Microbiology User Manual

Information for Users 2025-26

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1.0 Aim of User Manual

This guide describes the clinical and laboratory services of the Microbiology Department at LTHT, available to users. This guide is intended to enable all users to make best use of the various services provided, ensuring an accessible and efficient service.

If you have any comments on the content of this manual, please contact a member of the management team. Details can be found in the key contacts section.

This is a controlled document. The most up to date version will only be available in electronic format on the Microbiology website https://www.leedsth.nhs.uk/a-z-of-services/pathology/microbiology-2/

2.0 General Information

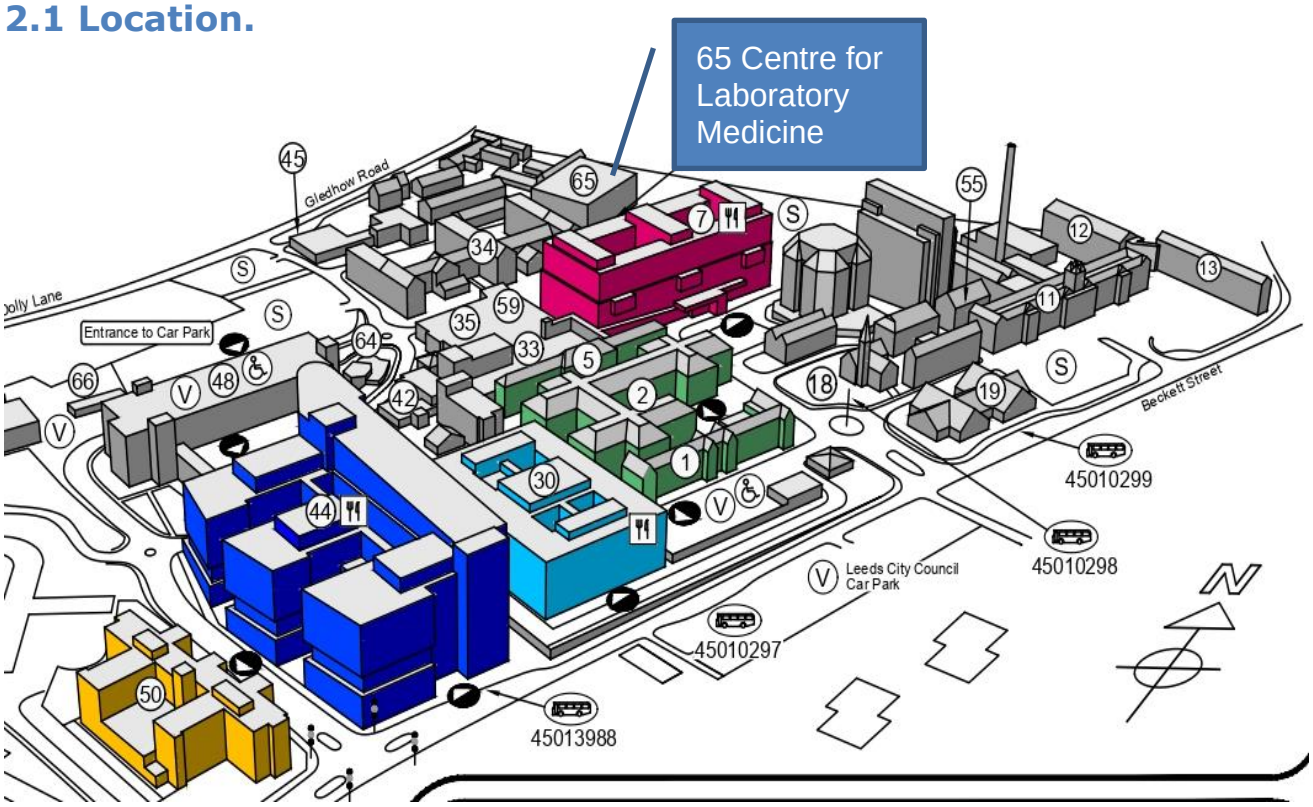
The Microbiology Department is located within the Centre for Laboratory Medicine at the St James University Hospital site.
The department provides diagnostic services for Bacteriology, Mycology and Virology across the Leeds Teaching Hospitals Sites located at Leeds General Infirmary, St James University Hospital, Chapel Allerton Hospital, Seacroft Hospital and Wharfedale Hospital.
The department also provides services to GP practices across the Leeds and Bradford region.

The Microbiology Department acts as the Regional Laboratory on behalf of Public Health England (UKHSA) providing support for testing in cases of suspected outbreaks or incidents. Information and key contacts for the UKHSA can be found in the Public Health Laboratory Yorkshire and Humber Service User Handbook by following the link.

The UKHSA hosted laboratory service at Leeds is part of the Clostridium difficile Ribotyping Network (CDRN). Details about the network, key contacts and information on how to access the service can be found using the link.

Sampling and requesting advice for CDRN can be found section 6.2.1 Bacterial Serological/Molecular Testing

2.1 Location.



https://www.leedsth.nhs.uk/hospitals/st-jamess-university-hospital/

2.2 Postal Address

Department of Microbiology
Centre for Laboratory Medicine
St James University Hospital
Beckett Street
Leeds
LS9 7TF

2.3 Hayes DX address

DX 6281504, Exchange
LEEDS 90 LS.

2.4 Normal Working Hours

Weekdays: 08:30 - 17:00
Sat to Sun: 08:30 - 17:00

2.4.1Contact Us (In Normal Hours)

Results for LTHT internal clinicians, nurses, etc.	Check results server and / or ICE and / or PPM+	
Results for external users (GP's, etc.)	0113-3923499	Mon-Fri: 08.30-17:00,
Duty Medical Microbiologist (interpretative & clinical advice)	0113-2069450	Mon-Fri: 09:00-17:00, Sat: 09:00-13:00
Duty Medical Virologist (interpretative & clinical advice)	0113-3928750	Mon-Fri: 08.30-17:00,
Clinical Scientist (PCR for Mycobacteria and *Tropheryma whipplei*	0113-3928797 (laboratory) 0113-3923929 (Clinical Scientist Tues & Thurs)	Mon-Fri: 08.30-17:00,
Clinical Scientist (CDRN Services, UKHSA)	0113-3928663	Mon-Fri: 08.30-17:00,
Duty Clinical Scientist Mycology	0113-3923390	Mon-Fri: 08.30-17:00 **only**
For laboratory assistance within normal working hours & general enquiries (e.g. urgent samples)	0113-3923499	Ask for the appropriate lab section for sample type
For Mycology assistance	0113-3926787	Mon-Fri: 08.30-17:00 **only**

2.4.2 Contact Us (Outside Normal Working Hours)

Duty Medical Microbiologist (interpretative & clinical advice)	Via switchboard 0113-2432799	
Duty Medical Virologist (interpretative & clinical advice)	Via switchboard 0113-2432799	
Microbiology Laboratory	All sites Via switchboard 0113-2432799 Or bleep 07659523854 Mobile 07880786778	Ask for Microbiology BMS

Virology Laboratory	**Nights only** All sites Via switchboard 0113-2432799 Or bleep 07659523854 Mobile 07880786778 **Weekends 8.30-17.00** Via switchboard	Nights ask for Microbiology BMS

2.6 Key Contacts

Dr Kavita Sethi	Clinical Lead	kavita.sethi@nhs.net	0113-3925034
Ian Cocking	Service Manager	iancocking@nhs.net	0113-3926777
Nicola Millican	Bacteriology/Mycology Service Lead	nicola.millican@nhs.net	0113-3928831
Nicola Bowers	Serology/Molecular Service Lead	n.bowers@nhs.net	0113-3928719
Hannah Armitage	Quality Manager	hannah.armitage1@nhs.net	0113-2069429

For Laboratory Leads see website

For Microbiology Consultants and Speciality see website

For Mycology contacts see website

https://www.leedsth.nhs.uk/services/pathology/microbiology/

3.0 Quality Assurance

3.1 Accreditation

UKAS MEDICAL
10883

The UKHSA Laboratory including the C difficile Ribotyping Network hosted by LTHT Microbiology is accredited to ISO15189:2022, customer number 10883.

The full scope of the tests that are accredited can be viewed on the UKAS website by following the link.

Update on our Scope of Accreditation LTHT Microbiology
As part of our ongoing commitment to quality, safety, and compliance, the Pathology Laboratory services at Leeds Teaching Hospitals NHS Trust (specifically relating to Blood Sciences, Specialist Laboratory Medicine, and Microbiology) are undergoing a planned relocation to the new Centre for Laboratory Medicine (CfLM) facility, along with the implementation of a new Laboratory Information Management System (LIMS) and the verification and validation of new equipment procured under the provisions of a new regional managed service contract.

Following extensive discussions with direct UKAS involvement that included a detailed appraisal of all available options, we have taken the decision to voluntarily and temporarily withdraw our UKAS ISO15189:2022 accreditation scope for the specialities being relocated, during the transition period.

The withdrawal shall commence as follows:

Microbiology – from 19 May 2025
Blood Sciences and Specialist Laboratory Medicine – from 2 June 2025
This is a proactive and precautionary measure to maximise the resource available to support safe and efficient transfer of operations during the critical transition period, ensuring the time required to fully optimise and embed laboratory processes without rushing. Maintaining our standard assessment schedule during this period would not provide that flexibility.

These measures will remain in place only until the relocation is complete and a successful UKAS assessment has been undertaken within the new facility. We anticipate reinstatement inspections to take place for each affected service during the period [October 2025 – January 2026], with reinstatement to follow shortly after, with the usual a 2-month period allowed to clear any improvement actions that may be raised. Any delays to this schedule will be clearly communicated via updates on this webpage.

During this interim period, we want to assure you that:

All testing will continue under our ISO 15189 2022-accredited single Quality Management System, with full adherence to validated procedures and standard operating practices falling under this remit.
There will be no compromise in staff competence, equipment calibration, or result quality.

Internal auditing and other key quality assurance measures, such as standard External Quality Assessment and Internal Quality Control measures will continue without interruption to maintain patient safety and data integrity.

We appreciate your understanding and partnership as we undertake this significant period of change that will lead to significant enhancements to service delivery, within a modern, purpose-built facility. Should you require any further details, please contact: leedsth-tr.pathologycustomerservice@nhs.net and use the subject header 'UKAS accreditation enquiry'.

3.2 Providing Feedback

The Department aims to continuously improve its services in response to user requirements. Suggestions for improvements can be sent via email to the Quality Manager, Service Manager or Service Leads (see section 2.6 Key contacts) or using the user feedback facility on the website Pathology - Leeds Teaching Hospitals NHS Trust (leedsth.nhs.uk) or using the following link Pathology User feedback form

3.3 Complaints & Compliments

The views of our users are very important to the service we provide. If you wish to raise a formal concern regarding our services, information and guidance on the procedure can be found on the Leeds Teaching Hospitals website PALS and Complaints information.

3.4 Protection of Personal Information

The laboratory complies with the requirements of the Data Protection Act and Caldicott Principles on safeguarding patient confidentiality and information. The Department will only disclose patent information to other health care professionals who need to know that information in order to deliver effective care and treatment. The information provided will be the minimum necessary to allow appropriate and effective care. All staff must undergo mandatory training regarding confidentiality.

4.0 Requesting Tests

4.1 Request Forms and Specimen Labelling

For a quality result to be issued it is essential that request forms are correctly completed, and specimens labelled adequately. The laboratory policy for the standards for labelling of request cards and specimens can be found by following this link LTHT Policy for the Labelling of Request Forms and Specimens

To ensure samples are dealt with as efficiently as possible do not send multiple requests for tests on one form - One Request-One Bag-One Sample set.

