is set out in *Hospital Control of Infection Policy 4: Blood-Borne Virus and Inoculation Incident Policy*, available on the intranet at:
http://iokodetect2004/C2/Infection Prevention & Control/Infection Prevention & Control clinical policies/Section 004.doc

A l0 mL sample of blood should always be sought from the recipient (according to the indications in the policy) and may be tested in the laboratory as a matter of urgency (such as for anti-HBs levels) and/or stored for a period of at least two years for reference purposes. In situations where the patient concerned is identifiable, he/she should be asked to provide a sample of blood (with appropriate pre-test counselling) to be tested for hepatitis B, C and HIV for the benefit of the recipient of the exposure.

Notification of infectious diseases
Forms for the notification of infectious diseases are available at https://www.gov.uk/government/publications/notifiable-diseases-form-for-registered-medical-practitioners
A list of notifiable diseases is shown in *Hospital Control of Infection Policy 2: Isolation of Patients Policy Principles and Notification of Infectious Diseases*.

It is the duty of the clinical doctor first diagnosing the case to notify the Health Protection Team (HPT) on 0113 386 0300. The written forms are always required but in urgent/serious cases, particularly where an outbreak is suspected or prophylactic drugs or vaccines are indicated for the protection of contacts (i.e. diseases such as dysentery, food poisoning, typhoid fever,

meningitis) a phone call should also be made to the CCDC so that he/she can begin investigations without delay.

Out-of-hours cover for HPT is available by the telephoning 0151 9091219.

Reference Laboratories

Please request information from the Pathology laboratory regarding referral laboratories.

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Table 1 Specimens for Bacteriology, Parasitology or Mycology Investigations

Specimen Type	Sample collection	Service location Turnaround time – All TAT are approximate unless more complex work is required on a sample or isolate
Blood culture	**Standard blood culture set:** 1 x BD BACTEC PLUS Aerobic /F culture vial (blue/grey lid) 1 x BD BACTEC Lytic/10 Anaerobic /F culture vial (purple lid) Each bottle requires 8.0 -10.0 mL blood Blood culture bottles themselves - containing blood taken from PICC line, peripheral line, central venous line etc. - must be clearly labelled as such, not just the request forms. **Or for children**, **Paediatric bottle:** 1 BD BACTEC PEDS PLUS/F culture vial (pink lid) Requires 1.0 -3.0 mL blood NB: Do not use Vacuum Transport System for Blood Cultures Protocols for the aseptic collection of blood cultures on the intranet at: http://iokodetect2004/C5/Infection%20Control/default.aspx Training videos at: http://iokodetect2004/C5/Infection%20Control/default.aspx	In-house test Blood cultures are delivered to the laboratory by the hospital porters. Out of hours the porters are instructed to place the bottles in a dedicated, labelled incubator located at the entrance to the Pathology Department Negative reports issued after 5 days. However when infective endocarditis is suspected, bottles are incubated for 10 days The Consultant Microbiologist will contact clinical staff with positive results. Significant isolates from blood cultures are stored indefinitely at -80^{o}C
Bile	Container: 30 mL white top universal Routine examination is culture for bacteria only. By specific request: screening for *Salmonella* carriage/infection may be performed	In-house test TAT 3 days

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Specimen Type	Sample collection	Service location Turnaround time – All TAT are approximate unless more complex work is required on a sample or isolate
Broncho-alveolar lavage fluid	Container: 30 mL white top universal Routine examination is culture for bacteria only	In-house test TAT 3 days
Broncho-alveolar lavage fluid (additional tests)	By specific request only: mycobacterial culture, Legionella culture, pneumocystis, viral PCR	LGI* (pneumocystis, virology) NHPA* (mycobacterial culture) TAT up to 8 weeks
Central venous catheter tips	Container: 30 mL white top universal Disinfect skin site and remove catheter using aseptic technique. Cut 4cm length of catheter, including tip, using sterile scissors. Only send catheter tip when infection is suspected (not routinely)	In-house test TAT 3 days
Cerebrospinal Fluid	Container: 3 x 30 mL white top universal & fluoride oxalate tube Collect 4 sequential CSF samples into numbered containers **Specimen 1**: 0.5 mL CSF grey fluoride oxalate tube Specimen 2: 0.5 mL CSF into universal container for protein **Specimen 3: 1.0 mL CSF into sterile universal for Microbiology** Specimen 4: 1.0 mL CSF into universal for spectrophotometry Specimen no 3 is usually sent to microbiology, the rest are for biochemical tests DO NOT send in the pneumatic tube system-send the specimens via a porter and contact both Microbiology and Biochemistry (or on-call BMS if out of hours up until 9pm) before sending the specimen to ensure urgent processing. After 9pm on weekdays and weekends the Microbiology CSF sample should be sent to LGI by taxi using LGI request on ICE and sample transport boxes provided.	In-house tests Telephone call made to alert requester that interim report is available on ICE within 1 hour of receipt TAT 3 days

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Specimen Type	Sample collection	Service location Turnaround time – All TAT are approximate unless more complex work is required on a sample or isolate
Cerebrospinal fluid (cell count , Gram stain and bacterial culture)	Requests for viral PCR, meningococcal and pneumococcal PCR and mycobacterial culture all require discussion with the Consultant Microbiologist	Viral PCR: LGI* TAT 7 days Meningococcal and pneumococcal PCR: MRI* TAT 10 days Mycobacterial culture: NHPA* TAT up to 8 weeks
Chlamydia /GC RNA (endocervical/urethral)	Container: GenProbe APTIMA unisex swab specimen collection kit for endocevical or male urethral specimens (purple box & collection kit labelling)	In-house tests TAT Chlamydia 7days GC 10 Days
Chlamydia/GC RNA (vaginal)	Container: GenProbe APTIMA vaginal swab specimen collection kit for self-taken or clinician collected specimens (orange box & collection kit labelling)	In-house tests TAT Chlamydia 7days GC 10 Days
Chlamydia/GC RNA (urine)	Container: GenProbe APTIMA urine specimen collection kit (yellow box & collection kit labelling)	In-house tests TAT Chlamydia 7days GC 10 Days
Chlamydia/GC RNA (other sites)	Container: GenProbe APTIMA collection kit using unisex or vaginal swab Eye swabs, pharyngeal and rectal swabs are also accepted for chlamydia testing although please note that this technique **has not been validated** for these specimens and the requesting clinician carries responsibility for acting on the results Note: eye swabs should **NOT** be taken following the use of fluoroscein as this may be inhibitory.	In-house tests TAT Chlamydia 7days GC 10 Days

PATHOLOGY SERVICE – GENERAL PATHOLOGY

Specimen Type	Sample collection	Service location Turnaround time – All TAT are approximate unless more complex work is required on a sample or isolate
Corneal Scrape	Packs consisting of 4 agar plates and a glass slide are stored in the Biochemistry fridge in the designated drawer for use by the eye clinic. Only clinicians trained in the taking and plating of corneal scrapes should perform this test.	In-house test TAT 3 days
Covid Samples for molecular Detection of SARS-CoV-2	Nose/throat swabs to be collected in viral transport media	In house test Within 24 hours
CPE testing	See rectal swab below	
Faecal calprotectin	Container: 30 mL blue top universal with integral spoon (use 2-3 scoops) For patient information regarding stool collection methods see Appendix 1	In-house tests TAT 4 days
Faeces	Container: 30 mL blue top universal with integral spoon (use 2-3 scoops) For patient information regarding stool collection methods see Appendix 1 Please provide information regarding any recent foreign travel. Ova, cysts and parasites investigation by specific request only. Where food poisoning is suspected, please indicate the probable food source.	In-house tests TAT 4 days
Faeces for Clostridioides difficile	*Clostridioides difficile* toxin test is performed on all inpatients ≥2y with loose stools, (or clinical details stating type 5,6 or 7 stool) for all outpatients/GP/ED/OccHealth patients ≥65y with diarrhoea samples (unless specifically requested on patients 2-65y) Only diarrhoeal specimens, which take the shape of the specimen container, are tested. A minimum of 1.5 mL of sample is required.	In-house tests Same day testing when specimen received before 15.00hrs weekdays and 11am weekends

