Warrington and Halton Teaching Hospitals
NHS Foundation Trust

Pathology Department Laboratory Users' Handbook
(GP edition)

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Quick Index

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26/01/2026	G08.24	Quality Leads & Quality Manager

AMENDMENTS

Section 5- Microbiology investigations

- BV added as a microbiology test
- Parasitology TAT 48 hours- not 24.
- Aspergillus PCR samples should be stored at 4ºC.
- Acanthamoeba TAT increased.

Section 8 – Biochemistry Investigations – Details amended for the following tests:

- Sodium
- Potassium
- Chloride
- Bicarbonate
- Anion Gap
- Urea
- Serum osmalility
- Total protein
- Albumin
- Globulin
- CA199
- CEA
- HCG
- PSA
- Free T3/T4
- Testosterone
- Free Androgen
- Prolactin
- Total bilirubin
- Direct bilirubin
- GGT
- ALP
- Vitamin D
- Uric Acid

- Transferrin
- Vitamin B12
- Folate
- CRP
- 24-hour Urine sodium excretion
- 24-hour Urine potassium excretion
- 24-hour Urine urea excretion
- 24-hour Urine calcium excretion
- 24-hour Urine phosphate excretion
- 24-hour Urine magnesium excretion
- 24-hour Urine uric acid excretion
- Creatinine clearance
- IgA/ IgG/ IgM
- Total calcium
- Adjusted calcium
- Phosphate
- Magnesium
- Carbamazepine
- Valporate
- CK
- Glucose
- Digoxin
- FIT test
- SHBG
- KFRE
- Fructosamine
- Amylase
- Calcitonin

Section 10 – Histology Investigations –

- Updated for urgent lung, head and neck samples no longer referred tests as now done on-site.
- MUM1 and p53 not currently accredited tests.

Her Majesty now referred to as His Majesty.

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Note: **Throughout this document the 24-hour clock system is used; for example: 2 pm is given as 14:00 hrs.**

Telephone numbers, where given in full, have the internal extension number part indicated in bold & italics.

Suggestions on how to improve this handbook are welcome. Please forward any suggestions to the Pathology Quality Manager victoria.williamson8@nhs.net

General Information.

1.1 Location of the Laboratory:

The Pathology Laboratories are based on the two hospital sites – the main laboratory being situated on the first floor, Appleton wing of the Warrington site whilst a satellite laboratory at Halton is located on the ground floor, opposite the Renal Dialysis Unit.

The postal address is:

Pathology Department
Warrington and Halton Teaching Hospitals NHS Foundation Trust
Lovely Lane
Warrington
Cheshire
WA5 1QG

Telephone Number: 01925 635911
Facsimile Number: 01925 662043

1.2 Organisation.

Pathology is a key clinical service and is an integral part of the Clinical Support Services of Warrington & Halton Teaching Hospitals NHS Foundation Trust.
It houses some of the most up to date testing equipment, receiving around 1.5 million samples per year and performing 4 million tests in support of community healthcare within the locality as well as hospital care at Warrington and Halton Hospital sites.
Although divided into four specialist departments, it has unified facilities for the collection and receipt of specimens and for issuing of results.
There is a shared approach to delivering an effective, high-quality service.

1.3 Clinical Services offered by the Laboratory

There are four disciplines within the Warrington and Halton Hospitals' Pathology Department whose clinical services are described below:

Biochemistry (including Immunology & Point of Care Testing)

The Biochemistry Department provides a high quality, efficient service to Hospital Clinicians and General Practitioners, to aid in the speedy diagnosis of disease and in the monitoring of treatment. A Consultant Chemical Pathologist leads the service, which provides a wide range of laboratory tests ranging from routine biochemical analyses to the more esoteric. Further detail regarding examinations offered is provided in the Biochemistry section of this Handbook. Analysis is available on **both** sites but non-urgent Halton work is processed at the Warrington site. A Point of Care Testing service is managed by the department, monitoring the performance of near patient testing equipment and their users.

Haematology and Blood Transfusion

The Haematology and Transfusion Departments provide an accurate and efficient service to Hospital Clinicians and General Practitioners to aid in the speedy diagnosis of disease and monitoring of treatment.
Three Consultant Haematologists lead the Haematology service for both Hospital Inpatient and Outpatient Departments with assistance provided by an Associate Specialist. Within Haematology, the services offered include general haematology, haemoglobinopathy screening, routine & specialist coagulation testing & anti-coagulant monitoring.
Blood transfusion services include blood grouping, antibody screening, compatibility testing & provision of the full range of blood & blood components.
Further detail regarding examinations offered is provided in the Haematology & Blood Transfusion sections of this Handbook. Analysis is available on **both** sites but non-urgent Halton work is processed at the Warrington site.

Histopathology and Cytology.

The Histopathology and Cytology Departments provide an accurate and efficient service to Hospital Clinicians & General Practitioners in the surrounding area. This service includes Histopathology, Non-Gynae Cytology (including fine needle aspiration cytology), and Mortuary. The Department also takes part in the Breast Cancer Screening Service.
Further detail regarding examinations offered is provided in the Histopathology & Cytology sections of this Handbook.
Analysis is undertaken at the Warrington site only.

Microbiology (including Virology & Molecular)

The Microbiology Department provides an accurate and efficient service to Hospital Clinicians & General Practitioners in the surrounding area. The department provides routine microbiological investigations for a wide variety of samples as well as virology and molecular analysis, aiding in the diagnosis and treatment of disease.
The department is led by three Consultant Microbiologists, one of which undertakes the lead role in the Hospital Infection Control Team.
Further detail regarding examinations offered is provided in the Microbiology section of this Handbook.
Analysis is undertaken at the Warrington site only.

Antenatal Screening Tests

Two of the departments provide antenatal screening testing in the form of Sickle Cell & Thalassaemia (SCT) screening in Haematology and Infectious Disease in Pregnancy Screening (IDPS) in Microbiology.
For further details, see the following sections:

- For SCT – see section 9.2 of this handbook - ANC Sickle cell & Thalassaemia screening programme within Haematology Investigations table.
- For IDPS – see section 11.5 of this handbook - IDPS screening programme within Virology / Serology (in-house) investigations table.

Referred Tests

Some examinations will be referred to other laboratories for analysis & this information is detailed within the departmental information sections of this handbook (sections 8-11). A list of the referral laboratories can be found in appendices 8-11 of this handbook.

1.4 General Pathology Contact Details

Role	Name(s)	Telephone Number(s)
Clinical Lead	Dr A. M. Davis	**Ext 2531** (External - 01925 662531)
Pathology Manager	Mr N.Gaskell	**Ext 2538** (External - 01925 662538)
Pathology Quality Manager	Miss V.Williamson	**Ext 5192** (External - 01925 275592)
Transfusion Specialist	Mrs R. Spiers	**Ext 5199** (External - 01925 275599)
Pathology I.T. Manager	Mr T.Koutsopoulos	**Ext 2537** (External - 01925 662537)
Point of Care Department whh.poct@nhs.net		**Ext 4216** (External - 01925 664216)
Results & Enquiries		
ICE enquiries – I.T. leads	Kelly Halliwell **kellyhalliwell@nhs.net** Emma O'Brien **e.obrien1@nhs.net**	**Ext 2303** (External - 01925 662303) **Ext 2575** (External - 01925 662575)
Pathology Results		**Ext 2545** (External - 01925 662545)
Pathology General Enquiries		**Ext 2546** (External - 01925 662546)
Halton Laboratory - Enquiries & Results		**Ext 3325** (External - 01928 753325)
Glucose Tolerance Tests Requests		**Ext 2136** (External - 01925 662136)
Warrington Pathology Fax		**Ext 2043** (External - 01925 662043)
Halton Pathology Fax		**Ext 3117** (External - 01928 753117)
Phlebotomy Appointments		(External - 01925 662011 or 01925 662003)
Biochemistry Laboratory		**Ext 2352** (External – 01925 662352)
Haematology Laboratory		**Ext 2549** (External – 01925 662549)
Histology Laboratory		**Ext 2542** (External – 01925 662542)
Microbiology Laboratory		**Ext 2134** (External – 01925 662134)

1.5 Working Hours & out of Hours Service

1.5.1 Monday - Friday Core Hours (Excluding Bank Holidays):

- Biochemistry – 09:00 – 17:30hrs
- Haematology & Blood Transfusion – 08:45 – 17:15 hrs
- Histopathology & Cytology - 09:00- 17:00 hrs
- Microbiology – 08:50 – 17:20hrs
- Halton Laboratory – 09:00 – 17:30hrs
  (**Note:** latest time for receipt of specimens for **urgent processing** in Halton lab is 16:45. Specimens will be accepted between 16:45 & 17:30 but urgent requests may need transport to Warrington for analysis)

1.5.2 Saturday (core hours) for Blood Sciences 09:00 – 12:30 hrs. Saturday (core hours) for Microbiology 08:50 – 17:20 hrs. Sunday (core hours) for Microbiology 08:50 – 17:20 hrs.

Outside the above times see section 1.5.5 below (out of hours)

1.5.3 **Urgent requests during core hours** do not need a preceding telephone call **except** in the case of urgent requests for blood gases, blood and/or blood products and/or urgent Microbiology requests. However, ALL urgent requests should be marked in the "**urgent**" section of the request form to ensure a faster turnaround time.

1.5.4 **Results:** Critical abnormal results according to a pre-determined set of values will be telephoned to the requesting doctor or the patient's ward as soon as they are generated. **All results will be available on ICE as soon as authorised.**

1.5.5 All Other Times – out of hours (non-core):

Biochemistry & Haematology provide a 24 hour, 7 day a week service with some limitations on tests (see the tables in the departmental sections below).

Requests for tests during non-core hours will be dealt with upon receipt and no prior telephone call is necessary **unless** the request is **extremely** urgent **or** involves a request for blood gases or blood and/or blood products.

If **immediate** attention is required direct contact via the phone (Biochemistry & Haematology) must always be made with the Duty BMS. This is absolutely **essentia**l in the case of requests for blood gas, provision of blood or blood products or extremely urgent cases.

Biochemistry	**Phone**	**2352**
Haematology	**Phone**	**2547**

For Microbiology – See section 11 of this document for details

Halton: There is **no** onsite weekend or out of core hours service at Halton Hospital.

Saturday Morning: A single transport of specimens to Warrington is available at 10 am on Saturday morning. Any specimens for analysis **must** be delivered to the Laboratory before this time to ensure processing. Deliver specimens to the Laboratory at Halton into the Laboratory door post box. Do not post samples through this post box after 10am.

Other out of core hours periods: During the weekday out of core hours period **and** between 10 am Saturday & 9 am Monday urgent samples must be sent to Warrington for analysis via the Porters.

Note: It is the responsibility of the requesting clinician or ward staff at Halton to arrange transport of specimens from Halton to Warrington during the non-core hours period. Arrangements for transport during these times can be made via the Porters.

It is not necessary for staff at Halton requiring out of core hours tests to contact the duty Biomedical Scientist (BMS) at Warrington **unless** the request is **extremely** urgent or involves a request for blood gases or blood/blood products.

1.6 Consultant (Clinical) Advice:

A Consultant from each discipline is always available to provide clinical advice (e.g. result interpretation/judgement, choice of tests, clinical indications, frequency of requesting etc) and may be contacted via the hospital switchboard if the enquiry is clinically urgent. In all other cases enquires should be made as follows:

- **For Biochemistry**, urgent requests should be made via the hospital switchboard as stated above. For non-urgent requests for advice, users should phone 2550. Primary care users have an e-referral system via the ‘choose & book’ link.

- **For Haematology**, requests from within the Trust should be made via the ICE referral pathway & advice given is recorded on Lorenzo. Primary care users have an e-referral system via the ‘choose & book’ link.

- **For Microbiology**, requests for advice is often received via the telephone, but also given during antibiotic ward rounds run twice weekly & daily ward rounds on ITU. Results of discussions are retained on Lorenzo.

- **For Histology**, most of the clinical advice is post-examination in the form of clinical comments on reports & also attendance at MDT meetings.

  Note: Histology consultant advice is available during core hours only (Monday - Friday 09:00 – 17:00 hrs)

If users require advice on technical matters and the information is not found within this handbook, please contact the respective departments. Contact numbers can be found in sections 8-11 of this handbook - Pathology Departmental Information

1.7 Protection of personal information

Warrington & Halton Teaching Hospitals NHS Foundation Trust is registered as a data controller with the Information Commissioner's Office (ICO) to process person identifiable information and special category data. The Trust's employees have a common law and contractual duty to maintain the highest levels of confidentiality of service user's information.

The person identifiable data of service users and staff is managed in line with the requirements of the NHS England Data Security and Protection Toolkit and the Data Protection Act 2018.

All staff are contractually obliged to maintain the confidentiality, integrity and availability of the information held by the Trust and in that regard, they are required to:

- Record patient information accurately and consistently
- Keep patient information private
- Keep patient information physically secure
- Disclose and use information with appropriate care

Any breaches of Data Security and Protection policy, information security requirements or data loss incidents are investigated and reported routinely via the Trust's incident reporting system (Datix). Incidents of the requisite severity are escalated externally via the NHS England Data Security and Protection Toolkit incident reporting tool and, if necessary, the Information Commissioner's Office, Department of Health and Social Care and NHS England.

In order to support our staff in ensuring that personal information is held and used in accordance with UK Law and NHS England policy the Trust has a suite of Information Governance related policies such as:

- Data Protection and Confidentiality Policy
- ISMS General Security Policy
- Digital Acceptable Use Policy
- Mobile Communications Policy
- Bring Your Own Device (BYOD) Policy
- Data Quality Policy
- Medical Records/Subject Access Policies

These policies detail the requirements which the Trust's staff must adhere to when accessing or sharing personal information. In addition to a suite of up-to-date Information Governance policies the Trust maintains an Information Security Management System (ISMS) which was authored in line with the principles of the ISO 27001 and contains documentation related to the management of:

- Cyber Security Risk
- IT Asset Management
- Information Systems Asset Register
- Information Asset Owners Policy

- Physical and Environmental Security Standards
- Network Management
- System Access Control
- Access and Authentication Standards
- IT Change Enablement Policy
- Digital Services Risk Log
- Threat Assessment and Management Standards
- Malware Standard
- Perimeter Management Standard

The Trust has an internal security assurance dashboard that provides the latest information and status regarding NHS England's CareCERTs (NHS Digital's Security Bulletins), server patching and details regarding the security status of our applications. The Trust also has an external security assurance dashboard that provides the Trust with a cyber-security rating score and identifies areas of vulnerability which are then targeted with remedial work. The Trust's network is tested for weaknesses on a monthly basis by performing network penetration tests.

The information provided by the security assurance dashboards is reported to the Information Governance and Records Sub-Committee and routinely escalated to the Quality Assurance Committee in order to provide assurance.

It is a mandatory requirement that all the Trust's staff receive annual Data Security and Protection training and all new starters receive this training as part of their corporate induction on commencement of employment with the Trust.

The Trust submits a Data Security and Protection Toolkit assessment to NHS England on an annual basis and the veracity of this submission is audited annually by Mersey Internal Audit Agency.

1.8 Complaints Procedure

Warrington and Halton Teaching Hospitals NHS Foundation Trust is committed to consistently providing the highest possible standard of service, though we accept that from time to time patients, relatives or service users may have a cause for concern. It is important that patients, relatives and service users feel confident that feedback is positively welcomed by the department and that we encourage them to inform us whenever standards fall below their expectations.

Making an informal complaint / raising a concern.

A verbal complaint or concern can hopefully be dealt with satisfactorily by Pathology staff locally without the need for a formal complaint. Pathology procedures require staff to raise any complaints on the Pathology Quality Management System. Following receipt of an informal complaint/ concern, the Pathology Quality Manager will receive notification & initiate a process of identifying the cause & any necessary corrective action. The complainant will be contacted following the investigation.

If you wish to make an informal complaint /concern regarding any aspect of the Pathology Service, please inform us either by telephone or written contact to one of the following:

- Victoria Williamson - Pathology Quality Manager – Telephone 01925 275592 , e-mail victoria.williamson8@nhs.net
- A member of Pathology staff from the appropriate department (refer to the departmental contacts lists).

Making a formal complaint

If the user considers the complaint to be sufficiently serious, the option is available to make a formal complaint to Trust level. A formal complaint may be lodged verbally or in writing (by letter, or email) & addressed to either the Complaints department or PALS (Patient Advice & Liaison Service)
Following receipt of a formal complaint, the Trust will investigate concerns raised and identify any appropriate actions or learning. Following investigation, the Complaints Department will contact the complainant to offer a response either by a formal letter or face to face meeting.

Contact Details:

Complaints Department	
Telephone	01925 662281
e-mail	whh.complaints@nhs.net
Address	Complaints Department 1st Floor, Kendrick Wing Warrington & Halton Teaching Hospitals NHS Foundation Trust Lovely Lane Warrington WA5 1QG

PALS (Patient Advice & Liaison Service)	
Telephone	01925 275512
e-mail	whh.pals@nhs.net
Address	PALS Department Warrington & Halton Teaching Hospitals NHS Foundation Trust Lovely Lane Warrington WA5 1QG

1.9 Quality & Accreditation.

Quality Control: All tests carried out within the laboratory are subject to regular internal quality control mechanisms. If Internal QC results do not meet the required acceptance criteria, routine analysis will not proceed until appropriate corrective action has been undertaken & satisfactory performance is demonstrated.

Quality Assurance: The Directorate participates in External Quality Assurance Programmes. The performance of these programs is managed and reported by independent bodies. Failure to maintain appropriate standards can result in intervention

from an expert panel. However, any performance issues are raised internally and are subject to corrective action following the non-conformance handling procedure.

Data Availability: All data from Quality Control and Quality Assurance programs is held within the laboratory. Should any user wish to examine any of this data then this can be facilitated. Any request for control data associated with any individual test can also be identified and reported.

Accreditation:

Each of the four Pathology departments are accredited by UKAS in accordance with the recognised International Standard *ISO 15189:2022 – Medical Laboratories- Requirements for quality and competence.*

Pathology has a single schedule of accreditation (incorporating all four departments) found on the UKAS website using the following link:

http://www.ukas.com/search-accredited-organisations/

The accreditation number for Pathology at Warrington is 9560.

Any tests referred to in this handbook which are not covered in the schedule of accreditation are by definition **not** accredited & a comment has been added against the test in the respective departmental table of investigations.

UKAS accreditation is subject to continued compliance with ISO 15189:2022 & the laboratory is required to inform UKAS of any changes that may affect our accreditation or compliance with the accreditation requirements.

We are committed to inform our users to any changes to our accreditation status or changes to the accreditation status of any examination procedures.

All laboratories to which specimens or tests are referred are accredited. Confirmation of this is assessed annually & can be obtained from the individual disciplines. A list of laboratories to which work is referred, is found in Appendices 13- 16.

1.10 Covid-19 Testing

The majority of Covid testing undertaken within the Trust is using Lateral Flow Devices (LFD). PCR testing is still available for applicable patient groups. For latest guidance - see Hub for testing algorithm.

Covid swab

Requesting: Mid-turbinate swabs are collected into 3ml VTM – collection packs are supplied by Pathology & the test should be requested via the ICE system.

Result Availability: Results should be available within 2 hours of receipt in the laboratory.

1.11 Information for Patients

The laboratory is committed to ensure that patients' well-being, safety & rights are the primary considerations, with patients and samples treated with due care and respect at all times. The rights of patients to care that is free from discrimination will be upheld at all times. Further information for patients regarding services within the Hospitals is available on the Warrington & Halton Teaching Hospitals website.	
Information for patients contained within this handbook	
Location of the Pathology Laboratories	See details within section 1.1 of this handbook
General Contact information	See details within section 1.4 of this handbook
How to raise a complaint	See details within section 1.8 of this handbook
Information regarding patient collected specimens	See details within section 3.9 of this handbook
Booking an appointment for a blood test (Phlebotomy)	See details within section 4.1 of this handbook
Booking an appointment for a Glucose Tolerance Test	See details within section 4.2 of this handbook
Patient Satisfaction	The laboratory will endeavour to seek patient opinions with the use of patient surveys relating to areas where the laboratory interacts directly with the patient (e.g. phlebotomy) Responses to surveys will be reviewed and used as opportunities for improvement where applicable.

2.0. Requesting, Request Forms & Pre-Collection Information

General Information

Requesting Pathology tests may be undertaken either **electronically** using the Sunquest ICE system (see section 3.1 & appendix 14 below) or using a **manually completed paper** request form (see section 3.1 below). Both the above methods result in the generation of a request form to be sent with the specimen(s) to the laboratory. Receipt of the request/specimens is the usual way the user communicates the request to the laboratory.

If the user requires **any clarification** at any point during the requesting process, the individual laboratory will be happy to assist in this process – see contact telephone numbers for individual departments (sections 8-11 of this handbook)

The laboratory is also happy to discuss the format or any other aspect of request forms. Please contact the respective departments or Victoria Williamson, Pathology Quality Manager on 01925 275592 or victoria.williamson8@nhs.net

Please Note: Each request received by the laboratory for examination(s) shall be considered an agreement between the user & the laboratory to undertake the examination(s).

2.1. Requesting Pathology Tests – Completion of Request Forms/Electronic Requests

Electronic Requesting
Electronic requesting is available using Sunquest ICE & allows the user to generate a printed request form & barcode labels for each specimen, each containing the required patient details. Following specimen collection, the identity of the person collecting the sample, collection date & collection time should be recorded on the request form (This information should be recorded electronically if the correct procedure is followed on ICE – see appendix 15 for details)
Use of the system is password protected and training is managed by Pathology's IT Systems Manager.
95% of our GP practices currently use the system and benefit from fast electronic transmission of results which occurs every 15 minutes from our Pathology Department. For the system to be effective, good quality barcode labels produced at the GP practices are essential and these have to be applied correctly to patient samples in order to guarantee the required turnaround of test results.

When requesting tests on the "ICE" system, please be aware that…

- To receive results electronically the patient's NHS number must be entered on requests.

- Ensure barcodes are clear and placed on samples bottles correctly otherwise the analysers will not be able to read the barcode.

- Orders can be edited after the blood samples have been taken but remember to **reprint the form and discard the first request.**

- Tests cannot be added by writing on the printed request form. A new order must be requested.

- Repeat blood samples must have a **new, separate** order.

- Regular repeat tests require a separate new request for each period of monitoring e.g. patients on regular medication which requires regular testing.

- Ensure printer maintenance is up to date and toner levels checked to ensure good quality of printing of forms and barcodes as this could delay sample analysis

- Glucose Tolerence Tests must be ordered as "**Glucose Fasting"** and "**Glucose 120 mins"**

- Separate tubes must be taken for each label sticker, please note that samples with multiple barcodes cannot be run on laboratory analysers.

Full details of how to request blood tests using Sunquest ICE is available in Appendix 13 of this document. Further information & enquiries - contact IT department on 01925 662303

Additional to the above, there is an electronic form used when requesting for Sickle Cell & Thalassaemia Screening in Pregnancy. This form is used to complete an electronic family origin questionnaire (e FOQ) on ICE. Completion confirms patient consent. **Note:** The identity of the staff member taking these sample is recorded on the request form or electronic request.

Manual Paper Requesting

Request forms for all departments are scanned and electronic images retained in the Laboratory System using an optical character recognition system. Addressograph labels may be attached to the forms but **must be correctly positioned as indicated on the form.**

The request date, consultant code and source must be indicated clearly in **black** ink.

Test requests are made by blocking the appropriate test box in black ink as indicated on the form. Writing outside of the marked areas should be avoided, as this will cause problems on scanning the forms. Following specimen collection, the identity of the person collecting the sample, collection date & collection time should be recorded on the request form.

Request forms must not be defaced with "hole punch marks" as scanning such forms can result in the requesting of non-required tests.

The use of staples should also be avoided as these will damage the electronic scanners used to input requests onto the laboratory information system (LIS)

There is a paper request form for FOQ which can used as an alternative to the e FOQ when requesting for Sickle Cell & Thalassaemia Screening in Pregnancy. Completion confirms patient consent.

Copies of Pathology Request Forms in use are found in the appendices to this handbook.

Request Form Information

Request forms/Electronic requests must include sufficient information to allow the unique identity of the patient. **Three** Patient Identifiers are therefore required:

Full Name (surname and forename)
Date of Birth
Hospital or NHS Number

The following information is also required

1 Location of the patient (i.e. destination for the report)
2 Sex of the patient
3 Identity of the requesting clinician
4 Date (and where relevant the time) of specimen collection.
5 Type of specimen and, where appropriate, anatomical site of origin.
6 Examinations requested.
7 Relevant clinical information.
8 Identification of priority status i.e. Urgent or Routine
9 ILOG number for outbreaks (Microbiology requests only)
10 Previous Histology Numbers (Histology only)

Failure to supply the stated minimum identifiers or other information will not automatically result in the specimen being discarded but **will** result in the report being delayed and **may** result in the sample being rejected.
Clinical details are important in aiding understanding of result sets by the laboratories' scientific and medical staff. Failure to give **relevant clinical details** may result in unnecessary further tests or inadequate or misleading reports. For Histology requests, this may lead to delayed processing or sample rejection.
Where necessary for patient care, the laboratory may communicate with the requestor to clarify the request.

NOTE: Forms for danger of infection specimens must be clearly labelled with appropriate labels.

2.2. Verbal Test Requesting

Verbal test requests are accepted for specimens already received in the laboratory. A verbal request via telephone to the appropriate department is acceptable providing the specimen stability is valid – see section 7.2 below (Additional requests on primary samples).
If acceptable, confirmation should be sent by the user in the form of an 'add on request' using Sunquest ICE (using either the General Pathology or Microbiology buttons) or a manually completed paper request form indicating the request is an 'add on' request & completed with all patient identifying data and the additional tests required.

2.3. Other pre- collection information

Activity	**Details included in section of this handbook**
Preparation of the patient	See section 3.4
Type & amount of primary sample to be collected with descriptions of sample containers & necessary additives	See tables in departmental sections 8-11
Special timing of collection if required	See tables in departmental sections 8-11
Clinical information relevant to sample collection, examination performance or result interpretation	See tables in departmental sections 8-11

2.4. Obtaining request forms, blood bottles and other consumables

GP's & Surgeries.

All surgeries have been issued with a green box clearly marked with the surgery name to meet Health and Safety requirements.

When ordering pathology consumables please send the **green box** with an **order form** placed inside and give this to the courier when your specimens are collected.

The order will be made up and sealed in the green box and the courier will return this to your surgery within a few days.

Please retain the box at your location until an order is required. Only send the green box when an order is needed.

Orders will not be accepted without an order form and the green box.

Nursing homes.

When ordering consumables please ensure there is a contact telephone number and location indicated on the form. We will contact you to advise when your order is ready for collection**.**

2.5. Retesting Intervals

Pathology users should consider the necessity of repeating tests within short timeframes & the laboratory would advise to check when tests were previously requested.
The current national guidance document is held within the Pathology Quality Management System for laboratory staff to refer to.
If users have queries regarding retesting intervals, it is advisable to contact the individual department – see contact details in sections 8-11 below.

3.0. Collection & identification of Pathology samples.

3.1. General Information.

Blood Samples
When taking a series of blood specimens, it essential to follow the recommended draw order. Blood cultures should be taken first (Aerobic followed by Anaerobic), followed by the order on Vacuette® Selection Chart; see Appendix 1 - Sample Container Types & Draw Order. Copies of this chart are available to users.

Failure to adhere to this sequence may lead to contamination of blood samples with anticoagulants or preservatives. This contamination can produce spurious or invalid results.

Avoid haemolysis, drip contamination, over-heating and prolonged venous constriction. Ensure thorough **gentle** mixing of blood with anticoagulant (heparin, fluoride EDTA or potassium EDTA) for plasma samples. **do not shake** sample tubes – this leads to frothing which interferes with analysis.

Do not transfer blood from one tube to another e.g. from an EDTA bottle to an SST bottle.

It is advisable not to leave blood samples overnight as this can severely affect some results.

If in doubt, please contact the appropriate department for advice.

Leaking blood tubes will be discarded.

For information on storing samples: Please refer to **Section 7** below.

Collection of non-blood samples may be undertaken by the patient or healthcare professional. Details of patient collected samples are available in section 3.9 below.
If further information is required on collection of non-blood samples, please contact the relevant department for advice.

3.2. Patient consent for venepuncture

Patients presenting with a request form for blood tests will be viewed as providing implied consent and the venepuncture procedure explained to ensure that patients fully understand and are comfortable with the process.

For Out-Patients – consent can be inferred when the patient presents himself or herself with a request form & willingly submits to blood collection. A simple question is sufficient when you introduce yourself *'we are just going to take a blood sample, which arm would you like me to use?'*

3.3. Requests Requiring Written Consent

There are some examinations for genetic testing & some procedures including more invasive procedures which require the requestor to provide detailed explanation & obtain written consent. The user should stress the importance of providing patient & family information if requested.

Biochemistry Department	
Test/ Procedure	**Written Consent obtained using**
CF gene	Genetic Consent Form
Fabry Disease	Genetic Consent Form
Familial Hypercholesterolaemia screen	Genetic Consent Form
Gilbert's Phenotype	Genetic Consent Form
HFE gene	Genetic Consent Form
MEN1 testing	Genetic Consent Form
Genetics tests shown above should be made using a specific genetics referral form available from the referral laboratory. The current version of this form can be obtained from the following link: Genetic Laboratory Services - Liverpool Womens NHS Foundation Trust From this link, users can download the genetics referral form as shown below. • Genetics Referral Form	

Haematology Department	
Test/ Procedure	**Written Consent obtained using**
Haemoglobinopathy screening – Family Origin Questionnaire (FOQ)	Family Origin Questionnaire Form- Consent acknowledged by the Health Care professional on the form.
Bone Marrow Aspiration	WHH Consent Form 3: Patient/parental agreement to investigation or treatment form

Histopathology Department (including Mortuary)
Full details are included in section 10 of this handbook

3.4. Patient preparation & specimen collection – Blood Specimens

- Greet the patient in a professional, courteous and understanding manner.
- Give full explanation of the procedure to the patient.
- **To determine the identity of the patient** - Check details on the patient's request form by asking the patient to identify themselves verbally whenever possible.
- **To determine the identity of the patient -** for inpatients it is important to check the patient's wrist band to confirm the patient's identification. If bleeding an in-patient, and they do not have a hospital wrist band on then the procedure should not be undertaken.
- Prior to blood collection it is important to **check that the patient meets any special requirements** – Examples may include the following:

    - Should the patient have fasted
    - Should the sample be collected only after cessation of medication
    - Should the sample be collected at a pre-determined time or time intervals)

    Note: On rare occasions it may be necessary to deviate from the usual specimen collection requirements (e.g. additional citrate specimen for FBC in patients with persistent clumping of platelets in EDTA)

    Note: Any deviations from the documented specimen collection procedure must be clearly marked on the request form to ensure this information is recorded alongside the final report produced by the laboratory.

- Obtain verbal **consent** from the patient – see section 3.2 above.
- Assemble all equipment required, sharp safe tray, sharps bin, needle, holder, cotton wool, alcohol swab (streret), micropore, tourniquet, gloves, pen, correct tubes for the tests required.
- Ensure the patient is comfortable and the appropriate arm is supported,
- If the patient is anxious ask them, would they prefer to lie back, if so recline the chair in to a horizontal position and ask the patient to lie back before commencing the procedure to the patient.
- Give full explanation of the procedure to the patient.
- Apply the tourniquet to the appropriate arm, applying it firmly around the upper arm. (Tourniquet should be on the patients arm no longer than 1 minute.)
- Ask patient to clench their hand making a fist.
- Select the best vein, by palpitation with your index finger.
- Put on non-sterile gloves
- Clean the insertion site with a pre- injection alcohol swab, and then wait about 20 seconds for the area to dry
- While you are waiting, un-assemble the safety cover from the needle, by twisting the green area.
- Perform the venepuncture using the correct order of draw as indicated on the manufacturer's information.

Greiner blood tube order of draw
Citrate – Blue top
EDTA – Purple top
SST Gel tube – Gold Top
Lithium Heparin – Green top
Fluoride Oxalate – Grey top
Plain tube – Red top
6ml EDTA for Transfusion – Pink top

- The needle should be inserted at a 15-degree angle.
- Attach the tube and wait for it to fill. The system will collect the correct amount of blood. Repeat if more samples are required.
- Release the tourniquet and ask the patient to unclench their hand when filling the last tube required.
- Remove the tube, as the needle is removed, gently cover the puncture site with a clean piece of cotton wool.
- Press firmly on the cotton wool immediately after the needle has been withdrawn.
- To ensure **safe disposal of materials used** - Place the needle, holder, alcohol swab & cotton wool in the sharps container.
- Apply compression until the bleeding has stopped and then apply a clean piece of cotton wool ball to the puncture site securing it by micropore.
- Label the tubes correctly with appropriate patient details – **note this may be handwritten or ICE labeling (See section 3.7 below & Appendix 14 for further details)**
- Place the labeled tubes into a plastic specimen transport bag & match with the request form.
- **Storage & Transport - Prior to delivery to the laboratory**, specimens should be maintained within the temperature range specified for sample collection and handling (room temperature unless otherwise stated) and should be **transported** to the laboratory via the chute or other method in a timely manner to preserve the integrity of the samples.
- Excessive delays or exposure of specimens to extremes of temperature should be reported to Pathology.

3.5. Specimen Collection - Non –blood specimens

Collection of non-blood samples may be undertaken by the patient or healthcare professional. Details of patient collected samples are available in section 3.9 below.
If further information is required on collection of non-blood samples, please contact the relevant department for advice.

3.6. Blood Sample Labelling & Acceptance Criteria (see 3.7 below for Transfusion samples)

Sample Acceptance

Blood specimens will be **accepted** provided the following criteria are met:

All samples and request forms **must** have a minimum of **three** identifiers on them.

The identifiers must be the following:

- **Full Name** (Forename & Surname)
- **Hospital Number** or **NHS Number** (essential for electronic transmission of results)
- **Date of Birth**

The identifiers on the request form must match the identifiers on the specimen(s)

Sample Rejection

Blood specimens will be **rejected** if the above labelling criteria are not met.