The **REQUEST FORM must** contain the following:

ALL Patients
i. **Forename & Surname** in full, initials are not permitted ii. **Date of Birth (DoB)** iii. **PAS Number / NHS Number / ED (A&E) number** iv. **Consultant/ GP (or Requesting Officer within Pathology for referrals from other hospitals)** v. **Location: GP Surgery/ Ward/OPD/Unit (or hospital/department for referrals from other hospitals)** vi. **Date of request** vii. **Time of collection (where relevant)** viii. **Clinical details e.g. presenting complaint, relevant medication, procedure etc.** ix. **Investigation/Tests required** x. **Infection status (where relevant)** xi. **Handwritten requests only: Signature, printed name and contact number of the person taking responsibility for completing the request card). N.B. This information is provided in digital format on all ICE requests based on the requestor's login.**

The details on the request form MUST match those on the specimen container

Labelling of the **SPECIMEN**:

ALL Samples
i. **Forename & Surname** in full, initials are not permitted ii. **Date of Birth (DoB)** iii. **Date and time of collection** iv. **PAS / NHS / ED (A&E) number.** v. **Blood Sciences & Microbiology ICE Requests only: the ICE accession number on the sample must match that on the form**

The details on the specimen container MUST match that on the request form

Where possible the ICE Order Comms System should be used to generate electronic requests for tests. If possible, tests should not be requested in advance of taking the sample. If this is required ensure the correct date and time of collection is clearly marked on the request card. The small ICE barcode label is sufficient for labelling specimens and should be securely attached to the specimen. If tests are requested in advance on order comms ensure the actual date and time of collection are written clearly on the form. Note this practice is discouraged wherever possible as there is a clinical risk if labels are not printed at the time the sample is taken.

Printed addressograph labels from patient records **should not** be used to label specimens.

If a critical, non-repeatable sample is not being processed due to labelling errors then the user will be contacted by telephone whenever possible to request further information.

If a sample is inadequately labelled the laboratory may issue a rejection report. It is still possible for the sample to be analysed if the requestor completes a declaration form to take responsibility for the additional risks generated. The form can be found using this link. Retention time for the majority of samples originally rejected is 7 days after which time the sample may not be able to be processed. Non-repeatable samples may be kept for 1 month. If a sample can be easily repeated it is advised that another sample and request is sent due to possible deterioration of the specimen.

If more than one specimen is taken please send separate request forms and specimens for each investigation to prevent delays in testing. E.g. HVS samples and Chlamydia samples should be sent in separate specimen bags with two requests.

4.2 Using Order Comms to request tests.

Order Comms has been configured for many specialities in the Trust, through discussion with users, to provide the most commonly used tests on one page. Guidance on the correct samples to collect for presenting conditions has also been set up for some specialities or tests needed in specific clinics. Appendix C of this document demonstrates the functionality of the application.

For Clinical Haematology and Oncology, both paediatric and adult services, there is a specialised collection of Microbiology tests on the department pages which

should be used for requesting bacterial swab cultures. This is to ensure this group of patients receives the appropriate testing within the laboratory.

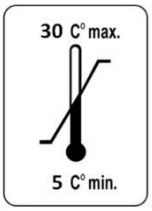
If you have suggestions for changes to Order Comms or believe a test is not on the system, contact the Informatics Service Desk by email: InformaticsServiceDesk@leedsth.nhs.uk or phone: 0113 39 26655

4.3 Specimen Containers & Sample Collection

Ensure that the correct specimen container is used for the sample type. A guide to using the correct specimen containers is available throughout the test repertoire. An "at a glance" section of what to use and what not to use for Microbiology tests is included in Appendix A of this document. A printable version can be found on the website.
If you are unsure of which sample to take, please contact the laboratory (0113 3923499) for advice.
GP's can order supplies of specimen containers via email leedsth-tr.pathologysupplies@nhs.net using the Pathology Supplies Order Form
Which can be found on the following link Pathology Supplies - Leeds Teaching Hospitals NHS Trust (leedsth.nhs.uk)

It is vital that excess supplies of specimen containers are not kept by users to prevent out of date stock been used which can impact on the quality of the result.

To ensure the quality of the test, stocks of consumables should be kept at the temperature recommended by the manufacturer at all times, usually indicated on the box. Below is a typical example



BD Blood culture bottles	2-25°C out of direct light
Copan eSwab (single and multipack)	5 – 25°C
Aptima swabs (for Chlamydia and Gonorrhoea testing)	15-30°C
Blood Tubes	4-25°C
Virocult (Viral transport media for Covid-19 PCR)	2 – 30°C
UTM Viral transport media	2-25°C

4.4 High Risk Samples

It is the responsibility of the requesting clinician to indicate or highlight that a specimen may contain a HG3 pathogen(s). As per Trust policy this should be clearly stated on the request form and a yellow high risk specimen label attached to the form and specimen. They MUST supply all relevant clinical details as is reasonable and practical at the time of initial clinical assessment.
Where there is a failure to follow this procedure a Datix incident report will be raised for investigation by the requestors CSU.

Appendix B of this document details potential specimens and clinical details that may indicate a high risk specimen.

Further information regarding HG3 pathogens and high risk labelling requirements can be found on the website for internal users by following the link to Leeds Healthcare Pathways or IPC Labelling advice

4.5 Requesting Urgent Tests

An urgent sample is defined as a specimen where prompt release of results is essential to the immediate clinical management of the patient.
Specimens that require urgent processing must be notified to the laboratory in advance of their arrival via bleep or telephone.
Specimens that are marked via sticker or handwritten as urgent but without prior notification may not be treated as urgent.
All CSF samples are regarded as urgent, but staff should still be notified of their arrival.

4.6 Requesting Additional Tests

In some circumstances tests may be added to samples that are already in the laboratory. Time limits will apply dependent on the stability of the sample and length of storage. Contact the relevant laboratory for further advice.

4.7 Specimen Transport

Specimens should be sent by established transport networks. Specimens from within the Leeds Teaching Hospitals NHS Trust should be sent either via the air tube system or specimen shuttles from other sites.

All samples should be transported to the laboratory as soon as possible. If there is a delay anticipated, then samples should be refrigerated at 4ºC with the exception of:

- Blood Cultures - store at room temperature
- TB Quantiferon test - room temperature, must arrive within 16 hours of collection. Do not send samples at weekends. **USE BLUE BAGS PROVIDED FOR TRANSPORT**
- T spot tests - must be received by the laboratory by 4pm on the day of collection **USE BLUE BAGS PROVIDED FOR TRANSPORT**
- Culture for Neisseria gonorrhoea must be received within 24 hours - samples may be refrigerated or stored at room temperature

Specimens sent via the postal system or Hayes DX must be appropriately packaged. Specimens (tube or packet) must be clearly labelled with the patient's name, and where appropriate a referring laboratory number.

5.0 Results

For inpatient and outpatient results in the Leeds Teaching Hospitals Trust please use the Results Server (internal NHS staff only), Order Comms or ppm+. Results for general practice are delivered electronically over NHSNet and are also available on Order Comms.

Clinically relevant or urgent positive results will be telephoned to requesting location by medical staff.

5.1 Clinical Advice

Clinical Advice is available by contacting the Duty Microbiologist, Duty Virologist or Duty Clinical Scientist for Mycology. See contact numbers in General Information.

Microbiologists assist in the interpretation of laboratory results and can offer further advice if required on specimen conditions for infectious conditions and patient therapy. Therapeutic advice may be based on culture results (definitive) or clinical suspicion (empirical).

Advice and guidelines for the use of Antimicrobials can be found on the Leeds Health Pathways site by following the link.

Infection Control is an integral part of the work of the Microbiology Department. For Infection Prevention & Control Advice Monday to Friday 8am to 5pm contact ext. 22691. For acute or urgent issues infection prevention can be bleeped via switchboard. Further contact information for the team can be found by following the link.

Out of hours and weekends Infection Prevention advice is provided by the Duty Medical Microbiologist. See contact numbers in General Information.

5.2 Antimicrobial Sensitivity Testing Results

Where required the medical team will report the most appropriate antibiotics for patient care based on clinical & demographic information available. Other options may be available and can be discussed by contacting the Duty Microbiologist.

In some cases, a result may be reported as "I". This result equates to susceptible, increased exposure: There is a high likelihood of therapeutic success if exposure to the agent is increased by adjusting the dosing regimen or by its concentration at the site of infection.

6.0 Investigations, Turnaround Times & Sample Requirements

6.1 Uncertainty in Microbiology Tests

In laboratory testing there are potential "uncertainties" that may affect test results (for example, specimen not collected correctly, presence of antimicrobials, biological variation)
Additionally, factors within the laboratory may lead to variation (for example, incubation times, time to processing). The Microbiology laboratory has measures in place to minimize the level of uncertainty and this is reflected by the Quality Assurance processes in place.
Results provided by the laboratory are representative of the sample tested and must be considered against clinical presentation. There are a number of factors that may affect the quality and validity of a result that are outside of the laboratories control.

Factors that may affect results:	Mitigating actions:
Delays in transportation of samples. Isolation or quantification of some microorganisms may be affected by prolonged storage of a sample.	• Ensure samples are sent as soon as possible via transport (external) or airtube (internal) • If problems with transport occur contact the laboratory. • Notify the laboratory of any urgent samples • Ensure the date of collection is clearly marked so any possible

	decrease in quality can be noted on the report • If serum samples required these should be split from blood if delay anticipated
Inappropriate sample type sent for investigations Examples: • Copan liquid swabs used for Chlamydia • Plain universals used for urine culture • Formalin pots used for tissue samples for microbiological culture • Blood tubes with preservatives sent for serology tests	• Refer to user guide and tests and tubes website • Contact laboratory if unsure of requirements • Print specimen user guides (appendix A)
Insufficient volume of sample sent	• Refer to user guide and tests and tubes website • Contact laboratory if unsure of requirements
Out of Date specimen container used	• Do not overstock areas • Practice stock rotation • Check expiry dates before use
Contamination of samples	• Always use sterile containers • Maintain aseptic technique • Where appropriate refer to sampling guidance on Leeds Healthcare Pathways
Sample Quality	• Maintain aseptic technique • Where appropriate refer to sampling guidance on Leeds Healthcare Pathways • Refer to user guide and tests and tubes website
Insufficient Clinical Details - tests may often be designated within the laboratory based on the clinical details provided. Tests may be missed if there is not enough information	• Complete requests as fully as possible
Presence of antimicrobials	• Where possible take samples before therapy is started • State any antimicrobials in use on the request form
Inherent Factors E.g. Age, gender, congenital immunosuppression	• Advice on the need to always provide full clinical details • Medical authorisation of results

6.2 Test Repertoire: Bacteriology

Please note turnaround times will be reviewed annually and revisions notified via the website.

Investigation	Specimen Container	Collection Comments	Clinical Indication & Further Comments	Turnaround times
Urine Microscopy and Culture	 	Urine samples should be sent in boric acid preservative. They should be filled to the line marked on the container to ensure the concentration of the preservative is not inhibitory. Smaller sample bottles are available for paediatric samples. Samples are screened by microscopy and cultured if infection is likely or patients fall within a defined group. For narrow topped tubes please use collection cups provided. For instructions for use please see Appendix E	Investigation of suspected Urinary Tract Infection Urine cultures may be reported as total count of: Skin flora Enteric flora Skin and Enteric Flora These reports are issued when a mixed growth of organisms has been isolated. WBC and RBC will no longer be reported as a cut-off value, but always as a numerical value. The previous cut-off's used for WBC were reflective of the value used to indicate the level of WBC where a culture would be positive, based on laboratory verification work. The value now used for the new system, based on local verification is WBS >50.	4 days

			There is no normal range for RBC in urine and the presence can be affected by a number of factors. For advice on interpretation of RBC's in urine please see local guidance on Leeds Health pathways and national referral guidelines Scenario: Referral for suspected urological cancer | Management | Urological cancers - recognition and referral | CKS | NICE	
Faeces Culture		Full travel history and clinical details must be included on request or some pathogens may be missed. If suspected E coli 0157, *Shigella dysenteriae* or typhoid or details of HUS, PUO or fever following foreign travel mark clearly as Danger of Infection. Enough sample to fill one third of the pot should be provided, minimum volume is 2ml. Ensure lid is secure. Specimens of faeces should be transported as soon as possible as pH changes within faeces may affect the viability of pathogens. Shigella species may not survive pH changes that occur in stool samples if not sent without delay. Refrigerate samples if delay is anticipated. Rotavirus testing by enzyme immunoassay (EIA) will automatically be carried out on all samples submitted on patients under 5 years of age.	Investigation of suspected gastroenteritis. Food poisoning is a notifiable disease. Further investigations for specific food poisoning pathogens (*Bacillus cereus, Clostridium perfringens*) available on request	5 days

