Bolton NHS Foundation Trust

Laboratory Medicine Handbook

The Blood Sciences Test Repertoire/Assay Finder is located on the Bolton Foundation Trust Internet / Intranet under the Laboratory Medicine Service menu: Test Repertoire.

The Microbiology Test Repertoire is located on the Bolton Foundation Trust Internet / Intranet under the Laboratory Medicine Service menu: Test Repertoire.

Any test that has not been accredited by UKAS to ISO 15189:2012 is clearly identified within the Test Repertoires.

Contents

Introduction

Laboratory Medicine

This handbook provides information about Laboratory Medicine Services which encompass the Service Areas of Blood Sciences (Haematology, Blood Transfusion, Clinical Chemistry, Immunology, Serology & NW Regional Downs Screening Laboratory) Cellular Pathology (with Histology ,Cytology and Morbid Anatomy) & Microbiology (with Virology).

The Department of Laboratory Medicine processes several thousand requests daily. Processing such a workload, much of which needs to be reported within the same working day, requires considerable organisation of schedules and patterns of working together with strict criteria to ensure that results leaving the Department are accurate and relate to the correct patient. Within these schedules we try to provide some flexibility to take account of urgent clinical need. The following notes are to help the user to understand how the Department's services are organised and hence to make the best use of the service by complying with necessary requirements.

There is a list of investigations, specimen containers and turnaround times. Certain investigations are referred to external laboratories, if further information regarding these laboratories or any other general information is required please contact the Lab Medicine Helpline on Tel 01204 390414.

All requests received by Laboratory Medicine shall be regarded as a service agreement, in compliance with ISO standards 15189:2012.

Clinical and interpretive advice is available from the Consultant Pathologists.

Despite an annual increase in workload, the Department of Laboratory Medicine aims to maintain a high quality service, and quality is assessed annually by our user satisfaction survey and monthly via internal audits. The results are analysed and made available to senior managers at regular Speciality and Performance Review Meetings. All Service Areas participate in EQA (External Quality Assurance).

Microbiology (No 8707); Cellular Pathology (No 9927) & Blood Sciences (No 9925) are all a UKAS accredited medical laboratory; (UKAS assessment against ISO standard 15189:2012.) (Reference: Lab 1 Reference to Accreditation for Laboratories.)

Quality is overseen by our Clinical Lead and service managers with support from laboratory managers and the Quality & Service Improvement team. The Department of Laboratory Medicine is subject to the Trust Clinical Governance structure.

The Haematology and Clinical Chemistry laboratories operate an Out of Hours system, and a 7-day working arrangement is operational in Microbiology, out of hours cover is provided through switchboard.

The Department of Laboratory Medicine aims to continually improve the repertoire of investigations, and co-operate in the formulation of guidelines, clinical pathways and protocols advising on the appropriateness of tests. The results which are issued are designed to be accurate, timely, and informative and quality assured.

If you have any comments about the Laboratory Medicine service or about this handbook, please contact

Dr Pradeep Subudhi - chinari.subudhi@boltonft.nhs.uk

Department of Laboratory Medicine Clinical Lead

To raise a Compliment, Concern or Complaint:

- The Patient Advice & Liaison Service (PALS) is available in all NHS Hospitals and Primary Care Trusts for information, help, comments or complaints about any aspect of the services provided at the hospital.
- Access to this service is detailed on the Bolton Foundation Trust Website: Your Views Matter page : Your views matter - Bolton NHS FT (boltonft.nhs.uk)

Patient Advice & Liaison Service (PALS)
Location: Bolton Foundation Hospital Main Entrance
Telephone: 01204 390193. An answer service is available
Email: pals@boltonft.nhs.uk

Patient Consent & Confidentiality:

Information for patients:

It is the responsibility of the requesting clinician (doctor or GP) to obtain appropriate informed consent for all investigations, including:

- For blood-borne viruses is obtained prior to testing & that any implications of a positive report are fully explained.
- For performing genetic testing & appropriate counselling of their patients has been performed. Also – The laboratory will always refer any requests for children (under 17 years) to one of the consultants for a decision on whether to test.

Confidentiality:

Personal health information is strictly confidential & will not be disclosed without the patients' consent, except in exceptional circumstances, for example, where there would be a serious risk to public health if information were not disclosed.

Result Uncertainty / Measurement of Uncertainty:

Measurement uncertainty of results for every test is available on request from the laboratory.

Please contact the laboratory if in there are any concerns regarding the validity of results.

Departmental Telephone Numbers

General Contact Numbers

	Designation	Internal number	External number
Dr Pradeep Subudhi	Clinical Lead	5410	390410
Lewis Hurley	Service Manager	5088	390088
Phil Henry	Operational Business Manager	5419	390419
Rupa Miah	Computer & IT Manager	5253	390253
Barbara Y Colman	Administration & Support Services Manager	5437	390437
QSIT	Quality & Service Improvement Team	5124	390124
Jamie Osborne	POCT Quality Manager/ Principal Biochemist	5420	390420
Emma James	POCT Manager	5421	390421
Laboratory Medicine Secretariat		5437	390437
Laboratory Medicine Reception		5508	390508
General Helpline		5414	390414
Lab Medicine Patient Appointment Call Centre		5923	390923

Blood Sciences – Contact Numbers

	Designation	Internal number	External Number
Clinical Chemistry			
Carolyn Williams	Consultant Biochemist	5172	390172
Gina Mott	Secretary	5025	390025
Steve Sawley	Clinical Chemistry Laboratory Manager	5296	390296
Clinical Chemistry Section Managers		147456	01204 487456
General Enquiries – office hours		144390	01204 390390 ext. 144390
Urgent requests and contact out of office hours		Bleep 4087	
Haematology			
Dr Chetan Pattalappa	Consultant Haematologist	5511	390511
Vacant	Consultant Haematologist	5511	390511
Clinical Haematology Secretariat		5511	390511

Vacant	Associate Specialist	5511	390511
Imran Mohamed	Haematology Laboratory Manager	5296	390296
Janet Ashworth	Blood Science Specimen Reception & Phlebotomy Manager	5296	390296
General Enquiries – office hours		5414	390414
Contact out of office hours		Bleep 5512	

Blood Transfusion			
Josephine McCullagh	Principal Clinical Scientist Blood Transfusion Clinical Lead/HSST	5254 (bleep 3026)	390254
Karen Farrar	Laboratory Transfusion Manager	5297	390297
Blood Transfusion Lab General Enquiries – office hours		5514	390514
Urgent requests and contact out of office hours		Bleep 5512	
Clinical Transfusion – office hours only		Bleep 3026	
Antenatal Screening			
Karina Hambridge	Antenatal Screening Laboratory Manager	5422	390422
General Enquiries – office hours		5424	390424

Cellular Pathology & Andrology – Contact Numbers

	Designation	**Internal number**	**External Number**
Histopathology			
Dr Patrick Waugh	Consultant Histopathologist	3570	390534
Dr J Mark Pearson	Consultant Histopathologist	4808	390534
Dr P Kushwaha	Consultant Histopathologist	5534	390534
Dr Ravindra Sawant	Consultant Histopathologist	144590	390534
Dr Foutoun Salim	Consultant Histopathologist	5534	390534
Dr Geekika Anand	Consultant Histopathologist	147455	390534
Cellular Pathology Secretariat		5534/4544	390534
Tracy Eastland	Histopathology, Cytology & Andrology Laboratory	3606	390534

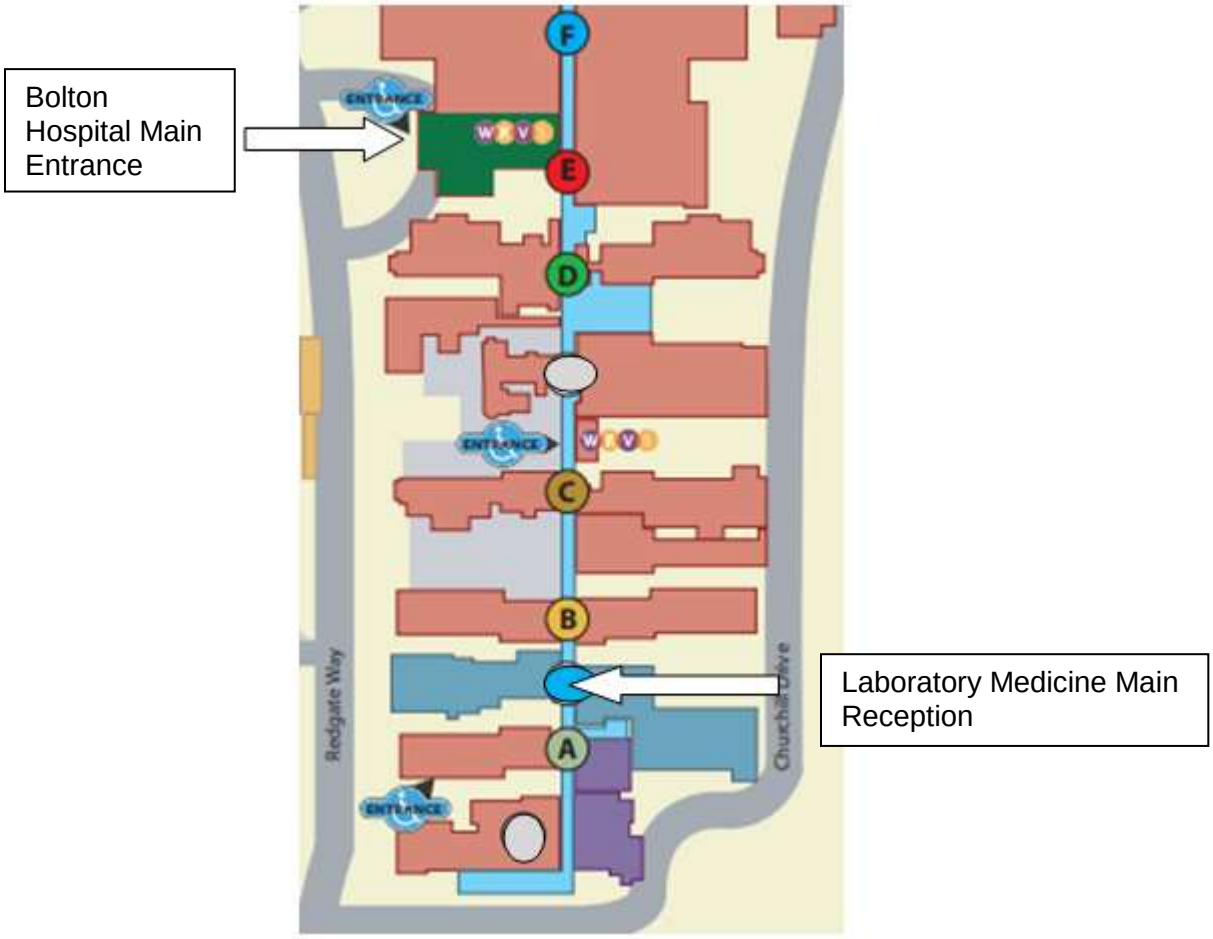
	Manager		
General and Urgent Enquiries – office hours Tel		5534	390534
Cytology & Andrology			
General and Urgent Enquiries – office hours Tel		5513	390513
Mortuary			
Danny Corry	Mortuary Manager	5690	390690
Mortuary Tel		5690	390690

Microbiology – Contact Numbers

Dr Pradeep Subudhi	Consultant Microbiologist	5410	390410
Dr Katy Edwards	Consultant Microbiologist	5080	390080
Dr Celia Chu	Consultant Microbiologist	4166	390416
Dr Rashmi Gupta	Consultant Microbiologist	5080	390080
Microbiology Secretariat		5416	390416
Alison Hardy	Microbiology Laboratory Manager	5409	390409
General and Urgent Enquiries – office hours		5411/5412	390411/2
Urgent Enquiries – out of hours		Via hospital switchboard (Internal ‘0’, External 01204 390390)	

Location & Hours of Opening

Location	**Postal address**
Laboratory Medicine is located just off the Main corridor in between A & B Block.	Department of Laboratory Medicine Royal Bolton Hospital Minerva Road Bolton, Greater Manchester BL4 0JR Tel 01204 390437



Hours of Opening

Specimen delivery (inpatient, outpatient, GP)

Monday – Friday 8.45am – 5.00pm

Outside these hours' arrangements differ between departments.

See below for further details of each department's arrangements.

All work outside normal hours are intended for inpatient work only unless by specific agreement in an individual case.