Blood specimens will also be **rejected** if addressograph labels are used (**please note** the exceptions to this are paediatric (microtainers), blood gas samples and blood culture bottles)

Use of pre-printed addressograph labels on blood samples can impede the mixing process on laboratory analysers.

Exceptions

The Laboratory recognises that the NHS number of a patient may not always be readily available. In such circumstances, where the patient may be a temporary resident, new to the practice or when I.T. downtime occurs, this must be indicated on the request card.
Please use the code “ZZZZ999” on the request card if the NHS number is unavailable.
Note – Electronic results are not available when the NHS numbers is not supplied. Results for such requests are returned via the delivery of printed paper reports.

Further Information

See below for correct & incorrect way to label specimens with ICE labels

3.7. Blood Sample Labelling & Acceptance Criteria - Blood Transfusion & Ante-Natal Samples

Sample Acceptance

Transfusion blood specimens will be **accepted** provided the following criteria are met: Three identifiers are necessary on both the sample and request form; they MUST be:

- Full Name (Forename & Surname)
- Date of Birth
- Hospital Number or NHS number

Also required on the sample are:

- First line of address,
- Date and time of sample
- A legible signature of person taking sample (This must match the signature on the request form). Initials are **not** acceptable.

The identifiers on the request form must match the identifiers on the specimen(s)

Sample Rejection

Transfusion Blood specimens will be **rejected** if the above labelling criteria are not met.

Any missing patient information from either the specimen or request form will result in the specimen being rejected.

Note: If there is **any** incorrect spelling of forename or surname on a sample the sample is classed as incorrectly labeled and will be rejected.

Exceptions

None

Further Information

Samples for blood grouping or blood/blood component transfusion or ante-natal purposes **must** be labelled in a continuous non interrupted procedure:

- By the person collecting the samples.
- Next to the patient i.e. at the site of collection.
- With handwritten details taken from the wristband confirmed by talking to the patient if conscious.

Sample bottles **must not** be pre-labelled.

For further information refer to the “Administration of Blood Policy”, available on the Trust Intranet and the British Society for Standards in Haematology (BSH) Guidelines available on the internet - https://b-s-h.org.uk/guidelines/guidelines

3.8. Sample labelling & acceptance criteria - other samples (non-blood samples)

Sample Acceptance

Specimens will be **accepted** provided the following criteria are met:

All samples and request forms **must** have a minimum of **three** identifiers on them.

The identifiers must be the following:

- **Full Name** (Forename & Surname)
- **Hospital Number** or **NHS Number** (essential for electronic transmission of results)
- **Date of Birth**

The identifiers on the request form must match the identifiers on the specimen(s)
For Histology requests, failure to give relevant clinical details may lead to delayed processing or sample rejection.

Sample Rejection

Specimens will be **rejected** if the above labelling criteria are not met.

Exceptions

The Laboratory recognises that the NHS number of a patient may not always be readily available. In such circumstances, where the patient may be a temporary resident, new to the practice or when I.T. downtime occurs, this must be indicated on the request card.
Please use the code “ZZZZ999” on the request card if the NHS number is unavailable.

Please note – Electronic results are not available when the NHS numbers is not supplied. Results for such requests are returned via the delivery of printed paper reports.

Inadequately or unlabelled **unique** specimens e.g. Histopathology or some non-repeatable Microbiology specimens may be accepted at the discretion of the laboratory. Where possible the user would be contacted for the appropriate details.

Two –week wait specimens would not routinely be rejected, however, where possible the user would be contacted for the appropriate details.

Further Information

Sample bottles can be either labelled **by hand** or by using **ICE system labels**, however they **must not** be pre-labelled.

Addressograph labels are permitted on **non-blood samples** e.g. Histopathology pots & Microbiology specimens.

Histology specimens – should be sent in 10% Neutral Buffered Formalin with the following exceptions:

- Immunofluorescence on skin biopsies – Samples must be taken in Michel's medium (available from Histology – 2542)
- Placenta for cytogenetic testing – Send directly to Women's Hospital Liverpool in pink cytogenetics fluid (available from Women's Hospital 0151 702 4229)

3.9. Patient Collected Samples

Please ensure the information in this section is available for patients as required

3.9.1. General Information

Please note: Samples must be labelled with three patient identifiers:
- Full name (surname AND forename)
- Date of birth
- NHS number OR hospital number

Sample containers must be safely sealed in a plastic bag as indicated below & transported as directed to either the requesting GP surgery or directly to Pathology Reception.

3.9.2. Biochemistry Specimens

a) Collection of 24 hr Urine Specimens - There are three patient information leaflets available as follows:
- Collection of a 24 hr Urine Specimen
- Collection of a 24 hr Urine Specimen for 5HIAA
- Collection of a 24 hr Urine Specimen for Metadrenalines

The above leaflets are distributed alongside the urine container upon receipt of a request form at Pathology Reception. The leaflets include details on specimen collection & patient preparation as appropriate.

b) Collection of Random Urine Specimens (Yellow top plain urine bottle) -

- Provide a sample of urine in the receptacle provided.
- Follow the user guide instructions provided with the container.
- Ensure the sample is labelled & place inside the plastic bag.
- Place the request form in the sleeve of the plastic bag.
- Do not put the request form in the bag with the sample.

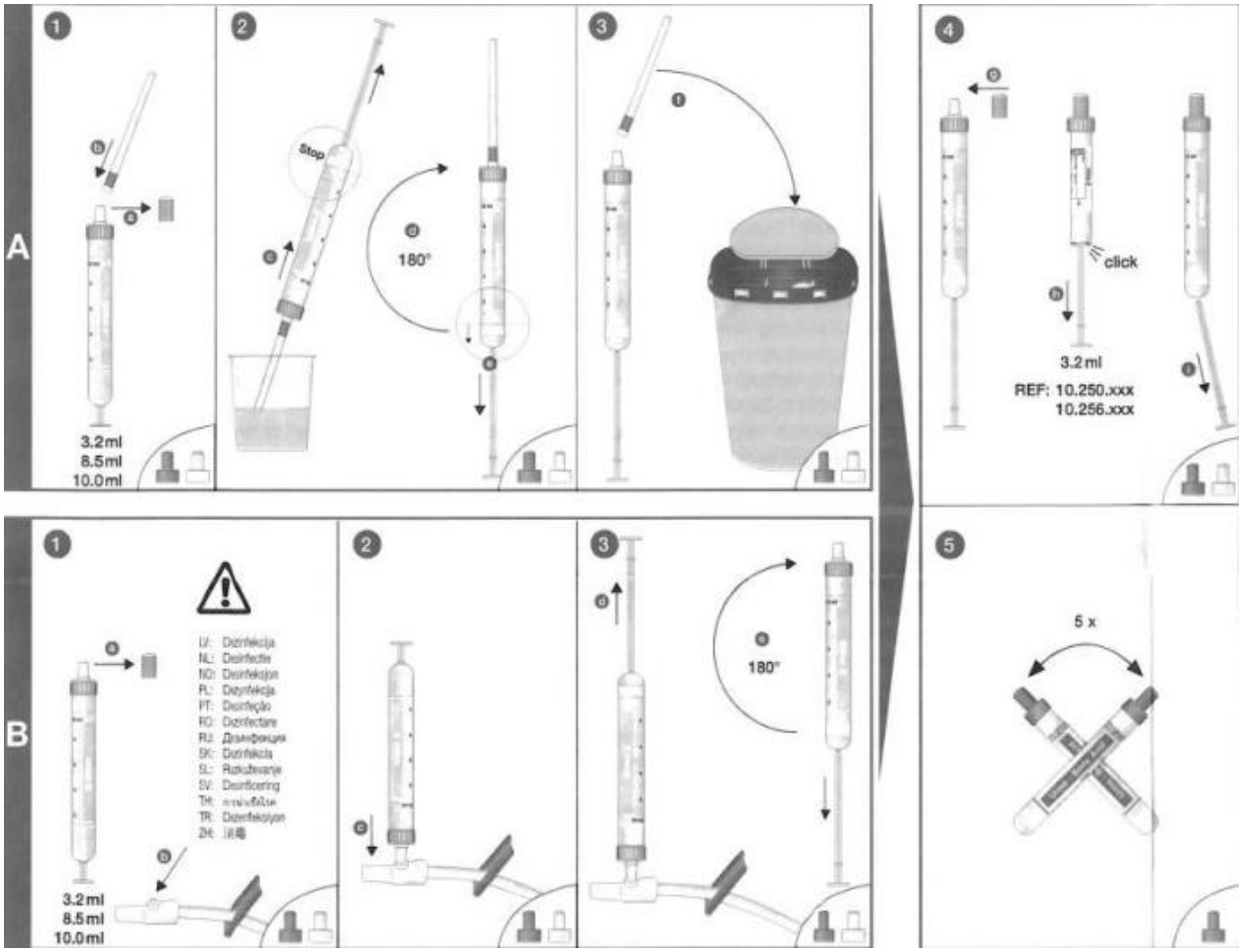
c) Collection of Faeces Specimens (For Faecal Calprotectin, faecal reducing substances & faecal elastase) -

The blue 30ml plastic container provided has a spoon attached to the inside lid. Use this to obtain a large pea sized portion of faeces obtained in a convenient container.

3.9.3. Microbiology Specimens

a) Collection of a mid-stream specimen of urine for culture and sensitivity
(Green top urine bottle with boric acid preservative) -

- Ensure that the perineum area has been washed in the last 12 hours (i.e. had a shower or a bath)
- Catch the middle portion of the urine in the receptacle provided.
- Follow the user guide instructions provided with the container **(see below)**
- **It is important to fill the specimen to the fill line.**
- Ensure the sample is labelled & place inside the plastic bag.
- Place the request form in the sleeve of the plastic bag.
- Do not put the request form in the bag with the sample.



b) Collection of urine for Schistosoma haematobium

Collect the total urine output over the time period between 10am and 2pm. Use a sterile container without boric acid

c) Procedure for collection of a specimen of faeces

The blue 30ml plastic container provided has a spoon attached to the inside lid. Use this to obtain a large pea sized portion of faeces obtained in a convenient container. Rectal swabs are not a substitute for faeces samples.

d) Procedure for Threadworm/Pinworm collection

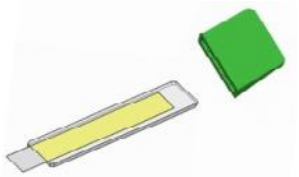
Graham Test for Detection of Pinworm

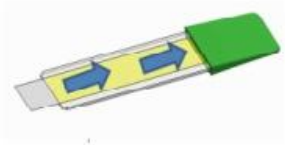
What is the Graham Test (Safe & Clean*)?
It is a system composed of:

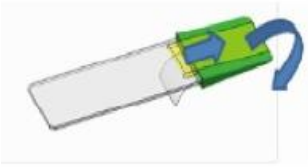
- A glass slide with adhesive tape and plastic cap at one end.
- A plastic box that protects it during transportation.

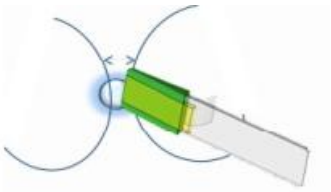
What is it for?
The diagnosis in the laboratory of the presence of pinworms is made by the recovery of the eggs from the perianal area of the patient and their subsequent identification by microscopy.

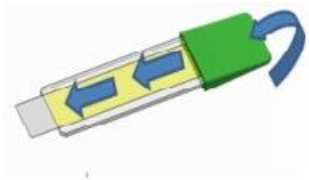
How to Perform the Graham Test
N.B: Use protective gloves to guard against transmission

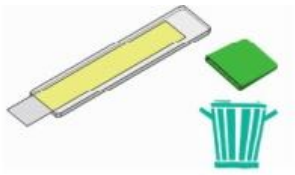
1. 
Place the cap on the unlabeled end of the slide.

2. 
Peel off the tape from the slide and bring it to the cap.

3. 
Place the tape over the cap.

4. 
Place the cap with the tape in contact with the perianal area.

5. 
Replace the tape in its initial position, preventing the formation of bubbles or folds.

6. 
Remove the cap from the slide and throw it away. Place the slide in the plastic box.

7. Discard your gloves into the waste bin by removing from the cuff down. Avoid 'flicking' the gloves into the bin.
8. Place the plastic box inside a sample bag and return to the laboratory

e) Procedure for the collection of sputum

Fresh sputum is required from the lower respiratory tract, expectorated by deep coughing. Saliva and postnasal secretions are not suitable. Early morning specimens for examination of Mycobacterium species should be collected on 3 consecutive days. Place labelled sample inside a plastic bag. Do not put the request form inside the bag with the sample.

f) Procedure for the collection of self-taken vaginal swabs for chlamydia

HOLOGIC

Aptima® Multitest Swab Specimen Collection Kit

Patient collection procedure guide

For vaginal swab specimens

Wash hands before starting. If you have any questions about this procedure, please ask your healthcare provider.

Partially open swab package and remove swab. Do not touch the soft tip or lay the swab down. If the soft tip is touched, laid down, or dropped, discard and get a new Aptima Multitest Swab Specimen Collection Kit. **Hold swab, placing thumb and forefinger in the middle of swab shaft over black score line.**

Carefully insert swab into opening of the vagina, about 2 inches (5 cm), and gently **rotate swab for 10 to 30 seconds**. Make sure swab touches the vagina walls so that moisture is absorbed by the swab. Withdraw swab without touching skin.

While holding swab in your hand, unscrew tube cap. Do not spill tube contents. If tube contents are spilled, request a new Aptima Multitest Swab Specimen Collection Kit.

Immediately place swab into transport tube so black score line is at top of tube. Align score line with top edge of tube and carefully break swab shaft.

Discard top portion of shaft. Tightly screw cap onto tube. Return tube as instructed by your healthcare provider.

Translations for the collection guide may be available. Please check with your Hologic rep for all collection guides.

hologic.com | diagnostic.solutions@hologic.com | 1.888.484.4747

g) Procedure for the collection of urine samples for chlamydia

HOLOGIC®

Aptima® Urine Specimen Collection Kit

Collection procedure guide

For male and female urine specimens

Patient should not urinate for at least 1 hour prior to specimen collection.

Direct patient to provide **first-catch** urine (~20 - 30 mL of initial urine stream) into urine collection cup. Collection of larger volumes of urine may result in specimen dilution that may reduce test sensitivity. Female patients should not cleanse labial area prior to providing specimen.

Remove cap and transfer 2 mL of urine into urine specimen transport tube using the pipette provided.

The correct volume of urine has been added when the fluid level is between black fill lines on urine specimen transport tube label.

Discard pipette. Tightly screw cap onto tube.
This is now known as the "processed urine specimen."

Hologic provides this collection procedure guide as a general informational tool only; it is not an affirmative instruction or guarantee of performance. It is the sole responsibility of the clinician/laboratory to read and understand the appropriate package insert and comply with applicable local, state and federal rules and regulations.

hologic.com | **diagnostic.solutions@hologic.com** | **1.888.484.4747**

3.9.4. Histopathology/ Cytology specimens

Some patients may require a urine specimen to be taken for cytology & patients should follow labelling requirements stated in section 3.9.1 above.

3.9.5. Haematology specimens

There is no requirement for patient collected specimens in Haematology.

3.10. Danger of Infection/ High Risk samples

For the safety of laboratory staff, it is essential that specimens which are known or suspected to contain hazardous pathogens are labelled with yellow "**Danger of Infection**" stickers and placed in biohazard bags. The request form must also be labelled with a yellow "**Danger of Infection**" sticker.

For manual request forms complete the **"Danger of Infection"** box on the request form. For ICE requests, ensure the **"Danger of Infection"** status has been selected when making the request electronically.

This applies to all specimens from patients known or suspected to be infected with the following (please note this list is not exhaustive*):

HIV
Hepatitis B or C (including samples taken from IV drug abusers)
E.coli O157
Mycobacterium tuberculosis (TB)
Salmonella typhi (Typhoid fever)
Brucella
Anthrax
Mpox
Viral Haemorrhagic Fever (VHF) including Ebola virus
*All other Hazard Group 3 and 4 organisms. Please contact the Microbiology Department if further guidance is required.

3.11. Specimens for cytogenetics testing

The Genetic Laboratory Service based at the Liverpool Women's Hospital site is now part of Manchester University NHS Foundation Trust. For further information visit the North West Genomics Laboratory Hub website: https://mft.nhs.uk/nwglh/

Requesting areas in WHH are to obtain their own supply of sample containers with preservative and request forms directly from Liverpool Women's Hospital Cytogenetics department. Pathology do not have any stocks of these items.

Specimens must be placed in tissue culture medium as soon as possible.
If out of core hours the specimen in medium must be stored in the fridge.

There is a daily courier transport from Warrington Pathology to Liverpool Women's Hospital. Areas of WHH can use this transport if they wish or arrange their own transportation to Liverpool Women's.

There is a regular (Monday to Friday) courier transportation from Halton Pathology to Warrington Pathology. The last run leaving Halton at 16:00. If a cytogenetics specimen is at Pathology before this run, then Pathology would transport to Warrington and then onward courier to Liverpool Women's on the next weekday run.
If a sample at Halton is too late in the day for the 16:00 courier, then it can be stored in the fridge in Pathology. If after 17:00 the Halton Porters will facilitate this. The sender could order a taxi for direct transportation to Liverpool Women's (assuming it would arrive before their closure at 17:30) if they required a speedier transportation.

Friday afternoon specimens that would not reach Liverpool Women's by 17:30 can be refrigerated and sent to them the following Monday.

Pathology do **not** record cytogenetic samples. The sender should have their own recording mechanism for traceability e.g. theatre book.

4.0. Phlebotomy Service.

4.1. General Information

Location:
The phlebotomy service is available at both Warrington & Halton sites in the following locations:

- Warrington site – on the ground floor, Out-Patient's Department
- Halton site – on the upper floor, Out-Patient's Department

Service:
The service accepts requests from hospital patients attending OPD clinics & also GP patient requests. **Please note, the service is by appointment only**. To make an appointment, please telephone 01925 662011 or 01925 662003.

Opening hours (both sites):

Monday - Friday 09:00 – 12:00 hrs and 13:00 – 16:30hrs

(**Note**: There is no Phlebotomy service on Bank Holidays at either site)

Advice for GP's regarding phlebotomy appointments:

Urgent Appointments: should be made by a GP or member of staff from the practice, as these appointments are limited to 16 per day across both sites. This will ensure that practice staff can make alternative arrangements for blood collection if the urgent request cannot be accommodated on that day.
Call **01925 662011 or 01925 662003** to make an appointment at either site.

Routine Appointments can be made by the patient.

- Inform the patient of the locations available.
- Advise patients to call **01925 662011 or 01925 662003** to make an appointment at either site.
- This phone number will be manned 9 – 5 pm Monday to Friday
- Appointment slots will be 10 minutes apart – advise patients to attend on the exact time, do not come early to wait.

Paediatric phlebotomy:
For paediatric patients, phlebotomy will be undertaken in the outpatients blood collection room providing the patient is over 16 years of age & accompanied by an adult. For children under 16 years of age, phlebotomy is undertaken by appointment in Paediatric Outpatients (01925 662860)

Phlebotomy appointments are also available at Bath St Clinic in Warrington. If you would like an appointment outside of the hospital, please contact Bath St on 01925 843853.

4.2. Booking an appointment for a glucose tolerance test

Appointments can be made by telephoning 01925 662011.

5.0. Transport of specimens to the laboratory.

5.1. Model rules & general precautions

Note: All samples should be transported to the laboratory in a timely manner to avoid deterioration.

Prior to delivery to the laboratory, specimens should be maintained within the temperature range specified for sample collection and handling (room temperature unless otherwise stated) and should be **transported** to the laboratory via the chute or other method in a timely manner to preserve the integrity of the samples.
Excessive delays or exposure of specimens to extremes of temperature should be reported to Pathology.

For samples received from outside the Trust, the laboratory has a service level agreement with the Trust's transport courier services to ensure safe & timely delivery of samples from GP surgeries & outreach clinics.

All specimens should be regarded as being potentially infective. Staff have a personal and statutory duty of care to protect the Health and Safety both of themselves and others who deal directly or indirectly with patient specimens. Failure to comply with the Trust infection prevention policies is notifiable under the Trust's Incident Reporting Scheme, whether or not an accident, injury or infection has resulted. Disciplinary action may ensue.

Users should ensure that any member of staff should carry any specimens to the laboratory at either site in suitable appropriate containers. Please contact the laboratory for advice.

Never leave samples unattended in a public area.

When handling samples, cover any cuts, grazes or broken skin with a waterproof dressing. Samples must **never** be carried unprotected in the open hand or given to other members of staff in this way. Multiple specimens must be carried in the appropriate containers, never in hands or pockets.

When the request form has been correctly completed and the samples fully labelled, place the specimens in a clear plastic specimen bag, attach the bag onto the request form.

Do not put request forms inside the specimen bag.

If double pocket bags are used – please place samples in the sealed pocket and the request card in the side pocket.

Ensure needles are removed from blood gas samples and syringes are sealed with appropriate stoppers and all air bubbles removed.

Fluid pH must also be received in a syringe with air expelled

Place blood culture specimen bottles in a separate bag.

Take samples directly to Pathology; do not eat or drink when transporting samples to Pathology. Wash your hands if they come into contact with the sample or its container

Inform laboratory staff if any sample is deemed urgent. Also, inform the laboratory staff if there is any possibility that the specimens may have deteriorated prior to or during transport to the laboratory, for example delay, refrigeration problems, exposure to undue heat.

Danger of Infection (DOI) samples **must** be clearly and appropriately labelled – see section 3.10 above.

Note: Some specimens require special handling. Please refer to departmental sections within the Handbook or contact the appropriate department.

5.2. Spillage and leaks

Spillages of blood and body fluids must be regarded as presenting a risk of infection to any person coming into contact with them. Containment, treatment with a suitable disinfectant and removal will greatly reduce the risk.

In the event of an accident or spillage of a pathology specimen see the Guidelines for the Management of Blood and Body Fluid Spillages (Related to Trust Infection Control Policy) on the Trust Intranet, under "Policies and Procedures" > Infection Control Policies.

The following is an extract from the Trust Guidelines.

*Appropriate Personal Protective Equipment **must** be worn at all stages of the process when dealing with blood/body fluids or cleaning products.*
Cover and contain spillage with disposable paper towels until all the blood/body fluid has been removed, placing the towels in a clinical waste bag (as per current waste management policy and associated guidelines).
If required wet the spillage area with hypochlorite solution (10,000ppm) and leave for 10 minutes (if spillage is on floor ensure warning signs are displayed and area is monitored due to risk of slips).
*If broken glass is present remove using dustpan and brush or disposable scoop **after** hypochlorite solution has been poured over spillage. Place in rigid puncture proof container (e.g. sharps box) and seal. If glass is adhering to the dustpan/brush this should also be discarded into the sharps box (box must be large enough to accommodate the dustpan and brush) for disposal.*
Use paper towels to remove excess solution and place in clinical waste bag (as per current waste management policy and associated guidelines). Wipe over the surface with fresh solution, rinse and dry.
The area should then be cleaned using general purpose detergent and water (1ml:1litre).
Remove personal protective equipment and discard into a clinical waste bag (as per current waste management policy and associated guidelines).
Wash hands.

In the event of Formalin spillage – contact a member of laboratory staff on 2543 or 2537 (If out of hours – ring either 2547 or 2352)

The courier company transporting specimens to the laboratory have a protocol for sample spillage which includes a dedicated spillage kit.

However, there are circumstances where individuals bring their own specimens into the laboratory. They should be advised of the appropriate course of action should the specimens break or spill.

The following is recommended:

- In the event of sample breakage at home or in transport vehicle seek advice from requesting GP.
- In the event of sample breakage or spillage within hospital grounds contact

the laboratory for advice.

Comprehensive advice is available from the laboratory staff.
Note: Laboratory staff have a discretionary right to discard any sample or request form that is received in a state which renders it hazardous for them to handle.
Report the accident to one of the senior laboratory staff or your supervisor as soon as possible; an Incident report should be completed.

5.3. Specimen packaging & transportation

Packaging	Specimens placed in plastic specimen bag & retained alongside the request form. Place in a large plastic specimen transport bag.
Transport to the Laboratory	Await collection by courier.

Samples are collected from surgeries on weekdays as per published schedule. See Appendix 9 for current schedule.

Samples, which miss the routine collection, **may** be stored, **but** please refer to **section 7.1** (Storing Samples) for further information.

Halton Hospital: GP specimens sent into Halton Hospital are forwarded to Warrington Path Lab during the working day via a scheduled van service. This operates from Halton at the following times.

Monday – Friday 10:15, 12:15, 14:15 and 16:00 hrs

Samples which miss the final scheduled transport run will be analysed on the next available working day.

GPs will be advised if there is a problem in storing or analysing a late sample.

6.0. Reporting Results

6.1. Validity of Results – Traceability & Uncertainty

Traceability

Results, where possible are traceable to national standards by the use of calibrators which have had their traceability assessed. Laboratory measuring systems where appropriate are subject to calibration using devices traceable to national standards. Traceability information is retained within laboratory procedures.

Uncertainty of Measurement

All laboratory examination procedures are assessed by laboratory staff for uncertainty of measurement & documented evidence is held within the laboratory. **This information is available for users on request.**

Certain factors may affect and possibly invalidate some test results, causing potential biological and analytical interference. Examples include, blood transfusion and other intravenous fluids, antibiotics, anticoagulants, drugs, timing of specimen in relation to drug dose, type of tube. Haemolysis, lipaemia and icterus can interfere with some analytes, hence these results are deleted automatically when such interfering conditions are detected.
The major interfering factors and limitations of analyses are listed in the departmental section tables below.
For Point of Care analyses, limiting and interfering factors are indicated in the appropriate SOPs and are available to users on the intranet - on the Point of Care website.

It is also important that pre-examination procedures such as specimen collection & transport are undertaken correctly as they can affect the quality of examination procedures. Information is included in sections 3 & 5 of this handbook (Collection & Identification of Pathology Specimens and Transport of Specimens to the Laboratory)

Results from automated analysers are validated automatically if they fall within preset ranges and have no instrument warning flags. Ranges have been discussed and approved by senior scientists and consultant staff. Results outside of these ranges are assessed by qualified scientific and medical staff and validated as appropriate. Comments may be appended and additional analyses undertaken based on the clinical details provided and on previous results.

Critical results according to a pre-determined set of values will be telephoned to a suitably qualified health professional - (see table below – section 6.2) **Note**: This is not applicable for Histology results. Pathologists will follow a protocol for communication of results considered outside the normal parameters.

6.2. Blood Sciences Critical Results Table (results available on ICE following authorisation)

TEST	CRITICALLY ABNORMAL RESULT	
Sodium	≤ 120 mmol/L (for GP ≤ 125 mmol/L)	≥ 155 mmol/L (for GP OOH ≥ 159 mmol/L)
Sodium (children <16 yrs)	≤ 130 mmol/L	≥ 155 mmol/L
Potassium	≤ 2.7 mmol/L	≥ 6.5 mmol/L
AKI Alert	1st AKI level 3 only. UE & AKI results phoned (Not required for Dialysis or ITU patients)	
Urea		≥ 40.0 mmol/L (≥ 10.0 in children)
Creatinine	New result ≥ 355 µmol/L – except in dialysis unit (≥ 200 in children)	
Corrected Calcium	≤ 1.80 mmol/L	≥ 3.10 mmol/L
Magnesium	≤ 0.40 mmol/L	≥ 2.10 mmol/L
Amylase		≥ 300 U/L
CK		≥ 2000 I.U/L
Glucose	≤ 2.4 mmol/L	≥ 20.0 mmol/L (for GP OOH ≥ 29.9 mmol/L)
Glucose (children <16 yrs)	≤ 2.4 mmol/L	≥ 15.0 mmol/L
Blood Gases - **PO2**	≤ 7.0 KPa	≥ 50.0 KPa
Blood Gases – **PCO2**		≥ 7.0 KPa
Blood Gases – **HCO3**	≤ 10.0 mmol/L	≥ 50.0 mmol/L
Lithium		≥ 1.6 mmol/l
Digoxin		≥ 2.6 µg/l
Theophylline		≥ 25 mg/l
Valproate		≥ 200 mg/l
Phenytoin		≥ 19.9 mg/l
Carbamazepine		≥ 15 mg/l
Bile acids		≥ 14.1 µmol/l
Phosphate	≤ 0.3 mmol/L	
Lactate		≥ 2.6 mmol/l
TNI		≥ 50 ng/L
CRP		Within Trust ≥ 300 mg/l , outside Trust ≥ 200 mg/l
PR3/MPO		≥ 10 U/ml (for new patients)
AGBM		≥ 7 U/ml
AST		≥ 600 I.U/L (First presentation or subsequent increase of 200)
ALT		≥ 600 I.U/L (First presentation or subsequent increase of 200)

Bilirubin (Total)		≥ 300 µmol/l (Only in infants <1yr)

Bilirubin (Direct)		≥ 25.0 µmol/l (Only in infants <1yr)
Ethanol		≥ 400 mg/dl (≥ 11.0 in children under 16 yrs)
Paracetamol		≥ 31 mg/l (≥ 11.0 in children under 16 yrs)
Salicylate		≥ 300 mg/l
Ammonia		≥ 100 µmol/l
PLGF	All results telephoned	
Protein/Creatinine Ratio		≥ 30.0 (ANC patients only)
HbA1c		≥ 80.0 mmol/mol
Cortisol	≤ 50.0 nmol/l	≥ 1500.0 nmol/l
Haemoglobin	≤ 70 g/L	≥ 200 g/L
Platelets	≤ 30 x 10^9/L	≥ 1000 x 10^9/L
WBC	≤ 2.0 x 10^9/L	
Absolute Neutrophils	≤ 0.5 x 10^9/L	≥ 30 x 10^9/L
Absolute Lymphocytes		≥ 30 x 10^9/L
Blood film / abnormal differential	Any case of suspected Leukaemia or other serious Haematological condition	
Malaria Screen	Positive Screen; Parasites on Blood Film	
ESR	>100mm/hr for patients where Temporal Arteritis is being considered	
INR (patient on warfarin)		>5.0
APTT Ratio (patient on heparin)		>5.0
PT (patient not on ACT)		>30 secs
APTT (patient not on ACT)		>45 secs
Fibrinogen	<1.0 g/l	
D-Dimer	Positive	
Sickle Screen	Positive or the result of any test marked 'Urgent'	

Note: For GP/OPD users: The laboratory will phone results in accordance with the critical limits listed above, as agreed by the CCG. Please note these limits may change if there is the necessity to involve the out of hours service.

Note: Some results may be telephoned even if they are not outside the stated critical values examples include raised tumour marker results.

Note: In Microbiology, significant results will be communicated as appropriate with consideration of national guidelines, locally agreed procedures and clinical picture.

6.3. Turnaround Times (TAT).

Routine: The routine TAT in working days for each test (i.e. time between receipt of a specimen and issue of a report) is listed in tables under the appropriate test in each department section. The laboratory expects to achieve the TAT for **the stated %** of requests received.
Urgent: The laboratory regularly monitors TAT for all assays & there are certain areas where the expected TAT will be significantly less reflecting the urgent nature of the requests – See tables below

Department : Biochemistry TAT			
Urgent Request	Location(s)	Expected TAT for **95%** of requests	Expected TAT for **90%** of requests
Renal Profile (Na K Urea Creat GFR AKI)	AE,A1,WACC,SAU	90 minutes	60 minutes
Liver Profile	AE,A1,WACC,SAU	90 minutes	60 minutes
CRP	AE,A1,WACC,SAU	90 minutes	60 minutes
TNI	AE,A1,WACC,SAU	90 minutes	60 minutes
AMY	AE,A1,WACC,SAU	90 minutes	60 minutes

Department : Point of Care		
Urgent Request	Location(s)	Expected TAT for **90%** of requests
Fetal Fibronectin(FFN)	Obstetric locations	60 minutes

Department : Haematology TAT			
Urgent Request	Location(s)	Expected TAT for **95%** of requests	Expected TAT for **80%** of requests
FBC	AE,A1,WACC,SAU	60 minutes	45 minutes
D- dimer	AE,A1,WACC,SAU	75 minutes	60 minutes

Department : Microbiology TAT			
Urgent Request	Location(s)	Expected TAT for **95%** of requests (**Core Hours**)	Expected TAT for **95%** of requests (**Out of Core Hours**)
CSF microscopy	ALL	1 hour	2 hours
Joint fluids – positive microscopy	ALL	2 hours	2 hours
MRSA PCR	ALL	4 hours	4 hours
Ascitic fluids	ALL	1 hour	2 hours

Department : Histopathology & Cytology TAT		
Urgent Request	Location(s)	Expected TAT
Urgent Histopathology Biopsies	ALL	90% reported within 14 calendar days
Urgent Skin Samples	ALL	90% reported within 14 calendar days
Urgent Resection Samples	ALL	90% reported within 14 calendar days
Urgent Lung Biopsies, head & neck samples, cervical screening samples & non-gynae cytology	ALL	90% reported within 14 calendar days

6.4. Types of Report.

Printed Laboratory reports may be indicated as "Intermediate", "Final" or "Amended".

Reports may also be verbal. Printed reports may be collected from the Laboratory during working hours but are also delivered internally and by external post.

Reports are also transmitted electronically dependent on the provision of a hospital or NHS number and, in exceptional circumstances, may be sent by **secure** fax.

6.5. Verbal Reports – Phone 2545 for all reports.

The laboratory prefers to keep the verbal transmission of reports to a minimum because of the possibility of transcription error. These will normally only be issued for urgent specimens or if a consultant feels that the result is of a particular urgency. Such results will only be given to doctors, nursing staff, medical secretaries or health centre staff who are trained to take results.

When verbal (telephone) reports are given it is necessary for the person taking the result to give their name and to read the results back to ensure accuracy.

6.6. Written Reports.

Warrington Hospital: Reports for Wards and other Departments are distributed via the Pharmacy Drug Round each morning (Monday to Saturday).

Halton Hospital: Reports for Wards & Departments are collected and distributed by the Porters each day (Monday to Friday).

