East Sussex Healthcare NHS Trust

Pathology Services Handbook

Eastbourne District General Hospital
Conquest Hospital, Hastings

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Ratification Committee

Date of Issue	Version	Next Review Date	Date Ratified	Name of Committee/Board/Group
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Aug 2022	V16	Aug 23	30/08/22	Pathology Management Team
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Contents

Introduction

The guidance in this handbook has been written for all users of Eastbourne DGH and Conquest Pathology services to enable clinical staff to make the best use of our Pathology services. Should you have queries with regard to any aspect of the service, please use the e-mail address **esh-tr.ContactPathology@nhs.net** or discuss with a staff member on 734908 (internal) (0300 131 4908 if dialling from outside). Please note that this e-mail account is not intended for blood collection supplies enquiries or Phlebotomy issues.

The Pathology department consists of:

UKAS accredited medical laboratory no.	8189 Clinical Biochemistry Conquest and EDGH
	8790 Cellular Pathology
	9915 Microbiology
	9988 Haematology EDGH
	9989 Haematology Conquest

Full details of the scope of accreditation can be found on the UKAS website by searching for the accreditation number referenced above.

You are most welcome to visit the department with prior arrangement.

This handbook has been updated to provide information for both Eastbourne DGH and Conquest hospital Pathology departments and we have tried our best to make it user friendly. The authors would be grateful for comments as well as any suggestions for the next edition.

For the Pathology department to provide an accurate, complete and timely service, it is essential that you, the user of this service, provide the following:-

- ✓ **The right sample**
- ✓ **In the right container (transported in the right conditions)**
- ✓ **For the right test**
- ✓ **At the right time.**

The information contained in this document identifies these requirements.

Complaints and Plaudits

Complaints or plaudits about laboratory services or staff may be made to any member of staff within Pathology (see contact details above) in writing, by email or verbally. The Trust *Policy and Procedure for the Recording, Investigation and Management of Complaints, Comments, Concerns and Compliments Experiences Count Policy*) which meets the requirements of The Local Authority Social Services and National Health Service Complaints (England) Regulations 2009, will be followed to investigate the complaint and report on the outcome of the investigation.
If you raise a formal complaint, you will receive a letter from the Trust within three working days acknowledging the complaint and the investigating officer will contact you to discuss further. The investigation will be carried out in a timely manner.
Each complaint will be investigated for root cause and actions assigned to resolve the matter where necessary. If requested the complainant will be kept informed regarding the findings of the complaint investigation and the outcomes.

Formal complaints should be made directly to:
The Chief Executive
East Sussex Healthcare NHS Trust,
St Anne's House
729 The Ridge
St Leonards-on-Sea
East Sussex
TN37 7PT

Or via email: esh-tr.complaints@nhs.net

Pathology related issues/concerns:-
esh-tr.ContactPathology@nhs.net

Please note that this e-mail account is not intended for blood collection supplies enquiries or Phlebotomy issues.

For other general queries and issues regarding care the patient advice and liaison service (PALS) can be contacted on:

Conquest Hospital – PALS	**Eastbourne DGH – PALS**
Tel: 0300 131 5309	Tel: 0300 131 4784
Email: esh-r.patientexperience@nhs.net	Email: esh-tr.patientexperience@nhs.net

Consent

Any requirements for patient consent (e.g. consent to disclose clinical information and family history to relevant healthcare professionals, where referral is needed) or the use of human tissue (including blood samples and other bodily fluids) that has been provided for testing and subsequently requested by the Pathology Department for research purposes is covered by the Trust's Policy and Procedure for Consent.

Pathology Opening Hours

Patient Information

The Pathology Reception on each site is open for receipt of specimens 9am – 5pm.

General enquiries can be made by phoning switchboard on: **Conquest 0300 131 4500 (ext 734928)**
EDGH 0300 131 4500 (ext 774425)

For further information on tests that have been requested please refer to the following website:-
http://www.labtestsonline.org.uk/home

GP Information

The Pathology Department is open for receipt and processing of routine specimens during the following hours. Please consult the Pathology telephone directory (page 6) for departmental telephone numbers.

Site / Department	Monday - Friday	Saturday / Sunday / Bank Holidays
Phlebotomy Reception	8:30am – 4:30pm	**Closed**
Reception Conquest	9am - 5pm	**closed**
Reception EDGH	8am – 8pm	**closed**
Haematology and Transfusion Conquest	8:45am - 5pm	**n/a**
Haematology and Transfusion EDGH	9am - 5:30pm	**n/a**
Clinical Biochemistry Conquest	9am - 5pm	**n/a**
Clinical Biochemistry EDGH	9am - 5pm	**n/a**
Microbiology Conquest	9am – 5pm (Conquest GP Consultant Microbiologist advice only)	**n/a**
Microbiology EDGH	8am – 5pm (all laboratory tests and Eastbourne GP advice only)	**n/a**
Histology Conquest	8.30am – 5pm	**n/a**
Histology EDGH	8am – 4.30pm	**n/a**
Cytology Conquest	8.30am – 5pm	**n/a**
Cytology EDGH	8am – 4pm	n/a

Information for hospital users

The Pathology Department is open for receipt of samples at the following times. Please note the conditions for processing of samples outside of normal office hours and for processing of urgent samples at any time:

Routine samples			Urgent Samples	
Site / Dept	**Monday - Friday**	**Saturday / Sunday / Bank Holidays**	**Normal hours**	**Outside hours**
Reception Conquest	9am – 5pm	n/a	Phone	n/a
Reception EDGH	8am – 8pm	n/a	Phone	n/a
Haematology and Blood Transfusions	Open access / On Call	Open access / On Call	Phone	Contact BMS through switchboard
Clinical Biochemistry	Open access / On Call	Open access / On Call	Phone	Contact BMS through switchboard
Microbiology	8am – 5pm	8am - 4.30pm	Phone	Contact BMS through switchboard
Histology	9am - 4pm	n/a	Phone	n/a
Cytology	9am – 4.30pm	n/a	Phone	n/a

Services Provided

The Eastbourne DGH laboratory is located on the Ground floor adjacent to the restaurant.
The following services are provided on-site at Eastbourne DGH.

- Blood Transfusion
- Clinical Biochemistry
- Haematology
- Immunology
- Histology (cut up, reporting, frozen and skin immunofluorescence)
- Cytology (for receipt of specimens only, Cytology based at Conquest site)
- Microbiology (Consultant Microbiologist advice (via secretary) Routine specimen processing and test requests 08.00am-16.30pm, out of hours specimen processing Eastbourne Hospital only 18.00pm-08.00am Monday-Friday, Weekends and Bank holidays 16.00pm-08.30am)
- Mortuary
- Reception
- Point of Care Testing Department
- Phlebotomy (Level 2 Pink zone, Outpatients area, adjacent to hospital main entrance)

The Conquest laboratory is located on Level 4, Departmental Block, opposite the staff restaurant.
The following services are provided on-site at Conquest.

- Blood Transfusion
- Clinical Biochemistry
- Cytology
- Haematology
- Histology
- Microbiology (out of hours on call for sterile site cultures only) (Consultant Microbiologist advice (via secretary) out of hours specimen processing Conquest hospital requests only 18.00pm-08.00am *only. Weekends and bank holidays 16:30pm to 08:00am*)
- Mortuary
- Reception
- Point of Care Testing Department
- Phlebotomy (Adjacent to Pathology specimen reception)

Phlebotomy Service

The Trust's phlebotomy team provide a 7 day/week ward service (mornings only) for acute sites and an outpatient service. There is one clinic at each acute site and one at the Bexhill CDC. All clinics are by appointment only with the Bexhill CDC open to both Trust and Primary Care patients.

All clinics are by appointment only on:	
Telephone 0300 131 5560 on-line at www.esht.nhs.uk/BloodTests	
Clinic opening hours	
Conquest	08:30 – 17:00 Mon - Fri
EDGH	08:30 – 17:00 Mon - Fri
Bexhill CDC	08:30 – 18:00 Mon – Fri 09:00 – 17:00 Sat

Requests and Results

Minimum labelling for specimens and request forms

All specimens and request forms sent to the Pathology Laboratories from either hospital sites or GP practices must be clearly and correctly labelled. This is necessary to ensure that the patient details are correctly matched to the correct specimen, thus ensuring that the correct results are returned to the correct location for interpretation by the correct clinician and that cumulative records can be maintained. Wherever possible, Pathology staff will endeavour to match any limited patient details received to the hospital electronic records. In order to reduce the risk of misidentification and improve efficiency it is essential that the minimum requirements for Hospital and GP patient samples and request forms are met, as listed below.

It is essential that all writing is in ball point pen, legible and in block capitals.

Hospital In-Patients and Out-Patients

Minimum label requirements for specimens	
Patient Name	This must consist of the full forename and surname of the patient.
and at least one of the following two items (with the exception of BT samples which require all items – as below)	
Date of Birth	The date of birth should clearly identify day, month and year, and must be verified with the patient at the time of specimen collection.
Unit Number or NHS number	The PAS number or NHS number written in full.
Blood transfusion specimens (including all HLA tests inc HLA B27, HFE gene and Platelet antibody tests)	The patient's hospital PAS number (X number) must be included on the specimen label and the request form. Patient details must be handwritten on all specimens. Request form and sample must be signed dated and time of collection stated, blood taker must also print their name in the box provided.
PLEASE NOTE: PAS labels or any label with a bar code or a label that exceeds the size of the current specimen label cannot be used on blood specimens as they cause problems with the instrumentation.	

Minimum label requirements for request forms	
Patient Name	This must consist of the full forename and surname of the patient.
….. and at least two of the following three items	
Date of Birth	The date of birth should clearly identify day, month and year, and must be verified with the patient at the time of specimen collection.
Unit Number or NHS number	All in-patients and out-patients are issued with a PAS number. This must be used on request forms at all times. PAS labels can be used on request forms ensuring that all copies of the request form are labelled.
Patient's Address	The current address of the patient must be included. This assists the laboratory and the practice in identifying patients correctly.

The following information is ESSENTIAL to aid the accurate and efficient processing of the sample and issue of the sample report. This information is also ESSENTIAL to identify the report destination for accurate activity monitoring:

Ward/Location	To ensure the reports can be sent to the correct locations the appropriate ward must be written on the request form.
Consultant name	To ensure the reports are sent to the correct consultant, the name of the consultant responsible for the patient must be included on the request form. This is key information if the ward or location of the patient changes.
Requesting doctor's name and bleep number	This enables the laboratory to contact the requesting doctor if there are problems with the specimen or the results.
Clinical Details	When available, these should be brief and relevant to the tests requested. Clinical details help the laboratory to check the relevance of the tests requested and to suggest other more appropriate tests if necessary. It is also helpful when interpreting abnormal results. Any drug or IV therapy should be particularly noted as these can cause result anomalies.
Test Requests	Please remember to indicate which tests are required. If there is not a 'tick' box provided, the test request can be written on the form in the relevant section.
Date of Specimen Collection and name of collector	Please state the date and time of specimen collection. As well as the name of the sample collector. It is helpful when interpreting abnormal results.

GP Patients

Minimum label requirements for specimens	
Patient Name	This must consist of the full name of the patient. There is the added complication in GP practices that entire families may be registered with the same GP. The use of a title (Mr, Master) will assist with correct identification.
….. and at least one of the following two items (with the exception of BT samples which require all items – as below)	
Date of Birth	The date of birth should clearly identify day, month and year, and must be verified with the patient at the time of specimen collection.
Unit Number or NHS number	The PAS number or NHS number written in full.
Blood transfusion specimens (including all HLA tests inc HLA B27, HFE gene and Platelet antibody tests)	For patients registered with the hospital the PAS number (X number) must be included on the specimen label and the request form. For patients **not** registered with the hospital (PAS number not assigned), the NHS number of the patient must be included on the specimen label and the request form. Patient details must be handwritten on all specimens.

Minimum label requirements for request forms	
Patient Name	The full forename and surname of the patient must be written.
….. and at least two of the following three items	
Date of Birth	The date of birth should clearly identify day, month and year, and must be verified with the patient at the time of specimen collection.
Unit Number or NHS number	If available, the PAS number or NHS number must be included.
Patient's Address	The current address of the patient must be included. This assists the laboratory and the practice in identifying patients correctly.

The following information is ESSENTIAL to aid the accurate and efficient processing of the sample and issue of the sample report. This information is also ESSENTIAL to identify the report destination for accurate activity monitoring:

GP name and Practice	Practices must include the GP and practice name to ensure that reports can be sent to the correct location. The Pathology laboratory will not issue any results either verbally or in writing direct to patients. All results to GPs will be sent directly to the GPs concerned.
Clinical Details	These should be brief and relevant to the tests requested. Clinical details help the laboratory to check the relevance of the tests requested and to suggest other more appropriate tests if necessary. It is also helpful when interpreting abnormal results. Any drug therapy should be particularly noted as these can cause result anomalies.
Test Requests	Please remember to indicate which tests are required. If there is not a 'tick' box provided, the test request can be written on the form in the relevant section.
Date of Specimen Collection and name of collector	Please state the date and time of specimen collection. As well as the name of the sample collector. It is helpful when interpreting abnormal results.

UNLABELLED OR INADEQUATELY LABELLED SPECIMENS WILL NOT BE TESTED.
REPEATABLE SPECIMENS WILL BE DISCARDED.

Repeatable Specimens	**Non-Repeatable Specimens (including specimens collected by a surgical procedure)**
Hospital Patients	
Unlabelled or inadequately labelled repeatable specimens will not be tested and will be discarded. The requesting doctor **/** ward will be informed of the rejection in an appropriate manner.	Laboratory staff will ensure that unlabelled or inadequately labelled non repeatable specimens are corrected by the Doctor/Ward before testing commences (except in the case of Blood Transfusion specimens which will be discarded without exception).
GP Patients	
Repeatable unlabelled specimens will be discarded and the surgery informed. The minimum acceptable information on the specimen label is the full name of the patient and the date of birth (for transfusion specimens, the specimen must also include the PAS or NHS number). This will only be accepted if the request form is completed in full. If this is not the case the specimen will be discarded and the surgery informed.	For unlabelled or inadequately labelled non repeatable specimens, the relevant GP surgery will be contacted by the applicable laboratory staff to correct the discrepancy.

Please note:

- Clinical Governance requires that all specimens be adequately labelled and the patient clearly identified on both the specimen and the request form. This is especially important with urgent or life-savings specimens, when rapid clinical decisions may be made according to the results obtained. It is vitally important that all clinicians understand the importance of adequately labelling patient specimens and request forms. Further information on the provision of key clinical information on laboratory specimen request forms can be found on the HSE website.
- Each request for testing that is accepted by the laboratory shall be considered an agreement to perform the test under the terms of ISO15189:2022 (Medical laboratories: Requirements for quality and competence.
- The patient identity must be verified by the individual collecting the sample prior to proceeding.
- If more than one sample is taken from a patient at the same time then these samples must be labelled clearly so as to distinguish them with detail on location sample was taken from and any relevant clinical details.

Protection of personal information

The laboratory will maintain the confidentiality of patient information by following Trust policy on Information Governance Strategy and Policy (including Data Protection and Confidentiality; Caldicott Guardian Function). It will only disclose information on patients to other health care professionals who need to know that information in order to provide effective care and treatment to that patient. The information provided will be the minimum necessary to allow appropriate and effective care.

Laboratory staff use information about a service user:

- to continue with the on-going care for that person; or
- for purposes where that person has given permission to use the information or the law allows staff to do so.

Laboratory staff will also maintain adherence to the conditions of any relevant data-protection laws and always follow best practice for handling confidential information. Best practice is likely to change over time, and laboratory staff are subject to annual Trust mandatory training to stay up to date. Confidentiality is not only protected by the education of staff but also by the use of security access to computer systems and swipe card access to the Pathology laboratories.

Additional Tests

For additional tests requests to pre-submitted samples will require a separate request form to be completed **(Please do not hand write additional tests on the printed ICE request forms).** This must then be submitted to the laboratory. In some cases additional requests can only be performed within 24 hours of submission (Haematology & Chemistry). Please ask the appropriate laboratory to confirm whether additional tests will be possible.

Ward order comms / ICE requests (electronic requesting)

Pathology requests from GP surgeries
Where possible all GP Pathology requests should be made via Ice requesting. This is available on almost all GP practice systems. New users can be added by emailing the person's name, role and practice to the ICE team. Hand written Pathology requests are still acceptable if Ice is unavailable but in order to comply with our accreditation requirements other types of request form should not be used.

Pathology/phlebotomy requesting on the wards
Pathology requests on the wards should be made electronically via e-Searcher. Clinicians should have been given a username and password for e-Searcher when they arrived, but if not they can be obtained from Medical Staffing. In addition to Pathology requesting it is the preferred way of looking up Pathology results and you will find it useful for a number of other uses too; it is quite intuitive. After logging on simply select the patient from a ward list, clinic list, consultant list or by entering the hospital number. It is

then possible to access a number of functions, but clicking on Order Tests allows requesting of Pathology tests. If your account is not set up for requesting you will be invited to submit your details and the lab will aim to activate your account for requesting within 24 hours.

