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| PHE small logo for A4***National Infection Service*** |
| **Specialist Microbiology Services** |
| East of England  Clinical Microbiology Laboratory,  Colchester |
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| **User Handbook** | | | |
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| **CHANGE CONTROL** |
| The 2020 revision of the Microbiology User Handbook has been amended principally to reflect the changes to urine selective culture and direct susceptibilities. In addition, changes include updates to specimen turnaround times.  Other minor details have also been updated and document change requests implemented. References to ISO accreditation and updated information on interaction with changes pathology service with North East Essex and Suffolk Pathology Service (NEESPS) and the changes in arrangements with local which is now East Suffolk and North Essex NHS Foundation Trust (ESNEFT).  Further information on CRO screening and some changes in TAT reflecting change of practice in relation to CMV and Toxoplasma testing |

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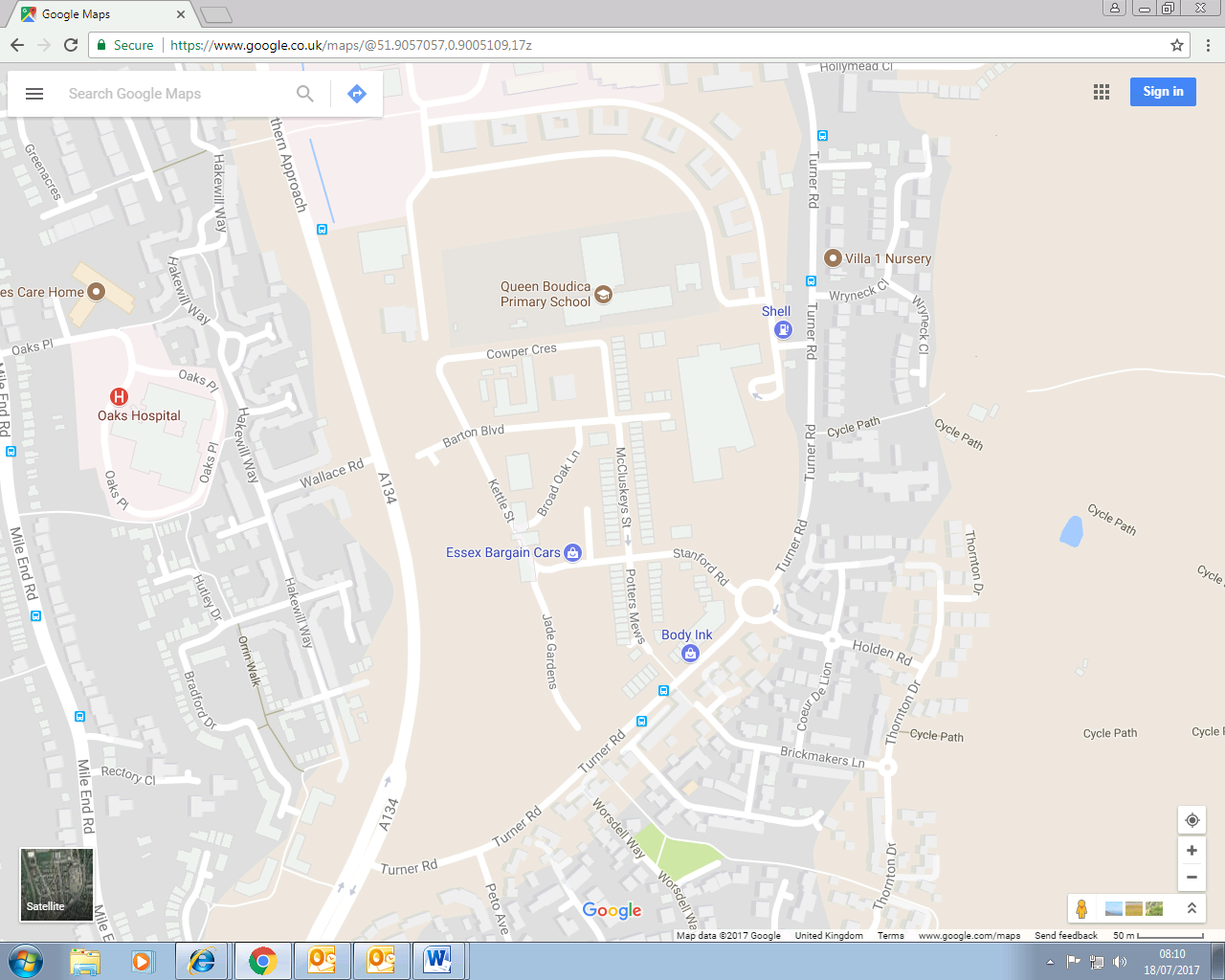
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# introduction

Microbiology services are provided at the 215 Turner Road Colchester site

## Location



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We are here

The laboratory is located on Turner Road.

The postal address is:

Microbiology, 214 Turner Road, Colchester Essex CO4 5JR

The laboratory provides direct clinical, diagnostic and public health microbiological services to three NHS Trusts in North East Essex and to community health services from its laboratory based in Colchester Hospital which is part of North Essex and East Suffolk NHS Foundation Trust.

The laboratory provides epidemiological data for the Communicable Disease Surveillance Centre in Colindale and investigates outbreaks of infectious disease in support of the Consultant in Communicable Disease Control.

## Scope of services offered

The comprehensive service offered includes:

* Microbiological (bacterial, fungal, protozoan, parasitic and viral) diagnosis of human infections and infectious diseases
* Testing of antimicrobial agents against micro-organisms from clinical specimens, and advice on antimicrobial therapy.
* Advice on infection control measures including prophylaxis (antibiotics, vaccines and immunoglobulin therapy)
* The prevention and control of cross infection
* Advice on antisepsis, disinfection and sterilisation
* The investigation of outbreaks in collaboration with the consultant for communicable disease control (CCDC) and environmental health officers (EHO)

Further locally specific microbiology related advice can be obtained from the local clinical teams and intranet pages of the relevant Trust commissioning the microbiology services.

## Scope of examinations available (indicative list)

### Detection and identification of microorganisms

| Main specimen types | Main groups of pathogens and principal tests available | | | |
| --- | --- | --- | --- | --- |
| Direct  Microscopy (e.g. Gram stain) | Culture (& sensitivity) | Direct Antigen or toxin detection | Nucleic acid detection |
| Blood |  | B |  | V |
| Cerebrospinal fluid | G | B | CN | V |
| Faeces | P | B | V CD HP | V |
| Fluids (aspirated) | G | B |  |  |
| Oral secretions |  |  |  | V |
| Skin and nails | F | F |  |  |
| Sputum, Respiratory secretions & washings | G, AFB | B M |  | V PCP |
| Swabs etc: |  |  |  |  |
| * Cervical swabs |  | B |  | NG |
| * Cough swabs |  | B |  |  |
| * Ear swabs |  | B |  |  |
| * Eye swabs, scrapes |  | B A |  |  |
| * Nose swabs |  | B |  |  |
| * Penile swabs |  | B |  |  |
| * Pernasal swabs |  | BP |  |  |
| * Rectal swabs |  | B |  |  |
| * Skin swabs |  | B |  |  |
| * Throat swabs |  | B |  |  |
| * Urethral swabs | G | B |  |  |
| * Vaginal swabs |  | B |  |  |
| * Vesicle/lesion (fluid/swab) | G | B |  |  |
| * Wound swabs |  | B |  |  |
| Urine | B | B | LP SP | C |
| Tissues and biopsies | G | B |  |  |
| Wound pus/drainage fluid | B, AFB | B |  |  |
|  |  | | | |
| Specimens for screening tests (e.g. MRSA, ESBL, VRE CRO colonisation) | See specimen types, above | | | |

**Key**

|  |  |  |  |
| --- | --- | --- | --- |
| **B** | Bacteria, Yeasts & Fungi | **A** | Acanthamoeba |
|  |  | **BP** | Bordetella pertussis |
| **M** | Mycobacteria | **CD** | Clostridium difficile |
| **P** | Parasites, ova, cysts |  |  |
| **V** | Viruses |  |  |
|  |  | **HP** | Helicobacter pylori |
| **AFB** | Acid/alcohol-fast bacteria | **LP** | Legionella pneumophila |
| **G** | Gram’s stain |  |  |
|  |  | **SP** | Streptococcus pneumoniae |

### b) Detection of serological markers of infection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Antibodies and/or antigens | | | |
|  | Viruses | Bacteria, rickettsiae, chlamydiae, spirochetes | Parasites | Yeasts & fungi |
| Blood for serology (serum or plasma) | ✓ | ✓ | ✓ | ✓ |

## Quality & Governance

The Microbiology Laboratory participates in a full range of national quality assessment schemes. Since CPA (Clinical Pathology Accreditation (UK) Ltd.) was superseded by UKAS (United Kingdom Accreditation Service), in October 2018, the Colchester Microbiology Laboratory test repertoire has been unaccredited but the service is actively working towards achieving accreditation under the UKAS ISO 15189 standards

### Complaints procedure

A complaint may be made via any normal means of communication.

* Through ESNEFT – normally via the Patient Advice and Liaison Service (PALS), who will direct relevant aspects of any complaint to the laboratory
* To the laboratory directly – normally to the Clinical Services Director, the Head of Operations, or to the above through the Governance manager.

### Confidentiality

The laboratory is committed to maintaining patient confidentiality and is Caldecott compliant. At times this will mean that electronic communications (phone, email) to and from the laboratory may be constrained by protocols intended to preserve patient confidentiality. These controls will be in accordance with professional and regulatory guidance.

### Quality assurance

See section 11

# laboratory opening times and out of hours service

The laboratory at Colchester is staffed between the hours of 8.30 to 17.30 Monday to Friday, 9.00-13.00 on Saturday, 10.00-12.00 on Sunday and 10.00-12.00 Bank Holidays. Outside these hours the laboratory offers an `On Call` service. Clinical advice and Biomedical Scientist assistance is available via the Colchester Hospital switchboard 01206 747474

Specimens can be delivered to the laboratory reception at any time.