6.7. Electronic Reports.

Results are available on the system as soon as they are verified. Details of how to use Sunquest ICE may be obtained from the IT department – telephone 01925 662303

7.0. Storing samples

7.1. Storing samples prior to delivery to the laboratory

The laboratory would discourage users from storing samples prior to sending to the laboratory.
The following table lists specific samples or tests requests which, even if not urgently required, cannot be stored on the ward:

Department	Tests/Requests which **cannot** be stored & **must** be sent to the laboratory.
Biochemistry	Potassium Phosphate Osmolality B12 Folate LDH Troponins NT pro BNP PTH Chromosomes Downs Screening Tests Gene studies Any hormones (male/female) HLA B27 Antibody requests Blood Gases
Haematology	Films Malaria parasites G6PD PK Any coagulation test including thrombophillia and lupus screens.
Histopathology	Sputum for cytology Any cytology samples without fixative
Microbiology	Blood cultures CSFs Corneal scrapes. Ascitic fluid for cell counts.

7.2. Sample Retention

Following analysis samples are stored for varying lengths of time in accordance with the current version of Royal College of Pathologists' publication **"The Retention and Storage of Pathological Records and Specimens".** During the storage period it **may** be possible to request additional tests on a sample that has already been received in the department.

7.3. Additional requests on primary sample

A further request form is needed to request such tests, completed with all patient identifying data and the additional tests required- see section 2 above (Verbal test requesting)

Due to varying degrees of stability of different analytes in storage media, it is not possible to provide a fully comprehensive table identifying which analytes may be requested and undertaken after specific storage periods. The following table lists the more commonly requested additional tests and the limitations of stability for these analytes

Biochemistry Department

Biochemistry Analyte(s)	**Number of days stability at 4 - 8 °C**
B12 / Folate	1
Bone	7
Cholesterol / triglyceride	7
CRP	11
Ferritin	7
HDL	7
Iron Profile	7
Liver Profile	7
Osmolality	1
TSH	3
FT4	8
TNI	**24 Hours** post venesection
EPO	24 hours at 4 – 8'C, 8 hours at room temp
MPO/PR3/TTG/ANA (CTD) screen	**2 days**

Haematology & Transfusion Departments

Haematology Tests Time limits for requesting additional examinations	
Test	**Number of hours stability**
Full Blood Count	24 hrs from receipt of specimen
ESR	24 hrs from receipt of specimen
Reticulocytes	12 hrs from receipt of specimen
Glandular Fever Screen	24 hrs from receipt of specimen
Malarial Parasites Screen	12 hrs from receipt of specimen
Blood Film	12 hrs from receipt of specimen
DCT	24 hrs from receipt of specimen
PT/APTT/Fibrinogen/Coagulation Screen	4 hrs from receipt of specimen
D-Dimer	4 hrs from receipt of specimen
INR	24 hrs from receipt of specimen
Haemoglobinopathy screening using HPLC/ Sickle Screen	24 hrs from receipt of specimen
Note: For add on requests for blood/blood components - Contact Transfusion Lab on 2547 **(Specimen validity in Transfusion will vary dependent on previous Transfusion history)**	

The requesting Clinician **must** contact the appropriate department and seek advice for any additional tests required that are not included in the above table/s

Histology & Cytology Departments

Additional tests on Histology samples may be requested at any time; formalin fixed, paraffin wax embedded tissue and tissue slides are available for further tests. Wet tissue is kept for 5 weeks post reporting.

Additional tests on Cytology samples may be requested for 5 days post receipt.

Microbiology Department

Specimens are retained for 7 days following receipt. Availability of additional tests will vary greatly dependent on the test required & nature of the specimen. If additional tests are required – contact Microbiology Department on 2134 for advice.

8.0. Biochemistry Department.

8.1. Contacts:

Consultant:	Dr A Davis	01925 66***2132***
Biochemistry Manager:	Ms Tracey Orford	01925 66***2531*** tracey.orford1@nhs.net
Results & Enquires:		01925 66***2545***

8.2. Table of tests available.

The following tables include information on containers to be used, reference ranges & turnaround times. Abbreviations used in this section are as follows:

Adult	Adult Reference Range	MRI	Path Lab, Manchester Royal Infirmary
BLFP	Blue top faecal pot	Plain	Plain Urine bottle. or Yellow top syringe type bottle
Calc	Calculated results, separate sample not required	Red	Plain tube – no anticoagulant (Red top)
EDTA	4ml Ethylene Diamine Tetra-acetic acid (purple top short tube)	RLUH	Royal Liverpool University Hospital.
F	Female		
FLOX	2ml Fluoride Oxalate (Grey top)		
HEPASy	Heparinised syringe	SST	Serum Separation Tube (Gold Top)
LIHEP	Lithium Heparin (Green top)	TH	Therapeutic Range
M	Male	Wyth	Wythenshawe

8.3. Profiles.

O/H – Out of core hours availability; **T** = Turnaround time in working days
**** = Contact laboratory for TAT**

Profile	Tests Included	Samples Required	O/H	T	Special Precautions, Interfering Factors & Limitations
Renal Profile:	Sodium Potassium Urea Creatinine Glomerular Filtration Rate (GFR) AKI when required	SST	Y	1	**Severely** haemolysed samples are likely to affect some or all parameters. See appropriate test in following table for specific effects. Interpretation of the GFR is printed on the report form
Liver Profile:	Albumin Total Protein Alkaline Phosphatase Bilirubin AST ALT GGT	SST	Y	1	
Bone Profile:	Calcium Phosphate Alkaline Phosphatase Albumin	SST	Y	1	
Full Lipid Profile:	HDL Cholesterol LDL Cholesterol, Cholesterol Triglycerides Cholesterol/HDL ratio Non HDL	SST	Y	1	See appropriate test in following table for specific effects.
Iron Profile:	Iron, Transferrin, Total Iron Binding Capacity (TIBC) % Iron Saturation Ferritin	SST	Y	2	**Severely** haemolysed samples are likely to affect some or all parameters. See appropriate test in following table for specific effects.

8.4. Sample volumes and advice

One fully filled 5 ml SST Vacutainer sample will generally contain sufficient blood for analysis of all profiles listed above.
However, this does depend on the HCT of the patient and assumes that a minimum of 2mls of serum can be separated
For single analytes 1 ml of whole blood is usually sufficient.
For all assays not quoted above please send one full tube of the correct type, if collection of multiple tubes causes a problem please call the laboratory for advice.

If the user is unsure that the minimum volume has been obtained, a comparison should be made between the volume taken against the expected fill volume (black line) indicated on the label. Expected fill volumes for each bottle type are detailed in Appendix 1 of this Handbook.

Paediatric sample bottles (microtainers) should be filled to the FIRST line indicated on the container. This usually guarantees sufficient blood for the analysis of general biochemistry profiles – but this again is dependent on the patients' HCT.
For multiple tests, please contact the laboratory for advice.

Where Fasting samples are required for analysis, the patient should fast from midnight. It is permissible to drink water after this time and prior to blood-letting; no other drinks are allowed.

Any **prescribed** medication should be taken as normal

8.5. Biochemistry Investigations – (including turnaround times and other information)

O/H – If yes, the test is available outside core hours. Core hours are Mon-Fri 09:00 – 17:30hrs, Sat 09:00-12:30hrs (Excluding Bank Holidays)

T = Turnaround time in working days, ** = Contact Laboratory for TAT

Test	Samples Required	Biological Reference Range	O/H	T	Special Precautions, Interfering Factors & Limitations
α-1-acid glycoprotein (Orosomucoid)	SST	See final report	N	**	Referred to MRI
ACTH	EDTA	See final report	N	**	Referred to RLUH
Albumin	SST	0-15 years 30-45 g/L 16+ years 35 – 50 g/L	Y	1	
Aldosterone	EDTA	See final report	N	**	**On ice to Lab as soon as possible.** Referred to Wythenshawe
Alkaline phosphatase	SST	0-28 days = 70-380 U/L 1 month - 15 years = 60-425 U/L 16+ years = 30-130 U/L	Y	1	Variable with age
Alpha fetoprotein (AFP)	SST	0 – 7.0 ng/ml	N	3	
ALT	SST	<34 IU/l	Y	1	Variable with age
Ammonia	LIHEP	< 28 days < 100 umol/L < 16 Years < 50 umol/L > 16 Years 11-32 umol/L	Y	1	**Must ring lab in advance to notify.** Ideally a fasting sample should be taken & should be brought immediately to lab post collection on ice cubes/pack if possible. Reference Range Variable with age. Refer to report. **Note:** Comment on samples < 28 days - PLEASE NOTE: for sick or premature neonates reference interval = < 150 umol/L. Follow metbio.net guidance.
Amino acid	LIHEP	Refer to report from reference lab.	N	**	Referred to Biochemistry, Alder Hey Hospital
Amylase	SST	30 – 118 IU/l	Y	1	
Angiotensin converting enzyme (ACE)	SST	See final report	N	**	Referred to Wythenshawe
Anion Gap	Calc	10 – 20 mmol/l	Y	1	Calculation = (Na+K)-(Cl+CO2)
Ascitic fluid	See Note	Contact Lab for Interpretation.	N	2	Plain sterile container with no additive. **(Note-** this test is not accredited- For advice telephone laboratory 01925 662352)
AST	SST	<34 IU/l	Y	1	Variable with age

Biochemistry Investigations (cont'd) – (including turnaround times and other information)

Test	Samples Required	Biological Reference Range	O/H	T	Special Precautions, Interfering Factors & Limitations
B12	SST	211 – 911 ng/l	N	3	
Bicarbonate (Serum/Plasma)	SST	22 -29 mmol/l	Y	1	
Bile Acids	SST	< 14.1 μmol/l	N	1	
Bilirubin (Direct)	SST	0-15 years < 10 μmol/l 16+ years < 5 μmol/l	Y	1	
Bilirubin (Total)	SST	0 – 20 μmol/l	Y	1	Variable with age
NT pro **BNP**	SST	<300 ng/L	Y*	3	New reference interval for NT-pro-BNP on 10/07/25, results not affected. In acute heart failure: See NICE CG187 and ESC Heart Failure Association Consensus Statement (2023). For age related information – see details below:
	Age <50:				• NTproBNP <300 ng/L excludes the possibility of Acute heart failure. • NTproBNP 300-449 ng/L. Acute heart failure possible. Review and refer for echo within 48 hrs if high clinical suspicion. • NTproBNP ≥450 ng/L. Acute heart failure.
	Age 50-75:				• NTproBNP <300 ng/L excludes the possibility of Acute heart failure. • NTproBNP 300-899 ng/L. Acute heart failure possible. Review and refer for Echo within 48 hrs if high clinical suspicion. • NTproBNP ≥900 ng/L. Acute heart failure is likely. Refer for urgent Echo within 48 hrs.
	Age >75:				• NTproBNP <300 ng/L excludes the possibility of Acute heart failure. • NTproBNP 300-1799 ng/L. Acute heart failure possible. Review and refer for echo within 48 hrs if high clinical suspicion. • NTproBNP ≥1800 ng/L. Acute heart failure is likely. Refer for urgent echo within 48 hrs.
	In chronic heart failure: See NICE NG106.				• NTproBNP <300 ng/L in an untreated person makes Chronic heart failure unlikely. • Mildly elevated NTproBNP but level <400 ng/L in an untreated person, makes Chronic heart failure unlikely. • NTproBNP 400-2000 ng/L. Chronic heart failure possible. Investigate according to NICE guidelines. Echo within 6 weeks. • NTproBNP >2000 ng/L. High probability of Chronic heart failure. Refer to specialist (Echo) within 2 weeks.

Biochemistry Investigations (cont'd) – (including turnaround times and other information)

Test	Samples Required	Biological Reference Range	O/H	T	Special Precautions, Interfering Factors & Limitations
C3	SST	0.7-1.7 g/l	Y	1	
C4	SST	0.12-0.36 g/l	Y	1	
CA125	SST	<35 kU/l	N	1	
CA 19-9	SST	<31kU/l	N	2	
Caeruloplasmin	SST	See final report.	N	**	Not indicated in patients >45 years. Referred to RLUH
Calcitonin	SST	F= ≤5.89 ng/L M = ≤12.69 ng/L	N	**	Referred to Christies Biochemistry
Calcium (Adjusted)	SST	2.2 - 2.6 mmol/l	Y	1	Variable with age
Calcium (Total)	SST	0-28 days 2.0-2.7 mmol/L 1 month - 15 years 2.2-2.7 mmol/L	Y	1	16+ years no range reported
Carbamazepine	SST	4.0 – 12.0 mg/l	N	1	Reference interval is for samples taken at 6 hours post dose.
Carboxyhaemo-globin	HEPASy	< 5 %	Y	1	
Cart/Neurotensin	3 x EDTA	<85 pmol/L	N	35	Fasting specimen on ice. Prior to blood being taken, H2 blockers should be stopped for 72 hours and omeprazole stopped for 2 weeks. Separate and freeze within 15-mins Referred to Charing Cross Hospital
CEA	SST	<2.5 μg/l	N	3	
CF gene	EDTA	Refer to report from reference lab	N	25	Whole blood required, Referred to Liverpool Women's Hospital**– Consent Required**
Chloride	SST	95 – 108 mmol/l	N	1	
Cholesterol (Fasting or Random)	SST	<5.0 mmol/l	Y	1	Variable with age
Chol/HDL ratio	Calc	0-5	N	1	

Biochemistry Investigations (cont'd) – (including turnaround times and other information)

Test	Samples Required	Biological Reference Range	O/H	T	Special Precautions, Interfering Factors & Limitations
Cholinesterase	SST	Refer to report from reference lab	N	**	Referred to MRI
Chromogranin A	EDTA	<60 pmol/L	N	35	Part of Gut Hormone Profile - Referred to Charing Cross Hospital. Send the samples to the lab immediately (on ice if possible) as they need to be separated and frozen within 15 minutes.
Chromogranin B	EDTA	<150 pmol/L	N	35	Part of Gut Hormone Profile - Referred to Charing Cross Hospital. Send the samples to the lab immediately (on ice if possible) as they need to be separated and frozen within 15 minutes.
Copper	SST	See final report	N	**	Referred to RLUH
Cortisol	SST	7-9 am: 145-619 nmol/l	N	3	New analytical method and reference interval for cortisol on 11/06/2025. There will be a significant change in the cortisol results. Assay cross-reacts with prednisone, prednisolone, 6-methylprednisolone and metyrapone. Patients treated with these may show falsely ELE.
C-peptide	SST	See final report	N	**	Contact Lab & bring **immediately** or on ice Referred to Alder Hey
C-peptide/Insulin Ratio	Calc	See final report	N	**	Referred to Alder Hey
Creatine Kinase	SST	M 40 –320 IU/l F 25 - 200 IU/l	Y	1	
Creatinine	SST	M <120 μmol/l F <100 μmol/l	Y	1	Variable with age. (**Note**- this test is not accredited- For advice telephone laboratory 01925 662352)
CRP	SST	< 4 mg/l	Y	1	
CTX	EDTA	0.10 – 0.50 ug/l	N	11	Referred to RLUH
Cyclosporin	EDTA	See final report	N	**	Samples sent to originating hospital. Referred test.
DHEA	SST	See final report	N	**	Referred to Wythenshawe unless <1 yr old
Digoxin	SST	0.5 – 1.0 μg/l	N	1	Note the range quoted is that for heart failure. The general target range = 0.50-2.00 ug/L. Reference interval is for samples taken at 6 hours post dose. There is an increased risk of toxicity in the elderly and in those with renal impairment.
Drain fluid	See Note	Contact Lab for interpretation	N	2	Plain sterile container with no additive. **(Note-** this test is not accredited- For advice telephone laboratory 01925 662352)
Electrophoresis	SST	See α_1, α_1, β & γ globulins	N	For normal results 3 - 4 days Confirmation of M band 7 - 10 days.	

Biochemistry Investigations (cont'd) – (including turnaround times and other information)

Test	Samples Required	Biological Reference Range	O/H	T	Special Precautions, Interfering Factors & Limitations
Estradiol	SST	See separate table below	N	3	
Ethanol	FLOX	See table in Toxicology section	Y	1	
Fabry Disease	EDTA	Refer to report from reference lab.	N	25	Referred to Willink Laboratories; 5 mls whole blood required. Sample must be taken on a Monday or Tuesday and sent to Biochemistry without delay. **Consent Required**
Faecal elastase	BLFP	See final report	N	**	Referred to Wythenshawe Hospital
Faecal Immunochemical(FIT) Test	See Note	Refer to report	N	2	'Request via ICE to ensure the correct information is provided, GP to provide patient with the MAST Group Faecal Immunochemical Test: Sample collection kit'. Contact lab on 01925 662352 for advice on requesting this test.
Faecal reducing subs	BLFP	Negative	N	**	Fresh sample required as rapid deterioration occurs. Referred to Alder Hey
Familial Hypercholesterolaemia screen	EDTA	Refer to report from reference lab.	N	25	Whole blood required. Referred to Liverpool Women's Hospital**– Consent Required**
Ferritin	SST	M: 30-291 ug/L F: 30-322 ug/L	N	2	Variable with age. Adult reference range (18+) quoted. New reference intervals for Ferritin on 10/07/25, results not affected. Ferritin lower limits are now aligned to NICE Anaemia – Iron Deficiency CKS Guidance.
Fetal Fibronectin (FFN)	See Note	Clinical Interpretation by Obstetrician	Y	1	Specific collection kit required. Obstetric Department requests ONLY. **(Note-** this test is not accredited- For advice telephone laboratory 01925 662352)
Folate	SST	> 5.4 ng/ml	N	3	Sufficient folate >5.4 ng/mL Indeterminate folate 3.4-5.4 ng/mL Deficient <3.4 ng/mL
Free Androgen Index	Calc	16-20 years = Female: 0.4-5.3 % 21-50 years = Female: 0.3-4.4 % >50 years = Female: 0.3-2.5 %	N	3	Calculated from testosterone and SHBG
Free T3	SST	3.5 – 6.5 pmol/l	N	5	
Free T4	SST	11.5 – 22.7 pmol/l	N	2	Only performed if TSH is outside reference range
Fructosamine	SST	151-300 umol/L	N	**	Referred to Biochemistry at Salford Royal
FSH & LH	SST	See separate table below	N	3	
Gamma GT	SST	0-15 years (all) 0 – 55 IU/l 16+ Years Females <38 U/L 16 + Years Males <73 U/L	Y	1	Variable with age
Gastrin	EDTA	<40 pmol/L	N	35	Cease Omeprazole for two weeks, fasting specimen - send to Lab immediately (or) on ice Part of Gut Hormone Profile - Referred to Charing Cross Hospital

Biochemistry Investigations (cont'd) – (including turnaround times and other information)

Test	Samples Required	Biological Reference Range	O/H	T	Special Precautions, Interfering Factors & Limitations
Genetic testing	See note	Refer to report from reference lab	N	**	Referred to The North West Genomic Laboratory Hub. Sample requirement depends on test, contact Biochem for further advice
Gentamicin	SST	See section below			**(Note-** this test is not accredited- For advice telephone laboratory 01925 662352)
Gilbert's Phenotype	EDTA	Refer to report from reference lab.	N	25	Whole blood required. Referred to Liverpool Women's Hospital**– Consent Required**
Globulin	Calc	20 – 35 g/l	Y	1	
Glomerular Filtration Rate (GFR)	Calc	Value calculated from Renal Profile results on SST sample. Interpretation given on report form			
Glucagon	EDTA	<50 pmol/L	N	35	Part of Gut Hormone Profile - Referred to Charing Cross Hospital. Send the samples to the lab immediately (on ice if possible) as they need to be separated and frozen within 15 minutes.
Glucose	FLOX	Fasting 3.6 – 5.5 mmol/l Random 4.0 – 7.7 mmol/l	Y	1	
Glucose tolerance test (GTT)	FLOX	**I**nterpretation by Consultant Biochemist	N	1	Appointment required. Phone ext 2136 (External - 01925 662136)
Growth hormone	SST	Contact Consultant Biochemist	N	**	Referred to Christies Biochemistry
Gut Hormone Profile	3 x EDTA	See final report	N	35	Fasting Specimen, transport to lab immediately after collection on ice. Prior to blood being taken, H2 blockers should be stopped for 72 hours and omeprazole stopped for 2 weeks. Separate and freeze within 15-mins. Profile includes VIP, PANP, GAS, Glucag, SOMATO, CHROA, CHROB Referred to Charing Cross Hospital
HbA1c (IFCC)	EDTA	<42 mmol/mol	N	1	
HCG	SST	< 4 U/l	Y	1	Post-menopausal reference interval < 10 U/L. Pituitary production of BHCG can occur peri/post menopause.
HDL Cholesterol	SST	1.0 - 2.0 mmol/l (Fasting)	N	1	
HFE gene	EDTA	Refer to report from reference lab.	N	25	3 mls whole blood required. Referred to Liverpool Women's Hospital**– Consent Required**
HLA Typing (inc. B27)	2 x EDTA	See final report	N	**	Referred to Immunology, RLUH
Homocysteine & Methylmalonic Acid	3 x EDTA	See final report	N	16	Spin and separate ASAP. Referred to St Thomas' Hospital
Immunoglobins	SST	See individual immunoglobulins			

Biochemistry Investigations (cont'd) – (including turnaround times and other information)

Test	Samples Required	Biological Reference Range	O/H	T	Special Precautions, Interfering Factors & Limitations
Insulin	SST	See final report	N	**	Fasting sample required for interpretation and must be accompanied by a glucose sample. Referred to Alder Hey
Insulin/Glucose Ratio	Calc	See final report	N	**	Indicative of Insulinoma. Fasting sample required for interpretation and must be accompanied by a glucose sample. Referred to Alder Hey
Iron	SST	M: 6 - 29 μmol/l F: 5 – 33 μmol/l	N	2	Variable with age
Iron Saturation (%age)	Calc	M: 20 – 50 % F: 15 – 50 %	N	2	
KFRE	SST	>5%	N	1	5-year risk- this is associated with increased risk of progression of kidney disease and need of renal replacement therapy in CKD patients; patient should be referred into secondary care if 5y risk is >5%.
Knee fluid profile	See Note	Contact Lab for interpretation	N	2	Plain sterile container with no additive. **(Note-** this test is not accredited- For advice telephone laboratory 01925 662352)
Lactate	See Note	0.5 – 2.0 mmol/l	Y	1	Lithium Heparin specimen required. **(Note- If lactate is required, this should be discussed with the laboratory prior to requesting – telephone 01925 662352)**
LDH	SST	120-246 IU/L	N	1	Cumulative results from before and after the change are NOT comparable - new values are approximately 50% lower the previous. DO NOT trend results across this date (11/06/2025).
LDL Cholesterol (Fasting & Random)	Calc	0.5 – 3.0 mmol/l	N	1	
Lead	2 x EDTA	See final report	N	**	Referred to City hospital Birmingham
LH	SST	See separate table below	N	2	
Lithium	SST	0.4 – 1.0 mmol/l	Y	1	Contact laboratory for optimum time for collection of specimen.
Magnesium	SST	0-28 days 0.6-1.0 mmol/L 28 days + 0.7 -1.0 mmol/l	Y	1	
MEN1 testing	EDTA	Refer to report from reference lab.	N	25d	Whole blood required. Referred to Liverpool Women's Hospital**– Consent Required**
Metadrenalines (Plasma)	2 x EDTA	See final report	N	**	Ideally a fasting sample, send to lab immediately. Referred to Wythenshawe Hospital.
Non-HDL Cholesterol	Calc.	<4 mmol/L	N	1	**Calculated Test. (Note-** this test is not accredited- For advice telephone laboratory 01925 662352)

Biochemistry Investigations (cont'd) – (including turnaround times and other information)

Test	Samples Required	Biological Reference Range	O/H	T	Special Precautions, Interfering Factors & Limitations
Osmolality (Serum)	SST	275 – 295 mOsm/Kg	Y	1	**Contact laboratory if request is urgent.**
P3NP	SST	Measure P3NP pre-treatment and at least every 3-4 months for patients on Methotrexate therapy. Refer to Hepatology if the P3NP >7.0 ng/ml (or >4.2 if measured prior to 02/06/23) on 3 separate measurements within a 12-month period or >13.0 ng/ml (or >8.0 if measured prior to 02/06/23) on 2 consecutive samples.	N	3	(**Note**- this test is not accredited- For advice telephone laboratory 01925 662352)
PANP (pancreatic polypeptide)	EDTA	<300 pmol/L	N	35	Part of Gut Hormone Profile - Referred to Charing Cross Hospital
Paracetamol	SST	< 10 mg/l	Y	1	**The results of some biochemical markers from samples taken following the administration of N-Acetylcysteine may be affected. The list of tests include: Cholesterol, Enzymatic Creatinine, Glucose, Lactate, Triglyceride and Uric acid.**
Peritoneal fluid	See Note	Contact Lab for interpretation	N	2	Plain sterile container with no additive. **(Note-** this test is not accredited- For advice telephone laboratory 01925 662352)
Phenytoin	SST	10.0 - 20.0 mg/l	N	1	Contact laboratory for optimum time for collection of specimen.
Phosphate	SST	0-28 days 1.3-2.6 mmol/L 4-52 weeks 1.6-2.4 mmol/L 1-15 years 0.9-1.8 mmol/L 16+ years 0.8-1.5 mmol/L	Y	1	Variable with age
Plasma Metanephrines,	EDTA	<510 pmol/L	N	16	Referred to Wythenshawe. A fasting specimen is required. Patient should fast from 10pm but is allowed to drink water. Send fasting samples to lab immediately.
Pleural fluid	See Note	Contact Lab for interpretation	N	2	Sterile pot with white lid- no additive. **(Note-** this test is not accredited- For advice telephone laboratory 01925 662352)
Potassium	SST	0-28 days = 3.4-6.0 mmol/L 1-12 months = 3.5-5.7 mmol/L 1-15 years = 3.5-5.0 mmol/L 16+ years = 3.5-5.3 mmol/L	Y	1	Variable with age
Porphyrins	EDTA	See final report	N	**	Referred to Biochemistry, Hope Hospital, Salford.
Progesterone	SST	M: <5 nmol/l F: 30 – 130 nmol/l (luteal phase)	Y	1	21 day sample preferred
Prolactin	SST	M: < 45-375 mU/l F: < 59-619 mU/l	N	2	

Biochemistry Investigations (cont'd) – (including turnaround times and other information)

Test	Samples Required	Biological Reference Range	O/H	T	Special Precautions, Interfering Factors & Limitations
PSA	SST	< 5.0 ng/ml	N	2	Variable with age. New units for PSA on 04/08/25, results not affected - these are equivalent to the old units of ng/mL. Results will now be reported down to a lower limit of 0.2 ug/L.
PTH	SST	1.5 – 7.6 pmol/l	N	2	
Purine/Pyrimidine Screen	EDTA	See final report	N	21	Referred to St Thomas' Hospital. A random urine to accompany the blood sample is required for a full screen.
Renin	EDTA	See final report	N	**	Sample to Lab immediately or on ice – Referred to Wythenshawe
Salicylate	SST	< 30 mg/l	Y	1	
SHBG	SST	Reference range varies with age/sex. See report.	N	3	
Sodium	SST	133 –146 mmol/l	Y	1	Reference
Somatostatin	EDTA	<150 pmol/L	N	35	Part of Gut Hormone Profile - Referred to Charing Cross Hospital
Teicoplanin	SST	See section below			Referred to Whiston
Testosterone	SST	M 18+ 8.0 – 36.0 nmol/l F < 50 years <1.2nmol/L F + 50 years <1.5nmol/L	N	3	
Theophylline	SST	10.0 - 20.0 mg/l	N	1	Contact laboratory for optimum time for collection of specimen.
Thiopurine Metabolites (TGN & MMP)	2 x EDTA	See final report	N	**	One EDTA is for these tests & the other EDTA is needed for FBC results (required by referral lab - Referred to GSTS.
Tobramycin	SST	See section 8.6.2 below. Referred to Alder Hey			
Total Iron Binding Capacity (TIBC)	SST	M: 45 – 72 μmol/l F: 36 – 77 μmol/l	N	2	Variable with age
Total Protein	SST	60 – 80 g/l	Y	1	Variable with age
TPO	SST	<14U/Ml	N	3	New analytical method and reference interval for TPO on 11/06/2025. Cumulative results from before and after the change are NOT comparable.
TRAB	SST	See final report	N	**	Referred to Sheffield NGH
Transferrin	SST	< 1 year all: 1.68-3.42 g/L 1-12 years all: 2.14-3.07 g/L 12-19 years all: 2.35-3.63 g/L 20+ years F: 2.5-3.8 g/L M: 2.15-3.65 g/L 1.9 – 3.75 g/l	N	2	Variable with age

Triglyceride (Fasting & Random)	SST	0.2 - 2.0 mmol/l	N	1	
Troponin I (High Sensitivity TNI)	SST	<50 ng/l	Y	1	**Under review with Cardiology .TNI for investigation of chest pain is not suitable for use in a primary care setting due to pathway guidelines in relation to the requirement for timed serial samples. For advice, contact Dr Davis or Dr Magapu in Cardiology.**
TSH	SST	0.2 – 6.0 mU/l	N	2	
Urea	SST	0-28 days = 0.8-5.5 mmol/L 1-12 months = 1.0-5.5 mmol/L 1-15 years = 2.5-6.5 mmol/L 16+ years = 2.5-7.8 mmol/L	Y	1	Variable with age
Uric acid	SST	< 1 year all: 0.1- 0.35 mmol/L 1-12 years all: 0.13- 0.33 mmol/L 12-18 years F: 0.17-0.40 mmol/L M: 0.17-0.49 mmol/L 19+ years F: 0.14-0.36 mmol/L M: 0.2-0.43 mmol/L	N	1	Variable with age
Valproate	SST	<100 mg/l	N	1	Toxicity may occur at valproate levels >100 mg/L. Note, 0-100 mg/L is NOT a therapeutic target interval for valproate.
Vancomycin	SST	See section 8.6.3 below. (NOTE- this test is not accredited- For advice telephone laboratory 01925 662352)			
Vaso Int Pep	EDTA	<30 pmol/L	N	35	Part of Gut Hormone Profile - Referred to Charing Cross Hospital. Send the samples to the lab immediately (on ice if possible) as they need to be separated and frozen within 15 minutes.
Vitamin A	SST	See final report	N	**	Referred to RLUH. **Note: Specimen must be transported to the lab in the dark (envelope)**
Vitamin D	SST	50 -250 nmol/l	N	3	L ≤ 25 nmol/L = Deficient 26-50 nmol/L = Insufficient > 50 - 250 nmol/L = Sufficient **Lithium Heparin tube is unsuitable.**
Vitamin E	SST	See final report	N	**	Referred to RLUH. **Note: Specimen must be transported to the lab in the dark (envelope)**
White cell enzymes	EDTA	See final report	N	**	Referred to Willink, Biochemistry
Zinc	SST	12.0 – 20.0 μmol/l	N	5	

8.6. Antibiotic Assays.

8.6.1. Containers, transport and storage

Adult samples should be taken into 5 ml standard SST tubes. Write the time taken on the tube.
Paediatric samples can be taken into green or red top Microtainers.

Samples must reach the Pathology Department within 4 hours. They will not be tested if left for longer than 4 hours, unless they have been stored between 2°C and 8°C in a fridge.

8.6.2. Gentamicin and Tobramycin assays

Gentamicin

Conventional twice a day (BD) or three times a day (TDS) dosing:

Take samples of clotted blood immediately pre-dose (the **"trough"**) and 1 hour post-dose (the **"peak"**) and submit them together. Please ensure samples are labelled accordingly.
Results are expressed in micrograms/ml. The **trough** should be **<2** and the **peak** between 5 and 9.

Once a day dosage:

Follow the protocol available from the Pharmacy Department or the Antibiotic Formulary available on the Intranet.
For interpretation and advice please phone Pharmacy on 2297.

Tobramycin

Tobramycin requests are sent to Alder Hey. Please contact lab if required urgently and sample will be sent by Taxi.

8.6.3. Vancomycin Assay

Only pre-dose levels need to be done

Send blood before the third or fourth dose of Vancomycin

Interpret results and dose accordingly, - as detailed in the antibiotic formulary, found on the Hospital Intranet.

8.6.4 Teicoplanin Assay

Teicoplanin levels are not measured routinely because a relationship between plasma concentration and toxicity has not been established. However, teicoplanin concentration can be used to optimise treatment in some patients i.e. those on high dose or long treatment duration.

If teicoplanin levels are required then trough levels should be taken (immediately pre-dose).

Refer to the Antibiotic Formulary, available on the Intranet, for dosing of teicoplanin as this is based on actual body weight and indication.

Discuss all sub- or supra-therapeutic levels with a Consultant Microbiologist as dosage may need adjusting or therapy changing depending on the severity of the infection, the patient's clinical response to antibiotic therapy and the isolated organism.

8.7. FSH, LH and Estradiol Reference Ranges.

	FSH (U/l)	LH (U/l)	Estradiol (pmol/l)
Follicular	1.3 – 6.3	0.8 – 2.5	102 – 631
Mid Cycle	2.3 - 20.9	25 – 57	
Luteal	0.8 – 7.5	0.8 – 27	202 – 903
Post Menopause	>35	>35	<150
Male	0.9 – 13.0	4.5 – 9.0	<180

Tube required: **SST.**
Turnaround times: **3 working days.**
Limitations: **Day of cycle would be helpful for interpretation.**

8.8. Urine Biochemistry - General

For **Creatinine Clearances,** the laboratory requires a 24-hour urine sample and a 5 ml SST sample, acquired within or very close to this time period.

Urine **Pregnancy tests** are also performed by the laboratory – a yellow topped urine container (syringe type, with no additive is required).

Contact Biochemistry (ext. 2352) for advice about appropriate containers.

See table of tests, reference ranges, turnaround times etc on next page.