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Specimen Type	Sample collection	Service location Turnaround time – All TAT are approximate unless more complex work is required on a sample or isolate
Faeces for Helicobacter pylori	Container: sterile universal or 30 mL blue top universal with integral spoon (1 scoop is sufficient) ICE requesting via microbiology, faeces	See serology table below for interfering substances and TAT
Fluid from normally Sterile sites	Container: 30 mL white top universal Contact the laboratory on ext 5645 (or on-call BMS via switchboard if out-of-hours up until 9pm) before sending the specimen to ensure urgent processing. After 9pm on weekdays and weekends the samples should be sent to LGI by taxi using LGI request on ICE and sample transport boxes provided.	In-house tests Interim microscopy report (urgent, out-of-hours Gram stain, cells and crystals if appropriate) issued within 2 hrs and the report is available on ICE TAT 4 days Mycobacterial culture: NHPA* TAT up to 8 weeks

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Specimen Type	Sample collection	Service location Turnaround time – All TAT are approximate unless more complex work is required on a sample or isolate
Fungal cultures	Container: Dermapak or 30 mL white top universal For hair, skin scrapings, nail clippings: Numbers and frequency of specimen collection are dependent on clinical condition of patient. The minimum amount that is acceptable should be enough to cover a five pence piece. Use aseptic technique: **Skin -** swab with 70% alcohol prior to collection. Edges of skin lesions yield greatest quantities of viable fungus. Scrap with a blunt scalpel blade. If insufficient material can be obtained by scarping- press a swab or sticky tape onto lesion, transfer to a clean glass slide for transportation **Nail – sample** discoloured, dystrophic or brittle parts of the nail. The affected nail should be cut as far back as possible through the entire thickness and should include any crumbly material. If associated skin lesions are present samples from these are likely to be infected with the same organism and are more likely to give a positive culture. Sample from associated sites should be sent in separate packets. **Hair -**Samples from the scalp should include skin scales and hair stumps. Cut hairs are not suitable for direct examination. Plastic hairbrushes, scalp massage pads, swabs or plastic toothbrushes may be used to sample scalps for culture where there is little obvious scaling. Any sharps used during the collection of these samples must be disposed of safely.	In-house tests Interim microscopy at 72 hrs TAT 3 weeks

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Specimen Type	Sample collection	Service location Turnaround time – All TAT are approximate unless more complex work is required on a sample or isolate
Genital swabs	Container: Amies transport medium with charcoal (Transwabs) Take cervical and high vaginal swabs with the aid of a speculum to avoid vulval contamination. For trichomonas swab the posterior fornix. If pelvic infection or gonorrhoea is suspected include the cervical os.	In-house tests TAT 3 days
MRSA screening swabs	Container: Amies transport medium with charcoal (Transwabs) Routine screening of elective and emergency admissions are performed by culture method using chromogenic agar. Guidance on MRSA screening is in the Hospital Infection Prevention & Control Policy 12: MRSA (Table 1 and flowchart in section 12.4) available on the intranet at: http://nww.hdft.nhs.uk/long-term-and-unscheduled-care/infection-prevention-control-tb-service/hospital-and-hdft-community-staff-resources/ipc-policies-on-a-page/	In-house tests TAT 3 days
Pernasal swab for diagnosis of pertussis (whooping cough)	Container: pernasal swab (note: thin wire shaft) Pernasal swabs for pertussis culture and full instructions for their use are available from the microbiology department. The swabs have a thin flexible wire shaft. SWABS WITH A RIGID SHAFT ARE UNSUITABLE AND WILL NOT BE PROCESSED. After sampling, swabs should be transported to the laboratory in CHARCOAL TRANSPORT MEDIUM (this is the black medium supplied with 'standard' microbiology swabs).	Culture: In-house tests TAT 7 days Serology/PCR (see table 2)

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Specimen Type	Sample collection	Service location Turnaround time – All TAT are approximate unless more complex work is required on a sample or isolate
Rectal swab for CPE testing	Samples should be collected using a 'Copan' dual swab (supplied with instructions to all wards)	In-house test - within one hour of receipt into laboratory during normal working hours. Same day testing when specimen received before 16.30 hrs weekdays and 11.00 am weekends
Respiratory specimens: sputum, ear, mouth, nose, and throat swabs	Container for swabs: Amies transport medium with charcoal (Transwabs) Container for sputum: 60mL wide topped universal container	In-house tests TAT 3 days Mycobacterial culture: NHPA* TAT up to 8 weeks
Respiratory samples for molecular detection of SARS-CoV-2 or respiratory viruses	Viral transport media for nose/throat swabs	TAT within 24 hours
Schistosomiasis (Bilharzia)	Container: 3x 250mL universal Collect the total volume of urine produced between 1000-1400 hours	In-house tests TAT 3 days
Threadworm (*Enterobius vermicularis*)	A perianal swab is used in preference to a sellotape slide. Both samples should be taken in the morning before washing the perianal area. Faeces are not an appropriate specimen. Use cotton wool swab in dry container. Spread buttocks apart, rub moistened cotton wool swab over area around anus. Place swab back in container (no transport medium required). OR Apply Sellotape to perianal region, pressing adhesive side of tape firmly against left and right perianal folds several times. Smooth the tape back on a slide, adhesive side down.	In-house tests TAT 2 days

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Specimen Type	Sample collection	Service location Turnaround time – All TAT are approximate unless more complex work is required on a sample or isolate
Tissue/ biopsies	Container: 30 mL white top universal A small amount of sterile normal saline may be added to prevent desiccation. Contact the laboratory (or on-call BMS if out-of hours) before sending the specimen to ensure urgent processing	In-house tests TAT up to 25 days –due to extended incubation times for potentially slow growing organisms
Urine cell count and culture	Container: boric acid universal (30 mL red top) Standard procedures for midstream urine collection are used For dipstick testing, please decant a small amount of urine into a second container to prevent contamination of the sample. Fill container to the line as indicated on the label. If <1mL urine is collected, a 30mL white top universal container (without boric acid) should be used. CSU from indwelling catheters is obtained from the sample port in the catheter tubing and NOT from the bag	In-house tests If white cell count <80/uL and no bacteriuria detected, final report released within 90 minutes If white cell count >80/uL and/or bacteriuria is detected TAT 72-96 hrs
Urinary legionella and pneumococcal antigen detection	Container: 30 mL white top universal ICE requesting via microbiology, urine	In-house tests TAT 2 days
Wound/ abscess/pus	Container: 30 mL white top universal or Amies transport medium with charcoal (Transwabs) Samples of pus are preferred to swabs Please indicate whether actinomycosis or other slow growing pathogens are suspected to ensure that the culture receives prolonged incubation	In-house tests TAT 3 days (TAT 10 days for actinomycosis)

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Table 2 Specimens for Serology/Virology