There is a simple user guide in the Order Tests section that can be printed out,

Handling and labelling danger of infection specimens

Specimens and request forms from patients known to be at 'risk of infection' should be labelled with the Danger of infection warning label.

Specimens from the following will require "Danger of Infection" labelling:
Patients with proven infection with a Hazard Group 3 (HG3) pathogen, such as tuberculosis and other mycobacteria, typhoid, brucella, Escherichia coli O157 and anthrax.
Patients suspected of having an infection caused by a HG3 pathogen, (information from clinical history and examination e.g. injecting drug user, haemophiliac, vCJD), a patient who is part of an ongoing outbreak caused by a HG3 pathogen.

Patients with MRSA do not require "Danger of Infection" labels.
Patients with blood borne viruses HIV and Hepatitis B, C do not require "Danger of Infection" labels as standard universal precautions are sufficient to protect laboratory staff.

If there is doubt as to whether a specimen is "high risk", please contact the microbiology laboratory. Further information can also be found on the HSE website (The Approved List of biological agents - MISC208(rev5) (hse.gov.uk))

Transportation of samples

Hospital collected samples

Ensure that the request form is placed in the separate compartment of the specimen bag to the samples.
Swabs and blood samples can be supplied to the laboratory either via the pneumatic tube system (except blood cultures) or hand delivery at the reception desk.
Histology samples are to be delivered by hand in all cases.
Samples for some tests will require special pre and post collection requirements (e.g. fasting, keep sample on ice, keep sample warm, etc). Details for any requirements are listed by the test in Appendix 1 of this handbook.

GP surgeries and private hospitals

Blue Versapak travel bags are supplied to transport samples collected in GP surgeries and private hospitals. These bags meet the regulations regarding the transportation of diagnostic substances. Each Versapak travel bag contains a self-seal liner bag, and an absorbent material pouch (contained within the liner bag).
Samples are to be packaged for transport as follows:-
Ensure that samples are placed in the specimen bag with the request form
Place the specimen bag and request form inside the liner bag.
Once all of the samples are inside the liner bag the top of the bag is sealed.
The Versapak bag is then zipped close and a security tag placed in through the zip tab and into the bag. This secures the zip to identify if the bag has been opened whilst in transit.
The bag is now ready for collection by the Trust courier, who will replace the collected bag with an empty one.
All transport bag accessories and consumables are available to order via the Pathology Stores.
Samples for some tests will require special pre and post collection requirements (e.g. fasting, keep sample
on ice, keep sample warm, etc). Details for any requirements are listed by the test in Appendix 1 of this handbook.

For further information regarding the transportation of Pathology specimens, please refer to the Procedure entitled '**Procedure for the transportation of clinical samples to the pathology**

laboratory'. This is available on the internet website (**http://www.esh.nhs.uk/pathology/**) and the Extranet by clicking on departments and divisions or via a document search.

Urgent Requests (instructions for Trust requesters)

Clinical Biochemistry / Haematology Service
Normal working hours
Monday to Friday 9am – 5pm Conquest Pathology reception: 734928 | Eastbourne DGH Pathology reception: 774425
There is no need to page the Biochemist or Haematologist within these times. Send samples by air tube (except blood cultures) or porter. The turnaround target for reporting urgent samples is 90% of sample submissions reported within one hour (this will vary based on the tests requested). If this target turnaround time is unacceptable, e.g. patient bleeding in Theatre, please phone the relevant Pathology Reception or contact the relevant shift staff outside hours to arrange immediate action.
Outside Normal working hours
7 day, 24-hour open access service is provided for Haematology and Biochemistry only.
The Biochemist and Haematologist will **NOT** routinely check Reception, so **MUST** be contacted and advised when urgent samples are taken. Response times for urgent requests: the time between arrival in the lab and the reporting time of e.g. FBC or U&E should normally be within one hour. Unexpected grossly abnormal life threatening results will be telephoned as soon as they are available.
Blood Transfusion requests **MUST** be telephoned to Haematology in every event
Microbiology Service routine day hours
Monday to Friday **Eastbourne:** 8.00am – 17.00pm (Conquest users- phone EDGH laboratory who will then arrange transport from Conquest pathology reception) 18.00pm-08.00am out of hours specimen processing only Please note: Any samples received after 16.30pm will not be processed until the following day. Out of HOURS 18.00pm to 08.00am Monday- Friday Out of HOURS 16.00pm to 08.00am Weekends and bank holidays ANY urgent tests/specimen processing outside these hours- please contact the on-call Microbiology Biomedical scientist (BMS) through the Hospital Switchboard (service is provided on both sites by a BMS). Please DO NOT phone BMS for clinical advice, infection control or treatment advice. Samples requiring urgent analysis require a prior telephone call

Urgent Requests (instructions for non-Trust requesters e.g. GPs)

Please ensure that any urgent sample sent to the laboratory is clearly labelled as such. Please advise us of urgent samples in transit by contacting our Reception on the appropriate site:

For samples en route phone EDGH: 0300 131 4500 (774425) / Conquest: 0300 131 4500 (734928)

Please also ensure that you provide a contact number (direct line to surgery or personal telephone number) so that the results can be reported without delay (and often outside of normal surgery hours).

Pathology out of hours service (Haematology and Clinical Biochemistry)

Eastbourne DGH and Conquest sites

7 day, 24-hour open access service for Haematology, Clinical Biochemistry and Transfusion

For Microbiology see Microbiology Laboratory Services Section of this handbook

Instructions for the air tube system

The air tube systems are for the transport of Pathology specimens to the laboratories. Ports are situated in various areas on each site. A full description of the use and maintenance of the pneumatic tube system is available from the extranet and also on the internet website.

The air tube system is **NOT** to be used for Danger of Infection samples, Blood cultures, CSF's or any unrepeatable samples - please send all these samples by Porter instead.

Ensure that all samples and accompanying forms are sealed in transparent plastic bags. Place the sealed bag(s) containing sample & form in a pod having checked that the lid is properly closed and that the pod is in good condition (no cracks or breaks). Open the carrier door and input the number of the target destination onto the keypad. Place the pod into the carrier and close the door. The carrier mechanism will move the pod through 90º and send the pod on its way.

If this process does not take place within a few minutes or if an audible alarm is heard, please contact the Estates department.

Results

Printed reports are available electronically via the hospital computer system (E-Searcher) for all wards and outpatients. GP practice results are sent electronically via the GP links.

Significantly abnormal results will be telephoned to the requesting doctor, NHS 111 (for GP results), nurse or consultant's secretary as appropriate.

Appendices

For:
Which specimen container, volume of specimen and any special storage requirements - see Appendix 1

For:
Unlabelled specimen policy - see Appendix 2

Clinical Biochemistry

Availability of Clinical Advice

For clinical Biochemistry advice there is a Consultant available at the DGH (09.00 – 17.30) or at the Conquest (09.00 – 17.30), Mon-Fri. No out of hours service is provided. Telephones have answering machines in the event of annual leave etc. or please email esh-tr.dutybiochemist@nhs.net or esh-tr.BiochemistryEastbourne@nhs.net

Sample requirements

A comprehensive list of available tests, with reference ranges, sample requirements and expected turnaround times is provided at the end of the Clinical Biochemistry section of this Handbook. The vast majority of Clinical Biochemistry tests are performed using Greiner Ochre (Gold) Top blood tubes.

Quality control

In order to maintain high standards of analysis the Pathology Department at both Conquest and EDGH participates in national quality assurance schemes and maintains its own internal system of quality control checks. However some errors can arise as a result of poor specimens (such as arise by poor bleeding technique, delays in transport, poor identification etc.), and also as a result of errors in recording results transmitted by telephone.

Sample considerations

Do not use large tubes for small blood samples as this greatly reduces the volume of serum/plasma which can be obtained.
Specimens should ideally be sent to the laboratory as soon as possible (via the next transport on the day of sample collection – GP surgeries and locations external to the hospital). Any specimen older than 24 hours from collection may produce inaccurate results. For any specific test sample requirement or more information , please contact the laboratory.

When using the Greiner vacutainer system, tubes must be filled in the following order to minimise contamination from tube additives:

Trisodium Citrate (Blue top)
Plain (red top)
Plain (Ochre)
Li Heparin (Green top)
EDTA (Lavender top)
EDTA blood bank (Pink top)
Sodium Fluoride (Grey top)
Sodium Heparin trace elements (Royal blue top)

Never tip blood from one tube into another, or swap tube lids.
Contact the department if any difficulties in interpretation occur, and do not just ignore results which cannot be explained or are thought to be erroneous.

Venous blood

Specimens of venous blood should preferably be taken with the patient sitting or lying down and without prolonged venous stasis. Do not collect specimens from a vein in a limb into which an intravenous

infusion is being given. If there is anticoagulant in the tube, mix by repeated gentle inversion – do not shake the specimen.

Patients with very high platelets or white cell counts may give spuriously high serum potassium levels, sample should be taken using lithium heparin plasma (green top tube).

Arterial blood

Arterial blood specimens are usually taken only for blood gas analyses, in which case it is important that the syringe is properly heparinised and that the blood is collected anaerobically. When the heparinised syringe has been filled with blood remove any air bubbles and seal with a plastic syringe cap. Mix the blood by inversion and rolling of the sample. Then label the syringe before taking it to the analyser. Keep the syringe in ice if the analysis cannot be performed immediately.

Capillary blood

Capillary blood should be collected whenever possible in children to avoid the occasional hazards of venepuncture. However, good collecting technique is essential in the interests of both the quality and the quantity of the specimen.

Cerebrospinal fluid (CSF)

Collect CSF specimens according to the Microbiology protocol. Kits for the collection of CSF can be obtained from the Pathology Stores. Microbiology will usually forward the specimens to Clinical Biochemistry for the assay of CSF protein, CSF glucose and CSF spectrophotometry (if clinically indicated).

CSF collected for the detection of oligoclonal bands should be accompanied by a blood (Plain/Red top tube) sample taken at approximately the same time.

Urine

An aliquot of a random (usually early morning) urine should be collected into 25ml universal containers.

It is essential that timed urine collections are made with great care. Precise instructions must be given regarding the emptying of a patient's bladder at the start of the collection period (discarding the urine).

24h urine containers are issued by the laboratory. Pathology reception staff are responsible for ensuring that the correct container and collection details are issued, either directly to the patient or to the ward or clinic staff.

Special 24h Urine Containers. Mercury and Heavy Metals require a polycarbonate (thick plastic) container which has been pre-soaked overnight in 2M HNO_3. These containers are available from the laboratory by special arrangement.

Miscellaneous body fluids

Pleural, ascitic and fluids of unknown origin should be collected into WHITE CAPPED (Sterilin) bottles.

Storing specimens overnight

Specimens should not be stored overnight or placed in a fridge, doing so will produce changes in the concentrations of some analytes. Serum potassium levels will be elevated due to leakage from red blood cells. Serum phosphate is also likely to increase on samples which have been stored overnight. The bicarbonate level may also decrease. Ensure that phlebotomy is timed to ensure the samples can be transported on the same day.
Do not store specimens in the freezer or stand specimens on radiators or other very hot places!

Reporting results

Results will be reported as soon as possible but interim reports may be issued when any delay is expected because a more difficult or time-consuming analysis has been requested. Printed reports are no longer sent to the wards because they are no longer filed and the results can be viewed electronically, printed outpatient reports are sent to the consultants' secretaries. Results on routine in-patient and out-patient samples are usually available on E-Searcher.

The department follows the guidance of the Royal College of Pathologists "The communication of critical and unexpected pathology results" requiring urgent clinical action and telephone laboratory results requiring urgent clinical action to all areas of clinical responsibility, including both primary and secondary care. Results of emergency analyses may also be telephoned, but results reported in this way are a frequent source of error, so please repeat the results back to the laboratory staff when they have been recorded. Please do not telephone the laboratory for results unless you cannot find them in any other way. Constant interruptions delay the flow of work.

Phoning policy

Results will be telephoned under the following circumstances:

If E-searcher is working:

i) If we have been contacted by the Doctor who requests results to be phoned.
ii) When the request is from a GP or Outpatients and marked "urgent" or "please phone".
iii) For SCBU and ITU: we will inform the units that the results are now available on E-searcher. Results will not normally be phoned unless we have been requested to do so by the doctor, or they are outside the Action Limits.
iv) For all other wards and GPs/OPs results will be phoned if they are outside the laboratory set phoning criteria:

Test	**Phoning Limits**
AKI Stage 3	ALL new occurrences
ALT	>500
Ammonia	>100
Amylase	>550
Bicarbonate	<10
Bile acids	>10
Calcium	**Corrected** calcium <1.8 >3.5 adults < 2.0 or >3.0 if < 1.1 years
Carbamazepine	>25
Conj. bilirubin	>25. Neonates only.
Creatinine	> 300 adult **(GPs, Outpatients if the first time)** unless known RF > 200 if less than 16 years
CK	>5000 **GP patients only**
Cortisol	<100, unless part of dexamethasone suppression test.
CRP	>300 mg/L **GP patients >200 mg**/L
Digoxin	>2.5
Ethanol	>400
Gentamicin	>3.0
Glucose	<2.5 >25.0. ≥ 15 mmol/L if < 16years**.**
Free T4	>40
Free T3	>10
Iron	>50
Lithium	>1.5

Mg	<0.4
Paracetamol	All positive results
Phenytoin	>25
Phenobarbitone	>70
Phosphate	<0.3
Pro-BNP	>2000 **GP patients only** during core hours i.e. not 111.
K	<2.5 or >6.5 mmol/L(Irrespective of location) . Brighton Renal Unit: >6.0 mmol/L
Salicylate	> 300
Na	<120 >150 <130 if less than 16 years
Theophylline	>25
Triglyceride	>20
TnT	>14 ng/L **GP patients only. Also >100 for A+E, DMAU, AAU.**
TSH	>100
Urate	>340, pregnancy only
Urea	>30 adults **GP patients only** >10 if <16 years
Vancomycin	>20.0
Vitamin D	>300
Xanthochromia	Phone all results (as provisional results)

If E-searcher is not working:

As above, but we will endeavour to telephone all A&E, ITU and SCBU results.

Paediatric investigations

Test priority

Because of the small sample volume available for measurement of blood constituents, test priority should be indicated in case there is insufficient sample to perform everything requested.

Sweat tests

Sweat Test service: This service is offered at both sites EDGH and CONQ. Arrangements for sweat testing can be made with the lab by telephone. Sweat collection and testing is performed by a HPC registered biomedical scientist after appropriate training and completion of a competency assessment.

Suspected inborn errors of metabolism

In addition to general biochemistry, the majority of these patients will require some or all of the following investigations:

plasma amino acids	1 ml blood in paediatric lithium heparin tube (Green top)
urine amino acids	5-10 ml urine in a plain (white top) universal
urine organic acids	10 ml urine in a plain (white top) universal
blood ammonia	2 ml blood in paediatric EDTA tube (Lavender top) Lab must have prior notice. Sample must reach Lab within 20 mins of collection).
blood lactate	1 ml blood in fluoride oxalate tube. Lab must have prior notice. Take sample without stasis and ensure sample arrives in lab within 1 hour of collection).
acyl carnitine profile	3-4 spots of blood on a Guthrie card

Where possible, samples should be collected during acute illness. Relevant clinical details must be provided, including drug and diet history.

Please contact senior biochemistry staff for advice and when urgent analyses are required.

Thyroid function testing

TSH is used as a first line approach to thyroid function testing.

If the serum TSH falls outside either the lower or upper reference range when screening a patient then a free T4 will also be assayed.
All patients on anti-thyroid drugs or receiving treatment for thyrotoxicosis e.g. radioiodine, are pregnant or are under 18 years of age will also have a freeT4 measured.
Patients who are taking thyroxine will only have a free T4 measured if the TSH is found to be suppressed. Please advise patients that samples for TSH should be taken before taking their Thyroxine supplementation to avoid spurious report.

Free T3 assay is also available for the confirmation of suspected T3 thyrotoxicosis in patients with suppressed TSH and normal levels of free T4.
TSH, FT4 and FT3 will be measured if the patient is indicated as being on Amiodarone.

Please state the suspected diagnosis and give details of any recent thyroid related therapy when making a request – otherwise the test cascade will not operate properly.

Please do not request thyroid function tests on acutely ill patients unless there is reason to believe that thyroid disease is responsible for their acute condition. The results are difficult to interpret in the acutely ill.

Troponin testing

Assay of serum troponin T is available for the investigation of patients with suspected acute coronary syndromes (ACS). The NICE guidelines (Link) are followed for the use of this test.

Protein electrophoresis

Serum protein electrophoresis is carried out when specifically requested.

Immunoglobulins (IgG, IgA and IgM) are estimated:
When specifically requested with appropriate clinical details.
In order to investigate an abnormality detected by serum protein electrophoresis.