Laboratory Medicine Helpline

Monday – Friday 9.00am – 5.00pm

The Department operates a helpline for professional users of the Laboratory Medicine Service for clinical advice and enquires relating to all laboratory disciplines. To contact the laboratory outside these hours please see each laboratory's arrangements.

Laboratory Medicine Call Centre

Monday – Friday 9am – 12 noon

The Department operates an appointment line for GP/hospital patients to contact the Department to make appointments for phlebotomy.

Blood Sciences

Operate an out of hours' system for work outside the above stated hours.

Microbiology

Monday – Friday 8.30am – 5.00pm

Saturday-Sunday 8.30am - 5.00pm (reduced service)

At all other times the laboratory offers an on-call service to cover the following samples.

- CSF's
- Paediatric urine MC&S-only from children **<3 months** of age
- Joint fluids
- Pleural fluids
- Ascitic fluids
- Tissue & pus samples from Theatre
- Corneal scrapes
- Any other sample as requested by a Consultant Microbiologist.

This is available via the hospital switchboard.

Cellular Pathology (Histopathology/Cytology)

Monday – Friday 8.30am – 4.45pm

Mortuary

Monday – Friday 8.00am – 1.00pm
1.30pm – 4.00pm

Phlebotomy

Laboratory Medicine Outpatients	Monday – Friday	8.45am – 4.30pm
General Outpatients	Monday – Friday	9.00am – 12.30pm
	Wednesday	2.00pm – 4.00pm

Wards: phlebotomists visit between 8.45am and 12.15pm on weekdays (Monday – Friday) and a restricted service is provided at weekends and Bank Holidays. At all other times it is the responsibility of the requesting doctor to obtain the appropriate specimen for analysis.

Continuous Rota Working in Blood Sciences (Clinical Chemistry, Haematology and Blood Transfusion)

1. The Blood Sciences laboratory is staffed 24 hours a day including weekends and Bank Holidays to provide investigations required for same-day management of patients urgent or routine

2. Between 5.15pm – 8.45 am on weekdays and at all times on weekends and Bank Holidays, there may be only one member of staff available in each area. Therefore, it is not possible for staff to answer telephone calls. In emergency situations it is necessary to contact the laboratory staff using a bleep system

3. Results are available as soon as possible and in any case within 2 hours of receiving the specimen. It is not necessary to telephone to ask for investigations to be done.

4. **Please ensure that all tests required are requested 1st time, any add-ons requested do affect the availability of the results and can lead to un-necessary delay which may have a detrimental effect on patient care and experience**. (If an add-on is requested, after telephoning the request to the laboratory a 'Add-on Request form' must be completed & sent to the appropriate laboratory either by internal post or electronically via LabMedAdmin@boltonft.nhs.uk)

5. It is not necessary to telephone to ask for investigations to be done unless they are required more rapidly than the 2-hour guaranteed return.

6. Specimens from A&E, ICU & HDU will be considered urgent without requiring telephone confirmation. They will be done as soon as possible.

7. Results will be immediately available for viewing through the Web Browser.

Constraints

It is important that users take account of the following factors if the full benefits are to be realised.

1. Not all investigations are covered. Those investigations shown in the Assay Finder as being available within 2 hours are covered. Excluded are more complex analyses such

as immunology, endocrinology, electrophoresis and any work not performed/analysed on site.

2. Staff are occupied with routine work throughout their duty period whether within or outside hours. Bleeping staff will delay work. **ONLY BLEEP** if a test result is required in less than 2 hours (except A&E, ICU, MAU, HDU and NNU) or for a Transfusion emergency. Users should use the ward based PCs to look up laboratory results.

3. Such open access to Laboratory Medicine could potentially add further to financial pressures in the Department. Care needs to be exercised to ensure that tests which have been done during the normal day are not repeated unnecessarily as can happen where a patient moves location and previous results are not to hand. If in doubt, look for a result using the computer access.

Seeking Advice

Each laboratory has its own arrangements for providing advice to patients and users. The telephone numbers to be used are given at the beginning of this handbook. For general enquiries and for results please use the General Helpline number.
Out of normal laboratory hours it is important to understand that clinical advice is not available by telephoning the laboratory. All members of staff who work out of hours are fully trained and competent analysts, but they are not trained to provide clinical assistance or to judge the importance of requests made by clinicians to carry out work outside agreed guidelines.

There is, however, always a medically qualified member of staff or an appropriately trained clinical scientist available via hospital switchboard, (Tel. ext. 01204 390390, Tel. int. 0), who can quickly assist in such queries. Users will be directed to use this on call service by laboratory staff in appropriate circumstances.

Where there is a need for a repeat sample due to analytical failure or additional samples are required; (insufficient primary sample available); the laboratory will issue a report to inform the appropriate ward, department &/or clinician to request a repeat sample, & an appropriate comment will be added to the report & sent to the requestor.

The laboratory will also contact the requestor where there will be significant delay in the sample results being available for whatever reason.

Further examinations of the primary sample are dictated by the results from the initial screening & may be requested by the Departmental Consultants or Clinical Leads.

Requesting Investigations & Labelling

It is essential that all requests, forms or samples are completed correctly with the minimum of 3 unique patient identifiers.

i. Unique identification number e.g. hospital number or NHS number II.
ii. Surname / Forename
iii. Date of Birth

Single or two identifiers may be accepted as long as there is a unique identifier number e.g. GUM clinic numbers, Clinical Trial patients.

The patient must be uniquely identified on the form **and** on the specimen. For inpatients the form must show the patient's NHS or hospital number as well as the name and date of birth. Failure to do so can cause results to be allocated to the wrong patient and /or investigations not performed.

The addressograph label should always be used for hospital patients (**except for Blood Transfusion, see below).**

The addressograph barcode contains all the necessary patient identification. The sample itself must be labelled with the patient's first name, surname, date of birth, hospital or NHS number and the date and time of the specimen.

All requests:
The source of the specimen (ward or department **and** Consultant or GP) must be given. Several sets of results each day cannot be sent out because this information is not given.

The name of the requesting doctor and the doctor's bleep number (when indicated on the request form) must be clearly shown. This reduces delays when the laboratory needs to contact the clinician either because of a problem with the specimen or request or because of abnormal or unexpected results.
All the data on the form and specimen must be legible.

To help reduce the risk of Laboratory acquired infection by exposure to potentially hazardous clinical samples all samples must be sent in the appropriate containers. The specimen bags must be sealed before sending and every effort made to check samples for leaks prior to sending in the transport. For large urine specimens make sure that the plastic bag containing the request form is securely attached to the urine bottle and that the urine container itself is labelled.

Requesting additional tests on blood samples after submitting the original request causes considerable disruption to the flow of work in the laboratories and the sample may no longer be

available or suitable for testing. The need for additional tests may be reduced by requesting against agreed pathways and test protocols in the first instance.

Electronic Requesting

All test requests (except for Blood Transfusion & Cellular Pathology) can be ordered using electronic requesting: Sunquest ICE for GPs & EPR for inpatients OPD are to be included in phase 2 of EPR introduction & it is hoped that this will be on-line sometime after March 2020 (Date to be confirmed). All results are sent to ICE. This improves result retrieval as pathology reports become part of the electronic patient record.

All specimens must be ordered using the ICE system (GPs), EPR (Inpatients only) **OR** accompanied by a fully completed request form. (Please ensure that the correct form for the laboratory to which the request is directed is used.)
Further guidance for specialist requests is given under specific laboratory sections of this handbook.

The Use of Addressograph labels on samples is not permitted within Blood Transfusion.

Blood Transfusion Samples and Request Forms

1. **Identify the patient accurately.**
    a. Ask the patient (if able) to state their full name and date of birth. Check that this matches the ID on the transfusion request form.
    b. Then check the full name, hospital number and date of birth on the request form matches those on the ID wristband.

Unconscious patients MUST be identified by information present on the ID wristband

2. Unidentified patients must have an ID wristband generated in the following format:
    Surname: UNKNOWN,
    Forename: MALE/FEMALE,
    Estimated date of birth,

LE2.2 will generate a new hospital number.
    This wristband must remain on the patient until the patient can be fully identified and blood transfusions are no longer needed.
3. Handwrite the sample tube at the patient's bedside, clearly and accurately. The minimum details accepted are forename, surname, date of birth, hospital number (or A&E number if the hospital number cannot be obtained), date of sample and signature of person taking the sample. **THE USE OF ADDRESSOGRAPH LABELS IS NOT PERMITTED,** samples

labelled with addressographs or have omissions or errors will be discarded and repeat samples requested.

4. State on the request form, the reason for the request, indication code previous transfusion/obstetric history, the consultant, the location of the patient plus any subsequent change of location, the quantity of blood components required (or Group & Save only), and the time and date required.
5. **Take full personal responsibility for ensuring that the blood sample from the patient is placed in the correct tube for that patient. Your signature on the form and tube label records that you have ensured that the sample and patient have been correctly identified.**

Please refer to Histopathology and Cellular Pathology for **2) Requesting Instructions:**

Essential Clinical Details:

To further reduce the risk of Laboratory acquired infection by exposure to potentially hazardous clinical samples please include all relevant clinical info pertinent to the sample being sent; such as:

- Travel History; Foreign Travel with Regions Specified
- Micro-Organisms Suspected; Burkholderia pseudomallei, Bacillus anthracis, Salmonella typhi, Vibrio cholerae, Tapeworms, Neisseria meningitidis, Q-fever, E.coli 0157, Rickettsia, Shigella dysenteriae, Coccidioides, Histoplasma, Penicillium marneffei, SARS, MERS, Corona virus
- Exposure to Known Hazards; TB Contact, Needlestick Injury, Bites, Animal Worker, Dust/Hay, Ebola Contacts, Wastewater exposure
- Past Clinical History; Previous Tb, Immunocompromised, Tick Bites, Contact With Birds/Bats, Prion Exposure, Ebola Contacts
- Other Relevant Information; Unpasteurised Milk, Passing Parasites In Stool, Wound Lesion Or Blister Description, Location Of Pain, Differential Diagnosis, Erythema nodosum, Blood Diarrhoea, Viral Haemorrhagic Fever

Potentially Infective and High Risk Specimens

All specimens should be treated as if potentially infective, but specimens suspected or known to have certain infectious diseases constitute a hazard.

Specimen containers and request forms from patients known to be Hepatitis B Surface Antigen (HBsAg) carriers, cases of suspected acute hepatitis, patients with Tuberculosis (TB), patients known or at risk of being HIV positive, Hepatitis C (HCV), Creutzfeldt-Jakob Disease CJD and variant CJD must be labelled with a “Danger of Infection” sticker.

High Risk Specimens

The receiving laboratory **MUST** be informed despatching these specimens. They **must** be identified as being high risk in the clinical history on the request form and placed in a separate plastic bag and sealed. For further advice, contact Laboratory Medicine.

Blood Collection Order of Draw

When multiple specimens are taken at a single venepuncture there is a small risk that additives within sample tubes may be carried over into the next tube.
It is therefore advised that plain tubes be filled first, followed by tubes with additives, and where several tubes are used, the order should be:

I. Blood Culture
II. Plain (non-additive) tubes, brown
III. Heparin containing tubes, orange
IV. EDTA, red/pink top
V. Oxalate fluoride tube, yellow
VI. Other

Requesting Urgent Analyses

Requests for **all** urgent analyses during normal working hours must be made initially by telephone by the requesting doctor. This allows steps to be taken to intercept the sample on arrival and to prepare the necessary resources.

For Blood Sciences telephone the call centre directly during normal working hours. During Out of Hours Working periods, if it is necessary to contact the laboratory staff regarding emergency requests only by using the bleep system. (Tel. ext. 01204 390390, Tel. int. 0)

For Microbiology out of laboratory hours the doctor must make this request via switchboard for the on-call member of staff, (Tel. ext. 01204 390390, Tel. int. 0)

It is not the responsibility of Laboratory Medicine to arrange for the transport of specimens. All urgent work must be correctly booked onto the ICE system or accompanied by a fully completed request form as described above.

When a specimen that has already been sent as ‘routine’ becomes ‘urgent’, the turnaround time will be extended since the specimen was not intercepted on arrival and now has to be found.

Obtaining Specimen Containers and Supplies

All specimen containers can be obtained from the Department of Laboratory Medicine within normal opening hours. Bottles for urine specimens sometimes need to contain appropriate stabilisers and/or preservatives. If in doubt about the type of container, consult the laboratory. GPs may obtain their supplies via the laboratory courier service (see below – **Transport**).