Test required	Container 1 x	Maximum turnaround time (days)	Specimen retention time	Investigation performed at	Factors significantly affecting performance or result interpretation
Adenovirus PCR	Purple	5	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
Amoebic antibodies	Gold	14	N/A	HTD*	Advice provided by reference laboratory on final report where applicable
Antistreptolysin O titre (ASOT)	Gold `	5	4 wks	Severn Pathology, Bristol	Advice provided by reference laboratory on final report where applicable ASOT: >200 IU/mL may be indicative of streptococcal infection
Aspergillus PCR	Purple	5	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
Aspergillus antibodies	Gold	10	N/A	LGI*	Advice provided by reference laboratory on final report where applicable Reference range quoted: >39.9 mg/L is likely to indicate aspergillosis. In CF patients >89.9 mg/L is likely to be significant
Avian antibodies	Gold	10	N/A	LGI*	Advice provided by reference laboratory on final report where applicable >9.9 mg/L likely to indicate significant reaction to bird antigens
Beta –D-Glucan	Gold	14	N/A	Mycology, LGI	Advice provided by reference laboratory on final report where applicable >80 pg/mL is considered positive
Bordetella pertussis antibodies	Gold	14	N/A	Severn Pathology, Bristol	Advice provided by reference laboratory on final report where applicable

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Test required	Container 1 x	Maximum turnaround time (days)	Specimen retention time	Investigation performed at	Factors significantly affecting performance or result interpretation
Bordetella pertussis PCR	Pernasal swab / NPA	4	N/A	COL*	Advice provided by reference laboratory on final report where applicable
Borrelia antibodies	Gold	5	4 wks	In-house	This assay has not been established with heat-inactivated, haemolysed, lipaemic or icteric samples.
Borrelia antibodies confirmation	Gold	21	N/A	Porton Down, PHE*	Advice provided by reference laboratory on final report where applicable
Brucella antibodies	Gold	14	N/A	BRU*	Advice provided by reference laboratory on final report where applicable
Campylobacter antibodies	Gold	10	N/A	RPH*	Advice provided by reference laboratory on final report where applicable
Candida antigen	Gold	10	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
Chlamydia antibodies	Gold	7	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
Cytomegalovirus (CMV) PCR	Purple	5	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
CMV antibodies	Gold	5 – 10*	4 wks	IgM / IgG LGI*	This assay has not been established with heat-inactivated haemolysed, lipaemic or icteric, post-mortem, neonatal samples or cord blood.
Cryptococcus antigen	Gold	10	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
Cysticerosis	See Taenia antibodies				Advice provided by reference laboratory on final report where applicable
Dengue virus serology	Gold	14	N/A	Porton Down PHE*	Advice provided by reference laboratory on final report where applicable
Diphtheria antibodies	Gold	14	N/A	COL*	Advice provided by reference laboratory on final report where applicable

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Test required	Container 1 x	Maximum turnaround time (days)	Specimen retention time	Investigation performed at	Factors significantly affecting performance or result interpretation
Echinococcus antibodies	Gold	14	N/A	HTD*	Advice provided by reference laboratory on final report where applicable
E. coli O157 antibodies	Gold	14	N/A	COL*	Advice provided by reference laboratory on final report where applicable
Epstein Barr Virus (EBV) PCR	Purple	5	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
EBV antibodies	Gold	5 – 10*	N/A	IgM / IgG LGI*	This assay has not been established with heat-inactivated haemolysed, lipaemic or icteric or samples from immunocompromised or immunosuppressed patients.
Farmers lung antibodies	Gold	10	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
Filarial antibodies	Gold	14	N/A	STM*	Advice provided by reference laboratory on final report where applicable
Haemophilus antibodies	Gold	14	N/A	Immunology, LGI	Advice provided by reference laboratory on final report where applicable Inadequate: <0.1 ug/mL Sub optimal: 0.1 – 1.0 ug/mL Adequate: >1 ug/mL
Helicobacter pylori antigen (faeces)	Universal	5	1 wk	In-house	Antimicrobials, PPI and bismuth preparations are known to suppress *H. pylori*.

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Test required	Container 1 x	Maximum turnaround time (days)	Specimen retention time	Investigation performed at	Factors significantly affecting performance or result interpretation
Hepatitis A antibodies (IgM)	Gold	5	6 mths	In-house	This assay has not been established with cord blood, neonatal, cadaver or heat-inactivated samples or body fluids other that serum or plasma. Samples that are haemolysed, lipaemic, icteric or proteinaemic from patient that are immunosuppressed or immunocompromised may affect result.
Hepatitis A antibodies (total - immune status)	Gold	5	4wks	In-house	This assay has not been established with heat-inactivated haemolysed or lipaemic samples.
Hepatitis B core antibodies	Gold	10	N/A	In-house Confirmation at LGI*	Advice provided by reference laboratory on final report where applicable
Hepatitis B markers	Gold	10	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
Hepatitis B PCR	Purple	5	N/A	LGI*	Advice provided by reference laboratory on final report where applicable

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Test required	Container 1 x	Maximum turnaround time (days)	Specimen retention time	Investigation performed at	Factors significantly affecting performance or result interpretation
Hepatitis B surface antibodies (anti-HBs - immune status)	Gold	5	4 wks	In-house	This assay has not been established with cord blood, neonatal, cadaver or heat-inactivated samples or body fluids other that serum or plasma. Samples that are haemolysed, lipaemic, icteric or proteinaemic, biotin spiked or hyper IgG from patient that are immunosuppressed or immunocompromised may affect result. For interpretation of Anti-HBs levels in certain patient groups, please refer to Hepatitis B; the green book (2022).
Hepatitis B surface antigen	Gold	5	6 mths 2yrs antenatal	In-house Confirmation at LGI	This assay has not been established with cord blood, neonatal, cadaver or heat-inactivated samples or body fluids other that serum or plasma. Samples that are haemolysed, lipaemic, icteric or proteinaemic, biotin spiked, hyper IgG or high in cholesterol from patient that are immunosuppressed or immunocompromised may affect result.
Hepatitis C antibodies	Gold	5	6 mths 2yrs antenatal	In-house	This assay has not been established with cord blood, neonatal, cadaver or heat-inactivated samples or body fluids other that serum or plasma. Samples that are haemolysed, lipaemic, icteric or proteinaemic or from patient that are immunosuppressed or immunocompromised may affect result.
Hepatitis C antibodies (confirmation)	Gold	10	N/A	LGI*	Advice provided by reference laboratory on final report where applicable

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Test required	Container 1 x	Maximum turnaround time (days)	Specimen retention time	Investigation performed at	Factors significantly affecting performance or result interpretation
Hepatitis C PCR	Purple	5	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
Hepatitis E antibodies	Gold	10	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
Herpes simplex virus (HSV) antibodies	Gold	10	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
HSV PCR	CSF/ vesicle fluid	5	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
HIV antibody/antigen	Gold	5	6 mths 2yr antenatal	In-house	This assay has not been established with cord blood, neonatal, cadaver or heat-inactivated samples or body fluids other that serum or plasma. Samples that are haemolysed, lipaemic, icteric or proteinaemic, hyper IgG, cholesterol, hyperproteinaemic, biotin spiked or from patient that are immunosuppressed or immunocompromised may affect result. This assay has not been established for infants or children.
HIV genotype/viral load	Purple	5	N/A	Micropathology	Advice provided by reference laboratory on final report where applicable
HIV confirmation	Gold	10	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
HTLV I/II	Gold	10	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
Hydatid cyst	See Echinococcus antibodies				Advice provided by reference laboratory on final report where applicable