Serum free light chains are recommended instead of urine protein electrophoresis for the investigation of suspected myeloma.

Investigation of suspected phaeochromocytoma and carcinoid

No single biochemical analysis can provide 100% accuracy. A clinical suspicion and family history are paramount when assessing these patients. Both Plasma and 24hr urine metanephrines are recommended as first line tests. However, in primary care settings two 24hr collections (not on consecutive days) is a reasonable first line approach where exclusion of a catecholamine secreting tumour is the aim.
Plasma free metanephrines may be appropriate in the investigation of sporadic phaeochromocytomas where there is high clinical suspicion or borderline results have been obtained with urine sampling but these cases should be discussed with the endocrine team. Plasma free metanephrines should be requested via the endocrine clinical nurse specialists to ensure that appropriate sample collection is followed.
A number of drugs may interfere with the results including: labetolol, atenolol, captopril, enalapril, oxprenolol, lisinopril, doxazosin, felodipine, tricyclic antidepressants, phenothiazines, MAOIs, methylphenidate (Ritalin), amphetamines and their derivatives and dopaminergic drugs e.g. levadopa. Ideally, patients should stop taking beta blocking or dopaminergic drugs for 2 days prior to collection, but this may be contraindicated in some patients in whom a rebound hypertensive episode may be precipitated. There are no dietary restrictions other than to refrain from excessive coffee intake, nicotine and large doses of vitamin C. Patients should refrain from vigorous exercise prior to and during the collection.

Sample: a single 24 hour urine for consistently elevated blood pressure and 3x 24 hour collections (as advised by a clinical scientist/consultant) for intermittent hypertension. If the patient is having hypertensive or sweating episodes they should start the collection as soon as the episode begins. The urine should be collected in to a plain container, which should be returned to the laboratory as soon as possible.

For suspected **carcinoid** tumours excretion of 5HIAA is measured in a 24 hour sample. The patient should avoid eating bananas, red plums, walnuts, tomatoes, aubergines, avocados and pineapple during the collection and the preceding 48 hours as these can cause biological increases in 5HIAA.
Anticancer drugs e.g. cisplatin, fluorouracil and melphalan, phenmetrazine, reserpine and rauwolfa and 5-hydroxytrytophan (5HTP, available over the counter from health food shops) can increase the excretion of 5HIAA.
5HT synthesis inhibitors (methyldopa, isonicotinic acid hydrazide and p-chloro-phenylalanine), MAO inhibitors e.g. imipramine, L-dopa, ethanol, ranitidine and fluoxetine (Prozac) can decrease the excretion of 5HIAA.

Sample: a single 24 hour urine collected in to a plain bottle with no preservative. The collection should be kept in a cool dark place and should be returned to the laboratory as soon as possible. The collection should be started as soon as possible after an episode of clinical symptoms e.g. flushing.

N.B. The same 24 hour urine collection can be used for both metanephrines and 5HIAA.

Therapeutic drug monitoring

Anticonvulsants

These include:
Phenytoin, Primidone, Carbamazepine, Phenobarbitone, Ethosuximide, Sodium valproate.

Please supply adequate information of:

Therapy: Drugs, dose, frequency, date and time of last dose. Time when sample taken.

Clinical: Type of fit, frequency, toxic side effects, etc.

Sampling Time: Immediately before next dose. Following a change in therapy it is advisable to allow time for re-equilibration of the new dose (2-3 weeks).
(N.B. Valproate levels are not recommended to monitor therapy)

Digoxin

Collect specimens at least 6 hours after last dose.

Lithium

Collect specimens 12 hours after last dose.

Theophylline

Collect specimen immediately before next dose (trough) or, if given IV, 6-8 hours post dose.

Antibiotics: Gentamicin, Vancomycin, Teicoplanin

For information and advice please contact Consultant Microbiologist.

Investigation of drug abuse (Drug Abuse Screen – Referral laboratory)

The most useful specimen for detection of drugs of abuse is urine. If possible, a minimum of 20 ml fresh urine, collected under supervision, should be sent to the laboratory. The urine must be collected in a white top universal container. Red top universal containers (boric acid preservative) are unsuitable for Clinical Biochemistry investigations. Where possible, information on the drugs the patient may have taken should be provided on the request form.

Samples can be tested for the following substances: Barbiturates, Benzodiazepines, Cocaine, Methadone, Opiates, THC (Cannabis), Amphetamines.

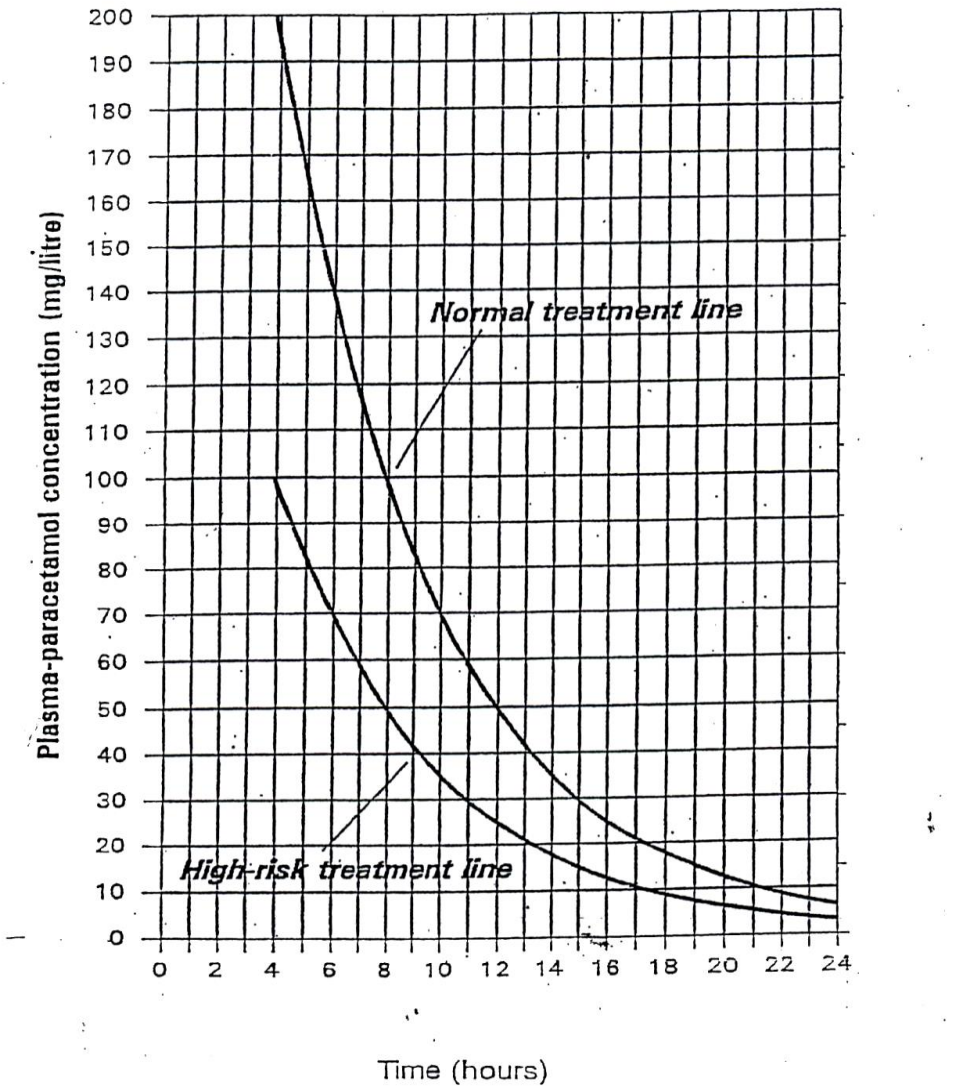
Paracetamol poisoning

The National Poisons Information Service recommend treatment following ingestion of more than 5g by an adult (12 years or over) or 150 mg/kg body weight by a child.

The risk of developing liver damage is best assessed by measuring a serum paracetamol concentration. Blood should be taken at **not less than** four hours post-ingestion. Samples do not have to be taken before Parvolex is given. If the level falls above the relevant treatment line shown below then the patient is at risk of liver damage.

The prothrombin time and serum transaminase measurements are helpful in monitoring the development of liver damage.

NB:- malnourished people or those with induced liver enzymes, e.g. alcoholics or epileptics on anticonvulsant drug therapy, may be more susceptible to lower doses of paracetamol and should be treated with lower paracetamol levels. This also applies if the overdose has been taken chronically.



Patients whose plasma-paracetamol concentrations are above the normal treatment line should be treated with acetylcysteine by intravenous infusion (or, provided the overdose has been taken within 10–12 hours, with methionine by mouth). Patients on enzyme-inducing drugs (e.g. carbamazepine, phenobarbitone, phenytoin, rifampicin, and alcohol) or who are malnourished (e.g. in anorexia, in alcoholism, or those who are HIV-positive) should be treated if their plasma-paracetamol concentrations are above the high-risk treatment line.

Lipid analysis

When fasting and non fasting lipids are requested on samples, the laboratory will routinely measure total cholesterol, HDL, triglyceride and calculate LDL, non HDL cholesterol and the cholesterol/HDL level. Further investigations are available following discussion with Clinical Biochemists or the Chemical Pathologist.

Lipid results are significantly affected by major acute illness and following myocardial infarction it may take up to 8 weeks for lipid values to return to pre-infarct baseline values.

Prior to initiation of long term lipid lowering therapy, secondary causes of hyperlipidaemia such as hypothyroidism, diabetes, alcohol abuse, obstructive liver disease and nephrotic syndrome should be excluded.

All patients on lipid lowering drug therapy should have regular monitoring of their liver function and CK.

Guidance on the requesting of tumour markers

Tumour markers are relatively expensive tests and the results may be misleading; please request them selectively. The following guidance has been formulated to assist with the selection of the most appropriate assays for a given clinical situation.

General Guidance

No serum marker in current use is specific for malignancy. Many patients with early localised disease will have normal levels of serum tumour markers. No cancer marker has absolute organ specificity. PSA however, appears to be relatively specific for prostate tissue. Requesting of multiple markers (such as CEA and the CA series of antigens) in an attempt to identify an unknown primary cancer is rarely of use. Reference ranges for cancer markers are not well defined and are used only for guidance.

Please note that a level below the reference range does not exclude malignancy while concentrations above the reference range do not necessarily mean the presence of cancer. Changes in levels over time are often more clinically useful than absolute levels at one point in time.

PSA

PSA is an extremely useful marker for the detection of prostatic cancer and for monitoring treatment in patients with known carcinoma of the prostate. Referral thresholds are used for PSA results

Age range	Referral threshold
<40	Use clinical judgement
40 - 49	≥ 2.50 ug/L
50 - 59	≥ 3.50 ug/L
60 - 69	≥ 4.50 ug/L
70 - 79	≥ 6.50 ug/L
80 - 84	≥ 10 ug/L
≥ 84	≥ 20 ug/L
Thresholds do not apply to patients who have had, or are receiving, prostate cancer treatment.	

It is important to recognise that in addition to prostate cancer and benign prostatic hypertrophy a number of factors can give rise to significant increases in PSA including UTI, prostatitis, recent ejaculation (within 48 hrs), retention, prostate biopsy, sustained cycling (15 minutes on an exercise bike or a 25 mile bike ride), catheterisation, prostate massage (within the past week) and cystoscopy. A repeat PSA should be considered if any of these factors are present.

CEA (Carcinoembryonic antigen)

Although primarily considered to be a tumour marker for colorectal cancer, less than 50% of patients with Dukes A or Dukes B colorectal cancer will have an elevated serum CEA level at presentation. Furthermore, CEA may be elevated in almost any advanced adenocarcinoma. It is also elevated in a variety of non-malignant conditions including hepatitis, cirrhosis, obstructive jaundice due to gall stones, ulcerative colitis, Crohn's disease, renal disease and smokers.

The main clinical indication for the measurement of CEA is for monitoring patients with known colorectal cancer, when it may provide a lead time for the detection of recurrence. It may also be helpful for monitoring the response to chemotherapy or radiotherapy in patients with advanced disease.

Ca 12-5

Ca 12-5 is a glycoprotein antigen associated with epithelial ovarian cancer. It is elevated in approx. 80% of all cases of epithelial ovarian cancer, but only 50% of early (stage 1) disease.

Ca 12-5 is not specific for ovarian cancer and a variety of non-ovarian intra-abdominal cancers may give rise to elevated serum levels, including colorectal, gastric, cervical, endometrial and pancreatic cancers. Ca 12-5 may also be elevated in patients with advanced lung and breast cancer. Ca 12-5 is also elevated in a range of non-malignant conditions, including endometriosis, pelvic inflammatory disease, cirrhosis and peritonitis. Furthermore, menstruation and pregnancy may be associated with moderately raised levels up to 3 times the upper reference limit.

The main established clinical applications for the measurement of Ca 12-5 are for monitoring treatment of patients with known ovarian cancer and as an aid in the differentiation of malignant and benign pelvic masses.

Ca 15-3

Ca 15-3 is a transmembrane glycoprotein antigen most commonly associated with breast and other adenocarcinomas. Unfortunately, Ca 15-3 is rarely elevated in patients with early disease and may be elevated in non-malignant conditions including cirrhosis.

The main clinical application for the measurement of Ca 15-3 is for monitoring patients with known breast cancer.

Ca 19-9

Ca 19-9 is a mucin antigen most commonly associated with pancreatic adenocarcinoma. Ca 19-9 may also be elevated in patients with gastric and cholangiocarcinomas. For colorectal cancer, CEA is generally more valuable than Ca 19-9.

Unfortunately, Ca 19-9 is also frequently elevated in a variety of non malignant conditions, particularly obstructive jaundice due to gall stones (where very high levels may be seen), acute and chronic pancreatitis, cholangitis and cirrhosis.

The main clinical indication for the measurement of Ca 19-9 is as a diagnostic aid for pancreatic adenocarcinoma and for monitoring patients who are known to have the disease.

Alpha Fetoprotein (AFP)

AFP is a glycoprotein which performs some of the functions of albumin in the fetal circulation.

AFP is usually elevated in the serum of patients with non-seminomatous germ cell tumours of the testis, ovary and other sites, hepatocellular carcinoma and hepatoblastoma. Measurement of AFP may be useful for diagnosis and monitoring treatment of patients with these tumour types.

Non-malignant conditions which may give rise to elevated serum levels include hepatitis, cirrhosis, biliary tract obstruction, alcoholic liver disease, ataxia-telangiectasia and hereditary tyrosinaemia.

Serum AFP is also increased in pregnancy and the first year of life. Infants have extremely high levels which fall to adult values between 6 months and 1 year of age.

Simple dynamic function tests

Consider discussing dynamic function tests with Endocrinology prior to testing

Oral glucose tolerance test

Patient preparation

Normal unrestricted diet with a minimum of 150g carbohydrate for at least 3 days prior to test. Smoking prohibited on day of test. All drugs should be clearly indicated on the request form. Patient should fast overnight (14 hrs) taking water only, and should sit quietly during the test.

Glucose Load Test (OGTT)

i) Collect fasting blood sample for glucose. Ensure tube is appropriately labelled fasting and has a record of the time the sample was taken.

ii) Give patient 113mls of Polycal made up with water to 200mls.
For children, the recommended test load is 1.75g glucose (or 2.64 ml of Polycal) per kg body weight up to a total of 75g anhydrous glucose (113 ml of Polycal).

iii) Two hours after giving the glucose load, take a further blood sample for glucose. Ensure tube is appropriately labelled "2 hr sample" and has a record of the time the sample was taken.

Interpretation

Normal OGTT	Fasting glucose ≤ 6.0 mmol/L and 2 hr glucose < 7.8 mmol/L
Impaired Fasting Glycaemia	Fasting glucose 6.1 – 6.9 mmol/L and 2 hr glucose < 7.8 mmol/L
Impaired Glucose Tolerance	Fasting glucose ≤ 7.0 mmol/L and 2 hr glucose between 7.8 and 11.0 mmol/L
Diabetes	Fasting glucose ≥ 7.0 mmol/L or 2 hr glucose ≥ 11.1 mmol/L

These values apply to venous plasma glucose.
According to NICE guidelines the diagnosis of gestational diabetes is confirmed if the fasting plasma glucose level is 5.6 mmol/litre or above, or the 2-hour plasma glucose level is 7.8 mmol/litre or above.

Low dose dexamethasone suppression test

This test provides a simple screening procedure for Cushing's syndrome.

Dexamethasone (1 mg) is given as a single oral dose at 23.00 hours. Serum cortisol is measured on a specimen taken at 09.00 hours the next morning. Suppression of the serum cortisol level to less than 50 nmol/L makes a diagnosis of Cushing's syndrome unlikely.

Short synacthen test

Ideally, this test should be performed in the morning. The patient should be at rest for 30 minutes before the test. Blood is taken for basal cortisol assay. 250 μg of tetracosactrin (from Pharmacy) is injected into the deltoid muscle. Take blood for cortisol assay 30 minutes after the injection.