Key to Urine Table below

Code	Container
24A	24 Hour urine container with acid (all collection to be included, no minimum volume)
24P	24 hour urine container – no additive (all collection to be included, no minimum volume)
Plain	8 ml(or 10ml) yellow top urine bottle (syringe type) - Alternatively 25 ml plastic universal bottle with no additive can be used. **Minimum volume for analysis – 5ml**

8.9. Urine Biochemistry – Table

O/H – Out of core hours availability; **T** = Turnaround time in working days, ** = Contact Laboratory for TAT

Test	Samples Required	Biological Reference Range	O/H	T	Special Precautions, Interfering Factors & Limitations
5HIAA	24A	< 45 μmol/24 hours	N	**	Referred to Wythenshawe. Refer to Patient information leaflets for interfering factors.
Albumin Creatinine Ratio (ACR)	Plain	F: < 3.5 mg/mmol M: < 2.5 mg/mmol	Y	1	Diabetic population
Albumin Creatinine Ratio (ACR)	Plain	< 30 mg/mmol	Y	1	Non-diabetic population
Amino acid (screen or quantitative)	Plain	See final report	N	**	Referred to Alder Hey
Bence Jones protein	Plain	Not detected	N	For normal results 5 days Confirmation of band 7-10 working days **(Note-** this test is not accredited- For advice telephone laboratory 01925 662352)	
Calcium	24P	2.5 - 7.5 mmol/l/24hrs	N	1	
Calcium/Creatinine Ratio	Plain	0.3 – 0.7 mmol/mmol	N	1	This is a calculated test. **(Note-** this test is not accredited- For advice telephone laboratory 01925 662352)
Creatinine	24P	9-18 mmol/24hrs	N	1	
Creatinine clearance	24P	>90 mL/min	N	1	
KFRE (ACR)	24P	>5%	N	1	ACR/urine sample ideally is collected within one month of creatinine/eGFR sample and must be collected within six months. Note eGFR should be calculated using the CKD-EPI 2009 equation only and only this value from this specific equation can be used for KFRE in the UK (KFRE is only validated against the CKD-EPI 2009 equation).
Magnesium	24P	2.4-6.5 mmol/24h	N	1	
Metadrenalines (VMA)	On the rare occasions urine metadrenalines are required – please contact the laboratory on 2352.				
	24A	See final report	N	**	Referred to Biochemistry, Hope Hospital, Salford.: Refer to Patient information leaflets for interfering factors.
Mucopolysaccharide	Plain	Refer to report from reference lab	N	**	Referred to Alder Hey
Osmolality (urine)	Plain	250 – 750 mosmol/kg	Y	1	**Contact laboratory if request is urgent.**
Phosphate	24P	15-50 mmol/24h	N	1	
Porphyrins (Total)	Plain	See final report	N	**	Referred to Biochemistry, Hope Hospital, Salford. **Special requests only. Protect from light.**
Potassium	24P	25 - 125 mmol/24hrs	Y	1	

Urine Biochemistry – Table (Cont'd)

Test	Samples Required	Biological Reference Range	O/H	T	Special Precautions, Interfering Factors & Limitations
Pregnancy test	Plain	Presence/absence of HCG reported.	Y	1	Early morning urine in plain sterile container.
Protein	24P	< 0.15 g/24 hours	N	1	**Note:** Samples from patients receiving amikacin, gentamycin, kanamycin or tobramycin should be avoided as they can falsely increase the result. Sample is stable for 3 days if stored in the fridge.
Protein/Creatinine ratio	Plain	<50 mg/mmol	N	1	**Note:** Samples from patients receiving amikacin, gentamycin, kanamycin or tobramycin should be avoided as they can falsely increase the result. **(Note-** this test is not accredited- For advice telephone laboratory 01925 662352)
Reducing substances	Plain	Negative	N	**	Fresh sample required. Referred to Alder Hey
Sodium	24P	40 - 220 mmol/24hrs	Y	1	
Urea	24P	430 - 710 mmol/24hrs	N	1	
Uric Acid	24P	1.5-4.5 mmol/24h	N	1	

8.10. Miscellaneous Investigations.

O/H – Out of core hours availability; **T** = Turnaround time in working days.
** = Contact Laboratory for TAT

Test	Samples Required	Biological Reference Range	O/H	T	Special Precautions, Interfering Factors & Limitations
Glucose tolerance test	FLOX	Contact Consultant Biochemist for interpretation	N	1	Performed only by prior arrangement with the Laboratory. At least 24 hours notice required. To book a GTT, contact appointments on 01925 662136 (2136 from within the Trust)
Downs screening	SST		N	**	Referred to Bolton Royal
pH of body fluids	HEPASy	Contact Consultant Biochemist for interpretation	N	1	Fluid pH samples must be received in a syringe with air expelled. **(Note-** this test is not accredited- For advice telephone laboratory 01925 662352)
Cytogenetic Tests	Refer to individual tests in the tables above & section 3.11 for further information.				

8.11. Immunology

8.11.1. Autoantibodies; Endomysial Antibodies & Other Antibodies.

The tests featured in the table below are screened in Biochemistry and all positive samples are referred to the Immunology Department at the Royal Preston Hospital. Results are returned to Warrington and entered into the Trust's computer to generate a report which is then forwarded on to the appropriate ward or department.
Clinical Immunology advice is provided by the external referral laboratory. Contact details for clinical staff at reference site are available on request from Biochemistry on 2352.

8.11.2. Turnaround Times & Notes - Immunology

Test	Samples Required	Biological Reference Range	O/H	T	Special Precautions, Interfering Factors & Limitations	Clinical Indications
Faecal Calprotectin	1x Plain faecal sample (Blue-top)	<50 mg/kg	N	10	Sample must be received by laboratory on the day of specimen collection	Faecal Calprotectin measurement is useful in the differential diagnosis of IBS and IBD. In addition, where a diagnosis of IBD has been made Calprotectin is useful for monitoring disease activity and predicting patient relapse of IBD.
CTD Screen	SST	Refer to report	N	7	Turnaround times unless subsequent investigations are required	Systemic autoimmune rheumatic diseases (SARDs) are a wide spectrum of systemic autoimmune diseases including rheumatoid arthritis (RA), systemic lupus erythematosus (SLE) and several other connective tissue diseases. The diagnosis of these is often challenging as the patients can present with multiple features consistent with two or more SARDs resulting in an undifferentiated or even overlap syndrome. The complex nature of the underlying disease pathology can take many years to evolve from a relatively undifferentiated to a fully-differentiated form. Therefore, the presence or absence of biomarkers such as autoantibodies can be helpful in guiding appropriate medical care and treatment. The CTD screen contains the following antigens U1RNP, SS-A/Ro, SS-B/La, centromere B Scl-70 Jo-1, fibrillarin, RNA Pol III, Rib-P, PM-Scl, PCNA, Mi-2, Sm and ds DNA.
Liver Autoantibodies		Refer to report	N	**		The autoantibody screen is used to detect autoantibodies characteristic of a wide range of autoimmune diseases, Autoantibodies recognising antigens in liver, kidney or stomach are detected. The autoantibody screen detects anti-nuclear antibodies; gastric parietal cell antibodies, mitochondrial antibodies, liver-kidney microsomal and smooth muscle antibodies. A number of other autoantibodies of varying diagnostic value are also detected e.g anti-reticulin. Referred to Preston.
TTG		<7 U/ml	N	7		Untreated coeliac disease is characterised by the presence of IgA antibodies to one or more antigens. IgA anti-tissue transglutaminase antibodies are now used as the screening test of choice. All positive samples are then tested for IgA anti-endomysial antibodies. There is a good correlation with disease activity. The widespread use of these tests has led to the realisation that coeliac disease is common in all age groups even the elderly and presentation can be varied. An immune response to tissue transglutaminase or its products is the cause of coeliac disease. Most untreated coeliacs will have both IgA anti-tTg and endomysial antibodies. IgA anti-tTg tends to appear before anti-endomysial, sometimes before overt symptoms. On a gluten free diet IgA anti-tTg usually disappears after IgA anti-endomysial. Relapse or poor compliance with a gluten free diet is often associated with return of antibody positivity. Note that coeliac disease is often associated with IgA deficiency. IgA levels are estimated in all patients with suspected coeliac disease. IgA deficient individuals with suspected coeliac disease are tested for IgG anti-tTg and IgG anti-endomysial antibodies. The test for IgA anti-TTg will usually detect IgA deficiency and indicate the need for measurement of IgG antibodies. Occasionally the standard autoantibody screen will identify anti-reticulin autoantibodies which can suggest coeliac disease. In such cases, the serum will be tested for IgA anti-TTg.
TTG (paediatrics)	Red top paediatric sample or adult SST tube.	<7 U/ml	N	7		
MPO/PR3	SST	MPO < 3.5 U/ml PR3 < 2.0 U/ml	N	7		Myeloperoxidase is the most commonly recognised p-ANCA antigen. It is a 140kDa cationic protein found predominantly in azurophilic granules of neutrophils and monocytes. The p (peripheral)-ANCA staining pattern is an artefact produced when the MPO released form the

						granules by the ethanol used in fixation of the cells is attracted to the nucleus. The enzyme which accounts for up to 5% of total cell protein generates anti-microbial chlorinated oxygen species from hydrogen peroxide produced as a result of the neutrophil respiratory burst. The autoantibodies appear to recognise conformational determinants but do not inhibit the enzyme activity. In different studies only 10-35% of P-ANCAs showed anti-myeloperoxidase activity. An improved assay (termed MPOS) was introduced May 16 2011. Quantitative values using the new assay may vary from those obtained previously The archetypal c-ANCA antigen is a serine proteinase termed proteinase 3, a 28kDa protein. Autoantibodies recognise primarily conformational epitopes. An improved assay (termed Pr3S) was introduced May 16 2011. Quantitative values using the new assay may vary significantly from those obtained previously
Anti GBM	SST	< 7 U/ml	N	7		Goodpasture's syndrome is an autoimmune condition characterised by rapidly progressive glomerulonephritis accompanied by pulmonary haemorrhage. It is caused by antibodies to the glomerular and alveolar basement membranes. Anti-GBM antibody-induced glomerulonephritis is responsible for about 5% of human glomerulonephritides, and is most common in young males. The antibodies which are pathogenic are usually IgG. Anti-GBM antibodies are a highly sensitive and specific marker of Goodpasture"s syndrome. Levels correlate with disease activity and often predict clinical outcome. In kidney sections ,these autoantibodies show linear distribution in the GBM, Bowmans capsule, and distal tubular basement membranes, but not of proximal tubules. The same antigen is found in basement membranes of the alveoli, and choroid plexus, and to membranes of the lens capsule, choroid, and retina of the eye and cochlea, but not in other organs. The antigen is on the globular domain of subendothelial collagen type IV; specifically the 30kDa M2 subunit. Glomerular Type IV collagen contains unique types of collagen chain termed a3 and a4; six types of a-chain have been identified in other basement membranes. NC1 domains of the various a-chains are released as hexamers by collagenase digestion of GBM. This is the antigen used in our assay.
Alpha 1 anti-trypsin	SST	0.9 - 2.0 g/L Variable with age	N	5		The quantitation of Alpha-1-antitrypsin (AAT) is indicated in the evaluation of chronic obstructive airway disease, emphysema and in neonatal and adult liver disease where low concentrations may have diagnostic significance. AAT levels ≤1.2g/L will be referred for phenotyping.
Ig SUBCLASSES	SST	Refer to report	N	**	Referred to Central Manchester Immunology	IgG subclass measurements are really only useful in the investigation of suspected immune deficiency. Levels vary with age. IgG2 (and IgG4) levels are physiologically low in infancy and may not reach adult levels until 10 to 12 years of age IgG subclass measurements may be more important in patients with IgA deficiency. IgG2 and combined IgG2 /IgG4 deficiency are of particular concern. There is little point in generally measuring subclass levels although they can be raised in certain diseases. Raised levels are IgG4 levels tend to higher in atopic individuals and can be raised in some autoimmune diseases and in cystic fibrosis. IgG1 can be very high in Sjogrens syndrome.
IgA	SST	<2 yrs <1.70 g/L 2-5 yrs 0.37-1.78 g/L 6-13 yrs 0.58-2.51 g/L 14-18 yrs 0.71- 3.35 g/L >18 yrs 0.4- 3.5 g/L	N	1	Adult/Variable with age	Total immunoglobulins are indicated for recurrent infections, liver disease, suspected myeloma, lymphoma and connective tissue disease. Factors affecting this test include age and primary/secondary immunodeficiency. Raised IgA is seen in the elderly, chronic infection and cirrhotic liver disease. This test is also performed as part of the coeliac screen to rule out IgA deficiency common in this group of patients.

IgE (Total)	SST	< 15 kU/L	N	5	Common allergens at Warrington. Referral of others to Preston.	Total IgE levels are elevated in atopic eczema, allergic asthma bronchopulmonary aspergillosis, invasive helminthiasis, parasitic infections, Wiskott-Aldrich syndrome, Churg-Strauss and Hyper IgE syndrome and some forms of immunodeficiency. Measurement of total IgE levels is not essential for the diagnosis of allergy.
Specific IgE (Common Allergens)	SST	<0.35 kAU/l	N	5	Common allergens at Warrington. Referral of others to Preston.	Allergies result from an inappropriate reaction to a usually innocuous environmental protein, or allergen. They most frequently present as rhinitis, asthma, atopic dermatitis and other skin manifestations, and occasionally as life-threatening anaphylactic shock . Antigen binding membrane bound IgE will specifically release preformed mediators from blood basophils or tissue mast cells, and it is the action of these mediators which are responsible for immediate hypersensitivity reactions. The allergen-specific IgE antigen test is done to screen for an allergy (a type I hypersensitivity) to a specific substance or substances in response to acute or chronic allergy-like symptoms in the patient. The level of IgE present does not correlate to the severity of an allergic reaction and it is possible to have a positive specific IgE result to an antigen that is not a cause of allergy in the patient. It is essential that the results are interpreted alongside a full allergic history and any tests that have been performed, such as skin prick tests
IgG	SST	<1 year1.4-8.9 g/L 1-3 years 4.4-12.4 g/L 4-9 years 5.7-13.6 g/L 10-18 years 6.8-15.8 g/L >18 years 6.5-16 g/L	N	1	Adult/ Variable with age	Total immunoglobulins are indicated for recurrent infections, liver disease, suspected myeloma, lymphoma and connective tissue disease. Factors affecting this test include age and primary/secondary immunodeficiency. Marked polyclonal IgG elevation is seen in HIV, viral and autoimmune hepatitis, Sjögrens syndrome and sarcoidosis. Less marked elevation seen in chronic inflammatory and infective conditions.
IgM	SST	< 1 year 0.2-1.1 g/L 1-18 years M:0.4-1.7 g/L 1-18 years F:0.5-2.1 g/L >18 years 0.5-3.0 g/L	N	1	Adult/ Variable with age	Total immunoglobulins are indicated for recurrent infections, liver disease, suspected myeloma, lymphoma and connective tissue disease. Factors affecting this test include age and primary/secondary immunodeficiency. Raised IgM is seen in primary biliary cirrhosis, acute infection, EBV, CMV and TB.
RA Latex	SST	<12.5 IU/l	N	2		Rheumatoid factors are autoantibodies of IgM, IgG, IgA or even IgE class which recognise antigenic determinants on the Fc region of IgG. Remarkably, the exact nature of the antigenic determinants is still not recognised. Since the rheumatoid factor is detected in the presence of a vast excess of IgG in the serum, the antigen which is detected is often referred to as altered IgG. An alternative explanation is that the anti-IgG antibodies are of low affinity and are only detected on aggregated antigen (latex particles in our assay). Rheumatoid factor (usually IgM) is present in approximately 70% of patients with RA. Higher levels and the presence of IgG and IgA RFs correlate with more severe disease. The assay that we use is supposed to detect all classes of RF but probably detects mainly IgM. The presence of RF is not essential for the diagnosis of RA (so-called seronegative arthritis). RF also occurs in other autoimmune diseases (SLE, Scleroderma, Sjogrens) and in chronic infections (septicaemia, bacterial endocarditis) Rheumatoid factor is thus a rather non-specific assay. Anti-CCP is much more sensitive and specific for rheumatoid arthritis.
Anti-CCP	SST	<7 U/ml	N	14		Rheumatoid Arthritis (RA) is one of the most common systemic autoimmune diseases (prevalence 1-2%). It is characterized by chronic inflammation of the joints and may lead to progressive erosions and cartilage destruction. Until recently, the early diagnosis of RA relied chiefly on clinical manifestations and on rheumatoid factors (RF) as serological marker. Determination of RF is rather sensitive for RA (50-90%), but only of limited specificity (70-90%). Patients with various other diseases (e.g. SLE, Sjögren's syndrome, systemic sclerosis, polymyositis/dermatomyositis) and some healthy individuals were reported to be positive for RF as well2.

						In 1998, highly RA specific antibodies were described that were directed against citrullinated peptides. . Thus, anti-CCP testing is a tool to aid in the diagnosis of RA.

If you cannot find the test you require in the above sections or lists, please contact Biochemistry as the test repertoire is being continually updated

9.0. Haematology Department.

9.1. Contacts:

Consultant:	Dr M Spanoudakis	01925 66**5613**
Secretary:		01925 66***2534***
Haematology Manager	Mrs R Langan	01925 66***2539*** rachel.langan@nhs.net
Transfusion Specialist:	Mrs R. Spiers	Ext ***5199*** or Bleep 052
General Enquiries & Results:		01925 66***2545***
Special Enquiries:	Transfusion Haematology Coagulation	01925 66***2547*** 01925 66***2549*** 01925 66***2194***

Table Of Tests Available.

The following tables include information on containers to be used, reference ranges & turnaround times. The following abbreviations are used in this section.

ACA:	Anticardiolipin Antibody
Adult:	Adult Reference Range
CIT:	Citrate bottle (Blue top)
EDTA:	Ethylene Diamine Tetra-acetic Acid 4 ml (Purple top – short)
EDTA6:	Ethylene Diamine Tetra-acetic Acid 6 ml (Pink top – long)
EDTAp:	Paediatric EDTA bottle.
F:	Female
FBC:	Full Blood Count
LIHEP:	Lithium Heparin bottle (Green top)
M:	Male
O/H:	Availability of test out of routine hours
PRO:	Prophylactic
RED:	Plain tube – no anticoagulant (Red top).
TH:	Therapeutic.
T:	Turnaround times in working days. Those marked * may be variable due to test batching or reference to an outside laboratory.

9.2. Haematology Investigations

O/H – Out of core hours availability; **T** = Turnaround time in working days; * may be variable due to test batching or reference to an outside laboratory.

- Severely haemolysed samples will **not** be processed & comments will be added as appropriate if slight haemolysis is observed.
- **Minimum primary sample volume requirements** are stated in the section below :- see section 9.3 below
- **Sample Container Types & Draw Order details are featured in Appendix 1 of this Handbook**

Test	Samples Required	Biological Reference Range	O/H	T	Special Precautions, Interfering Factors & Limitations
ACA IgG	1 RED	< 10.0 GPL u/ml	N	20*	
ACA IgM	1 RED	< 8.0 MPL u/ml	N	20*	
ADAMTS13	2 x CIT	See interpretive report	N	14	**Referred to RLUH**
ADAMTS13 Inhibitor	2 x CIT	See interpretive report	N	14	**Referred to RLUH**
Activated Protein C Resistance (APCR)	2 x CIT	0.7 – 1.1	N	20*	
Alpha -Thal screening	EDTA	See interpretive report	N	30*	Following 1st line testing. **Referred to MRI**
APTT	CIT	22.0 – 34.0 secs	Y	1	Variable with age
APTT Ratio	CIT	1.8 – 3.3	Y	1 for routine. (see note for urgent requests)	For Intravenous Heparin dosage. Expected TAT for Urgent APTT Ratio requests is 90% reported within 90 minutes.
Anti-Thrombin III (ATIII)	2 x CIT	75 – 120%	N	20*	
ATIII antigen	CIT	See interpretive report	N	21*	Following 1st line testing. **Referred to RLUH**

Haematology Investigations (cont'd)

Test	Samples Required	Biological Reference Range	O/H	T	Special Precautions, Interfering Factors & Limitations
BCR-ABL diagnosis	LIHEP or bone marrow	See interpretive report	N	3*	Only following Haematology advice. **Referred to HODS**
BCR-ABL monitoring	EDTA x 3	See interpretive report	N	14	Only following Haematology advice. **Referred to HODS**
Bone Marrow Aspirate Morphology	EDTA	See interpretive report	N	10	Only following Haematology advice. Initial examination (including iron stain) can be processed in house at Warrington. **Referred to HODS for end report.**
Bone Marrow Trephine	Sample in 10% Formalin	See interpretive report	N	14	Only following Haematology advice. Referred to **RLUH**
BRAF codon 600 mutation	EDTA	See interpretive report	N	10	Only following Haematology advice. Referred to **LWH.**
CALR exon 9 mutation	EDTA	See interpretive report	N	10	Only following Haematology advice. Referred to **LWH**
Cell Marker studies	EDTA	See interpretive report	N	5	Only following Haematology advice. **Referred to HODS**
CLL Panel	LIHEP or EDTA	See interpretive report	N	21*	Only following Haematology advice. **Referred to HODS**
Cytogenetics (FISH analysis)	LIHEP or bone marrow	See interpretive report	N	21	Only following Haematology advice. **Referred to HODS**
D-Dimer for DIC	CIT	< 0.4 mg/l FEU	Y	1	To investigate patients with possible DIC
D-Dimer for VTE	CIT	Negative	Y	1	To investigate patients with possible DVT or PE. Presence of oral a/c can lead to false negative results. Age adjusted cut-off values applied to patients aged over 50 years of age.

Haematology Investigations (cont'd)

Test	Samples Required	Biological Reference Range	O/H	T	Special Precautions, Interfering Factors & Limitations
Direct Coombs Test (DCT)	EDTA	Negative	Y	1	
ESR	EDTA	M: 0 – 6 mm/1hr F: 0 – 8 mm/1hr	Y	1	Variable with age
Factor Assays	2 x CIT	Given on final report	N	14*	**Referred to RLUH – TAT < 21 days** **NOTE:** Repeat samples may be requested in response to a low result.
Factor V Leiden	EDTA	Not detected	N	10*	Referred to **MWL**
Factor VIII Level	2 x CIT	40 – 145%	N	10*	**Note:** Repeat samples may be requested in response to a low result.
Factor Xa	CIT	Variable	Y	5	**Specimen should be taken 4 hours post dose** To monitor Low Molecular Weight Heparin dose
Fibrinogen	CIT	1.5 – 4.0 g/L	Y	1	
Full Coagulation Screen - includes PT, APTT & Fibrinogen	CIT	See individual assays	Y	1	To investigate bruising, bleeding, pre-op coagulation status, DIC etc. Correction tests for PT/APTT may be initiated by the laboratory.
Film (Blood Film)	EDTA	n/a	Y	1	**Note**- Digital Morphology is used alongside microscopy for this test. The digital morphology aspect is not currently accredited- For advice telephone laboratory 01925 662549)

Haematology Investigations (cont'd)

Test	Samples Required	Biological Reference Range	O/H	T	Special Precautions, Interfering Factors & Limitations
Full Blood Count (FBC) – includes the parameters below:					
WBC	EDTA	3.8 - 11.0 X 10^9/l	Y	1	Variable with age.
RBC		M: 4.5 – 6.5 x 10^{12}/l F: 3.8 – 5.8 x 10^{12}/l			
Hb		M: 130 – 180 g/l F: 115 – 165 g/l			
HCT		M: 0.400 – 0.540 F: 0.350 – 0.470			
MCV		85 – 105 fl			
MCH		27.0 – 32.0 pg			
MCHC		31.0 – 36.0 g/l			
Platelets		150 – 450 x 10^9/l			Variable with age. Persistent clumping requires citrate sample (blue top)
White Cell Differential		Neutrophilis, Lymphocytes, Monocytes, Eosinophils, Basophils			Variable with age & sex. Contact lab if specific information is required.

Haematology Investigations (cont'd)

Test	Samples Required	Biological Reference Range	O/H	T	Special Precautions, Interfering Factors & Limitations
G6PD Enzymes	EDTA	See interpretive report	N	3	Referred to **MRI** **Results of doubtful value in cases with high retic values**
Glandular Fever Screen	EDTA	Negative	Y	1	**Note:** A glandular fever screen is only positive in 80-90% of acute cases. If the screen is negative, but symptoms persist, please clinically correlate and if appropriate perform additional testing using other clinical methods. A positive glandular fever screen may be observed in conditions other than glandular fever, which produce heterophile antibodies, e.g. CMV, Burkett's, RA. Please clinically correlate.
Haemoglobinopathy screening using HPLC	EDTA	Interpretation with results	N	10*	
Haemoglobinopathy screening using HPLC – further investigation & confirmation.	EDTA	See interpretive report	N	7*	Following 1st line testing. **Referred to Trafford.**
HbA_2 Quantitation	EDTA	2.0 – 3.5%	N	3*	
HbF Quantitation	EDTA	0.0 – 2.0%	N	3*	
HbS Screening test (Sickle Screen)	EDTA	Negative	Y	3	Same day pre-op.
Homocysteine Level	FLOX	< 15 mols/l	N	<14*	Discuss with the Consultant Haematologists before requesting. Referred to **RLUH**
INR	CIT	Condition dependent	Y	1	To monitor dose of Warfarin & Di-coumarin drugs. To monitor Paracetamol overdose

Haematology Investigations (cont'd)

Test	Samples Required	Biological Reference Range	O/H	T	Special Precautions, Interfering Factors & Limitations
JAK 2 V617F Mutation	EDTA	See interpretive report	N	10	Only following Haematology advice. Specimen must be received in reference lab within 48 hrs of collection. **Referred to HODS**
JAK 2 exon 12 Mutation	EDTA	See interpretive report	N	10	Only following Haematology advice. Specimen must be received in reference lab within 48 hrs of collection. **Referred to HODS**
Lupus screen	2 x CIT	< 1.2	N	20*	
Lupus confirm	2 x CIT	< 1.15	N	20*	
Malarial Screen	EDTA	Negative	Y	1	**MUST STATE COUNTRY OF TRAVEL.** **Note:** The rapid diagnostic test used as part of a malaria screen is not validated to detect Plasmodium Knowlesi. If the malaria screen is negative, but symptoms persist, accompanied by travel to South East Asia, suggest a repeat FBC and MPS for referral to the Liverpool School of Tropical Medicine. This must be clearly stated in the clinical details.
Malaria Confirmation	EDTA	See interpretive report	Y	1	**MUST STATE COUNTRY OF TRAVEL. Referred to School of Tropical Medicine**
MPL codon 515 mutation	EDTA	See interpretive report	N	20	Only following Haematology advice. Referred to **LWH.**
PDGFRA	EDTA	See interpretive report	N	14	Only following Haematology advice. **Referred to HODS**
PNH	EDTA	See interpretive report	N	3	Only following Haematology advice. Specimen must be received in reference lab within 24 hrs of collection. **Referred to HODS**
Protein C	3 x CIT	75 – 140 %	N	20*	
Protein S Free antigen	3 x CIT	58 – 135%	N	20*	
Protein S Total antigen	CIT	See interpretive report	N	21*	Following 1st line testing. **Referred to RLUH**
Prothrombin Gene Variant	EDTA	Not detected	N	14*	Discuss with the Consultant Haematologists before requesting. **Referred to MWL**
Pyruvate Kinase	EDTA	See interpretive report	N	10*	Discuss with lab before requesting. **Referred to Kings College Hospital NHS Trust**

Haematology Investigations (cont'd)

Test	Samples Required	Biological Reference Range	O/H	T	Special Precautions, Interfering Factors & Limitations
Reticulocytes	EDTA	10 – 100 x 10^9/l	Y	1	
ANC Sickle cell & Thalassaemia screening Programme(Haemoglobinopathy screening using HPLC)	EDTA	See interpretive report	N	3	Request requires a fully completed Family Origin Questionnaire (FOQ). Consent acknowledged by the Health Care professional on the FOQ form. Partner testing may be required following advice from the laboratory.
T Cell rearrangement studies	EDTA	See interpretive report	N	20*	Only following Haematology advice. **Referred to HODS**
Thrombin Time	CIT	12 – 18 secs	Y	1	
Thrombophilia Screen	4x CIT & 1 RED	See individual assays.	N	20*	Screen includes ATIII, Protein S free antigen, Protein C, APCR, Lupus, Lupus Confirm, ACA IgG & ACA IgM. **Specimens only valid > 3 months post thrombotic event.** **NOTE:** Repeat samples may be requested in response to a low result.
Von Willebrand Screen (Adult)	3 x CIT	See individual assays.	N	21*	**Referred to RLUH**
Von Willebrand Screen (Paed)	3 x CIT	See individual assays.	N	14*	**Referred to Alder Hey.**

9.3. Sample Volume Requirements

Note:
This table includes guidance for common tests. If further advice is required, please telephone the appropriate department.
If the user is unsure that the minimum volume has been obtained, a comparison should be made between the volume taken against the expected fill volume (black line) indicated on the label. Expected fill volumes for each bottle type are detailed in Appendix 1 of this Handbook.

Specimen Bottle & Test(s)	Minimum Sample Volume Required
EDTA (For FBC, GF screen, Blood Film, Malarial Parasites, Reticulocytes, Haemooglobinopathy screening using HPLC, G6PD, Sickle Screen,DCT)	**1.5 ml**
EDTA (If ESR is also required additional to any of the above)	**4ml**
EDTA (Paediatric for FBC)	**250 µl**
EDTA (For Factor V Leiden, Prothrombin Gene)	**4ml**
Sodium Citrate (Paediatric ESR)	**1ml**
Sodium Citrate (For INR, Coagulation Screen,Fibrinogen, D-dimer, Anti-Xa)	**3.5ml**
Sodium Citrate (For Thrombophilia Testing)	**4 x 3.5ml**
Sodium Citrate (For Lupus Screen)	**2 x 3.5ml**
Sodium Citrate (Paediatric for Coag Screen)	**1.3ml**
Plain Serum (For Anticardiolipin Antibodies)	**1ml**
EDTA (For Kleihauer)	**1.5 ml**
EDTA6 (For Blood Group, Antibody Screen & Cross Match)	**3ml**
EDTA (Paediatric Blood Group, Antibody Screen, DCT & Cross Match) **Note:** This applies for **neonates <4 months old** & **a maternal sample may also be required in a 6ml EDTA bottle(EDTA6) alongside a separate request form.**	**500 µl**
EDTA6 (Paediatric Blood Group, Antibody Screen, DCT & Cross Match) **Note**: This applies for **infants >4 months old**	**3ml**

9.4. Coagulation Studies:

For clinical indications and therapeutic ranges for oral anticoagulation please refer to anticoagulant guidelines which are available on Intranet.

9.4.1. Thrombophilia Screen:

The following tests are undertaken for a full Thrombophilia screen.

- Prothrombin Time (PT)
- Thrombin Time (TT)
- APTT

- Fibrinogen
- Antithrombin III (ATIII)
- Protein C
- Protein S
- Lupus Anticoagulant (Anti-phospholipid antibodies)
- Anti-cardiolipin antibodies (ACA)
- Activated Protein C Resistance (APCR)

The laboratory will request a repeat EDTA sample from a patient for Factor V Leiden Mutation test when necessary.

9.4.2. Guidelines for investigation of Thrombophilia

Indications are:

- Established Venous Thromboembolism (VTE) before the age of 40 years.
- Recurrent VTE without provoking factors.
- Thrombosis in unusual site e.g. mesenteric vein, cerebral vein etc.
- Unexplained neonatal thrombosis.
- Skin necrosis, particularly if on coumarins.
- Relatives of patients with thrombophilic abnormality with a strong family history of unprovoked recurrent venous thrombosis.
- Patients with recurrent foetal loss (on 3 or more occasions).

If you have any concerns or questions regarding the investigation of a possible Thrombophilia, please contact the Consultant Haematologist to discuss **before** to sending any samples to the Laboratory.

9.5. Investigation of possible haemolytic anaemia:

These tests are done by arrangement only with the Consultant Haematologist. At least 24 hours notice required in most cases.

9.6. Investigation of possible haemoglobinopathy

The following tests form a routine screen for the investigation of the above.

- HbS Screening test
- Haemoglobinopathy screening using HPLC
- HbA_2 Quantitation
- HbF Quantitation

If in doubt please contact the Laboratory on extension 2194

9.7. Bone Marrow Aspiration.

By arrangement with Consultant Haematologist after the patient had been seen by the Haematology Team. Consent should be obtained using Warrington & Halton Hospitals – Consent Form One: Patient agreement to the procedure or course treatment.

9.8. Cytogenetic Tests

Refer to individual tests in the tables above & section 3.11 for further information.

9.9. Transfusion.

9.9.1. Blood Grouping:

In normal circumstances requests for Blood Grouping and associated tests are based on clinical need, therefore it is not necessary for a GP to request blood grouping or associated tests
However, if a patient requests a Blood Group for any purpose (insurance, medical screening etc) the test can be carried out for the appropriate fee. Please contact the Transfusion Dept **in advance** of the request on 01925 635911, ext 2547 (dial direct 01925 662547) to arrange.
Blood groups will also be undertaken for an appropriate fee by the Regional Transfusion Centre at Manchester or Liverpool. These may be contacted on the following numbers to arrange.

Liverpool Blood Centre	0151 552 7000
Manchester Blood Centre	0161 251 4200

9.9.2. Tests Performed & Samples Required.

In all situations haemolysis may interfere with the test procedure. So please note: Severely haemolysed samples will **not** be processed.

T = Turnaround time in working days.

Test	Samples Required	Biological Reference Range	T	Special Precautions, Interfering Factors & Limitations
Blood grouping for ABO & Rhesus	EDTA6	Not applicable	1	
Ante-Natal Blood grouping & antibody screening	EDTA6	Not applicable	1*	Turnaround time may be variable
Direct Coombs Test (DCT)	EDTA6 or EDTA	Negative	1	
Free Foetal DNA	**EDTA6**	See lab report	10	Referred to **NBS**

10.0. Histopathology, Cytology & Mortuary

10.1. Contacts:

Consultant	Dr C. Li	01925 66 ***5136***
Specialist Registrars		01925 66 ***5135***
Histology Manager	Mrs G Jenkins	01925 66***5092*** gemma.jenkins5@nhs.net
Technical Enquiries	Histopathology	Ext ***2542***
Technical Enquiries	Cervical Cytology	0161-276-5111

Out of core hours: Although the department does not have 24-hour staff cover, a Consultant is always available for advice by contacting switchboard.