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Test required	Container 1 x	Maximum turnaround time (days)	Specimen retention time	Investigation performed at	Factors significantly affecting performance or result interpretation
Legionella antigen	Urine (boric acid or white topped universal)	2	1 wk	In-house	This assay has not been established in out-patients
Leishmania antibodies	Gold	14	N/A	STM*	Advice provided by reference laboratory on final report where applicable
Leptospira antibodies	Gold	10	N/A	CI*	Advice provided by reference laboratory on final report where applicable
Lyme disease	See Borrelia antibodies				
Measles antibodies	Gold	5 – 10	4 wks	In house – IgG LGI - IgM	This assay has not been established with plasma, heat-inactivated, haemolysed, lipaemic or icteric samples.
Meningococcal antibodies	Gold	14	N/A	MRI*	Advice provided by reference laboratory on final report where applicable
Meningococcal PCR	Purple	7	N/A	MRI	Advice provided by reference laboratory on final report where applicable
Mumps antibodies	Gold	10	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
Needle stick injury	Gold	3	2 yrs	In-house	See specific sections on HIV antigen/antibody, Hep C antibodies, Hep B surface antigen
Parvovirus antibodies	Gold	10	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
Pertussis	See *Bordetella pertussis*				
Polio antibodies	Gold	14	N/A	COL*	Advice provided by reference laboratory on final report where applicable

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Test required	Container 1 x	Maximum turnaround time (days)	Specimen retention time	Investigation performed at	Factors significantly affecting performance or result interpretation
Pneumococcal antibodies	Gold	14	N/A	Immunology, LGI	Advice provided by reference laboratory on final report where applicable Inadequate: <10 ug/mL Sub optimal: 10-30 ug/mL Adequate: >30 ug/mL
Pneumococcal antigen	Urine (boric acid or white topped universal)	2	1 wk	In-house	This assay has not been established in young children. This assay has not be established for patients who have taken antibiotics for > 24 hours. Patients who have received pneumococcal vaccine within the last five day may have false positive result.
QuantiFERON-TB	Quantiferon Sampling Instruction	10	N/A	NPHE*	Advice provided by reference laboratory on final report where applicable
Rabies antibodies	Gold	14	N/A	VLA*	Advice provided by reference laboratory on final report where applicable
In patients : In house Respiratory PCR screen in house during flu season to include RSV, Influenzae A & B, Parainflunzae, Mycoplasma pneumoniae, Coronavirus including SARS & MERS, Bocavirus, Rhinovirus, Enterovirus,	Nose / Throat swab in viral transport with red or pink top	1	1 day	In house	Testing performed between 08:00 and 21:00 - 7 days a week

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Test required	Container 1 x	Maximum turnaround time (days)	Specimen retention time	Investigation performed at	Factors significantly affecting performance or result interpretation
Out patients/A&E/GP patients Respiratory Screen by PCR to include seasonal influenza A & B, RSV, Adenovirus, Metapneumovirus, Parainfluenza (types 1-4), Rhinovirus and Mycoplasma pneumoniae	Throat swab in viral transport with red or pink top	5	N/A	LGI	Advice provided by reference laboratory on final report where applicable
Rickettsia antibodies	Gold	14	N/A	PPHE*	Advice provided by reference laboratory on final report where applicable
Rubella IgG	Gold	5	2yr	In-house	This assay has not been established with cord blood, neonatal, cadaver or heat-inactivated samples or body fluids other that serum or plasma. Samples that are haemolysed, lipaemic, icteric or hyperproteinaemic or from patient that are immunosuppressed or immunocompromised may affect result.
Rubella IgM	Gold	10	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
RSV antigen	NPA	2	1 wk	In house	This assay is not established for effects of antimicrobials and interferons.
Schistosoma antibodies	Gold	14	N/A	HTD*	Advice provided by reference laboratory on final report where applicable

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Test required	Container 1 x	Maximum turnaround time (days)	Specimen retention time	Investigation performed at	Factors significantly affecting performance or result interpretation
Strongyloides antibodies	Gold	14	N/A	HTD*	Advice provided by reference laboratory on final report where applicable
Syphilis antibodies	Gold	5	6 mths 2yrs antenatal	In-house	This assay has not been established with cord blood, neonatal, cadaver or heat-inactivated samples or body fluids other that serum or plasma. Samples that are haemolysed, lipaemic, icteric or proteinaemic, hyper IgG, cholesterol, hyperproteinaemic, biotin spiked or from patient that are immunosuppressed or immunocompromised may affect result.
Syphilis confirmation	Gold	10	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
T Spot	Quantiferon Sampling Instruction	5 days	N/A	Oxford Diagnostic Laboratories	Advice provided by reference laboratory on final report where applicable
Taenia antibodies	Gold	14	N/A	HTD*	Advice provided by reference laboratory on final report where applicable
Tetanus antibodies	Gold	14	N/A	SJH*	Advice provided by reference laboratory on final report where applicable Inadequate: <0.01 IU/mL Sub optimal: 0.01 – 0.15 IU//mL Adequate: >0.15 IU/mL
Toxocara antibodies	Gold	14	N/A	HTD*	Advice provided by reference laboratory on final report where applicable

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Test required	Container 1 x	Maximum turnaround time (days)	Specimen retention time	Investigation performed at	Factors significantly affecting performance or result interpretation
Toxoplasma antibodies	Gold	5	4 wks	In-house	This assay has not been established with haemolysed, lipaemic or icteric, neonatal samples or cord blood.
Toxoplasma confirmation	Gold	10	N/A	SHS*	Advice provided by reference laboratory on final report where applicable
Toxoplasma PCR	Purple	7	N/A	SHS*	Advice provided by reference laboratory on final report where applicable
Varicella zoster virus (VZV) PCR	Purple	5	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
VZV IgG	Gold	3	4 wks	In house	This assay has not been established with heat-activated, haemolysed, lipaemic or icteric samples.
VZV IgM	Gold	10	N/A	LGI*	Advice provided by reference laboratory on final report where applicable
Weil's disease	See Leptospira antibodies				
Whipples PCR	Purple	5	N/A	LGI	Advice provided by reference laboratory on final report where applicable
Whooping cough	see *Bordetella pertussis*				

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Critical Alert Organisms and Infections

This section deals with the verbal communication of critical alerts initiated by the laboratory. Routine reporting to test requesters is by electronic or paper copy reporting, however, there are some results which require urgent communication – see table below. The list is not all inclusive and unusual or rare isolates or identifications can always be discussed with the Duty Consultant. In addition, the service user is directed to the interim report available on ICE for CSF, urgent joint fluid and urgent paediatric urine microscopy results.

Responsibility of staff reporting to the General Practitioners: Laboratory staff telephone GP surgeries with results for all the appropriate isolates/conditions listed in the table below. It is expected that in most cases the GP receptionist will be happy to take the results and pass them to the GP. Duty Consultants telephoning results will normally speak to the GP him/herself.

Responsibility of staff reporting to the Hospital Infection Prevention and Control Nurses: Laboratory staff telephone, message on answer phone or bleep (ext/bleep 3112) the HIPCN as soon as the isolate identification is made for all the appropriate organisms/conditions in the table below **unless** the Duty Consultant has advised them this is not required.

Responsibility of staff reporting to the Community Infection Prevention and Control Nurses: Laboratory staff should telephone the CIPCN 'hotline' for *C. difficile* cases in the community **unless** the Duty Consultant has advised them this is not required.

Telephone enquiries for results from patients and relatives: Results must not be given to patients or their relatives, or any other person not directly concerned with the care of the patient. This includes staff members at HDFT.