		Cryptosporidium and Giardia testing by EIA will automatically be carried out on patients with a travel history, appropriate clinical details and liquid stool samples.		
Faecal Parasitology		Full travel history must be provided. Some parasites excretion is cyclical and may require several samples. For patients with absolute eosinophilia who have travelled to the tropics it is advisable to send 3 OCP specimens collected on 3 consecutive days. Minimum volume 2ml	Investigation of suspected intestinal parasites	7 days
Urine for Schistosomiasis		Urine for Schistosomiasis must be collected between 10am and 2pm after a period of activity into an appropriate plain screw capped CE leak proof specimen container. Alternatively, a 24h collection of terminal samples of urine may be obtained. Boric acid **must not** be used. Minimum volume 10mls	Schistosomiasis (Bilharzia) following fresh water exposure in endemic areas (Africa, Middle East, Corsica)	7 days
Sellotape Slide for Enterobius vermicularis		Recommended that samples are taken for at least 3 consecutive days. Samples should be taken between 22.00h and midnight, or early in the morning, before defecation or bathing. Apply clear Sellotape to perianal region, press firmly against folds and fold the tape back on to itself. A perianal swab may also be taken.	Investigation of pruritus ani	7 days

OCP from samples other than faeces		A variety of samples such as tissues, biopsies, hydatid cyst and pus from abscesses, CSF, bile, duodenal/jejunal aspirates, sputum and bronchoalveolar lavage can be examined for parasites. Suspected whole worms or segments of Tapeworm may also be submitted for identification Submit whole collection of fluid in a sterile universal container Tissue/ biopsies; if specimen is small, place it in sterile water to prevent desiccation	It is important to include sufficient clinical details and travel history with the submitted sample. This will not only aid in the diagnosis of parasites but will also protect the laboratory staff if a hazardous pathogen is suspected or indicated from the clinical information supplied If a worm or segment is reported as Taenia (Tapeworm) then this sample will be referred to the reference laboratory for speciation to differentiate between *T.solium* (Pork Tapeworm) or *T.saginata* (Beef Tapeworm)	7 days
Helicobacter pylori		A minimum 2g of faecal sample is required. The use of antimicrobials, proton pump inhibitors and bismuth preparations are known to suppress *H. pylori* and ingestion of these prior to *H. pylori* testing may give a false negative result. In this case test should be repeated two weeks after discontinuing treatment. Refer to PHE Test and treat for Helicobacter pylori in dyspepsia for indications for appropriate *H.pylori* requesting	Investigation of patients with gastric and peptic ulcers. Antigen detection can be used for initial diagnosis and monitoring success of treatment and eradication From November 2024: requests with clinical details which do not fit the criteria according to the PHE guidelines will no longer be tested.	5 days

Faecal Calprotectin		A minimum 2g of faecal sample is required. Samples should be collected as soon as possible after the onset of symptoms.	Investigation of suspected Inflammatory Bowel Disease. This test should only be used according to the Leeds Map of Medicine change in bowel habit (CIBH) pathway as a guide to differentiate between IBD and IBS.	14 days
Clostridium difficile GDH & toxin testing		Repeated testing of negatives is not indicated within 7 days. Repeated testing of positives is not indicated within 14 days. If patient has significant risk factors e.g. Antibiotic exposure or recent hospitalisation, please state clearly on request. The initial test result screens for the presence of C difficile. Confirmation of toxin production indicates active disease. Samples must be received by the laboratory within 72 hours of been taken. Minimum volume 1.5ml	Investigation of suspected Clostridium difficile infection in at risk populations. Patients in the community, under 2 years (with appropriate underlying condition) and in hospital > 3 days are tested routinely for C difficile. GDH and toxin testing performed by ELISA At LTHT a further PCR test is carried out on samples that are GDH positive but toxin negative to detect the presence of the toxin gene and therefore guide IC isolation procedures. Samples are checked on arrival in the lab for previous testing. If a sample has been reported as negative within the previous week the sample will not be retested but will be stored in the laboratory	Screening test and Confirmation of toxin production Within 24 hours

			unless there is clear clinical indication that this is required. If a sample has been reported as positive for C diff, repeat samples will not be tested within 14 days.	
Blood Cultures	Adult   Paediatric	For guidance on taking blood culture samples see website here. Ideally 8-20ml of blood should be inoculated into two bottles for adult patients. A smaller volume of 3ml can be used for a single paediatric sample. Samples should not be refrigerated. It is advised that cultures should be incubated in the laboratory within 4 hours of inoculation therefore it is imperative samples are sent without delay. Blood cultures can be sent via the air tube system. If the Air tube system is not working porters should be contacted to transport Blood Cultures to specimen reception as soon as possible If insufficient Pods are available contact 22622 (LGI) or 69468 (SJH) to request additional carriers. Always include clinical details on the request. If a patient has a history of foreign travel or PUO or suspected enteric fever, ensure form and bottles are labelled as Danger of Infection. Where possible take before antibiotics, during or as soon after a spike in temperature.	Blood Cultures can be used to assist in the diagnosis of a number of suspected conditions including: • Fever ≥ 38ºC (suspected bacterial or fungal cause) • Pyrexia of unknown origin (PUO) • Rigors • Febrile convulsion (paediatrics) • Sepsis, septicaemia or septic shock • Febrile neutropenia • Pneumonia • Meningitis • Meningococcemia/petechial, purpuric or non-blanching rash • Enteric fever (typhoid) Infective endocarditis or other endovascular infection Pyelonephritis • Pancreatitis • Septic arthritis • Intravascular catheter/cannula infection	6 days for final negative result. An interim report will be provided at 48 hours (36 hours for paediatric samples). Positive results may be available sooner, but TAT is dependent on bacterial load in blood stream. Turnaround time may be increased if prolonged

			Blood culture positives are dealt with in the laboratory 24 hours a day and initial gram stain results released to the results server. Communication from the Microbiology medics regarding positive cultures is carried out from 9am -10.30pm. Cultures that flag positive overnight will be phoned through the following morning.	culture indicated
AAFB Microscopy and Culture	 	There are a number of specimens that are suitable for microscopy and culture of AAFB dependent on the suspected site of infection. Full clinical details are vital to providing correct test conditions. **Investigation of respiratory disease**: three early morning samples on consecutive days. BAL, ET secretions, pleural aspirates and or lung/lymph node biopsy. Do not send samples in trap containers with tube attached, replace cap or transfer to sterile container. **Renal TB**: three early morning urine samples if sterile pyuria has been confirmed **Other extra pulmonary samples** depend on site of disease: Lymph node/tissue biopsies or pus Gastric biopsies **TB Meningitis:** CSF sample in sterile universal. Remember all samples for TB **must** be clearly labelled as Danger of Infection and	Indicated in the investigation of: • Pulmonary tuberculosis • Extra pulmonary tuberculosis can present as "cold" abscesses in almost all sites. • Lymphadenitis • Bone and joint, including spinal, tuberculosis • Renal mycobacterial disease Tuberculosis is a notifiable disease.	Microscopy for AAFB available within 24 hours for samples received from Mon-Fri before 12pm. TAT for samples received weekends and bank holidays will be 3 days Culture 60 days. TAT may be increased if prolonged

		should not be transported via the air tube. Follow health and safety precautions when taking samples		culture is indicated
AAFB blood culture		Special blood culture bottles are required for this investigation. They can be ordered from the laboratory (ext. 23926 in hours or via switchboard out of hours). Suitable for investigation of blood samples or bone marrow. Discuss with Microbiologist before sending samples. 10-20 ml of blood is recommended for this test. If these specific bottles are unavailable at the time required, then the blood or bone marrow sample(s) can be collected into lithium heparin tube(s) and transferred to the laboratory	Investigation of military tuberculosis. Immunocompromised patients with disseminated atypical infection e.g. *M avium complex.* *Bone marrow is not a validated or accredited sample type.*	Culture 60 days
Respiratory Culture		The quality of the result for sputum culture is dependent on the quality of the sample as contamination from upper respiratory tract can affect the result. Sputum should be sent in collection pots that can be adequately sealed. Lids with suction tubes attached must not be used as samples will leak in transit and may be rejected. Ideally samples should be sent before antimicrobial therapy. If this is not possible this must be stated on the request form. Sputum can be obtained from the lower respiratory tract by deep coughing, physiotherapy, saline induction or other clinically indicated methods such as	Investigation of lower respiratory tract bacterial infections including pneumonia. Routine sputum culture request is not suitable for investigation of viral infection, TB or legionella. Sputum samples are checked on arrival in the laboratory for previous testing. If there is a sample in progress or reported in the previous 5 days the samples will not be tested but will be stored within the	7 days

		bronchoscopy. Saliva and post-nasal secretions are not appropriate samples	laboratory, unless clear clinical indication for testing is given.	
Respiratory Culture for Cystic fibrosis patients	 	Expectorated sputum or induced sputum are the preferred samples for culture. In certain patients, particularly younger patients, this may be difficult to obtain so cough swabs are accepted.	Investigation of respiratory tract infections in Cystic fibrosis patients. Culture is carried out for a wider range of bacteria and fungi so it is essential to indicate on request form if CF patient or request **Respiratory culture - Cystic Fibrosis on** ICE order Comms	7 days

Bordetella pertussis culture		*Bordetella pertussis* is the causative agent of whooping cough. The disease is characterised by a mild respiratory infection following a 7-10 days incubation period. The cough changes character after 1-2 weeks and becomes more paroxysmal followed by an inspiratory "whooping" sound. The cough ultimately subsides after 1-2 months. Manual culture and plate reading	Positive cultures will be referred to the reference laboratory at Colindale for confirmation. If patients have been started on erythromycin or other macrolides culture is not recommended as yield is reduced. In these instances, blood for Bordetella serology should be taken. In selected patients PCR detection can be discussed with the laboratory.	9 days
MRSA Culture		Copan triple pack swabs are available from Microbiology for MRSA screening. These contain 2 pink swabs and 1 white swab. The first pink swab should be used to sample both axillas, the swab is rotated into the liquid to discharge material, excess liquid squeezed against side and then discarded. Procedure is repeated with second pink swab on groin site. The white swab should be used for the nose. This swab is then broken at the marked point and remains in the tube. Links to pictorial instructions are found here If more than three sites are to be sampled use the first pink swab for both the axilla's and then the groin before discharging material into liquid media. The second pink swab would then be used for the additional hard to decolonise site. If more than 4 sites are to be sampled use the swabs from another pack but always ensure material is	MRSA screening is aimed to prevent the transmission of MRSA by providing staff with the information to identify and manage patients who are colonised or infected. For LTHT policy on MRSA screening, decolonisation and Infection control see guidelines on Leeds Healthcare Pathways.	3 days

		discharged into one tube. **One tube=one screen.**		
Genital Tract Culture	 	Order Comms is set up to specifically guide on the samples required for investigations. The Genito-Urinary page is set up in collections of presenting conditions. The samples listed within the collection should be sent to the laboratory for investigation. If pH testing is indicated the request will lead you through steps of an algorithm and advise on empirical treatment if a swab is not necessary. In no case should a pH be entered incorrectly as this could lead to missed pathogens. If order comms is not available provide full clinical details and refer to the algorithm and sampling advice here HVS samples should be taken with the aid of a speculum to avoid perineal contamination. A HVS swab is not suitable for the isolation of Neisseria gonorrhoea. Cervical swabs should be taken using a speculum and inserting approx. 1cm in cervical canal. Culture for gonorrhoea should be reserved for strong clinical suspicion when treatment is needed. Otherwise Aptima samples should be sent for both Chlamydia and Gonorrhoea screening. HVS samples are not suitable for Trichomonas - use Aptima swabs	Diagnosis of genital infection may be made by clinical examination, clinical and sexual history and vaginal pH see Leeds Health Pathways In some cases, pH testing may indicate a sample should be taken or other demographic or clinical details may indicate the need for sampling. Genital samples are indicated in patients where: ▪ Symptoms consistent with recurrent thrush, vaginal pH < 4.5 ▪ Abnormal discharge NOT consistent with BV or TV, vaginal pH > 4.5 ▪ Abnormal discharge in a patient who is > 60 years old or who has dyspareunia or dysuria Group B streptococcal screening in pregnancy ▪ Discharge in children <10 ▪ Male discharge	6 days