Please also see Trust Intranet

<http://nww.colchesterhospital.nhs.uk/pathology/path_lab_id.shtml>

## Urgent requests

At all times, every effort will be made to examine samples urgently in cases where results are likely to influence treatment or when samples would deteriorate if delayed

### Labelling urgent specimen requests

If a sample is urgent, please place the specimen in a red bag, and/or apply a (yellow) “Microbiology urgent sticker” to the specimen bag (and/or on the container, if this can be done without obscuring any patient details).

This will generally apply to the following types of sample:

* CSF
* Sample from normally sterile sites, where an urgent microscopy result will impact on clinical management
  + Such specimens include joint fluids, ascitic taps, tissue, vitreal fluid, etc
* Stool for *Clostridium difficile* test (during routine hours, Saturday and Sunday am)

### Notification

The laboratory requests that, whenever possible, urgent requests are phoned ahead of specimen transportation so that the specimens can be identified on receipt.

Phone microbiology pre-analytical reception at the Laboratory (01206 747374 or 747314) or the hospital switchboard (01206 747474) outside of normal hours and ask for the Biomedical Scientist on duty.

### Transport

For transport of urgent specimens, please see section 10.

### Turn-around time (TAT)

For urgent specimens sent with prior notification to the microbiology laboratory, it is expected that microscopy results would be available within two hours hour of receipt[[1]](#footnote-1).

TATs for routine or non-urgent investigations are shown in section 11.

### Medico-Legal Samples

If a sample is being taken in which the results may be used as evidence in court e.g. Sexual Assault, Food Poisoning outbreak, the request should be sent with a Chain of evidence form (see [Taking of Medico-Legal Pathology Specimens Procedure](https://intranet.esneft.nhs.uk/intranet/documents/302/1535/)).

## Hours of Service

The laboratory at Colchester is staffed 08.30 to 17.30 Monday to Friday, 09.00 to 13.00 on Saturdays, 10.00-12.000 and 09.00 to 12.00 on Bank Holidays

Specimens can be delivered to the laboratory reception at any time during these hours.

Outside “normal” hours of service, i.e. at night and at weekends or bank holidays, when the laboratory is not fully staffed, there is an emergency contact system for specimen processing and clinical advice.**Contacts**: Out-of-hours, contact

* The duty Biomedical Scientist (BMS) for sample examination, via the Colchester Hospital Switchboard (01206 747474)
  + Please do not phone the on-call Biomedical Scientist until the specimen is ready.
* The on-call medical microbiologists for advice on diagnosis, antimicrobial treatment or infection control via the Colchester General Hospital switchboard
  + Bacteriology or virology clinical advice – contact Duty Medical Microbiologist via switchboard

**Blood cultures** taken out-of-hours should be taken to Blood Sciences Laboratory reception on level 1 of the hospital. The BMS does not need to be contacted. Blood cultures are examined routinely five times daily at weekends. As on weekdays, positive results will be telephoned by laboratory medical staff as soon as available

**Non-urgent specimens** taken out-of-hours should be transported to Blood Sciences Laboratory Reception on Level 1 of Colchester General Hospital.

# microbiology contacts

|  |  |  |
| --- | --- | --- |
| **Bacteriology/Microbiology Consultants** | Dr Sima Jalili  Dr Freda Sundram | 7313  7313 |
| **Duty Bacteriologist –** |  | 7374 |
| **Laboratory Management** |  |  |
| Clinical Services Director | Dr Sima Jalili | 7316 |
| Laboratory Manager | Mr Peter Hitchcock | 7315 |
|  |  |  |

## Telephone enquiries to the laboratory for advice

For advice on diagnosis or interpretation of microbiology results, contact the medical microbiologist via the Trust switchboard depending on the patient location.

For antimicrobial treatment (general information) see section 3.2.)

Telephone enquiries for the microbiology laboratory should be made to:

* Bacteriology General Enquiries and Clinical Advice –01206 747374/ 747314)

Outside normal hours the duty clinical microbiologist may be contacted via the Colchester General Hospital switchboard 01206 747474

## Treatment

Advice on empirical and specific treatment of infections is located in the Antibiotic pages of Trust Intranet. Please consult these sources in the first instance prior to trying to contact a medical microbiologist for advice.

## Infection Prevention and Control

The Infection Prevention and Control Teams (IPCT) for ESNEFT provide a comprehensive service for the prevention, control, surveillance and audit of infection throughout the Trusts.

Detailed policies are on the ESNEFT intranet at: <https://intranet.esneft.nhs.uk/pages/infection-prevention-control>

The Colchester IPCT comprises medical staff from the microbiology department and nursing staff employed by the Trust:

* Consultant Microbiologist & Infection Control Doctor: Dr S. Jalili Ext 7316

Infection control nursing team (Senior Nurse & Clinical Nurse Specialists) Ext 4268

# safety considerations

Specimen containers must be sufficiently robust and must not leak when used or transported. If in doubt, use a CE marked specimen container. Specimens collected into suction trap devices should not be submitted to the laboratory with the suction line tubing still attached, because of the high probability of leakage (and rejection of the specimen on quality or safety grounds).

In diagnostic pathology, there will always be some specimens that present a risk of infection. Every medical, nursing, phlebotomy, laboratory, portering and other staff member involved in handling specimens must be trained in relevant safety procedures. Nevertheless, the person who requests or takes specimens that are from patients known to be infectious must ensure that both the form and specimen bag are appropriately labelled.

It is essential, where the requester knows or strongly suspects that the patient is infected with a dangerous pathogen that this specific information is provided with every specimen or request form (see 4.3). “Risk of Infection” should be used in such cases.

**The laboratory needs to be alerted to the possibility of any significant infection risks prior to receipt of the samples.**

## Safe packaging of specimens

Specimens should be placed in the appropriate specimen container, which must be securely fastened, and any accidental spillage cleaned immediately. Each specimen should be individually placed in a clear plastic double (“marsupial”) self-sealing bag with one compartment containing the request form (if used) and the other the specimen or place in the bag attached to a request form

**Where a needle has been used to obtain the specimen, the needle must not be included in the packet transported to the laboratory.**

## Packaging of “High Risk” Specimens

Specimens from patients in the “infection risk from blood” category (see 4.4) should be placed in the appropriate specimen container, which must be securely fastened, and any accidental spillage cleaned immediately. This should be placed in a **clear** plastic double (“marsupial”) self-sealing bag with one compartment containing the request form and the sealed compartment containing the specimen and the other the specimen or places in the bag attached to a request form, or in the bag attached to the paper Microbiology request card.

Request forms accompanying, and/or the clear bags containing all such “high risk” specimens should be clearly labelled with an “Infection risk from blood” label. (The specimen need not be so labelled as to do so could obscure important information.)

## Safe transport of specimens

Specimens should be transported to the laboratory in a robust, lidded, washable transport box. Samples transported between sites should be undertaken by approved couriers who have been provided with suitable safety training. Do not use ordinary envelopes or “jiffy” bags for transportation. Do not staple or puncture polythene bags.

In the event that specimens are transported to the laboratory in a manner that jeopardises the safety of the carrier or the general public, the sender will be contacted immediately and informed about measures to prevent recurrence.

In ESNEFT premises all specimens must be transported safely according to ESNEFT / NEESPS policies.

High risk patients and safety

When a patient is

* jaundiced, and the cause of disease is not known, or
* if there are other reasons to suspect carriage of
  + Hepatitis B virus, Hepatitis C virus
  + infection with HIV, or
  + one of the acute haemorrhagic fever (AHF) viruses (e.g. fever in any patient who has been on the African continent during the four weeks preceding admission to hospital in the UK).
  + or from other “high risk” groups of patients where a Hazard group 3 organism is suspected e.g. Pyrexia associated with foreign travel;

then additional precautions must be taken to avoid accidental self-inoculation, contamination of the eyes, skin or mucous membranes with blood or other body fluids.

For additional information on blood-borne viruses in the workplace, refer to HSE guidance at <http://www.hse.gov.uk/pubns/indg342.pdf>

In the case of a suspected acute/viral haemorrhagic fever or any other samples suspected of containing a Hazard group 4 organism, the laboratory/trust clinical microbiology team must always be contacted for advice before any specimens are transported, see ESNEFT policy `Viral Haemorrhagic Fever Doc no 2391. See also the DH guidance document, *Management of Hazard Group 4 viral haemorrhagic fevers and similar human infectious diseases of high consequence* available at <https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/377143/VHF_guidance_document_updated_19112014.pdf>

## Phlebotomy

### Safe disposal of sharps

General practitioners and Phlebotomy Clinics should make suitable arrangements for the disposal of all used needles in such a way that they are not a hazard to anyone.

Risks to be considered include injury to refuse collectors from unguarded needles and re-use of syringes and needles by unauthorised persons, especially drug addicts and children.

Those practising near a hospital may be able to arrange to use its disposal facilities. Others, particularly in health centres and group practices, may have suitable incinerators on their premises. Where these methods are not available ask the medical officer for environmental health to make arrangements for the safe disposal of all discarded materials.

If a syringe and needle are used to obtain other fluid specimens, the needle must be discarded prior to specimen transport to the laboratory.

### Obtaining a blood sample from “high risk” patients

* Wear well-fitting surgical gloves and a plastic apron.
* Wear eye protection.
* Put an “Infection Risk” sticker on the request form and if appropriate on the plastic bag (see 4.2 above).

# specimen collection & volumes

## Patient consent

The laboratory follows professional and regulatory guidance on consent to the collection and testing of specimens.

* The general and specific information in this document may be used to inform and explain to patients how their specimens will be taken/collected and what they will be tested for.
* Consent to testing will normally be inferred by the laboratory on receipt of a specimen and request from an authorised health professional
* In some cases, specifically for some blood-borne virus testing, particularly HIV, a higher standard of evidence of patient consent is required. In such cases the request form/requesting process has a requirement for a declaration of consent to be signed by the health professional who requested the test, and to be kept in the patients notes.