10.2. Request Forms:

Ensure all fields are completed on request forms, including the sample date and time, urgency of the sample, clinical information, any previous histology numbers and specimen type. Failure to give relevant clinical details may lead to delayed processing or sample rejection.

Electronic requesting on Sunquest ICE is available as an alternative to manual paper requesting.

Note: Forms for danger of infection specimens must be clearly labelled with the appropriate labels.

10.3. Factors known to affect the performance of the examination or interpretation of the results

Histology specimens		
Factor	**Cause**	**Solution**
Delay in placing the specimen in formalin	Deterioration of cells leading to difficulty interpreting cellular changes and impact on any subsequent Immunocytochemistry and a possible impact on diagnosis and prognosis	Place specimens in formalin as soon as possible
Inadequate volume of formalin to fix the specimen		Ensure the volume of formalin is enough to cover the specimen adequately – See section below
Delay transporting the specimen to the laboratory		Ensure the specimen is promptly transported to Pathology
Refrigerating specimens		Ensure specimens are stored at room temperature

Non-Gynae Cytology specimens		
Factor	**Cause**	**Solution**
Delay transporting the specimen to the laboratory	Deterioration of cells leading to difficulty interpreting cellular changes and impact on any subsequent Immunocytochemistry and a possible impact on diagnosis and prognosis	Ensure the specimen is promptly transported to Pathology
Unfixed specimens stored at room temperature		Ensure unfixed specimens are stored in a refrigerator

10.4. Time limits for requesting additional examinations on the primary sample

Additional tests on Histology samples may be requested at any time; formalin fixed, paraffin wax embedded tissue and tissue slides are available for further tests. Wet tissue is kept for 5 weeks post reporting.

Additional tests on Cytology samples may be requested for 5 days post receipt.

10.5. Histology Investigations

Test	Samples Required	Biological Reference Range	O/H	TAT	Special Precautions, Interfering Factors & Limitations
Routine Histopathological Examination	Tissue in 10% Formalin	n/a	No	90% within 28 days.	Pre-filled containers of 10% formalin for use on wards, in clinics and by GP's are available on request from Pathology (fax order form to x2043, or telephone x2265). For larger specimens, pre-diluted 10% formalin can be ordered on SBS and poured straight into larger specimen containers. The container selected must be large enough to fix the specimen adequately. Ideally, the volume of formalin should be 10 times the volume of the specimen. If this is not possible, the specimen must be well covered by Formalin and sent to Pathology as soon as possible. Clearly label the container (not the lid) as described in section 1.7.4. **Note: Danger of infection specimens must be clearly labelled with the appropriate labels** The volume of primary sample is not applicable in the case of Histology specimens as sample types and sizes vary greatly. It is important to ensure specimens are immersed in an adequate volume of formalin, and transported to the Pathology department promptly **Note:** Some cases are reported using digital pathology which is currently not accredited - For advice telephone laboratory 01925 662542)
Special Tinctorial Stains	Taken from Tissue in 10% Formalin (as above)	n/a	No	Variable	Several stains are used. For currently accredited methods – see schedule of accreditation found on the UKAS website as indicated in section 1.9 of this handbook.
Immuno-Histochemistry	Taken from Tissue in 10% Formalin (as above)	n/a	No	Variable	Several antibodies are used. For currently accredited methods – see schedule of accreditation found on the UKAS website as indicated in section 1.9 of this handbook. **NOTE:** The MMR IHC panel for Lynch syndrome, GATA3, H.pylori, p40, p53 and MUM1 are currently not accredited- For advice telephone laboratory 01925 662542) **Note:** Please be aware that IHC antibodies are proficiency tested by an external quality assessment scheme if available. Those not subject to proficiency testing by an external quality assessment scheme (CK8/18, CK14) are referred for assessment outside an external quality assessment scheme.
Immunofluorescence on Skin Biopsies	Samples must be taken in Michel's medium (available from Histology – 2542)	n/a	No	See other table – section 10.9	Please ensure specimens for Immunofluorescence are placed into Michels' Medium, and transported to Pathology at Warrington Hospital promptly. All specimens are received at Warrington & subsequently referred to Whiston Hospital for examination.

Test	Samples Required	Biological Reference Range	O/H	TAT	Special Precautions, Interfering Factors & Limitations
Foetus/Placenta/RPC	Routine Histology - Tissue in 10% Formalin Cytogenetic investigations – Unfixed fresh specimen, no additive Foetus – dependent on consent	n/a	No	See other table – section 10.9	All requests for Histology examinations of Foetus /RPC must be accompanied by a FULLY completed and signed "Consent/Refusal to Histological Examination (below 14 weeks) ''form. All foetuses over 14 weeks (on Ultrasound scan – USS) will be sent to Alder Hey for examination. Please ensure that the Alder Hey consent booklet is completed. In addition , due to HTA requirements other accompanying forms are required (dependent upon gestational age) Ensure all relevant forms are completed as appropriate. No Histology will be performed until all the correctly completed forms are received. Please refer to section 10.11.7 below- Summary Chart for Handling Foetuses. For placenta which are referred to Alder Hey, a 'request for examination of placenta' form must be completed & included.

10.6. Non-Gynae Cytology Investigations

Test	Samples Required	Biological Reference Range	O/H	TAT	Special Precautions, Interfering Factors & Limitations
Fine Needle Aspirate (FNA)	Frosted end slides, slide box, 25 ml universal bottle containing CytoRich Red cytology collection fluid.	n/a	No	See other table – section 10.9	Label slides with pencil with patient's surname, forename, and D.O.B & unit number. Spread material thinly & evenly on slides. Fix, whilst wet with cytofix fixative. When the fixative has dried place the slides in the slide box. Place the slide box in the plastic bag attached to the request form. Additional material, obtained by washing the needle through, may be put into a CytoRich Red cytology collection fluid bottle. **Please ensure specimens are transported to the Pathology department promptly**
Cyst aspirates	25 ml Universal Bottle white top	n/a	No	See other table – section 10.9	Clinically benign breast cysts which aspirate to dryness, where the aspirate is not blood stained, may be discarded. **Please ensure specimens are transported to the Pathology department promptly**

Test	Samples Required	Biological Reference Range	O/H	TAT	Special Precautions, Interfering Factors & Limitations
Common bile duct washings and brushings	Frosted end slides, slide box, 25 ml universal bottle containing CytoRich Red cytology collection fluid.	**n/a**	No	See other table – section 10.9	The brush should be immersed in 25 ml universal bottle containing CytoRich Red cytology collection fluid. and any direct slides sent. **Please ensure specimens are transported to the Pathology department promptly**
Body fluid	Collect specimens into sterile universal containers	n/a	No	See other table – section 10.9	Ensure lid is secured properly on the container to prevent leaks. Please ensure specimens are transported to the Pathology department promptly.
Bronchial washings and brushings	25 ml universal bottle containing CytoRich Red cytology collection fluid to be added to bronchial washing container. Brushings should be added directly to CytoRich Red cytology collection fluid	n/a	No	See other table – section 10.9	The brush should be immersed in 25 ml universal bottle containing CytoRich Red cytology collection fluid **Please ensure specimens are transported to the Pathology department promptly**
EBUS (ENDOBRONCHIAL ULTRASOUND)	25ml universal bottle containing Cytorich Red fluid	n/a	No	See other table – section 10.9	**Please ensure specimens are transported to the Pathology department promptly**
Urine	Fresh specimen in 10 ml of Ethanol fixative **(Max 20ml sample)**	n/a	No	See other table – section 10.9	Urine should be obtained at the beginning or end of voiding, not early morning or mid-stream specimens. **Please ensure specimens are transported to the Pathology department promptly**
Sputum	Plain 60 ml sterile container. Three early morning specimens, produced before breakfast, are required.	n/a	No	See other table – section 10.9	Sample must be a deep cough specimens and they must reach the laboratory before 14:00 hrs on the day they are produced (**weekdays only)**. Cytology of sputum samples will **only** be performed on patients with a clinical suspicion of lung cancer who are unfit for bronchoscopy. **Please ensure specimens are transported to the Pathology department promptly**
Serous fluids and peritoneal washings	2 x 25 ml Universal Bottle white top **(approx 50ml fresh sample)**	n/a	No	See other table – section 10.9	**A 50ml fresh sample is required for cytology.** **Please ensure specimens are transported to the Pathology department promptly**

Test	Samples Required	Biological Reference Range	O/H	TAT	Special Precautions, Interfering Factors & Limitations
Nipple discharge	Prepared slides	n/a		See other table – section 10.9	These should be spread directly onto a slide at the bedside/clinic. **Please ensure specimens are transported to the Pathology department promptly**
CSF	3 ml White top **(use – CSF for Cytology pack)**	n/a	No	See other table – section 10.9	**There is a specific collection pack available for CSF Cytology. Please do not use the CSF collection kit used for Biochemistry & Microbiology specimens.** If CSF Cytology is required, users must obtain a **CSF Cytology collection pack** either by attending Pathology Reception in person, or by ordering via the lab consumable ordering form. Use of the pack is important as these requests are no longer processed at WHH & must be easily identifiable to allow transfer to the referral lab. Users should make the request on either a paper Histopathology/Non Gynaecological Cytopathology request form or an ICE form accompanied by a CSF sample in a white top 3ml container. Form & sample must be sent to the lab in a specimen bag labelled 'CSF for Cytology' (available in the collection pack). Samples should be transported to the laboratory immediately. Staff should clearly indicate to Pathology Reception that the specimen is CSF for Cytology.

10.7. Communication of critical and unexpected pathology results

Pathologists will follow a protocol for communication of results considered outside the normal parameters. Examples include cases where there is a predictable degree of urgency, cases unexpectedly found to be infectious, biopsy or removal of an unexpected organ, an unexpected finding of malignancy or findings that trigger a particular referral pathway.

10.8. Specimens for cytogenetics.

Refer to individual tests in the tables above & section 3.12 for further information.

10.9. Histopathology & Cytology - Turnaround Times.

Turnaround times are audited monthly.

Users have been advised that the following turnaround times apply:

- 90% of requests marked **urgent** within 14 calendar days – see further details in section 6.3 above

- 90% of requests marked **routine** within 28 calendar days

Factors Affecting Turnaround Times

The following factors impact on TAT for histopathology/cytopathology samples
- specimen type and size (depending on time of receipt, small samples may require further fixation for one day, large samples for two days, before processing)
- the complexity of the case
- additional investigations/ further specialist tests that may be required.

Exceptions to Stated Turnaround Times

- Bone samples or other specimens requiring decalcification before examination will result in longer turnaround times. This will vary according to the size and nature of the specimen.
- Samples labelled DOI (subject to a further 24-48 hr fixation dependent upon size).
- Cases that require a second opinion outside of the department.
- Complex cases that require further tests to be performed/ more clinical information.

Urgent Cases

Urgent cases and those required for **MDT** are prioritised over non-urgent specimens. If an **urgent** report is needed, or the report is required for an **MDT,** this should be **clearly indicated on the request form**. It is important to mark the request form “urgent” where appropriate as this is the flag used by the Laboratory Information System to enable prioritisation.

The **time** of sample taken should be indicated on the request card, as well as the date, so that the laboratory can ensure fixation is adequate, prior to processing an urgent specimen. Inadequate fixation may affect some immunohistochemical (IHC) tests required for diagnosis.

N.B. The following samples are referred to an external lab for reporting resulting in an extended TAT:

Sample type	Referral lab	Referral lab stated TAT
Ocular tissue	LCL	7-10 days
• Post Mortem Examination of Foetuses from 16 weeks gestation. • Post Mortem Examination of Stillbirths. • Histological examination of complex placentas	RLCH Alder Hey	• The target for report post-mortem cases is within 56 days. • The placental TAT is within 42 days.
Skin for immunofluorescence	Mersey and West Lancashire Teaching Hospitals NHS Trust	TAT monitored & details available on request.

10.10. Cervical Cytology

NHS Cervical Screening Programme

Call and recall for the Cervical Screening Programme are provided by The Cervical Screening Administration Service (CSAS). Queries in relation to the Screening Programme are managed by submission of an online form
https://www.csas.nhs.uk/contact-us/screening-laboratory-query-info/
Any queries about prior notification lists or patient recall should be directed to CSAS.

Samples taken in GP practices, sexual health services, extended access services and colposcopy services across Warrington, Halton, St Helens and Knowsley CCG localities are now analysed by Manchester University NHS Foundation Trust laboratory (MFT).

Samples are collected using ThinPrep Liquid Based Cytology (LBC) and are screened for HPV – Human Papilloma virus.

Specimen containers, request forms & designated orange transport bags are available directly from Manchester Laboratory – Appendix 14 of this handbook shows an image of the specimen bag.

Please note: The orange transport bags are strictly for cytology use only.

Collected samples are transported to Warrington Hospital by our transport provider and from there they are transferred to MFT by courier. For further Information please contact Manchester laboratory on 0161 276 5111.

Advice & Support

If you wish to **view** the HPV primary screening PowerPoint presentation, this can be accessed via the Cervical Sample Taker Database (CSTD) http://cstd.mft.nhs.uk/

For technical support contact the IT support desk by email on labs.sd@mft.nhs.uk

To **undertake** the new HPV primary screening training primary care and colposcopy staff can access this via e-learning using the following links:

E learning for primary care staff: https://portal.e-lfh.org.uk/Component/Details/559150

E learning for colposcopy staff: https://portal.e-lfh.org.uk/Component/Details/559152

10.11. After the death of a patient.

10.11.1. Death Certificate.

A Death Certificate should somehow summarise what, in your opinion, has happened to the patient in the following order:

a) The most likely terminal event:
b) due to:
c) due to:

Any other major condition which did not directly cause death, but may have contributed to it. If in doubt, talk to your consultant, or to the consultant Histopathologist.

10.11.2. Deaths to be reported to his majesty's coroner

1. Where the body is unidentified.
2. Where the cause of death is unknown
3. Where the death was sudden or unexpected, or attended by suspicious circumstances.
4. Where a death occurs during an operation or before recovery from the effect of anaesthesia or when there is a possible relationship between in previous operation and death
5. Death within 24 hours of admission
6. When the death might be due to industrial injury or disease, or to an accident, violence, neglect or abortion, or any kind of poisoning.
7. When the death occurs through employment e.g. pneumoconiosis.
8. When the deceased had been in receipt of disability benefit.

If in any doubt it is best to discuss the problem with the consultant Histopathologist. In cases of suspicious death and/or unnatural causes the police at Warrington should be informed. They will act on behalf of the coroner.

10.11.3. Mortuary Services

The Trust does not undertake hospital post mortems. All post mortems undertaken on behalf of the Coroner are performed in the mortuary at Warrington Hospital.

For information/enquiries contact the Anatomical pathology team on 01925 635911.

An on call/out of hours service is provided for:-

- Police Identification's
- Tissue Donation
- Release of deceased for religious purposes (Trust SOP 'Death Certification')
- Equipment failure (e.g. body store failure)
- Capacity issues
- General advice

The duty site manager is responsible for authorising contact with APT staff out of hours

Mortuary opening times for release of the deceased are as follows:

Day	AM	PM
Mon	08.30-12.00	13.00-16.00
Tue	**Closed**	13.00-16.00
Wed	08.30-12.00	13.00-16.00
Thu	**Closed**	13.00-16.00
Fri	08.30-12.00	13.00-16.00

There is no weekend service for release of the deceased.

10.11.4. Foetal/Perinatal/Post-Mortem/Histology

All requests for Post Mortem or Histological examination must be accompanied by the appropriate consent form following the relevant guidelines. The forms are available from Women's and Children's CBU.

10.11.5. Flow Chart for Handling Foetuses

10.11.5.1. Consent To Histological Examination Obtained.

Scenario	Action	Forms
Foetus - 13 weeks	Send to Pathology (in formalin)	1, 2, 3 (B78B to General Office)
Foetus - 14 weeks	Send to Mortuary [if part of the case is on the ward – then return to ward, then all of the case is sent to the Mortuary] (dry – fridge out of core hours)	1, 4, 5 Case notes (copy) (B78B to General Office)
Foetus – Unknown age	Clinical guess/estimate then send wherever appropriate	Dependent upon guess/estimate (B78B to General Office)
No apparent foetus – clinically 10 weeks	Send to Pathology (in formalin)	1, 2, 3
No apparent foetus – clinically 16 weeks	Send to Pathology (in formalin)	1, 3, 6
Placenta only	Send to Pathology (in formalin)	3, 6
RPC only	Send to Pathology (in formalin)	1, 2, 3
Ectopic pregnancy	Send to Pathology (in formalin)	1, 2, 3
Cytogenetics	Send directly to Liverpool Women's Hospital by usual route **not** via Pathology or Mortuary with other specimens	Cytogenetics request

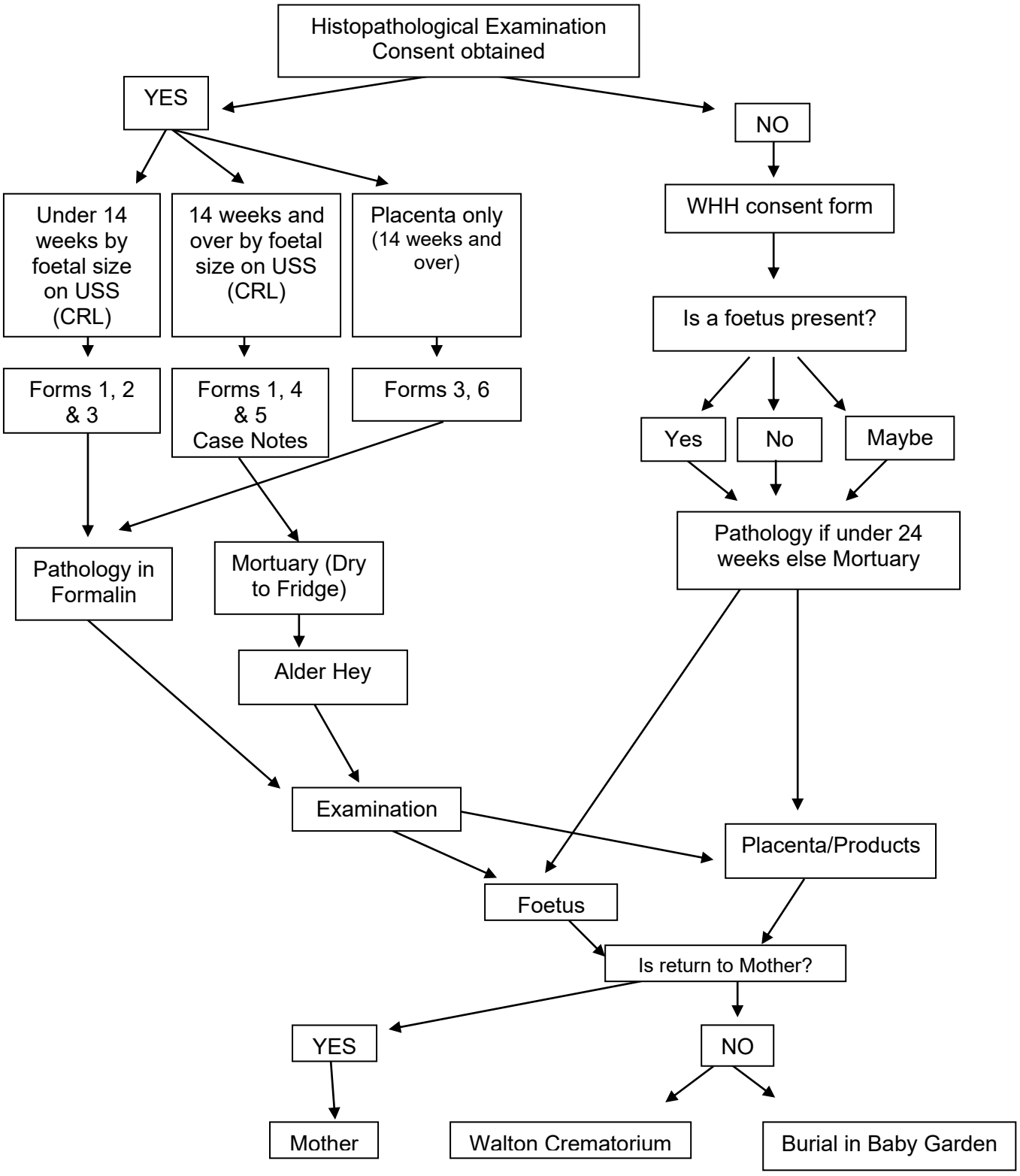
10.11.5.2. Consent to Histological Examination Refused.

Scenario	Action	Forms
Foetus – 13 weeks	Send to Histology (dry – fridge out of core hours)	1 (B78B to General Office)
Foetus – 14 weeks	Send to Histology (dry – fridge out of core hours)	1 (B78B to General Office)
Placenta only	Dispose of in the Ward/Theatre/A&E	None
No apparent foetus – clinically 10 weeks	Send to Histology (dry – fridge out of core hours)	1
No apparent foetus – clinically 16 weeks	Send to Histology (dry – fridge out of core hours)	1

Forms :

1. **Warrington & Halton Hospitals NHS Foundation Trust - "Consent/Refusal to Histological Examination (below 14 weeks)"**
2. **Warrington & Halton Hospitals NHS Foundation Trust "Clinical Information" (2 part)**
3. **Usual Pathology request**
4. **Royal Liverpool Children's Hospital "Consent for Hospital Post Mortem"**
5. **Royal Liverpool Children's Hospital "Request for foetal, perinatal or infant Post Mortem" (2 page)**
6. **Royal Liverpool Children's Hospital "Request for examination of placenta" (1 page)**

10.11.6. Summary Chart for Handling Foetuses.



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1 Warrington & Halton Hospitals NHS Foundation Trust "Consent/Refusal to Histological Examination (below 14 weeks)"
2 Warrington & Halton Hospitals NHS Foundation Trust "Clinical Information" (2 part)
3 Usual Pathology request (4 part)
4 Royal Liverpool Children's Hospital "Consent for Hospital Post Mortem" (blue booklet)
5 Royal Liverpool Children's Hospital "Request for foetal, perinatal or infant Post Mortem" (2 page)
6 Royal Liverpool Children's Hospital "Request for examination of placenta" (1 page**)**

Section 11 - Microbiology

Contents

1. General information

The Microbiology laboratory is part of Pathology and provides services to our users in Warrington, Halton, Widnes and the surrounding areas. Pathology forms part of the Women's, Children's & Clinical Support Services Division of the Warrington & Halton Teaching Hospitals NHS Foundation Trust. The Pathology department has unified facilities for specimen collection & receipt and for issuing results. There is a shared approach to delivering an effective, high-quality service.

This handbook is provided to inform users of the services available and how to obtain them.

Suggestions on how to improve this handbook are welcome. Please forward any suggestions to the Pathology Quality Manager victoria.williamson8@nhs.net

1.1 Location of the laboratory

The laboratory is located on the first floor of the Appleton wing at Warrington Hospital:

Lovely Lane
Warrington
WA5 1QG

1.2 Contact details of key staff

Name	External numbers	Internal numbers
Dr Z.Qazzafi Lead Consultant Microbiologist	01925 662535	2535
Dr T.Chin Consultant Microbiologist	01925 662529	2529
Dr J.Purcell Consultant Microbiologist	01925 662134	2134
Dr A.M. Davis Clinical lead, Consultant Biochemist	01925 662132	2132
Mrs Hannah Gill Microbiology Service Manager hannah.gill5@nhs.net	01925 662133	2133
Results and enquires	01925 662545	2545
Microbiology Laboratory	01925 662134	2134

1.3 Services offered by the laboratory

The department provides services in medical bacteriology, mycology, virology, parasitology and serological investigations. Advice on the selection of appropriate diagnostic specimens, their collection and transport is available in this handbook. If further advice is required, please contact the laboratory.

Results of particular clinical significance are phoned through to the surgery or relevant medical staff, irrespective of whether the original request is urgent or routine.

1.4 Laboratory opening hours

The laboratory is open:

Monday to Friday: 08.50am – 20.00pm

Saturday: 08.50am – 17.20pm

Sunday: 08.50am – 17.20pm

1.5 Out of hours / on-call service

An on-call service is provided for out of hours:

Monday – Friday: 20.00pm – 08.50am

Saturday: 17.20pm – 08.50am

Sunday: 17.20pm – 08.50am

Please note that during these hours the BMS on call may **not** be on site. Contact the BMS via hospital switchboard.

1.6 Clinical advice

Clinical advice is provided by the Consultant Microbiologists and is available 24 hours.

For advice during normal working hours (09.00am – 17.00pm Monday - Friday) contact the laboratory or Consultants directly using the numbers provided above.

Out of hours and weekends, contact the on-call Consultant Microbiologist via the hospital switchboard.

1.7 Results

All urgent results will be telephoned. Please ensure that contact numbers are provided. All urgent requests should be preceded by a phone call to the laboratory in order that the sample may be processed as quickly as possible. See key Contacts above for results and enquiries line.

- General culture results are available 24 hours after receipt (at the earliest). For "special" samples such as blood cultures and CSF, the Consultant will usually inform the clinicians of initial significant results as soon as they are known.
- For Microbiology results please check ICE in the first instance.

- Some results may be telephoned due to their significance e.g. identification of certain bacteria.

2. Requesting examinations

Sunquest ICE (formerly Anglia ICE) is an on-line requesting and reporting system for Pathology and Radiology tests.
Use of the system is password protected.
95% of our GP practices currently use the system.

When requesting tests on the "ICE" system, please be aware that…

- To receive results electronically the patient's NHS number must be entered on requests.

- Ensure barcodes are clear and placed on samples bottles correctly otherwise the analysers will not be able to read the barcode.

- Orders can be edited after samples have been taken but remember to **reprint the form and discard the first request.**

- Tests cannot be added by writing on the printed request form. A new order must be requested.

- Repeat samples must have a **new, separate** order.

Paper request forms, available from the laboratory are used to request Pathology tests in Healthcare Institutions that are not connected to ICE; and also as a back-up for ICE, in the event of any IT failures/breakdowns.

Completed request forms for all Pathology tests are scanned into the Laboratory system using an optical character recognition system. This transmits GP data, patient data and the test requested onto the Laboratory Information System (LIS).
When forms are handwritten, the information given must be indicated clearly in **black** ink. Test requests are made by blocking the appropriate test box in black ink as indicated on the form.

Writing outside of the marked areas should be avoided, as this will cause problems on scanning the forms. However, typing details onto the request form is acceptable.

Copies of the forms in use are found in the appendices to this publication.

3. Specimen Acceptance Policy

Labelling your specimens correctly does matter. The Specimen acceptance Policy is shown below. Failure to provide the correct details may result in the specimen not being processed.

The laboratory will inform users by means of an electronic or printed report when a specimen has been rejected for the reasons described below.

See below

3. Specimen Acceptance policy

Labelling Your Specimens Matters

Specimens must be correctly labelled and request forms adequately completed. Incorrect labelling and inadequate forms can cause specimen rejection, confusion and delay.

Please adhere to the following:

Specimens **must** be labelled with the following **three** patient identifiers:

Full name (surname and forename)

Date of birth

NHS number **or** hospital number (this is essential for electronic transmission of results)

Request forms **must** also have the same **three** patient identifiers:

Full name (surname and forename)

Date of birth

NHS number **or** hospital number

Request forms **must** match the information on the sample.

Plus Address for the report
Name of requestor
Name of Consultant / GP
Tests required

Request forms **should** also have:

Relevant clinical information
Time and date
Sex
Contact number for requestor
ILOG number for outbreaks

If you have any problems or queries contact:
Microbiology laboratory: 01925 662134
Hannah Gill, Service Manager: 01925 662133 hannah.gill5@nhs.net

Requesting tests via the electronic “ICE” system ensures that date and time of sample request, and the requestor are logged electronically.
If written request forms are used ALL samples and request forms should be dated, timed and signed by the person taking the sample.

The Laboratory recognises that the NHS number of a patient may not always be readily available. In such circumstances, where the patient may be a temporary resident or new to the practice, this must be indicated on the request card.
Please use the code “ZZZZ999” on the request card if the NHS number is unavailable.

Please note – Electronic results are not available when the NHS numbers is not supplied. Results for such requests are returned via the delivery of printed paper reports.

3.1 Danger of infection / high risk samples

For the safety of laboratory staff, it is essential that specimens which are known or suspected to contain hazardous pathogens are labelled with yellow “**Danger of Infection**” stickers and placed in biohazard bags. The request form must also be labelled with a yellow “**Danger of Infection**” sticker.

For manual request forms complete the **“Danger of Infection”** box on the request form. For ICE requests, ensure the **“Danger of Infection”** status has been selected when making the request electronically.

This applies to all specimens from patients known or suspected to be infected with the following (please note this list is not exhaustive*):

HIV
Hepatitis B or C (including samples taken from IV drug abusers)
E.coli O157
Mycobacterium tuberculosis (TB)
Salmonella typhi (Typhoid fever)
Brucella
Anthrax
Mpox
Viral Haemorrhagic Fever (VHF) including Ebola virus
*All other Hazard Group 3 and 4 organisms. Please contact the Microbiology Department if further guidance is required.

4. Transport of specimens

4.1 Model Rules & General Precautions

All specimens should be regarded as being potentially infective. Staff have a personal and statutory duty of care to protect the Health and Safety both of themselves and others who deal directly or indirectly with patient specimens. Failure to comply with the Trust infection prevention policies is notifiable under the Trust's Incident Reporting Scheme, whether or not an accident, injury or infection has resulted. Disciplinary action may ensue.

Users should ensure that any individual transporting a specimen to the

Laboratory at either site does so in a suitable container. Please contact the laboratory for advice.

Individuals should be advised that when handling samples any cuts, grazes or broken skin should be covered with a waterproof dressing. Samples should **never** be carried unprotected in the open hand.

When the request has been correctly completed and the samples fully labelled (see **Section 3** above), place the specimens in a clear plastic specimen bag and attach this to the form. **Do not put the request form inside the same bag with the samples.**

Do not place Urgent specimens in bags with non-urgent samples.

Wash your hands if they come into contact with the sample or its container. Take samples directly to Pathology; do not eat or drink when transporting samples to Pathology.

Inform laboratory staff if any sample is deemed urgent. Also, inform the laboratory staff if there is any possibility that the specimens may have deteriorated prior to or during transport to the laboratory, for example delay, refrigeration problems, exposure to undue heat.

Danger of Infection (DOI) samples must be clearly and appropriately labelled.

4.2 Warrington Hospital: Each ward & department is responsible for their own specimen delivery. A Pneumatic tube system is available at selected sites for transporting samples to the laboratory.
Please note that the pneumatic tube system **must not** be used to transport unique samples e.g. CSF.

4.3 Halton Hospital: In-patient specimens and GP specimens sent into Halton Hospital are forwarded to Warrington Path Lab during the working day via a scheduled van service. This operates from Halton at the following times.

Monday – Friday	**10:15, 12:15, 14:15 and 16:00 hrs.**
Saturday	**10:00 hrs.**

Outside of the above stated hours, the responsibility for the transport of specimens to the Laboratory lies with the requesting ward or department.

Samples which miss the final scheduled transport run will be analysed on the next available working day, unless transported urgently.

4.4 Routine Courier Transport for GP Surgeries.

Samples are collected from surgeries on weekdays as per arranged schedule.

Samples, which miss the routine collection, **may** be stored, please refer to tables below for further information.

4.5 Spillage and Leaks – General Advice.

Spillages of blood and body fluids must be regarded as presenting a risk of infection to any person coming into contact with them. Containment, treatment with a suitable disinfectant and removal will greatly reduce the risk.

In the event of an accident or spillage of a pathology specimen see the Guidelines for the Management of Blood and Body Fluid Spillages (Related to Trust Infection Control Policy) on the Trust Intranet Infection Control Web Community webpage for full information.

The following is an extract from the Trust Guidelines.

*Appropriate Personal Protective Equipment **must** be worn at all stages of the process when dealing with blood/body fluids or cleaning products.*
Cover and contain spillage with disposable paper towels until all the blood/body fluid has been removed, placing the towels in a clinical waste bag (as per current waste management policy and associated guidelines).
If required wet the spillage area with hypochlorite solution (10,000ppm) and leave for 10 minutes (if spillage is on floor ensure warning signs are displayed and area is monitored due to risk of slips).
If broken glass is present remove using dustpan and brush or disposable scoop AFTER hypochlorite solution has been poured over spillage. Place in rigid puncture proof container (e.g. sharps box) and seal. If glass is adhering to the dustpan/brush this should also be discarded into the sharps box (box must be large enough to accommodate the dustpan and brush) for disposal.
Use paper towels to remove excess solution and place in clinical waste bag (as per current waste management policy and associated guidelines). Wipe over the surface with fresh solution, rinse and dry.
The area should then be cleaned using general purpose detergent and water (1ml: 1litre).
Remove personal protective equipment and discard into a clinical waste bag (as per current waste management policy and associated guidelines).
Wash hands.

The courier company transporting specimens to the laboratory have a protocol for sample spillage which includes a dedicated spillage kit.

However, there are circumstances where individuals bring their own specimens into the laboratory. They should be advised of the appropriate course of action should the specimens break or spill.

The following is recommended:

- In the event of sample breakage at home or in transport vehicle seek advice from requesting GP.

- In the event of sample breakage or spillage within hospital grounds contact the laboratory for advice.

Comprehensive advice is available from the laboratory staff.
Note: Laboratory staff have a discretionary right to discard any sample or request form that is received in a state which renders it hazardous for them to handle.
Report the accident to one of the senior laboratory staff or your supervisor as soon as possible; an Incident report should be completed.

5.0. Microbiological Investigations (Including Turnaround Times and other Information)

Note: Following specimen processing at Warrington, samples may sometimes require referral to reference laboratories for further investigations.
Note: Interpretative comments & biological reference ranges will appear on the final report where appropriate.