		Male urethral samples should be taken on an orange topped fine swab The recommended diagnostic test for the investigation of this sexually transmitted disease is NAAT testing – see separate entry. If Gonorrhoea is suspected and treatment is planned, it is preferable to refer the patient to Leeds Sexual Health (LSH). At LSH, cervical and urethral swab samples may be collected, and/or rectal and pharyngeal swabs if relevant. For specific advice please contact the laboratory (Ext 23962). Specimens for gonococcal culture should be taken using a pink E-Swab, (or if a thin swab is required, an orange E-Swab).	Negative results will be issued as "No target pathogens identified" with further comment to define what organisms the swab has been cultured for. Positive results will report the target organism identified with further comment to define all organisms the swab was cultured for. See Appendix D for information on target organisms for specific details and demographics	
Routine Bacterial Swab Culture ***Including ENT swabs, wound, skin, ulcer swabs***	 Pink top - skin, wound,nose,eye, throat, mouth	Order Comms is set up to direct specific clinical detail requesting rather than generic swab requesting to ensure the correct investigation is set up in the laboratory. For order comms requesting use Microbiology page and specific collections for swabs. For Children's BMT/Oncology patients use Paediatric services page Paediatric Haem collection Microbiology/Mycology for Paediatric Haematology or page Paediatric Onc collection Microbiology/Mycology for Paediatric Haematology For Adult BMT/Oncology patients use Adult services pages Clinical Haematology or	Bacterial swabs are set up in the laboratory to investigate for specific target pathogens dependent on the site of the swab and the clinical details provided. It is therefore vital to ensure that the correct sample type is requested, and full clinical details provided on the request. Pus samples in plain universal are preferable to swabs of pus especially in deep seated infection sites. * Swabs from ulcers should be discouraged, preferred sample aspirate or biopsy.	6 days

	Orange top- Ear swabs  **Do not use for virology requests**	Oncology Microbiology/Mycology for Clinical Haematology or Oncology. Liquid amies swabs are used for samples. When collecting sample, the white swab should be snapped at the marked point and remain in the tube. The liquid must remain in the tube as this is what is tested. Links to pictorial instructions are found here Wound samples should be taken from the bottom of a wound which looks visibly infected. Ulcers should be debrided before sampling if sample required* Ear swabs should be taken using a thin shaft orange topped swab. Middle ear infection should be referred to ENT specialist.	Empirical therapy may be required as culture results can take 6 days. Local protocols should be followed or contact medical microbiologist for advice if uncertain.	
Carbapenemase Detection	 	Screening samples for the detection of the main five Carbapenemase detection methods. Rectal swabs should be sent for routine screening. Hard to decolonise sites e.g. wound, device site should also be sent. If patient is known to have been ventilated on a critical care unit, a sputum (if available) or throat swab should be sent. For catheterised patients send CSU. Please indicate full demographic details as directed on ICE	Note requests for CPE detection on rectal swabs should be discussed with consultant Microbiologist before sending. Contact Medical Microbiologist if PCR is needed, note dry swab is required if this test is approved	2 days

Ophthalmic Culture (other than eye swabs)		Aqueous or vitreous humour may be sent in a sterile universal or syringe if this is securely sealed with plastic stopper to prevent leakage and secure with surgical tape. Transport sample as soon as possible as recovery of anaerobes may be compromised if time exceeds 3 hours. Corneal scrapes are inoculated directly into BHI with 5% Fildes broth at the site of operation. Broths are sent routinely to Ophthalmology at St James and Ireland Wood Surgery. For other users wishing to send these samples please contact the laboratory 0113 (20)69468	Extended culture of fastidious organisms from inner eye infections	10 days
Tip Culture		Samples should be collected before starting antimicrobial therapy when possible. 4cm length of the tip should be aseptically cut off and sent in a sterile universal, do not send any longer than 6cm Concurrent blood cultures should also be obtained. See further on website here. A swab of the cannula site may also be sent if necessary.	Indicated for investigation of cannula-related infections leading to intravascular device related blood stream infection. Tips should not be sent routinely following removal only if catheter/cannula related blood stream infection is suspected. The method of testing is not valid for drain tips or epidural tips.	4 days

Fluid culture		Observe aseptic technique when sampling fluids. Do not sample from drain bag or reservoir. Samples must be transported as quickly as possible as the recovery of anaerobes may be compromised if the transport of sample exceeds 3 hours. If sample requires urgent processing overnight, please contact the laboratory see section 2.4.2 Fluid should be marked as high risk if TB suspected. Blood culture bottles may also be injected with **sterile fluid** for culture (not for drains) Do not use sample pot lids with suction tubes attached as samples will leak in transit and may be rejected.	Fluid samples from sterile sites, e.g. ascitic fluid, peritoneal fluid, synovial fluid, pericardial fluid, amniotic and pleural fluid can detect organisms that may indicate potentially life-threatening infections. Gram stain will be performed which can indicate potential causative organisms. Contact Microbiology Medics to discuss treatment. Synovial fluid will also be investigated for crystal microscopy which may indicate gout/pseudo - gout. Drain fluids may grow mixed bacteria and results will be authorised to indicate clinical significance.	8 days Microscopy including crystal microscopy will be available in <1 day. If urgent, please contact lab
Pus Culture		Observe aseptic sampling technique. Cleaning the site with sterile saline or 70% alcohol is recommended Samples must be transported as quickly as possible as the recovery of anaerobes may be compromised if transport time exceeds 3 hours. Larger volumes of specimen maintain the viability of fastidious organisms but do	Pus samples may be obtained from incision and drainage of abscesses or deep-seated infections. Gram stain will be performed which can indicate potential causative organisms. Contact Microbiology Medics to discuss treatment.	10 days TAT may be extended on requests where extended incubation for fungal culture is indicated

		not exceed the fill mark on universal container. A minimum volume of 1ml is recommended. If sample requires urgent processing overnight, please contact the laboratory see section 2.4.2 Pus should be marked as high risk if TB is suspected.	Swabs of pus are an inferior sample and will not have gram stain performed.	
Tissue Culture		Samples must be obtained under sterile conditions. If small sample add sterile saline to prevent desiccation. Do not send whole amputated tissue. Suspected infected portion should be sent. Specimen should be transported to the laboratory as soon as possible. Larger pieces of tissue may maintain viability of organisms longer. If delayed transport refrigerate sample. Delays over 48 hours are undesirable.	Investigation of deep-seated infections. If Acid and Alcohol fast bacilli (AAFB) are suspected ensure sample is labelled as high risk and that this request is explicit on the form. If an urgent gram stain is required, please contact the laboratory. Gram stain is not routinely performed on non-sterile tissue, diabetic feet or prosthetic joint samples. Gram stain will be available within 24 hours or sooner if requested as urgent.	10 days. TAT may be longer if extended culture for fungi or other fastidious pathogens is required.

CSF culture and microscopy (bacterial)		If subarachnoid bleed is suspected send 2 tubes (1&3) for comparison of cell count. Please number containers clearly. Culture results are more sensitive than the Gram stain. Where possible, send separate tubes for separate tests, and list these explicitly on the request form. For cryptococcal or AAFB investigations, please send a separate specimen. Likewise, any specimens for cytopathological examination should be sent separately as MC&S will render specimens unusable for this. If Xanthachromia is required, send a tube to Biochemistry. This should be covered to avoid light damage. If viral meningitis is suspected a separate request and sample should be sent for PCR CSF from patients with shunts and EVDs can also be examined. If shunt infection is suspected, collect a sample of CSF from the relevant part(s) of the shunt apparatus. (Ensure samples are labelled to indicate the origin of the sample). Please do NOT submit shunt tubing, tip, or reservoir for examination. Urgent samples should be notified to the laboratory - see section 4.4 SOP's for collecting CSF samples can be found on Leeds Healthcare Pathways	Suspected bacterial meningitis can be confirmed by CSF culture. A high white cell count along with positive gram stain would support diagnosis Pre-antibiotic CSF will give better culture yields, but this does not imply to withhold antibiotic therapy. The time between collection of CSF samples to microscopy and culture should occur within a maximum of 2 hours. Cells disintegrate and a delay may produce a cell count that does not reflect the clinical situation of the patient.	Cell Count - within 1 hour if laboratory is notified prior to arrival Standard culture -5 days Neuro ward culture -7 days

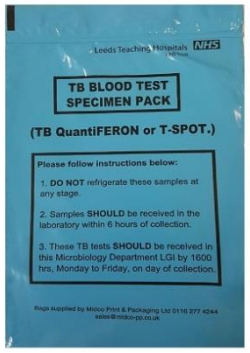
CSF Cell Count Only (Paediatric Haematology only)		Samples for monitoring patients CSF cell counts may be sent from Paediatric Haematology. Please send in sterile universal.	It is imperative that these samples are requested on Order Comms from the Paediatric Haematology page under the collection Bone Marrow and CSF. If infection is suspected, then request from the main Microbiology page and ensure clinical details are clear that infection is suspected.	Cell Count - within 4 hours

6.2.1 Bacterial Serological/Molecular Testing

Investigation	Specimen Container	Collection Comments	Clinical Indication	Turnaround times
Urinary testing for Legionella		Minimum volume 2mls. **Do not use** urine container with additives (boric acid).	Clinical suspicion of Legionnaire's disease, please provide full clinical details Antigen detection in urine samples can occur as early as 3 days from onset of symptoms In house positives will be sent to the reference laboratory for confirmation There are two methods of testing, a manual test which is done on urgent request and an automated routine test.	2 days

Bacterial Meningitis PCR	 	PCR testing on CSF or EDTA samples only	Indicated for patients with suspected bacterial meningitis and/or septicaemia. These tests detect Meningococcal (*Neisseria meningitidis* species and serogroups) and Pneumococcal (*Streptococcus pneumoniae* species). Sample must be in the laboratory before 9:30 am (Mon to Sat) for same day testing	3 days
TB Quantiferon	 	QuantiFERON TB Gold Plus tubes must be used for this investigation. The four tube system consists of the Nil antigen (grey cap), TB1 (green cap), TB2 (yellow cap) and Mitogen (purple cap) For each patient collect 1 ml of blood by venepuncture directly into each QuantiFERON - TB Gold Plus tube As 1 ml tubes draw blood slowly, keep the tube on the needle for 2-3 seconds, until the tube appears to have completed filling: ensure that the correct volume is drawn.	For test discussion within hours contact Deborah Gascoyne-Binzi (Tues/Thurs) on 0113 3923929 or alternatively contact the laboratory on 0113 23924 Interferon-gamma release assay (IGRA) for the detection of Latent TB infection.	6 days

		The black mark on the side of the tube indicates the 1 ml fill volume. If the level of blood is not close to the indicator line, it is recommended to obtain another blood sample. NB Tubes should not be overfilled. If a "butterfly needle" is used, a "purge" tube should be used to ensure the tubing is filled with blood prior to filling QuantiFERON TB Gold Plus tubes. Once the blood sample has been taken mix the tubes by **shaking vigorously for 5 seconds** to ensure the entire surface of the tube has been coated with blood. **DO NOT REFRIGERATE SAMPLES. MUST ARRIVE WITHIN 16 HOURS OF COLLECTION. USE BLUE TRANSPORT BAGS PROVIDED** **EXTERNAL REFERRING LABORATORIES:** On receipt of samples shake each tube vigorously for 5 seconds. Incubate at 37°C for 16 hours as soon as possible in an upright position, and within 16 hours of collection.	