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Organism/infection	**GP if not in hospital**	**HIPCN if in hospital**	**CIPCN if not in hospital**
Organisms			
Bacillus anthracis	By CM	By CM	
Bacillus cereus	By BMS	By BMS	
Bordetella sp	By CM[j]	By CM[j]	
Brucella sp	By CM	By CM	
Campylobacter sp		By BMS	
Carbapenemase Resistant Organism (CRO)	By CM	By CM	By CM
Chlamydia trachomatis[a]	By CM		
Clostridium botulinum	By CM	By CM	
Clostridioides difficile[b]		By CM	By BMS
Clostridium perfringens[c]			
Clostridium tetani	By CM	By CM	
Corynebacterium diphtheriae or *ulcerans*	By CM	By CM	
Cryptosporidium		By BMS	
Entamoeba histolytica	By CM	By CM	
E. coli O157 (inc. presumptive)	By CM	By CM	CR
Giardia		By BMS	
Haemophilus influenzae type b[d]	By CM	By CM	
Hepatitis A (acute)		By BMS	
Hepatitis B or C	By CM	By CM	
HIV	By CM	By CM	
Influenza A&B, RSV, Parainfluenzae, SARS, MERS	By CM	By CM	
Legionella sp (inc. urinary antigen)	By CM	By CM	
Listeria sp	By CM	By CM	
Mycobacterium/AAFB	By CM	By CM	CR
Neisseria gonorrhoeae[a]	By CM		
Neisseria meningitidis	By CM	By CM	

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Pneumococcal antigen (urinary)			
Rotavirus		By BMS	
Salmonella sp		By BMS	
Salmonella typhi/paratyphi	By CM	By CM	
Shigella dysenteriae	By CM	By CM	
Shigella sp		By BMS	
Staphylococcus aureus MRSA (not bacteraemia), inc PCR		By BMS	CR
Streptococcus Gp A[e]	By BMS	By BMS	
Streptococcus Gp B[f]	By BMS		
Taenia solium			
Treponema pallidum	By CM		
Vibrio sp	By CM	By CM	
Yersinia enterocolitica		By BMS	
Yersinia pestis	By CM	By CM	
Varicella zoster IgG (if absent)[g]	By CM		
Other infections			
Meningitis – any organism		By CM	
Bacteraemia (organisms other than organisms above)	By CM	By CM[h]	

Legend

CM	Duty Consultant
BMS	Biomedical Scientist
HIPCN	Hospital Infection Prevention and Control Nurse
CIPCN	Community Infection Prevention and Control Nurse
CR	copy report

a non-urinary and non-genital isolates only

b use CIPCN 'hotline' 01423 557340

c non-gastrointestinal

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d invasive disease only

e not ear/nose/throat isolates

f maternity/SCBU only. BMS also contacts requester if ANC, Community Midwife etc.

g in pregnant or immunocompromised contacts

h if an alert organism e.g. MRSA, multi-resistant Gram-negative bacillus

j positive *Bordetella* sp culture results should be telephoned to the requesting clinical team (excluding GP OOH) by the CM.

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HISTOPATHOLOGY

Location

Histopathology is located on the 1st floor of Fewston Wing. Histopathology Specimen Reception is found on the right just after the 2nd set of double doors after passing the exit to Herriot's Restaurant.

Opening Hours

08:45 to 17:00 hrs, weekdays only**.** Please note that the Histopathology Department is not open at weekends or Public Holidays and it does not provide an on call service**.**

Staff Contact Details

Name	Job Title	Tel. No.	email
Dr C. Gray	Consultant Histopathologist	01423 55**3071**	carl.gray1@nhs.net
Dr C. lo Polito	Consultant Histopathologist	01423 55**3107**	c.lopolito@nhs.net
Dr D Scott	Consultant Histopathologist	01423 55**5664**	daniel.scott1@nhs.net
Dr E Millward	Consultant Histopathologist	01423 55**5635**	esther.millward@nhs.net
Dr E Tjio	Consultant Histopathologist	01423 55**5724**	e.tjio@nhs.net
Dr I Georgiades	Consultant Histopathologist	01423 55**5072**	Izabela.Georgiades@nhs.net
Dr N Maughan	Consultant Histopathologist	01423 55**3074**	n.maughan@nhs.net
Mr Peter Helliwell	Pathology General Manager – IPS Histopathology & Bradford site	01423 55**3074**	Peter.helliwell@nhs.net
Mrs Alison Boyle	IPS Histopathology Cross site Lead		Alison.boyle4@nhs.net
Mrs T Boughton	Secretary	01423 55**4443**	Tracy.boughton@nhs.net
Ms F Molloy	Secretary	01423 55**3072**	fleur.molloy@nhs.net
Mrs C Johnston	Secretary	01423 55**4448**	Caroline.johnston2@nhs.net

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Contacts for Advice and Interpretation

Clinical enquiries	Consultant Histopathologists	As above
MDT enquiries		Hdft.histologymdt@nhs.net
General queries, missing reports etc	Histopathology office	ext. 3072 or hdft.histology@nhs.net
Technical advice, booking frozen sections, fresh tissue arriving	Histopathology Laboratory	ext. 5609

On Call Arrangements

There is no on-call rota for Histopathology. In emergencies, a member of the consultant staff may be contactable via the switchboard.

Communication of Critical and Unexpected Histopathology Results

All Histopathologists are responsible for communicating critical or unexpected results. Biomedical scientists will facilitate the effective, rapid communication of critical unexpected results.

Turnaround Time

Turnaround time depends on a variety of factors. These include the following:

- Size of the sample – larger samples require longer fixation
- Decalcification of samples – bone samples will have a longer turnaround time.
- Time of receipt of the sample in the laboratory – please ensure urgent samples and cytology samples are sent to laboratory as early in the working day as possible.
- Sample referral – If a sample has to be referred to another laboratory for extra tests this will result in a longer turnaround time

In the majority of cases, the turnaround time is likely to be less than that stated below. The times given have been designed to meet the needs of users whilst allowing Histopathology to carry out any extra tests that may be needed for the report. If the turnaround time is likely to exceed those stated below an interim report will be issued.

The targets that the department aims to meet are as follows:

Urgent specimens	90% reported within 7 calender days
	98% reported within 10 calender days
Non-urgent specimens	90% in 14 calender days

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PLEASE NOTE THE TURNAROUND TIME IS FROM RECEIPT OF THE SAMPLE IN THE LABORATORY, NOT THE TIME YOU TAKE IT. IF SAMPLES ARRIVE LATE IN THE DAY AND CANNOT BE PLACED ON OUR OVERNIGHT PROCESSOR THEN IT WILL BE PROCESSED OVER THE FOLLOWING NIGHT INCREASING THE TURNAROUND TIME.

Factors Affecting Test Performance

It is important that all histopathology and non-gynaecological specimens sent to Histopathology arrive no later than **16:45 hrs** to allow adequate time for preparation. Specimens will be accepted up until 1700 hrs but these specimens may be subject to a 24 hour delay in the turnaround time. If you are unable to get the sample to Histopathology by 17:00 hrs please ensure the specimen is retained in the clinical area. Non-gynaecological specimens should be refrigerated; this will help preserve cellular viability. For histopathology specimens ensure that an adequate amount of formalin is present in the container, these do not need to be refrigerated. The specimen should be submitted early the next working day. **Please note that Histopathology does not open bank holidays and weekends.**

Histopathology and cytology are both vulnerable to sampling errors, and to errors of interpretation. If you have doubts about the diagnosis, or if the diagnosis does not seem to fit the clinical picture, always ask for a review of the histology or cytology, and provide all the relevant clinical information. The Consultant Pathologists are always willing to discuss individual cases and to give advice when they can. Contact may be made by phone or via e-mail.