See also local trust consent policies

## General principles (pertaining to every specimen collected)

Successful laboratory diagnosis depends on the collection of specimens at the appropriate time, using the correct technique and equipment and transporting items safely to the relevant laboratory. See also section 10.

* Ensure specimens are collected in the appropriate containers and the lid securely tightened.
* Ensure that, wherever possible, specimens are taken prior to the commencement of antibiotics or chemotherapeutic agents. If these have already started it should be noted on the request card.
* Ensure that completed date and time of collection of the specimen is on the request documentation, as well as on the specimen container. *This is particularly important when request forms have been prepared in advance.*

Any request for additional tests on primary samples must be received within a certain timescale depending on specimen type:

Swabs: 72 hours

Urines: 48 hours

Sputum: 24 hours

Faeces: 48 hours

Blood cultures: 5 days

Blood: 3 months (depending on the clinical requirements of the requests)

If it is required that a large and/or complex set of investigations are to be requested, especially on a specimen of limited quantity, then it is good practice to contact the laboratory in advance. In this way, priorities can be established, and the lab will be able to analyse the sample in the most productive way.

See also section 7 for guidance on request forms and specimen labelling.

## Specimen volumes

In general, obtaining a minimum specimen volume is only relevant for samples of body fluids such as blood, CSF and urine. The following guidelines are not comprehensive. Allowances should be made for ensuring there is sufficient sample for retention where it may be required and the possibility for retesting a sample where problems are encountered during initial testing.

|  |  |
| --- | --- |
| **Specimen type** | **Sample volume** |
| Blood for serology (clotted) | 5-10 ml |
| Blood for molecular diagnostics (EDTA) | 5 ml |
| Blood cultures | According to instructions supplied |
| Blood for T-Spot | 2 x 7ml Lithium Heparin |

|  |  |
| --- | --- |
| CSF | 0.5 -1ml minimum |
| Urine in borate (red cap) - paediatric | 7 ml (to fill line of container & mix) |
| Urine in borate primary tube (red cap)  Urine for Chlamydia | 11 ml (to fill line of container & mix)  2ml in BD Chlamydia collection tube |

All efforts will be made to examine small volume samples where possible. Where appropriate the report will include an explanation of the limitations to interpretation of the results as a result of reduced sample volume. Containers should not be overfilled, especially blood cultures which can signal false positive results for overfilled bottles

# specimen collection methods for microbiology

Please also see ESNEFT Intranet

<http://nww.colchesterhospital.nhs.uk/pathology/path_specimens.shtml>

## General

This section applies to all specimens: for microbiological culture or molecular tests for detection of nucleic acids.

* Verify the patient’s identity according to local protocol.
* Collect specimens before antimicrobial therapy where possible. Record relevant treatment details and dates and include with the request.
* Explain and discuss the procedure with the patient, obtain informed consent and ensure privacy while the procedure is being carried out.
* **Perform hand hygiene prior to and post specimen collection**. ***Note:*** The use of disposable gloves is essential during sample collection in order to prevent cross-infection.
* Use personal protection (PPE) appropriate for the procedure (i.e. gloves, apron and eye protection, as necessary). This is to protect the healthcare worker and minimise the possibility of contamination of the specimen.
* Use the appropriate sample collection medium for bacteriological, chlamydial or viral samples in order to preserve the organism within the specimen. Use collection systems intended for microbiological examination and ensure any collection medium is within the expiry date on the container. Advice/instructions are available on electronic order communication systems.
* When taking a swab from dry areas of skin, moisten the swab with sterile water/saline. This prevents patient discomfort and assists the uptake of organisms.
* Provide sufficient relevant clinical details with the request to help the laboratory ensure the correct investigations are performed and any results effectively interpreted. Include the date of onset of symptoms, any recent, current or intended antibiotics/antiseptics and any travel history. Thorough clinical details will help the laboratory staff assess any infection risks associated with a sample and help determine any additional safety measures to be taken while processing the samples.
* Specimens from patients in the ‘Infection Risk from Blood’ category should be labelled with an ‘Infection Risk’ sticker. This will alert other staff handling the specimen to the risks.
* For guidance on exposure to blood of body fluids, <http://intranet.rde.local/intranet/search/index.php?q=needlestick+policy&filter=Search>
* Record the identity of the person who collected the specimen(s)
* Dispatch specimens promptly to the laboratory with the completed requests to minimise sample deterioration prior to any laboratory examinations.

Service users in primary care are directed to the NHS “Clinical Knowledge and Skills” (CKS) web pages on infections and infestations for guidance on microbiological specimens and investigations in patient care: <http://cks.nice.org.uk/clinicalspeciality#?speciality=Infections%20and%20infestations>

## Aspirated fluids

### Joints or other normally sterile sites

Transfer the sample to a plain, sterile, (silver-capped) ‘universal’ or 60ml sterile pot CE marked specimen container from which all relevant tests can be done. Fill the container approx. two thirds full. Secure the cap tightly. Do not overfill the container.

### Bone marrow

Specimens should ideally be collected into blood culture bottles if possible. However, additional specimens may be collected in appropriate sterile CE marked leak-proof silver capped specimen containers containing anti-coagulants. Secure the cap tightly.

As large a sample as possible should be obtained, with the caveat that volumes greater than 3ml are likely to be contaminated with peripheral blood which may have a dilution effect.

## Blood Cultures

***Important note****: The culture media in blood culture bottles are formulated to grow bacteria in the presence of added blood. Other types of specimen should not in general be added to blood culture bottles but transported to the laboratory in sterile white-capped ‘universal’ containers.* If non-blood samples are inoculated to blood culture bottles, please also send some of the original sample in a plain (silver-capped) 60ml container.

A copy of the blood culture instruction sheet is included with each blood culture bottle set.

**General information**

1. Normally one set of blood cultures should be taken in a patient with suspected bacteraemia: put 10ml blood in each of the 2 or 3 bottles included in the adult set. Put 10ml blood in the single bottle supplied for paediatric blood cultures
2. Do not take blood cultures in afebrile patients with no other clinical signs or symptoms suggestive of a systemic reaction to infection, as this increases the risk of a false-positive result due to culture contamination.
3. Since the volume of blood sampled is more important than the number of bottles used, and because the culture media are configured to be diluted by 10ml blood, it is better to fill one bottle up to the maximum capacity of 10ml, than to try to share the blood between several bottles.
4. For most patients one blood culture set will be sufficient.
5. No more than two sets of blood cultures should be taken in a 24hr period, unless endocarditis is suspected, when up to three sets should be taken at different times.
6. Blood cultures should be taken from a peripheral vein whenever possible.
7. Do not take additional blood cultures through an intravascular line as well as a peripheral vein, or multiple cultures via several line lumens. This very rarely yields useful information and increases the chance of culture contamination.
8. Avoid venepuncture at sites of abnormal skin such as eczema and psoriasis because these sites are always heavily contaminated with bacteria.
9. Samples for blood culture should be taken via a dedicated venepuncture, and the use of samples for multiple purposes (e.g. blood cultures, full blood count and U&E) is discouraged. When this is unavoidable, inoculation of the blood culture bottle should be done first to minimise the risk of contamination.

**PROCEDURE**

1. Please document the reason why cultures were taken, date, and time taken. Also record any foreign travel and antibiotics prescribed.
2. **Use ANTT Aseptic Non Touch technique when taking cultures**
3. Wash and alcohol foam hands
4. Select suitable vein, apply tourniquet. Clean skin with a 2% chlorhexidine and 70% alcohol applicator (Frepp) for 30 secs allow to dry for 30secs, using a basket weave pattern application.
5. Please use the suction caps and needle safe butterfly collection set to collect blood.

6. If a culture is being collected from a central venous catheter, disinfect the access port with a 2% chlorhexidine 70% alcohol paper swab.

7. Have sharps disposal container available in immediate vicinity so that sharps can be disposed of at the point of use.

8. Flip off bottle caps and clean the membrane of the bottles with a 2% chlorhexidine and 70% alcohol paper wipe contained in the pack. Allow to dry.

9. Perform [hand hygiene](http://connect/utilities/action/act_download.cfm?mediaid=356) again and don non-sterile gloves & apron.

10. Attach winged blood collection set to blood collection adapter cap.

11. Anchor the vein, warn patient to expect a sharp scratch and insert butterfly needle.

1. Secure the needle, either with adhesive tape or by an assistant, to avoid pain at the insertion site while the adaptor is attached to the bottles.

13. Hold the bottle in an upright position below the level of the vein to prevent backflow.

14. Place adapter cap over the aerobic (blue top) bottle and pierce septum and allow 8-10ml blood to pass into the bottle. Ensure that the adapter is tightly fixed to the butterfly system at all times. Remove the bottle and repeat with the anaerobic (purple top) bottle.

15. Release tourniquet and apply pressure with sterile gauze to the insertion site.

16. Remove butterfly and place directly into sharps bin with adaptor attached. Remove gloves and apron and perform [hand hygiene](http://connect/utilities/action/act_download.cfm?mediaid=356). Label bottles at bedside.

**17. Please place bar codes from the blood culture bottles on the request card**

18. Document date, reason for sample, site of venepuncture, operator undertaking procedure and if procedure was high risk with signature.