Transport

GP Surgeries:

The laboratory operates a transport system to deliver reports and collect specimens for analysis from GP surgeries in and around Bolton. The service runs daily Monday to Friday. Contact the helpline if you require further information.

Samples transported via the Trust courier service are temperature monitored during transit; any excursions are reported to the appropriate manager for action.

Wards and Hospital Departments

Gas samples, CSF, large specimen containers e.g. 24hrs Urine containers, and glass containers **MUST NOT** be sent via the Pod system.
All other samples can be sent via the Pod system
When the Pod system is not operational all samples must be transported safely to the Laboratory, the responsibility for ensuring this happens lies with the ward/departmental managers.
Laboratory Medicine Specimen Reception is situated on the Main corridor between A & B block.

iFM (Bolton) is responsible for the maintenance and service of the hospital pneumatic air-tube, together with its cleaning and decontamination. In case of failure or leaking samples please telephone the iFM help line 5995.

Blood Collection Health & Safety

A Sarstedt monovette system is in use in the Department and is supplied to wards, departments and General Practitioners. Samples should be taken in line with Trust Policy.
Every year numerous staff working in Healthcare sustains injuries from sharps. These injuries pose a significant risk to the physical and mental health of the staff member.

All members of staff have a responsibility to:

- Familiarise themselves with the guidance regarding the safe use and management of sharps.
- Adhere to safe working practice in order not to harm either themselves or others.
- Familiarise themselves with the necessary action to take in the event of injury and unsafe disposal.

- Report any incidents or unsafe practice

Managers must ensure that:

- The management of sharps is incorporated into the risk assessment process
- Suitable sharp containers are readily available and located in agreed areas.
- All personnel are informed of the correct and safe procedures for the management of sharps both at induction and during refresher training.
- All personnel are made aware of the action to take should a needle stick injury or sharps spillage occur, including appropriate reporting of the incident.
- A risk assessment is immediately undertaken if a member of staff reports a sharps injury.
- The incident is reported in line with the Trust Incident Reporting Procedure.

The use of sharps should be avoided where possible. When their use is essential, particular care is required in handling and during the disposal process:

Sharps **must** always be handled carefully, and in accordance with the following principles;

- 1. Do not re-sheath used needles, scalpel or sharp objects.
- 2. Never pass sharps from person to person by hand.
- 3. Never walk around with sharps in your hand.
- 4. Never leave sharps lying around – always dispose of them yourself.

Use of Sharps Bins

Sharps must only be disposed of, in designated sharps bins that meet the requirements of the British Standard: BS 7320 (1990) UN3291

The correct size plastic container must be assembled correctly prior to use and staff must ensure the lid is secure.

The person assembling the sharps container must complete the relevant sections on the label before putting it into use.

When placing the used sharps into the container, staff must ensure that all contents actually pass the plastic flap and enter the container.

The sharps container must be discarded when 75% full as per the Trust Blood Borne Virus Policy

When samples will not be analysed

Repeatable specimens that are unlabelled or where there is insufficient information to link the specimen specifically with the patient, will be discarded and the requestor informed either as a report or by telephone according to the urgency or specimen type.

In the interest of safety, specimens that leak inside the plastic specimen bag will also be discarded and the requestor informed. Samples with needles still attached will also be discarded.
Specimens collected into the wrong bottles cannot be analysed. Requestors will be informed.

Where the time of sample collection, the method of collection or the patient preparation for the test does not conform to the requirement for the investigation it may not be possible to continue with the analysis. Advice should be sought from the appropriate laboratory about the conduct of special investigations.

Availability of Results

Turnaround times for individual tests are available in Assay Finder and are referenced against a standard working week. These times are from receipt of specimens within the laboratory to the report leaving the laboratory. This time may be affected by public holidays and weekends. If significant delays are inevitable for a given investigation, efforts will be made to contact the requesting doctor.

Laboratory reports are reported electronically (not Blood Transfusion) and are supplemented by paper reports to those areas that do not have access to view or receive the electronic reports. . The exception is for the delivery of Cellular Pathology (Histopathology and Cytology) reports where both electronic and paper reports are issued and some paper reports for Blood Transfusion.

The Laboratory may telephone the requesting clinician if an unexpected/abnormal result is obtained.
The following information identifies under what circumstances the department may telephone the requesting clinician:

Antenatal Screening Laboratory:

The laboratory offers a two-day turn-around time from receipt of the blood sample to reporting of results. All higher-risk results are telephoned and emailed or faxed directly to the user, and electronic or paper reports are issued for all high and low risk reports.

Blood Transfusion:

Blood & blood product information - There may be certain circumstances when the laboratory is required to let the users know that blood is available e.g. urgent blood for theatre, A/E etc.
The laboratory is required to telephone the ward to inform them when platelets & FFP are ready due to the short expiry time.

Maternal & cord samples - When completed, the laboratory will ring the ward to inform them whether Anti-D immunoglobulin is required or not for their Rh negative mothers.

Cellular Pathology:

When an unexpected abnormal result has been confirmed the Consultant Histopathologist will contact the requesting Clinician or member of the clinical team directly to discuss the findings.

Clinical Chemistry:

Tests/requests for which immediate reporting of abnormal results is required can be found in the table below.
Most results require urgent communication (<2 hours) and are highlighted in red. Those that require communication within 24 hours are in black

Test/request	Lower Action Limit	Upper action Limit	Comments
Ammonia	-	≥100	
Amylase	-	≥500	By telephone together with Electrolytes
Adj. Calcium	≤1.9	≥3.5	By telephone with Electrolytes, Mg and P
AST		≥800	
ALT		≥800	
Bicarbonate	≤10	-	
Bile Acids	-	≥14	In pregnancy only
Carbamazepine	-	≥20	
CK	-	≥5000	
Cortisol	≤50		Communicate within 24 hours
Creatinine	-	≥354	Excludes Renal Dialysis Unit patients. Communication not required when historical results are similar.
Creatinine (paediatric < 16 years)	-	≥200	Excludes Renal Dialysis Unit patients. Communication not required when historical results are similar.
CRP	-	≥300	Telephoning only required when new finding for outpatient/GP
CSF Protein	-	≥1g/L	a) child over 3 months b) CSF protein result >1g/L (caution specimen must not be blood-stained, See LM-BS-72)
Digoxin	-	≥2.5	Telephone any digoxin when K<3.5mmol/L
Ethanol		≥4000	
Gases	pH <7.2	pH>7.5	Phone with all other gases results
Glucose	≤2.5	≥25	By telephone together with Electrolytes
Paed Glucose	≤2.5	≥15	By telephone with Electrolytes if <16 years old
GP troponins	-	≥14	By telephone to surgery
Iron	-	-	Telephone in cases of suspected poisoning
Lactate		≥3.5	
Lithium	-	≥1.5	Also report Electrolytes result
Magnesium	≤0.5	-	By telephone with Ca
Neonatal Tbil Neonatal BC	-	≥350 ≥250 ≥25	For Inpatients For Outpatients
NT Pro BP		>2000	Does not need to be telephoned OOH
Paracetamol	-	Detected	
Phosphate	≤0.32	-	By telephone with Ca
Potassium	≤2.5	≥6.5	Only if historical results are not similar
Phenytoin	-	≥25	
Salicylate	-	≥ 300	
Sodium	≤120	≥160	Only if historical results are not similar
Theophylline	-	≥25	
Urate		≥340	Pregnancy only when new finding
Urate		≥1000	Non pregnancy
Urea	-	≥30	Exclude Dialysis Unit patients Not required when historical results are similar. (>10 if patient <16 years)

Haematology:

The following results are telephoned to the requestor (in the absence of previous abnormal results).

Test	Result	Additional comments
Haemoglobin	<80g/L	
Adult haemoglobin	>190g/L	In cases where the result is unexpected with reference to clinical details & previous results. (Excluding paediatric/neonates.)
Haematocrit	>0.55	
Platelet count	<50 x 10^9/L	
Absolute neutrophil count	<0.8 x 10^9/L	
Malarial parasites	Positive	
International normalised ratio	>5.0	
Activated partial thromboplastin time	>90 seconds	
Fibrinogen	<0.5g/L	
Presence of blasts on blood film - acute leukaemia, confirmed or suspected		
Any thalassaemia or haemoglobinopathy affecting antenatal patients and their partners which may affect the baby (e.g. both parents' heterozygous beta thalassaemia trait, both parents haemoglobin S trait etc.).		
Positive sickle cell screen on patients about to go for a general anaesthetic.		

Microbiology:

During normal working hours the following results are telephoned by the Microbiology Medical Staff to the requesting doctor, ward or surgery.

Infection Control team are responsible for telephoning:

- MRSA positive results from in-patients
- Clostridium difficile toxin positive detections from in-patients

The Microbiology Medical staff are responsible for telephoning:

- Blood cultures - Positive Gram films
- AAFB - New positive films
- CSF – Results of >5 WBC and or positive Gram films
- Joint fluids - Positive Gram films
- Ascitic fluids - Positive Gram films
- Pleural fluids - Positive Gram films
- Vitreous/Aqueous humour taps - Positive Gram films
- Positive HIV screening reports
- Significant virology and serology reports

Reference Ranges

Where appropriate reference ranges for specific tests will be available on the result, electronically, via web browser or paper copy. The reference ranges on tests carried out in-house are available via the Assay Finder.

Electronic Transmission of Results

All GP Practices receive their pathology results via email (currently this service is not available for Cellular Pathology (Histopathology/Cytology) reports). Contact the Laboratory Medicine Computer & IT Manager for further details. Results for hospital wards and out patients are reported to the Trust system (ICE).

Direct Access to Results

GP's can view all results (except Blood Transfusion) on ICE and hospital users can view hospital results electronically following the instructions found on BoB (Looking up results link).

Telephoning for Results

Please use ICE function 

on the desktop rather than telephoning for results, this reduces the following risks:-

1. Giving patient information to someone not authorised to receive it. This might include the patients themselves who may not identify themselves as such and for whom results should only be given by their treating clinician in the context of all the clinical information.

2. Transcription errors. These occur if the person taking the results does not hear properly what is said over the telephone, does not write the results down properly having heard them or writes them in such a way that they are subject to misinterpretation by another person when reading them. This is most likely to occur when given results to those least familiar with their use and meaning.

Where a telephone report is required or whether the laboratory has to telephone urgent results, the following procedure has been adopted by the Trust (originally adopted by the Medical Executive Committee) to minimise potential errors.

1. *The telephoning of results should be avoided if possible as errors and misunderstandings may have disastrous consequences.*

2. *Where possible results should be retrieved directly by means of ward-based computer links with Laboratory Medicine; or a printed report should be requested via the air tube transport system; or a member of ward staff should collect a copy of the report from the laboratory. If the report is required at another site it may be possible to print it remotely.*

3. *It is recognised that results may need to be telephoned under certain circumstances.*

4. *The following guidelines for telephoning results are applicable to the Bolton Laboratories:*

    a. *Results will be read out by medically qualified staff, Healthcare Scientists, or other persons specifically trained to provide accurate information over the telephone. Reports will only be read if they have been authorised.*

    b. *It is recognised that results cannot always be telephoned to a medical practitioner. Results may be given to qualified nursing staff, a registered practitioner or medical secretary. In appropriate cases to pharmacy staff and dietitians all of whom must identify themselves and comply with the guidelines given above.*

    c. *Before providing any results the identity of the person (the job title if not the name) to whom the results are to be given and their location (which ward or GP practice) must be established as clearly as practicable.*

    d. *If there are doubts about the appropriateness of an individual to receive results, an alternative arrangement should be discussed. In the case of a patient searching for their own results they should normally be referred to the requesting clinician.*

    e. *Where there are doubts about the appropriateness of the location and the individual, no information should be given at all. This includes information about whether pathology tests have been carried out or not. This might occur, for instance, if the requestor gives a name and a location that is outside the normal range of requestors (e.g. a GP practice not normally using our service, a distant hospital, a private company etc.). Details of the request should be noted without acknowledgement on our part of any involvement in the case, and the requestor should be told that we will telephone them back. As far as is possible, the validity of the request should be established before telephoning back with information. The telephone number should be independently verified if possible.*

    f. *All reports must be written down by the receiver on paper labelled with the patient's name (and case number where appropriate) or written directly into the case notes. The result must be read back to the member of laboratory staff, to ensure that all numerical values and units are correct. Pre-printed pads for writing down results are available.*

Faxing of Results

Laboratory Medicine no longer fax results in accordance with Trust Guidelines, all results are available electronically.