When submitting bone or calcified tissue for analysis please be aware that the decalcification process required for sampling may have an effect on the antigenicity of the tissue in immunohistochemical testing. This could introduce uncertainty in staining, and is considered by the reporting Pathologist.

Measurement of Uncertainty

The majority of diagnostic services provided by Histopathology are not numeric and, therefore, reports cannot be traced back or related to national or international standards of measurement.

Uncertainty in reporting is minimised by:

- Pathologists seeking a second opinion.
- Discussion of results at multidisciplinary team meetings.
- Reference to published descriptions of pathology.
- Internal quality control.
- Participation in relevant external quality assurance (EQA) schemes and / or proficiency testing.

- Equipment / reagents sourced from reputable suppliers, verified before use, serviced and calibrated as required.

Uncertainty may arise from many sources including:

- An inappropriate or inadequate specimen being taken.
- Inadequate fixation.
- Delayed transport to the laboratory.
- Inadequate storage of specimens.
- Inadequate training or supervision of staff.
- Malfunctioning equipment.
- Inadequate internal quality control of staining results.
- Unresolved poor performance in EQA schemes.

The department addresses these issues by:

- Compliance with standard operating procedures.
- Training and competency assessment for staff.
- Resolution of poor performance / non conformities.
- Equipment / reagents sourced from reputable suppliers, serviced and calibrated as required.

Requests for Additional Examinations

Requests for additional examinations must be made as soon as possible, following the laboratory's receipt of the specimen. These requests must be made by telephone or email to the reporting pathologist. Depending on the nature of the specimen, and the request made, be aware that it may not be possible to accommodate your request although every effort will be made to do so, if clinically relevant.

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Routine	Fixation	Routine Turnaround times (If urgent please indicate urgent on form)	Comments, Special precautions, information required	Specimen retention time	Investigation performed at
Urgent histology and cytology for small biopsies on cancer pathway	Histology in 10% formalin Cytology in universal	7 calendar days	Site. Reason for biopsies	Minimum 6 weeks	HDH
Routine biopsies and large resection	10% Formalin	14 calendar days	Site. Reason for resection	Minimum 6 weeks	HDH
Effusions for cytology	Fresh, no fixative. Place in universal container	10 calendar days	Provide clinical details, especially if mesothelioma suspected. Do not submit in receiving set. Send as early in the working day as possible.	Minimum 6 weeks	HDH
Fine Needle Aspiration Cytology	Place in a universal container with cytofluid added	10 calendar days		Minimum 6 weeks	HDH
Urine	Fresh, in universal container	10 calendar days	Do not submit early morning urine, as cells will be degenerate. Submit second voiding of the day. State if obtained after catheterisation.	Minimum 6 weeks	HDH
Immunofluorescence	Michel's medium	4 weeks	Send to the laboratory immediately. These samples are referred to St John's Institute of Dermatology which results in a longer turnaround time	N/Aa	St Johns Institute of Dermatology

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Sample Handling and Transport

The department usually receives tissues fixed in 10% formalin fixative. **See exceptions below**. Other fixatives may cause severe distortion of tissues rendering diagnosis impossible. Samples will not be accepted out of hours. If samples cannot be delivered before 17:00 pm they must be kept in the clinical area and delivered to Histopathology the following morning.

Please refer to the Trust Policy 'TRANSPORT OF HISTOPATHOLOGY SPECIMENS POLICY'

This is available on the intranet using the following link:

Histopathology (hdft.nhs.uk)

Urgent Samples

Urgent samples must be clearly marked **URGENT**. Please only mark those samples requiring an urgent report as urgent. Specimens require overnight processing for optimal technical results. Please telephone laboratory (ex 5609) when sending urgent samples to ensure same day processing. Please indicate 2-week wait pathway.

Fresh Tissue

If the specimen being sent is a fresh piece of tissue, please contact the Histopathology laboratory to inform the staff that the tissue is being sent. This will ensure they are able to handle the request appropriately.

Theatre Samples

All theatre specimens **must be transported directly to Histopathology Reception**. They should not be transported to clinical sciences reception. If they cannot be delivered before 17:00 pm then they must be kept in Theatres and delivered early the following morning.

Small containers containing 10% formalin fixative are ordered by individual departments. The histopathology department only supplies large, empty containers to which formalin fixative obtained by requisition from pharmacy stores (ext. 3087) may be added.

Exceptions for sample fixation are:

- Frozen sections
- Skin immunofluorescence - specimens received locally and dispatched to St John's Institute of Dermatology for analysis
- Lymphomas and haematological malignancy – specimens received locally and dispatched to HMDS at St James's University Hospital
- Cytogenetics samples – to be sent directly (not via histopathology)

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- Muscle biopsies for enzyme histochemistry – to be sent directly (not via Histopathology)
- Ophthalmic Specimens

Frozen Sections – No fixative required
Consultant availability can only be guaranteed through prior notification by telephone (Ext. 5609). Specimens for frozen section should be taken **unfixed** immediately to Histopathology reception (first floor, Fewston Wing). They should be handed in person directly to a member of Histopathology laboratory staff. The request form should include details of the operating theatre being used and the contact telephone number for the report.

There is no formal out of hours service for frozen sections available, however, a Consultant Histopathologist may be available for advice. Please contact Switchboard.

Reporting - a verbal report will be made to the requesting clinician as soon as possible. A final report will be issued after paraffin processing. Please note that frozen sections are not within the accredited scope of the laboratory.

Skin biopsies for Immunofluorescence – Michel's Medium

The specimen should be placed in the small bottles containing Michels medium that are supplied and sent directly to Histopathology reception (first floor, Fewston Wing) 0900–17:00 hours Mon-Fri. The request form should clearly indicate that immunofluorescence is required. **Specimens must be received before 16:30 hours**. These specimens may be sent via the POD system to station 2.
Reporting - the reporting Histopathologist at St John's Institute of Dermatology is responsible for the interpretation and reporting of immunofluorescence samples. Reports will be added to the corresponding in house histopathology report and will be available on ICE. Clinical advice and interpretation is available via the multidisciplinary team meetings (MDTs), and from the reporting pathologist. If this pathologist is not available, other pathologists from the same specialty will provide this service.

Lymphoma and Haematological Malignancy Specimens

Lymphoma diagnosis is based on a combination of routine histopathology on formalin-fixed tissue and immunophenotyping studies performed on fresh unfixed tissue. If a whole lymph node then please send fresh as soon as possible directly to the department of Histopathology. A portion of fresh tissue will be transported to the HMDS laboratory at St. James's University Hospital. The remaining tissue is placed in formalin fixative and processed for routine histopathology at Harrogate. If there is more than one biopsy then please

send one in formalin fixative for routine histopathology and place the other biopsy in saline and send both to the Histopathology Department.

Skin biopsy for possible cutaneous lymphoma – send immediately in saline soaked gauze.

Reporting - HMDS is responsible for the interpretation and reporting of samples. Results are sent directly to the referring clinician. HMDS has senior staff experienced in all aspects of the diagnosis of haematological malignancies. If you are unsure of who to contact please call 0113 2067851 and ask to speak to any of the consultants or clinical scientists who will be able to direct your enquiry appropriately.

Cytogenetic Samples

Send in transport medium (RPMI) directly to the Leeds Genetics Laboratory based at St James Hospital, Leeds. **DO NOT** send to Histopathology**.** Requests must include clinical history and reason for request. Samples should be collected into a sterile Universal container containing culture medium (Ham's F10) and antibiotics. If no transport medium is available, it is possible to send the tissue in sterile isotonic saline, or in a dry sterile vessel. These samples should be sent to the laboratory without delay.