In normal individuals serum cortisol should increase to a level of at level 440 nmol/l during the test.

Creatinine clearance

Over a 24-hour period urine collection errors are relatively small, and because the blood creatinine level is relatively constant, a blood sample taken at any point during the test should be representative. Where such a blood sample is received, the creatinine clearance will be reported by the laboratory. If need be and provided that the status of the patient is not changing rapidly, a serum creatinine value obtained within a few days of the urine collection can be used with reasonable accuracy.

The urine volume is measured and hence the minute volume V is calculated:

$$V = \frac{\text{urine total volume in ml}}{\text{time of collection in minutes}}$$

U and P, the creatinine concentrations of urine and plasma, are determined.

Then creatinine clearance (ml/min) = $\frac{U(mmol/l) \times V(ml/min) \times 1000}{P\ (\mu mol/l)}$

Specimen requirements for Biochemistry

Reference and therapeutic drug ranges

Please see the Clinical Biochemistry Reference Ranges Manual on the Hospital extranet or the external website.

COLLECTION OF URINE SPECIMENS

5HIAA	24 hr (Diet Sheet Needed)
Amino Acid Chromat.	Random
Calcium	24 hr / Plain
Catecholamines	24 hr / Preservative
Citrate	24 hr / Plain
Cortisol	24hr / Plain
Creatinine Clearance	24 hr / Plain (Bl sample within the 24 hr period)
Cystine	24 hr / Plain
Mercury	Random (When exposure is over long term or when exposed to inorganic Mercury Compounds.)
Microalb/Creat Ratio	Random
Organic Acid Studies	Random
Osmalality	Random
Oxalate	24 hr / Plain
Porphobilinogen	Random (Abdo pain & other Neurological disorders)
Porphyrins	Random (Keep samples in the dark – transport to lab in a black plastic bag)
Protein 24 hr	24 hr / Plain
Steroid Profile	24 hr/ Plain (SPOT urine is acceptable for paediatric patients)

Adult reference ranges and typical turnaround times

KEY

Specimen Type
S = Serum
U = Urine
Bl = Whole Blood (EDTA)
Pl = Plasma
Faeces

Location
Lab = Daily routine tests
Lab* = Batched
PoCT = Point of Care Testing (Near Patient Testing)
Ref = Referral to other hospitals. Please note that there are times it takes longer than stated due to unforeseen circumstances. Alternatively, some tests may be analysed more rapidly if the laboratory is contacted in advance.

N/A
Not applicable / Not available

NB: Turnaround times may be longer for tests received on Fridays or Bank Holidays/weekends. Please contact the laboratory if tests are required urgently.

For reference ranges please refer to the '***Laboratory Reference Ranges Handbook***' (BIJ-11) which is available to view:-
on the Internet for external users at http://www.esh.nhs.uk/pathology/handbook/
or the extranet for internal users at http://nww.esht.nhs.uk/clinical/pathology/biochemistry-policies/
or via a 'document search'.

Test Name	LOC.	Comments (reporting frequency) Referral lab results expected as stated – maximum turnaround time 4 weeks
1,25-Hydroxy Vitamin D (S):	REF	4 weeks
17 Alpha Hydroxyprogesterone (S): Female Follicular Luteal Neonates Male Neonates	REF	14 days

17 Beta Oestradiol (S): Post Menopausal Follicular Mid-Cycle Luteal Males	Lab	2 days
25-Hydroxy Vitamin D (S)	Lab	2 days
5HIAA (U)	Ref	10 days
Albumin (S)	Lab	2 days
Alcohol (S) (Ethanol, C2H5OH)	Lab*	2 days
Aldosterone (S)	Ref	4 weeks
Alkaline Phosphatase (S)	Lab	2 days
Alpha 1 Antitrypsin (S)	Ref	2 weeks
Alpha 1 Antitrypsin Phenotype (S)	Ref	2 weeks
Alpha Fetoprotein (S)	Lab	2 days
Amino Acid Chromatography (Pl)	Ref	2 weeks
Amino Acid Chromatography (U)	Ref	2 weeks
Amiodarone (S): Desmethylamiodarone	Ref	14 days
Ammonia (B1)	Lab	1 day
Amylase (S)	Lab	1 day
Androstenedione (S)	Ref	10 days
Angiotensin Converting Enzyme (ACE), (S)	Ref	1 week
Beta 2 Microglobulin (S)	Ref	2 days
Beta HCG (EDGH only) (U. Pregnancy Test)	PoCT	Daily
Bilirubin- (Neonatal)	PoCT	1 day Daily
Bilirubin (S)	Lab	1 day
Bilirubin- (Total)	Lab	1 day
Biotinidase Activity (Pl)	Ref	2 weeks
Blood Gases PH PO2 PCO2	PoCT	On the Ward
C-Reactive Protein (CRP)(S)	Lab	1 day
CA 19-9 (S)	Lab	3 days
CA 125 (S)	Lab	2 days
Caffeine (S)	Ref	7 – 10 days
Calcitonin (S)	Ref	Contact lab. Sample on ice. 1 week
Calcium (S)	Lab	2 days
Calcium (U)	Lab	2 days
Calproctectin	Lab	2 days
Carbamazepine (S) Proprietary Name **–Tegretol** (ACD/AED)	Lab*	Sample should be pre-dose. 2 days
Carboxyhaemoglobin (Bl)	PoCT	On the Ward
Carcino Embryonic Antigen (S) (CEA)	Lab	2 days
Carotene (S)	Ref	2 weeks

Chloride (S)	Lab	3 days
Cholesterol (S)	Lab	2 days
Cholinesterase, Dibucaine & Fluroide No. (S): Cholinest. Activity Dibucaine No. Fluoride No. R02 Genotype Fenotype	Ref	3 weeks
Cholinesterase (S)	Lab*	3 weeks
Citrate (U)	Ref	2 weeks
Clobazam (S): Desmethylclobazam	Ref	2 weeks
Clonazepam (S)	Ref	2 weeks
Copper Ceruloplasmin (S)	Ref	14 days
Cortisol (S)	Lab	2 days
Creatinine (S)	Lab	2 days
Creatinine Clearance (U)	Lab	2 days
C-Terminal Telopeptide (CTX)	Ref	14 days
Cyclosporin (S or EDTA depending on the Hospital)	Ref	1 week
Cystic Fibrosis Screen	Ref	4 weeks
Cystine (U)	Lab*	3 weeks
Dehydroepiandrosterone SO4 (DHEA) (S)	Ref	10 days
Digoxin (S)	Lab	2 days
Drug Abuse Screen	Ref	21 days maximum
Ethosuximide (S) (ACD/AED)	Ref	2 weeks
FIT Testing	Lab	1 day
Free T3 (S) Free T4	Lab	2 days
FSH (S)	Lab	2 days
Gamma GT (S)	Lab	2 days
Gentamicin	Lab	1 day
Glucose (CSF)	Lab	1 day
Glucose (Pl)	Lab	2 days
Gonadotrophins (FSH&LH) (S) FSH Post Menopausal Follicular Mid-Cycle Luteal Males LH Post Menopausal Follicular Mid-Cycle Luteal Males	Lab	2 days
Gut Hormone (Pl): Glucagon Gastrin Vasointestinal Peptide	Ref	Contact lab. EDTA / Lavender x 2 and ochre x 1 Fast overnight (10hr), recommended that blood is taken

Neurotensin Somatostatin		between 8am-10am for convenience of fasting. H2 blockers should be stopped for 72h and Omeprazole for 2 weeks before blood is taken. Send on ice to lab immediately. 2 weeks
HbA1c (S)	Lab	1- 2 days
HMBS (Washed RBC & Pl)	Ref	7 days
Homocysteine (S)	Ref	2 weeks
Human Growth Hormone (S)	Ref	1 week
IGF-1 (S)	Ref	7 days
IgG Alb. Ratio / Oligoclonal Bands: Albumin IgG Imm.Electro	Ref	2 weeks
IgG Sub-Classes (S): IgG1 IgG2 IgG3 IgG4	Ref	10 days
Immunoglobulins (S) IgG IgA IgM	Lab*	2 days
Insulin (S)	Ref	Contact lab. Sample to lab within 2 hours of collection. 1 week
Iron & TIBC (S) –	Lab	3 days
Lactate (Bl)	Lab PoCT	Test available on blood gas analysers **or** Contact lab. Take sample and ensure arrival in lab within 1hr of collection. 1 day Urgent / daily
LDH (S)	Ref	6 weeks
Lead (Bl)	Ref	10 days
Lipid profile (S): Cholesterol Triglycerides HDL LDL	Lab	2 days
LH (S)	Lab	2 days
Lithium (S)	Lab	Sample should be 12 hrs post dose. 2 days
Magnesium (S)	Lab	2 days
Mercury (Bl)	Ref	10 days
Mercury (U)	Ref	10 days
Metanephrines (U) Noradrenaline Adrenaline Dopamine	Lab*	Supply current drug therapy. 2 weeks
Microalb/Creatinine Ratio (U)	Lab*	2 days
Organic Acid (U)	Ref	2 weeks

Osmolality (S)	Lab	2 days
Osmolality (U)	Lab	2 days
Oxalate (U)	Ref	5 days
P1NP (Type 1 procollagen N-Terminal Peptide	Ref	14 days
Paracetamol (S)	Lab	1 day
Parathyroid Hormone (PTH) (Pl)	Lab	1 days
PET testing SFLT/PLGF ratio	Lab	24 hours
Phenobarbitone (S)	Ref	Take sample immediately before next dose. 7 days
Phenylalanine (Phenylketonuria) (S)	Ref	2 weeks
Phenytoin (S) Proprietary Name - **Epanutin** (ACD/AED)	Lab*	2 days
Phosphate (S)	Lab	2 days
Placental Alkaline Phosphatase (PALP) (S)	Ref	2 weeks
Porphobilinogen (U)	Lab*	Contact lab. 1 week
Porphyrins (Bl)	Ref	Contact lab. 7 days
Porphyrins (Faeces)	Ref	Contact lab. 7 days
Porphyrins (U)	Ref	Contact lab. 7 days
Potassium (S)	Lab	2 days
Primidone (S) Proprietary Name - **Mysoline** (ACD/AED)	Ref	7 – 10 days
Procalcitonin	Lab	24 hours
Progesterone (S) Post-Menopausal Follicular Mid-Cycle Luteal Males	Lab	2 days
Prolactin (S) Male Female	Lab	2 days
Protein (CSF)	Lab	1 day
Protein Electrophoresis (S)	Lab*	2 weeks
Protein-24 hour (U)	Lab*	2 days
PSA (S)	Lab	2 days
Quinine	Ref	2 weeks
Renin (Pl)	Ref	Contact lab. Sample to lab on ice. 4 weeks
Rheumatoid Factor (S)	Lab	2 days
Salicylate (S)	Lab	1 day
Serum B12	Lab	2 days
Serum ferritin	Lab	2 days
Serum folate	Lab	2 days
Sex Hormone Binding	Lab	2 days

Globulin (S)		
Sodium (S)	Lab	2 days
Steroid Profile (U)	Ref	21 days
Stone Analysis (Stone)	Ref	3 weeks
Sweat Test Sweat sodium Sweat chloride	Lab	By prior arrangement with the lab.
Tacrolimus (FK506)	Ref	Dependent on referral Lab
TCO2 (S)	Lab	2 days
Testosterone (S)	Lab	2 days
Theophylline (S)	Lab*	Take sample immediately before the next dose. 2 days
Thyroglobulin (S)	Ref	2 weeks
Thyroid Function Tests (S)	Lab	2 days
Total Creatine Kinase (S)	Lab	2 days
Total Protein (S)	Lab	2 days
TNT (Troponin T)	Lab	1 day
Urate (S)	Lab	2 days
Urea (S)	Lab	2 days
Valproate (S) Proprietary Name - **Epilim** (ACD/AED)	Lab*	2 days
Vancomycin	Lab	1 day
Vitamin A (S)	Ref	3 weeks
Vitamin E (S)	Ref	3 weeks
Vitamin K (S)	Ref	10 days
Zinc (S)	Lab	10 days

NOTE: Reference ranges are liable to change due to updates in equipment, methods, reagents and change in Ref Labs. Reference ranges are updated on our computer system as they are received and are shown on the test report.

Please contact us if you need further information on tests or reference ranges. Contact numbers are at the start of the Clinical Biochemistry section of this document.

The above list is of common tests. For a full list of tests provided please refer to **Appendix 1** at the end of this document - section entitled 'Eastbourne DGH & Conquest Pathology service – alphabetic test container guide'.

Regularly used referral laboratories

Addenbrooke's NHS Trust
Neonatal Screening Service, Box 247, Level 6, Hills Road, Cambridge CB2 2QQ

Bristol Royal Infirmary
Upper Maudlin Street, Bristol, BS2 8HW

Charing Cross Hospital
Department of Medical Oncology, Fulham Palace Road, London W6 8RF

Epilepsy Society
Chesham Lane, SL9 0RJ

Great Ormond Street Hospital
Chemical Pathology Dept., Great Ormond Street, London WC1N 3NN

Virology Laboratory, Level 4, Camelia Botnar Labs, London WC1N 3JH

Guy's Hospital
Department of Chemical Pathology, 5th Floor, Guy's Tower, London SE1 9RT
Medical Toxicology Department, Avonley Road, New Cross, London SE14 5ER
Regional Genetics Centre, 5th Floor, Guy's Tower, St Thomas Street, London SE1 9RT

Harefield Hospital
Transplant Immunology, Heart Science Centre, Harefield, Middlesex UB9 6JH

King's College Hospital
Department of Biochemistry, Denmark Hill, London SE5 9RS
Department of Clinical Biochemistry, Bone Marker Section, Denmark Hill, London SE5 9RS
Institute of Liver Studies (Dr Mike Tredger), 2nd Floor, Denmark Hill, London SE5 9RS
Infection & Immunity (Prof J Brostoff), Division of Life Sciences, Franklin-Wilkins Building, 150 Stamford Street, London SE2 8WA

Royal Devon and Exeter Hospital
Barrack Road, EX2 5DW

Royal Free Hospital
Renal Unit Laboratory, Pond Street, London NW3 2QG

Royal Surrey County Hospital
Department of Immunology, Egerton Road, Guildford GU2 5XX

Sandwell & West Birmingham Hospitals NHS Trust
City Hospital, Dudley Road, B18 7QH

St George's Hospital
Analytical Unit, Medical School, London SW17 0RE
Chemical Pathology Department, Protein Reference Unit, PO Box 10295, London SW17 0NH
Department of Chemical Pathology, 2nd Floor, Jenner Wing, Tooting, London SW17 0QT
Department of Chemical Pathology, PO Box 10295, London SW17 0NH

St Thomas' Hospital
Department of Chemical Pathology, 5th Floor, North Wing, Lambeth Palace Road , London SE1 7EH
Department of Endocrinology, 5th Floor, North Wing, London SE1 7EH

Synnovis PLC including
St Thomas Hospital
King's College Hospital
Guys Hospital

UCLH NHS Foundation Trust
Special Biochemistry, 60 Whitfield Street, London WIT 4EU

University Hospital of Wales
Ms J Woolf, Porphyria Service, Medical Biochemistry (Upper Ground Floor) , Heath Park, Cardiff CR14 4XW

University of Birmingham
Division of Immunology & Infection, Vincent Drive, Edgbaston, Birmingham. B15 2TT

Point of Care Testing

Point of Care Testing is any Pathology analytical process performed for patient care outside of the laboratory. Please refer to the 'Policy for the Management of Point of Care Testing Equipment' available on the Trust extranet for full details.

The PoCT Co-ordinator, PoCT Support Officer & Link Nurses, are responsible for assisting with staff training, maintenance and troubleshooting of the point of care equipment. Competency is the responsibility of the ward / area as stipulated in the PoCT policy. This in some cases is also supported by the Nurse Educator, who is a representative of the supplier who provides training in the use of a particular device.

The Trust has a range of PoCT equipment in various locations around the hospital. PoCT covers tests and investigations using fixed or portable devices (such as blood gas analysers, urine stick analysers, glucose meters, coagulometers and blood count analysers) as well as eye readable technologies such as pregnancy testing.

These analysers may only be used by nominated individuals who have received training from the point of care testing co-ordinator / Link Nurses. Arrangements for this training should either be via one of the Link Nurses or by the PoCT co-ordinator on extension number: Conquest 734905 and EDGH 734499.

Staff members who work in the areas occupied by the point of care testing equipment are responsible for the calibration and quality control of the analysers. Users are expected to enrol their equipment in an external quality control scheme.

It should be remembered that safety regulations apply to PoCT investigations carried out away from the main laboratory and side room analyses, whether automated or simple "stix tests", must not be undertaken in rooms used for eating or drinking. Any spillages must be promptly wiped up, and the area disinfected with Precept 1000 ppm for routine disinfection of surfaces (10,000 ppm if visible contamination) or Trust sporicidal / decontamination wipes. In the event of any difficulty with the performance or interpretation of such tests please contact the point of care testing co-ordinator on: Conquest 734905 and EDGH 734499 or alternatively contact the appropriate Link Nurse.