		Record on the request card that samples have been incubated and transport to Leeds as soon as possible after this time.		
TB Quantiferon GP Only		A minimum of 6ml of blood collected by venepuncture into Lithium heparin tubes is required. It may be necessary to distribute the sample between two tubes to ensure sufficient blood is available for testing	For GP use only	6 days
T spot	 	Minimum of 6ml of blood in lithium heparin tube is required. Samples must arrive in the laboratory by 16.00pm on day of collection (Mon-Fri only) **DO NOT REFRIGERATE SAMPLES. MUST ARRIVE WITHIN 16 HOURS OF COLLECTION. USE BLUE TRANSPORT BAGS PROVIDED**	Test is primarily for the detection of latent tuberculosis as opposed to active clinical disease. Quantiferon is preferred sample. Indicated where Quantiferon results are indeterminate or where patients are severely immunosuppressed. For test discussion within hours contact Deborah Gascoyne-Binzi (Tues/Thurs) on 0113 3923929 or alternatively contact the laboratory on 0113 23924 T spot assays are referred for testing to Oxford Diagnostic laboratories, Oxford Immunotec	5 days

			Ltd. Testing is accredited to ISO17025	
TB (Mycobacterial) PCR		TB (Mycobacterial) PCR can be carried out on a variety of samples (e.g. sputum, CSF - ideally submit 5mls of CSF for best yield -, aspirate fluids and non-fixed biopsy specimens). Histological samples (send 10 sections 10µl thick) can also be processed though have a lower sensitivity due of the effects of histological fixatives on DNA All non-histological clinical specimens should be marked "Danger of Infection". Blood samples are unsuitable for this assay. Please ring if discussion required. The form can be downloaded using the following link: Request form for bacterial PCR test	Molecular detection of mycobacteria may be useful where there is a high clinical suspicion of tuberculosis and a rapid diagnosis of tuberculosis would have a positive impact on patient management or infection control, (e.g. treatment for other diseases delayed due to the possibility of tuberculosis; confirmation of smear positive sample before contact tracing; high probability of infection with MDR-TB, etc.). Confirmation of the presence of NTM and species identification may prevent patients being started on unnecessary treatment for tuberculosis and reduce concerns regarding infection control measures and / or contact tracing. It may also be useful for diagnosis of NTM infection in patients who have an impaired immune system and are likely to have a rapid progression of disease. Direct detection of mycobacteria in histological samples can be used to confirm a histological	14 days

			diagnosis in cases where no sample is available for mycobacterial culture. PCR may be less sensitive than mycobacterial culture. Please ensure samples are sent for mycobacterial culture where possible	
TB drug resistance by PCR	Various -contact laboratory if unsure	Specimens will require a positive *M.tuberculosis* complex PCR before testing to ensure sufficient DNA available for successful testing. A variety of samples as for PCR can be used. All non-histological clinical specimens should be marked "Danger of Infection".	These assays are available following discussion with a Microbiology Consultant or Specialist Clinical Scientist. They are useful for the rapid prediction of drug resistance in samples from patients with risk factors associated with drug resistance (e.g. contact with a known case of MDR-TB, born/previously resident of a country with high prevalence of MDR-TB, previously treated for tuberculosis). They may also be appropriate in cases where co-morbidities may complicate the choice of suitable anti-tuberculous drugs. Testing may be carried out using PCR assay or Cepheid Gene Xpert assay	14 days

16s rDNA PCR and Sequencing		A number of samples may be suitable, e.g., Heart valves, CSF samples, synovial fluid. Send in sterile universal. If unsure contact laboratory. Aseptic technique is paramount as bacterial contamination will be detected and invalidate the result Samples should be from a normally sterile site. Blood is not a suitable sample for this assay.	Must be discussed prior to request with Medical Microbiologist and be approved before sending sample. Testing is usually indicated where bacterial culture has been unsuccessful, but infection is strongly suspected. Unsuccessful culture may be due to previous antibiotic therapy or through infection with bacteria that require special growth conditions. Due to problems of background levels of bacteria present in reagents, etc. this assay is less sensitive than PCRs which target specific bacteria.	10 days
Trophymera whipplei PCR		Blood and CSF samples are the most commonly received sample types for this test although a number of samples may be suitable, e.g., Heart valves, synovial fluid, paraffin embedded tissue and fresh tissue. Send in sterile universal. If unsure contact laboratory.	PCR assay for the detection of *Trophymera whipplei* - causative agent of "Whipples Disease" Classic Whipple's Disease is associated with intermittent arthralgia or chronic digestive disorder with diarrhoea and/or weight loss. Other common manifestations include endocarditis and neurological symptoms as well as chronic localised infections such as adenopathy, uveitis,	5 days

			pulmonary and joint infections. *T.whipplei* has also been associated with acute infections such as pneumonia, gastroenteritis and bacteraemia	
Bordetella Pertussis PCR		To obtain a pernasal sample: Using a flexible, fine wire-shafted swab, gently insert swab into one nostril straight back (not upwards) until it reaches the posterior wall. The distance from the nose to the ear gives an estimate of how far back the swab should be inserted. Rotate the swab a few times then remove. Replace swab back in empty collection tube. Please note: Rigid-shafted swabs will be rejected by the laboratory NPA samples may also be sent. Throat swabs and lower respiratory tract specimens [sputum and bronchoalveolar lavage (BAL)] may also be tested.	Indicated for patients with clinically suspected "Whooping Cough" or close contacts of a confirmed case who present with cold symptoms. PCR is recommended to test specimens taken 0-3 week following cough onset.	3 days

C difficile Ribotyping		For investigation of changes in epidemiology *C. difficile* toxin-positive faecal samples should be stored routinely at 4ºC or -20ºC on an ongoing basis. *C. difficile* will survive in frozen specimens even if repeatedly freeze-thawed. This test is offered by UKHSA (UK Health Security Agency)	Indications for use and guidance on accessing the service can be found on the Public Health England website by following the link. Multilocus Variable Repeat Analysis (MLVA) is available on request. For guidance on accessing this service follow the link. UK users should use the Electronic Requesting System to request services. For external users please use C diff ribotyping and enhanced fingerprinting sample submission form	14 days

6.3 Test Repertoire: Mycology

See Mycology Reference Centre User Guide

6.4 Test Repertoire: Virology/Serology

In some cases, samples sent for Virology will be allocated appropriate testing based on clinical details. It is essential that full clinical details including travel history and status of immunity/immunosuppression along with patient demographics are provided to allow appropriate tests to be selected.

There may be instances where you receive a result for a test that you have not requested (except where consent for testing is required). This is because the scientific staff evaluate requests and assign testing dependent on the details provided.

6.4.1 Specimen types for Virology/Serology

Sample type	Specimen Container	Suitable for
Serum sample ***Serum gel tube or serum separator - min 5mls***	**Adult: Red top, yellow ring - ensure tube is filled to line. Separate samples should be sent for blood sciences requests.** **Paediatrics: Red top, white ring. Multiple tests may require multiple bottles.**  **Do not use tubes with additives** **Lithium/heparin tubes are not acceptable**	Antibody detection tests IgG/IgM
Plasma sample	**Adults: Lavender top, black ring, ensure tube is filled to line. Multiple tests require additional tubes.**	Molecular PCR test and viral loads.

	Paediatrics: Lavender top, white ring  **Lithium/heparin tubes are not acceptable**	Samples for CMV, EBV, Adenovirus PCR tests need to be in the lab by 9:30am (Mon to Sat) for same day testing.
UTM Viral swab sample (VTM)	**UTM viral swabs are ordered through Pathology supplies** 	Skin swabs, eye swabs, throat swabs, nose swabs, vesicle fluid swabs for PCR
Viral Swabs (COVID) UTM sample		PCR test - COVID samples

Respiratory Samples	**Nasopharyngeal aspirate**  **BAL or Tracheal Aspirate in Sterile Universal**	PCR test - Respiratory samples
CSF sample	**Send separate sample and request from other investigations: Sterile Universal** 	Suitable for PCR tests for virology
Faeces sample	**Samples for faecal virology. Indicated for immunocompromised patients and suspected community acquired outbreaks.** 	PCR tests - Gastroenteritis

Tissue Samples	**If small biopsy or aspirate sample, moisten with sterile saline. Send in sterile universal.** 	PCR tests
Urine Samples	**Urine samples for virology should be sent in sterile containers,do not use containers with boric acid preservative** 	PCR tests, please check test repertoire

6.4.2 Virology/Serology Test Repertoire (alphabetical)

Virus	Tests Available	Specimen Required	Comments	Turnaround times
Adenovirus	PCR	Eye swabs	Conjunctivitis	3 days
		EDTA samples	Quantitative levels in blood from patients on immunosuppressive therapy or with clinical sign of infection. Rises can be used to direct pre-emptive therapy and monitor treatment response as well as excluding infection.	
		CSF	Meningoencephalitis	
		NPA Nose and Throat sample (1 tube)	Pneumonia Pharyngitis	
		Faeces	Part of extended viral screen for gastroenteritis on patients <5, immunocompromised or supressed LTHT locations	3 days
Astrovirus	PCR	Faeces Vomitus	Part of extended viral screen for gastroenteritis on patients <5, immunocompromised or supressed LTHT locations	3 days
BK Virus	PCR	EDTA sample or Urine sample for virology	Investigation of secondary BK virus infection in renal transplant and bone marrow transplant patients	8 days
Cytomegalovirus	PCR	EDTA	Diagnosis of CMV viremia is of particular significance in immunocompromised. Can cause congenital infection. Quantitative levels in	3 days

			blood from patients on immunosuppressive therapy or with clinical sign of infection. Rises can be used to direct pre-emptive therapy and monitor treatment response as well as excluding infection.	
		Urine	Urine levels in congenital CMV are diagnostic of infection	
		Tissue	Turnaround time may be longer as repeat freeze thaw cycles are required prior to processing. (4 days)	
		CSF	Meningoencephalitis	3 days
	CMV IgG	Serum sample	For evidence of past exposure/status	5 days
	CMV IgM	Serum sample	Detection consistent with acute infection	5 days
	CMV IgG avidity	Serum sample	Performed on CMV IgM patients, low avidity indicates recent, acute infection	7 days
Enterovirus	PCR	Viral Throat swab	Pharyngitis Non-vesicular rash	3 days
		CSF	Meningoencephalitis	
		Pericardial fluid	Myocarditis	
		Tissue	Internal organ infection affecting heart, liver or pancreas	
		Faeces	Meningoencephalitis, Myocarditis, Rash, myalgic encephalomyelitis	
		Eye swab (external)	Conjunctivitis	
		Mouth swab	Mouth ulcers	
		Skin or vesicle swab	Rash	
		EDTA sample	PUO < 3-month-old	
Epstein Barr Virus	PCR	EDTA	Use in immunocompromised patients if antibody response incomplete or lacking. Detection of EBV associated disease such as	3 days

			post-transplant lymphoproliferative disorders (PTLD)	
		Tissue	Turnaround time may be longer as repeat freeze thaw cycles are required prior to processing. (4 days)	
		CSF	Meningoencephalitis	
	EBV IgG	Serum sample	For evidence of past exposure	5 days
	EBV IgM	Serum sample	Detection consistent with acute infection	5 days
	EBV nuclear antigen	Serum sample	Fatigue >3 months	5 days
Hepatitis A	Hepatitis A IgM	Serum sample	Diagnosis of acute infection in jaundiced patients	4 days
	Hepatitis A total antibody	Serum sample	Indicative of past infection or response to vaccination, not routinely performed.	5 days
Hepatitis B	Hepatitis B core IgG	Serum sample	To check for past infection with Hepatitis B	4 days
	Hepatitis B core IgM	Serum sample	To detect acute infection in jaundiced patients	10 days
	Hepatitis B surface antigen	Serum sample	To diagnose active Hep B infection or chronic carriage	4 days
	Hepatitis B surface antibody	Serum sample	To test vaccine response of individuals previously not infected with hepatitis B. Individuals who have cleared an infection will have positive titres	5 days - TAT may be increased if this test is requested with a panel of other investigations
	Hepatitis B e antigen/ antibody	Serum sample	To determine infectiousness of patients with acute infection and chronic carriers.	5 days - TAT may be increased if this test is requested

				with a panel of other investigations
	DNA PCR	EDTA sample Samples should be transported to the laboratory without delay.	Quantification of the concentration of HBV particles in plasma. Indicator of viral replication. Significant for initiation and monitoring of interferon therapy.	7 days
Hepatitis C	Hepatitis C Antibody	Serum sample	Antibodies to infection are measured but may take up to 6 months after exposure to be detectable. PCR may be required. Patients with acute hepatitis who test negative initially may need follow up tests.	4 days
	Hepatitis C PCR	EDTA sample Samples should be transported to the laboratory without delay.	PCR should be used for diagnosis of active infection, long term disease progression and response to antiviral therapy	7 days
Hepatitis D	Hepatitis D total antibody	Serum Sample	Detection of both IgG and IgM antibodies to Hepatitis Delta Antigen in the serum of infected patients. Anti-HD can be detected in high titres in HbsAg chronic carriers (superinfection) and at lower levels in patients with acute infections (coinfection)	9 days
Hepatitis E	Hepatitis E IgG	Serum Sample	Used in combination with IgM to diagnose primary disease.	7 days
	Hepatitis E IgM	Serum Sample	Used in combination with IgG to diagnose primary disease.	7 days
Herpes Simplex Virus	PCR	CSF	Meningoencephalitis	3 days (non genital)
		Viral Eye swab (internal and external)	Conjunctivitis Retinitis	
		Throat swab	Rash <10yrs, neurological symptoms	