Please see The Leeds Genetics Laboratory, Tissue Sample (leedsth.nhs.uk). Here you can find information on sending samples to the laboratory and order medium by following the links at the bottom of their homepage.

They supply medium at no cost as part of the service. **N.B Harrogate District Hospital Histopathology department no longer supplies RPMI.** Requests are sent to:

North East & Yorkshire Genomic Laboratory Hub, Central Lab
Genomic Specimen Reception (Histopathology Department)
Bexley Wing (Level 5)
St. James's University Hospital
Beckett Street
Leeds
LS9 7TF

Reporting - the Leeds genetics laboratory is responsible for the interpretation and reporting of cytogenetic samples. Results are sent to the referring clinician. Complex abnormal results are usually telephoned prior to the written report being sent and the interpretation and implication discussed. In response to telephone enquiries, only normal results or those which confirm a previous finding are given to a clinician's secretary or the clinic sister. All

other results are only given to clinicians or faxed reports are sent to designated contacts.

Muscle Biopsies

For **ALL** muscle biopsies the following protocol must be followed:

- The Specialist Histopathology department at St James university Hospital **MUST** be informed by telephoning 0113 2064710 when a muscle/nerve is being sent and also of the expected time of arrival.
- Biopsies should arrive no later than 16:00 pm.
- Muscle for histological and histochemical analysis can be sampled as either an open biopsy or a needle biopsy.
- Muscle from an open biopsy should measure approximately 2.5 cm in length and 0.5 cm in diameter. Alternatively 2 or 3 samples (0.5 x 0.5 cm) should be obtained if the procedure involves using a biopsy needle (Conchotome).
- Place the sample/s into a screw top container or petri dish, which contains damp **but not wet** saline gauze. The gauze should not come into direct contact with the muscle.
- If a nerve biopsy is also to be sent, take a sample 2.0-3.0 cm in length. Keep the nerve straight and cover with a **damp but not wet** saline gauze before placing in a screw top container or petri dish.
- Place the screw top container/petri dish containing the samples into a leak proof box, include a request form and send by taxi or courier to:

  The Specialist Histology Unit via;
  Pathology Reception, Ground Floor of Block 32,
  Chancellor Wing
  St James's University Hospital
  Beckett Street
  LEEDS
  LS9 7TF

NB The screw top container/petri dish should be surrounded by ICE (not dry ice) if the sample is likely to take longer than 1 hour before it arrives at the specialist histopathology department at St James.

Ophthalmic Specimens

The NHS National Commissioning Group has designated laboratories to undertake specialist eye and ocular adnexal pathology reporting. Areas of expertise include orbital and adnexal neoplasia, ocular and adnexal trauma, degenerative eye conditions; corneal and ocular surface pathology, paediatric and developmental conditions, and infectious disease. All Ophthalmic

samples will therefore be referred to the National Specialist Pathology Service at Manchester Royal Infirmary. They accept fixed tissue, fresh (conjunctival) specimens for immunofluorescence and cytology specimens.

Reporting – The National Specialist Pathology Service is responsible for the interpretation and reporting of Specimens. Results are sent directly to the referring clinician. The service can be contacted on 0161 276 8808.

High Risk Specimens

All high risk specimens must be clearly labelled as such on both the specimen and request form

Non-Gynaecological Cytology

Effusions for cytology should be sent fresh (no fixative) in a conical universal container. Do not send in taking sets. Send no more than 20 mL in each universal sent.

Fine needle aspiration cytology – send in cytospin fluid in a universal container. Fixed slides should no longer be sent.

Urine – send fresh in a conical universal container, not a boric acid microbiology container.

Use a routine histopathology form for all samples

Sputum Cytology

N.B. Sputum cytology should not be used as one of a battery of investigations when admitting a patient with chest infection or recent exacerbation of chronic bronchitis. It cannot be used to exclude carcinoma due to inherently low sensitivity.

Sputum cytology is considered appropriate in the following circumstances:

- To obtain a histological diagnosis in individuals with a **persistent** abnormality (usually radiological) in whom bronchoscopy is clinically inappropriate.
- To obtain a histological diagnosis of peripheral lung lesions where bronchoscopy is unlikely to obtain diagnostic material.
- For certain non-neoplastic conditions such as atypical asthma, where cytological constituents may aid diagnosis.

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If a request for inappropriate sputum cytology is sent to Histopathology the department will register it on the laboratory management system but the sample will not be processed. A pathologist will email the requesting clinician to inform them the sample has been rejected. A report will be issued on ICE reflecting this. These reports will be highlighted with a red flag.

Cervical Cytology

The cervical cytology service is provided by Gateshead Health NHS Foundation Trust. All enquiries regarding supplies of consumables and results should be made using the contact details below:

General Enquiries	email:	ghnt.neycervicalscreeningcentre@nhs.net
	Telephone:	0800 953 7610
IT Issues	email:	ghnt.pathsupport@nhs.net
	Telephone:	0191 445 6504
Supplies	email:	ghnt.hpv-supplies@nhs.net
Address:	NEY Cervical Screening Service	
	The Pathology Centre	
	Queen Elizabeth Hospital	
	Sheriff Hill	
	Gateshead	
	NE9 6SX	

Placentas, Foetuses & Cytogenetics

Placentas

Routine placentas are not sent for histopathology. Placentas should only be submitted if they appear abnormal; or if the baby is abnormal, unwell or stillborn; or following a pregnancy affected by medical complications. Microbiology samples should be taken on the ward and sent to microbiology, prior to placing the placenta in formalin. Placentas should be submitted in formalin, accompanied by a completed "Request for Histopathology" form. This should include the obstetric history and reason for histopathology request.

Foetuses and Foetal Material

Foetuses and embryos less than 24 weeks' gestational age have no legal identity as an individual, and are examined and recorded as histopathology requests in the Histopathology laboratory. However, it is the policy of the Histopathology department is to accord all recognisable babies the respect due to human life. Details of the policy and procedures for dealing with foetal material are given in the “Management of Pregnancy Remains Policy” under the Trust Wide tab at the top of the intranet home page and then Care and Procedures after Death, then policies. All foetal tissue submitted to the Histopathology department must be accompanied by a request form that

indicates whether or not histological examination is required, the gestational age, and confirm that the mother has given consent for respectful disposal. A sticker summarising this information is available in theatre and on relevant wards to fix to the standard request form. The foetal material should be submitted in formalin (cytogenetic and microbiology samples should be taken on the ward prior to fixation).

If internal examination of a recognisable foetus is required, the foetus must be accompanied by a post-mortem request form signed by one of the parents, preferably the mother. At present consent is recorded on the NHS form "Consent to a hospital post mortem examination on a baby or child ". If no forms are available on the ward a copy may be printed from "Families and post mortems: a code of practice", pages 30-37, then photocopied to provide copies for the notes, the Histopathology Department and the mother.

Foetuses and stillbirths over 24 weeks' gestational age, and live born infants dying in the perinatal or neonatal periods, have a legal identity. A death certificate is required, and the babies are examined and reported as post mortem examinations at the mortuary (see the Mortuary section)

Reference Laboratories

Please request information from the Pathology laboratory regarding referral laboratories.

MORTUARY

Location of Mortuary
The mortuary is located on the ground floor of Harrogate District Hospital next to the switchboard room. Access is restricted by means of swipe card access. An intercom system is available at both entrances for visitors to the department. There is vehicular access for funeral directors and emergency services via Willaston Crescent.