Haematology, Blood Transfusion & Immunology

General information

	CONQUEST 0300 131 4500	EDGH 0300 131 4500
Laboratory routine opening hours	Monday to Friday 8:45am – 5:00pm Outside these hours BMS is contactable by bleep	Monday to Friday 9am – 5.30pm Outside these hours BMS is contactable by bleep
Haematology Clinics	None	Monday am Tuesday am Wednesday am / pm Friday am

Availability of Clinical Advice

For any Haematology clinical advice there is a Specialty Registrar available on bleep 0101 during normal working hours, and out of hours there is always a consultant haematologist available via switchboard.

Maximum Surgical Order Blood Schedule

Refer to the agreed Surgical Blood Ordering Schedule in the Trust Transfusion policy which can be found on the Trust Extranet.

Laboratory Services Provided

Tests	Specimen Bottles / Container
Full blood count + differential+/- film; reticulocytes HPLC, malarial parasites; Glandular Fever screening test Sickledex; G6PD screen (Note: -If persistent EDTA platelet clumping is suspected a citrate sample should be submitted in addition to EDTA for a citrate platelet count) -Sickledex solubility Test – not valid for infants < 6months, please request Hb electrophoresis	1x purple EDTA 4ml 1x purple EDTA 1.3ml (paediatric)
ESR	1x purple EDTA 4ml
Coagulation* *ensure samples are filled to the black arrow	
Screening tests; D-dimers; Factor assays	2x blue citrate 3.5 ml 2x blue citrate 1.3ml (paediatric)
Lupus anticoagulant testing	2x blue citrate 3.5ml
Paediatric suspected non-accidental injury (STNAI)	3x blue citrate 1.3ml (paediatric)
Thrombophilia screening, Thrombophilia screening only performed after vetting by Consultant Haematologist	3x citrate 3.5ml 1x blue citrate 1.3ml (paediatric)
All other coagulation tests	Contact the lab for sample requirements
Blood Transfusion	
Current guidance on transfusion matters can be found on the Trust Extranet: Blood and Blood Components Transfusion Policy Clinical Guideline for the Correction of Preoperative Anaemia in Adults Clinical Guideline for the Management of Massive Blood Loss (Haemorrhage) Clinical Guideline for the Management of Postpartum Haemorrhage and Major Obstetric Haemorrhage. Iron Deficiency Anaemia Pathway Paediatric and Neonatal Transfusion Guidelines Policy for Care of Patient Receiving a Blood Component Managing Transfusion Reaction Tool Policy and Procedure for the Prescription and Administration of Prothrombin Complex Concentrates (PCC) (Beriplex) Clinical Guideline for the management of patients who decline transfusion of blood and blood components	
Group & save plasma	6ml EDTA tube, Pink top
Some samples may be only save plasma if transfusion requirements are low or the blood group is not necessary for patient management.	
Crossmatch	6ml EDTA tube, Pink top
Antibody identification	6ml EDTA tube, Pink top x3
Kleihauer test	6ml Pink top G&S sample 4ml EDTA Purple top sample
Cord blood group(includes DAT)	6ml EDTA tube, Pink top
Direct antiglobulin test (DAT)	6ml or 4ml EDTA tube
Blood grouping on neonates 4months old (includes DAT)	Paediatric EDTA tube, Purple top
All other grouping requests on children	6ml EDTA tube, Pink top, containing at least 2ml of blood
RHD screen (NIPT using cffDNA)	6ml EDTA (pink top)
The laboratory can refer samples for genotyping and phenotyping tests for very specific patient criteria, please contact the lab for details.	

DAT is the correct terminology for what was previously called DCT- direct coombs test.

Labelling Requirements for Blood Transfusion

SAMPLE	Full name (both surname and first name), unit record number, date of birth, ward and date of collection must be on specimen, as well as time and signature of collector. Sample labels must be handwritten for any samples going to the blood transfusion lab, Addressograph labels are not acceptable Inadequately or incorrectly labelled samples will be disposed of in line with BSH guidelines.
REQUEST FORM	Full name (both surname and first name), sex, unit record number, date of birth, patient home address, report address, full clinical details, requesting clinician name, date and time blood or blood products are required. Other details should be filled in where known. There is a separate box on the request form for the date time and signature of the person taking the sample. For Transfusion samples the blood taker must also PRINT their name in the box provided.

The person who performs the venepuncture MUST sign/date and time both the sample and request form in the appropriate box.

All other tests by arrangement with Haematology Department. Blood Transfusion work to a protocol for crossmatching of blood for common surgical and orthopaedic operations (see 'Blood Transfusion' section).

The blood transfusion request forms which are issued should be used for all requests for blood and blood products. As much notice as possible is required for planned transfusions including routine operation cover, to enable full grouping and antibody screening procedures to be carried out prior to crossmatching. Please refer to the Blood Transfusion Policy for the full transfusion request process.

Patients who have not been grouped before on our system must have two samples taken ideally at least 10 minutes apart, where possible or if urgent then can be taken at the same time by two separate venepunctures and by two different staff members. The lab will inform as to whether this second sample is required.

Whenever possible 48 hours notice should be given, and in all cases at least one clear working day is required to complete the tests unless the patient's serum has previously been "grouped and saved". More notice is required for irradiated or CMV negative blood, or for large amounts of blood which are not in stock and will have to be obtained from the National Blood Transfusion Centre. Patients with antibodies will need to be discussed with laboratory staff to check timescales.

The patient's full name (forenames and surname), date of birth, hospital number, and gender must be put on **both** the specimen and the request form. Emergency numbers for patients are available in the Accident and Emergency Department in a Major incident or in the event of the PAS system being unavailable, (or NHS number for GP patients if patient has no hospital number). In the interests of safety of the patient crossmatching of blood **cannot be undertaken** without an identifying number, sex and estimated DoB. The department operates a "zero tolerance" policy in the event of mislabelled samples due to the inherent clinical risk.

Blood Donor Pack Compatibility Labelling

There is a single card attached to each blood component or product unit.

This card will carry all the compatibility information and is attached to the unit of product. Prior to administration all patient identification details **MUST** be checked against the card.

The card **MUST** be signed and witnessed prior to administration of the unit of blood or blood product. On completion of administration the completed card **MUST** be detached and returned to the blood bank.

This is a legal requirement. Do not return the empty blood bag or container unless the patient has a reaction.
Each card **MUST** be returned individually.

Blood Products Available

Whole Blood	Only by specific request to NHSBT (rarely used).
Red Cells	Supplied in plasma depleted form, resuspended in an optimal additive solution (SAGM or CPDA).
Red Cells CMV Seronegative	To prevent CMV in vulnerable patients.
Red Cells Gamma Irradiated	To prevent transfusion-associated graft versus host disease.
Platelets	A pack pooled from four random donors, or from a single apheresis donor. (CMV seronegative, irradiated, HLA matched, washed and specific antigen negative can also be supplied).
Fresh frozen plasma	Pack contains 300 ml. Contains coagulation factors. Preparation time (thawing at 37oC) takes 30 minutes.
Octoplas	Named patient basis. Pack contains coagulation factors. Preparation time (thawing at 37oC) takes 30-40 minutes.
Cryoprecipitate	Contains Factor VIII and fibrinogen. For patients with fibrinogen deficiency
All blood components are leucodepleted as a precaution against Creutzfeldt-Jacob disease	
20% Albumin	For patients with severe hypoalbuminaemia for whom a low sodium preparation is required.
Freeze dried human plasma FVIII/VWF	Von Willebrand disease patients.
Recombinant coagulation Factor VIII	For patients with Haemophilia A - Factor VIII deficiency. Does not contain Von Willibrand Factor.
Recombinant coagulation Factor IX	For patients with Haemophilia B – Factor IX deficiency, Christmas disease.
Concentrate of coagulation Factors II, VII, IX, X human (PCC)	For reversal of oral anticoagulant overdose; for treatment of acquired coagulation and congenital disorders where individual concentrates are not available.
Recombinant coagulation Factor VIIa	For treatment of major haemorrhage where all other treatments have been exhausted. For patients with inhibitors to Factor VIII and IX.
Fibrinogen Concentrate	Available for obstetric bleeds and Major haemorrhage.
Anti-D	For RhD negative Mothers (with a RhD positive foetus) to prevent HDFN
Please discuss eligible patients with the Haematologist if applicable	

Suspected Transfusion Reactions

A description of transfusion reactions is available on the Extranet at the following location:-
http://nww.esht.nhs.uk/wp-content/uploads/2018/08/01283_P.pdf

If a transfusion reaction is suspected please inform the Transfusion Department or the BMS on duty and send the following to the laboratory:

Blood pack involved, with giving set still attached. (Securely clamped)
6ml EDTA Cross-match (pink top) from the patient (Group, AB screen, DAT)
4ml EDTA Full blood count (purple top) ~ baseline parameters, agglutinates on film
4ml citrate (blue top) Coagulation screen (DIC)
4ml plain tube (yellow top) Urea, creatinine, electrolytes (renal function)
Urine sample (haemoglobin)
Blood cultures (detect septic reactions)

Do not transfuse any remaining units of blood until the problem has been investigated.

Emergency Transfusion

In the Blood Bank Issue Fridge at the Conquest and EDGH Hospital are two units of Group O Rh D Negative blood for use in an extreme emergency. For Male patients (and occasionally for females over 50yr) then Group O Rh D Positive blood should be used in order to preserve O Rh D Negative stocks- units are available upon request. Emergency Group O blood will NOT have been tested as compatible and still carries a small risk.

Please use the Emergency Issue O Rh Negative blood only in an extreme transfusion emergency and inform the laboratory immediately so that the units can be replaced and compatible units can be issued thereafter. The completed traceability paperwork supplied must be returned to the laboratory. If not already done, a pre-transfusion sample of blood from the patient must be sent to the blood bank so that it can be crossmatched and the compatibility confirmed. Wherever possible it is better to use uncrossmatched blood of the same group as the patient than to use O Negative. The Laboratory will confirm the patient's blood group, however uncrossmatched blood of that group, other than the emergency issue O Negative, cannot be issued without checking the patient's group first, even if they carry a donor blood card.

NB: These products are strictly for emergency use only.

NHS Sickle cell and Thalassaemia screening programme (SCTP)

Haematology departments take part in The NHS Sickle cell and Thalassaemia screening programme (SCTP). The aim of this programme is to offer timely antenatal sickle cell and thalassaemia screening of all women (and appropriate couples) to enable personal informed choice.
SCTP requires a 4ml EDTA sample with an accompanying Family Origin Questionnaire (FOQ).
ESHT are a low prevalence area where less than 1% of the antenatal screening test results for SCTP received by the laboratories are screen positive. Screening is performed for thalassaemia on all women who have accepted screening using the routine Full Blood Count (FBC) results. Further laboratory testing is processed on all women with defined abnormalities of the FBC, those with high-risk family origins in either biological parent as determined on the FOQ, all fertility patients with egg donation, and those women who request testing.

Immunology

GENERAL INFORMATION

Working Hours: Monday-Friday 09.00-17.30

The Immunology laboratory at Eastbourne District General provides routine diagnostic immunology services. The clinical lead is Dr Maher, Consultant Immunologist, who is based at Guy's and King's College Hospitals and visits Eastbourne Hospital on a monthly basis. Dr Maher is available by e-mail or telephone for clinical and diagnostic immunology queries.

All Immunology specimens should be sent to the Haematology Laboratory at Eastbourne. All our tests are run with clotted blood.

Specimens should be labelled with the patient's full name, date of birth, hospital unit number and date of collection

- **Specimens must be accompanied by a completed request form. Please indicate the required tests clearly**
- **Samples that are haemolysed, icteric or lipaemic may be rejected**

In general, the diagnostic performance of autoimmune serology does not lend itself to unfocussed 'screening'. You should try to formulate a clear differential diagnosis and use diagnostic immunology to confirm or refute the possibilities

PERNICIOUS ANAEMIA (gastric parietal cell antibodies, intrinsic factor antibodies)

A composite block slide of liver, stomach and kidney is used to detect antibodies associated with autoimmune liver disease and pernicious anaemia. Follow-on tests may be performed in certain situations.

Gastric parietal cell antibodies:

Use of test	Diagnosis of pernicious anaemia
Where performed	Synnovis
Method used	Indirect immunofluorescence using composite tissue block
Sample	1 clotted tube
Turnaround	Up to 28 days
Reporting results	Positive, weak positive or negative

Intrinsic factor antibodies:

Use of test	Diagnosis of pernicious anaemia
Where performed	Synnovis
Sample	1 clotted tube
Method used	ELISA
Turnaround	Up to 28 days
Reporting results	Positive or negative

Pernicious anaemia (PA) abrogates gastric intrinsic factor secretion and is one of several causes of low levels of vitamin B12. In patients with confirmed low levels of vitamin B12, please request gastric parietal cell antibodies AND intrinsic factor antibody levels.

Gastric parietal cell antibodies (GPCA) are about 81-90% sensitive for the diagnosis of PA, but the specificity is poor at around 50%. False-positives increase in frequency with age and are very commonly associated with other autoimmune diseases, notably autoimmune thyroid disease. **I**ntrinsic factor antibodies are nearly 100% specific for pernicious anaemia, but only 27-60% of patients will be positive.

AUTOIMMUNE LIVER DISEASE (Smooth muscle, LKM, mitochondrial)

A composite block slide of liver, stomach and kidney is used to pick up antibodies associated with autoimmune liver disease and pernicious anaemia. Follow-on tests may be performed in certain situations.

Use of test	Diagnosis of autoimmune hepatitis and primary biliary cirrhosis
Where performed	Synnovis
Method used	Indirect immunofluorescence using rat composite tissue block
Sample	1 clotted tube
Turnaround	Up to 28 days
Reporting results	Positive or negative. Smooth muscle results will in addition be titrated. Samples with mitochondrial staining on composite block will be tested for M2 specificity by ELISA

M2 antibody confirmation

Use of test	Diagnosis of primary biliary cirrhosis
Where performed	Synnovis
Method used	ELISA
Sample	1 clotted tube
Turnaround	Up to 6 weeks*
Reporting results	Positive or negative.

*The referral laboratory will perform the test within this many days of sample receipt; however, shipping, time taken to complete all referred work, results entry and authorisation mean that the result may not be visible to users within this timeframe. Please telephone if results are not on the system and are required more urgently.

Smooth muscle antibodies

Patients with Type 1 autoimmune hepatitis may have antibodies to smooth muscle antigens that are detectable by indirect immunofluorescence and reported as positive, weak positive or negative. Sera are no longer routinely titrated. Weak positive results are of uncertain significance.

Antimitochondrial antibodies

M2 antibodies have high predictive value for primary billary cirrhosis. When mitochondrial staining is evident on the tissue block, the sample will be analysed further for M2 specificity. Non-M2 antibodies (i.e. positive staining on IIF indirect immunofluorescence with negative M2 ELISA) have no association with primary biliary cirrhosis.

Anti-liver/ kidney/ microsomal antibodies (LKM)

LKM antibodies are found in Type 2 autoimmune hepatitis, a rare disease usually seen in children and young adults.

COELIAC DISEASE

Use of test	Diagnosis of coeliac disease
Where performed	Synnovis
Method used	TTG: ELISA Endomysial antibody: indirect immunofluorescence of monkey oesophagus
Sample	1 clotted tube
Turnaround	TTG antibody up to 14 days Endomysial antibody up to 28 days
Reporting results	TTG antibody: <7 negative >7 positive Endomysial antibody: negative, positive, weak positive or equivocal

Coeliac disease is an enteropathy triggered by dietary glutens in wheat, barley and rye. A small proportion of patients develop the bullous skin disease dermatitis herpetiformis.

Interpretation of results
Patients should take gluten in more than one meal a day for at least 6 weeks before the test
Synnovis will automatically test any sample with TTG antibody level>7 for endomysial staining. TTG antibody negative sera will not be analysed for endomysial staining.
There is no need to request total IgA levels separately. The TTG antibody detection system can flag up low IgA samples, which will then be automatically analysed for total IgA levels and, if necessary (e.g. IgA < 0.2g/L), IgG endomysial staining.
Note that the sensitivity of IgG endomysial antibody for coeliac disease is inferior to IgA endomysial antibody.
A small proportion of patients are seronegative

Positive serology in adults should be followed up with duodenal biopsy to confirm the diagnosis. ESPGHAN have published a position paper suggesting that biopsy may be avoided in selected children with strongly positive serology under specialist care

AUTOIMMUNE ENDOCRINE DISORDERS

Thyroid peroxidise antibodies (TPO)

Use of test	Diagnosis of autoimmune thyroid disease
Where performed	Conquest
Method used	Electro-chemiluminescence assay
Turnaround	Up to 7 days
Reporting results	Results are expressed as IU/ ml <50 negative 50-75 borderline >75 positive

TPO autoantibodies are found in patients with all types of thyroid disease and are not uncommon in the healthy population. The TPO method at EDGH is being replaced with the existing method in use at the Conquest Hospital. This should improve turnaround times by unifying the methods used.