POINT OF CARE TESTING TEAM

The POCT team oversee and maintain several points of care diagnostic devices located in clinical areas. These include blood gas analysers in critical care areas, hemocues, and glucometers located in both primary and secondary care.

The POCT team:

- Perform regular maintenance of the devices as appropriate
- Ensure training and competency checks of users
- Monitor the quality of the devices
- Troubleshoot errors and faults
- The POCT team are available Monday –Friday 8.30 am-16.30 pm. If you require assistance with a device, please telephone: ext. 5025, 5420 or 5421.
- Support is also available on POCT webpage accessible via the Laboratory Medicine webpages on BOB.

BLOOD SCIENCES – CLINICAL CHEMISTRY

Investigations and Turnaround Times

Specimens are kept for a very limited period after testing, Clinical Chemistry 48 hours, Haematology 24 hours, & aliquots of the Antenatal Screening Samples are kept for 24 months. If you have any queries about the results or the tests that have been performed it is important to discuss this with the laboratory as soon as possible so that any checks can be made.

Tests may be added onto received serum samples within 48 hours of receipt providing they are clinically appropriate and the sample remains viable. (Please contact the Biochemists ext. 5420, if in doubt over viability issues.)
Please note: by adding additional tests onto the original sample may cause delays in the final results being issued and may have an impact on patient health & wellbeing.

Any combination of requests with a 2-hour turnaround time needing a clotted blood sample (brown bottle) requires only a single 7.5ml specimen.

Requests marked with an asterisk are available more urgently than the given turnaround time. The laboratory must be telephoned by the doctor requiring more urgent analysis.

When quoted in days, **turnaround times refer to standard (normal) working days**. When quoted in hours, results are available in a 24-hour basis.

Many investigations not shown below are available through regional and national centres, including specialised endocrinology, toxicology and Clinical Chemistry and molecular biology for inherited disease. For further information, please check the Assay finder or for primary care users please contact the laboratory.

Analyses

Urine samples with no preservative must be sent to the laboratory as soon as possible after the collection is completed.

Note: Spot specimens for Osmolality, sodium and potassium and early morning urines for electrophoresis **must not** contain preservative *(Fraser C G (1986) Interpretation of Clinical Chemistry Data, Blackwell, Oxford) (Fraser, C G (1992) Personal Communication) (Adapted from Shepherd, M D S and Mazzachi R D (1983) The Clinical Biochemist Reviews, 4, 61).*

Factors affecting results

•Contamination- Please use the correct tube and blood draw order to reduce the risk of interference – e.g. EDTA contamination with potassium, calcium and magnesium

- Haemolysis, icteric and lipaemia can interfere with certain analytes. These are indicated as comments on the report and no result for these parameters will be released. Common analytes affected include: sodium, potassium, bilirubin, magnesium, phosphate, AST, ALT, and troponin.

- Transport delay- Serum samples should be processed (centrifuged and serum separated from the cells) within 12 hours of collection. Any delay can influence potassium and enzyme results.

- Extreme temperatures (hot or cold) can cause abnormal levels of some analytes – especially potassium

- Sample timing- the time of taking a sample in relation to a person taking a drug will influence the concentrations and ability to interpret results for therapeutic drug monitoring.

- CSF samples for xanthochromia need to be protected from light

BLOOD SCIENCES –HAEMATOLOGY

Investigations and Turnaround Times

The haematology laboratory in-house testing repertoire includes full blood count, blood film analysis, coagulation, haemoglobin A1c & abnormal haemoglobin investigations.
Molecular testing is offered for Factor V Leiden & the prothrombin 20210 Mutation as well as BCR-ABL monitoring.
The laboratory offers universal screening for sickle cell & thalassaemia for antenatal patients as required by the National Screening Programme for England.
Specimens are kept for 24 hours after testing. However, sample viability is limited for many tests which may restrict 'add-on' requests. Please seek advice from the laboratory.

Requests for malarial parasites screen must include information on travel history; foreign travel with regions specified.

Turnaround times & reference ranges on tests carried out in house are available via Assay Finder.

For urgent analysis contact the relevant section so that arrangements to intercept the request on arrival can be made. See telephone numbers on page 5-7.

Factors affecting results:
Coagulation test requesting - Please note that all sample need to be filled to the fill line, under or overfilled sample will be rejected as will any samples found to be haemolysed

Transport delay - sample viability is limited to a short period of time for many haematology tests, therefore transportation to the laboratory should not be delayed.

Extreme temperatures (hot or cold) – will likely affect results for haematology tests.

BLOOD TRANSFUSION

Refer to the following policies and guidelines on the intranet

- *Transfusion Clinical Process Policy (Hospital Practice)*
- *Indications for the Transfusion of Blood Components in Adults Policy*
- *Neonatal & Paediatric Transfusion Guideline*
- *Guideline for the use of Prothrombin Complex Concentrate (Octaplex)*
- *Major Haemorrhage guideline*
- *Guideline for patients who refuse blood*

The transfusion laboratory issues the following blood products:

- Red cells
- Fresh Frozen Plasma
- Cryoprecipitate
- Platelets
- Prothrombin Complex Concentrate (Octaplex)
- Anti-D immunoglobulin
- Other factor concentrates

The **Blood Component Transfusion Record Document** (HM-FRM-TEC-0037) must be used for all documentation required in the transfusion process. This incorporates the request form, blood prescription, observation chart, prescribing protocols and general procedural guidance. This document must be used for the prescription of blood components, anti-D immunoglobulin and factor concentrates including Octaplex.

All staff involved in the transfusion process MUST be trained and competency assessed. This is a Trust policy requirement (see the clinical transfusion process policy and the Trust mandatory training policy).

Provision of Blood in an Emergency

Contact the transfusion lab immediately and provide the patient's ID and location. Be clear about the level of blood provision you require:

- 2 units of emergency O Negative blood available in the top of each blood bank fridge (this is ABO compatible but may not be compatible if the patient has an alloantibody).
- Further emergency group O blood can be issued from the lab within 10 minutes if a suitably labelled sample has not been received. This will be O+ will be issued to males, women who are not of childbearing potential, O- will be issued to women of childbearing potential or patients known to have allo anti-D. The blood will be labelled as "EMERGENCY Patient". This is ABO compatible but may not be compatible if the patient has an alloantibody

- ABO/D matched blood can be issued from the lab within 15 minutes of the sample arriving in the lab. This is ABO compatible but may not be compatible if the patient has an alloantibody.
- Fully cross matched blood can take up to 45 minutes from the sample arriving in the lab (sometimes longer if the patient has an allo-antibody).

Emergency blood will arrive by 'red alert' porter in a blood box.

Release, Collection and Storage of Blood

Only trained authorised staff are permitted access to the blood fridges. Staff requiring access to blood bank fridges for their role should contact their ward *Blood Tracking* cascade trainer, who will provide training/assessment and issue the member of staff with a barcode to access the fridge. Any problems with the blood tracking system should be reported immediately to the transfusion laboratory.

Blood Transfusion Investigation & Turnaround times

Investigation	Specimen requirements	Turnaround times	Special requirements
Antibody Identification referred to National Blood Service	2x7.5ml Red top transfusion sample	Contact Transfusion Laboratory to discuss current reference laboratory turnaround times	
Cold Agglutinins	7.5ml Transfusion EDTA (separated warm at 37°C)	Contact Transfusion Laboratory to discuss current reference laboratory turnaround times.	Specimen must be collected, received and separated at 37°C (contact laboratory before taking sample)
Crossmatch (Red Cell Issue)	7.5ml Red top transfusion sample	45 minutes from sample in lab – full crossmatch 15 minutes from sample in lab – ABO/D matched only	
Direct Antiglobulin Test	2.7ml EDTA	60 minutes	
Foetal Cell Tests (Maternal Blood and Cord Blood*)	7.5ml Red top transfusion sample	Maternal/Cord groups and anti-D issue* 60mins Kleihauer Same day *If not obtained at delivery send 1 red top paediatric	
Blood Group Phenotype (Rh and K)	7.5ml Red top transfusion sample	60 minutes	
Group and Save	7.5ml Red top transfusion sample	60 minutes	Sample saved for 7 days (but validity will depend upon transfusion history)
HLA Typing	7.5ml red top transfusion sample	Contact Transfusion Laboratory to discuss current reference laboratory turnaround times.	
Platelet Immunology (Platelet Antibody)	7.5ml clotted (brown) and EDTA (Red top transfusion bottle)		Contact Transfusion Laboratory to discuss.
Granulocyte Antibody (Neutrophil Antibody)	7.5ml clotted (brown) and EDTA (Red top transfusion bottle)		Contact Transfusion Laboratory to discuss.
Issue of FFP, Platelets and Cryoprecipitate	7.5ml Red top transfusion bottle	Platelets can be provided within 2 hours (or can be sent by 'blue light' emergency delivery) FFP & Cryoprecipitate can be issued within 30 minutes of receiving sample in the laboratory.	
Antenatal grouping & antibody Screening Bloods	7.5ml Red top transfusion sample	Same day	
Transfusion Reaction Investigations	7.5ml red top transfusion sample on request (other samples will be advised dependant on nature of reaction)		Contact the transfusion laboratory or duty scientist. Advice can also be sought from the Hospital Transfusion Team bleep holder in normal hours (bleep 3026)

Cellular Pathology (Histopathology/Cytology)

1. Introduction:

The Cellular Pathology department at the Royal Bolton Hospital offers the following diagnostic services:

Histology - The study of the structure of tissues and organs. This includes immunocytochemistry and a frozen section service.

Cytology - The microscopic study of cells. Samples received include Non Gynae fluids and needle aspirates.

Andrology - The study of sperm to determine male fertility and confirm infertility following vasectomy.

1a) Address

Histopathology Department
Royal Bolton Hospital
Minerva Road
Bolton
BL4 0JR

1b) Opening Hours:

Our normal opening hours are 08:45am – 16:45pm Monday to Friday. Specimens that are urgent and requiring prompt attention should be brought before 16:45pm. We currently do not operate an out of hours or bank holiday service.

1c) Key Personnel & Contact Information:

For results and general enquiries:

- Medical secretaries/general enquires - 01204 390534 or Fax – 01204 390946

Clinical advice:

Clinical advice is available from Consultant Histopathologists between 08:45am-17:00pm. If you require clinical advice please contact 01204 390390 and ask for pathologist required. If calling internally ring the internal telephone listed below:

Clinical Staff:

- Dr Patrick Waugh – Consultant Histopathologist – Clinical lead (ext. 5534)
- Dr Mark Pearson – Consultant Histopathologist (ext. 4586)
- Dr Ravnidra Sawant – Consultant Histopathologist (ext. 144590)
- Dr P Kushwaha - Consultant Histopathologist (ext. 5534)
- Dr Fountoun Salim - Consultant Histopathologist (ext. 5534)
- Dr Geekika Anand - Consultant Histopathologist (ext. 147455)

Technical Advice:

- Lewis Hurley –Service Manager (ext. 5088)
- Tracy Eastland –Histology and Cytology Laboratory Manager (ext. 3606)

1d) Quality and Accreditation:

Our Cellular Pathology department is assessed by the United Kingdom Accreditation Service (UKAS 9927). The current status and repertoire can be check at www.ukas.com

2) Requesting Instructions:

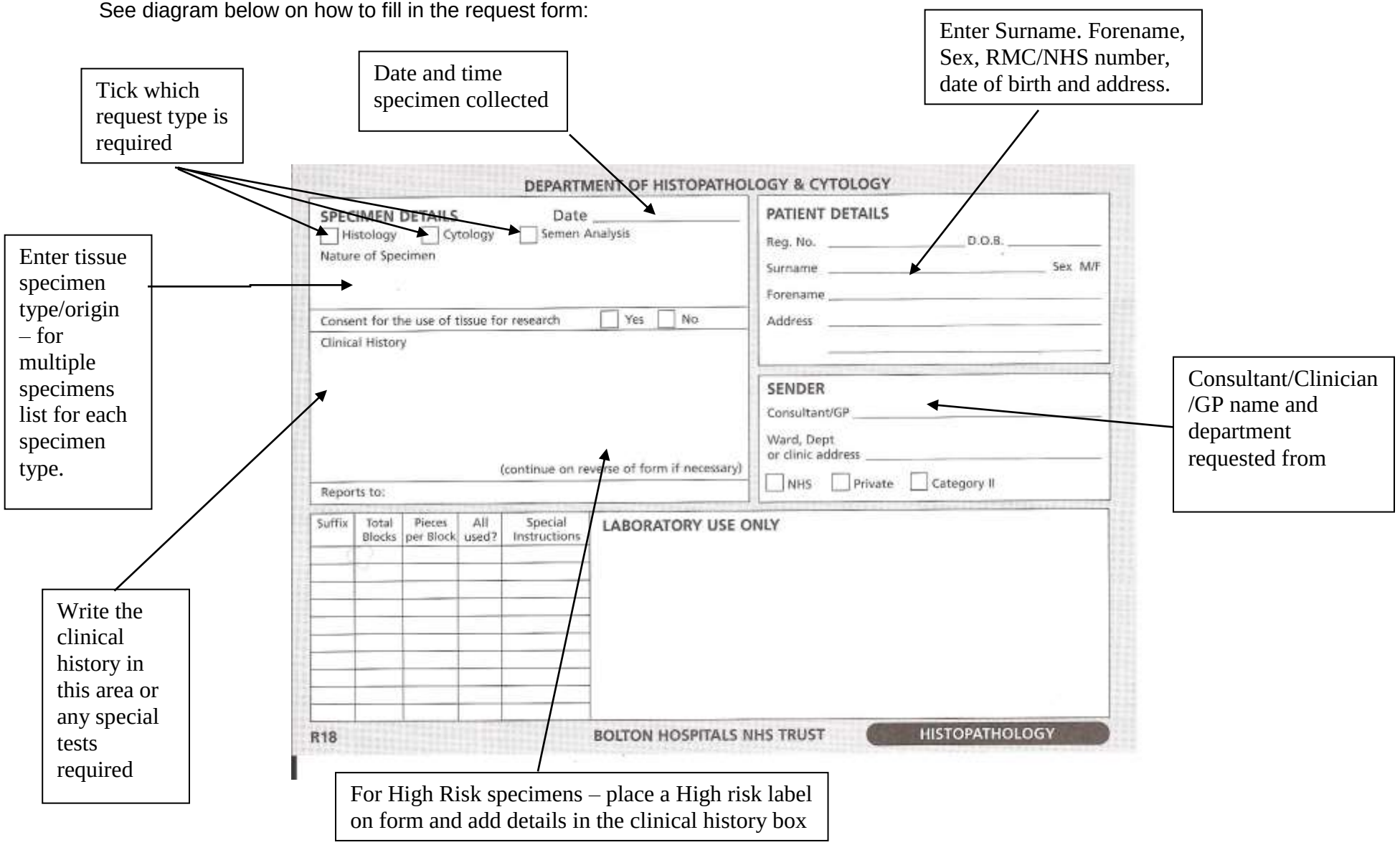
2a) Request Form Requirements:

All samples must be accompanied by a request form that is completed legibly and accurately. The request form must include the following details:

- Patient Forename and Surname
- Date of Birth
- NHS/RMC number
- Specimen type
- Clinical details.
- Time and date the sample was collected
- Full name of requesting Clinician/Consultant/GP **(clearly printed)** and signed
- Requesting Department/GP practice

For multiple specimens for a single patient, ensure that the specimen type is labelled with a prefix such as A-Left colon, B-Right colon and so on.

See diagram below on how to fill in the request form:



2b) Sample container/pot requirements and Fixation:
It is **mandatory** that all requests contain 3 matching, legible patient identifiers between the request and each pot. They are:

- Unique identification number (hospital or NHS number, both if available)
- Full name i.e. Surname (Family Name) and Forename (First Name)
- Date of birth
- Specimen origin of each tissue must also be clearly stated on the pot label as well as on the request form.

The sample and the request form must be placed into a plastic 'biohazard' bag ensuring that the form and sample are in separate sections of the bag. This will prevent contamination of the request form if the sample container leaks. Ensure all sample pots and container lids or screw tops are tightly closed before transporting to avoid leakages and/or loss of specimen tissue.

Please Note: Incorrectly labelled samples or incomplete request forms will be delayed until the sample and/or request form is completed or amended satisfactorily by the sending department.

All samples for Histology should be placed in a suitably sized pot (please take the size of the tissue specimen into consideration) in 10x the volume of 10% neutral buffered formalin (1:10).

3) High Risk/Danger of infection/radioactive specimens:
Specimens potentially infected with a hazard group 3 organisms, such as SARS-CoV-2 , HIV, TB, HEP B/C etc. must be clearly marked as such, and the nature of the risk described. High risk samples must be labelled with a High risk label and any clinical notes recorded. This will allow the laboratory staff to take any necessary precautions. Such specimens will require a further 24 hours' fixation in 10% formalin, therefore, a delay in reporting. This should be taken into account when booking return appointments.
Specimens that may be radioactive, for example, Sentinel Lymph nodes, should be marked with a radioactive label on the request form and specimen container/pot.

4) Urgent requests:
All urgent requests **must** be clearly marked on the request form (this includes handwritten forms) either by a clear 'URGENT' written on the form or by the use of an URGENT Label. Quick TAT for urgent cases are still depends on adequate fixation and requires to be brought **by 16:45pm** on the day of specimen collection.

5) Frozen Sections:
A frozen section service is available at the Royal Bolton Hospital. The service operates between 08:45am and 16:30pm Mon to Fri. Surgical staff should contact the histology laboratory on extension 4588 for booking in the frozen section at least 48 hours prior to the surgery taking place. Full name of patient, date of birth, RMC/NHS number, specimen type and approximate

time of specimen delivery must be given when booking in. Please contact the laboratory to cancel the frozen section if no longer required. Allow 30 minutes from receipt for a frozen section report to be issued by telephone.
Note: Frozen sections are not performed on high risk specimens.

6) Histology: Turnaround times:

The department is working to RCPath Key Performance indicators (KPI). The target is to report 80% of diagnostic biopsy cases within 7 days, and 90% of all specimens within 10 days. Our performance against these targets is constantly monitored and reported to Quality and Governance meetings and the Speciality Senior Staff meetings held on a monthly basis. Whilst we maintain our turnaround times regularly if you need our current turnaround times please contact the laboratory manager.
The complexity of a case will increase the time taken to report it. Complex cases or bone samples may require extensive laboratory work up or referral to outside departments; large specimens require adequate time to fix before investigations can be started in order to provide optimum accuracy. The department urges users to take this into account when booking follow up appointments or MDT discussions.

Frozen sections are reported on the day and a verbal report is usually given by telephone within 30 minutes.

7) Non-Gynae Cytology: **Turnaround times, specimen and temperature storage requirements.**

Unfixed specimens need to be submitted promptly before degeneration of the cells occurs. If this is not possible, ensure the specimen is kept refrigerated between 4-7°C. Contact the laboratory if any advice is required (01204 390390 ext. 4588) Please ensure that the date and time of collection is given on all cytology requests. Please contact the laboratory to request supplies of cytology collection fluids, slides, fixatives and FNA kits. 48-hour advance notice will need to be given to the laboratory to ensure that the requests can be prepared and ready for collection.

Investigation	Turnaround time	Requirements and safety precautions (Fixative, Pot,)	Temperature interval
Synovial Fluids	**7 days**	Collected into a 2ml paediatric lithium heparin tube.	Room temperature
Body Cavity Fluids (Pleural, ascitic, pericardial, peritoneal) cyst, seroma fluids and bronchial washings	**7 days**	No fixative – use a 25ml universal container If cannot send before 1645 keep in a refrigerator between 4-7°C **Please note**: A bronchial washing specimen is not a BAL (See BAL sample below) and therefore a differential cell count will not be performed on this type of sample. However, presence of eosinophils can be confirmed if required.	Room temperature if sending same day or at 4°C if stored overnight.

Fine Needle Aspiration (FNA) Cytology	**7 days**	FNA kit for Direct smears – placed in 95% industrial methylated spirit. Smears must be fixed immediately and labelled in pencil for patient identifiers. **THEY MUST NOT BE ALLOWED TO AIR DRY.** Rinse the needle out into the small container (bijou) containing cell collection fluid for optimal cell preservation of residual material. For ENT specimens - Universal containers with green Cytological fixative or CytoRich® Red for bloodstained specimens should be used and available from Cytology.	Room temperature
Urine	**7 days**	Collected in urine bottles containing cell collection fluid, which are obtainable from the Cytology Laboratory on request. If the specimen is collected out of normal laboratory opening hours it can be stored at room temperature. Collect a mid-morning sample in a dry container (Early morning specimens are less suitable as the exfoliated cells are more degenerate. If possible, submit the whole specimen for analysis as this increases the cell content. Deliver to the laboratory as soon as possible on the day of collection. State the collection method i.e. voided, catheter specimen, ileal conduit.	Room temperature
Broncho-alveolar lavage specimens (BAL) BAL is used mostly to diagnose infections (such as *Pneumocystis jiroveci/carini* – and for differential cell counts for interstitial lung disease.	**7 days**	No fixative; transport to the lab as soon as possible within normal working hours on ice. Sample needs to be received **by 15:00** at the latest and prior notice given to Cytology laboratory. **Please note** that a differential cell count can only be done on a BAL (Not for bronchial washings)	4-7°C (on ice)
Brushings - Bronchial or Biliary	**7 days**	Direct smears – placed in 95% industrial methylated spirit. Smears must be fixed immediately and labelled in pencil. **THEY MUST NOT BE ALLOWED TO AIR DRY**. Brush head is detached and placed in a bijou of cell collection fluid.	Room Temperature
Cerebrospinal Fluids (CSF)	**7 days**	Collect 1-2 ml in a universal bottle and deliver to the lab as soon as it is taken and by 1500 at the latest. CSF specimens can degenerate rapidly, compromising diagnostic interpretation. Specimens taken after 1500 should not be taken. If there is likely to be a delay, the specimen can be kept refrigerated around 4 C overnight.	Room temperature on day of collection or at 4°C if stored overnight.
Sputum	**7 days**	• Collect in a dry container • Specimen should be obtained by deep coughing in the morning, before eating,	Room temperature on day of

		drinking or cleaning of teeth. • Saliva or nasal secretions are NOT suitable. Patient may be induced to provide a deep cough sample. To maximise detection of pulmonary malignancy; 3 separate samples collected on consecutive days should be sent. • Deliver to the laboratory as soon as possible on the day of collection. If there is likely to be a delay, the specimen can be kept refrigerated around 4 C overnight.	collection or at 4°C if stored overnight
Cervical Cytology Smears for Manchester University NHS Foundation Trust (MFT)	**Not performed in Bolton. Please contact CMFT Lab for current turnaround time**	Please place these samples in a lilac coloured bag – do **not** place in any other colour bag under any circumstances. Also do not place any other samples in these bags as samples placed incorrectly in the lilac coloured bag will be delayed and patient will need to have repeat samples done. LBC kits are available from Manchester Cytology Laboratory Tel: 0161 276 8817.	Room temperature

8) Andrology: Turnaround times, specimen and temperature storage requirements:

For full details on specimen collection see Patient leaflet on:
Instructions for patients – Male fertility
Instructions for patients providing a PVSA sample
Instructions for patients providing a 1 Hour PVSA sample

Fertility Semen Analysis	**7 days**	No fixative. A fresh semen sample is required in a specimen container which has been pre-weighed and tested for spermicidal properties by the laboratory. This will be issued to the patient together with an appointment and instructions on how to collect the sample and transport to the laboratory. Criteria for the test as per the WHO 6 Laboratory Manual: Sampled adequately labelled. Sexual abstinence of between 48 hours to 7 days before the test. The entire ejaculate collected. Sample collected in the container provided. Sample brought to the laboratory as soon as possible so that critical tests can be performed within 60 minutes. Samples which do not adhere to the criteria will be rejected as this will affect the results of the test.	Sample must be kept close to body temperature 37°C during transportation e.g. under clothes and under the armpit.	Semen analysis is carried out via appointment with the Laboratory. The request form is sent to the laboratory by the requesting clinician and an appointment is made and sent to the patient.
Routine Post Vasectomy Semen Analysis	**7 days**	No fixative. A fresh semen sample is required in a sample container pre-weighed and tested for spermicidal properties by the laboratory. This is provided to the patient by the clinician performing their procedure. Criteria for the test as per the 2016 Post Vasectomy Guidelines: Sampled adequately labelled. Sexual abstinence of between 48 hours to 7 days before the test. The entire ejaculate collected. Sample collected in the container provided. Samples which do not adhere to the criteria will be rejected as this will affect the results of the test.	Sample must be kept close to body temperature 37°C during transportation. e.g. under clothes and under the armpit.	Post vasectomy semen analysis is carried out by appointment only. The first appointment is allocated to the patient by the clinician following the procedure. The laboratory will send the report to the consultant who performed the vasectomy surgery.
1 Hour Post Vasectomy Semen Analysis	**7 days**	No fixative. A fresh semen sample is required in a sample container pre-weighed and tested for spermicidal properties by the laboratory. Sample must be received within 40 minutes of collection to allow time-critical tests to be performed within 60 minutes.	Sample must be kept close to body temperature 37°C during transportation.	1 Hour PVSA samples are by appointment only by contacting the laboratory. The laboratory will send

		Criteria for the test as per the 2016 Post Vasectomy Guidelines: Sampled adequately labelled. Sexual abstinence of between 48 hours to 7 days before the test. The entire ejaculate collected. Sample collected in the container provided. Sample must be received with sufficient time to assess for motility within 60 minutes of collection. Samples which do not adhere to the criteria will be rejected as this will affect the results of the test.	e.g. under clothes and under the armpit.	the report to the consultant who performed the vasectomy surgery.