Microbiology				
Analyte	**Minimum sample volume required / Container**	**Turn-around time**	**Turn-around urgent**	**Special Precautions, Interfering Substances & Limitations**
Actinomyces investigations	60ml screw-capped sterile container	10 days	n/a	Actinomyces investigations for IUCD will only be carried out if clinically indicated
Ascitic (peritoneal) fluids for SBP investigation	Inoculate a set of blood culture bottles (Green top and Orange top) 10ml of fluid into each bottle Inoculate EDTA bottle for cell count.	Samples incubated for 5 days. Positive culture results phoned as available. Negative culture results reported at 48 hours. Cell count available within 2 hours of receipt.	Out of hour's samples, cell count available within 2 hours of receipt. Urgent service available until 10.30pm	
Bacterial Vaginosis (BV)	High vaginal swab in charcoal transport medium.	24-72 hours	n/a	Recent antibiotic use may suppress vaginal flora and produce false-negative results. Vaginal douching, lubricants, or antiseptics may alter findings. Menstruation or heavy discharge can interfere with microscopy interpretation.
Blood culture	**Adults** – Green top & Orange top up to 10ml to each bottle **Children** – single Yellow top up to 4ml **Neonates** – single Yellow top 1-2 ml	Samples incubated for 5 days. Positive results phoned as available. Negative result reported at 48 hours. Neonatal results reported at 36 hours.		**Do not** remove detachable bar code labels. Out of hours please transport to pathology reception within 4 hours. Pneumatic tube may be used where available. Please refer to Blood Culture Policy available on The Hub for timing of collection and other information.
Bordetella pertussis (whooping cough) culture	Fine wire charcoal swab	Up to 7 days	n/a	It is best to obtain a culture from nasopharyngeal specimens collected during the first 2 weeks of cough. This is when viable bacteria are still present in the nasopharynx. After the first 2 weeks, sensitivity decreases, and the risk of false negatives increases.
Candida auris screening	Axilla, groin & nasal swabs in charcoal transport medium- add in also??	72hrs	n/a	No special precautions
Chlamydia/GC TMA **Eye**	Chlamydia collection kit (white)	95% within 48hrs of receipt	n/a	Referred to Whiston Hospital
Chlamydia/GC/ TV	Chlamydia collection kit (Orange multi-test swab)	95% within 48hrs of receipt	n/a	Referred to Whiston Hospital **Note**: requests for both TV and CT/NG TMA testing require 2

TMA **Clinician Taken/Self Taken HVS**				separate vaginal swab samples in 2 separate Aptima containers (multitest swab tubes), one required for CT/NG TMA and the other for TV TMA.
Analyte	**Minimum sample volume required / Container**	**Turn-around time**	**Turn-around urgent**	**Special Precautions, Interfering Substances & Limitations**
Chlamydia/GC/ TV TMA **Urine**	Chlamydia collection kit (yellow)	95% within 48hrs of receipt	n/a	Referred to Whiston Hospital
Corneal scrape	n/a	Up to 7 days	n/a	• Collect plates from Pathology reception • Label plates, mark a 2cm circle on the reverse and inoculate within. • Ring 2134 & arrange to return plates to Pathology reception *After 8pm weekdays and 5.20pm weekends please contact the on call Microbiology BMS via switchboard
CPE – Rapid screen	Rectal swab	4 hours	n/a	Collection packs available from infection control. This must be accompanied by a C-Log request form. Please contact Infection Control Team for advice.
CSF	Container – 3x small white top sterile container. (7 ml bottle) Minimum volume 1ml CSF for TB – minimum of 6ml is required as per British Infection Society guidelines. Smaller volumes will not be processed by the reference laboratory and a report will be issued with an automated comment indicating low volume. These guidelines also recommend that repeated CSF examinations are strongly encouraged, particularly if the diagnosis of TBM is suspected	Microscopy – within 1 hour of receipt. Culture – 24 – 48 hours.	Out of hours samples, microscopy available within 2 hours of call.	CSF sample kits are available from Pathology Reception. For microbiological investigations samples 2 & 3 are required, clearly labelled as such, together with the minimum identifiers. During normal hours please contact the laboratory when sending a CSF sample. If outside core hours the on-call lab personnel must be contacted via switchboard. **Note: there are no microbiology staff on-site outside normal hours.** Requests for TB examination made out of normal hours will be deferred until the next working day. This is not considered to be an urgent test.
CSF for **Filmarray**	CSF – 1ml minimum Use small white top sterile container(7 ml	12 hours	n/a	Panel includes bacteria and viruses.

(Molecular Testing Panel)	bottle)			
Analyte	**Minimum sample volume required / Container**	**Turn-around time**	**Turn-around urgent**	**Special Precautions, Interfering Substances & Limitations**
Faeces for EntericBio PCR	Container – Blue 30mL plastic bottle with spoon. “pea sized” portion of faeces.	24 Hours for the PCR result (Weekdays) Culture findings for PCR positive Salmonella, Shigella and VTEC samples will follow when required	n/a	Samples should be transported to the laboratory as soon as possible. Samples may be refrigerated if transport delays occur. Samples will receive a culture if they are positive for specific targets, this culture result will follow within the subsequent 36 hours. Campylobacter no longer receives sensitivity testing as standard. The PCR targets are Salmonella, Shigella, Campylobacter, VTEC, Cryptosporidium, Giardia. These targets will be investigated for every patient.
Faeces for trophozoites (Hot stool)	Container – Blue 30ml plastic bottle with spoon. “Pea sized” portion of faeces	Within 1 hour of receipt.	n/a	Contact the laboratory prior to sample collection. Samples should be sent to the laboratory within 1 hour of collection. Liquid stools within 30minutes of collection. For all other sample types for parasite investigation please contact the laboratory. Sample types may include: • CSF • Bile • Pus from absesses • Duodenal/jejunal aspirates • Tissues • Hydatid cyst • Sputum/bronchoalveolar lavage • Biopsies from colonoscopy or surgery
Faeces for Clostridium difficile toxin	Container – Blue 30mL plastic bottle with spoon. “pea sized” portion of faeces.	24 Hours (Weekdays)	Out of hours contact infection control team	Available for 7 days of the week. All suitable samples of patients of the age of >/= 65 years old will be processed for C.difficile. A “suitable sample” will be diarrhoeal and must take the shape of the container for it to be tested. The sample will also not be tested if: • the patient has had a previous negative result within 72 hours. • the patient has had a previous positive result within 28 days. For trust policy on management of CDI, refer to “**Trust Guidelines on the Control and Management of Clostridium difficile**” available at the infection control web community on the hospital intranet. Also refer to Trust Antibiotic Formulary for

				interpretation of C difficile test results, severity assessment and treatment of CDI.
Analyte	**Minimum sample volume required / Container**	**Turn-around time**	**Turn-around urgent**	**Special Precautions, Interfering Substances & Limitations**
Faeces for ova, cysts and parasites	Container – Blue 30mL plastic bottle with spoon. “pea sized” portion of faeces.	48 Hours (Weekdays)	N/A	Samples for ova, cysts and parasites should be as fresh as possible.
Threadworm Investigation	Use specific Sellotape preparation container.	24 Hours (Weekdays)	N/A	Follow the instructions listed in the Sellotape preparation kit as to how to take the sample.
Faeces for H. pylori	Container – Blue 30ml plastic bottle with spoon. “Pea sized” portion of faeces.	8 days		
Fluids (Inc. amniotic, pericardial, pleural, empyema, bile)	Minimum volume 1ml of aseptically obtained fluid in a sterile container (60ml screw-capped sterile container)	24-96 hours	n/a	Samples should be transported to Pathology **immediately after collection.**
Helicobacter spp. from gastric biopsy	Multiple gastric biopsies (5-6), at least 2 from the antrum and 2 from the anterior and posterior corpus respectively, in Biomeriuex Portagerm HP transport medium or saline (separate pot for each biopsy)	19 days	n/a	If possible, wash the stomach with saline before taking biopsies. Must be sent to Microbiology without delay and within 24 hours of collection. Endoscopic biopsies should be performed in early or middle of the week (avoid Fridays). Patients should ideally have a drug free interval before biopsy ideally 2 weeks off PPI and 4 weeks off antibiotics (ideally 8 weeks).
Joint fluid	10-25mls of aseptically obtained fluid in a sterile container (60ml screw-capped sterile container). Also inoculate a set of blood culture bottles (Green top and Orange top) 10ml of fluid into each bottle.	Samples incubated for 5 days. Positive culture results phoned as available. Negative culture result reported at 48 hours. Microscopy available within 2 hours of receipt.	Out of hour’s samples, microscopy available within 2 hours of call.	Samples should be transported to Pathology immediately after collection.
Legionella urinary antigen detection	Container – yellow or green top urine container Minimum volume 1ml	24 hours	n/a	
MRSA - Routine	Nasal / groin or perineum Black topped charcoal swabs	48 hours	n/a	For further information on the Trust MRSA screening policy please refer to documents in the Infection Control Community on the Hospital Intranet.

Analyte	Minimum sample volume required / Container	Turn-around time	Turn-around urgent	Special Precautions, Interfering Substances & Limitations
MRSA - Rapid	Rapid MRSA collection packs available from Pathology reception. These packs contain duplex swabs specific for rapid screening.	Within 4 hours of receipt	Service available for samples received before 18:30hrs (Mon – Fri), 16:00 (Sat – Sun)	This service is only available for ITU patients, unless discussed with Consultant Microbiologist.
Mycobacteria investigations	Sputum – send 3 consecutive early morning samples in a 60ml sterile screw-capped container. Urine – Timing of collection: send 3 consecutive early morning urines (approx. 30 ml each) in a sterile container. Treat as "Danger of Infection"	Culture up to 6 weeks	n/a	Tests performed at Liverpool Clinical Laboratories. Date all samples clearly. All samples for AAFB should be clearly labelled “Danger of Infection”, placed in a plastic bag with the request form also labelled “Danger of Infection”, in the outer side pocket. Samples may be stored at 2-4° for up to 48 hours if transport is delayed.
Mycology	Skin/nail scrapings – see comments	Culture up to 3 weeks Microscopy 24-96 hours	n/a	Patient’s skin and nails can be swabbed with 70% alcohol prior to specimen collection in order to remove any treatment creams before sampling. Swabs are of little value for dermatophyte culture. Place samples into sterile plastic specimen pots or Dermapak® collection kits available on request. State sample site on request form. • Skin samples: Scrape skin from the advancing edge of lesion/s, using a blunt scalpel blade or similar. 5mm² of skin flakes are needed for microscopy and culture. • Nail samples: Sample most proximal part of the diseased nail with chiropody scissors. Include full thickness clippings of the diseased nail. Sample as far back from the nail tip as possible. In superficial infections scrape the surface of diseased nail plate. • Hair samples: Take scalp scrapings along with plucked hairs or hair stumps. Cut hairs are not suitable. Samples should be transported to laboratory without delay, preferably within 3 days of sampling. Samples should be kept dry and at room temperature. Do not refrigerate as dermatophytes are inhibited at low temperatures and humidity facilitates the growth of contaminants.

Analyte	Minimum sample volume required / container	Turn-around time	Turn-around urgent	Special Precautions, Interfering Substances & Limitations
Pneumococcal urinary antigen detection	Container – yellow or green top urine container Minimum volume 1ml	24 hours	n/a	This test is intended, in conjunction with culture and other methods to aid the diagnosis of pneumococcal pneumonia. Use standard urine containers. Transport to the lab as soon as possible. If it is not possible to transport immediately samples may be stored at 2-4°for up to 24hrs.
Respiratory samples (including cystic fibrosis samples)	Sputum / Tracheal aspirates/Bronchial washings - 1ml minimum volume in 60ml sterile screw capped container.	2-5 days	n/a	Respiratory samples must be sent to lab as soon as possible as bacterial overgrowth occurs rapidly leading to false positive results.
Swabs (culture)	Use black topped charcoal swab.	24 – 96 hours	n/a	Swab samples should be sent to the laboratory the same day. **If delay is unavoidable, store refrigerated at 2-4 degrees.**
Tissue samples	60ml sterile screw capped container.	24 – 96 hours		Transport to the laboratory without delay. Aseptic collection of specimen is essential.
Tissue & Bone samples (intra-operative)	Sterile containers containing saline and ballotini beads.	24 – 96 hours		Transport to the laboratory without delay. Aseptic collection of specimen is essential.
Urine	Use green top Monovette Boric acid system. It is important to fill the container to the fill line. Insufficient volume of urine results in incorrect concentration of boric acid which can cause erroneous results on the laboratory analyser. For **paediatric samples** please use yellow top containers – minimum volume 1ml. As these do not contain boric acid, samples must be transported to the laboratory within 4 hours. Ensure plunger is fully drawn back and then snapped off. Replace cap.	Negatives – 24 hours Positives 24 – 96 hours	Please contact laboratory if required urgently. Out of hours only on children < 3 months with known renal problems.	Transport to the lab as soon as possible. If it is not possible to transport immediately urine samples in boric acid may be stored at 2-4° for up to 48 hours. Yellow top **non-boric acid** containers must be transported to the laboratory within 4 hours. Investigation for the presence of pathological casts will be made on request. Please indicate on the request form along with the relevant clinical details. For **paediatric samples** please use yellow top containers – minimum volume 1ml. As these do not contain boric acid, samples must be transported to the laboratory within 4 hours. **Urgent samples out of hours – culture only.**
Urine for Schistosomiasis	Obtain a minimum 10ml urine sample taken between 10am and 2pm Use yellow top containers (does not contain boric acid)	24 hours		Samples must be transported to the laboratory within 4 hours

Virology / Serology (in-house)				
Analyte	**Minimum sample volume required / container**	**Turn-around time**	**Turn-around urgent**	**Special Precautions, Interfering Substances & Limitations**
ASOT	Plain red top blood tube Minimum volume 0.5 – 1 ml (for children)	48 hours	n/a	(**Note**- this test is not accredited- For advice telephone laboratory 01925 662134)
CMV	Plain red top blood tube Minimum volume 7ml	48 hours		
EBV	Plain red top blood tube Minimum volume 7ml	48 hours		
Flu screen- Rapid (Includes Flu A, Flu B, RSV & SARS-CoV-2)	Copan Xpert collection kits	24 hours	n/a	Copan Xpert collection kits must be used– kits are available from Pathology reception. If full respiratory panel required, see below (Respiratory Virus PCR) featured in table entitled *'Tests referred to external laboratory'*
HbsAg	Plain red top blood tube Minimum volume 7ml	48 hours		Screening test. Positive/equivocal results will require confirmation at an external laboratory. Turn-around time for confirmatory tests is 5 – 10 days. If urgent ANC request i.e.>24 weeks booking bloods, contact laboratory and indicate clearly on request form.
Hepatitis A diagnosis	Plain red top blood tube Minimum volume 7ml	48 hours		
Hepatitis B core antibody	Plain red top blood tube Minimum volume 7ml	48 hours		Screening test. Positive/equivocal results will require confirmation at an external laboratory. Turn-around time for confirmatory tests is 5 – 10 days
Hepatitis B surface antibody (post vaccination)	Plain red top blood tube Minimum volume 7ml	48 hours		Screening test.
Hepatitis C diagnosis	Plain red top blood tube Minimum volume 7ml	48 hours		Screening test. Positive/equivocal results may require confirmation at an external laboratory. Turn-around time for confirmatory tests is 5 – 10 days
HIV	Plain red top blood tube Minimum volume 7ml	48 hours	If urgent needle-stick required refer to Trust *Blood Borne Virus Including Sharps safety Inoculation Incidents and Management*	Screening test. Positive/equivocal results will require confirmation at an external laboratory. Turn-around time for confirmatory tests is 5 – 10 days. If urgent ANC request i.e.>24 weeks booking bloods, contact laboratory and indicate clearly on request form.

Analyte	Minimum sample volume / container	Turnaround time	Turn around urgent	Special Precautions, Interfering Substances & Limitations
IDPS screening (Includes screening for HbsAg, HIV & STS)	Plain red top blood tube Minimum volume 7ml	48 hours	24hrs	Consent acknowledged by the Heath Care Professional when making the request. Screening test. Positive/equivocal results will require confirmation at an external laboratory. Turn-around full screening results is 8 days. If urgent ANC request i.e.>24 weeks booking bloods, contact laboratory and indicate clearly on request form.
Measles immunity (IgG)	Plain red top blood tube Minimum volume 7ml	48 hours	Contact laboratory	
Respiratory virus PCR Panel: Human Rhinovirus/Enterovirus Human Metapneumovirus Bordatella pertussis Adenovirus Parainfluenza 1 Influenza A Influenza B RSV Mycoplasma pneumoniae	Nasopharyngeal swab in viral transport media)	Within 3 hours of receipt	n/a	(**Note**- this test is not accredited- For advice telephone laboratory 01925 662134)
Rubella immunity (IgG)	Plain red top blood tube Minimum volume 7ml	72- 96 hours		If urgent ANC request i.e.>24 weeks booking bloods, contact laboratory and indicate clearly on request form.
STS	Plain red top blood tube Minimum volume 7ml	48 hours		Screening test. Positive/equivocal results will require confirmation at an external laboratory. Turn-around time for confirmatory tests is 5 – 10 days If urgent ANC request i.e.>24 weeks booking bloods, contact laboratory and indicate clearly on request form.
Varicella zoster immunity (IgG)	Plain red top blood tube Minimum volume 7ml	48 hours	Contact laboratory. Out of hours urgent requests – contact Consultant Microbiologst.	

Virology / Serology / Molecular Diagnostics (majority of tests referred to external reference laboratory - Manchester Medical Microbiology Partnership, where indicated some referred to Immunology, Vaccine Evaluation Unit and Meningococcal Reference Unit at Manchester University NHSFT)				
Analyte	**Minimum sample volume / container**	**Turnaround time**	**Turn around urgent**	**Special Precautions, Interfering Substances & Limitations**
Acanthamoeba culture and PCR	Contact lenses in their lens case. Corneal scrapes, biopsies, fluids and swabs should be collected in a bijou of 3ml sterile saline	Up to 11 working days for culture and up to 14 working days for PCR	n/a	Isolation of Acanthamoeba from contact lens-related specimens, whilst suggestive, does not necessarily implicate the amoeba as causing the patient's symptoms. Amoebic genera (other than Acanthamoeba), flagellates, ciliates and other organisms may be found in contaminated washing fluids and on lenses, particularly with poor lens hygiene. Please do not send any blades used to obtain the corneal scrape.
Adenovirus PCR (eye swabs)	Swab – green top viral transport media	7 days	n/a	
Antimicrobial Assays- Antibiotic assays Acyclovir & Ganciclovir	Serum gel tube or 6ml Plain red top blood tube - Minimum volume 6ml	7 – 10 days	n/a	Urgent requests must be discussed with Consultant Microbiologist. Requests referred to Antimicrobial Reference Laboratory.
Aspergillus IgG (Referred to Immunology Department at MUNHSFT)	6ml Plain red top blood tube Minimum volume 6ml	7 – 10 days	n/a	Previously known as Aspergillus precipitins
Aspergillus galactomannan ELISA	6ml Plain red top blood tube Minimum volume 6ml	7 – 10 days	n/a	
Aspergillus PCR	Sputum, BAL, CSF **Pulmonary infection with Aspergillus spp** A minimum of 1mL of a bronchoalveolar lavage in a sterile screw-capped plastic container **Fungal infections of the central nervous system** A minimum of 0.5mL of whole CSF	10 days	Contact laboratory	**Pulmonary infection with Aspergillus spp** Sample should arrive at the laboratory within 1 working day. The sample should not be frozen, but should be stored at 4ºC before dispatch, and kept cool during transport to the laboratory. Non-invasive samples such as sputum may be used if BAL is unobtainable. **Fungal infections of the central nervous system** Do not centrifuge. Use a small capacity screw capped container.
Avian precipitins (Referred to Immunology Department at MUNHSFT)	6ml Plain red top blood tube Minimum volume 6ml	7 – 10 days	n/a	

Analyte	Minimum sample volume required / container	Turn-around time	Turn-around urgent	Special Precautions, Interfering Substances & Limitations
BK virus PCR	4ml EDTA whole blood (minimum volume 5ml), CSF, urine	7 – 10 days	n/a	
Bordetella pertussis PCR	Pernasal swab Nose and/or throat swab (virus transport medium) BAL/Sputum (sterile container) NPA (Sterile container)	5 – 7 days	Contact laboratory	
Bordetella pertussis (whooping cough) serology	Minimum 400µl serum (≥2 week history of cough)	12 days	n/a	Serology may be helpful to confirm the diagnosis of whooping cough in patients with cough duration of more than 2 weeks, when culture and PCR are unlikely to yield positive results. The anti-PT IgG serology test cannot, however, be used to determine immunity as there are currently no agreed correlates of protection.
CD4 T-cell count (GUM patients only) (Referred to Immunology Department at MUNHSFT)	4ml EDTA whole blood (minimum volume 4ml)	5 – 7 days	n/a	
Coronavirus PCR	See dedicated Coronavirus section – 1.10 of this handbook.			
Cryptococcal Antigen	6ml Plain red top blood tube Minimum volume 1ml	3 days	n/a	
Cytomegalovirus PCR	4ml EDTA Minimum volume 4ml In special circumstances 0.5ml of serum or plasma may be tested	5 days	n/a	
Cytomegalovirus IgG/IgM	6ml Plain red top blood tube-minimum volume 4 ml	7 – 10 days	n/a	
Cytomegalovirus IgG Avidity	6ml Plain red top blood tube-minimum volume 4 ml	7 – 10 days	n/a	

Analyte	Minimum sample volume required / container	Turn-around time	Turn-around urgent	Special Precautions, Interfering Substances & Limitations
EBV serology (IgG and IgM)	6ml Plain red top blood tube Minimum volume 4ml	5 – 7 days	n/a	
EBV PCR	4ml EDTA Minimum volume 4ml In special circumstances 0.5ml of serum or plasma may be tested	5 days	n/a	
Enterovirus Inc. parechovirus PCR	4ml EDTA blood (minimum volume 4ml) In special circumstances 0.5ml of serum or plasma may be tested, CSF (minimum volume 0.5ml)	5 – 7 days	n/a	
Functional antibodies (Pneumococcal, Haemophilus) (Referred via MUNHSFT to the Vaccine Evaluation Unit)	6ml Plain red top blood tube Minimum volume 0.5ml	5 weeks	n/a	Tetanus and diphtheria antibodies also available.
Hepatitis A IgG	6ml Plain red top blood tube Minimum volume 2ml	7 – 10 days	n/a	
Hepatitis B confirmatory serology (markers)	6ml Plain red top blood tube Minimum volume 2ml	5 – 10 days	n/a	
Hepatitis B PCR (viral load)	4ml EDTA Minimum volume 3ml	5 – 10 days	n/a	
HBV genotyping and resistance markers	4ml EDTA Minimum volume 3ml	7 – 10 days	n/a	
Hepatitis C Ab confirmation	6ml Plain red top blood tube Minimum volume 2ml	5 – 7 days	Contact laboratory	
Hepatitis C genotyping	4ml EDTA Minimum volume 3ml	7 – 10 days	Urgent arrangements are in place for Hep C Clinic	
Hepatitis C PCR (viral load)	4ml EDTA Minimum volume 3ml	5 – 7 days	Urgent arrangements are in place for Hep C Clinic	

Analyte	Minimum sample volume required / container	Turn-around time	Turn-around urgent	Special Precautions, Interfering Substances & Limitations
Hepatitis D (delta) virus antibody	6ml Plain red top blood tube Minimum volume 2ml	7 – 10 days	n/a	
Hepatitis E diagnosis (IgM)	6ml Plain red top blood tube Minimum volume 2ml	5 – 7 days	n/a	
Herpes simplex virus types 1 & 2	**Swab** in viral transport medium (green cap) - PCR **4ml EDTA blood** – Minimum volume 4ml – PCR In special circumstances 0.5ml of serum or plasma may be tested **Serology** (antibody detection)Plain top red tube – minimum 6ml Minimum volume 2ml	5 days	Contact laboratory	
HIV confirmatory serology	6ml Plain red top blood tube Minimum volume 2ml	7 – 10 days	Contact laboratory	
HIV viral load	6ml EDTA Minimum volume 3ml	7 days	Contact laboratory	Neonates – see “Protocol for processing blood samples from non-breast fed neonates for HIV viral load (PCR) testing”
HTLV 1 and 2 antibody	6ml Plain red top blood tube Minimum volume 2ml	7 – 10 days	n/a	
JC virus PCR	4ml EDTA blood (minimum volume 4ml) In special circumstances 0.5ml of serum or plasma may be tested, CSF, urine (minimum volume 0.5ml)	7 – 10 days	n/a	
Lyme disease (Borrelia) serology	6ml Plain red top blood tube Minimum volume 2ml	7 – 10 days	n/a	
Measles virus	**Buccal fluid swab** (green top viral transport media) **Measles IgM and IgG referrals**-6ml Plain top red – minimum volume 2ml	5 days 7 days	Contact laboratory	

Analyte	Minimum sample volume required / container	Turn-around time	Turn-around urgent	Special Precautions, Interfering Substances & Limitations
Meningococcal and Pneumococcal PCR (Referred via MMMP to the Meningococcal Reference Unit at MUNHSFT)	6ml EDTA Minimum volume 2.5 – 5ml Smaller volumes (0.5 – 1ml) from infants and babies can also be examined. CSF – if available send in addition to blood sample.	1 – 2 days for provisional result	Contact laboratory	Positive results will be telephoned as soon as possible on the morning of the next working day. **Important**: ensure sample accompanied by completed Meningococcal reference Unit request form.
Mumps IgG and IgM	6ml Plain red top blood tube Minimum volume 4ml	7 – 10 days	n/a	
Mycoplasma PCR	Suitable samples include throat & nasal viral swabs(green top), sputa, BAL or respiratory washings	4 days	n/a	
Parvovirus B19 IgG and IgM	6ml Plain red top blood tube Minimum volume 4ml	7 days	n/a	
Parvovirus B19 PCR	4ml EDTA blood (minimum volume 4ml) In special circumstances 0.5ml of serum or plasma may be tested, CSF, urine (minimum volume 0.5ml)	5 – 7 days	n/a	
Pneumocystis jiroveci (PCP) PCR	Minimum 1ml bronchalveolar lavage in sterile screw capped container.	7 days	Contact laboratory	Induced sputum, tracheal aspirate may be used if BAL unobtainable.
Rubella IgM	6ml Plain red top blood tube Minimum volume 4ml	7 days	n/a	
Syphilis confirmatory serology (including RPR)	6ml Plain red top blood tube Minimum volume 1.5ml	10 days	n/a	
Syphilis PCR	Swab in green capped container	7 – 10 days	n/a	

Analyte	Minimum sample volume required / container	Turn-around time	Turn-around urgent	Special Precautions, Interfering Substances & Limitations
TB quantiferon (IGRA) (Referred to Immunology Department at MUNHSFT)	Collection kit available from laboratory on request	7 – 10 days	n/a	Samples must be received by laboratory on day of collection (within 12 hours of phlebotomy) This is a referred test for the detection of latent (or active) Mycobacterium tuberculosis infection. The test comprises a set of 4 tubes, a request card and an instruction sheet. Only consultant generated requests will be accepted. Clinical indications and date and time of specimen collection should be stated on the request form. Unlabelled or inappropriately labelled specimens will not be processed as per laboratory policy.
Toxoplasma serology (IgG and IgM)	6ml Plain red top blood tube Minimum volume 4ml	7 – 10 days	n/a	
Varicella zoster virus IgM (and IgG referrals for confirmation)	6ml Plain red top blood tube Minimum volume 4ml	7 days	Contact laboratory	
Varicella zoster virus PCR	Swab in viral transport medium (green cap) CSF – 1ml minimum	5 days	Contact laboratory	Swab of blister fluid

For details on requesting Viral Haemorrhagic Fever – see table below in section 6.0

Please note: turn-around times are from receipt of sample in the laboratory. The Microbiology department aims to maintain stated turnaround times for 95% of samples received

6.0. List of main serology/molecular tests referred to Manchester Medical Microbiology Partnership (unless otherwise stated) for primary or confirmatory testing.
Please note: Manchester further refers these tests to other reference laboratories.
See appendix 13 for details of referral laboratories.

Analyte	**Laboratory**
Bartonella	
Campylobacter serology	
C. botulinum antibody	
C-J Disease	Western General Hospital, Edinburgh
Coccidiomycosis	
Chlamydia pneumoniae	
Cryptococcal antibody	
Cryptosporidium	
Dengue Fever	
Enterovirus serology (IgM)	
Enterovirus typing	
Ganciclovir levels	
HBV viral load (health care workers)	
Hepatitis E IgG	
Histoplasmosis	
Hydatid serology	Liverpool School for Tropical Diseases
Leptospira	
Lymphogranuloma Venereum PCR	PHE Colindale, London
Listeriosis	
Lyme disease (positive results referred by MMMP)	
Mycobacterium avium intracellulare	Liverpool Clinical Laboratories
Nocardia	
E.coli 0157	PHE Colindale, London
Polio antibodies	
Psittacosis	
Q fever	
Rabies	
Rickettsia	
Severe Acute Respiratory Syndrome	PHE Colindale, London
Schistosomiasis serology	Liverpool School for Tropical Diseases
Shigella/Salmonella	PHE Colindale, London
TB PCR	
E.coli VTEC antibodies	PHE Colindale, London
Viral Haemorrhagic Fever Please refer to Trust policies on The Hub. Contact Consultant Microbiologist. If testing for VHF is required based on the risk assessment, this will be sent to the reference laboratory by the Microbiology department.	RIPL, Porton Down

Must be labelled "High risk, danger of infection"	
West Nile virus	
Yersinia	PHE Colindale, London
Yellow fever	
Zika Virus	
Parasite investigation	Liverpool School for Tropical Diseases

7. Key factors affecting the performance and/or result of a microbiology test:

- Quality of the sample, how it is taken
- Inappropriate container used.
- Inappropriate storage of sample / delayed transport.
- Recent antibiotic treatment (please advise where appropriate).
- Insufficient clinical details
- Inability to follow Trust guidelines e.g. Infection Control policies on sample collection.

8. Tests/Requests which cannot be stored & must be sent to the laboratory as soon as possible:

- Blood cultures
- CSFs
- Corneal scrapes
- Ascitic fluid for cell counts.
- Joint fluids
- Tissue samples

9. Additional tests

Following analysis all samples are stored in accordance with "The Retention and Storage of Pathological Records and Specimens" (5th edition, 2015). During this storage period it **may** be possible to request additional tests on a sample that has already been received in the department. Contact the laboratory for advice. A further request form will be required, completed with all patient identifying data and the additional tests required. It must be recognised that if the sample is still available it will have a limited volume.

Appendix 4: Microbiology request form

Appendix 12: Laboratories to which specimens are referred: Microbiology

Appendix 1: Sample Container Types & Draw Order.

VACUETTE® SELECTION CHART

NHS Warrington and Halton Teaching Hospitals NHS Foundation Trust

VERSION 9
Last updated: August 2022

Blood Cultures should be drawn first – Aerobic followed by Anaerobic. (If insufficient blood for both culture bottles, use Aerobic only.)
Samples should then be drawn in the following order:

	Item Number	Volume	Cap Colour	Cap Ring Colour	Tube Type	Tests	Special Instructions
1	456 018	5ml	Gold	Gold	Serum Gel Separator	• B12 & Folate • Ferritin • Zinc • P3NP • IGE (Allergy) • Biochemistry Profiles (Bones, Lipid, Liver, Renal) • Therapeutic Drug Monitoring inc. Lithium. • NT PRO BNP • General Chemistry • Hormones • Vit D • Vancomycin • Protein Electrophoresis • TNI • Gentamicin • PTH	Downs Screening (1 x Gold top)
2	456 092	6ml	Red	Black	Serum Plastic	BIOCHEMISTRY: • Autoantibodies (TTG, ANA, ANF, DNA) • Copper • C3 • C4 • ANCA • GBM HAEMATOLOGY: • Anticardiolipin Antibodies MICROBIOLOGY: • Viral Titres • HIV • Hep A, B or C • Covid antibodies	
3	454 332	3.5ml	Blue	Black	Sodium Citrate	• INR • Coagulation Screen • APTT /Ratio • Fibrinogen • D-Dimer • V W Screen x 3 • Factor Assays x 3 • Anti XA • Lupus Screen x 2 • Thrombophilia Screen x 4	Thrombophilia and Lupus Screen also require Red Top x 1
4	454 209	4ml	Lavender	Black	EDTA	BIOCHEMISTRY: • Lead • TPMT • HLA B27 • HFE gene x 2 • HLA • DQ2+DQ8 • ACTH • Plasma Metradrenalines • Homocysteine/Methylmalonic Acid x 2 (B12 def) • Renin/Aldosterone* • VIP* • Gastrin* • Chromogranin A+B* HAEMATOLOGY: • FBC • ESR • Retics • GF Screen • Hb opathy screen • Malarial Parasites • G6PD/PK • Sickle Cell Screen • Cell Markers • Factor V Leiden • Kleihauer • DCT • Prothrombin gene variant • MTHFR • Blood Film MICROBIOLOGY: • Viral PCR	* fasting sample - send immediately to lab.
5	456 052	6ml	Pink	Black	Cross Match	• X Match • Blood Groups • Antibody Screens	
6	454 237	2ml	Green	Black	Lithium Heparin for Plasma Separation	• Tissue Typing x 2 • Chromosomes x 2 • Specialist Tests x 2 (2 bottles required) • HbA1c • Ammonia* • GAL-1-PUT	*On ice please send immediately to lab.
7	456 020	5.5ml	Grey	Black	Fluoride Oxalate	• Glucose Tolerance Test • Glucose Test • Alcohol • Homocysteine (Young Stroke)	

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

PLEASE NOTE! BLOOD MUST NOT BE INJECTED THROUGH THE CAP - THIS WILL HAEMOLYSE THE SAMPLE AND IS A HEALTH & SAFETY ISSUE

ALL BLOOD TUBES MUST BE GENTLY INVERTED A MINIMUM OF 6 TIMES. UNDER NO CIRCUMSTANCES SHOULD THEY EVER BE SHAKEN!