Adrenal antibodies

Use of test	Diagnosis of Addison's disease
Where performed	Synnovis
Method used	Indirect immunofluorescence using adrenal tissue sections
Sample	1 clotted tube
Turnaround	Up to 6 weeks
Reporting results	Results are reported as positive or negative

75% of patients with Addison's disease have circulating antibodies to adrenal antigens, which can be detected by indirect immunofluorescence.

Diagnosis of Type 1 diabetes mellitus: GAD, IA2 and ZnT8

Use of test	Assist in the diagnosis of type 1 diabetes
Where performed	Synnovis
Method used	ELISA
Sample	1 clotted
Turnaround	Up to 6 weeks*
Reporting results	Results are reported as positive or negative

*The referral laboratory will perform the test within this many days of sample receipt; however, shipping, time taken to complete all referred work, results entry and authorisation mean that the result may not be visible to users within this timeframe. Please telephone if results are not on the system and are required more urgently

DIAGNOSIS OF VASCULITIS AND CONNECTIVE TISSUE DISEASE

Glomerular basement membrane (GBM) antibodies

Use of test	Diagnosis and monitoring of Goodpasture's syndrome
Where performed	Synnovis
Method used	ELISA
Sample	1 clotted tube
Turnaround	14 days*
Reporting results	Negative<7 U/ ml

*The referral laboratory will perform the test within this many days of sample receipt; however, shipping, time taken to complete all referred work, results entry and authorisation mean that the result may not be visible to users within this timeframe. Please telephone if results are not on the system and are required more urgently.

Glomerular Basement Membrane (GBM) antibodies are found in nearly all patients with Goodpasture's syndrome. The diagnosis must be confirmed by an independent test, most commonly renal biopsy. Glomerular Basement antibodies are directly pathogenic in the disease and serum levels correlate with disease activity.

This test is available urgently on request Monday-Friday within routine laboratory hours – however, in case of acute renal failure that is potentially a result of anti-GBM disease, it makes more sense to organise transfer directly to the regional nephrology centre.

Anti-neutrophil cytoplasmic antibodies (ANCA)

Use of test	Diagnosis of small vessel vasculitis
Where performed	Synnovis
Method used	ANCA: indirect immunofluorescence using fixed human neutrophils
Sample	1 clotted tube
Turnaround	14 days*
Reporting results	ANCA results are expressed as positive, weak positive or negative with a staining pattern of peri-nuclear (P-ANCA) or cytoplasmic (C-ANCA); where the staining cannot be read it will be indicated as 'obscured/atypical', and you should refer to MPO/ PR3 antibody results instead

*The referral laboratory will perform the test within this many days of sample receipt; however, shipping, time taken to complete all referred work, results entry and authorisation mean that the result may not be visible to users within this timeframe. Please telephone if results are not on the system and are required more urgently.

This test is available urgently on request Monday-Friday within routine laboratory hours – however, in case of acute renal failure that is potentially a result of anti-GBM disease, it makes more sense to organise transfer directly to the regional nephrology centre.

There are two clinically relevant immunofluorescence staining patterns known as C-ANCA and P-ANCA. C-ANCA displays a granular cytoplasmic staining pattern and P-ANCA is characterised by a perinuclear staining pattern. If the MPO and PR3 antibody test is positive, we will then perform the ANCA immunofluorescence test.

MPO and PR3 antibody:

Use of test	Diagnosis and monitoring of small vessel vasculitis
Where performed	Synnovis
Method used	ELISA (only ANCA indirect immunofluorescence positives analysed)
Sample	1 clotted (will be performed as add-on to ANCA sample, no extra sample required)
Turnaround	Up to 14 days*
Reporting results	PR3>1.8 IU/ ml is positive MPO antibody > 3.6 IU/ml is positive

*The referral laboratory will perform the test within this many days of sample receipt; however, shipping, time taken to complete all referred work, results entry and authorisation mean that the result may not be visible to users within this timeframe. Please telephone if results are not on the system and are required more urgently.

Interpretation of Results
ANCA can neither confirm nor refute vasculitis definitively. Results must be interpreted in clinical context
The presence of ANCA staining in the absence of specificity for MPO and PR3 is of little clinical utility and may be seen in a range of conditions including infection and inflammatory bowel disease
Serial monitoring may be of value in ANCA-associated vasculitis with specificity for MPO/PR3 antibody.

Anti-nuclear antibodies

Use of test	Diagnosis of connective tissue disease and autoimmune liver disease
Where performed	Synnovis
Method used	Indirect immunofluorescence using fixed HEp2 cells, initial screening dilution 1:80
Sample	1 clotted
Turnaround	Hep-2 indirect immunofluorescence up to 14 days*
Reporting results	Indirect immunofluorescence using Hep-2 cells: results are reported positive or negative with a pattern. Positive samples will be titrated (i.e. the staining will be diluted out to give a semi-quantitative estimate of the antibody concentration),

*The referral laboratory will perform the test within this many days of sample receipt; however, shipping, time taken to complete all referred work, results entry and authorisation mean that the result may not be visible to users within this timeframe. Please telephone if results are not on the system and are required more urgently.

Anti-nuclear antibodies (ANA) represent a useful test in screening for diagnosis of connective tissue disease. They may also be found in autoimmune liver disease. However, the presence of ANA is a very non-specific finding. In other words, ANA will often be positive in healthy individuals, particularly in the elderly. Consequently, the test should be used to confirm or refute your clinical impression rather than for unfocussed screening purposes. ANA is a very sensitive test for systemic lupus erythematosis, so this disease is unlikely if ANA is negative.

Where results are positive follow up testing of the measurement of antibodies to double stranded DNA (dsDNA) and common Extractable Nuclear Antigens (ENA) will be performed. The titre of ANA does not correlate well with clinical disease activity. Consequently, repeat analysis of known positives is not helpful unless the clinical features change; the laboratory may store such samples and suggest that you make contact to discuss whether repeat is indicated.

Antibodies against ds-DNA

Use of test	Diagnosis and monitoring of SLE
Where performed	Synnovis
Method used	ELISA
Sample	1 clotted tube
Turnaround	Up to 28 days*
Reporting results	Negative results are < 10 IU/ml Positive >10 IU/ml

*The referral laboratory will perform the test within this many days of sample receipt; however, shipping, time taken to complete all referred work, results entry and authorisation mean that the result may not be visible to users within this timeframe. Please telephone if results are not on the system and are required more urgently.

Antibodies against double-stranded DNA (dsDNA) show strong association with SLE, and particularly lupus nephritis. The levels of antibody have some correlation with disease activity, meaning that repeated measurement can be useful in monitoring of the activity of SLE.

Antibodies against extractable nuclear antigens (ENA)

Use of test	Diagnosis of connective tissue disease
Where performed	Synnovis
Method used	Screening ELISA Typing ELISA for screen-positive sera
Sample	1 clotted tube
Turnaround	Up to 28 days*
Reporting results	ENA antibody screen is reported as negative, positive or borderline. ENA antibody profile will be performed on positive or borderline sera. ENA profile results are reported as positive or negative for each ENA antigen

*The referral laboratory will perform the test within this many days of sample receipt; however, shipping, time taken to complete all referred work, results entry and authorisation mean that the result may not be visible to users within this timeframe. Please telephone if results are not on the system and are required more urgently

The specificity of ANA-positive sera may be further defined according to reaction with a group of antigens collectively known as extractable nuclear antigens (Sm, RNP, Ro, La, Scl-70 & Jo-1).

***Antibodies to Sm and RNP Antigens**:* Antibody to Sm antigen is found in a subset of patients with SLE and is fairly specific for lupus when present alone, When RNP antibodies are present alone, they are associated with mixed connective tissue disease. RNP antibodies are also frequently found in patients with lupus, in which case other antibody specificities (especially Sm) are usually present.

***Antibodies to Ro (SS-A) and La (SS-B) Antigens**:* Ro and/ or La antibodies are found in 60 to 70% of patients with Primary Sjögrens syndrome and 30 to 40% of patients with SLE, particularly those with cutaneous lupus. The presence of Ro antibodies during pregnancy can result in fetal congenital heart block and neonatal lupus, meaning that specialised clinical monitoring may be appropriate. The presence of Ro antibody with negative or weak ANA staining should be interpreted with caution.

Antibodies to Scl-70 : This antibody is associated with primary systemic sclerosis.

***Antibodies to Jo-1** :* Jo-1 antibodies occur in polymyositis and dermatomyositis and are frequently associated with interstitial lung disease.

Please note: Centromere antibody is detected by the characteristic centromere staining pattern on indirect immunofluorescence. The antibody has an association with the limited form of systemic sclerosis.

DIAGNOSIS OF RHEUMATOID ARTHRITIS: CYCLIC CITRULINATED PEPTIDE ANTIBODIES

Use of test	Suspected rheumatoid arthritis
Where performed	Synnovis
Method used	Quantitative ELISA for IgG CCP antibodies
Sample	1 clotted
Turnaround	Up to 28 Days
Reporting results	0 – 6.9 U/ml - Negative > 6.9 U/ml – Positive

Antibodies directed against CCP are around 70% sensitive and 95% specific for rheumatoid arthritis.

DIAGNOSIS OF ANTI-PHOSPHOLIPID SYNDROME (Anticardiolipin antibodies)

Use of test	Confirmatory test in the diagnosis of anti-phospholipid syndrome
Where performed	Synnovis
Method used	Screening ELISA followed by quantitative IgG/ IgM ELISA for positive samples
Sample	1 clotted
Turnaround	Up to 6 weeks
Reporting results	Screen: positive or negative Quantitation: IgG anticardiolipin >12.1 U/ml – Abnormal Quantiation: IgM anticardiolipin >9.3 U/ml – Abnormal

The main clinical features of the anti-phospholipid syndrome are recurrent thromboses and pregnancy-related morbidity, but numerous other presentations are reported, particularly neurological defects and thrombocytopenia. Lupus anticoagulant activity (performed in haematology, e.g. Dilute Russell Viper Venom Test and one other test) and IgG anti β2GPI (glycoprotein I) antibodies should be measured in addition to anti-cardiolipin antibodies. The association of IgM cardiolipin antibodies with anti-phospholipid syndrome is less well-defined, and false positive results are common during infection and in the presence of rheumatoid factor. Testing for IgA anti-cardiolipin antibodies is not currently recommended. Transient low-level results may occur, so positive results should be confirmed with a repeat after 12 weeks.

MEASUREMENT OF COMPLEMENT PROTEINS

C3 and C4

Use of test	Diagnosis and monitoring of diseases involving complement consumption of failure to produce complement components
Where performed	ESHT (Biochemistry)
Method used	Immunoassay (C8000)
Sample	1 clotted
Turnaround	2 days
Reporting results	Normal range C3: 0.90-1.80 C4: 0.10-0.40

Measurement of complement components C3 and C4 is usually performed for the diagnosis and monitoring of inflammatory diseases with antigen-antibody complex formation, particularly systemic lupus erythematosus but also cryoglobulinemia, rheumatoid vasculitis and post-streptococcal glomerulonephritis. C3 and C4 are both acute phase proteins (e.g. levels rise during an acute phase response), and this should be considered when interpreting results.

C1 INHIBITOR DEFICIENCY

Use of test	Diagnosis of C1 inhibitor deficiency
Where performed	Synnovis
Method used	Nephelometry
Sample	1 clotted
Turnaround	42 days*
Reporting results	0.22 - 0.38g/ L

*The referral laboratory will perform the test within this many days of sample receipt; however, shipping, time taken to complete all referred work, results entry and authorisation mean that the result may not be

visible to users within this timeframe. Please telephone if results are not on the system and are required more urgently.

C1 inhibitor deficiency leads to attacks of subcutaneous and submucosal swelling without urticaria; if the gut is affected, patients suffer extreme abdominal pain and vomiting, whilst involvement of the larynx can lead to suffocation. The hereditary form usually presents in the second decade of life, but some cases are asymptomatic or present very late. C4 levels are almost always low in C1 inhibitor deficiency, providing a useful initial screen for the diagnosis. Low levels of C1-inhibitor are diagnostic of hereditary or acquired C1 inhibitor deficiency. If this diagnosis is being contemplated, please contact Dr Maher since additional functional testing may also be required.

ALLERGIC DISEASES

Total IgE

Use of test	Evaluation of total IgE levels
Where performed	Synnovis
Method used	Immunocap
Sample	1 clotted
Turnaround	Up to 6 weeks
Reporting results	Results are expressed in kU/ L Reference range 0 - 81.0kU/ L (Adult), Paediatric available on request

Measurement of total IgE is of limited clinical utility. Results within the normal range have some negative predictive value for the presence of an atopic phenotype; however, allergic diseases (most notably food allergy) may occur in the context of normal IgE. Equally, a finding of raised total IgE is a fairly non-specific finding and also does not indicate the nature of the sensitisation. High levels of total IgE are not uncommon in patients with extensive atopic eczema and this may confound the interpretation of a low-level positive result for one or more specific IgE tests.
Other uses are the evaluation of patients for possible Job's (hyper-IgE) syndrome and before Omalizumab for asthma.

Allergen-specific IgE

Use of test	Evaluation of Type 1 (IgE-mediated) allergic diseases
Where performed	Synnovis
Method used	Immunocap
Sample	1 clotted
Turnaround	Up to 6 weeks
Reporting results	Results are expressed in kUA/ L <0.35 negative

Low	High	Interpretation
0.01	0.35	Grade 0
0.36	0.70	Grade 1
0.71	3.50	Grade 2
3.51	17.50	Grade 3
17.51	50.00	Grade 4
50.01	100.00	Grade 5
100.00	999.99	Grade 6

Introduction
We can detect IgE directed against a variety of allergens in the laboratory. Performance of these tests may be similar to skin prick testing (particularly aeroallergens) but may also be quite different (particularly for plant-derived allergens, where the sensitivity is usually higher but the specificity lower). Allergens offered through our service are available as referral tests.

Please note the following:
The most important aspect in the diagnosis of allergy is the clinical history
Use these laboratory tests to confirm or refute your differentials
Tests for specific IgE will not inform the management of diseases that are clearly not IgE mediated, such as irritable bowel syndrome or migraines
Please provide appropriate clinical details
The allergy questionnaire form is now obsolete; please use a standard form, stating clinical details and exactly which allergens are of interest
These tests are extremely expensive. Requests for blanket testing are liable to be declined without discussion
If you are really unsure then discuss with Dr Maher or consider referral to a dedicated allergy clinic.
If screening panels are negative then no further action will be taken. If positive we will go on to test for the individual components. Please do not request screening panels if patients have a very high probability of a positive result: the screening reagents are expensive and a positive result will then trigger testing for individual allergens that may not be of interest to you

Interpretation
The results must be interpreted in clinical context, as positive results may demonstrate sensitisation rather than true clinical allergy and negative results may be misleading (e.g. wrong allergen tested, true false-negative result).

Please contact the Immunology laboratory in case of any difficulty.

Telephoning abnormal results

The following tests will be telephoned when the result meets or exceeds the stated value.

TEST	NEW patients only
Haemoglobin	adults<80g/L, newborns in SCBU/FS <120g/L
WBC	>30.0 x 10*9/L (not post op)
Neutrophils	<1.0 x 10*9/L (Not phoned to JBDU or Pevensey ward as routinely monitored.)
Platelets	<50 x 10*9/L
INR on anticoagulants	>4.9
INR no known reason	>1.5
APTR on anticoagulants	>5.0
APTR no known reason	>1.5
Fibrinogen	<1.0 g/L
Malaria	Positive
DAT	If suspected real transfusion reaction or strong positive in newborns
Sickle screen	Positive (Pre-op only)

Reports
Adult reference range and normal values for age and sex printed on the report form.

Haematology Normal Ranges and turnaround times

TEST Indices	Normal Range		Units	Turnaround Time	Referral Lab (Y/N)
	Male	**Female**			
D-dimer	<225	<225	ng/mL	8 hours	N
ESR	1-10	3-15	mm/hr	8 hours	N
Factor IX	50 – 150	50 – 150	iu/dL	42 days	Y
Factor VIII	50 –150	50 –150	iu/dL	42 days	N
FBC	Various - see report	Various - see report	Various - see report	8 hours	N
Fibrinogen	1.8-3.6	1.8-3.6	g/L	8 hours	N
Hb A2	2.2-3.5	2.2-3.5	%	3 days	N
Hb F	<1.0	<1.0	%	3 days	N
INR (Normal Range)	0.8 – 1.2	0.8 – 1.2		8 hours	N
INR (Therapeutic Warfarin Range)	2.0 – 4.5	2.0 – 4.5		8 hours	N
APTR (Normal Range)	0.85 – 1.1	0.85 – 1.1		8 hours	N
APTR (Therapeutic Heparin Range)	1.5 – 2.5	1.5 – 2.5		8 hours	N
Reticulocytes	10 - 100	10 - 100	$x10^9/L$	8 hours	N

The above list is of common tests. For a full list of tests provided please refer to Appendix 1 at the end of this document - section entitled ‘Eastbourne DGH & Conquest Pathology service – alphabetic test container guide’.