## Blood for serological tests, antibiotic assays, molecular tests, etc.

### Blood tubes to use (advice/instructions are also available on electronic order communication systems)

* For serology and antibiotic assays collect clotted blood in a plain tube or a serum gel tube.
* For molecular tests collect blood into an EDTA tube
* For T-Spot analysis samples should be sent in 2 x 7.5 Lithium Heparin bottles, samples can only be sent Monday -Thursday and must be received in the laboratory before 1.00pm to enable them to be couriered to the reference laboratory.
* For paediatric blood samples or other small volume specimens, please contact the lab to discuss any specific requirements

## Cerebrospinal fluid (CSF)

The user should refer to local NHS Trust clinical protocols

https://intranet.esneft.nhs.uk/intranet/documents/399/5671/

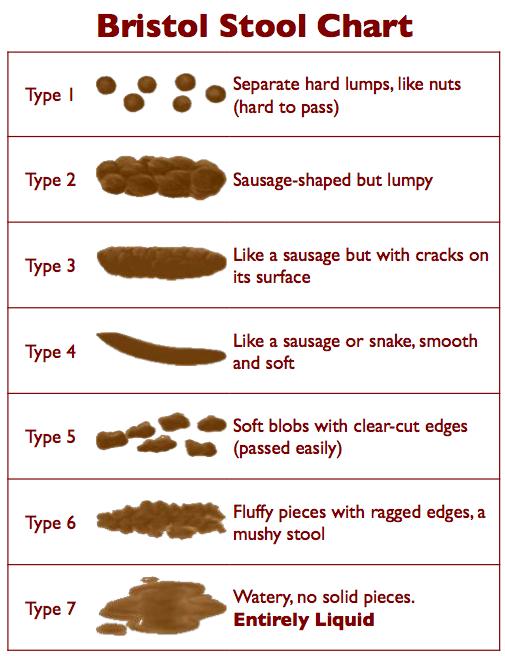
[http://intranet.rde.local/intranet/search/index.php If investigation for vCJD is required then the laboratory should be contacted as soon as the sample has been taken to ensure that the sample is stored in the correct conditions.](http://intranet.rde.local/intranet/search/index.php       If investigation for vCJD is required then the laboratory should be contacted as soon as the sample has been taken to ensure that the sample is stored in the correct conditions. )

## Faeces Specimens

Ask the patient to provide a sample into a clinically clean bedpan to avoid unnecessary contamination from other organisms.

* Scoop enough material to fill a third of the approved, CE marked, leak proof specimen container using a spatula or a spoon to prevent contamination (Spoons are often incorporated in the blue topped specimen universal.) Secure the cap tightly. Do not overfill container.
* If the patient has diarrhoea, then samples of the most liquid part of the stool must be sent. NB. Formed stool samples would indicate the patient does not have diarrhoea and formed samples are not normally examined for *C. difficile* toxin or other diarrhoeal investigations (please refer to the Bristol Stool Chart on page 20)..
* Segments of tapeworm are seen easily in faeces if infection is suspected and any such isolated segments should be sent to the laboratory for identification inside a suitable sealed CE marked specimen container (silver capped pot).
* See also section 6.10 for more information on stool specimens for parasitology.
* Patients suspected of suffering from amoebic dysentery should have any stool specimens dispatched to the laboratory for immediate testing. The parasite causing amoebic dysentery exists in a free-living form and converts to a non-motile cyst when the sample cools.

### The Bristol stool chart



## Respiratory samples and secretions etc.

### Sputum specimen

Sputum is never free from organisms since material originating in the bronchi and alveoli must pass through the pharynx and mouth, areas that have a normal commensal population of bacteria.

* Care should be taken to ensure that any material sent for microbial investigations is in fact sputum, not saliva. The culture of saliva is of little or no clinical value in the diagnosis of lower respiratory tract infections and results may be clinically misleading.
* Encourage patients who have difficulty producing sputum to cough deeply first thing in the morning. Alternatively, a physiotherapist should be called to assist the patient to produce a sample. (Nasopharyngeal samples are not a substitute for sputum investigation).
* Transfer a representative sample to a plain, sterile, universal or 60ml container from which all relevant tests can be done, please do not use 11ml primary tubes. Secure the cap tightly. Do not overfill the container.
* Send any sputum specimen to the laboratory immediately as the bacterial population can alter rapidly and rapid dispatch should help ensure accurate and reliable results.

### Nasopharyngeal aspirate

A catheter connected to a mucus trap on one end and to a vacuum source on the other is used to collect nasopharyngeal secretions.

* The catheter is inserted into the nostril, vacuum is applied and the catheter is withdrawn slowly with a rotating motion.
* The same catheter may be used for both nostrils and the catheter may be flushed with 3 ml of transport medium or sterile saline.
* Transfer a representative sample to a plain, sterile, silver-capped container from which all relevant tests can be done. Secure the cap tightly. Do not overfill the container.

### Other trap specimens

Follow local clinical protocols for other types of respiratory secretion or washings.

* Specimens must be transported to the laboratory in an approved leak-proof CE marked silver-capped specimen container.

### Specimens for respiratory virus examination, including influenza

The following respiratory samples can be tested:

* Nasopharyngeal aspirate (NPA),
* Nasopharyngeal secretions (NPS),
* Broncho-alveolar lavage (BAL),
* Endo-tracheal aspirate (ETA),
* Nose and throat swabs (in virus transport medium or sterile saline)
* (Sputum)

## Swab specimens

Ensure the correct swab is used for the required investigation. There are several dedicated types of swab and many investigations have specific sample collection requirements. Bacterial culture swabs come in a variety of forms for routine culture, swabs should be sent in a swab containing a preservative media, preferably containing charcoal to ensure the optimum and accurate culture of micro-organisms from the

swab. Viral swabs for PCR require the use of viral transport media. There are specific swabs for chlamydia testing and for collection of pernasal swabs.

### Eye swabs

Using either a plastic loop or a cotton wool-covered wooden stick, hold the swab parallel to the cornea and gently rub the conjunctiva in the lower eye lid. This will ensure that a swab of the correct site is taken and avoid contamination by touching the eye lid.

* Conjunctiva/corneal scrapings are more reliable culture samples than eye swabs. This procedure is usually only performed by medical staff in eye clinics. If possible, inoculate culture plates at the patient bedside before transfer to the laboratory for incubation.
* Corneal scrapings/contact lens fluids are the samples of choice for Acanthamoeba culture.
* For investigations of Chlamydia it is important that no fluorescent dyes are used prior to the taking of the sample as these will make the sample unsuitable for testing.

### Nose swabs

Moisten swab beforehand with sterile water to prevent discomfort to the patient. The healthy nose is virtually dry, and a dry swab may cause discomfort.

* Move the swab from the anterior nares and direct it upwards into the tip of the nose in order to swab the correct site and to obtain the required specimen.
* Gently rotate the swab.

### Pernasal swab

A pernasal swab (for whooping cough) kit can be obtained from Microbiology.

* Using the special soft-wire-mounted swab, pass it along the floor of the nasal cavity to the posterior wall of the nasopharynx. This will minimise trauma to nasal tissue and ensure that a swab from the correct site is obtained.
* Rotate the swab gently.

### Ear swab

No antibiotics or other chemotherapeutic agents should be used in the ear for at least three hours before taking the swab to prevent collection of traces of these substances which may interfere with culture results. Swab from the exterior auditory canal will only be able to diagnoses otitis externa unless the eardrum has been perforated and organisms from the middle ear are present in the outer ear canal.

* Swab any pus or exudates
* Place swab in the outer ear and rotate the swab gently. This will avoid trauma to the ear and ensure that a specimen of any secretions is obtained.

For investigation of fungal infection, scrapings of material from the ear canal are preferred although swabs can also be used.

### Throat swab

Ask the patient to sit in such a position that he/she is facing a strong light source. Depress the patient’s tongue with a spatula to ensure maximum visibility of the area to be swabbed. The procedure is one that is likely to cause the patient to gag and the tongue will move to the roof of the mouth, contaminating the specimen.

* Quickly, but gently rub the swab over the target area, usually the tonsillar fossa or any area with a lesion or visible exudate.
* Avoid touching any other area of the mouth or tongue to prevent contamination by other organisms.

### Wound pus/drainage fluid

Wherever possible send a sample of pus/drainage fluid in preference to a swab. The laboratory will then be able to report on the presence of anaerobes more reliably as the organisms will generally survive longer prior to culture.

***Please note***: Drainage fluid should be sent rather than empty drain tips.

Transfer a representative sample to a plain, sterile, silver-capped container from which all relevant tests can be done. Secure the cap tightly. Do not overfill the container.

### Wound swab

Take swab after cleansing the wound to prevent contamination of specimen with therapeutic materials used in previous dressing and to remove surface organism contamination.

* In the case of a dry wound the swab should be moistened with sterile water or saline or transport medium. This will enhance uptake of any organisms present.
* Swab a representative portion of the wound if practical using a zigzag movement while simultaneously rotating the swab.
* To avoid contaminating the outside of the container the swab should be inserted directly into the container which should contain transport medium.

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### Vaginal swab

*These instructions apply only to the use of the Becton Dickinson ProbeTec® swab specimen collection system*

* Remove all excessive amount of secretions or discharge.
* Obtain samples from the mucosal membrane of the vaginal vault.

### Penile swab

* Retract prepuce to obtain maximum visibility of area to be swabbed.
* Rotate swab gently in the urethral meatus to collect any secretions.

### Rectal swab

* Pass the swab, with care, through the anus into the rectum to ensure a rectal, not an anal, sample is obtained.
* Rotate gently to avoid trauma.
* In patients suspected of suffering from threadworms, take the swab from the perianal region. Threadworms lay their ova on the perianal skin.
* Rectal swabs are not usable as a substitute for a stool sample.
* This is the specimen of choice for CRO screening, if the patient has as stoma or colostomy, then a swab from that that site should be sent.

### Samples from a suspected VZV vesicular lesion

The appropriate specimen for detection of varicella zoster virus is an aspirate of a clear vesicular lesion. Lesions filled with purulent or cloudy fluid do not yield virus. Scrapings of the infected area are also adequate.

