Vision | Openness | Integrity | Compassion | Excellence

NHS Bolton NHS Foundation Trust

Microbiology

Laboratory Medicine User Handbook

... for a better Bolton

Document Control

Number of official printed copies of this document	0
Location of copies	
Copy 1	Electronic copy – Trust Intranet – Laboratory Medicine
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Contents

1. Introduction

Microbiology at The Royal Bolton Hospital NHS Foundation Trust is structured operationally within the Laboratory Medicine Department of the Diagnostics and Support Services Division (DSSD). The Microbiology department provides services to primary and secondary care within Bolton, Greater Manchester.

There are three laboratory specialties within the Microbiology department at The Royal Bolton Hospital NHS Foundation Trust:

Bacteriology is the specialty responsible for the diagnosis and management of a wide range of infectious conditions caused by bacteria. The majority of bacteria causing conditions are investigated using traditional agar culture media and subsequent identification, where significant pathogens (disease causing micro-organisms) are tested for their susceptibility to a panel of antibiotics.

Virology is the specialty responsible for the diagnosis and management of a wide range of infectious conditions caused by viruses. Viral investigations at The Royal Bolton Hospital NHS Foundation Trust are performed using viral-antigen detection methods such as immunoassays or molecular diagnostics.

Mycology is the specialty responsible for the diagnosis and management of a wide range of infectious conditions caused by fungi. This includes fungal nail, hair and skin infections. Mycology investigations are performed using traditional agar culture media and subsequent identification using microscopy.

Serology and Antimicrobial Levels are undertaken by **Blood Sciences at the Royal Bolton Hospital.** Interpretive advice on serology results is available from the Consultant Medical Microbiologists.

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.

This handbook aims to help our service users understand how the department's services are organised and hence to make the best use of the service by complying with necessary requirements.

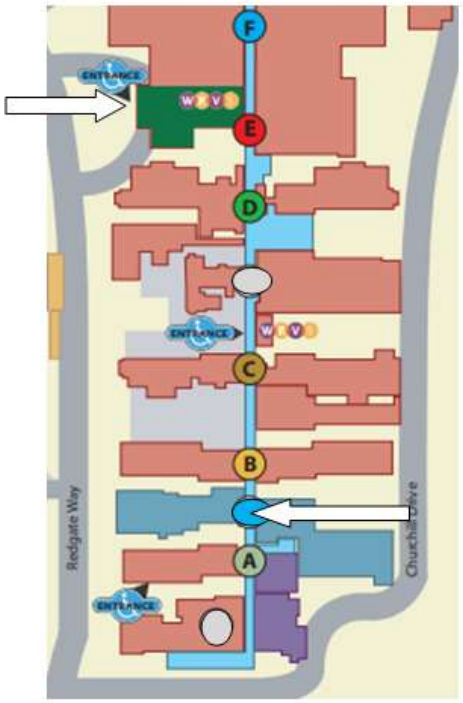
There is a list of investigations, specimen containers and turnaround times. Certain investigations are referred to external laboratories, if further information regarding these

laboratories or any other general information is required please contact the Laboratory Medicine Department Helpline on Tel 01204 390412 during routine working hours.

2. Address and Location

Location	**Postal address**
Laboratory Medicine is located just off the Main corridor in between A & B Block.	Microbiology Department of Laboratory Medicine Royal Bolton Hospital Minerva Road Bolton, Greater Manchester BL4 0JR Tel 01204 390437 DX 6961200

Bolton Hospital Main Entrance



Laboratory Medicine Main Reception

3. Opening Hours

3.1 General Laboratory Medicine

Specimen delivery (inpatient, outpatient, GP)
Monday – Friday 8.45am – 5.00pm

Laboratory Medicine Helpline (01204) 390516
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.

Laboratory Medicine Call Centre (01204) 390923
Monday – Friday 9am – 12 noon
The Department operates an appointment line for GP/hospital patients to contact the Department to make appointments for phlebotomy.