Opening Hours
08:00 to 16:00 hrs, weekdays only**.**

Please note that the mortuary is not open at weekends or Public Holidays. An on call service operates out of hours and staff are contactable via switchboard

Contact Details

Consultant Staff	**Telephone**	**email**
Dr Carl Gray	01423 55**3071**	carl.gray1@nhs.net
Dr Daniel Scott	01423 55**5664**	daniel.scott1@nhs.net

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Dr Elza Tjio	01423 55**5724**	e.tjio@nhs.net
Dr Nicola Maughan	01423 55**3074**	n.maughan@nhs.net

Mortuary Manager
Mr Andrew Cooper 01423 55**3391**

Mortuary Office 01423 55**3391**

Policies relating to death and bereavement are available from HDFT intranet under the Care and Procedures after death heading in the Trust Wide section including:
Care of the Dying Adult and Bereavement Policy
Death Certification, Cremation Forms, and Post Mortem Examination Policy

Advice on Death Certification, Coroner's Cases and Cremation

Death Certification and Cremation Forms

All deaths are scrutinised by the Medical Examiners team who issue death certificates and cremation forms.

Death certificates are completed by the doctor who has seen the patient in the 28 days before death. This may require the doctor to attend the Medical Examiner's Office to complete the Medical Certificate for Cause of Death (MCCD) and cremation forms when necessary.

Reporting Deaths to the Coroner

All unexplained or unexpected death are reportable to the Coroners Officer/Police as soon as possible. The Coroner is informed prior to the removal of any organs or tissues for transplant purposes where the death is notifiable to him or likely to be so.
For Indications for reporting deaths to the coroner please refer to Deaths that must be reported to HM coroner

The Coroner will issue all legal paperwork when a post mortem examination has been requested.

Hospital Consent Post-mortem Examination

Adult Consent Post-mortem Examination

Following a death within HDFT, the decision to request a post-mortem examination must be made by senior members of medical staff in discussion with the Consultant Histopathologist prior to requesting consent. The Consultant Histopathologist will also take the consent. The next of kin must be invited to attend the hospital to discuss the request for post mortem

examination and give consent. Consent paperwork must be sent to the Mortuary Department along with the medical notes.

Consent Forms:

Adult Post Mortem Request, Consent Form and Guide to the Post Mortem Examination Procedure

Paediatric Consent Post-mortem Examination

Consent for a paediatric post mortem examination is taken by trained staff in the maternity department in discussion with the next of kin and clinicians. Consent paperwork must be sent to the Mortuary Department.

Consent Forms:
Perinatal Post Mortem Request , Consent Form and Guide to the Post Mortem Examination Procedure involving Embryo, Fetus or Infant of any Age

Paediatric post mortem examinations take place at a specialist centre at St James Hospital, Leeds.

Post Mortem Requests from General Practice

A GP may request a post mortem examination. The GP must obtain written and informed consent from the next of kin or executor acting on behalf of the deceased, and must use the HDFT consent form. The request should be discussed with a Consultant Histopathologist.

Viewing of the Deceased

Viewing of the deceased in the mortuary department is by appointment only. To arrange a viewing within working hours contact the Mortuary Department extension number 3391. To arrange viewing out of hours please contact the clinical site manager via switchboard.

Please see Procedures for the viewing of a body or further information

Organ and Tissue Donation

NHS Blood and Transplant (NHSBT) manages the national voluntary donation system for blood, tissues, organs and stem cells turning these precious donations into products that can be used safely to the benefit of the patient.

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Appendix 1

How to collect a faeces (stool, motion) specimen for microbiological examination

Before collecting the specimen, make sure your name, date of birth, hospital number and date of the sample is on the specimen container.

Method 1: using a child's potty, a chamber pot, a commode or a suitable container (empty plastic margarine or ice cream tub which will not be required for any other purpose after such use)

- Clean the chosen container thoroughly with soap or detergent and water (DO NOT use disinfectant, bleach or cleaners containing bleach) and give a final rinse in clear water.
- Pass a motion into the container
- Open the specimen bottle and with the little spoon attached to the lid, scoop up enough of the motion to cover the bottom of the bottle
- Replace the lid securely on the bottle
- Dispose of the remainder of the motion down the toilet and either clean thoroughly, or dispose of the container in which the specimen was collected (replace lid of margarine or ice cream tub and put into the dustbin)
- Use and dispose of toilet paper down the toilet in the usual way
- Wash your hands thoroughly with soap and hot running water

Method 2: using cling film

- Raise the toilet seat and loosely place a sheet of cling film across the rim of the toilet bowl to stop anything from falling into the bowl
- The cling film should not be tight – it should have a dip in the centre.
- Place the toilet seat down. You can then sit as normal on the toilet seat.
- Pass a motion onto the cling film
- Open the specimen bottle and with the little spoon attached to the lid, scoop up enough of the motion to cover the bottom of the bottle
- Dispose of the remainder of the motion down the toilet and discard the cling film into a clean polythene bag, tie it and put into the dustbin
- Use and dispose of toilet paper down the toilet in the usual way
- Wash your hands thoroughly with soap and hot running water

REMEMBER: **Do not collect faecal specimens that have fallen into the toilet bowl or toilet water**. No matter how clean your toilet is, it will always contain some bacteria that will interfere with the test results.

For babies, a faeces (stool, motion) sample can be taken directly from a soiled nappy. (For most tests, it does not matter if a small amount of urine is accidentally passed into the pot, cling film or nappy with the faeces)

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Appendix 2

Instructions for Obtaining Patient-Collected APTIMA Vagina Swab Specimens

GEN-PROBE®

APTIMA®

***NOTE:** If you have any questions about this procedure, please ask your doctor, nurse or care-provider.*

Wash your hands before starting.

In the privacy of the examination room or restroom, you will need to undress from the waist down. You will need to comfortably position yourself to maintain balance during the collection procedure.

Open kit package and set the tube aside before beginning instructions.

***WARNING:** If the contents of the tube are spilled on your skin, wash the affected area with soap and water. If the contents of the tube are splashed in your eyes, immediately flush your eyes with water. Notify your doctor, nurse or care-provider if irritation develops. If the contents of the tube are spilled, your test result may be invalidated. Do not take internally.*

1. Partially peel open the swab package as shown in Diagram 1. Remove the swab.
   Do not touch the soft tip or lay the swab down.
   If the soft tip is touched, the swab is laid down, or the swab is dropped, request a new APTIMA Vaginal Swab Specimen Collection Kit.
2. Hold the swab in your hand as shown in Diagram 2, placing your thumb and forefinger in the middle of the swab shaft covering the score line.
   Do not hold the swab shaft below the score line.
3. Carefully insert the swab into your vagina about 2 inches (5 cm) inside the opening of the vagina (as shown in Diagram 3) and gently rotate the swab for 10 to 30 seconds. Make sure the swab touches the walls of the vagina so that moisture is absorbed by the swab and then withdraw the swab without touching the skin.
4. While holding the swab in the same hand, unscrew the cap from the tube as shown in Diagram 4.
   Do not spill the contents of the tube. If the contents of the tube are spilled, request a new APTIMA Vaginal Swab Specimen Collection Kit.
5. Immediately place the swab into the transport tube so that the score line is at the top of the tube as shown in Diagram 5.
6. Carefully break the swab shaft at the score line against the side of the tube as shown in Diagram 6.
7. Immediately discard the top portion of the swab shaft as shown in Diagram 7.
8. Tightly screw the cap onto the tube as shown in Diagram 8. Return the tube as instructed by your doctor, nurse or care-provider.