* Preparation of the lesion site with disinfectants may inactivate VZV; therefore, it is preferable to use local disinfectants after the specimen is obtained. Extreme care must be taken to prevent contamination of the specimen or transport media.
* For lesions, a specimen can be collected with a swab or sterile serrated blade. Incise vesicle peripherally with a sterile blade and remove the top of the lesion or any encrusted material and discard. Gently blot with a sterile swab to collect fluid and vigorously scrape cells from the base of the lesion with the same swab or a serrated blade. Place the swab into virus transport medium.
* If one specimen was collected with a blade, immediately place basal cell material into virus transport medium, swirling the blade into the media to dislodge basal cell material.

Vesicular lesions containing clear fluid may be aspirated with a needle and syringe and the fluid can be directly inoculated into virus transport medium. Light scraping on the base of the lesion with the needle tip to obtain some cellular material during aspiration may enhance viral recovery. **DO NOT transport the syringe to the laboratory with the needle attached.**

## Urine Specimens

### General information

Midstream Urines (MSU) (clean catch urines) are the most commonly collected specimens and are recommended for routine tests.

Samples may be tested by urine dipstick before deciding whether to send a sample to the laboratory for analysis.

Do not use dipsticks for:-

* Patients over 65 years of age
* Patients with urinary catheters

Dipsticks should only be used by trained personnel and ideally an automated dipstick reader should be used as each reaction has specific timings. Samples tested by dipstick should not be collected in boric acid containers. Once the dipstick test has been performed the sample should be transferred to a primary 11ml boric acid container (red top) if laboratory analysis is required.

Samples should be collected in the middle of voiding urine as early and late samples provide unreliable results. Early samples are subject to contamination with epithelial cells and bacteria present in the urethra and can give misleading results.

Samples should be collected in CE marked specimen containers. The use of boric acid preservative is strongly recommended as a bacterial preservative to maintain the integrity of the sample. Containers should be filled with the indicated level of urine to obtain optimum boric acid concentration. Use of boric acid significantly increases the time allowed before culture must be performed (Up to 4 days). For non-boric acid containers samples must be cultured within hours (maximum 24h) and any culture results may be unreliable.

**Storage and transport**

* Refrigerate specimens in non-boric acid containers to prevent bacterial overgrowth or use specimen pots with boric acid (fill to the line). Do not use borate for Legionella urinary antigen testing. Do not overfill container.
* Dispatch all specimens to the laboratory as soon after collection as possible.
* Optimally Urine specimens should be examined within two hours of collection in non-boric containers or within 24 hours if kept refrigerated at a temperature of 4°C. At room temperature, overgrowth will occur and lead to misinterpretation.
* Optimally Urine specimens should be examined within four hours of collection in boric containers or within 4 days if kept refrigerated at room temperature.

See also section 6.10, Urine collection for parasites (Schistosoma)

### Early morning urine (EMU) for tuberculosis

Specimens of urine should be collected as soon as possible after the patient wakens in the morning and at the same time each morning if more than one specimen is required. The bladder will be full as urine has accumulated overnight and the chances of detecting pathogens will increase. Specimens should be collected on 3 consecutive days. Specimens will be comparable if taken at the same time each morning.

* Collect samples into specific suitable containers which can be obtained from the laboratory. Dispatch all specimens to the laboratory as soon after collection as possible.

### Midstream specimen of urine: male

* Retract the prepuce and clean the skin surrounding the urethral meatus with soap and water, saline or a solution that does not contain a disinfectant. This prevents other organisms contaminating the specimen. Disinfectants may irritate or be painful to the urethral mucous membrane.
* Samples are best collected first thing in the morning. Ask the patient to direct the first and last part of his stream into a urinal or toilet but to collect the middle part of his stream directly into a sterile primary 11ml boric acid container (red top). This will avoid contamination of the specimen with organisms normally present on the skin or in the urethra.

### Midstream specimen of urine: female

* Clean the urethral meatus with soap and water, saline or a solution that does not contain a disinfectant. This prevents other organisms contaminating the specimen. Disinfectants may irritate or be painful to the urethral mucous membrane.
* Dry the area, swab from the front to the back to prevent further contamination of the urethral area. Use a new swab each time.
* Ask the patient to micturate into a bedpan or toilet to avoid contamination of the specimen with organisms normally present on the skin or in the urethra. Place a sterile receiver or a wide-mouthed container under the stream and remove before the stream ceases.
* Transfer the specimen into a sterile primary 11ml boric acid container (red top).

**NB:** ‘Clean catch’ urine specimens may be collected when it is impossible to obtain an MSU. These should be clearly identified as such when completing the request card.

### Catheter Specimen of Urine (CSU)

Submission of CSU samples for bacterial examination should be carefully considered. Cultures invariably show heavy mixed growth and are difficult to interpret. The clinical value/intention of the investigation should be clearly stated on the request. Blood cultures should be collected if sepsis is a concern.

**Clinical equipment:**

* 20ml Sterile syringe (No. 21 (blue) needle where required)
* Gate clip
* Swab impregnated with Isopropyl alcohol 70%
* Sterile specimen container
* Disposable sterile gloves
* If there is no urine in the tubing, clamp tube below sampling port until sufficient urine collects to obtain an adequate sample.
* Clean sampling port with an alcohol swab and allow it to dry to prevent contamination of the specimen.
* Using the sterile needle and syringe, aspirate appropriate amount of urine from the tube. Please note: some systems require syringe only. The sampling port will self-seal after removal of the needle to prevent leakage.
* Transfer sample to a primary urine tube (11ml) with boric acid (red top) container, avoiding splashing to prevent environmental contamination.
* Remove gate clip, if used to allow free drainage of urine.

***Note***: Please consult Local Policies and Practices when collecting specimens of urine from children and neonates.

### Ileal conduit or ileostomy urine specimen collection

**Clinical equipment:**

* Sterile dressing pack
* Soft catheter “Nefaton” type, not larger than 12-14 Fr
* Disposable apron
* Sterile specimen containers (silver-cap)
* Skin cleaners (H2O, Saline)
* Bactericidal alcohol hand rub
* Clean stoma appliance
* Open dressing pack as per dressing procedure to prevent contamination.
* Remove stoma appliance and cover stoma with clean swab to prevent leakage from stoma onto skin.
* Use bactericidal hand rub to clean hands and put on clean gloves.
* Remove topical swab from stoma with dressing forceps to prevent cross contamination.
* Clean stoma with H2O/saline starting at the stoma and working outwards.
* Using gentle traction to open stoma to prevent trauma, insert the catheter tip into opening to a length of 2.5 to 5cm and wait for urine to flow into catheter. You must wait for this to take place as force may damage stoma lining.
* Place specimen jar under end of catheter to catch specimen: 3 to 5ml is sufficient. Re-apply appliance in the usual manner to ensure patient’s skin is protected.

## Specimen collection for parasite examinations

### Specimens for Threadworm/Pinworm eggs – swab collection instructions for patients and their parents- swabs are the sample of choice.

|  |
| --- |
| Threadworm eggs are laid during the night around the anal area (around the back passage). This leads to itchiness. You can help us find out if there are any threadworm eggs around your child’s back passage. NB. Eggs are infectious.   1. Please do the swabbing first thing in the morning (before the child goes to the toilet). Wear disposable gloves if available and wash hands once sample collection has been completed. 2. Open the small bottle of saline and dip the tip of a swab into the saline to moisten it. 3. Rub the swab around the back passage especially where it is itchy. 4. Put the swab back into the saline bottle, break off the stem and screw the lid back on **securely** and shake the bottle for 10 seconds. 5. Label the bottle with the name of the patient and the date & time of specimen collection. 6. Return the specimen container, together with the request form/card, to the laboratory or to your GP surgery, as instructed. Whenever possible, the specimen should reach the laboratory on the day it was collected. 7. In the laboratory we will look for the eggs under the microscope and we will inform your doctor of the result. |

### Specimen collection of sellotape slide for Threadworm/Pinworm

This method is less reliable and subjects the user and laboratory staff to possible exposure to infectious eggs.

* Sellotape slides should be collected between 2200-2400hrs, or early in the morning, before defecation or bathing.
* Apply sellotape to the perianal region, pressing the adhesive side of the tape firmly against the left and right perianal folds several times. A tongue depressor can be used to wrap the tape around. Smooth the tape back on the slide, adhesive side down.
* Occasionally, an adult worm may be collected from a patient and sent in saline or water for identification It is recommended that samples should be taken for at least 4 to 6 consecutive days. If the results of all these are negative the patient can be considered free of infection. In practice, more than one specimen is rarely received.

### Specimen collection of urine for Schistosoma parasites

The optimum time for collection of urine for Schistosoma investigation is between 10:00h and 14:00h when it has been shown that a maximum concentration of eggs are excreted.

* Alternatively, a 24 hour collection of terminal samples of urine may be obtained.
* In patients with haematuria, eggs may be found trapped in the blood and mucus in the terminal portion of the urine specimen. Sterile containers without boric acid must be used.
* If the urine cannot be examined within an hour of collection, it is advisable to add 1ml of undiluted formalin to preserve any eggs that may be present, particularly if left overnight.

### Specimen collection of faeces for parasites

Fresh faeces specimens are essential for the examination of trophozoites

* Faeces may be passed directly into a sterile wide-mouthed leak-proof container or may be passed into a clean, dry bedpan or similar container and transferred into a sterile leak-proof container (silver-cap)..
* Ideally three stool specimens collected over no more than a 10-day period.
* It is usually recommended that specimens are collected every other day. Unless the patient has severe diarrhoea or dysentery, no more than one specimen should be examined within a single 24-hour period, as shedding of cysts and ova tends to be intermittent.
* If *E. histolytica* or *G. lamblia* are suspected, and the first 3 specimens are negative, ideally, 3 additional specimens should be submitted at weekly intervals.
* There are no prescribed limits for the size of sample required, but some laboratory procedures will require more than others. Minimum of 1ml is advisable.
* If processing is delayed, refrigeration is preferable to storage at ambient temperature. Delays of over 48h are undesirable.