For Further Information refer to Laboratory range guide - or call:
HISTOLOGY 01925 66 2542 MICROBIOLOGY 01925 66 2134
HAEMATOLOGY 01925 66 2549 BIOCHEMISTRY 01925 66 2352

VACUETTE® Venepuncture Solutions

VISIO PLUS Multi Sample Flashback Needle | Disposable Tourniquet | Holder | QuickShield | Safety Blood Collection Set with Luer Adapter/Holder

greiner bio-one

Appendix 2: Ice Order Form

Warrington and Halton Hospitals NHS
NHS Foundation Trust

WARRINGTON PATHOLOGY - ANGLIA ICE BLOOD SCIENCES REQUEST FORM

NHS #:

ICE order Number: 3708672

ICE #:

NHS No:	**9999999514**
Patient Name:	**Editestpatient, Six**
Patient Sex:	**Male**
Patient DOB:	**24/11/2011**

Address: **3 Any Street**
Dummyville
Postcode: **EX2 1AA**

Collection Date and Time: **22 Nov 2012 09:07**

Priority: **Routine**

High Risk?: NO

Requestor Location:	**PATHOLOGY W**
GP / Clinician:	**Pathology Warrington DAVIS ALISON**
Category:	**NHS**
Request Date:	**09:07 22/11/2012**

REQUESTS

ESR, Full Blood Count, Glucose (KW_FASTED=Yes), HbA1c, INR, Liver Profile, Renal Profile

Pathology Services Warrington & Halton Hospitals NHS Foundation Trust
Insert labelled specimen(s) into appropriate specimen bag
Seal and using second self adhesive strip affix bag here

Name: Editestpatient, Six
NHS #: 9999999514
DOB: 24/11/2011
7076181301
HEPA/Green Top (2ml)

Name: Editestpatient, Six
NHS #: 9999999514
DOB: 24/11/2011
7076181302
FLOX/Grey Top

Name: Editestpatient, Six
NHS #: 9999999514
DOB: 24/11/2011
7076181303
SERUM GEL/Gold Top

Name: Editestpatient, Six
NHS #: 9999999514
DOB: 24/11/2011
7076181304
CITRATE/Blue Top

Name: Editestpatient, Six
NHS #: 9999999514
DOB: 24/11/2011
7076181305
EDTA/Purple Top

Specimens Taken By:

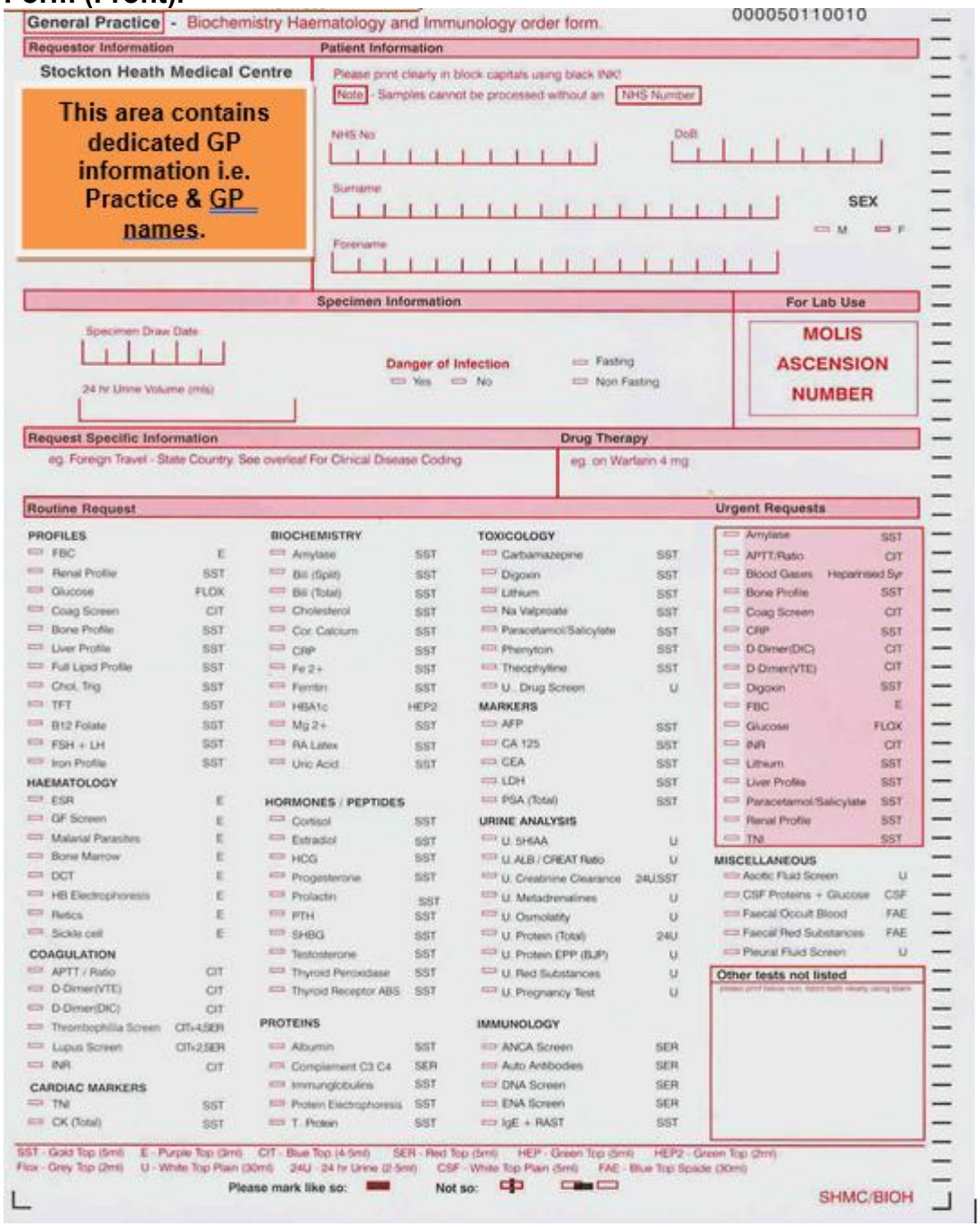
Date and Time:

SUPPORTING CLINICAL INFORMATION

Test Form

https://nchviceweb01.nch.nhs.uk/icedesktop/dotnet/icedesktop/PrintManager/PrintMa... 22/11/2012

Appendix 3: Biochemistry, Haematology & Immunology Combined Request Form (Front).



General Practice - Biochemistry Haematology and Immunology order form

000050110010

Requestor Information

Stockton Heath Medical Centre

This area contains dedicated GP information i.e. Practice & GP names.

Patient Information

Please print clearly in block capitals using black INK!

Note - Samples cannot be processed without an NHS Number

NHS No

DoB

Surname

SEX

M F

Forename

Specimen Information

For Lab Use

MOLIS ASCENSION NUMBER

Specimen Draw Date

Danger of Infection

Yes No

Fasting

Non Fasting

24 hr Urine Volume (mls)

Request Specific Information

eg. Foreign Travel - State Country. See overleaf For Clinical Disease Coding

Drug Therapy

eg. on Warfarin 4 mg

Routine Request

Urgent Requests

PROFILES		BIOCHEMISTRY		TOXICOLOGY		Urgent Requests	
FBC	E	Amylase	SST	Carbamazepine	SST	Amylase	SST
Renal Profile	SST	Bili (Split)	SST	Digoxin	SST	APTT/Ratio	CIT
Glucose	FLOX	Bili (Total)	SST	Lithium	SST	Blood Gases	Heparinised Syr
Coag Screen	CIT	Cholesterol	SST	Na Valproate	SST	Bone Profile	SST
Bone Profile	SST	Cor. Calcium	SST	Paracetamol/Salicylate	SST	Coag Screen	CIT
Liver Profile	SST	CRP	SST	Phenytoin	SST	CRP	SST
Full Lipid Profile	SST	Fe 2+	SST	Theophylline	SST	D-Dimer(DIC)	CIT
Chol, Trig	SST	Ferritin	SST	U. Drug Screen	U	D-Dimer(VTE)	CIT
TFT	SST	HBA1c	HEP2	MARKERS		Digoxin	SST
B12 Folate	SST	Mg 2+	SST	AFP	SST	FBC	E
FSH + LH	SST	RA Latex	SST	CA 125	SST	Glucose	FLOX
Iron Profile	SST	Uric Acid	SST	CEA	SST	INR	CIT
HAEMATOLOGY				LDH	SST	Lithium	SST
ESR	E	HORMONES / PEPTIDES		PSA (Total)	SST	Liver Profile	SST
GF Screen	E	Cortisol	SST	URINE ANALYSIS		Paracetamol/Salicylate	SST
Malarial Parasites	E	Estradiol	SST	U. 5H5AA	U	Renal Profile	SST
Bone Marrow	E	HCG	SST	U. ALB / CREAT Ratio	U	TNI	SST
DCT	E	Progesterone	SST	U. Creatinine Clearance	24USST	MISCELLANEOUS	
HB Electrophoresis	E	Prolactin	SST	U. Metadrenalines	U	Ascitic Fluid Screen	U
Retics	E	PTH	SST	U. Osmolality	U	CSF Proteins + Glucose	CSF
Sickle cell	E	SHBG	SST	U. Protein (Total)	24U	Faecal Occult Blood	FAE
COAGULATION		Testosterone	SST	U. Protein EPP (BJP)	U	Faecal Red Substances	FAE
APTT / Ratio	CIT	Thyroid Peroxidase	SST	U. Red Substances	U	Pleural Fluid Screen	U
D-Dimer(VTE)	CIT	Thyroid Receptor ABS	SST	U. Pregnancy Test	U	Other tests not listed	
D-Dimer(DIC)	CIT	PROTEINS		IMMUNOLOGY			
Thrombophilia Screen	CIT+4SER	Albumin	SST	ANCA Screen	SER		
Lupus Screen	CIT+2SER	Complement C3 C4	SER	Auto Antibodies	SER		
INR	CIT	Immunoglobulins	SST	DNA Screen	SER		
CARDIAC MARKERS		Protein Electrophoresis	SST	ENA Screen	SER		
TNI	SST	T. Protein	SST	IgE + RAST	SST		
CK (Total)	SST						

SST - Gold Top (5ml) E - Purple Top (3ml) CIT - Blue Top (4.5ml) SER - Red Top (5ml) HEP - Green Top (5ml) HEP2 - Green Top (2ml)
Flox - Grey Top (2ml) U - White Top Plain (30ml) 24U - 24 hr Urine (2.5ml) CSF - White Top Plain (5ml) FAE - Blue Top Spade (30ml)

Please mark like so: Not so:

SHMC/BIOH

Appendix 3: Biochemistry, Haematology & Immunology Combined Request Form (Back).

000000000001

Clinical Diagnosis Codes

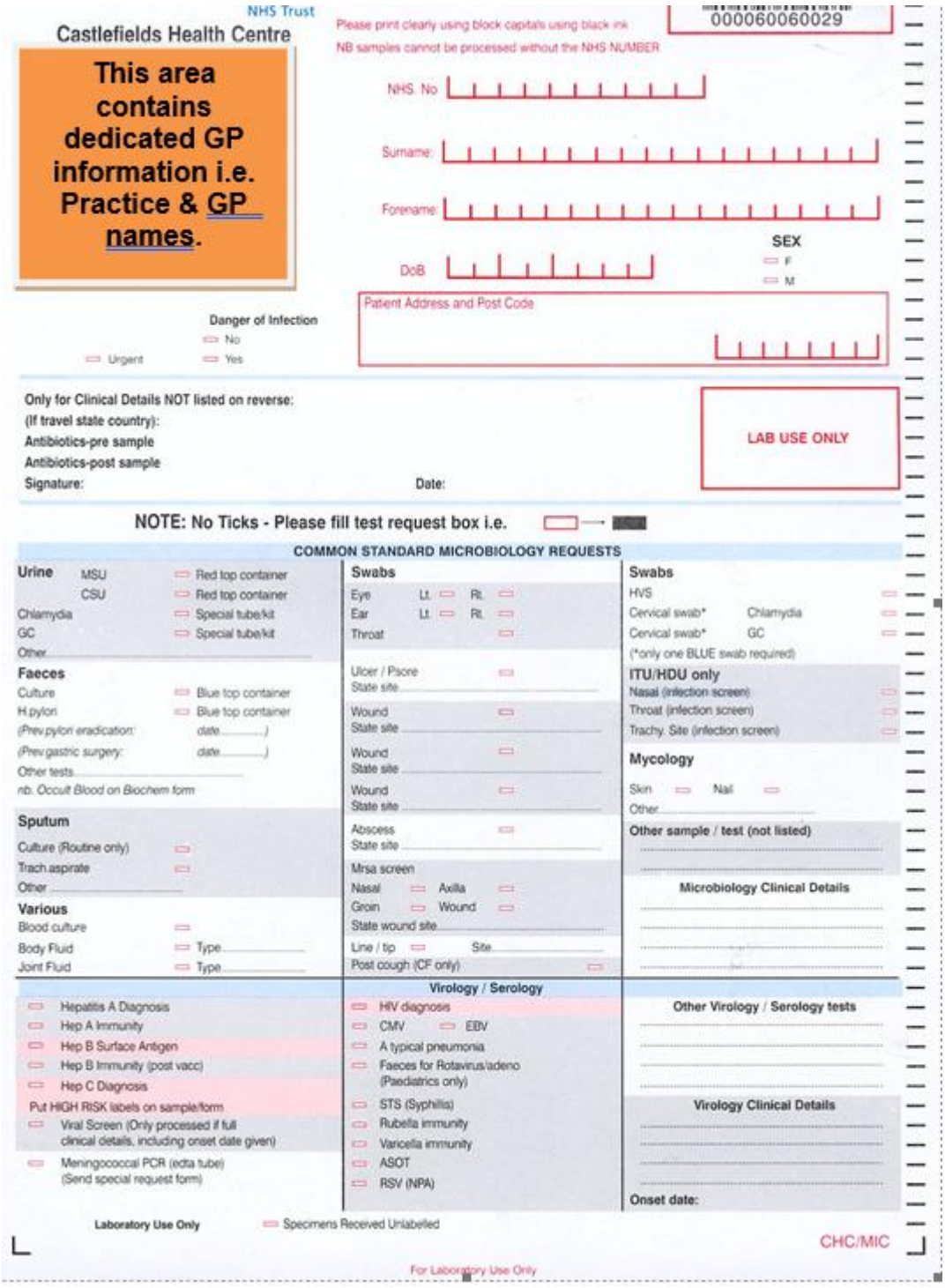
- Abdo pain (non specific)
- Abnormal LFT
- Abnormal PSA
- Abnormal Smear
- Abnormal TFT
- ALL
- Alzheimers
- Amenorrhoea
- AMMOL
- Anaemia
- Anaemia (Iron deficiency)
- Anaemia (Pernicious)
- Anaemia (sickle cell crisis)
- Anaemia (sickle cell)
- Angina
- Angina (Unstable)
- Anticoagulation therapy
- Appendicitis
- Appetite Loss
- APS
- ARF
- Arrythmia (unspecified)
- Arthritis (juvenile)
- Arthritis (osteo)
- Arthritis (rheumatoid)
- Arthritis (septic)
- Arthritis (spinal)
- Arthritis (unspecified)
- Asthma (family history of)
- Asthma
- Ataxia
- Atrial fib/flutter
- Back pain (unspecified)
- Blood in stool
- Bowel Obstruction
- Bradycardia
- Breast lump
- Bronchitis (acute)
- Bronchitis (chronic)
- Bronchitis (unspecified)
- Bruising
- Ca Colon
- Ca Liver (primary)
- Ca Liver (secondary)
- Ca Lung
- Ca Ovarian
- Ca prostate
- Ca stomach
- CABG
- Cancer (unspecified)
- Cardiac Arrest
- Cardiomyopathy
- CCF
- Cerebral Haemorrhage
- Cerebral Infarction
- CGL
- Chest infection
- Chest pain
- Chronic fatigue syndrome
- CLL
- CML
- Colitis (infective)
- Colitis (non infective)
- Colitis (ulcerative)
- Collapse
- Colon polyp
- Constipation
- COPD (chronic)
- COPD (exacerbation)
- COPD (Infective exac)
- Coronary Artery disease
- CRF
- Crohns disease
- CVA
- Dehydrated
- Dementia
- Dermatitis
- Diabetes Mellitus?
- Diarrhoea
- DIC
- Divertticular disease
- Dizziness/vertigo
- DKA (IDDM)
- DKA (NIDDM)
- DVT
- Dysuria
- Emphysema
- Epistaxis
- Fatigue/malaise
- FH of Thrombosis
- Fibrocystic breast
- Fractured neck of femur
- Gallbladder disease
- Gastritis
- GERD/GORD
- Glandular fever
- Gout
- Haemachromatosis
- Haematemesis
- Haematuria
- Haemolysis
- Haemophilia
- Headaches
- Heart disease (FH)
- Heparin therapy
- Hepatomegaly
- HIV +ve
- Hodgkins Lymphoma
- Hyper/hypocalcaemia
- Hyper/hypocholesterolaemia
- Hyperglycaemia
- Hyperkalaemia
- Hyperlipidaemia
- Hypertension
- Hyperthyroidism
- Hypoglycaemia
- Hypokalaemia
- Hypotension
- Hypothyroidism
- Hypoxia
- i.v. drug user (opiates)
- IDDM
- IHD
- Infertility
- Influenza
- Insomnia
- IPPV
- Iron deficiency
- Irregular periods
- Irritable bowel
- Jaundice
- Laparotomy
- Laryngitis
- Liver disease
- Liver failure
- Lymphadenopathy
- Malaena
- Malaria
- Meningitis (bacterial)
- Meningitis (viral)
- Menopausal?
- MI (Acute 1st)
- MI (Acute subsequent)
- Mononucleosis
- Myalgia
- Myeloma
- Myopathy
- Nephrotic Syndrome
- Neutrapaenia
- NIDDM
- Non Hodkins Lymphoma
- Oedema
- On chemotherapy
- On drug therapy
- On MTX therapy
- Overdose (drug unspecified)
- Palpitations
- Pancreatitis (acute)
- Pancreatitis (chronic)
- Paracetamol OD
- PE
- Perforated DU
- PIH
- PMR
- Pneumonia
- Polycythaemia
- Post op
- Pre op
- Pregnant
- Proteinuria
- PVD
- Pyrexia
- Raised CRP
- Raised ESR
- Raised INR
- Respiratory Failure (acute)
- Respiratory Failure (chronic)
- SBE
- Sepsis
- SLE
- Tachycardia
- Temporal Arteritis
- Thalassaemia
- Thrombocytopaenia
- Thrombocytosis
- Thyrotoxicosis
- Ulcer (decubitus)
- Ulcer (duodenal)
- Ulcer (jejunal)
- Ulcer (stomach not specified)
- UTI
- Vasculitis
- Warfarin therapy
- Weight Loss

Additional Clinical Information

For Lab Use

- Specimens Received Unlabelled

Appendix 4: Microbiology Request Form (Front).



NHS Trust
Castlefields Health Centre

This area contains dedicated GP information i.e. Practice & GP names.

Please print clearly using block capitals using black ink
NB samples cannot be processed without the NHS NUMBER
000060060029

NHS. No
Surname:
Forename:
DoB
SEX
F
M
Patient Address and Post Code

Danger of Infection
No
Urgent
Yes

Only for Clinical Details NOT listed on reverse:
(If travel state country):
Antibiotics-pre sample
Antibiotics-post sample
Signature:
Date:

LAB USE ONLY

NOTE: No Ticks - Please fill test request box i.e. ☐ → ■

COMMON STANDARD MICROBIOLOGY REQUESTS

Urine
MSU — Red top container
CSU — Red top container
Chlamydia — Special tube/kit
GC — Special tube/kit
Other

Faeces
Culture — Blue top container
H.pylori — Blue top container
(Prev.pylori eradication: date.....)
(Prev.gastric surgery: date.....)
Other tests
nb. Occult Blood on Biochem form

Sputum
Culture (Routine only)
Trach.aspirate
Other

Various
Blood culture
Body Fluid — Type
Joint Fluid — Type

Swabs
Eye Lt. Rt.
Ear Lt. Rt.
Throat
Ulcer / Psore
State site
Wound
State site
Wound
State site
Wound
State site
Abscess
State site
Mrsa screen
Nasal Axilla
Groin Wound
State wound site
Line / tip Site
Post cough (CF only)

Swabs
HVS
Cervical swab* Chlamydia
Cervical swab* GC
(*only one BLUE swab required)

ITU/HDU only
Nasal (infection screen)
Throat (infection screen)
Trachy. Site (infection screen)

Mycology
Skin Nail
Other

Other sample / test (not listed)

Microbiology Clinical Details

Virology / Serology
Hepatitis A Diagnosis
Hep A Immunity
Hep B Surface Antigen
Hep B Immunity (post vacc)
Hep C Diagnosis
Put HIGH RISK labels on sample/form
Viral Screen (Only processed if full clinical details, including onset date given)
Meningococcal PCR (edta tube) (Send special request form)

HIV diagnosis
CMV EBV
A typical pneumonia
Faeces for Rotavirus/adeno (Paediatrics only)
STS (Syphilis)
Rubella immunity
Varicella immunity
ASOT
RSV (NPA)

Other Virology / Serology tests

Virology Clinical Details

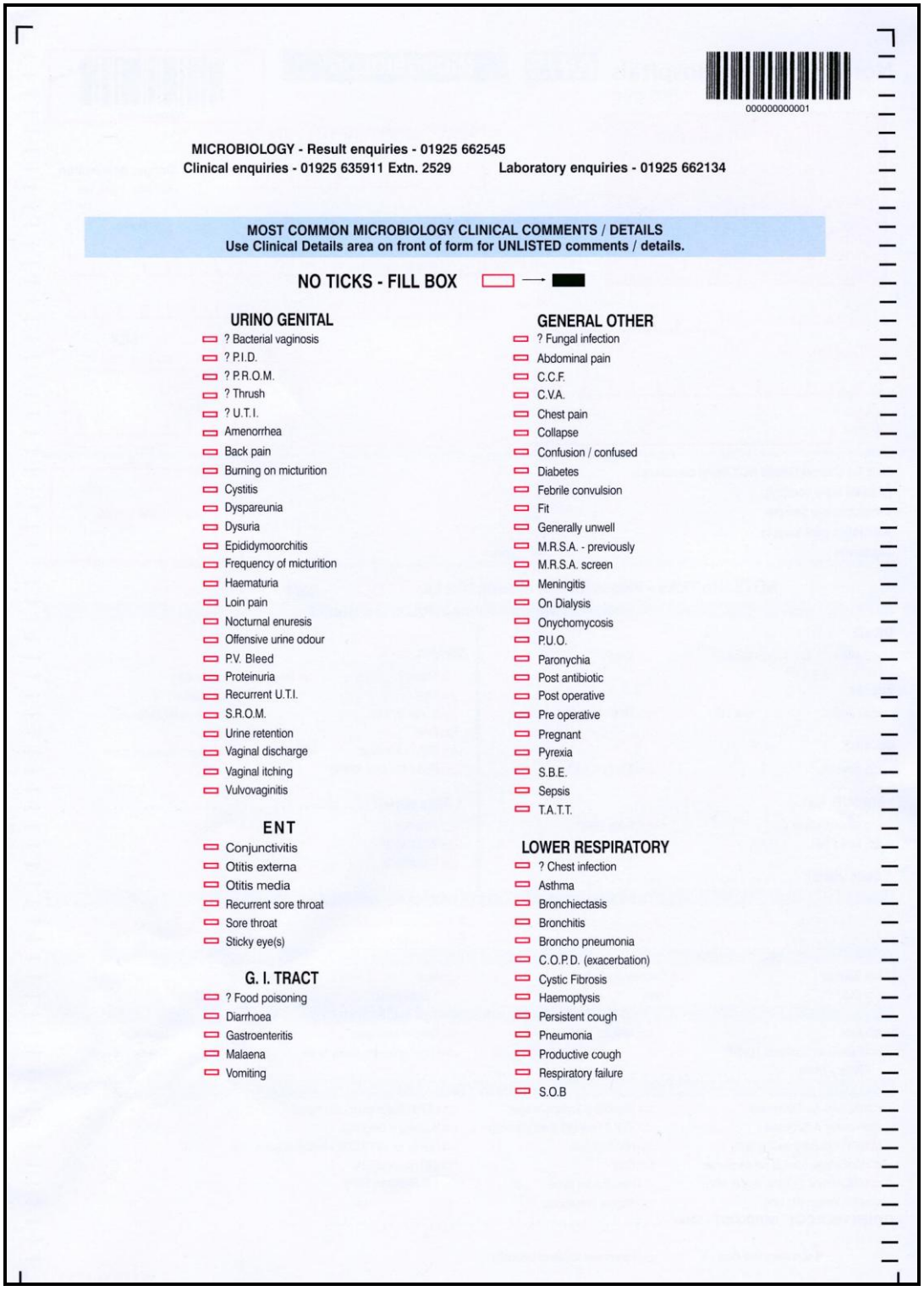
Onset date:

Laboratory Use Only
Specimens Received Unlabelled

CHC/MIC

For Laboratory Use Only

Appendix 4: Microbiology Request Form (Back).



000000000001

MICROBIOLOGY - Result enquiries - 01925 662545
Clinical enquiries - 01925 635911 Extn. 2529 Laboratory enquiries - 01925 662134

MOST COMMON MICROBIOLOGY CLINICAL COMMENTS / DETAILS
Use Clinical Details area on front of form for UNLISTED comments / details.

NO TICKS - FILL BOX ▭ → ■

URINO GENITAL
- ? Bacterial vaginosis
- ? P.I.D.
- ? P.R.O.M.
- ? Thrush
- ? U.T.I.
- Amenorrhea
- Back pain
- Burning on micturition
- Cystitis
- Dyspareunia
- Dysuria
- Epididymoorchitis
- Frequency of micturition
- Haematuria
- Loin pain
- Nocturnal enuresis
- Offensive urine odour
- P.V. Bleed
- Proteinuria
- Recurrent U.T.I.
- S.R.O.M.
- Urine retention
- Vaginal discharge
- Vaginal itching
- Vulvovaginitis

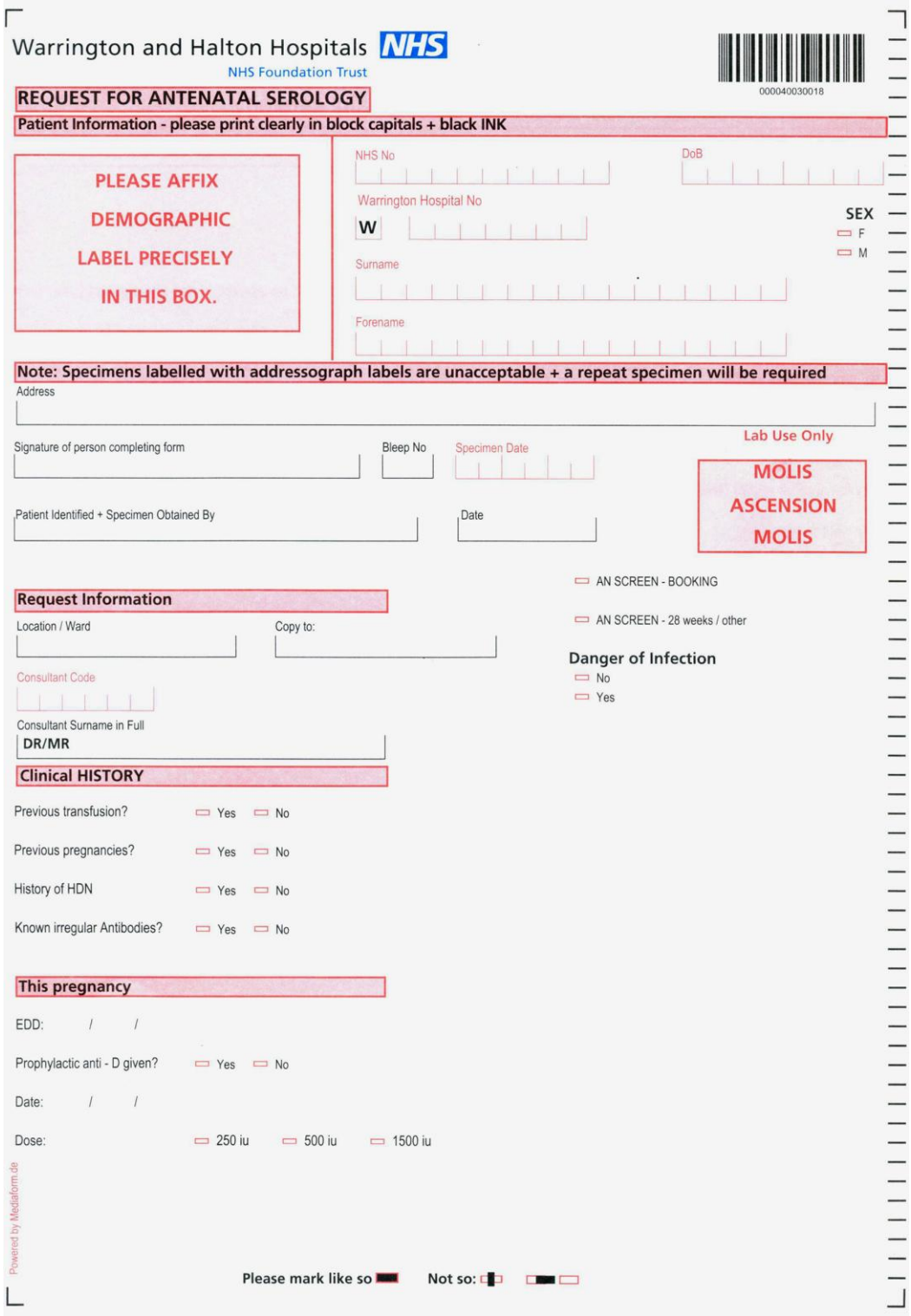
ENT
- Conjunctivitis
- Otitis externa
- Otitis media
- Recurrent sore throat
- Sore throat
- Sticky eye(s)

G. I. TRACT
- ? Food poisoning
- Diarrhoea
- Gastroenteritis
- Malaena
- Vomiting

GENERAL OTHER
- ? Fungal infection
- Abdominal pain
- C.C.F.
- C.V.A.
- Chest pain
- Collapse
- Confusion / confused
- Diabetes
- Febrile convulsion
- Fit
- Generally unwell
- M.R.S.A. - previously
- M.R.S.A. screen
- Meningitis
- On Dialysis
- Onychomycosis
- P.U.O.
- Paronychia
- Post antibiotic
- Post operative
- Pre operative
- Pregnant
- Pyrexia
- S.B.E.
- Sepsis
- T.A.T.T.

LOWER RESPIRATORY
- ? Chest infection
- Asthma
- Bronchiectasis
- Bronchitis
- Broncho pneumonia
- C.O.P.D. (exacerbation)
- Cystic Fibrosis
- Haemoptysis
- Persistent cough
- Pneumonia
- Productive cough
- Respiratory failure
- S.O.B

Appendix 5: Ante-Natal Grouping & Antibody Screen Form (Front).



Warrington and Halton Hospitals NHS
NHS Foundation Trust

000040030018

REQUEST FOR ANTENATAL SEROLOGY

Patient Information - please print clearly in block capitals + black INK

PLEASE AFFIX DEMOGRAPHIC LABEL PRECISELY IN THIS BOX.

NHS No

DoB

Warrington Hospital No

W

SEX
F
M

Surname

Forename

Note: Specimens labelled with addressograph labels are unacceptable + a repeat specimen will be required

Address

Lab Use Only

Signature of person completing form

Bleep No

Specimen Date

MOLIS
ASCENSION
MOLIS

Patient Identified + Specimen Obtained By

Date

Request Information

AN SCREEN - BOOKING

AN SCREEN - 28 weeks / other

Location / Ward

Copy to:

Danger of Infection
No
Yes

Consultant Code

Consultant Surname in Full
DR/MR

Clinical HISTORY

Previous transfusion? Yes No

Previous pregnancies? Yes No

History of HDN Yes No

Known irregular Antibodies? Yes No

This pregnancy

EDD: / /

Prophylactic anti - D given? Yes No

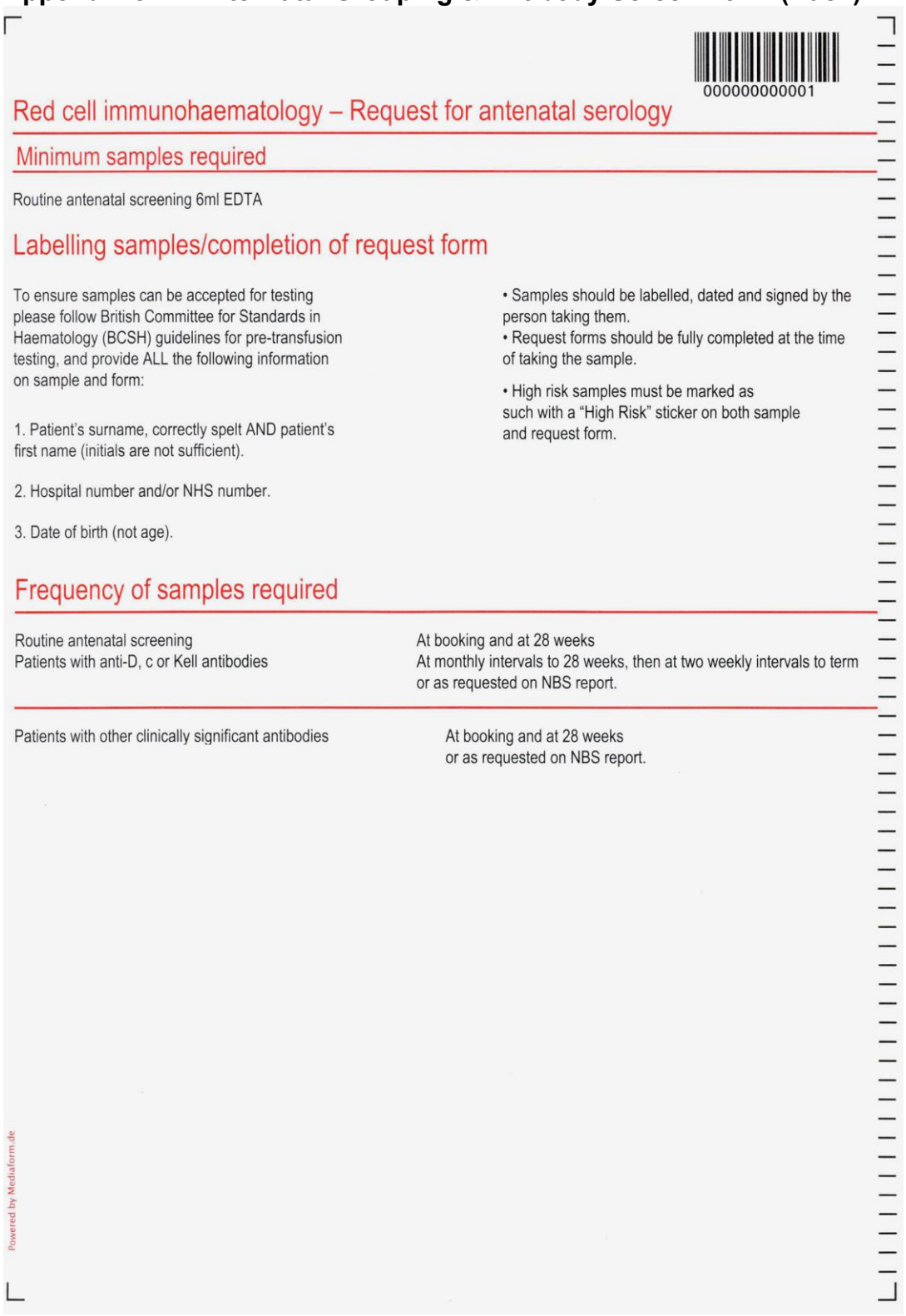
Date: / /

Dose: 250 iu 500 iu 1500 iu

Powered by Mediaform.de

Please mark like so ■ Not so: ▮ ▬

Appendix 5: Ante-Natal Grouping & Antibody Screen Form (Back)



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Red cell immunohaematology – Request for antenatal serology

Minimum samples required

Routine antenatal screening 6ml EDTA

Labelling samples/completion of request form

To ensure samples can be accepted for testing please follow British Committee for Standards in Haematology (BCSH) guidelines for pre-transfusion testing, and provide ALL the following information on sample and form:

1. Patient's surname, correctly spelt AND patient's first name (initials are not sufficient).
2. Hospital number and/or NHS number.
3. Date of birth (not age).