9) Spillages

If specimens are sent in appropriately-sized containers with secure lids, spillages should be minimal. Specimen containers should be placed in a sealable bag with a separate pocket for any request forms. Each sender must have their own local spillage policy or procedure which covers procedures in their area. There should be suitable materials for dealing with the samples you routinely handle. Spillages must be dealt with as soon as is safely practical. Saving the specimen, which may not be repeatable, must be the primary concern. It is as important as protecting the staff from possible infection. Specimens must not be discarded. Cellular pathology must be informed of cases where the spillage may have resulted in a diagnostic specimen being lost, partially lost or had its fixation compromised – This will need to be recorded on the request form. A safeguard incident must be completed and the sending clinician should be informed as soon as possible.

9a) Dealing with a formalin spillage

Formaldehyde is a severe skin irritant and sensitizer. Exposure to vapour can cause reddening/burning sensation in the eyes, irritation of the upper respiratory tract, allergic asthma or shortness of breath. Any spillage may require ventilation of the immediate area.

1) If formaldehyde has been spilled inform anyone in the vicinity. 2) Use PPE e.g. goggles, gloves, apron 3) Check any containers for damage and re-seal the container if safe to do so. Ventilate or evacuate the area if necessary. 4) Contain the spill using absorbent materials (or spillage kit if large) 5) Check the request card for details and attempt to locate any specimen. Where possible this should be returned to the original container and a note made on the request card. Please contact the laboratory on 4588 if you feel you need advice or assistance 6) Seal saturated absorbent materials in a clinical waste bag, to be sent for incineration 7) Wash the area with detergent and cool water

The Mortuary

Attending the Mortuary

Hospital medical staff and other staff may need to attend the mortuary for the following:

1. Identification of bodies for cremation certificates or occasionally to certify death.
2. Attendance at post mortems.

Please note that when attending the mortuary that other persons such as the deceased patient's relatives, funeral directors and the police may be attending for other reasons.

Mortuary Site

The Mortuary is situated in the Department of Laboratory Medicine at the Royal Bolton Hospital. Visitors are asked to proceed along the main hospital corridor to A block square and press the intercom button at the opening to the Mortuary corridor to gain access.

Telephone Enquiries **ext. 5690**

Hours of Opening

Monday – Friday 8.00am – 1.00pm
1.30pm – 3:45pm

The on call mortuary technician can be contacted via switchboard outside of these hours.

Requesting Autopsies

This guidance is offered by the Histopathology Laboratory which provides the autopsy service. The Laboratory is not responsible for the running of Patient Services, through which such requests are made.

Hospital/Voluntary Post Mortems

1. Request for a hospital post-mortem can be made by ANY doctor drawn from the clinical teams, which have been in charge of the patient's case prior to death.

2. The request can be made through the Patient Services Department at the time of death certification.

3. Consent for autopsy must be obtained from a spouse or first degree (or the nearest) relative and a consent form must be completed and signed by the deceased's spouse/relative stating the family relationship. Consent forms are available from the Patient Services Department and will be submitted with the case notes to the Pathologist.

4. An explanatory booklet is available for relatives from Patient Services containing information regarding post-mortem examination.

5. A death certificate will have been completed and this should be given to the relatives to register the death. The certificate should indicate that a post-mortem examination is awaited and further information from the post-mortem may be available later by ringing item 2 on the death certificate.

6. You will be contacted at the time of performance of the post-mortem. It is preferable, if time allows, to attend the post-mortem room and review the findings with the Consultant Pathologist which will also improve the clinicopathological correlation.

7. After the post-mortem, the Pathologist will issue a typed report. One copy will be sent to the Consultant-in-Charge and another will be sent to the deceased's GP. This will take a few days before receipt. A summary of the main post-mortem findings will be included. This will **not** be in the form of a cause of death, as a death certificate will already have been completed and this is not the main function of the hospital autopsy.

8. If post-mortem histology is required, a further and final report will follow in a few weeks' time.

9. **Note**: Rarely if a death certificate is issued which indicates to the Registrar for Deaths that referral to the Coroner should have been made – the death will **not** be registered and the Coroner will be contacted.

Coroner's Cases

Coroner's Staff

1. Coroner
2. Coroner's officers (Administration)
3. Coroner's Liaison Officers

Coroner's Autopsies

The Coroner (Office Staff) should be informed by e-mail of a death in hospital or in the district if:-

- Death is sudden and unexpected
- When death has occurred less than 24 hours after admission
- May have an industrial case e.g. Mesothelioma, pneumoconiosis
- Results or may result from injury/trauma
- Is suicidal
- When death occurred during an operation or before recovery from the effect of an anaesthetic
- Where the cause of death is unknown and the attending doctor cannot complete a death certificate

- Where the body is unidentified
- Where death has occurred in suspicious circumstances
- Where death is the result of poisoning, accident, neglect or violence.

Where you are undecided as to whether the case should be referred to the Coroner or not, further advice/information can be gained from:-

1. The Coroner's Office, telephone, Bolton **01204 338799**
2. A more senior member of your clinical team.
3. A Consultant Histopathologist.

Once referral to the Coroner has been made you should not complete a death certificate.

Microbiology

Please refer to the The Royal Marsden Manual of Clinical and Cancer Nursing Procedures for a searchable guide for Specimen Collection procedures.

Please consider and include all relevant clinical information for each specimen sent to Microbiology. Where appropriate the details MUST be noted on the Requesting Form. High-Risk specimens MUST be discussed with the Consultant Microbiologist prior to requesting Out-Of Hours testing.

This is essential for
a. Ensuring the patient receives the correct examinations
b. to reduce the risk of Laboratory acquired infection by exposure to potentially hazardous clinical samples

Risk Factor	Considerations/ Essential Information Required
Travel / Outbreak History	• Recent overseas travel including location and dates • Acute/outbreak case • Healthcare or community acquired.
High-Risk Organisms Suspected	Brucella sp. Burkholderia pseudomallei, Bacillus anthracis, Salmonella typhi, Vibrio cholerae, Tapeworms, Neisseria meningitidis, Q-fever, E.coli 0157, Rickettsla, Shigella dysenteriae, Coccidioides, Histoplasma, Penicillium marneffei, Mers-Cov, Mycobacterium tuberculosis, TSE (CJD)
Exposure to Known Hazards	• Needlestick Injury • Recreational/untreated water exposure including sewage. • Farm animal exposure/animal contact including Bites, Tick Bites • Wild animal exposure/contact (Birds,Bats) • Food intake, for example unpasteurised milk, goats milk, shellfish and chicken • Contact with TB, EBOLA, VIral Haemorraghic Fever or other 'High-Risk Organsisms' • Prion/TSE/CJD exposure
Patient Status / History / Clinical Symptoms	• Immune Status (Immunocompromised), • HIV Status • History of TB, • Blood in Faeces/Stool • Worms in Stool/Faeces • Recent antibiotic use • Erythema nodosum • Location of Pain/Symptoms/specimen site/ anatomical origin • Differential Diagnosis

For Microbiology routine sample information, sample turnaround times and specimen requirements **please access Microbiology User Guide** located on the BFT Intranet and Internet Laboratory Medicine: Microbiology Test Repertoire webpage.

Supplementary information regarding sample requirements follows. For additional information regarding sample types, sample containers or sample volumes please contact the Microbiology laboratory.

All alert organisms e.g. MRSA and Clostridium Difficile are reported to the Infection Prevention & Control team.
For further details of the Infection Prevention & Control team please refer to the Trust Intranet.

DELAYS
Samples for Microbiology must be sent to the laboratory for processing as soon as they have been collected. Any delay may affect the result and careful interpretation may be required.

FACTORS THAT MAY AFFECT THE RESULTS AND/OR REPORT
Full clinical details are required; failure to provide relevant details may lead to inappropriate diagnostic tests being performed.
Any recent antibiotic therapy may affect the results of any investigations requested.
If the patient's is on any antibiotics, this must be recorded on the request form.

ADDITIONAL TESTS
Additional tests may be requested within 12 hours of the laboratory receiving the sample.
The majority of referred samples are sent to CMFT Medical Microbiology Partnership.

For other referral test turnaround times please contact the Microbiology Laboratory

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Where presumptive isolations of significant organisms are made, time to final report will be extended to allow for identification and sensitivity (if appropriate)

Serological Investigations

Requests for Serological Investigations are undertaken now by **Blood Sciences at the Royal Bolton Hospital.**
***Interpretive advice on serology results is available from the Consultant Medical Microbiologists*.**

Investigation of Antibiotic Assays

Gentamicin and Vancomycin and assays are undertaken by **Blood Sciences at the Royal Bolton Hospital**. These assays are not normally available out of hours. All other assays such as Netilmycin, Amikacin, Tobramycin and Streptomycin are referred to specialist centres.

Interpretive advice on results of these assays is available from the Pharmacist at the Royal Bolton Hospital.

Investigation of Fluids from Normally Sterile Sites

Optimal Time of Collection
Before antimicrobial therapy where possible.

Time between Collection and Processing
Specimen transportation times should be as short as possible as a number of important pathogens may not survive long delays even if the sample is refrigerated. Refrigeration is preferable to storage at room temperature. Delays over 48 hours are undesirable.

Correct Specimen Types

a. Specialist collection is required for the following fluids:
    - Amniotic
    - Ascitic
    - Bursa
    - Pericardial
    - Pleural
    - Joint aspirate
    - Synovial fluid

    (Blood, cerebrospinal fluid, and urine samples are dealt with separately.)
b. Special local protocols to obtain samples and avoid contamination of the fluid should be followed. Ideally at least 1ml of fluid is required, generally, the volume of sample influences the transport time that is acceptable.
    *Example: **1ml aspirated material has an optimal transport time to the laboratory of less than 30 minutes.***
c. Samples should be transferred to a sterile white topped 30ml universal container.
d. Culture for Mycobacterium tuberculosis (TB) requires appropriate clinical details to be indicated on the request form submitted with the sample. See **Investigation of Specimens for TB**.

"Joint Fluids" require special collection kits containing a sterile white topped 30ml universal container and heparin tube. These are available from Laboratory Medicine Reception.

Availability of Results

Provisional culture results are available after 48hours and final culture results are available after 5 days via ICE.

Investigation of Skin and Superficial Wound Swabs

Optimal Time of Collection

Preferably before antimicrobial therapy is started.

Time between Collection and Processing

Specimen transportation times should be as short as possible. If processing is delayed, refrigeration is preferable to storage at ambient temperature. Delays of over 48 hours are undesirable.

Correct Specimen Types

Blue-topped swabs containing transport medium must be used for bacterial culture and microscopy. Biopsies should be placed in a sterile 70ml yellow-topped container with a small amount of sterile normal saline to prevent desiccation.

Samples of pus are preferable to swabs. If only a minute amount of pus or exudate is available then a swab should be soaked in the sample and placed in the transport medium to minimise the risk of desiccation. Routine processing of superficial swabs and ulcers is discouraged and the swabbing of dry crusted areas is unlikely to be helpful. Swabs for microbiological examination are useful from cases of cellulites, ulcers, burns, paronychia, impetigo, scalded skin syndrome, erysipelas, erysipeloid, ecthyma gangrenosum and superficial mycoses. Please **state the grade of wound** in accordance with Royal Bolton Hospitals NHS Foundation Trust Wound Care Guidelines.