		Skin swab	Skin lesions	5 days (genital)
		Vesicle swab	Cold sores, Skin lesions	
		Genital swab in Aptima STM(orange labelled tube)	Genital herpes	
	HSV IgG	Serum sample	Serology to determine antibody status	5 days
HHV6	PCR	CSF EDTA sample	Molecular detection. Indicated in babies <3 months 3 years of age with high fever followed by a mild maculopapular rash. Immunocompromised / Immunosuppressed patients with bone marrow suppression, pneumonitis, encephalitis, encephalopathy, hepatitis, fever and skin rash.	3 days
HIV	HIV total antigen/ antibody	Serum Sample	Diagnosis of HIV-1 Ab, HIV-2 Ab & HIV antigen infections	4 days, TAT may be increased by confirmatory testing
	HIV PCR	EDTA sample, minimum of 5mls required Samples should be transported to the laboratory without delay. CSF samples may be sent if CNS involvement suspected but please note the test has not been validated for use	Qualitative test of viral load. HIV positive patients for monitoring response to treatment. Confirmation of HIV positive status, especially in the pre-seroconversion 'window' period.	7 days
HTLV	HTLV Ab	Serum sample	Virus is associated with neoplastic conditions and variety of demyelinating neurological disorders including adult T-cell leukaemia.	4 days

			Testing is required for screening of candidate organ, tissue and cell donors Serology screens for past infection	
Influenza A virus	PCR	Respiratory secretions (NPA, BAL, Tracheal aspirate) Nose and throat swabs (combined in 1 VTM tube) Sputum only on discussion with consultant virologist	Tested for as part of a multiplex PCR test to diagnose presence of virus which may or may not be the cause of respiratory disease. Further testing is available for subtyping of Influenza A viruses including seasonal influenza, swine flu and avian flu.	1-2 days Samples should reach the laboratory by 9:30 am for same day testing
Influenza B virus	PCR	Respiratory secretions (NPA, BAL, Tracheal aspirate) Nose and throat swabs (combined in 1 VTM tube) Sputum only on discussion with consultant virologist	Tested for as part of a multiplex PCR test to diagnose presence of virus which may or may not be the cause of respiratory disease.	1-2 days Samples should reach the laboratory by 9:30 am for same day testing
JC Virus	PCR	EDTA sample or CSF sample	Testing should be considered in immunocompromised patients with progressive damage and inflammation of the white matter in the brain with neurological symptoms including: cognitive and behavioural changes; paraesthesia; visual problems; gait abnormalities and loss of limb coordination; and hemiparesis. JC virus is a causative agent of progressive multifocal leukoencephalopathy - details should be included on request form	8 days
Measles	PCR	Oral (buccal) swabs Urine sample Throat swab sample	Molecular detection. Consider in patients with maculopapular rash who have been in contact with a known case of measles or have no history of vaccination. Immunocompromised patients may not develop rash but present with	3 days

			pneumonitis, thus testing of a lower respiratory tract sample is advised. Although rare, neonatal measles has been associated with a risk of sub-acute sclerosing pan encephalitis (SSPE) - for these cases send paired CSF and serum for intrathecal antibody testing	
	Measles IgG	Serum sample	Test used for immune status, evidence of past infection. Indicated for pregnant patients of contact with maculopapular rash or post MMR	5 days
	Measles IgM	Serum sample	The rash in measles is classically described as a generalised, maculopapular, erythematous rash that begins several days after the fever starts Test used for investigation of rash in patients under 40 or over 40 with history of foreign travel, contacts, hospitalised patients, no vaccination history or from an outbreak.	6 days
Metapneumovirus	PCR	Respiratory secretions (NPA, BAL, Tracheal aspirate) Nose and throat swabs (combined in 1 VTM tube) Sputum only on discussion with consultant virologist	Tested for as part of a multiplex PCR test to diagnose presence of virus which may or may not be the cause of respiratory disease.	1-2 days Samples should reach the laboratory by 9:30 am for same day testing
Mumps	Mumps IgG	Serum sample	Indicated for test of immunity post MMR and for the investigation of parotitis. Mumps like symptoms can occur as a result of other illnesses so laboratory confirmation is important to establish diagnosis.	6 days
Mycoplasma pneumoniae	PCR	Nose and throat swabs (combined in 1 VTM tube)	Investigated as a common cause of tracheobronchitis and community acquired pneumonia. PCR detection allows for earlier	1-2 days Samples should reach

		Sputum samples are not suitable for this test Respiratory secretions (NPA, BAL, Tracheal aspirate) can be sent but sample type is not validated for test, please discuss with virology team	treatment as serological identification may only be achieved some time after initial infection.	the laboratory by 9:30 am for same day testing
Norovirus	PCR	Faeces Sample Vomitus	Part of multiplex PCR for viral gastroenteritis. Extended testing will be performed on some patient groups or in outbreaks where 6 or more patient samples have been initially negative. If foodborne outbreak suspected please indicate on request form. Testing for this virus may be performed on Cepheid Gene Xpert if outbreak suspected.	3 days
Parainfluenza virus	PCR	Respiratory secretions (NPA, BAL, Tracheal aspirate) Throat swabs for adults and older children. Nose swabs are acceptable for respiratory virus testing only where symptoms are mainly rhinorrhoea. Younger children require nasopharyngeal aspirate or swab. Sputum only on discussion with consultant virologist	Tested for as part of a multiplex PCR test to diagnose presence of virus which may or may not be the cause of respiratory disease.	1-2 days Samples should reach the laboratory by 9:30 am for same day testing

Parechovirus	PCR	As Enterovirus	In house assay run alongside enterovirus detection. Assay does not detect Parecho 22 and 23	3 days
Parvovirus	PCR	EDTA sample	DNA detection may be indicated in patients with significant immunosuppression if IgG is negative	3 days
	Parvovirus IgG	Serum or plasma sample	Screen for antibody status in pregnancy or patients with sickle cell anaemia or similar haematological syndromes. Investigation of hydrops fetalis (maternal sample)	5 days
	Parvovirus IgM	Serum or plasma sample	Excluded as cause of rash in pregnancy or following contact with rash. Screen patients with sickle cell anaemia or similar haematological syndromes. Look for current infection with symptoms of non-vesicular rash or arthralgia Investigation of hydrops fetalis (maternal sample)	5 days
Pneumocystis jirovecii (PcP) PCR	PCR	Broncho alveolar lavage (BAL) collected during bronchoscopy, sputum, and aspirates	Detection of *Pneumocystis jirovecii* DNA is indicative of active infection or colonisation (latter more likely when level is low). Immunocompromised patients who are colonised are at risk of developing PcP pneumonia	1-2 days
Respiratory Syncytial Virus	PCR	Respiratory secretions (NPA, BAL, Tracheal aspirate) Throat swabs for adults and older children. Nose swabs are acceptable for respiratory virus testing only where symptoms are mainly rhinorrhoea.	Tested for as part of a multiplex PCR test to diagnose presence of virus which may or may not be the cause of respiratory disease.	1-2 days Samples should reach the laboratory by 9:30 am for same day testing

		Younger children require nasopharyngeal aspirate or swab. Sputum only on discussion with consultant virologist		
Rhinovirus	PCR	Respiratory secretions (NPA, BAL, Tracheal aspirate) Throat swabs for adults and older children. Nose swabs are acceptable for respiratory virus testing only where symptoms are mainly rhinorrhoea. Younger children require nasopharyngeal aspirate or swab. Sputum only on discussion with consultant virologist	Tested for as part of a multiplex PCR test to diagnose presence of virus which may or may not be the cause of respiratory disease.	1-2 days Samples should reach the laboratory by 9:30 am for same day testing
Rotavirus	Enzyme Immunoassay Screen	Faeces Sample	Tested on samples from patients <5 years of age routinely or on specific clinician request. For full viral panel Rotavirus will be screened by PCR. Repeat samples which screen negative will not be repeated within 7 days, positive samples will not be repeated within 14 days.	5 days
	PCR	Faeces Sample Vomitus	Part of multiplex PCR for viral gastroenteritis. Extended testing will be performed on some patient groups or in outbreaks where 6 or more patient samples have been initially negative.	3 days
Rubella	Rubella IgG	Serum sample	Test used for immune status, evidence of past infection. Indicated for pregnant patients of contact with maculopapular rash but not	7 days

			routine as part of booking bloods, contact lab if required. Test of immunity post MMR.	
	Rubella IgM	Serum sample	Indicated for investigation of non-vesicular rash. Investigation of congenital infection (neonate sample) or maternal samples for the investigation of IUD/ Polyhydramnios/congenital infection.	7 days
Sapovirus	PCR	Faeces Vomitus	Part of extended viral screen for gastroenteritis on patients <5, immunocompromised or supressed LTHT locations	3 days
SARS-CoV-2	PCR (Antigen testing)	Respiratory secretions (NPA, BAL, Tracheal aspirate, Sputum) Nose and throat swabs (combined in 1 tube)	Diagnosis of SARS-CoV-2 from respiratory samples by PCR testing. Various methodologies are in use in the laboratory and as point of care tests. Current platforms in use: Panther Hologic Fusion and TMA (note: this is now routinely included in the Respiratory multiplex PCR panel) Cepheid Gene Xpert Biofire Roche LIAT (point of care) Accurate results are dependent on the quality of the sample taken. For sampling advice on how to take nose and throat swabs see Appendix F	Nose and Throat swabs 24-48 hours
Syphilis	Screen	Serum sample	Screening of samples for *Treponema pallidum*	5 days
	Syphilis IgM	Serum sample	Confirmatory tests for acute infection.	

	RPR	Serum sample CSF sample	Detection of non-specific treponemal antibodies for detection of acute infection or treatment success.	Confirmation testing may take longer than stated TAT
	TPHA	Serum sample CSF sample	Detection of specific treponemal antibodies for detection of long-standing infection	
	PCR 	Aptima STM (orange labelled tube) NOTE: Swabs in VTM are no longer suitable	Multiplex PCR assay for the detection of *Treponema pallidum* and HSV in lesions of the genital tract.	5 days
Toxoplasma	Toxoplasma IgG	Serum sample	Screening is indicated in congenital infection (neonate sample) or maternal samples for the investigation of IUD/ Polyhydramnios/congenital infection. Investigation may also be implicated in immunosuppressed patients. Positive screens are referred for confirmatory testing to a referral laboratory - see section 6.4.6 referred work	6 days
Varicella Zoster Virus	PCR	Skin or vesicle swabs	Chicken Pox	3 days
		Throat swab	Rash	
		CSF	Meningoencephalitis	
		Eye swab	Conjunctivitis	
	VZV IgG	Serum sample	Screen of antibody status for transplant assessment, pre chemotherapy and pregnant women in contact with VZV.	5 days

Some turnaround times may be increased if testing is requested as part of a panel of tests or if confirmatory work is required. If further details are required, please contact the laboratory.
If the test you require is not included in the table above, please contact the laboratory to discuss your needs. Further testing is available by referring work to specialised laboratories

6.4.3 *Chlamydia, Gonorrhoea, Trichomonas* and *Mycoplasma genitalium* Testing

Investigation	Specimen Container	Collection Comments	Clinical Indication	Turnaround times
Nucleic Acid Amplification Test - NAAT	 **Orange Aptima Collection Device Self-take Vaginal Swab**  **White Aptima Collection Device Cervical/Urethral Swab**  **Yellow Aptima Collection Device Urine**	Aptima collection kits should be used for all samples. Vaginal swabs (Orange) only are suitable for Trichomonas testing. Testing may also be indicated for eye swabs, use the white Aptima collection device for this sample and specifically request Chlamydia/GC Do not send Aptima tubes with request for MMCS Do not use Copan liquid tubes or UTM red capped tubes for this investigation Do not send samples in same bag as MMCS request, each sample should be sent with a separate request.	STI infection with *Chlamydia trachomatis* or *Neisseria gonorrhoea* (GC) Screen for *Trichomonas vaginalis* in patients with dysuria, strong suspicion of infection or with pH greater than 4.5 and a distinctive yellow/green frothy discharge. Vaginal swabs All sexually active patients under the age of 25 should be routinely offered an annual STI screen ICE Order Comms Genito Urinary Screen page is set up to direct testing for target pathogens on the appropriate presenting conditions. *Mycoplasma genitalium* is a sexually-transmitted gram-negative bacterium that is fastidious and difficult to culture. *Mycoplasma genitalium* infection is a major cause of urethritis in men and is associated with cervicitis, pelvic inflammatory disease, preterm birth, and spontaneous abortion in women. It has similar symptoms to Chlamydia but is more resistant to treatment and if left untreated, can lead to PID in women. M.gen NAAT testing is a requirement of the BASHH guidelines.	4 days CT/GC/TV Exception M Gen - 7 days