3.2 Microbiology Laboratory

Microbiology Laboratory (01204) 390412
Monday – Friday 8.30am – 5.00pm

Microbiology Out of Routine Hours (Trust Switchboard, bleep)
Evening – On call Urgent Requests (5.00pm – 8.30am)
Weekend – Reduced service Urgent Requests (8.30am – 5.00pm)

PLEASE NOTE: The on-call Biomedical Scientist MUST be contacted via Switchboard for Urgent Requests.

3.3 Microbiology Laboratory Oncall repertoire

- Cerebrospinal fluids (CSF)
- 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 and approved by a Consultant Microbiologist.

3.4 Microbiology Clinical Advice

Monday – Friday 8.30am – 5.00pm (via Microbiology Secretariat – see Contacts)
Evening 5.00pm – 8.30am (Trust Switchboard, aircall)
Weekend 8.30am – 5.00pm (Trust Switchboard, aircall)

4. Departmental Contact Details /Telephone Numbers

4.1 Laboratory Medicine General

Designation		Internal number	External number
General Helpline	Laboratory Medicine Office	142369	**(01204) 390516**
Carolyn Williams	Clinical Lead Laboratory Medicine	142369	(01204) 390516
Lewis Hurley	Service Manager	5088	**(01204) 390088**
Phil Henry	Operational Business Manager	5419	**(01204) 390419**
Rupa Miah	Computer & IT Manager	5253	**(01204) 390253**
Barbara Y Colman	Administration & Support Services Manager	5437	**(01204) 390437**
Laboratory Medicine Reception		5508	390508

4.2 Microbiology

Designation		Internal number	External Number
General and Urgent Enquiries – office hours		5411/5412	390411/2
Urgent Enquiries – out of hours		Via hospital switchboard (Internal ‘0’, External 01204 390390)	
Microbiology Secretariat		5416	(01204) 390416
Dr Pradeep Subudhi	Consultant Microbiologist	5410	(01204) 390410

Dr Katy Edwards	Consultant Microbiologist	5080	(01204) 390080
Dr Celia Chu	Consultant Microbiologist	4166	(01204) 390416
Dr Rashmi Gupta	Consultant Microbiologist	5080	(01204) 390080
Alison Hardy	Microbiology Laboratory Manager	5409	(01204) 390409

5. Enquiries and Complaints

- The department is committed to fully investigating all complaints regarding the standard and quality of services that we offer. Please contact our Laboratory Manager(s).
- 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

6. Quality

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 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. Quality assurance schemes such as External (Proficiency) laboratory comparative exercises and Internal (repeating a test on the same specimen) exercises make sure the department's high quality standards are consistent and maintained.

Training is accredited by the Institute of Biomedical Science (IBMS) for biomedical scientist specialist training, and by the Royal College of Pathologists for medical training. Continual Professional Development (CPD) participation is monitored by Laboratory management.

6.1 Accreditation

Microbiology is a UKAS accredited Medical Laboratory No 8707. The department has been assessed by the United Kingdom Accreditation Service (UKAS) and is accredited to meet the requirements of the International Standard 15189:2012.

Accredited Tests within the examination/test repertoire are available on the UKAS Schedule of Accreditation for 8707 on the UKAS Website: Search UKAS accredited organisations

Non-accredited Tests provided by the department include:

Test Name	Quality Assurance and Performance
Respiratory Biofire (Molecular Detection)	EQA “LAB QUALITY” GOOD IQA GOOD

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

Please contact the Laboratory Manager(s) for any enquiries as to the accreditation of our laboratory activities.

6.2 Confidentiality and Data Protection

Information is an essential for the clinical management of individual patients. The quality of the data supplied with a specimen determines the accuracy of the subsequent examination result and the timely return of the report.

Personal health information is strictly confidential and 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.
All staff should have an understanding of risks and responsibilities associated with incorrect data and the impact this can have on patient care.

The laboratory has policies covering the acceptance of specimens to ensure safe diagnosis and treatment, and that we act with the patient's consent. Specimens cannot be processed until any errors or omissions have been corrected and results will be delayed.