Protocol for Obtaining Suitable Samples

a. If specimens are taken from ulcers, debris on the ulcer should be removed, the ulcer cleaned with sterile saline, and either a biopsy, or preferably a needle aspiration of the edge of the wound taken.
b. Alternatively, use a small needleless syringe, lace the syringe tip under the ulcer margin and irrigate gently with at least 1ml sterile saline. Massage the ulcer margin, repeat the saline irrigation. Massage the ulcer margin again, aspirate approximately 0.25ml of the fluid into a sterile white-topped 30ml universal or soak up using a blue-topped swab.

Cultures for microbiological examination are set up on the day of receipt in the Microbiology Laboratory. Examination of specific pathogens will depend on appropriate clinical details to be indicated on the request form submitted.

Availability of Results
Provisional results are available after 48 hours and final results are available after 3 days All culture results are available via ICE.

Investigation of Specimens for Respiratory Pathogens

Optimal Time of Collection
Before antimicrobial therapy where possible.

Time between Collection and Processing
Specimen transportation times should be as short as possible as a number of important pathogens may not survive long delays even if the sample is refrigerated. Refrigeration is preferable to storage at room temperature. Delays over 48 hours are undesirable.

Correct Specimen Types

- Sputum

Routine examination of the following specimen types all include microscopy for AFB:

- Bronchial aspirate
- Bronchial brushings
- Bronchial washings
- Bronchoalveolar lavage (BAL)
- Transthoracic aspirate
- Transtracheal aspirate

Sputum samples should preferably be collected early in the morning, and promptly sent to the Microbiology Laboratory. Sputum should be expectorated from the lower respiratory tract by deep coughing. A minimum volume of 5ml per sample is required. When the cough is dry, physiotherapy, postural drainage or inhalation of nebulised saline before expectoration may be helpful.

Routine sputum examination is often of limited value because specimens are contaminated with organisms from the upper respiratory tract and mouth. Samples with large numbers of epithelial cells present on examination will not be processed further.

Routine sputa should “normally” be sent from certain categories of patient:

a. Ventilated patients in Intensive and High Care Units
b. Patients with clinical signs and X-Ray findings of acute pneumonia who have not received antibiotics
c. Cystic Fibrosis patients
d. Immunocompromised patients.

Sputum investigations are performed in batches and because of the time required, work on the last batch each day commences at 15.00hrs. Samples received after that time will be refrigerated and stored until the next day.

Saliva and postnasal secretions are unsuitable. Laryngeal and cough swabs are not recommended but may be received when sputum is unobtainable.

Bronchial washing, aspirate, brushing, Bronchoalveolar lavage (BAL), Transthoracic and Transtracheal aspirates

A medical practitioner will usually collect samples for microbiological examination, following local protocols to obtain suitable samples and avoid contamination. Care must be taken to avoid contaminating the bronchoscope and only sterile water, or saline is used.

Culture for Mycobacterium Tuberculosis (TB) requires appropriate clinical details to be indicated on the request form submitted with the sample. ET tubes should not be sent for this investigation. See **Investigation of Specimens for TB.**

Availability of Results

Provisional culture results are available after 48 hours and final culture results are available after 3 days via ICE.

Investigations of Fungi

Optimal time for Collection

Before antifungal therapy where possible.

Time between Collection and Processing

Specimen transportation times should be as short as possible to ensure optimal recovery of fungal pathogens. **Delays of over 48 hours are undesirable and may invalidate the culture.**

Correct Specimen Types

It is often helpful to clean lesions of the skin or scalp (and sometimes nail) with surgical spirit or 70% alcohol prior to collection of samples, as this improves the chances of detecting the fungus by microscopy and also reduces the likelihood of contamination of subsequent cultures. Cleaning is essential if the area is greasy, or ointments and powders have been applied to the region.

Superficial Mycoses

a. **Skin, hair and nail** – it is best to collect these directly into Dermapak Type 3 transport system. If none is available then sterile 70ml
b. -topped containers may be used.

   (i) Material from skin lesions should be collected by scraping outwards from the edges of the lesion, using either a blunt scalpel blade or the edge of a clean glass microscope slide. The edge of the lesion is where there is likely to be the most viable fungus.

   (ii) Samples from the scalp are best obtained by scraping using a blunt scalpel blade. The sample should include hair stubs, the contents of plugged follicle, and skin scales. Cut hairs are unsatisfactory as the focus of the infection is usually below or near the surface of the scalp.

(iii) Nail clippings should be taken from any discoloured, dystrophic or brittle parts of the nail. These should be cut back as far as possible from the free edge of the nail and include its full thickness, since some fungi are restricted to the lower parts. Where the nail is thickened scraping from under the nail should also be sent to supplement clippings.

(iv) Samples from the ear, mouth, vagina – swabs with Amies transport medium. Fungal infections of the outer ear are generally dry except where there is associated bacterial infection. Scrapings from material from the ear canal are best for laboratory diagnosis, although swabs are acceptable.

c. **Corneal Scrapes –** special transport bottles are available. The samples obtained from the eye will normally be obtained by a medical member of staff in accordance with local protocols.

Transport bottles are available from Laboratory Medicine Reception. These may be kept on the ward but please check expiry dates, and avoid stockpiling.

Subcutaneous Mycoses

a. **Ulcerated lesions** are best biopsied. A swab to collect material from draining abscesses or ulcers is less satisfactory. Material should be taken from as deep as possible within the lesion, avoiding the periphery and adjacent skin.
b. **Pus** samples should be collected aseptically with a sterile needle and syringe. Any grains visible in the pus must be included in the sample.
c. **Biopsies** are taken under aseptic conditions and the tissue transported to the laboratory in sterile saline. Ideally 2 biopsies should be obtained, one from the periphery and one from the centre.

Diagnosis of systemic fungal infections usually involves the examination of a number of specimens collected from as many sites as possible. Serology also plays an important part in the diagnosis of systemic mycoses.

a. **Abscess, Ulcers:** Pus is collected aseptically from un-drained abscesses using a sterile needle and syringe. **Miliary abscesses should be opened with a sterile scalpel and the expressed pus collected into a sterile container.** Ulcerated lesions of the skin and mucosa are usually biopsied. The use of a swab is unsatisfactory, and not recommended.
b. **Blood:** Blood Cultures should be undertaken; recovery of fungi from the blood is generally good.
c. **Bone Marrow** should be aspirated by a clinician in accordance with stated protocols and aspirated directly into a paediatric blood culture (BACTEC peds plus/F) bottle.
d. **CSF** should be collected by a clinician using the stated protocol for routine lumbar puncture. The laboratory and/or on-call BMS must be contacted and informed that a CSF is being sent for microbiological analysis.
e. **Fluids** should be collected aseptically into 30ml sterile universal containers.

f. **Sputum:** Early morning specimens expectorated into 70ml yellow-topped sterile containers. The delay between obtaining the sample and laboratory processing should be no more than 2 hours.
g. **Bronchial brushings/washings/alveolar lavage** are performed with a bronchoscope, and samples should be submitted in sterile saline using 30ml sterile universal containers.
h. **Lung biopsies** can only be obtained by bronchoscope, Transthoracic fine needle aspiration, or drill biopsy, or by open biopsy following thoracotomy. Samples should be submitted in sterile saline using 30ml sterile universal containers.
i. **Tissue** is collected aseptically and sent to the laboratory in sterile ringers (3mls) & Ballantoni beads using 30ml sterile universal containers. (Sterile kits are stored in the Orthopaedic Theatre).
j. **Urine:** Midstream urines are usually satisfactory. Samples should be sent to the laboratory as soon as possible.

Availability of Results
Final results are available after 21 days via ICE.

Investigation of Post-Operative Wounds and Deep-Seated Infections

Optimal Time of Collection
Before antimicrobial therapy where possible.
Time between Collection and Processing
Specimen transportation times should be as short as possible as a number of important pathogens may not survive long delays even if the sample is refrigerated. Refrigeration is preferable to storage at room temperature. Delays of over 48 hours are undesirable.

Correct Specimen Types
a. A medical practitioner will usually collect samples from abscesses for microbiological examination, following local protocols to obtain suitable samples and avoid contamination.
b. Ideally at least 1ml of fluid is required, generally, the volume of pus or aspirate influences sample viability and the transport time that is acceptable. The recovery of anaerobes is compromised if the transport – process time exceeds 3 hours.
Example: 1ml aspirated material has an optimal transport time to the laboratory of less than 30 minutes.
c. Samples of pus are preferable to swabs. If only a minute amount of pus or exudates is available then a blue-topped swab should be soaked in the sample and placed in the Amies transport medium supplied to minimise the risk of desiccation.
d. Samples of pus or aspirated material should be transferred to a sterile white-topped 30ml universal container or 70 ml yellow topped container.
e. Please ensure that the grade of wound, in accordance with Royal Bolton Hospital NHS Foundation Trust Wound Care Guidelines is clearly stated on the request form.

f. **Culture of Mycobacterium Tuberculosis (TB)** requires appropriate clinical details to be indicated on the request form submitted with the sample. See Investigation of Specimens for TB.

Availability of Results
Provisional culture results are available after 48 hours and final culture results are available after 3 days via ICE.

Investigation of Specimens for Mycobacterium Sp (TB)
Optimal Time of Collection
For initial diagnosis of mycobacterial infection all specimens should be fresh and taken when possible before anti-tuberculosis treatment is commenced.
Time between Collection and Processing
Specimen transportation times should be as short as possible as a number of important pathogens may not survive long delays even if the sample is refrigerated. Refrigeration is preferable to storage at room temperature. Delays of over 48 hours are undesirable.

Correct Specimen Types
Routine examination of the following specimen types includes microscopy for AFB:

1. Sputum
2. Bronchial aspirate
3. Bronchial brushings
4. Bronchial washings
5. Broncho alveolar lavage (BAL)
6. Pleural fluids
7. CSF
8. Gastric lavage

Sputum samples should preferably be collected early in the morning on 3 consecutive days, and each promptly sent to the Microbiology Laboratory. Specimens should not be pooled as the interpretation of the isolation of Mycobacterium sp other than TB is based on repeated isolation. Sputum should be expectorated from the lower respiratory tract by deep coughing. A minimum volume of 5ml per sample is required. When the cough is dry, physiotherapy, postural drainage or inhalation of nebulised saline before expectoration may be helpful.

Saliva and postnatal secretions are unsuitable. Laryngeal and cough swabs are not recommended but may be received when sputum is unobtainable.

Bronchial washing, aspirate, brushing, Broncho alveolar lavage (BAL), Transthoracic, Transtracheal aspirates and Pleural fluids: A medical practitioner will usually collect samples for microbiological examination following local protocols to obtain suitable samples and avoid contamination. Care must be taken to avoid contaminating the bronchoscope and only sterile water, or saline is used. A minimum sample size of 5ml is required if possible.

Blood, CSF, body fluids, aspirates, pus samples should be collected aseptically. As large a volume as possible should be sent to the laboratory in either a 30ml sterile white-topped universal container, or a sterile 60ml metal topped container.
EDTA, even in trace amounts will inhibit the growth of Mycobacterium sp

Bone Marrow should be added directly to the special liquid culture medium which is available from Laboratory Medicine Reception.

Faeces samples are not the specimens of choice, and may only be submitted after discussion with the Consultant Microbiologist.

Laryngeal swabs/other swabs are not recommended, but may be accepted when sputum or pus is unavailable. Laryngeal swabs should be sheathed in the container supplied and sent without delay to the laboratory. All other swabs must be placed into Amies transport medium and will receive direct microscopy only unless previously discussed with the Microbiology Laboratory.

Skin/Biopsy tissue/post-mortem samples should be collected aseptically into either a 30ml sterile white-topped universal container, or a sterile 60ml metal-topped container without preservatives. A caseous area should be selected as the majority of organisms will be found in the periphery of a caseous lesion. As large a sample as possible should be sent.

Urine samples should be submitted as early morning samples on 3 consecutive days. A minimum volume of 25ml is acceptable. Pooled samples are not acceptable. Microscopy is not performed on this sample type.

Gastric Lavage should be collected early in the morning (before breakfast) on 3 consecutive days. A minimum of 5mls is required. This is usually reserved for children where there are problems obtaining sputum.

Availability of Results
All samples: final culture results are available after 49 days via ICE.

Investigation of Urine

Optimal Time of Collection
Before antimicrobial therapy.

Time between Collection and Processing
Specimens should be transported and processed within 48 hours.