6.4.4 Specialised Testing and Sequencing

Investigation	Specimen Container	Collection Comments	Clinical Indication	Turnaround times
Hepatitis B genotypic resistance PCR		Hepatitis B viral load >100iu/ml Min. Vol 4ml (FULL tube)	DNA sequencing analysis for Lamivudine, Adefovir, Entecavir and Tenofavir resistance. *Requests for this test are referred to Colindale for processing.*	18 days - final report may take longer
Hepatitis C Genotyping		Hepatitis C viral load >100iu/ml Min. Vol 4ml (FULL tube)	Genotype is necessary if considering treatment and following treatment failure	18 days - final report may take longer
HIV Genotypic drug resistance		Send a baseline blood prior to drug treatment and following treatment failures. Min. Vol 4ml (FULL tube)	To determine the drug resistance of HIV positive patients either prior to or during treatment with Protease inhibitors, Nucleoside RTI or Non-Nucleoside RTI drugs. Requires viral load of >1000copies/ml. Lower levels please contact the laboratory. *Requests for this test are referred to Colindale for processing.*	18 days final report may take longer

6.4.5 Viruses Associated by Clinical Syndrome

Clinical Syndrome/Details	Viruses Associated	Specimen & Comments	Test Method
Conjunctivitis/Keratitis/ Retinitis	Herpes Simplex Virus (HSV) Adenovirus Varicella-zoster virus (VZV) Enterovirus Cytomegalovirus (CMV)	Viral Eye Swab	PCR
Mucous or cutaneous membranes - vesicular or ulcerative lesions	Herpes Simplex Virus (HSV) Adenovirus Varicella-zoster virus (VZV) Enterovirus	Viral Swab sample, skin lesions, mouth, lip samples	PCR
Maculopapular rash	Measles Parvovirus B19 Enterovirus Rubella Syphilis	Various samples see test repertoire	PCR and serology
Respiratory Infection	Adenovirus Influenza viruses A and B Respiratory Syncytial Virus (RSV) Parainfluenzaviruses 1-4 Metapneumovirus Rhinovirus SARS-CoV-2	NPA BAL Tracheal Aspirate Nose and Throat swabs In immunocompromised patients or critical care extended testing on the Biofire platform may be indicated. Please contact laboratory for advice	PCR
Exposure to Blood Bourne Virus	Hepatitis B surface antigen Hepatitis C antibody HIV	Serum sample Acute recipient samples will be stored only.	Serology

		If recipient post 3 month, please include hepatitis B vaccination history in clinical details Donor samples should indicate known infection if applicable	
Meningitis and Encephalitis	HSV VZV Adenovirus Enterovirus. In addition, for immunocompromised patients: CMV EBV JC	CSF sample Faeces samples for enterovirus only	PCR
Myocarditis and Pericarditis	Enterovirus Parvovirus Influenza A&B (seasonal)	EDTA sample Faeces sample for enterovirus only Respiratory samples	PCR
Haemorrhagic cystitis	Adenovirus CMV BK virus	Urine Sample	PCR
Gastroenteritis	Norovirus Rotavirus Adenovirus* Sapovirus* Astrovirus*	Faeces Sample * Tested on patients <5 years, all immunocompromised and immunosuppressed. External users should specifically request extended testing if required	PCR
Acute Hepatitis ***Jaundice*** ***Abnormal LFT's*** ***Hepatomegaly*** ***Dark urine/pale stools***	Hepatitis A, B, C, E	Serum sample	Serology

Viral Neonatal Fever	HSV Adenovirus Enterovirus CMV EBV VZV	EDTA sample Faeces sample for enterovirus only	PCR
Viral Fever > 3 months	Adenovirus Epstein Barr Virus CMV	EDTA sample	PCR
Viral Rash	Herpes Simplex Varicella Zoster Adeno Enterovirus.	UTM sample of affected site Faeces sample for enterovirus only	PCR

6.4.6 Referred Work

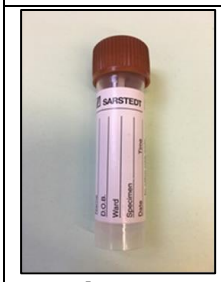
The Microbiology Department at Leeds refers a number of specimens for specialised testing to other referral laboratories. The most commonly referred tests are shown in the table below. Turnaround times are based on the time stated by the referral laboratories along with the time required to send the sample and receive the report. For further information regarding this facility or for information on any tests required that are not listed please contact the laboratory.

Common Referred Tests	User Information	Sample	Referred to	TAT
Lymes Disease (Borrelia burgdorferi) serology	Clinical details must include date of onset of symptoms	Serum gel tube, 4ml blood	North Cumbria University Hospitals	14 days
Pertussis serology	Indicated for clinical diagnosis, not vaccination status. Result >70iu/ml is consistent with recent infection.	Serum gel tube, 4ml blood	Respiratory and Vaccine Preventable Bacteria Reference Unit, Colindale	16 days
Toxoplasma serology	Referred from Leeds for Confirmatory Testing if screen positive	Serum gel tube, 4ml blood	Public Health Wales Microbiology Services	13- 16 working days
Brucella serology	Before sending serum for Brucella serology blood cultures must be sent clearly stating possible brucellosis case and marked as Danger of Infection. If possible, biopsy or aspirate material should also be sent to the laboratory.	Serum gel tube, 4ml blood	Brucella Special Diagnostic Unit, Liverpool Clinical Laboratories	11 days
Leptospira serology	Provide full clinical details including travel history and date of onset of symptoms	Serum gel tube, 4ml blood	Rare and Imported Pathogens Laboratory, Porton Down	11 days
Diphtheria antibody	To test response to vaccine in patients with impaired antibody response. Not indicated for suspected acute infections, request culture of throat swabs or tissue.	Serum gel tube, 4ml blood	Respiratory and Vaccine Preventable Bacteria Reference Unit, Colindale	28 days
Hepatitis E PCR	Detection of RNA	EDTA plasma sample (300 µl min)	Virus Reference Department, UK Health Security Agency, Colindale	20 days

Schistosoma serology	As passage of eggs in faeces is intermittent serology may be necessary to confirm diagnosis of Schistosomiasis. Schistosomal serology is not recommended to be repeated in less than one year, preferably 18 months, after treatment. Sensitivity and predictive values for this test apply to initial diagnosis only, not to post treatment follow up samples. Positive results are reported as levels from 1-9, level one being the lowest positive.	Serum gel tube, 4ml blood	UKHSA National Parasitology Reference Laboratory, London	13 days
Rickettsia serology	Provide full clinical details including travel history and date of onset of symptoms	Serum gel tube, 4ml blood	Rare and Imported Pathogens Laboratory, Porton Down	9 days
Strongyloides levels	Indicated for investigation of eosinophilia or clinical history of strongyloidiasis	Serum gel tube, 4ml blood	UKHSA National Parasitology Reference Laboratory, London	13 days
Dengue fever serology	Provide full clinical details including travel history and date of onset of symptoms If the sample is from a high risk patient, please ensure the form and samples are labelled using yellow Danger of Infection Stickers.	Serum gel tube, 4ml blood	Rare and Imported Pathogens Laboratory, Porton Down	11 days
Acanthamoeba PCR	This test is indicated to rule out Acanthamoeba keratitis in contact lens wearers or in cases of keratitis that is unresponsive to therapy, Positive results issued as Acanthamoeba DNA detected.	Corneal scrape, corneal swabs and contact lens	Micropathology Ltd, University of Warwick, Coventry	8 days

Appendix A: MICROBIOLOGY SPECIMEN CONTAINER GUIDE

Swab Type	✓ DO Use For	✗ DON'T Use For
 TOP **Pink Top Copan Eswab**	M,C & S investigations: Wounds Nose Eye Throat Rectal Vaginal	Chlamydia NAAT Gonorrhoea NAAT Trichomonas NAAT
 TOP **Orange Top Copan Eswab**	M,C & S investigations: Ear Urogenital tract (GC culture only)	Chlamydia NAAT Gonorrhoea NAAT Trichomonas NAAT Viral PCR
 TOP **Red Top UTM Viral Swab***	Molecular Virology and Bacteriology PCR only *please note these swabs contain antibiotics and must not be used for M,C & S investigations	Chlamydia NAAT Gonorrhoea NAAT Trichomonas NAAT M,C & S investigations Herpes simplex virus PCR Syphilis PCR
 TOP **Green Top UTM Viral Swab (Virocult)**	SARS-CoV-2	Chlamydia NAAT Gonorrhoea NAAT Trichomonas NAAT M,C & S investigations
 LABEL **Orange Aptima Collection Device. Self-take Vaginal Swab**	Chlamydia NAAT Gonorrhoea NAAT Trichomonas NAAT Herpes simplex virus PCR Syphilis PCR	M,C & S Investigations Viral PCR
 LABEL **White Aptima Collection Device Cervical/Urethral Swab**	Chlamydia NAAT Gonorrhoea NAAT Trichomonas NAAT	M,C & S Investigations Viral PCR
 LABEL **Yellow Aptima Collection Device Urine**	Chlamydia NAAT Gonorrhoea NAAT Trichomonas NAAT	M,C & S Investigations Viral PCR

Specimen Container	DO Use For	DON'T Use For
 **Green monovette boric acid urine container**	Urine cultures and microscopy ?UTI *check compatibility for dipstick testing with manufacturers guide	Chlamydia NAAT Gonorrhoea NAAT Trichomonas NAAT Microalbumin Protein:Creatinine Ratio Urine parasites
 **5ml Red Top Boric Acid Urine Container***	Paediatric urine cultures and microscopy ?UTI Small samples <30ml void urine	Chlamydia NAAT Gonorrhoea NAAT Trichomonas NAAT Microalbumin Protein: Creatinine Ratio
 **30ml White Top Plain Universal Container**	M,C & S investigations: Tissue Fluids Pus Biopsies Virology PCR tests Chlamydia NAAT (if Aptima urine collection device not available) Urine parasites	M,C & S investigations: Urine Sputum
 **30ml BrownTop Faeces Container with Spoon**	Faecal M, C & S ? C difficile Faecal parasites Calprotectin *Helicobacter pylori* Gastro-intestinal PCR investigations e.g. Norovirus	Other microbiology M,C & S investigations
 **60ml Plain Sputum Pot**	M,C & S investigations: Sputum AAFB / TB Culture (3x samples labelled 1,2,3)	Other microbiology M,C & S investigations