## Other specimen types/investigations

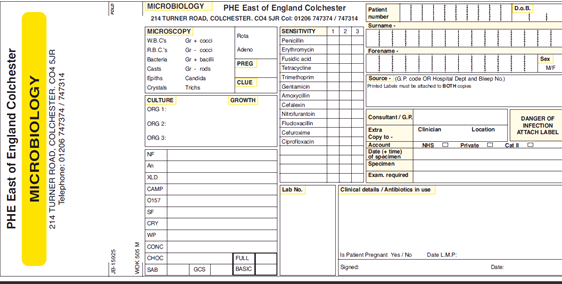
Contact the laboratory for advice.

# requests and specimen labelling

## Hospital users

Requests should be made using a paper request card (see below).

Specimen containers and swabs - all available from central pathology supplies at Waterbeach via the electronic ordering system. Ad hoc low-level supplies not stored at Waterbeach available directly from Colchester laboratory. Regular supplies to these sites are provided as requested from the laboratory at Colchester.



## Request forms for General Practitioners

Where available, the ICE electronic ordering system should be used.

Where ICE requesting is not available, an example of a suitable hand-written request form is illustrated below. There are no restrictions on which request form must be used if it complies with all the requesting criteria for a microbiology request.

## Completion of Requests

**Wherever possible, electronic ordering should be used.**

An associated request must accompany all specimens sent to the laboratory. It must clearly state the following minimum information:

EITHER

* NHS number (for all named patient requests), with
* Patient name (Surname, Forename) and address, with
* Hospital number, if appropriate

OR

* Valid unique alphanumeric identification code
* Date of birth
* Sex
* Patient location and/or destination for report

Please ensure the following fields are also completed:

* Practice address sticker/stamp
* Specimen type *N.B. In general, please submit one request per specimen, please*
* Anatomical site from which “wound” specimens were taken
* Date and time specimen taken *N.B. Accurate information is required avoid use of pre-ordered requests and/or update information when the sample is submitted.*
* Request (for investigation/tests required)
* All relevant clinical details including any antimicrobial treatment (recent, current and intended), clinical procedures and any relevant recent foreign travel
* Patient /sample infection risk information if applicable for patients with “blood borne virus” infections or other known high hazard potential
* Date of onset and duration of illness, particularly for serology
* Other relevant information e.g. Pregnancy status, whether the patient is immuno-compromised, etc. as appropriate

## Labelling of specimens and samples

All samples must be labelled with the

* Sample type and/or site of swab
* Date and time of sample collection

In order to establish accurately the identity of the patient supplying the specimen the following details must be supplied on the sample (and must match the information on the request form):

Our departmental specimen labelling policy states that there must be 3 points of patient identification on the specimen or sample, which must include:

* **SURNAME** [or coded ID] and NHS/hospital/unique **NUMBER**; plus
* Either **FORENAME** (full name not initial) or **DATE of BIRTH**.

If the specimen bears insufficient information to establish accurately the identity of the patient, or the details supplied on the specimen do not match those supplied on the request form, the specimen may be rejected. Rejected specimens will be indicated on the electronic / paper report.

### Exceptions

As a rule, for the sake of patient safety, unlabelled, mislabelled or partially labelled specimens will not be processed.

Exceptions to this rule would be considered with unrepeatable or difficult to repeat specimens such as CSF, bronchoscopy specimens, biopsied tissue, timed specimens and some blood and operative specimens.

* To be considered for processing, the sample must have come in a sealed bag with an individual request form so that there is a reasonable probability that it is the specimen referred to on the form.
* Laboratory staff will vet samples falling into this category and make the decision as to whether they should be considered for processing. In this case, an attempt will be made to contact the requestor to obtain further information to the sample.
* A comment will be added to the final report indicating that the identity of the sample cannot be fully assured.

## Laboratory sample acceptance policy

Samples may be rejected by the laboratory if, on receipt, they appear to pose a threat either to patient safety or the health & safety of laboratory staff, e.g.:

* Leaking[[2]](#footnote-2) (but readily repeatable)
* Incompletely labelled, unlabelled or mislabelled – see section 7.4
* Sample lacking a request form/ Request form lacking a sample
* If the sample has been too long in transit (this will vary with sample type)

In all cases, a formal (written or electronic) report will be issued wherever this is possible indicating why the test was not performed. Specimens which have not been accepted for testing will be retained for up to a week where practical in case further information becomes available and testing becomes possible. Any report issued after such testing will carry a comment explaining the uncertainty and any limitations of interpretation.

# specimen containers

|  |  |
| --- | --- |
| Aspirates and fluids from normally sterile sites (e.g. pericardial and pleural fluids, joint aspirates and bone marrow aspirates) | Plain sterile universal container (8.1b) |
| Blood cultures | Bactec blood culture bottle sets: NOTE: please carefully read the instruction leaflet enclosed with each bottle set |
| Blood for serology | Clotted sample, 5-10ml, in plain (white cap) or gel (brown cap) tube |
| Blood for PCR | (Blood with EDTA) minimum 5ml |
| Blood for viral load | (Blood with EDTA) minimum 5ml |
| Bronchial washings/ BAL | Plain sterile container; e.g. 60ml sputum (8.1d) or plain sterile universal container (8.1b) |
| Cervical swab | Endocervical swabs are required for gonococcal or chlamydial infections, and investigation of PID. For the investigation of gonorrhoea use a swab in bacteriology transport medium (8.1g) and transport to the laboratory immediately. For the investigation of Chlamydia by molecular tests, use the BD Chlamydia swab collection set See section 6.8 h, 8.1i |
| Cerebrospinal fluid (CSF) | For cell count, Gram staining and culture/viral PCR send 2-3ml of CSF in each of 3, sequentially numbered, plain sterile universal containers (8.1b). If meningitis is suspected contact the laboratory to request urgent testing and send the specimens immediately. (Send separate specimens for glucose and protein oligoclonal bands etc. to the appropriate departments). Please indicate if additional microbiology investigations are required e.g. TB, Cryptococcus, Viral PCR etc. |
| Chlamydia | Swabs from conjunctiva, urethra or endocervix in Chlamydia swab collection set. Urine in chlamydia urine tube. See 6.8 & 6.9, (8.1g) |
| CRO screen | Send a Rectal Swab in bacterial transport medium (8.1g) if the patient has a stoma or colostomy swab should be sent. |
| Culture for bacterial infections | Pus or a biopsy of infected tissue is preferable. Send in a plain sterile universal container (8.1b) If swabs are taken, send in bacterial transport medium (8.1g). |
| Ear swab | Send a swab in bacterial transport medium (8.1g). |
| Eye swab | Send a swab in bacterial transport medium for routine bacteriology (8.1g). |
| Faeces | Sterile universal container (see 8.1c), use the spatula provided in the container to transfer a representative plum-sized portion of faeces, or equivalent volume of fluid, into the container. (See section 6.6) |
| High vaginal swab (HVS) | Send swab in bacterial transport medium (8.1g) for routine culture, Candida, *Trichomonas vaginalis* and vaginosis. For PID, gonorrhoea and Chlamydia investigations send a cervical swab rather than a vaginal swab. |
| Line Tips | Disinfect skin around cannula entry site, remove cannula using aseptic technique and cut off 4 cm of the tip into a plain sterile container (8.1b or d) using sterile scissors. Urethral and chest drain catheter tips are not suitable for culture so please do not send these samples. |
| Lymph nodes (for routine culture and/or ?TB) | Send the fresh tissue in a plain sterile container (8.1b or d). |
| Mouth swab | Send a swab in transport medium (8.1g) |
| MRSA screens  Place requests as determined by local practices.  Refer to local trust screening policies | Take swabs (8.1g) from: Nose, perineum, groin and any other samples as clinically indicated or as prescribed in local infection prevention and control policies.  e.g. wounds, ulcers, pressure sores and IV line sites, sputum if the patient has a productive cough and a CSU if the patient is catheterised. |
| Nasopharyngeal aspirate | Many standard sputum traps are NOT adequate for transport of specimens. Always use a specimen grade container. DO NOT seal by looping the tubing between vents. |
| Pus | Plain sterile universal container (8.1b) |
| Screening swabs and surface swabs | Send swabs in transport medium (8.1g) from suitable sites according to locally agreed protocols. For MRSA screening dry swabs are acceptable but are not acceptable for any other screening samples. |
| Seminal fluid for culture | Plain sterile universal container (8.1b) |
| Skin, nail and hair for mycology | For skin, nail and hair clippings use black card or MycoTrans/Dermapaks which can be obtained from the Pathology ordering system. Plain sterile universal containers (8.1b) can be used if there is a significant amount of material. Routine bacteriology swabs (8.1g) are used for the investigation of Candida and yeast infections |
| Sputum | Sputum from deep expectoration and not saliva is required. Plain sterile container (8.1d) |
| Throat swab | For bacteriology investigations send a swab in bacterial transport medium (8.1g).  For viral investigations send a swab in viral transport medium (8.1i). |
| Tissues and biopsies | Plain sterile universal container (8.1b), if the biopsy is small add 0.5ml of sterile saline to prevent it from drying out.  Please ensure containers with formalin present are **not** used for microbiology investigations. |
| Tuberculosis | Sputum, BAL, urine, pus or tissue. Plain sterile container; e.g. 60ml sputum (8.1d) or plain sterile universal container (8.1b)  For sputum, 3 early morning specimens taken on consecutive days using a plain sterile container (8.1d)  For urine, 3 early morning specimens taken on consecutive days (obtain larger volume container for urine from lab).  If TB PCR is required, please discuss with duty microbiologist in advance. |
| Urine | **Bacteriology**: Collect sufficient volume into sterile universal container with boric acid (red top). (8.1a) or other boric acid containers (paediatric/primary tube) as provided by the laboratory.  **Bag urines and pad urines** are often contaminated in infants therefore clean catch urine or supra pubic aspirate is preferred wherever possible. Collect into sterile universal container (8.1b).  **Legionella**: Collect into a plain sterile container (white top) (8.1b).  **Virology**: Collect into a plain sterile plain container (white top) (8.1b). |
| Urethral swab | For the investigation of gonorrhoea use a bacteriology swab in transport medium (8.1g) and transport to the laboratory immediately. |
| Wound and ulcer swabs | Send a swab in bacterial transport medium (8.1g) |
| Viral swabs from eye, nose/throat or skin, mouth, vulval lesions | Send the swab in virus transport medium (8.1i) |

## Examples of common specimen containers (Not exhaustive)

|  |  |  |  |
| --- | --- | --- | --- |
| 11ml Primary Tube containing boric acidUniversal containers Plain (white top) | 327230_ol  images | | |
| Faeces container Blue top with integral spoon | 109120C | | |
| Sputum container 60ml plain container with silver top | sputum_pot | | |
| Mucus specimen trap Remove tubing and fit replacement cap before transporting to lab | Mucus Specimen Traps | | |
| Blood culture bottles |  | | P:\BactecBottles pair.JPG |
| Charcoal swab | Abstrichbesteck-MEDI_SWAB | | |
| MRSA swabs | **300250** | | |
| Virus transport medium For use with plain swab. Contains pink/orange liquid | | MicroTest 1 | |

## Expiry dates

**Important note**: Transport media, blood culture bottles and specimen collection sets have expiry dates beyond which they are not valid and must not be used. Use of out of date containers will lead to specimens being rejected in the interests of patient safety.