Correct Specimen Types

The use of a green-topped monovette syringe-type container is required for midstream urine, clean-catch, bag and catheter samples.

a. **Midstream Urine (MSU)** is the most commonly collected sample and is recommended for routine use.
   Collection Method
   The first part of voided urine is discarded and without interrupting the flow, approximately 10ml is collected in a clean container. The remaining urine is discarded. Syringe the urine into a green monovette container to the mark cap and break off the plastic barrel.

b. **Clean-Catch Urine** is an alternative to MSU. Thorough periurethral cleaning is recommended. The sample is collected into a green monovette container for examination.

c. **Catheter Urine (CSU)** may be obtained from transient catheterisation or from an indwelling catheter. The sample is obtained aseptically from a sample port in the catheter, or by aseptic aspiration of the tubing into a green monovette container. The sample should not be obtained from the collection bag.

d. **Suprapubic Aspirate (SPA)** is seen as the 'gold standard' but is usually reserved for the clarification of equivocal results from voided urine in infants and small children. The sample is obtained aseptically directly from the bladder by aspiration with a needle and syringe.

e. **Bag Urine:** Used commonly for infants and young children. Bags are taped over the genitalia. Contamination of the sample is frequently encountered with this type of sample.

f. **Urostomy Urine** may be obtained via a catheter passed aseptically into the stoma opening after removal of the external appliance.

g. **Cystoscopy Urine** may be obtained directly from the bladder using a cystoscope. Ureteric urine, paired samples are obtained from each ureter during cystoscopy via ureteric catheters inserted into the bladder.

h. **Urine for the diagnosis of Prostatitis** requires the initial 5-8ml voided urine (urethral urine), a MSU (bladder urine), and the first 2-3ml voided urine following prostatic massage.

i. **Urine for Salmonella typhi & Salmonella paratyphi:** any urine sample from a suspected typhoid case.

j. **Urine for Schistosomiasis:** the total urine collected between 10.00 – 14.00hrs must be collected into sterile universal white-topped containers. Alternatively, a 24 hour collection of terminal urine is suitable.

k. **Urine for TB:** 3 first voided early morning urine samples are required to be collected into sterile white topped universal containers

l. **Urine for Legionella antigen:** approximately 10ml collected into a yellow monovette syringe container.

m. **Urine for Streptococcus pneumoniae:** approximately 10ml collected into a yellow monovette syringe container.

n. **Urine for Chlamydia & gonorrhoea:** approximately 10ml collected into a yellow monovette container.

Availability of Results
Routine microscopy results are available via ICE. Samples which do not indicate infection are not routinely cultured. Results for 'positive' samples are available after 48 hours**.**

Investigation of Cerebrospinal Fluids

The Microbiology laboratory &/or on-call BMS must be informed when a CSF sample is being sent for analysis. CSF samples MUST NOT sent via the POD system, this could lead to cell disruption and could result in misleading results.

Optimal Time of Collection
Preferably before antimicrobial therapy is started. Antimicrobial therapy must not be delayed unnecessarily pending lumbar puncture.

Time between Collection and Processing
Specimen transportation times should be as short as possible as a number of important pathogens may not survive long. Cells disintegrate and a delay may produce a cell count that does not reflect the clinical situation of the patient.

Correct Specimen Types

a. Special local protocols to obtain suitable samples and avoid contamination of the fluid should be followed.
b. Ideally at least 1ml of fluid is required, normally collected sequentially into 3 or more separate containers sterile white-topped 30ml universal containers numbered sequentially.
c. **It is common practice to send the 1st and last specimens for microbiological examination, and the 2nd specimen for protein estimation by Clinical Chemistry.**
d. Collection of an additional sample into a 0.5ml fluoride (yellow) tube for glucose estimation by Clinical Chemistry should be considered.

e. If xanthochromia is requested an additional sample should be collected and sent to Clinical Chemistry in the appropriate container. (Contact Clinical Chemistry for further advice.)

Microbiological Examination
The Microbiology Laboratory performs microscopy on the day of receipt and results are available via ICE. Significant microscopic findings will be telephoned to the requesting source.

Culture for Mycobacterium Tuberculosis (TB) requires appropriate clinical details to be indicated. Microscopy will largely depend on the cell count results. **See investigation of Specimens for TB.**

Culture for Cryptococcus and other yeasts submitted will be performed on the basis of microscopy results and/or appropriate clinical details to be indicated on the request form.

Examination for Viruses will be performed on the basis of microscopy results and/or appropriate clinical details to be indicated on the request form submitted.
Availability of Results
Provisional results are available after 48 hours. All results are available via ICE. **If no report has been telephoned the cultures can be assumed to be negative.**

Investigation of Genital Tract and Associated Specimens

Optimal Time of Collection
Before antimicrobial therapy where possible.

Time between Collection and Processing
Specimen transportation times should be as soon as possible, delays of over 48 hours are undesirable. If processing is delayed, refrigeration is preferable to storage at room temperature. Blue topped swabs must be used for bacterial culture and microscopy.

Correct Specimen Types
Fluid and pus samples are preferred; the sample volume will influence the sample viability and subsequent transport times (2ml of aspirated material must reach the laboratory for processing in less than 3 hours to ensure optimal recovery of bacterial pathogens). If only a minute amount of pus is available then the swab should be soaked in the sample and placed into transport medium to minimise risk of desiccation.

Genital Tract Swabs: Cervical and high vaginal swabs should be taken with the aid of a speculum. It is important to avoid vulval contamination. For Trichomonas, the posterior fornix should be swabbed. If pelvic infection including gonorrhoea is suspected, the cervical os should be swabbed.

a. **High Vaginal Swabs (HVS):** The swab should be rolled over the surface of the vaginal vault.
b. **Cervical Swabs (CX):** The swab should be rotated inside the endocervix.
c. **Urethral Swabs:** Thin swabs are available for the collection of specimens. Care should be exercised to avoid contamination with micro-organisms from the vulva or foreskin. The patient should not have passed urine for at least 1 hour prior to swabs being taken. For males, if a discharge is not apparent, attempts should be made to 'milk' exudate from the penis. The swab is passed gently through the urethral meatus and rotated.
d. **Intrauterine Contraceptive Devices (IUCDs):** The entire device should be sent in a sterile 70ml yellow-topped container.
e. **Rectal Swabs** are obtained via a proctoscope.
f. **Throat Swabs** should be taken from the tonsillar area and/or posterior pharynx avoiding the tongue and uvula.
g. **Fluids and Pus** may be obtained from the fallopian tubes, tubo-ovarian and Bartholin's abscesses etc. during surgery. Fluids and pus samples should preferably be a minimum of 1ml.
h. **Genital specimens for Chlamydia:** special swabs are available from Laboratory Medicine Reception for Chlamydia PCR testing. The female cervical and male urethral swabs are the samples of choice and should be taken as indicated above. Urine samples can also be sent in sterile universals without boric acid. High vaginal swabs and 'routine swabs' in Amies transport medium are unsuitable for Chlamydia detection.

Availability of Results
Provisional culture results are available after 48 hours and final culture results are available after 3 days via ICE.

Investigation of Blood Cultures

Optimal Time of Collection
Before antimicrobial therapy where possible. Blood should be taken after a spike of fever, except in endocarditis where timing is less important.

Time between Collection and Processing
Specimen transportation times to the loading of cultures onto the automated detection system should be as short as possible to ensure optimal recover of bacterial pathogens. Delays of over 18 hours are undesirable and may invalidate the culture.

If transportation to the laboratory for processing is delayed, **refrigeration must not be used**, and the blood culture bottles can be kept at ambient temperature.

Correct Specimen Types
Special care is needed to avoid contamination of blood culture bottles. Blood Cultures must be inoculated at the time clinically indicated, by a doctor and first to avoid contamination if other blood tests such as blood gases or ESR is to be taken at the same venepuncture.

a. **Non-Paediatric patients** require 2 bottles per set:
   I. Blue topped (BACTEC plus + aerobic/F)
   II. Orange topped (BACTEC plus + anaerobic/F)

b. **Paediatric Patients** require 1 bottle:
   I. Pink topped (BACTEC paeds plus/F)

A stock of bottles is available from Laboratory Medicine Reception to replace used bottles on a one for one basis. A stock may be kept on the ward but please check expiry dates, and avoid stockpiling.
Emergency Additional supplies are kept on D2 ward.

The individual ward is responsible for maintaining adequate stocks of blood culture kits. It is not the responsibility of Laboratory Medicine to supply kits out of hours.

The Procedure for taking Blood Cultures
Follow the Trust Aseptic Non-Touch Techniques (ANTT) Policy.

1. Disinfect the skin at the venepuncture site with an alcohol wipe, and allow to dry.
2. Break the cover over the bottle top and disinfect the septum with a separate alcohol wipe, and allow to dry.
3. Use trust Approved Aseptic techniques for collection**.** Optimum blood volume for each aerobic & anaerobic vial is 8-10ml blood (but 3-10 ml is acceptable). If using a Paediatric bottle for children & neonates the optimum blood volume is 1-3ml (but 0.5 to 5 ml is acceptable) Samples must be collected using a “no touch technique” from a peripheral vein and divide the sample equally between the blood culture bottles. Samples should not be taken through an intravenous catheter or access device unless no other access is available.
4. Discard needles and syringes into a sharps bin.
5. Label bottles and complete the request form. **Do not obscure the bar code on the blood culture bottle.**
6. Please state on the request form if the patient is on antibiotics.

Culture for Mycobacterium Tuberculosis (TB) requires appropriate clinical details to be indicated on the request form submitted with the sample. **See investigation of Specimens for TB.**

Availability of Results
Provisional negative results are available after 48 hours and final negative results are available after 5 days via ICE. Positive results are notified by telephone, to the requesting source as soon as they are available.
If no report is telephoned the cultures can be assumed to be negative.

Investigation of Faeces

Optimal Time of Collection

As soon as possible after onset of symptoms.

Time between Collection and Processing

Specimen transportation times should be as short as possible as a number of important pathogens may not survive long delays even if the sample is refrigerated.

Correct Specimen Types

Specimen may be passed into a clean, dry disposable bedpan or similar container and then transferred into a blue-topped container, using the "spoon" inside the top. The sample will not be suitable if there are remains of soap or detergent in the collection container.

a. **Routine faecal culture requires a 1-2g sample**. If more than one sample is taken on the same day, then the samples may be pooled. **This will detect Campylobacter, Salmonella, Shigella, Escherichia coli 0157, and Cryptosporidium species**. Results are available 3-4 days after processing the sample.

b. **Culture for Vibrio** will depend on appropriate clinical details being supplied and the quality of the sample received. **Details of foreign travel must be indicated on the request form,** specifically if there has been travel to Africa, Asia, South/Central America, Eastern European Block or Third World countries.

c. **Faeces for detection of GDH or Clostridium Difficile toxins A&B** requires a sample conforming to the Bristol Stool Chart types 5-7 (liquid or taking the form of the shape of the container). Patients' symptoms include pseudomembraneous colitis, and antibiotic associated diarrhoea, **appropriate clinical details must be indicated on the request form submitted.** (**Toxin results will not be reported on GDH negative stools, or on samples.)** If any clinician requires toxin testing on samples that are not within in these criteria they must discuss the request with the Consultant Microbiologist.)

d. **Faeces for the detection of Rotavirus and Adenovirus** will be performed on semi-formed or liquid samples submitted from young children (up to 6 years).

e. **Faeces for the Detection of Norovirus** will be performed on diarrhoeal samples, after discussion with the Consultant Microbiologist responsible for Infection Prevention and Control.

f. **Faeces for the Detection of Yersinia enterocolitica** will depend on appropriate clinical details being supplied and the quality of the sample received. Yersiniosis may present as acute diarrhoea, mesenteric lymphadenitis, terminal ileitis, pseudo-appendicitis or reactive arthritis.

g. **Faeces for TB (Mycobacterium Tuberculosis & Mycobacterium avium-intracellulare (MAI).** The isolation procedure from this sample type is unreliable and has low success rates and is **not recommended.**

h. **Culture for Faeces for Bacteria Associated with Toxin Induced Food Poisoning.** Diagnosis is confirmed by culturing the faeces from infected persons as well as from incriminating foods. Culture will only be performed if the food samples are submitted. Organisms looked for are Staphylococcus aureus, Bacillus cereus, and Clostridium perfringens.

i. **Faeces for Viral Studies** depends on the appropriate clinical details being supplied on the request form. Only liquid faecal samples are accepted by the Virology laboratory in outbreak situations.

j. **Faeces for Parasites**. Appropriate clinical details must be indicated on the request form submitted. Essential detail must include reasons for investigations, foreign travel and the country visited.

Availability of Results

Final negative results are available after 48 hours system via ICE; Positive results are notified by telephone, to the requesting source as soon as they are available.

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