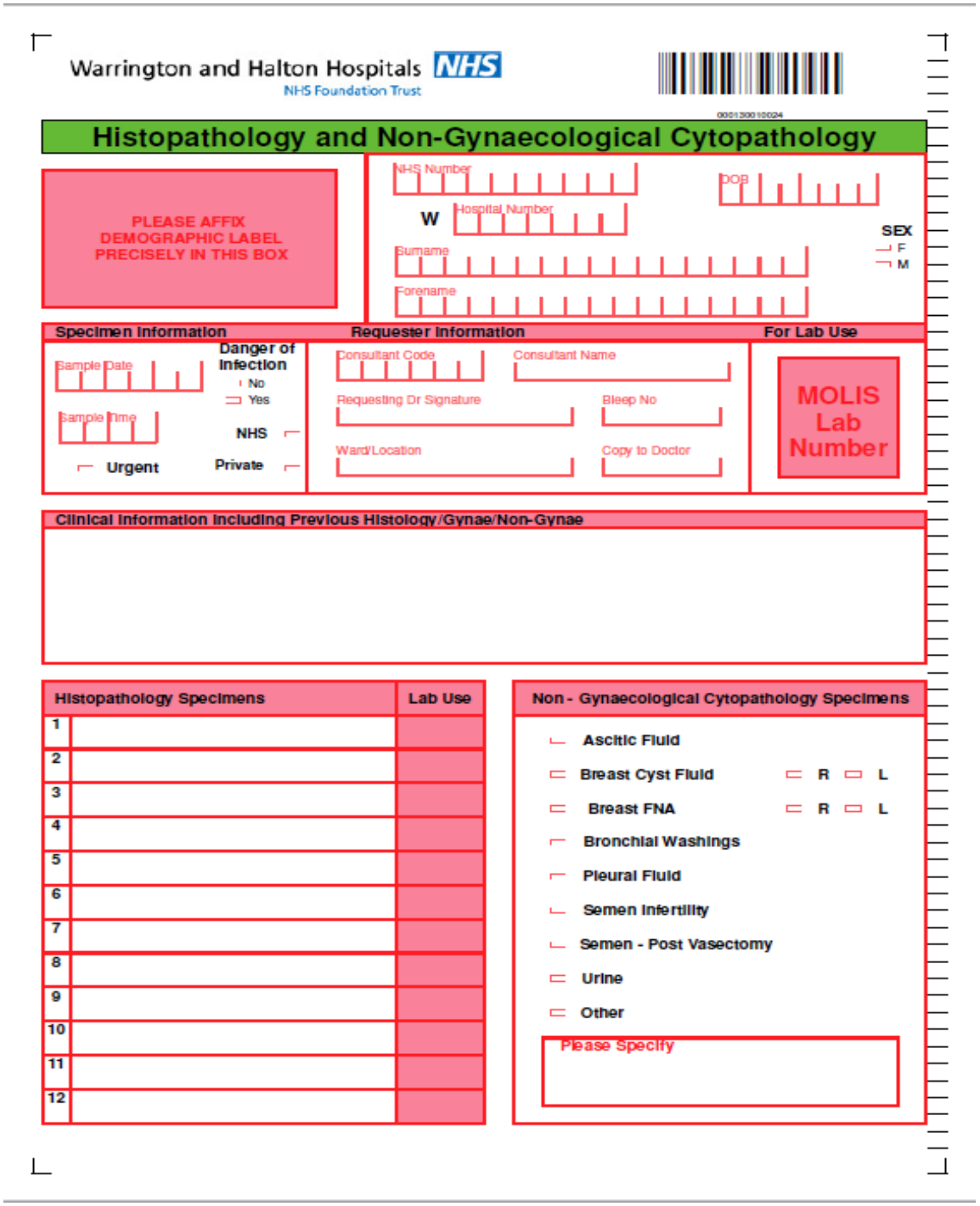
- Samples should be labelled, dated and signed by the person taking them.
- Request forms should be fully completed at the time of taking the sample.
- High risk samples must be marked as such with a "High Risk" sticker on both sample and request form.

Frequency of samples required

Routine antenatal screening Patients with anti-D, c or Kell antibodies	At booking and at 28 weeks At monthly intervals to 28 weeks, then at two weekly intervals to term or as requested on NBS report.
Patients with other clinically significant antibodies	At booking and at 28 weeks or as requested on NBS report.

Powered by Mediaform.de

Appendix 6: Histopathology & Non-Gynae Request Form.



Warrington and Halton Hospitals NHS
NHS Foundation Trust

Histopathology and Non-Gynaecological Cytopathology

PLEASE AFFIX DEMOGRAPHIC LABEL PRECISELY IN THIS BOX

NHS Number | DOB | W | Hospital Number | SEX F M | Surname | Forename

Specimen Information

Sample Date | Danger of Infection No Yes | Sample Time | NHS | Urgent | Private

Requester Information

Consultant Code | Consultant Name | Requesting Dr Signature | Bleep No | Ward/Location | Copy to Doctor

For Lab Use

MOLIS Lab Number

Clinical Information including Previous Histology/Gynae/Non-Gynae

Histopathology Specimens		Lab Use
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

Non - Gynaecological Cytopathology Specimens

- Ascitic Fluid
- Breast Cyst Fluid R L
- Breast FNA R L
- Bronchial Washings
- Pleural Fluid
- Semen Infertility
- Semen - Post Vasectomy
- Urine
- Other

Please Specify

Appendix 7: Family Origin Questionnaire Request Form

NHS Sickle Cell and Thalassaemia Screening Programme

Family Origin Questionnaire

If using a pre-printed label please attach one to each copy

Hospital number .....
NHS number .....
Estimated delivery date .....
Surname .....
Forename .....
Date of birth .....
Address 1 .....
Address 2 .....
Post code .....

Gestation at time of sample (weeks and days) ☐

Screening test declined ☐

Report destination
(such as community midwife, GP, antenatal clinic, obstetrician)
.....
.....

Is pregnancy the result of IVF? If yes, complete the form including **SECTION H.**

What are your and your family's origins?

Please tick all boxes in ALL sections that apply to the woman and the baby's biological father.

	Woman	Biological father
A. AFRICAN OR AFRICAN-CARIBBEAN (BLACK)		
Caribbean Islands	☐	☐
Africa (excluding North Africa)	☐	☐
Any other African family origins	☐	☐
B. SOUTH ASIAN (ASIAN)	Woman	Biological father
India or African-Indian	☐	☐
Pakistan, Bangladesh, Sri Lanka	☐	☐
C. SOUTH EAST ASIAN (ASIAN)	Woman	Biological father
China including Hong Kong, Taiwan	☐ #	☐ #
Singapore, Thailand, Indonesia	☐ #	☐ #
Malaysia, Vietnam, Philippines	☐ #	☐ #
Cambodia, Laos, Myanmar	☐ #	☐ #
Any other Asian family origins	☐ #	☐ #
D. OTHER NON-EUROPEAN (OTHER)	Woman	Biological father
North Africa, South America	☐	☐
Middle East, Saudi Arabia, Iran	☐	☐
Any other non-European family origins	☐	☐
E. SOUTHERN AND OTHER EUROPEAN (WHITE)	Woman	Biological father
Sardinia	☐ #	☐ #
Greece, Turkey, Cyprus	☐ #	☐ #
Italy, Portugal, Spain	☐	☐
Albania, Czech Republic	☐	☐
Poland, Romania, Russia	☐	☐
Any other Mediterranean country	☐	☐
F.* UNITED KINGDOM (WHITE) refer to the list on the back	Woman	Biological father
England, Scotland, Northern Ireland, Wales	☐	☐
G.* NORTHERN EUROPEAN (WHITE) refer to the list on the back	Woman	Biological father
Austria, Belgium, Switzerland, Scandinavia	☐	☐
Eire, France, Germany, Netherlands	☐	☐
Australia, North America, South Africa	☐	☐
Any other European family origins	☐	☐
* Hb Variant Screening Requested by (F) and/or (G)	☐	☐

Higher risk for alpha zero thalassaemia

	Woman	Biological father
H. DON'T KNOW		
Adoption/unknown ancestry	☐	☐
Donor egg/sperm (if pregnancy results from donor egg, order test for mother and offer biological father test immediately)	☐	☐
Bone marrow transplant (if mother has had a bone marrow transplant, order test for mother and offer biological father test immediately)	☐	☐
I. DECLINED TO ANSWER	☐	☐

All women need to be informed that routine analysis of blood may identify them as a thalassaemia carrier. In **low prevalence** areas OFFER haemoglobin variant screening to all women if they or the baby's father have answers in any yellow box. In **high prevalence** areas OFFER haemoglobin variant screening to all women irrespective of answers.

Signed ..... **Print name** ..... **Hospital** ..... **Date** .....
(By health care professional completing the form)

One copy of the form must be sent to the laboratory and one copy must be retained in the maternity record.

The completion of this form is an ESSENTIAL part of the screening programme for sickle cell and thalassaemia.

Appendix 8: Transport Schedule – 1

The following is the order in which the Transport couriers visit Practices to collect specimens for return to the Path Lab. There are two morning runs and one afternoon run. No specific times are given, however the morning runs commence at approximately 0900; the afternoon run at approx 1400.

Morning Route 1

4 Lexden Street
14-16 Bold St CDT
235 Dudlow Green Road
5 Hatton Lane Stretton
BUPA Stretton
Brookfield Surgery Lymm
1 Lakeside Road Lymm
235 Thelwall New Road
Grappenhall Clinic
Latchford Medical Centre
The Forge, London Road
Causeway Medical Centre
Leave specimens at Causeway for collection by Run4

7-8 The Mall, Cockhedge Centre
1 Manchester Road
2 Helsby Street
274 Manchester Road
278 Manchester Road
280 Manchester Road
Woolston Neighbourhood Hub
28 Holes Lane
Woolston Clinic
12 Station Road Padgate
Eric Moore Partnership (Jubilee Park)
Eric Moore Partnership at 74 Bewsey St
20 Dallam Lane
14-16 Bold Street CDT
Springfield Med Centre – Leigh St
Garven Place Clinic (Wellbeing Centre,Leigh St)
Guardian Street
Return to path lab

Morning Route 2

87 High Street
102 Market Street
101 Market Street/Legh St
48 Bridge Street
Bradleigh Nursing Home N-Le-W
Hollins Park
Kinnock Park Burtonwood
1a Clay Lane Burtonwood
Barrowhall Lane Medical Centre
Penketh Health Centre
31 Winstanley Close Gt Sankey
Burtonwood Rd Clinic
Westbrook Medical Centre
Leave specimens at Westbrook for Collection by Run 4
466 Warrington Road
Culcheth Medical Centre
Thompson Ave Culcheth
Risley Prison
Birchwood Health Centre
Millenium Way
Fearnhead Cross Medical Centre
4 Seasons Health Centre (Jubilee Park)
Parkview Med Centre (Jubilee Park)
Longford Street
Folly Lane Medical Centre
Return to path lab

Appendix 8: Transport Schedule – 2

Afternoon Route 1

Newton Community Hospital
Hollins Park

Afternoon Route 2

Grappenhall Clinic
Lakeside Medical Centre Lymm
Brookfield Medical Centre Lymm
Stretton MC 5 Hatton Lane
45 Dudlow Green Road
Stockton Heath MC
Causeway Medical Centre
2 Helsby Street
274 Manchester Road
Orford Clinic (Jubilee Park)
4 Seasons Orford HC (Jubilee Park)
Springfield Medical Centre, Leigh St
Folly Lane Medical Centre
Collect from Pharmacy W'ton
St Roccos Pharmacy delivery
Westbrook Medical Centre
31 Winstanley Close
Penketh Health Centre
Jubilee Park – Orford Clinic and Eric Moore Parnership
Warrington Wolves
Return to path lab

Please Note – This Transport Schedule is under Constant Review

The following appendices list the laboratories to which specimens for analysis are referred. Accreditation status, turnaround times & other details on these laboratories are kept on file within the individual disciplines. These may be viewed on request.

Appendix 9: Laboratories To Which Specimens Are Referred Biochemistry.

Chemical Pathology, Mersey and West Lancashire Teaching Hospitals NHS Trust, Whiston Hospital, Warrington Rd, Rainhill, Prescot L35 5DR	**Clinical Chemistry & Immunology,** Liverpool Clinical Laboratories , 5th Floor Clinical Support Services Building, Liverpool University Hospital Foundation Trust, Vernon Street, Liverpool, L7 8YE
Clinical Biochemistry, Aintree Hospitals NHS Trust, Longmoor Lane, Liverpool, Merseyside. L9 7AL	**Paediatric Biochemistry,** Royal Liverpool Children's NHS Trust, Alder Hey, Eaton Road, Liverpool. L12 2AP
Clinical Biochemistry, Central Manchester Hospitals NHS Trust Manchester Royal Infirmary, Oxford Rd., Manchester. M13 9WL.	**Protein Reference Unit - Northern General,** Sheffield Teaching Hospitals NHS Trust, Dept of Immunology, Herries Rd., Sheffield. S5 7AU.
Biochemistry Department Wythenshawe Hospital Southmoor Road Manchester M23 9LT	**Immunology Department**, Salford Royal Hospitals NHS Trust, Hope Hospital, Stott Lane, Salford. M6 8HD
Clinical Biochemistry, Salford Royal Hospitals NHS Trust, Hope Hospital, Stott Lane, Salford. M6 8HD.	**Biochemistry Department** Christie Hospital Trust Wilmslow Road Withington Manchester M20 4BX
Clinical Biochemistry & Metabolic Medicine, Liverpool Clinical Laboratories , 5th Floor Clinical Support Services Building, Liverpool University Hospital Foundation Trust, Vernon Street, Liverpool, L7 8YE	**Biochemistry Department** Royal Preston Hospital Sharoe Green Lane North Fulwood Preston PR2 9HT
Walton Centre for Neurology & Neurosurgery NHS Trust, Buxton Labs, Lower Lane, Liverpool. L9 7LJ.	**Regional Laboratory for Toxicology,** Specialist Chemistry Postal Reception, Pathology Department, Sandwell General Hospital, Lyndon, West Bromwich, B71 4HJ
Molecular Genetics, Liverpool Womens Hospital, Crown Street, Liverpool, L8 7SS	**SAS,** Biochemistry & Medical Oncology, Charing Cross Hospital, London. W6 8RF

Appendix 10: Laboratories To Which Specimens Are Referred: Haematology.

Coagulation Dept Liverpool Clinical Laboratories , 5th Floor Clinical Support Services Building, Liverpool University Hospital Foundation Trust, Vernon Street, Liverpool, L7 8YE	Regional Cytogenetics Lab Liverpool Women's NHS Foundation Trust, Crown St., Liverpool. L8 7SS
Biochemistry Dept Liverpool Clinical Laboratories , 5th Floor Clinical Support Services Building, Liverpool University Hospital Foundation Trust, Vernon Street, Liverpool, L7 8YE	School of Tropical Medicine Pembroke Place, Liverpool. L8 7SS
Department of Haematology Trafford General Hospital Moorside Road Davyhulme Manchester M41 5SL	Molecular Genetics Lab Liverpool Women's NHS Foundation Trust, Crown St., Liverpool. L8 7SS
Red Cell Investigation (RCI) National Blood Service, 14 Estuary Banks Speke Liverpool L24 8RB.	Red cell protein lab Dept. of Haematological Medicine Kings College Hospital NHS trust Denmark Hill London SE5 9RS
Immuno-phenotyping, Liverpool Clinical Laboratories , 5th Floor Clinical Support Services Building, Liverpool University Hospital Foundation Trust, Vernon Street, Liverpool, L7 8YE	Molecular Diagnostics MRI, Oxford Rd. Manchester. M13 9WL
Histocompatibility & Immunogenetics Diagnostic Reference Lab., National Blood Service, Longley Lane Sheffield S5 7JN	Haemostasis Laboratory, Specialist Haematology, Chancellor Wing, Block 32, St James University Hospital, Beckett Street, Leeds, LS9 7TF.
Haematological Malignancy Diagnostic Service, St James Institute of Oncology, Level 3, Bexley Wing, St James University Hospital, Leeds. LS9 7TF.	Molecular Biology Haematology Liverpool Clinical Laboratories , 5th Floor Clinical Support Services Building, Liverpool University Hospital Foundation Trust, Vernon Street, Liverpool, L7 8YE

Histology, Liverpool Clinical Laboratories , 5th Floor Clinical Support Services Building, Liverpool University Hospital Foundation Trust, Vernon Street, Liverpool, L7 8YE	NHSBT Filton, 500 North Bristol Park Northway, Filton, Bristol, BS34 7QQH
Haematology Department Liverpool Clinical Laboratories , 5th Floor Clinical Support Services Building, Liverpool University Hospital Foundation Trust, Vernon Street, Liverpool, L7 8YE	MCCN HODS Liverpool Clinical Laboratories , 5th Floor Clinical Support Services Building, Liverpool University Hospital Foundation Trust, Vernon Street, Liverpool, L7 8YE

Appendix 11: Laboratories To Which Specimens Are Referred: Histopathology.

ROAR Forensics Ltd Malvern Hills Science Park Geraldine Road Malvern Worcestershire WR14 3SZ	Source Bioscience Reference Laboratory 1 Orchard Place Nottingham Business Park Nottingham NG8 6PX
Mortuary, Alder Hey Hospital, Easton Rd., Liverpool. L12 2AP	Histology Department Mersey and West Lancashire Teaching Hospitals NHS Trust, Whiston Hospital, Warrington Rd, Rainhill, Prescot L35 5DR
Histology Department Liverpool Clinical Laboratories , 5th Floor Clinical Support Services Building, Liverpool University Hospital Foundation Trust, Vernon Street, Liverpool, L7 8YE	Histology Department Wythenshawe Hospital South Moor Rd Manchester M23 9LT
Regional Genetics Lab, Liverpool Women's NHS Foundation Trust Crown Street, Liverpool L8 7SS.	Histology Department Salford Royal NHS Foundation Trust Stott Ln, Salford M6 8HD

Appendix 12: Laboratories To Which Specimens Are Referred: Microbiology.

Reference Laboratory	Examinations Referred
Public Health England Bacteriology Reference Department (BRD) 61 Colindale Avenue London NW9 5EQ Includes: Antimicrobial resistance and healthcare associated infections (AMRHAI) Gastrointestinal bacteria reference unit (GBRU) The respiratory and Vaccine Preventable Bacteria Reference Unit (RVPBRU) The sexually transmitted bacteria reference unit (STRBU)	
Meningococcal Reference Unit (MRU) Manchester Medical Microbiology Partnership P.O. box 209 Clinical Sciences building 2 Manchester Royal Infirmary Oxford Road Manchester M13 9WZ	Blood samples for testing Bacterial Isolates for typing
Rare and Imported Pathogens Laboratory (RIPL) Public Health England Porton Down Salisbury Wiltshire SP4 0JG	
Anaerobe Reference Unit Public Health Wales Microbiology Cardiff University Hospital of Wales Heath Park Cardiff CF14 4XW	Anaerobic bacterial Isolates for typing
Mycology Reference Centre, Manchester 2nd Floor Laboratory Education and Research Centre Wythenshawe Hospital Southmoor Road Manchester M23 9LT	Fungal identification and antifungal sensitivity testing
Liverpool Clinical Laboratories , 5th Floor Clinical Support Services Building, Liverpool University Hospital Foundation Trust, Vernon Street, Liverpool, L7 8YE	Samples for *Mycobacterium tuberculosis* investigations, cervical swabs/eye swabs for chlamydia/GC TMA & samples for GC TMA confirmation.

Appendix 12: Laboratories To Which Specimens Are Referred: Microbiology (cont'd)

Antimicrobial Reference Laboratory Department of Microbiology Lime Walk Building Southmead Hospital Westbury on Trym Bristol BS10 5NB	Antibiotic Assays
Manchester Medical Microbiology Partnership Clinical Sciences Building Central Manchester & Manchester Children's University Hospital Trust Manchester Royal Infirmary Oxford Road Manchester M13 9WL	CD4 counts, Pneumococcal PCR, *Pneumocystis jiroveci* (formerly *Pneumocystis carinii*) , swabs for virology, samples for influenza, TB quantiferon samples, various virology referrals.
The Old Medical School Microbiology Department Infection Control Laboratory Thoresby Place Leeds LS1 3EX	Clostridium difficile toxin ribotyping
The National Creutzfeldt Jakob Disease Surveillance Unit Western General Hospital Crewe Road Edinburgh EH4 2XU	Samples for Creutzfeldt Jakob Disease
Cryptosporidium Reference Unit Public Health Wales Microbiology ABM Singleton Hospital Sgeti Swansea SA2 8QA	Cryptosporidium confirmation and specialist testing
Liverpool School of Tropical Medicine Diagnostic Laboratory Pembroke Place Liverpool L3 5QA	Faecal parasitology
Virology & Mycology Reference laboratory National Infection Services PHE South west laboratory Science Quarter Southmead Hospital, Bristol BS10 5NB	
Microbiology Department Mersey and West Lancashire Teaching Hospitals NHS Trust, Whiston Hospital, Warrington Rd, Rainhill, Prescot L35 5DR	

Appendix 13: Blood test requesting using Sunquest ICE

This procedure should be followed in all cases up to the point where a decision is made as to when the specimens are to be collected. At that point the user should follow the pathway of choice.

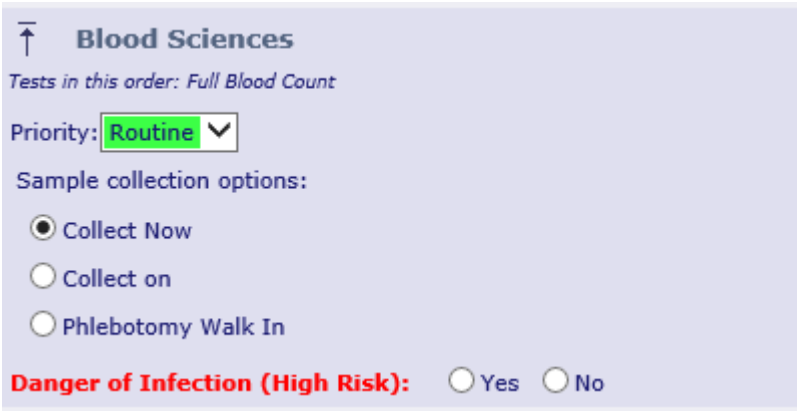
- Open ICE from icon on desktop & login with username & password
- From the ICE desktop select the patient from the ward list (or enter Hospital number into the search value box, click on search for a patient, click on patient details to select)
- Click on 'requesting' followed by 'new request'
- From Gen Path identify the test you require (if the test is not displayed, search using the specific discipline)
- To select the test, click on the box next to the test(s) you require.
- Click on 'continue with request' (Green box in bottom left of screen)
- Add contact number or bleep number.
- Select requesting consultant.
- The location should default to your current desktop location.
- Enter clinical details in the available box.
- Category should by NHS

The requestor must now decide when specimens are to be collected and follow one of the specific pathways detailed below. The choices are as follows:

a) Collect Now (immediate and by the requestor)
b) Collect On (not now but on a specified date & time)
c) Phlebotomy walk in (patient to attend walk in clinic)

a) Collect now (immediate and by the requestor)

- Request made using ICE as above
- From the sample collection options – select collect now

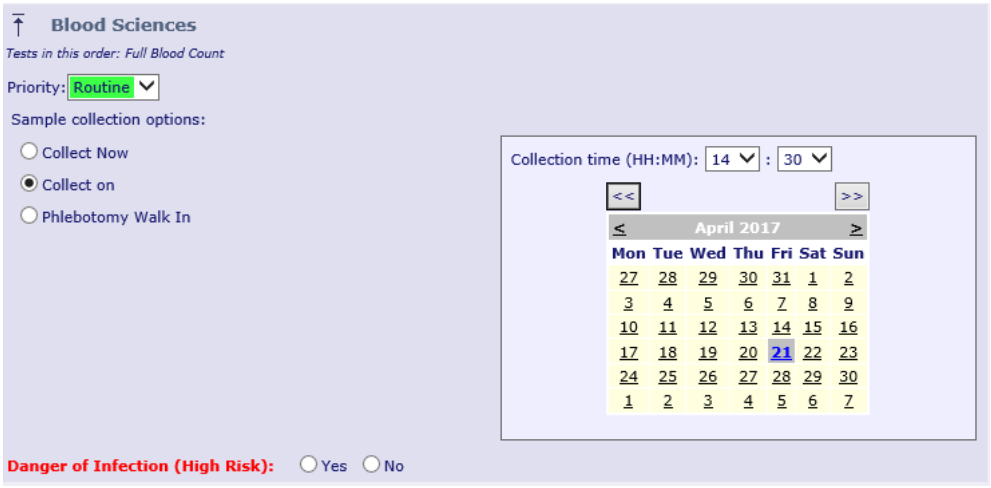


- Select Danger of Infection status
- Click on Accept Request
- Click on Print Request if in A&E or Outpatients. All other areas the form will print out automatically.
- Take form to patient

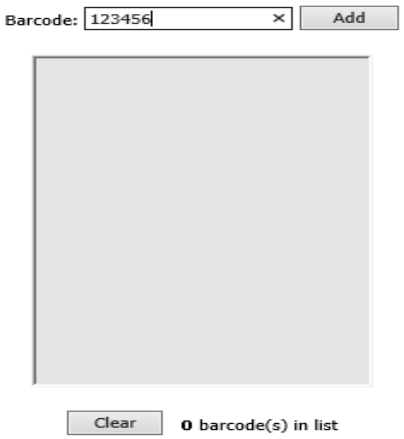
- Identify patient matches details on form – check wristband for details
- Draw blood
- Remove correct ICE label(s) from the form & stick the label(s) on the correct specimen(s)
- Apply danger of infection stickers where appropriate
- Place specimens & form in plastic specimen bag
- Transport to lab either via chute or other method.

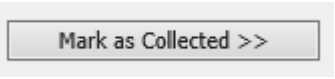
b) Collect On (not now but on a specified date & time- no time limit)

- Request made using ICE as above
- From the sample collection options – select Collect On
- A window opens displaying a calendar & clock – select the desired date & time of collection.



- Select Danger of Infection status
- Click on Accept Request
- Click on Print Request & store as appropriate (either in case notes or phlebotomy file)
- When blood collection is required, take form to patient & identify patient matches details on form – check wristband for details
- Draw blood
- Remove correct ICE label(s) from the form & stick the label(s) on the correct specimen(s)
- Apply danger of infection stickers where appropriate.
- When the blood has been collected, the person collecting the specimen(s) **must** now login to ICE system & indicate that they have taken the specimen(s)
- Open ICE from icon on desktop & login with username & password & select the 'requesting' tab.
- Click on 'sample collection'
- Add barcode number (this is the ICE order number in the top RHS of the request form

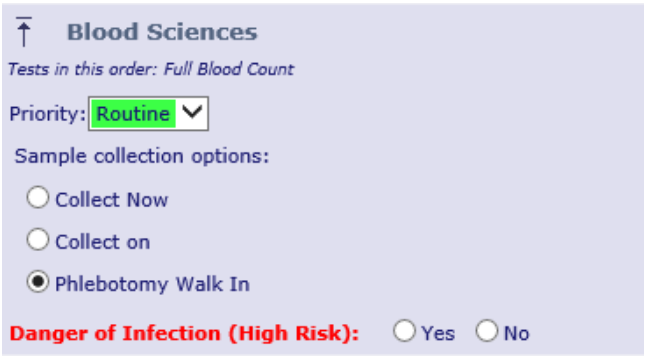


- Mark as collected 

- Place specimens & form in plastic specimen bag
- Transport to lab either via chute or other method.

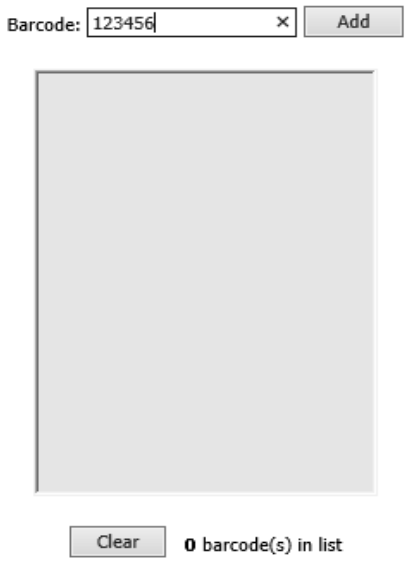
c) Request for patient to attend walk-in phlebotomy clinic (OPD or other)

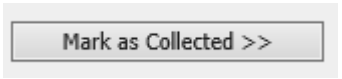
- Request made using ICE as above
- From the sample collection options – select Phlebotomy walk in



- Select Danger of Infection status
- Click on Accept Request
- Click on Print Request if in A&E or Outpatients. All other areas the form will print out automatically.
- Give the form to the patient & ask the patient to attend a walk-in phlebotomy clinic.
- At the point when patient attends the clinic, take form from patient
- Identify patient matches details on form – verbal confirmation from patient
- Draw blood
- Remove correct ICE label(s) from the form & stick the label(s) on the correct specimen(s)
- Apply danger of infection stickers where appropriate
- Place specimens & form in plastic specimen bag
- The phlebotomist collecting the specimen(s) **must** now login to ICE system & indicate that they have taken the specimen(s)

- Open ICE from icon on desktop & login with username & password & select the 'requesting' tab.
- Click on 'sample collection'
- Scan barcode number (this is the ICE order number in the top RHS of the request form)



- Mark as collected. 

- Place specimens & form in plastic specimen bag
- Transport to lab either via chute or other method.

Appendix 14: Telephoned Pathology Results Form

Patient Details			
Name			
Date of Birth		**NHS No.**	

Date Received		**Time**	

All critical abnormal results falling outside the limits below must be alerted to a doctor

Common Biochemistry Tests		
Test	**Results**	**Critical Abnormal Limits**
Sodium		≤ 125 mmol/L ≥ 155 mmol/L
Potassium		≤ 2.7 mmol/L ≥ 6.5 mmol/L
Urea		≥ 40.0 mmol/L (≥ 10.0 in children)
Creatinine		New result ≥ 355 µmol/L (≥ 200 in children)
AKI alert		Report 1st AKI 3 only
Corrected Calcium		≤ 1.80 mmol/L ≥ 3.10 mmol/L
Magnesium		≤ 0.4 mmol/L ≥ 2.10 mmol/L
Amylase		≥ 300 U/L
CK		≥ 2000 I.U/L
Glucose		≤ 2.4 mmol/L ≥ 20.0 mmol/L
TNI		≥ 50 ng/L
Lithium		≥ 1.6 mmol/l
Digoxin		≥ 2.6 µg/l
Theophylline		≥ 25 mg/l
Valproate		≥ 200 mg/l
Phenytoin		≥ 19.9 mg/l
Carbamazepine		≥ 15 mg/l
Bile acids		≥ 14.1 µmol/l
Lactate		≥ 2.6 mmol/l
CRP		>200 mg/l

Common Haematology Tests		
Test	**Results**	**Critical Abnormal Limits**
White Cell Count (WBC)		≤ 2.0 x 10^9/L
Haemoglobin (Hb)		≤ 70 g/L ≥ 200 g/L
Platelets		≤ 30 x 10^9/L ≥ 1000 x 10^9/L
Absolute Neutrophils		≤ 0.5 x 10^9/L ≥ 30 x 10^9/L
D-Dimer		Positive
Malaria Screen		Positive Screen, Parasites on film
INR (Patient on Warfarin)		>5.0
ESR		>100mm/hr (for patients where Temporal Arteritis is being considered
Blood film morphology		

Miscellaneous Results/ Messages:	
Results received by: (Print Name)	
Communicated to Doctor: (Print Name)	
Communicated to Doctor – Time & Date	

Appendix 15: Cervical Cytology Specimen Bag