NHS standards and guidelines state that all clinical records (including pathology requests):

- Must be written clearly, legibly and in such a manner that cannot be erased;
- Must be accurately dated, timed and signed with the full name printed alongside each entry;
- Should be completed with minimal abbreviations.

6.3 Requirements for Patient Consent

For the majority of routine laboratory activities, consent can be inferred or implied when a person willingly submits to sample collection procedure (eg, swab, pus, urine, and venepuncture). The responsibility to obtain appropriate informed consent for all tests requested resides with the individual requesting the test.

Informed consent should cover all the tests being requested, implications of their results and disclosure of clinical and personal details to personnel (in the requesting organisation and any other healthcare organisations involved in providing the test).

Please ensure that the appropriate request form is completed when requesting Genetic Tests. Request forms for these tests often contain further patient consent requirements.

6.4 Result Uncertainty / Measurement of Uncertainty

With every result produced by a laboratory there is an associated uncertainty, which may be attributed to a number of small variations arising at any stage of the total testing process, from specimen collection to analysis. It is important to understand that uncertainty is not the same as an error. An error implies that there is a difference between a measured value and the true value caused by an unknown factor, whereas uncertainty is an acceptable interval (95% confidence limit) within which a result can fall. We are able to predict this interval by calculating the measurement uncertainty (MU) for each test in our repertoire.

Further information on the measurement of uncertainty for all our laboratory assays is available by contacting the Microbiology Laboratory within routine working hours.

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

7. Requesting Laboratory Examination Tests

All specimens must have a request form (paper or electronic). Three (3) patient identifiers are required on all specimens and request forms. All patient identifiers must match exactly between the sample and the request form.

Further examination tests performed on the primary specimen are dictated by the results from the initial screening and may be requested by the Departmental Consultants or Clinical Leads.

7.1 Microbiology Test Repertoire

The MIcrobiology Tests Repertoire is available in excel format on the Internet and Intranet – under the Laboratory Medicine webpages.

The repertoire is a controlled document and updated regularly. The repertoire MUST be accessed via the webpages for each use opposed to saving on local computers.

7.2 Mandatory Specimen Labelling Requirements

The addressograph label should always be used for hospital patients

Specimens MUST be labelled with four unique identifiers :-

- Unique identification number e.g. hospital number ‘RMC’ , NHS number, GUM clinic
- Surname
- Forename
- Date Of Birth

Failure to meet these requirements can cause results to be allocated to the wrong patient and /or tests not performed

Date and time of sample collection **Must** be provided to support sample validity

Multiple specimens taken at different times on a patient MUST be labelled on the sample container with the time (24 hr. clock) when the sample is taken.

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

7.3 Electronic Requesting

Electronic ordering must **be used were available unless there is downtime, to reduce manual forms and associated transcription risks**. **The request form information** MUST match **the information on the sample.**

Hospital electronic requesting is available using the allscripts Electronic Patient Record (EPR) system.

GP electronic ordering is available using the sunquest ICE system.

7.4 Hard Copy / Paper Request forms

In addition to patient identifiable information, forms :-

- **MUST** contain legible information
- The **Ward/Department source** of the patient's care (ward or department **and** Consultant or GP) must be clearly provided. Several sets of results each day cannot be sent out because this information is not given. (please do not use POPD/GOPD-out patients, select speciality i.e. gastroenterology, this will ensure the requester receives the results in a timely manner
- **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 Hard Copy/Paper Request forms are available from Laboratory Medicine – please contact the Helpline.**

Microbiology Request Form

2021 request form_Final proof.pdf

7.5 Essential Clinical Details

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.

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

High-Risk specimens MUST be discussed with the Consultant Microbiologist prior to requesting Out-Of Hours testing.

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

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, RickettsIa, 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 EBOLA, VIral Haemorraghic Fever, Mers-Cov or other 'High-Consequence infectious 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

7.6 Potentially Infective and High Risk Specimens

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

7.6.1 High Risk Specimens

The receiving laboratory **MUST** be informed before sending these specimens. They **must** be identified as being high risk in the clinical history on the request form and the specimens labelled High Risk with a "Danger of Infection" sticker.