## Supply & Storage of specimen containers

### General Practice

Specimen containers and swabs - all available from central pathology supplies at Waterbeach via electronic ordering system. Ad hoc low-level supplies not stored at Waterbeach are available directly from Colchester laboratory. Regular supplies to these sites are provided as requested from the laboratory at Colchester.

| **Container** | **Instructions (unused containers)** | **Instructions (used containers – if delayed delivery to the laboratory)** |
| --- | --- | --- |
| Blood culture bottles. | Store at room temperature in the dark. Keep bottles of each set together in the plastic bag supplied and return any unused bottles at their ‘use by’ date.  **Do not cover or remove bar code label** | * BD Blood Cultures at ambient temperature. |
|  |  |  |
| Pernasal swab for whooping cough. | Store at room temperature | Store at 4°C if possible otherwise at room temperature overnight. Ensure delivery to the laboratory within 24h of collection. |
| Swabs with bacteriological transport media (Transwabs). | Store at room temperature | Store at 4°C if possible otherwise at room temperature overnight. Ensure delivery to the laboratory within 24h of collection. If N. gonorrhoea is suspected do not refrigerate - store at room temperature. |
| Swabs without transport medium for virology. | Store at room temperature. Use with virus transport medium. | N/A |
| Transport medium for virology and for Chlamydia testing. | Store at 4°C if possible, otherwise at room temperature | Store at 4°C if possible otherwise at room temperature overnight. Ensure delivery to the laboratory within 24h of collection. |
| Universal containers (sterile, empty) | Store at room temperature | Store at 4°C if possible otherwise at room temperature overnight. Ensure delivery to the laboratory within 24h of collection. |
| 11ml Primary containers (with borate - red cap) for bacteriology urine specimens. Also available in a paediatric size | Store at room temperature | Store at 4°C if possible otherwise at room temperature overnight. Ensure delivery to the laboratory within 24h of collection. |
|  |  |  |
| MycoTrans/Dermapak kits for skin, nail and hair | Store at room temperature | Store at room temperature |
| Early morning (125ml) urine containers (for TB) and suitable specimen bags | Store at room temperature | Store at 4°C if possible otherwise at room temperature overnight. Ensure delivery to the laboratory within 24h of collection. |
| Blood samples for virology/serology/molecular tests | Store at room temperature | Store at 4°C if possible otherwise at room temperature overnight. Ensure delivery to the laboratory within 24h of collection. |

## Delivery of specimens to the laboratory

Regulations for external transport and local policies for internal transport must be followed.

If specimens cannot be sent to the laboratory immediately, they should be stored as follows – see also 8.3:

* BD Blood culture samples store at room temperature
* All other specimens for culture store in a specimen refrigerator at 4°C with the exception of samples for culture of *N. gonorrhoeae (*e.g. genital swabs and neonatal eye swabs*)* and urines in Boric Acid which should be kept at room temperature and delivered with minimal delay.
* Blood samples for serology will be stable at 4°C in a specimen refrigerator.

### Colchester

All specimens should be delivered to the microbiology laboratory reception at 214 Turner Road, Colchester.

* For urgent samples telephone the laboratory so that the sample will be processed on arrival.
* For urgent samples outside of normal working hours (see section 2.1), telephone the duty Biomedical Scientist (BMS) via switchboard.

## Delays before transport

See section 9, below.

# factors that affect tests and results

## Factors which affect uncertainty of results

Performance of tests and interpretation of results in general is dependent upon reliable pre-analytical stages

* specimen collection; the sample must be appropriate for the diagnosis and of good quality– see sections 5 & 6
* completion of request form; provision of adequate information to the laboratory to ensure the correct tests are performed – see section 7
* specimen transport; delays should be avoided wherever possible and or the sample stored/transported in suitable conditions to prevent deterioration– see section 8

Also,

* the timing of the specimen in relation to anti-microbial therapy
* other variables associated with laboratory processes that may affect analysis of the specimen (see 9.5 below).

Information on uncertainty of measurement for specific tests that are reported numerically may be requested from the laboratory

## Effect of delays and storage temperature on sample testing

The time elapsed from taking (collecting) the sample to its reaching the laboratory may be significant if the specimen is not kept at the required temperature prior to dispatch or testing. See also 8.3 and 8.4.

* Delays may cause changes that could radically alter the result. The laboratory count of bacteria in a delayed specimen could be significantly different from that of the specimen when it was collected. Urine in the bladder for example; is normally sterile, whilst the urethra is not sterile and even a carefully taken urine specimen may contain a few microbes that will flourish and provide misleading results.

## Timing of virology samples and provisions of clinical details

In many cases of suspected acute viral illness, the date of onset of clinical signs and symptoms will be relevant to the choice of specimen type and test requested. For example,

* Swab samples should be taken within 5 days of onset
* Faecal samples in cases of gastroenteritis should be collected within 48 hours and should be diarrhoeal
* In other cases, faeces should be collected within 1 week
* For serology, an acute phase sample of blood may be collected in less than 5 days from onset, and the follow-up convalescent phase sample should be taken between 10 -14 days post-onset.
* For molecular diagnosis of viral disease an appropriate sample should be collected during the phase when the virus can be detected. For advice please contact the laboratory.

The date of onset must be supplied with suspected viral infection requests.

Date(s) of contact with, for example, infectious rashes, should be provided where tests for immunity or susceptibility are requested, or infection is suspected, to allow correct interpretation of results.

## Factors affecting antibody and antigen tests

In general, for blood and serum or plasma samples, the following conditions would render the specimen unsuitable for testing:

* Overt bacterial contamination
* Gross lipaemia
* Gross haemolysis
* Multiply frozen/thawed
* Containing particulate matter

## Performance characteristics of tests and assays

Please contact the laboratory for performance details of individual examination procedures and tests, such as:

* Principles of tests and methods
* Units of measurement
* Specific interfering factors
* Uncertainty of measurement (for results in measured quantity values)
* Biological reference intervals
* Clinical decision values
* Laboratory clinical interpretation
* Alert/critical values
* Potential sources of variation
* References

# guideline turnaround times

Please note that these are average turnaround times (in working days), for the production of 95% of final reports, from the time of receipt in the laboratory. In some cases, a preliminary verbal or written report will be issued and will be available on computer search. Positive results will be issued as soon as they are available (e.g. from blood cultures). Reports may be delayed by the isolation of slow-growing, fastidious, unusual or multi-resistant organisms.

Some isolates will be examined by reference facilities and hence the final report will be delayed beyond usual turnaround times. In these cases, an interim report will be issued. All listed turn-around times represent the great majority of clinical examinations. (This list is provided as a guide of normal expectations to users, and TATs shown will sometimes be different to those stated in specific contracts or SLAs.)

## Bacteriology: “Routine” microscopy & culture, etc.

| **Test** | **Turn-Around Time** | |
| --- | --- | --- |
|  | **Interim or negative report** | **Final or positive report** |
| Acanthamoeba culture |  | 7-10 days |
| Blood Culture | 2-5 days | 2-6 days |
| Cerebrospinal Fluid | Microscopy, 4 hours | Culture, 2-3 days |
| *Clostridium difficile* toxins | Toxin test, 24 hours | Confirmation, within 24 hr |
| CRO (Specific organism screen) | 1-2 days | 2-4 days |
| Enteric culture | 2-4 days | 3-6 days |
| Fluid (Normally Sterile Site) | 2-4 days | 4-6 days |
| Genital swabs | 2-4 days | 3-6 days |
| MRSA (Specific Organism Screen) | 1-2 days | 2-3 days |
| Mycobacteria[[3]](#footnote-3) | AFB Microscopy, 1 day | Culture, 10-49 days |
| Mycology | 1-3 days | 1-4 weeks |
| Parasitology | 2-4 days | 3-6 days |
| Respiratory, Lower | 2-4 days | 3-6 days |
| Respiratory, Upper | 2-4 days | 3-4 days |
| Sexually Transmitted Disease Screen | 2-4 days | 3-6 days |
| Tissue Samples | 2-4 days | 3-10 days |
| Urine Microscopy | Microscopy, 1 day | Culture, 2-3 days |
| Legionella antigen (urine) |  | 1 day |
| Wound Swabs | 2-4 days | 3-6 days |
| Specific Organism Screen | 2-4 days | 3-6 days |
| Other bacterial investigation | 2-4 days | 3-6 days |
| Viral antigens in faeces  (rotavirus, adenovirus) |  | 1 day |