For ranges of other tests please contact the department.

Please use E-Searcher to check the progress of your results.
To minimise disruption in the laboratory only telephone the laboratory when necessary.

Haematology Referral Laboratories

BCR/ABL	Haematological Malignancy Diagnostic Centre Kings College Hospital Denmark Hill London SE5 9RS
Immunophenotyping	Haematological Malignancy Diagnostic Centre Kings College Hospital Denmark Hill London SE5 9RS
Chromosomes	The Genetics Centre 5th Floor, Guys Tower Guy's Hospital St Thomas' Street LONDON SE1 9RT
Immunology	Synnovis
Haemoglobin variants	Red Cell Laboratory Kings College Hospital Denmark Hill LONDON SE5 9RS
HFE Gene	Kings College Hospital Denmark Hill London
HLA B27	Clinical Transplantation Department Guy's Hospital London SE1 9RT
Coagulation tests	St Thomas's Hospital
Serological investigations	National Blood service St George's Hospital Tooting London
E5MA for Hereditary spherocytosis (must have Consultant Haematologist agreement). Must be in lab by 10am and cannot be tested on Thursdays or Fridays	Red Cell Laboratory Kings College Hospital Denmark Hill LONDON SE5 9RS

Factors affecting samples / tests

Volume
Coagulation tests must be filled to the line or no less than 10% from the line. Under filled samples cannot be tested.

Clotted Samples
No tests can be done from FBC or Coagulation samples if the sample is clotted. This is particularly important if using needle and syringe for taking samples instead of the vacuum system.

Temperature
Heat: Samples must not be left in areas where the temperature exceeds ambient. e.g. of window siles, cars etc.
Cold: Not a problem above 4ºC but patients with Cold Agglutinins must have samples kept warm.

Lipaemia
High levels of fats or intra lipid can artificially elevate the haemoglobin.

Time
All haematology samples are affected by storage. In general tests can be performed up to a maximum of 24 hours after collection without significant deterioration but should be tested as freshly as possible. However, coagulation samples can only have tests added on up to 6 hours after collection.

Mixing
Insufficient mixing can lead to clotting taking place. Also if blood is allowed to stand in a syringe before being decanted into a sample bottle sedimentation may occur which may significantly alter the full blood count.

Haemolysis
Haemolysis can affect the quality of the blood sample particularly for transfusion related investigations. Haemolysis of sample can be caused by:

- excessive shaking of the sample once collected
- excessive delay in the sample reaching the laboratory
- phlebotomy technique
- duration of storage of the sample after collection at a high room temperature

Other Factors
High levels of Haematinics can influence results

Platelet clumping in EDTA: A small percentage of the normal population can experience clumping of platelets in EDTA. This means the lab can't accurately give results. In these patients an accurate platelet count can be obtained by sending a citrate tube. This means a separate citrate sample will need to be sent if coagulation results also required.

Microbiology

General information

Laboratory Working hours

The Microbiology Laboratory at Eastbourne provides diagnostic services for both sites.							
Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Bank Holiday
Laboratory hours: 8.00am –5.00pm *Please note: Any routine samples received after 4.30pm will not be processed until the following day*					Laboratory hours: 8:00am – 4:30pm *Please note: Any routine samples received after 1.00pm will not be processed until the following day*		
N.B. Antibiotic levels are NOT done outside normal working hours							

Laboratory Services

Urgent requests

During routine working day 08.00 to 18.00pm, samples requiring urgent analysis require a prior telephone call.

Routine specimens designated “urgent” on request form but not pre telephoned will be tested promptly but not immediately, with the exception of CSF ascitic fluids and flu tests.

Out of hours requests

18.00pm to 08.00am Monday-Friday, 16.30pm to 08.00am Weekends and bank holidays
An out of hours technical specimen processing and clinical advice is offered on both sites Eastbourne and Conquest. BMS and consultant staff can be contacted via switchboard.

If you require clinical advice; antibiotic treatment advice or infection control advice only ensure you ask switchboard to contact the Consultant Microbiologist. The biomedical scientist will not be able to give clinical advice.

Samples which will affect immediate patient management will be accepted. Please don’t ask for routine samples to be processed – the laboratory is not resourced for this.
Routine samples will be processed the next working day, however if there is an urgent need to process the sample then the on-call consultant microbiologist can be contacted who will ratify the specimen for processing if required.

DO NOT PHONE THE BMS UNTIL YOU HAVE OBTAINED THE SAMPLE.

Blood Cultures Check Blood culture policy - do not need to phone BMS but take down to Pathology Reception as soon as possible and within 4 hours of collection.
EDGH - place in Pathology Reception incubator – Do not leave on the bench.
Conquest - leave at Pathology Reception.
CSFs are always urgent. Always contact the BMS after taking the specimen.
Do not send via the pneumatic tube system. Please note chemistry will not be performed on sample until Microbiology investigations have been completed. If you do not contact the Microbiology Biomedical scientist out of hours results may be delayed.
Swabs Can almost always wait.
Sterile site specimens including Fluids e.g. joint aspirates/Ascitic fluids, Theatre Tissues and a collection of volume pus (not swabs) – contact the Microbiology on call biomedical scientist and negotiate when they can do it.
Urines Dipstick the urine (note do NOT use boric acid container urine for dipsticks). Calling in the BMS is rarely necessary and only if you have ratified with the duty Consultant Microbiologist first.
Antibiotic assays Refer to Trust Antibiotic Policy – samples are processed by the Biochemistry Dept.

Unrepeatable specimens must be delivered to the lab by hand.
Do not send via the pneumatic tube system.
C. difficile Toxin and carrier status
Tests are performed 7 days a week including Bank Holidays.
National guidelines state that the requestor must get the sample to the pathology as soon as possible.
Samples arriving in laboratory after 1pm will not be tested until following day.
Monday – Friday: Tests done before 3.30pm results normally available on e-searcher within 18 hours.
Weekends and Bank Holidays a single run takes place at the end of the morning only. Positives will be notified to relevant teams Monday – Friday, weekends and Bank Holidays.
Corneal scrapes are always urgent. Always contact the BMS after taking the specimen.

Results which will be telephoned to doctors/wards

When possible, results will be telephoned to doctors. If this is not possible, the result will be given to the nurse in charge of the ward/department or to a qualified nurse.

Cerebrospinal fluids	All microscopy results Positive culture results
Sterile body fluids and blood cultures	Positive microscopy Significant positive culture results
TB results	Positive microscopy Positive cultures
The isolation of the following pathogens	B. pertussis C. difficile N. meningitidis V. cholerae C. diphtheriae Cryptococcus neoformans Shigella sp. E.coli O157
Serology results	Positive HIV results (will be telephoned to medical staff only) Positive HbsAg Positive Rubella IgM in pregnancy (or rising-titres) Positive Hepatitis A IgM results
C. difficile Toxin	Positive toxin result or carrier status positive
Other results may be phoned if they are considered to be significant in the light of the clinical details supplied.	

All tests are routinely available except:

Please phone the laboratory before sending samples for the following:
- CSF
- Rabies Antibody Screen
- VHF (Viral Haemorrhagic Fever) – refer to the VHF policy available on the hospital extranet.

Tests only available if authorised by a Registrar or Consultant:
- CSF PCR (Herpes simplex/enterovirus)
- Hepatitis B DNA PCR
- Hepatitis C RNA PCR/genotyping
- TB PCR/DNA probe for resistance gene

VHF (Viral Haemorrhagic Fever) – contact Consultant Microbiologist before taking samples and see VHF policy on the extranet.

Microbiology Samples

In order to avoid cross contamination of samples, in the event that several fluid or tissue samples are taken from one patient please ensure that each sample is in a separate sample bag. If there is only one request form for several samples then please place all individually bagged samples into one larger bag along with the request form.

Blood Cultures

The IV Team, during the daytime and Clinical Site managers at night must be called in the first instance to take blood cultures. For Haematology, Paediatrics, Critical Care and Gateway (A&E, MAU, SAU) areas please see the Trust Blood culture policy. This document is available on the Trust Extranet.

All positive results will be phoned to medical staff as soon as available.

Urines

Containers for routine urine culture (MC&S)

These contain a white powder – boric acid – which acts as a bacterial preservative. This prevents bacterial overgrowth in samples which may not reach the laboratory immediately. Please do not tip this out of the container.

IMPORTANT NOTE they are NOT suitable for non routine urine culture specimens (Chlamydia, Clinic dipsticks, Chemistry investigations, CMV).

Hospital and Community users

For any pre-analytical tests (eg dipsticks) that you use in your areas continue to use your current containers – however if you are sending in a sample for urine microscopy and culture transfer to a boric acid container as described below. This will reduce the chance of bacterial overgrowth during transport For hospital patients ideally please use a Yellow 10ml tube/ 60ml pot collection kit (instructions see [A] on following pages. For community users use the red top 10ml Urine boric acid container (contains preservative – Boric acid unsuitable for non routine culture specimens – instructions see [B] on following pages). Please DO NOT use the white top (non preservative) universal containers for urine culture. Please note community users can use the tallow collection kits if preferred.

Any urine samples for culture/microscopy not in a current 10ml boric acid primary tube will not get a microscopy result and any culture result will need to be interpreted with care.

Collect urines as described on following pages. Do not discard the white powder.
Fill boric acid pot to the line marked and mix well. This gives the correct concentration of preservative.
Dispatch specimen to laboratory as soon as possible.
Boric acid preserved urine specimens may be stored at room temperature prior to processing.
They do not need to be placed in a refrigerator (although this is preferred particularly in hot weather).
Please note; do not use boric acid containers for purposes other than microbiological analysis of urine.

Catheter Urines Collection method

Please do not send CSUs unless the patient is CLINICALLY SYMPTOMATIC or for pre-operative Urology screening. ALL long-term catheters become colonized with bacteria over time and the urine may become dipstix +ve/cloudy, reflecting this. This is NOT an indication for culture or antibiotic treatment . Antibiotic treatment IS indicated if the patient has CLINICAL signs of UTI/sepsis, in which case the catheter should be removed or replaced. Catheter specimen should be collected using sterile technique.

Mid Stream Urines Collection method

A clean-catch midstream collection is a method of obtaining a urine sample free of most germs/bacteria that are normally found on the skin of your urinary area. Prior to collection the genital area should be cleaned with tap water. Antiseptics should not be used. If the area is soiled; use soap and water and rinse thoroughly.

Men : Retract prepuce. Wash the glans penis.

Women: Clean the vulva; first the outer labia; then the inner (clean from front to back). Separate the labia while the specimen is passed. Discard the initial part of the urine sample. Collect middle portion of the stream into a clean (preferable sterile) vessel. Then pour appropriate volume into the boric acid container.
Specimens should be transported to laboratory as soon as possible.
If transport is delayed a risk of bacterial overgrowth occurs - non preservative containers (Conquest) can be refrigerated for up to 24 hours
Preservative containers (Eastbourne Boric acid) can be stored for up to 72 hours at room temperature or in a fridge.

Collection of urine sample from a urostomy (ileal conduit)

Supplies Needed:
• 2 Povidone-iodine swabs
• Sterile gauze pads
• Sterile straight catheter (16 French)
• Lubricant jelly
• Sterile urine container
• Wet washcloth
• Towel
• New urostomy pouch

Procedure:
1. Wash hands.
2. Open supplies using sterile procedures
3. Remove old pouch.
4. Put on sterile gloves.
5. Clean the stoma and surrounding skin by firmly wiping the area with swabs in a circular motion, starting at the center and moving outward.
6. Allow to air-dry. Place sterile gauze over the stoma if urine is leaking.
7. Apply lubricant jelly to the tip of the catheter.
8. Gently insert the catheter tip about 3 inches into the stoma. If resistance is met, stop. Never force it.
9. Place the open end of the catheter in the sample container.
10. Hold the catheter in position until urine begins to flow. Collect 9mls of urine.
11. Gently remove the catheter and dispose of all used supplies.
12. Clean the stoma and surrounding skin with a wet washcloth and dry with a towel.
13. Apply a new urostomy pouch.
14. Label the specimen and send to the laboratory.

Collection of urine sample from a nephrostomy tube

Supplies Needed:
- sterile urine sample container
- specimen bag,
- chlorhexidine aqueous 0.1% antiseptic solution or two large alcohol wipes,
- basic dressing pack or sterile towel and gauze swabs
- sterile gloves,
- securement device or adhesive dressing,
- waterproof underpad,
- plastic bag.

Procedure:
1. Inform patient of the reason for collecting urine sample and need to avoid body movement during the procedure.
2. Provide privacy.
3. Perform hand washing.

4. Arrange patient's position and clothing to expose nephrostomy tube and its exit site. May need to gently remove existing adhesive dressing to allow access. Take care not to pull on the nephrostomy tube. If necessary, put an adhesive tape to secure the tubing of the collecting bag.
5. Place a waterproof underpad to prevent soiling of bed linen and clothing.
6. Perform hand hygiene.
7. Don personal protective equipment and sterile gloves.
8. Place sterile dressing towel under or next to the nephrostomy tube.
9. Clean nephrostomy tube and collecting bag junction with antiseptics, such as alcohol or chlorhexidine swabs.
10. Using sterile technique, detach nephrostomy tube from its existing collecting bag.
11. Place a sterile specimen jar immediately at the tip of the nephrostomy tube and allow gravity to provide fresh urine. Urine usually drips out slowly.
12. Collect about 9mls of fresh urine, close specimen jar firmly and place in specimen bag.
13. After collecting the urine, attach the nephrostomy tube to a new sterile urine drainage bag.
14. Anchor the nephrostomy tube and drainage tubing to prevent dislodgement.
15. Label specimen with patient identification and sample collection time and date.
16. Send specimen in specimen bag with completed laboratory service request form to laboratory for testing immediately. If sample pick up is delayed, store urine specimen in fridge at 4-10°C.
Alert!
Do not collect a sample from urine already in the existing collecting bag to avoid contaminants.

Instructions for Urine collection pack Vacutest tube
(For Hospital users although please note these are also available for community users if preferred)

These are in 2 parts –i] a large pot to urinate in and
ii] a collection tube which is sent to the laboratory.

1 A correctly labelled sterile container with Boric acid preservative must be used. Incorrectly or incompletely labelled specimens will not be tested.
2 Thoroughly wash your hands with soap and water.
3 Open the urine collection device provided to you by the laboratory.
4 Do not touch the inside of the urine cup or lid. DO not empty out the white powder, avoid touching the white powder.
5 Place the urine container on the counter beside you.
6 Urinate a small amount into the toilet then stop. Do not collect any of this sample.
7 Continue to urinate into the sterile container provided (see below) . Stop collection *before* you finish urinating.
8 Finish urinating into the toilet.
9 Close the cap by screwing lid tightly - then mix by gently shaking the container 8-10 times. Return the collection kit to the healthcare professional.
10 If you are at home, store the container in a cool dark place until the urine sample can be delivered to the laboratory.
11 Flush toilet.
12 Thoroughly wash your hands with soap and water.

1. Attention: for microbiological tests clean the hands and genitals thoroughly before use. OPEN THE CAP BY UNSCREWING ANTI-CLOCKWISE.

2. LAY THE CAP UPSIDE DOWN ON A CLEAN SURFACE.

3. DO NOT TOUCH INTERNAL SURFACES OF THE CONTAINER AND CAP.

4. COLLECT THE URINE SAMPLE. Fill the container up to ¾ of the capacity.

5. TURN THE CAP TIGHTLY IN A CLOCKWISE DIRECTION TO SEAL.

6. GENTLY SHAKE THE SAMPLE BEFORE TRANSFERRING IT TO THE TUBE.

7. PARTIALLY RAISE THE PROTECTIVE LABEL (DO NOT remove it completely).

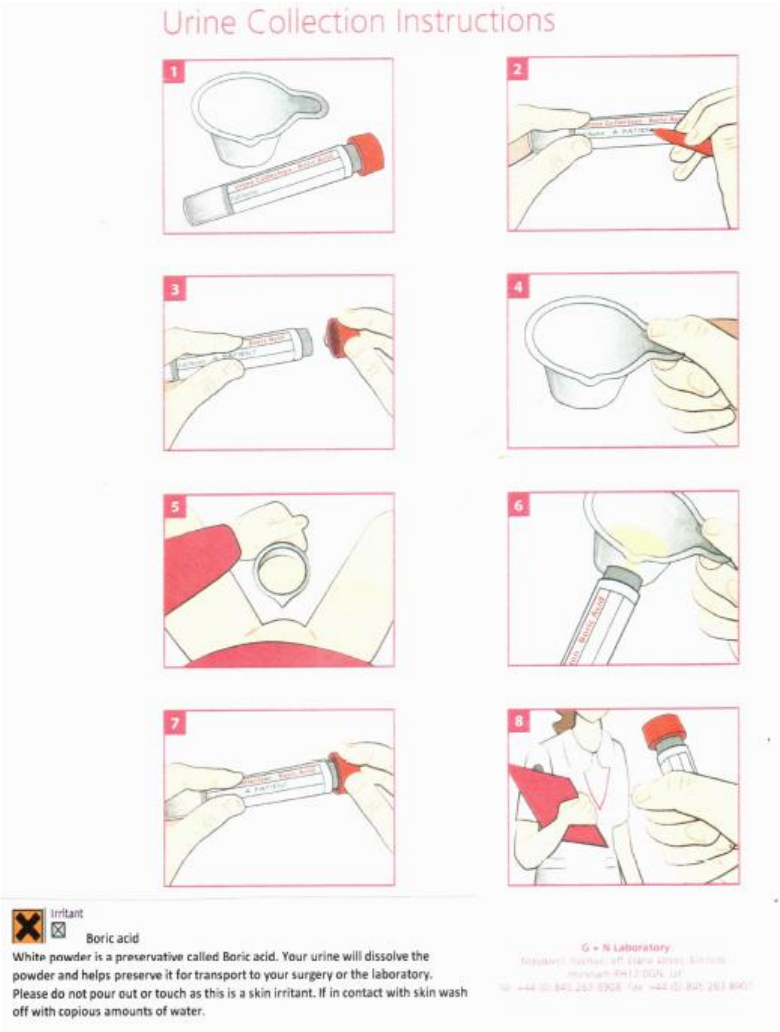
8. INSERT THE TUBE. GENTLY APPLY PRESSURE. KEEP THE TUBE IMMERSED UNTIL IT IS FULL (end of flow).