The specimens must be placed in a separate plastic bag and sealed. These specimens MUST not be transported using the POD system. For further advice, contact Laboratory Medicine.

7.6.2 High Risk Specimens: High consequence infectious disease (HCID)

The duty Consultant Microbiologist and receiving laboratory **MUST** be informed prior to collection of specimens from patients suspected of a High consequence infectious disease (HCID), previously termed Viral Haemorrhagic Fever (VHF).

Specimens **must** be identified as being high risk in the clinical history on the request form and placed in a separate plastic bag and sealed. A complete chain of custody is required for these specimens to maintain a record of who has the specimen and when.

7.7 Requesting Urgent Tests

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

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.

7.8 In the event of IT Failure

Microbiology paper/hard copy request forms must be used with essential to include source, consultant or caring medic and contact details. In the absence of this information the laboratory will not be able to alert critical results or return reports.

8. Specimen Collection and Transport

8.1 Specimen Collection

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

8.2 Obtaining Specimen Containers and Supplies

All specimen containers can be obtained from the Department of Laboratory Medicine within normal opening hours – please contact the helpdesk. 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**)

8.2.1 Table of Specimen Containers

Name	Image	Specimen Types
Yellow lid 60mL sterile container		Sputum, Pus, Tissue (ideally Ballotoni beads), Biopsy (small biopsies using cartridge), TB sputum and TB Urine
Paedriatric Blood Culture Vial		Bacteraemia, Whole Blood for ?sepsis
Adult Aerobic and Anaerobic Pair Blood Culture Vials		Bacteraemia, Whole Blood for ?sepsis
Yellow lid 30mL sterile container		CSF, Sterile Fluids (Joint, Ascitic, Pleural)
Faeces specimen container		Faeces, Rectal Swabs for Enterobius/Threadworm

Blue lid Swab in transport Medium (no charchoal)		CPE/VRE molecular detection (PCR)
Yellow Urine Monovette		Urine samples eg paediatric or volumes 8.5-10 ml, neutropenic Urine, Legionella/Pneumococcal antigen, Chlamydia/Gonorrhoae (male).
Hologic Multi-test Swab collection kit		Chlamydia/Gonorrhoae Urethral / Cervical
BFT Viral Transport Medium		Sars-Cov2, FluA/B/, RSV – other respiratory viruses, Herpes Simplex Lesions, other viruses
Blue lid Swab in transport Medium with charcoal		Superficial Skin, Mucosal (Eye,Ear, Nose, Throat), Wound, CPE/VRE culture only, MRSA *note:* Charcoal swabs cannot be used for molecular detection
MFT Viral Transport Medium		Sars-Cov2, FluA/B/, RSV – other respiratory viruses, Herpes Simplex Lesions, other viruses
Mycology Dermapak Collection kit	 	Hair, Nail, Skin scrapings – fungal investigations

Green Urine Monovette		Urine samples over 10mL (where the top line is reached)
Saline & Glass beads		Tissue samples

8.3 Specimen Transport

Each specimen or set of specimens must be placed in the plastic bag that accompanies the request form. This bag must be sealed to prevent any leakage or loss of samples in transit. Please do not use staples to seal these bags. Please ensure that the specimen label or addressograph label is placed on the paper request form that is attached to the sample bag and NOT placed directly on to the plastic bag.

Samples must NOT be stored but should be sent to the laboratory immediately via porter or air tube or, for off-site users, by the next available transport. Users must consider the time of the next transport as delays may compromise certain results - if unsure, contact the relevant laboratory.

8.3.1 GP Surgery Transport

Samples collected from GP practices are gathered into strong polythene bags which are sealed. The hospital transport drivers place these bags in the secure rigid sample transport boxes with sealable lids that they carry in their vans. These boxes must be labelled as “Diagnostic Specimens – UN3373” and have the department and hospital name and contact telephone number.