Appendix B: Identifying High Risk Samples

Table 1: Specimens that may potentially contain Hazard Group 3 pathogens

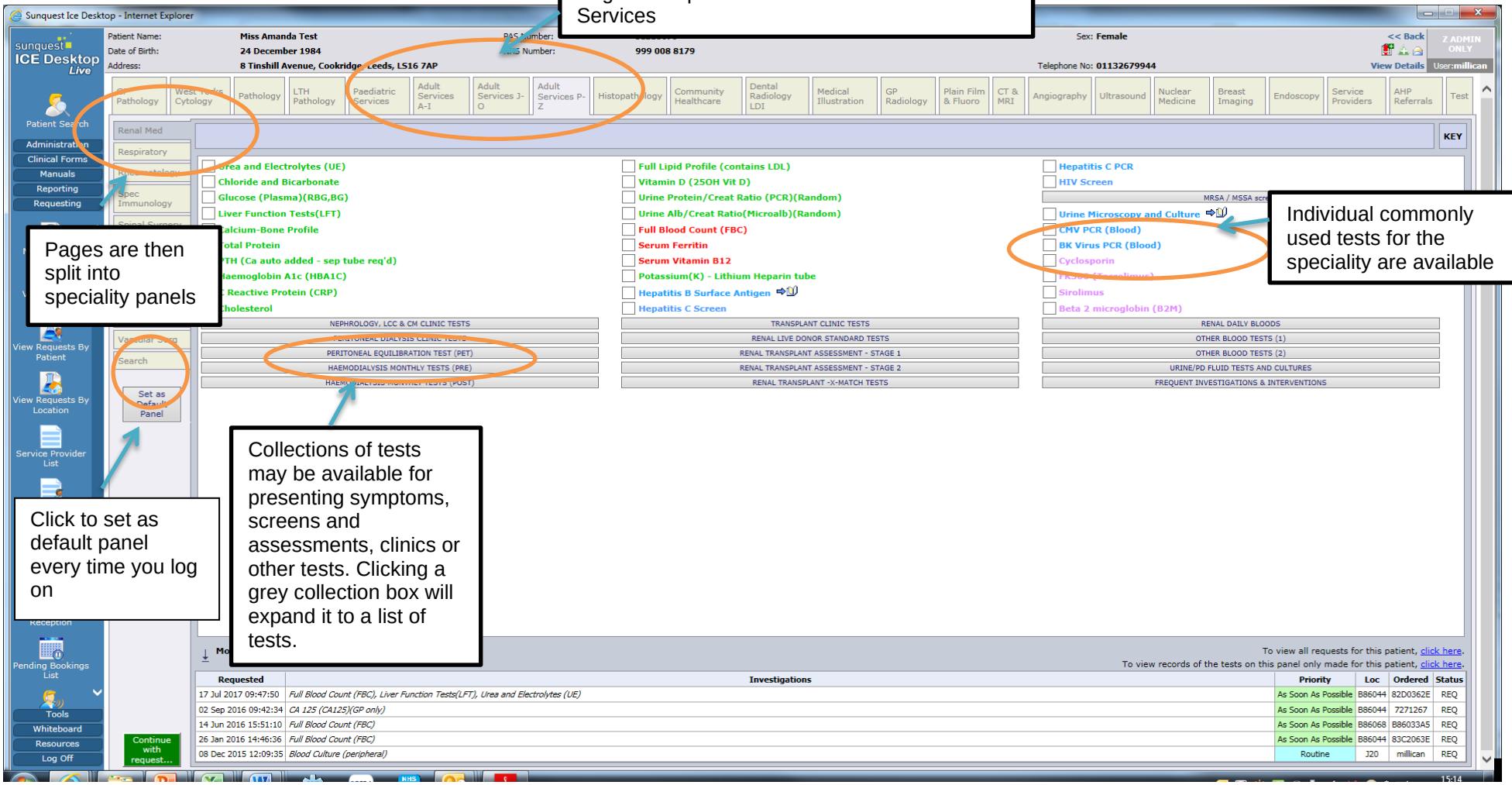
SPECIMEN	MAIN ASSOCIATED HG3 RISK	COMMENT
Blood / Serum (serology / molecular)	Blood Borne Viruses (inc HIV, Hep B, Hep C)	**NOTE:** Other HG3 and HG4 bacteria, viruses and fungi may be present. Refer to ACDP guidelines for up to date list
Blood Cultures	Blood Borne Viruses (inc HIV, Hep B, Hep C) *S typhi / paratyphi* *Brucella sp.* *Mycobacteria sp.* *Yersinia pestis* *Burkholderia mallei* *Bacillus anthracis* *Coxiella burnetti*	**NOTE:** Other HG3 and HG4 bacteria, viruses and fungi may be present. Refer to ACDP guidelines for up to date list
Sputum ***Broncho Alveolar Lavage (BAL)*** ***Bronchial Washings (BW)*** ***Pleural fluid*** ***Lung tissue / biopsy***	*Mycobacteria sp.* *Yersinia pestis* *Blastomyces sp.* *Coccidiodes sp.* *Histoplasma sp.* *Talaromyces marneffii* *MERS CoV* Avian Influenza	**NOTE:** Other HG3 and HG4 bacteria, viruses and fungi may be present. Refer to ACDP guidelines for up to date list
Faeces	*S typhi / paratyphi* *E coli O157* *Shigella dysenteriae (type 1)* *Taenia solium*	Enteric specimens suspected of containing HG3 pathogens after initial culture should be moved to CL3 for confirmation

Fine Needle Aspirate (FNA)	*Mycobacteria sp.*	
Lymph node(s)	*Mycobacteria sp.*	
Cerebral Spinal Fluid (CSF)	Blood Borne Viruses (inc HIV, Hep B, Hep C) *Mycobacteria sp.* Sporadic Creutzfeldt-Jakob disease (CJD) agent *Naegleria fowleri*	**NOTE:** Other HG3 and HG4 bacteria, viruses and fungi may be present. Refer to ACDP guidelines for up to date list
SPECIMEN	**MAIN ASSOCIATED HG3 RISK**	**COMMENT**
Pus / Fluid / Tissue ***Lung*** ***Liver (inc. ascites)*** ***Brain*** ***Kidney*** ***Heart*** ***Spinal cord***	Blood Borne Viruses (inc HIV, Hep B, Hep C) Mycobacteria sp. Sporadic Creutzfeldt-Jakob disease (CJD) agent *Brucella sp.* *Rickettsia sp* *Bacillus anthracis* *Echinococcus sp* *Bacillus anthracis*	**NOTE:** Other HG3 and HG4 bacteria, viruses and fungi may be present. Refer to ACDP guidelines for up to date list
Skin biopsy	*Leishmania sp.* *Blastomyces sp.* *Coccidiodes sp.* *Histoplasma sp.* *Talaromyces marneffii* *Bacillus anthracis*	
Pus from cold / Psoas abscess	*Mycobacteria sp.*	

Table 2: Clinical details that may suggest potential infection by HG3 Pathogens

Clinical Detail	High Risk Occupations	High Risk Sports/Pastimes
IV drug abuser	Hospital or Laboratory staff (exposure incident)	Outdoor Water Sports
Return travel/visitor from abroad where HG3 pathogens are endemic	Veterinary / Animal worker	Caving / pot-holing
Consumption of unpasteurised products (milk/diary)	Farming, visit to farm	Camping & Hunting in endemic areas
Psoas abscess / cold abscess	Slaughter house/abattoir worker	Animal Hide Drum playing/making
Enteric fever	Horse caretakers	
HUS - (haemolytic uremic syndrome)	Equine Butchers	
Consumption of raw or undercooked meat products	Industrial processing of wool, hide or hair	
	Meat Packing Plant Employees	

Appendix C: Using Order Comms to Guide Requesting Practices (LTHT)



Appendix D: Reporting Target Organisms in Genital Swabs

Clinical Details and Demographics Provided	Target Organisms
Vaginal discharge (age 10-60 years old) pH ≤ 4.5	Yeasts
Thrush / Candidiasis	
Pain / itch / Vaginitis / cervicitis (10-60 years old)	
Bleeding or menstrual irregularities	
Pregnant (including Ectopic)	Yeasts Significant *staphylococci* and *streptococci*
Inpatient or Diabetic	
Ring pessary	
Vaginitis / cervicitis (> 60 years old)	
Dysuria	
Dyspareunia (= painful intercourse)	
Postnatal (incl. Offensive lochia)	
Pyrexia	
Coil/IUCD in situ or removed	
Vaginal swab from patient with ?PID	Yeasts Significant *staphylococci* and *streptococci* Anaerobes
GC screen - treatment planned	*Neisseria gonorrhoea*
Penile swabs, non-catheterised	Yeasts Significant *staphylococci* and *streptococci* *Neisseria gonorrhoea*
Urethral, Introital swabs	
Vaginal discharge <10-year-old girl	Yeasts Significant *staphylococci* and *streptococci* *Haemophilus influenzae*
Vaginal discharge pH > 4.5 And discharge is NOT typical of BV or TV (ie not “grey, homogenous” or “green, frothy”)	Significant *staphylococci* and *streptococci*
Toxic shock syndrome/ Retained tampon	
? Actinomyces Actino-like organisms seen on smear	Yeasts Significant *staphylococci* and *streptococci* Anaerobes *Actinomyces sp.*

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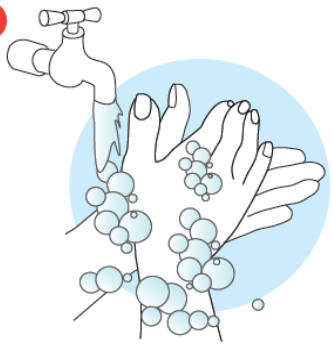
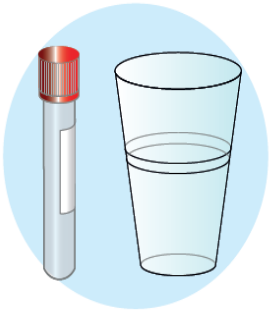
Appendix E: Instructions for use: New Urine Collection Cups and Tubes

1



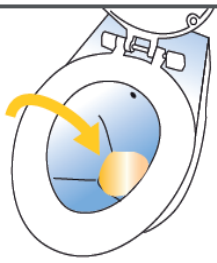
Wash your hands

2 Get your containers ready



- If there is powder in the sample bottle, do not tip it out
- Try not to touch the inside of the bottle or cup

3



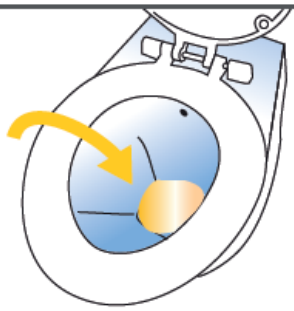
Position yourself over the toilet and start to pass urine – let the first bit of urine go into the toilet bowl

4

Collect the next bit of your urine flow (the "mid-stream" portion) in the cup

- Collect enough to fill the bottle

5

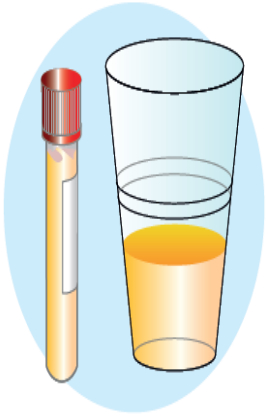


Finish passing urine into the toilet bowl

6

Pour urine from the cup into the sample bottle then screw the lid back on. If the bottle has a red top you must fill it up to the top of the label

- Make sure the bottle does not leak
- Try not to touch the inside of the bottle or cup



Fully label the sample and send to the Microbiology department as soon as possible
DO NOT refrigerate the sample.
It is important to follow instructions for collection of mid-stream urine as this reduces the risk of the sample been contaminated from the skin around the urethra or the hands.

Appendix F: SARS-CoV-2 Sample Guidance

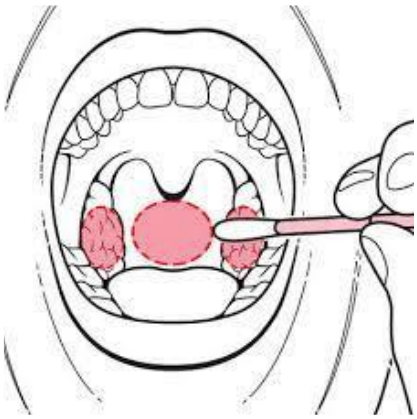
LTHT Microbiology

Sample Type: UTM

Recommended sample: Combined Nose and Throat swab - use single swab and send in one tube.

Before taking sample label container with either ICE label or handwritten details of the patient's name, date of birth and PAS or NHS number. Unlabelled samples are not able to be processed.
Ensure both ICE form and request form are fully completed.

1. Open swab packet and use the swab to collect specimen from patient's posterior pharynx and tonsillar area as indicated below. Swab both left and right sides. Avoid the tongue area.



2. Tilt the patients head back 70 degrees and using the same swab insert into nostrils whilst gently rotating swab. Insert until resistance is felt by the turbinates.

3. Rotate several times around the nasal wall and then repeat in the other nostril.

4. Place the swab into the eSwab liquid. Do not discard the liquid under any circumstance.

5. Break the swab at the point marked on the swab and screw on the lid.

6. Ensure the lid is fully tightened and secure.

7. Place swab inside a first specimen bag and then inside further bag with form attached.

8. Danger of infection stickers should be added to the forms. The form must not be sent in the bag next to the sample.

Note all samples for COVID-19 testing must be hand delivered to the laboratories. Do not send multiple requests in one bag as this may delay testing.

If samples cannot be sent immediately they should be refrigerated.

If sputum samples or BAL or Nasopharyngeal aspirate (NPA) are required, please send in sterile universal containers.

Further guidance on sampling, labelling and packaging of samples can be accessed on Trust information following the link