## Serology and antigen detection

This list is for commonly requested in-house tests. Please note that these are average turnaround times, for the production of 95% of final reports, from the time of receipt in the laboratory

| **Serology** | **Turn-Around Time (Days)** |
| --- | --- |
| Antenatal screening | 3 – 7 |
| Borrelia (Lyme disease) | 2 – 3 |
| Cytomegalovirus IgG | 2 – 5 |
| *Helicobacter pylori* faecal antigen | 1 – 3 |
| Hepatitis A IgG, IgM | 1 – 2 |
| Hepatitis B virus antigen & antibody | 1 – 2 |
| Hepatitis B confirmation | 2 – 3 |
| Hepatitis C virus antibody | 1 – 2 |
| Hepatitis C antibody confirmation | 2 – 5 |
| HIV antigen/antibody | 1 – 7 |
| Measles IgG virus | 1 – 2 |
| Mumps IgG | 1– 2 |
| Rubella IgG | 1 – 2 |
| Streptococcal ASO | 3 – 7 |
| Toxoplasma Screen | 1 – 5 |
| Treponema pallidum antibody (syphilis) | 2 – 7 |
| Varicella zoster virus IgG | 1 – 2 |

See sections 5 and 6 for specimen collection and sample volumes for serology

## Molecular diagnostics

The guidance in this list is for commonly requested in-house tests. For further information on the most appropriate samples for testing or for request for other testing please contact the laboratory.

| **Test** | **Sample Required - Depending on Clinical Symptoms** | **Turn-around Time (Days)** |
| --- | --- | --- |
| *Chlamydia trachomatis & Neisseria gonorrhoeae* | Cervical swab, urethral swab, conjunctival swab, urine, rectal swab | 3 – 5 |

It is our policy to report all results along with the requested result to provide as much information as possible to aid diagnosis.

## Tests done at referral laboratories

|  |  |
| --- | --- |
| Primary tests/Specialist tests | Allow 7-14 days from receipt in referring laboratory |
| Secondary tests/Reference tests | Allow 7-14 days after primary tests in referring lab |

# quality assurance

The laboratory adheres to standard principles of internal quality control (IQC), internal quality assurance (IQA) and external quality assessment (EQA).

* IQC uses materials of known characteristics. It relates to tests on the day and show that those assays are in control and that specific results are valid.
* IQA is an overall quality assurance measure that uses materials of unknown content, and shows, through regular repeat testing of a small percentage of samples, that the laboratory is able to obtain consistent results.
* EQA an overall quality assurance measure that uses materials of unknown content. The results are analysed by an external body and compared with national performance.

The laboratory participates in a full range of EQA (sometimes known as “interlaboratory comparison”, or “proficiency testing”). Details are available on request.

# other services

## Antibiotic assays

Please note that assays for the antibiotics below are not tested in Microbiology:

|  |  |
| --- | --- |
| **Antibiotic** | **Tested in** |
| Gentamicin  Vancomycin  Teicoplanin | Blood Sciences Laboratory, NEESPS  Blood Sciences Laboratory, NEESPS  PHE Bristol |

Assays for other antibiotics are performed by prior arrangement with the duty Medical Microbiologists (Extension: 7374) and will be referred to the appropriate reference laboratory.

Details of expected results from serum monitoring and appropriate dosage modification and re-testing are given on the relevant NHS Trust pharmacy pages of the intranet.

<http://intranet.rde.local/intranet/publish/INTRANET/departments/Pharmacy/Antibiotic_Management_Team/Prescribing_Guidelines_.php> See section 3.2

Time limits for requesting additional examinations

Where possible, samples are stored in the laboratory under stable conditions that permit additional requests, repeat or further examination with minimum loss of sensitivity. Laboratory staff will be able to advice on specific combinations of specimens and tests where deterioration of the specimen may have occurred that could adversely affect the quality of the result.

## Sample retention time limits

The following guidance is approximate and not comprehensive.

|  |  |
| --- | --- |
| **Sample type** | **Retention period** |
| Swabs and fluids for bacteriological examination | 7 days |
| Urine | 72 hours |
| CSF | 14 days |
| Other specimen types | 2 –7 days after final report issued |
| Specimens for chlamydia tests | 3 days |
| Blood for serology  Tissue & PM samples  Medico-Legal Samples | 2 years  6 weeks  Minimum 6 months |

## Additional request authorisation and confirmation

Additional requests may be made in person, by telephone, or electronically. In cases where the additional tests requested are consistent with the original investigation request, no written confirmation may be necessary. However, some additional tests will require a signature or electronic equivalent; in such cases laboratory staff will advise on the acceptable format. Such confirmation should normally be received within 2 working days. Even so, every effort will be made to facilitate urgent test requests, where possible, while formal confirmation is pending.

# results and reports

## General

### Interim and Final Reports

All reports are electronically produced or printed and dispatched depending on the requesting location every day as they are verified (see section 10 for guideline turnaround times).

### Telephoned results

Results regarded as urgent which may aid the immediate patient management, will be telephoned to the responsible clinician.

**Bacteriology**

Examples include positive blood cultures and cerebrospinal fluids; urgent Gram stains, positive TB microscopy; new positive syphilis serology, Clostridium difficile toxin, Significant (first isolation) resistant isolates, Group A Streptococci and Group B Streptococci (from pregnant women). Significant findings will be telephoned according to agreed critical resulting protocol SOP OF0002 Oral Transmission of Results

**Virology & Molecular**

Results likely to influence patient management will be phoned (or communicated electronically in peak seasons), including those with infection control implications. These include,

* Positive results for blood-borne viruses in pregnancy;
* IgM-positive serological results for:
  + parvovirus in pregnancy; mumps; measles; rubella; Hepatitis A;
* New diagnosis of Hepatitis B and C
* VZV-negative immunity screens from contacts in pregnancy, immunosuppressed patients and infection control cases
* Urgent results, where requested, e.g., patients for haemodialysis, patients for transplant, needlestick injuries, occupational health requests, etc.
* New HIV serological diagnoses
* Positive PCR results for viruses in CSF
* Viral load results for cytomegalovirus (CMV)
* Newly diagnosed cases in inpatients with influenza
* Positive norovirus PCR results (in new outbreak cases)

### Telephone enquiries

Users are encouraged to interrogate their own electronic records before phoning to request results.

For other telephone enquiries direct to the laboratory (see also section 3):

* Bacteriology General Enquiries – 01206747374/ 747314
* All Microbiology lines available 08.30-17:30 Mon-Fri, Saturday and Bank Holidays. 09.00- 13.00, Sundays 10.00-12.00

Please contact the relevant Microbiology staff via Colchester Hospital Switchboard (01206 747474) if there is no response or if outside these hours.

## Colchester Hospital; East Suffolk and North East NHS Foundation Trust

**Electronic Computer Results** are delivered electronically as soon as they are authorised and are available for viewing once received via ICE and Medway Portal System

## General Practice

**Electronic Computer Results** are delivered electronically as soon as they are authorised and are available for viewing via individual practice reporting systems.

## Other users (without access to electronic reporting)

**Printed paper results** are dispatched by mail or NEESPS GP couriers as soon as possible after they are authorised.

# other laboratories providing primary microbiology services

## Clinical Services

Primary testing (other than specialist reference work) is done on site, with the exception of respiratory virus, Mycobacteria culture, Dermatophyte culture and atypical pneumonia serology.

The main external primary referral testing sites are listed below. Specimens are managed and reported via the Colchester PHE microbiology laboratory.

| **Laboratory** | **Organism or Test** |
| --- | --- |
| Cambridge PHE Laboratory | Serological Testing and confirmation  PCR for Respiratory and Genital Viruses  HIV, HBV and HCV Viral Loads  Norovirus PCR  CMV PCR |
| Ipswich PHE Laboratory | TB Culture  Mycology |
| PHE Colindale | HIV and Syphilis Confirmation  Antibiotic resistance confirmation |
| Bristol, Southmead Hospital | Antibiotic assays |
| Bristol, PHE Microbiology Services Laboratory | Anti-fungal assays |
| Manchester, PHE Microbiology Services Laboratory | Meningococcus  (nucleic acid amplification test) |
| Bristol, PHE Microbiology Services Laboratory | Respiratory Serology  (Influenza, RSV, Adenovirus, Chlamydia, Coxiella, Mycoplasma) |
|  |  |

For turn-around times from off-site and referral laboratories, see section 10.4

Specialist and reference testing is done at PHE and other laboratories as listed on the PHE website at <https://www.gov.uk/health-protection/infectious-diseases>

## Food, water and environmental microbiology

A food, water and environmental microbiology testing service is provided by Public Health England. Testing for this is not part of the routine work of the laboratory and any requests for this service should be discussed with the laboratory prior to any samples being sent

## Other non-clinical microbiology services

The laboratory is working to be accredited to perform analysis of clinical samples using procedures based on standard microbiological methods. <https://www.gov.uk/government/collections/standards-for-microbiology-investigations-smi>

Some test requests/results may be available under alternative accreditation standards.

The laboratory is not currently working to be accredited for any non-clinical tests. Consequently, some tests may be provided where the quality of performance cannot be assured. These tests may form part of research, trials or support the work of other hospital departments. These tests will only be undertaken with a mutual understanding of the limitations of these tests and will be reported, if performed, as non-accredited tests.

|  |
| --- |
| **Equality and Diversity Statements**  This document complies with the Equality and Diversity statements of   * Public Health England * East Suffolk and North Essex NHS Foundation Trust |

All embedded links checked as accurate at the point of document approval on 31st May 2019.

1. If multiple urgent requests are all received at the same time, then time to first result may be extended. [↑](#footnote-ref-1)
2. Leaking specimens may be irretrievable; may cross-contaminate other specimens and thus give rise to erroneous results; or, may present an unacceptable risk to the H&S of personnel. [↑](#footnote-ref-2)
3. The time to detection of mycobacterial growth varies with species and between strains. The majority of positives from liquid culture are available between 1 and 3 weeks. [↑](#footnote-ref-3)