The laboratory has an arrangement with the Trust iFM (Estates) department to provide 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 Laboratory Helpline if you require further information regarding this service.

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

8.3.2 Hospital Transport

Pneumatic tube (POD)
Cerebrospinal fluid (CSF), vitreous humours, pleural fluids and sputum specimens **MUST NOT** be sent via the Pneumatic tube (POD) system.

All other samples can be sent via the Pod system.

Main Laboratory Medicine POD number: 3333

Microbiology POD number: 3434 (this auto-diverts to 3333 out of hours)

Allowed in Pods

- Blood tubes
- Blood cultures
- Faeces (please do not overfill and ensure that the lid is on correctly)
- Swabs
- Urines (please do not overfill and ensure that the lid is on correctly)

Not Allowed in Pods

- Sputum
- Pleural fluid (or other fresh fluid samples eg. Ascitic)
- Bronchial Washings
- Cerebrospinal Fluid (CSF)
- Theatre samples
- Radioactive Samples
- Histology samples
- Samples in Formalin
- Sharps or needles
- Leaking samples

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.

Delivery in person to the central reception
Samples must be sealed in plastic bags and must also be placed in an appropriate carrier, e.g. sturdy carry box, sealed strong bag or another approved container whilst being carried to the laboratory.

8.3.3 Postal Transport
Specimens that are sent via post must be packed in special containers that conform to regulation UN No 3373 – Packing instructions for Diagnostic specimens and Infectious substances (Packing instruction P650). This states that the 'packaging must be of good quality, strong enough to withstand the shocks and loadings normally encountered during carriage'.

9. Factors affecting the results or processing of specimens
Where a specimen is not processed the requestor will be informed either by report comment or by telephone according to the urgency or specimen type.

Where there is a need for a repeat specimen due to analytical failure or additional specimens are required (insufficient primary sample available); the laboratory will contact 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.

Factor	Laboratory actions
Unable to unequivocally identify the patient	Repeatable specimens that are unlabelled or where there is insufficient information to link the specimen specifically with the patient will not be processed.
Leaked Specimens	In the interest of safety, specimens that leak inside the plastic specimen bag will not be processed.
Needles attached	Specimens with needles attached will not be processed

Incorrect Collection bottle/device	Specimens collected into the wrong bottles may not be processed or may compromise the validity of the result. One example is the volume of Urine in a Boric acid supplemented container (green monovette) – urine volumes less than 10mL or from neutropenic patients should not be sent using the green boric acid urine monovettes. **If under filled there is a high risk of false negative results**.
Special Testing Requirements	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.
Transport Delay	Sample viability is limited to a short period of time for many tests, therefore transportation to the laboratory should not be delayed. *Trichomonas* species are not detectable upon delayed transport and testing. Sputum specimens may become overgrown with contaminating organisms where transports is delayed.
Temperature	Extreme temperatures (hot or cold) – will likely affect results for some tests eg. Shigella species do not survive well in faeces species.
Specimen timing	The time of taking a specimen in relation to a person taking an antibiotic will influence ability grow the subsequently identify the causative organism.
Contamination	Please use aseptic techniques to prevent the risk of contaminating specimens with contaminating normal commensal microorganisms.

Cerebrospinal Fluid (CSF)	Specimens for xanthochromia need to be protected from light.

9.1 Specimen Collection Health & Safety – Sharps

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.

9.2 Use of Sharps Bins

1. Sharps must only be disposed of, in designated sharps bins that meet the requirements of the British Standard: BS 7320 (1990) UN3291
2. The correct size plastic container must be assembled correctly prior to use and staff must ensure the lid is secure.
3. The person assembling the sharps container must complete the relevant sections on the label before putting it into use. Site/date in use etc…
4. When placing the used sharps into the container, staff must ensure that all contents actually pass the plastic flap and enter the container.
5. The sharps container must be discarded when 75% full as per the Trust Blood Borne Virus Policy

10 Reporting of Results

Turnaround times for individual tests are available in the Test Repertoire 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 test requestor.

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 paper reports for Blood Transfusion.

10.1 Electronic Transmission of Results

10.1.1 Hospital

Electronic Patient Record (EPR) and Trust Integrated Clinical Environment (ICE).

Hospital Users must request laboratory medicine tests and view results using the Sunrise Electronic Patient Record (EPR) where available, this reduced risks associated with paper/hard copy requesting.

The Bolton Sunrise EPR system is supplied by Allscripts®. Training and access to the system is available from the EPR Service desk Team EPRservicedesk@boltonft.nhs.uk.

When a result is expected, please check the 'results' tab within the patient record. Both electronic and paper/hard copy requests will be reported to EPR.

Results for hospital wards and out patients are additionally reported to the Trust ICE system.

10.1.2 GP results

Integrated Clinical Environment (ICE)
GP results (except Blood Transfusion) are reported to the Integrated Clinical Environment (ICE).

Results can be searched for using the Patient identifiable information.

PLEASE NOTE: Where secondary downstream systems such as System One, Vision and EMIS are in use. The 'result message' has been interfaced using requesting GP Practice (P number) and/or GP name.

Requests received in Laboratory Medicine with no requesting source/GP name will be processed. The result will be available on systems under the patient details, however the 'message' may not transfer in 'list format' to the source.

Contact the Laboratory Medicine Computer & IT Manager for further details.

10.2 Paper Hard Copy Reports

Electronic ordering must **be used were available unless there is downtime, to reduce manual forms and associated transcription risks**.

Where Paper Hard Copy Reports are required. These will be distributed through internal and external mail by the Laboratory Medicine Office Team.

It is essential that the requesting source (Ward, Clinic, Specialty) AND requesting Consultant/Doctor is clearly provided on the request form. Numerous reports with GOPD are printed daily, where the location of the request is not easily determined.

10.3 Communication of Critical Results

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:

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
- COVID, Flu, from in patients
- Noro from in patients

The Microbiology Medical staff are responsible for telephoning:

- Blood cultures - Positive Gram films
- Acid Alkali Fast Bacilli (AAFM – *Mycobacterium*) - 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

10.4 Reference Ranges

Where appropriate reference ranges for specific tests will be available on the result, electronically, via web browser.

10.5 Telephoning for Results

Where a telephone report is provided, the following procedure has been adopted by the Trust (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, Biomedical 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.

10.5 Faxing of Results

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

11. Test Repertoire Microbiology

- Test Repertoire for Microbiology
- Please refer to Blood Sciences for Serology investigations (infectious diseases identified in Blood Specimens)
- **Please use Ctrl + F to search for Test details**
- Tests not accredited to ISO 15189:2012 are listed in 6.1 Accreditation
- Tests **referred** to offsite laboratories for testing are marked as such

11.1 Investigation of Fluids from Normally Sterile Sites

Specimen Types

Amniotic fluid
Ascitic fluid
Bursa fluid
Synovial fluid
Pleural fluid
Joint aspirate
Pericardial fluid

Examination Method

Culture and Microscopy (gram stain);
Joint Aspirates additionally examined for Joint Crystals, to aid the diagnosis of gout or pseudogout
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**

Optimal time of collection

Before antimicrobial therapy where possible

Specimen collection requirements

Local protocols to obtain samples and avoid contamination of the fluid should be followed.

Specimen container

Sterile yellow top 30mL universal container

Joint Fluids require an additional 1mL orange top heparin tube. Joint Fluid Kits are available from Laboratory Medicine Reception.

Minimum volume

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.**

Transport to laboratory

If transport is delayed then refrigerate the specimen.

Delays over 48 hours are undesirable.

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

11.2 Investigation of Skin and Superficial Wound swabs

Specimen Types
Swab, Pus swab, Biopsies

Examination Method
Culture and Microscopy (gram stain);

Optimal Time of Collection
Before antimicrobial therapy where possible
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

Specimen Collection Requirements

Specimen container
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

Minimum Volume
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.**

Transport to the laboratory
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.

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

Additional Information
Examination of specific pathogens will depend on appropriate clinical details to be indicated on the request form submitted

11.3 Investigation of Specimens for Respiratory Pathogens

Specimen Types

Sputum	Bronchial brushings
Transthoracic aspirate	Transtracheal aspirate
Bronchial aspirate	Bronchial washings

Bronchoalveolar lavage (BAL)

Examination Method
Culture

Optimal Time of Collection
Before antimicrobial therapy where possible
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

Specimen Collection Requirements

Local protocols to obtain samples and avoid contamination of the fluid should be followed**.**

Specimen container

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.

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.

Minimum Volume

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.***

Transport to the laboratory
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.

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

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

11.4 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 (5mls) & 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.

11.5 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.

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.

c. Samples of pus or aspirated material should be transferred to a sterile white-topped 30ml universal container or 70 ml yellow topped container.

d. 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.

e. **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.

11.6 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.

11.7 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 monovette is suitable for urinary volumes of 10mL only. Lower volumes (8.5ml to 10 ml) and specimens collected from neutropenic patients should be collected in yellow top syringe-type monovettes.

Limitations & restrictions

False positives may occur due to contamination of the sample from microorganisms found on the perineum and external genitalia.
False negatives may occur if specimens, especially boric acid monovettes, are under filled. Boric acid monovettes should contain 8.5-10mls of urine.
Delays from collection to receipt in the laboratory may result in inaccurate results.
Boric acid samples should be kept at room temperature for no more than 24 hours. All other samples should be refrigerated at 2-8 degrees if possible.

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 monovette container to the mark cap and break off the plastic barrel.

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

b. **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 monovette container. The sample should not be obtained from the collection bag.

c. **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.

d. **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.

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

f. **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.

g. **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.

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

i. **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.

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

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

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

m. **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**.**

11.8 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.**

11.9 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.
i. GBS screening Screening is offered to antenatal patients with previous high risk (i.e. carriers of GBS in previous pregnancies). Vaginal/anorectal swabs are inoculated into enrichment media for 24h then sub-culture to selective media for isolation of Group B Streptococci.

Availability of Results

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

11.10 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 (within 4 hours where possible). 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)
   II.

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.

11.11 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.

k. Faeces for Threadworm (Enterobius vermicularis) perianal swab should be collected for E. vermicularis ova. Specimens of faeces are unsuitable for threadworm investigations. Perianal swab Perianal specimens are best obtained in the morning before bathing or defecation. Three specimens should be taken on consecutive days before threadworm infection is ruled out. Cotton-wool swab in dry container should be used for collection; a swab out of a standard transport swab kit can be used. Spread buttocks apart and rub the moistened cotton wool swab over the area around the anus, but do not insert into the anus. Place cotton wool swab back in its container (no transport medium required).

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

11.12 MRSA screening swabs

Methicillin resistant Staphylococcus aureus (MRSA) are multi-drug resistant strains of S. aureus that are resistant to all beta lactam antibiotics and in most cases other groups too. MRSA strains are a continuing and increasing problem in healthcare settings, with outbreaks now occurring in the community.

Screening for MRSA provides a means of identifying patients who may be at risk of infection and/or involved in transmission of the organism.

Specimen Collection

Routine screening includes a nose, throat, and perineum/groin swab. Other lesion sites may also be included as part of a screen.

MRSA screening for elective admissions will have as a minimum nose and perineum/groin swabs; and day cases a nose swab only.

Emergency admissions will be risk assessed and a variable swabbing regime utilised following the assessment.

Laboratory procedure

MRSA swabs are cultured onto special selective chromogenic agar and incubated for 18-24 hours.

Infection Screening Specimen Collection ITU surveillance specimens include swabs from nose, throat and perineum/groin. Other specimens may be sent if applicable e.g. wound swabs, urine and catheter sites. Laboratory Procedure Specimens are cultured onto appropriate media and incubated for 24-48 hours

11.13 Corneal scrape

Specimen collection
Corneal scrapings and intraocular fluids will be collected by an ophthalmic surgeon. Sterile needles may be used to aspirate or scrape material, and sterile scalpel blades to scrape material. It is important that material is collected into the appropriate media/container for the investigation required.

Contact lenses and/or fluid can be sent in their original storage case.

Samples are investigated on request for:
Bacterial and fungal pathogens (culture)
Viral pathogens
Chlamydia
Acanthamoeba (PCR) – referred to external labs for testing.

11.14 COVID PCR

Nose/throat swabs in viral transport medium for COVID PCR testing (Combined Nose & Throat swab in one collection tube OR single swab used for throat then nose)

Results should be available in 24 – 48 hours (depending on the time of receipt at the Laboratory) Results may be available on the same day if received early in the day

11.15 Chlamydia/Neisseria Gonorrhoeae molecular testing

Chlamydia / Neisseria gonorrhoeae Molecular Investigations Chlamydia / N. gonorrhoeae detection is performed using the Hologic Panther analyser. Only specimens collected into Hologic Aptima collection kits (including urine specimens) are suitable to run on this analyser.

Vaginal Swab Kit (Orange) - for collection of high vaginal or vulvo-vaginal specimens. This specimen collection kit can be used by the patient for self-collection of specimen following guidance from clinician, nurse or care-provider.

Urine Kit (Yellow) - for collection of “first-void” urine. A FIRST VOID URINE WILL CONTAIN THE MOST AMOUNT OF EPITHELIAL CELLS
Specimen collection Chlamydia is an intracellular organism that infects the columnar epithelial surfaces of the human urethra and endocervix. To maximise detection rates, specimens from these sites should contain as many columnar epithelial cells as possible.

Endocervical swabs Prior to sampling the endocervix, using the white shaft cleaning swab provided in the kit, clean the cervical to remove excess mucous or pus. Insert the blue-shaft swab provided in the collection kit approximately 1 cm into the cervical canal, rotating several times for 10 to 30 seconds. Withdraw the swab without touching the vaginal surfaces and place in the tube containing the Chlamydia transport media. Carefully break the swab shaft at the score line and replace the tube lid securely.

Urethral swabs Insert the blue shaft swab included in the Chlamydia collection kit into the urethra for approximately 4 cm, rotating several times for 2 to 3 seconds. Withdraw the swab and place in the tube containing the Chlamydia transport media. Carefully break the swab shaft at the score line and replace the tube lid securely.

Urine Collect first void urine into a urine collection container free of any preservatives. Transfer 2ml of the urine into a urine collection tube using the pipette provided. The sample MUST be between the two black lines. DO NOT OVER OR UNDER FILL THE TUBE or the sample will be rejected. Replace the tube lid securely.

The assay used on the Hologic Panther instrument has not yet been validated for eye swabs, these specimens will be processed and an appropriate comment added to the report.

All positive assays for N. gonorrhoeae and positive assays for Chlamydia from un-validated specimen types are confirmed by repeat testing, as are low-level Chlamydia positives. The repeat test is on the Cepheid platform.
Limitations of the assay Use only the swab and urine kits provided. Other types of swabs or urine containers may affect the performance of the assay and will therefore be rejected. It is critical that urine specimen containers are NOT overfilled or underfilled.

11.16 CPE Screening

CPE stands for Carbapenemase Producing Enterobacteriaceae.

The term “carbapenemase” is used to describe any β-lactamase enzyme that hydrolyses carbapenem antibiotics (doripenem, ertapenem, imipenem and meropenem). These carbapenems are antimicrobial drugs of last resort and are crucial for preventing and treating life-threatening nosocomial infections of clinical concern. Many carbapenemases confer resistance or reduced susceptibility to all or nearly all members of the β-lactam class along with other antibiotic classes.

Most carbapenemases are acquired and are passed between bacteria by small sections of DNA called plasmids. This gives potential for spread between different strains, species and genera of bacteria.

Specimen collection

Rectal swabs or faecal specimens should be sent following appropriate risk assessment on admission and to aid in infection prevention and patient management.

Laboratory Procedure

Specimens are cultured onto special selective chromogenic agar and incubated for 18-24 hours