9. REMOVE THE TUBE AND FULLY RESTICK THE PROTECTIVE LABEL.

10. TUBES WITH PRESERVATIVE GENTLY SHAKE THE SAMPLE 8-10 TIMES.

Instructions for Red top Boric acid 9ml container (COMMUNITY users only)

1 A correctly labelled sterile container with Boric acid preservative must be used. Incorrectly or incompletely labelled specimens will not be tested.
2 Take the red 9ml container and white cup into the toilet with you. (Note your GP may also give you a white top container for “dipstick” during your consultation – take this with you.
3 Thoroughly wash your hands with soap and water.
4 Do not touch the inside of the white cup or 9ml container. DO not empty out the white powder, avoid touching the white powder.
5 Place the red top 9ml container on the counter beside you.
6 Urinate a small amount into the toilet then stop. Do NOT collect any of this sample.
7 Now urinate into the white cup red top container until you reach the redline (see below. Stop collection *before* you finish urinating.
8 Finish urinating into the toilet.
9 Close the cap by screwing lid tightly (your specimen will be rejected if it leaks in transport to laboratory)
10 Then mix by gently shaking the container 8-10 times. Return the pot to the healthcare professional.
11 If you are at home, store the container in a cool dark place until the urine sample can be delivered to the laboratory.
12 Flush toilet.
13 Thoroughly wash your hands with soap and water.



The Boric acid pots are only suitable for microbiological urine culture /microscopy analysis; and are designed to prevent bacterial growth and preserve cellular constituents during transit. Please note that these boric acid containers are NOT suitable for Chemistry investigations. If you send a sample to chemistry in a boric acid tube it will be rejected and you will need to obtain a fresh specimen. See Chemistry section for details, Please note these boric acid containers are NOT suitable for Chlamydia investigations, dipstick analysis, Urine analysis for TB; Urine for Schistosoma (see below)

Urines for non culture investigations (eg Chlamydia, Mycobacteria, Schistosoma)

Urines for Chlamydia detection white top 30ml container (no preservative) (minimum 15ml first catch – see Chlamydia section)
Urines for Schistosoma white top 30ml container (no preservative)
Urine analysis for Mycobacteria use the 500ml pots available from pathology reception.

Plain top 30ml container for non-routine culture

NOTE Body fluids (eg Joint, Ascitic, CSFs) and drain taps white top 30ml container (no preservative)

Sterile Pyuria

There is no universal standard definition for ‘Sterile pyuria’. Essentially it is the presence of elevated numbers of white cells in a urine (for our laboratory methods >10 WBC x10^6/L), but appears sterile using standard culture techniques. Sterile pyuria is common and has many causes. There are no studies to

show the relative prevalence of each of them. The separation into infection and non-infection related is purely arbitrary for classification purposes.

Causes of sterile pyuria

Infection related

- A recently (within last 2 weeks) treated urinary tract infection (UTI)
- Current antibiotics – even one dose of antibiotic before collection of urine specimen
- Urine dilution by high fluid intake
- Extreme frequency of urine
- Use of an antiseptic to clean urethra prior to collection of MSU (false negative result)
- Vulvo-vaginitis – infectious causes with contamination of sample with vulvo-vaginal leucocytes
- Chlamydial urethritis
- Urethritis – other infectious aetiologies e.g N. gonorrhoea
- Prostatitis
- Balanitis
- Appendicitis – if appendix lies close to ureter or bladder
- UTI with 'fastidious' or slow growing atypical organism (an organism that grows only in a specially fortified artificial culture media under specific culture conditions)
- Viral infections of the lower genitourinary tract
- Renal tract tuberculosis – consider in patients with fever, weight loss, night sweats, anorexia with no other obvious cause
- Adenovirus – in immunocompromised patients
- Schistosoma haematobium – concurrent eosinophilia is common, history of possible exposure?

Non infection related

- Presence of catheter or recent catheter
- Recent cystoscopy and urinary tract surgery
- Urinary tract stones
- Physiological pyuria of pregnancy
- Vulvo-vaginitis – non-infectious causes with contamination of sample with vulvo-vaginal leucocytes
- Urethritis – non-infectious causes
- Urinary tract neoplasm
- Pelvic irradiation
- Interstitial nephritis: analgesic nephropathy, sarcoidosis (lymphocytes not neutrophils)
- Renal papillary necrosis: diabetes, sickle cell disease, analgesic nephropathy
- Polycystic kidneys
- Interstitial cystitis - similar symptoms to UTI with sterile pyuria; cystoscopy shows inflammation, sometimes with ulceration; may progress to cause contracture of bladder; cause is unknown
- Drugs – NSAIDS, steroids, cyclophosphamide, indinavir,
- Malignant hypertension
- Other reported associations include SLE and other systemic inflammatory diseases, Kawasaki disease

Urine for Schistosoma haematobium

It is preferable to obtain the total urine collected over the time period between 10am and 2pm as it has been shown that a maximum concentration of eggs are excreted at this time.

Alternatively a collection of terminal urine, collected over a 24hr period is acceptable. Sterile containers without boric acid must be used these are available from the Microbiology Department on each site. In patients with haematuria, eggs may be found trapped in the blood and mucus in the terminal portion of the urine specimen so it is important that all urine including the last few drops is collected as eggs are often only released in number as the bladder is contracted. Once a specimen has been collected it must be taken the Microbiology Department Eastbourne or Conquest Hospital immediately. 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.

Collection of urine sample for TB (Mycobacteria) investigations.
If your Doctor has requested a urine test for TB, the laboratory requires 3 consecutive early morning samples of urine (EMU). For this we have supplied the following instructions.

1. Collection of urine
Your doctor may provide you with the necessary containers and labels, if not these are available from the Microbiology Department at Eastbourne or Conquest Hospital.

Special container required for TB investigations

Thoroughly wash your hands with soap and water. Do not touch the inside of the container. Collect the whole of the first urine of the day – first thing in the morning when you get up. Pass the urine directly into the plastic container provided.

2. Labelling of containers
Each of the plastic specimen containers MUST have the provided labels stuck onto them (sellotape is fine but make sure that they are stuck down firmly). Complete the information required on the labels fully, writing clearly your surname, forename, date of birth, either your NHS number or hospital number (these may be on your request form but must be available from your G.P) and the date the sample was collected.

3. Storage and transport of collected samples

The samples may be brought to the laboratory or your GP surgery each day with a copy of the request form from the doctor or the samples may be kept refrigerated and brought all together to the laboratory or surgery.

Swabs

Bacteriology
This department uses liquid swabs for general bacteriology

Swabs should be sent to the lab in the container provided which contains transport medium. They should be placed in the refrigerator if there is delay.

Aspirated pus is always more useful than a superficial swab that may be contaminated by surface organisms. Please send pus in a dry sterile universal container.

Swabs from leg ulcers and pressure areas should only be taken if there are signs of infection (cellulitis etc.). They often yield heavy mixed bacterial flora which may mask the infecting organism. Careful cleaning of the skin and then swabbing or, ideally, aspirating from the edge of the ulcer may be helpful. Please note that swabs/pus from sinus tracts may also provide misleading culture results.

Operative specimens (tissue/bone) are generally required to identify the pathogens causing deep-seated sepsis and provide good quality results if processed within 2 hours (see previous section) please avoid taking swabs if pus or tissue is available.

Lower respiratory Tract Samples
Sputum, bronchial washings, tissue samples and any other body fluids to be sent in 60ml plastic sterile sputum (pots without formalin unless for Histology). Bronchial washings collected in the “bunny eared” pots will only be accepted but not if the “ears” are still connected – these samples will be discarded and a repeat sample requested.

Direction for collection of a sputum sample for culture
Equipment needed
1. 60ml wide-mouth container provided by the microbiology laboratory

Procedure

1. Collect sputum before starting antibiotics whenever possible
2. First morning specimen prior to eating or drinking is preferred.
3. Remove any dentures, gargle with water and rinse mouth.
4. Cough deeply to produce a specimen of sputum into the container provided.
5. Ensure specimen is sputum, not saliva. Saliva only is not acceptable. Saliva is a clear fluid from the mouth.
6. Screw the lid firmly onto the container to avoid spillage.
7. Write your surname, first given name, date of birth, hospital or NHS number available and time and date of collection on the container. As per national guidelines, specimens without 2 patient identifiers (where surname AND forename comprise one identifier) will be rejected.
8. Send the specimen to the microbiology laboratory as soon as possible on the day of collection.

Direction of collection of a Throat swab

Equipment needed

1. Sterile swab –Use swabs supplied with the specific test kit supplied by the microbiology laboratory.
   eSwab (pink top) for bacterial
   E virocult (green top tube) for viral
2. Tongue depressor
3. Light source; flexible lamp or head-mounted light

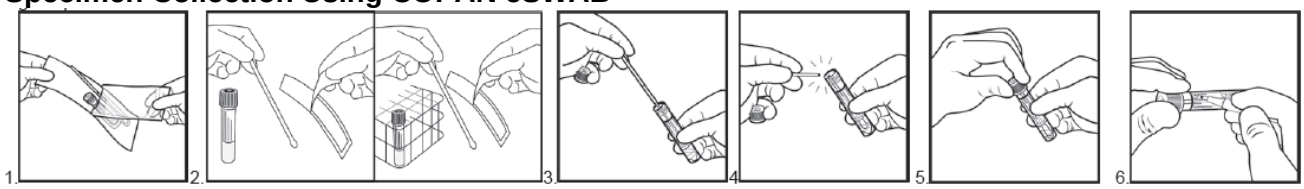
Procedure

1. Explain the procedure to the patient, including that they may gag briefly.
2. Wash your hands
3. Wear gloves and eye protection, and if COVID-19 (or any other airborne infection) is under consideration- wear gown, N95 respirator, and face shield.
4. Position the patient - Sitting position with head tilted back slightly
5. Illuminate the posterior oropharynx.
6. Have the patient open the mouth and relax the tongue by saying "aaaah."
7. Press the tongue down using a tongue depressor.
8. Gently rub the swab against both tonsils and the posterior pharynx. Proceed swiftly because the patient will likely gag
9. Place the swab in the culture medium in the tube.
10. Remove the gloves, eye protection and wash your hands
11. Label the tube - Write your surname, first given name, date of birth, hospital or NHS number available and time and date of collection on the container. As per national guidelines, specimens without 2 patient identifiers (where surname AND forename comprise one identifier) will be rejected.
12. Send to the microbiology laboratory as soon as possible

Special precautions:

- Don't touch the swab to the tongue or sides of the mouth
- Fastidious anaerobes, such as Fusobacterium necrophorum, will not be recovered from samples that are delayed.
- When Diptheria is suspected, advice from a Consultant Microbiologist should be sought prior to sample submission. Scarlet fever presentations should be noted on the request form as they are notifiable.
- Pharyngeal swabs for N.meningitidis carriage should be clearly labelled.

Specimen Collection Using COPAN eSWAB



Do NOT use the ESwab medium for pre-moistening or pre-wetting the applicator swab prior to collecting the sample or for rinsing or irrigating the sampling sites.
Do NOT use ESwab for MRSA testing – please see later section on MRSA swabs and Broths
Do Not use ESwab for Viral swabs, Chlamydia swabs, swabs for *Bordetella pertussis* or swab area that requires a thin tipped point (eg general swab for urethra, infant ear general swab etc.
Sterile gloves and protective clothing and eyewear should be worn when collecting and handling microbiology specimens. Care should be taken to avoid splashes and aerosols when breaking the swab stick into the tube of medium.

Refer to **Figure 2. Specimen Collection** (above) and follow the steps below:

1. Open the ESwab sample collection pouch and remove the tube and swab.
2. Collect the sample from the patient. **Do not touch below the red breakpoint.**
3. Unscrew and remove the cap from ESwab tube making sure not to spill the medium.
4. Insert the swab into the tube until the red marked breaking point is at the level of the tube opening.
5. Bend and **break the swab at the red marked breaking point** holding the tube away from your face. There is NO need to cut the swab with scissors!
6. Discard the broken handle part of the swab shaft into the approved medical waste disposal container.
7. **Replace cap on the tube and secure tightly.**
8. Write **patient information on the tube label or apply patient identification label** – try NOT to obscure the liquid level if possible. Do not apply multiple labels to the sample container to impact diameter of container.
9. Send the sample to the microbiology laboratory.
10. During sample collection when handling the swab applicator, the operator must not touch the area below the coloured breakpoint indication line; that is the area from the line to the tip of the nylon flocked swab (see **Figure 3** below), as this will lead to contamination of the applicator shaft and the culture thus invalidating the test results.

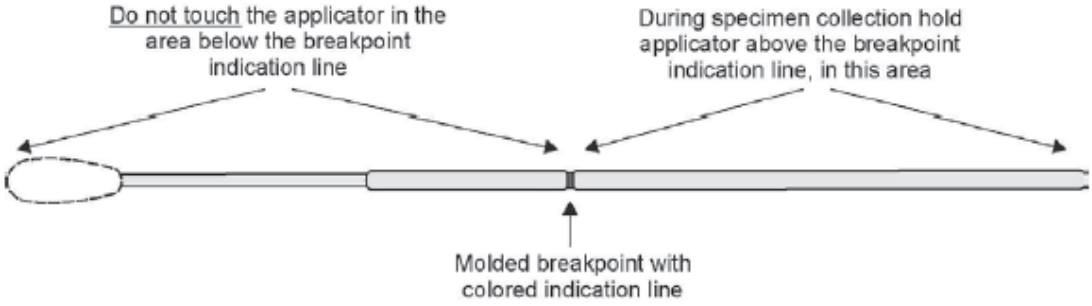


Figure 3 Collection swab showing breakpoint indication line and are for holding the applicator.
NOTE: Do not use excessive force, pressure or bending when collecting swab samples from patients as this may result in accidental breakage of the swab shaft. Swab shafts often exhibit diameter changes to facilitate different sampling requirements. Swab shafts have a molded breakpoint point designed for intentional breakage of the swab into the transport tube.

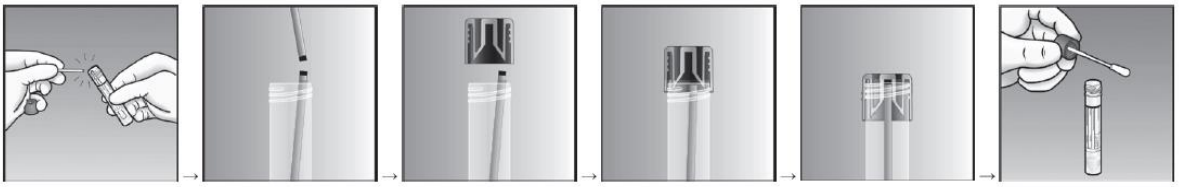


Figure 4. Capture of the broken swab applicator stick by Eswab Tube cap.

Bordetella/Whooping cough- use blue per-nasal swab (very thin wire shaft swab)
Bordetella PCR test recommended for patients matching Public Health England (PHE) guidance (See PHE website for details).

Stools

Specimen collected vial spoon into small pot.
DO NOT OVERFILL - pot should be no more than half-full, but preferably more than ¼ full.

Clostridium difficile screening

National guidelines state that the requestor must get the sample to pathology as soon as possible.
Samples arriving in laboratory after 1pm will not be tested until following day.
Please check esearcher for results before sending samples – DO NOT SEND repeat samples on the same day, they will NOT be tested.

C. difficile screening is performed on diarrhoeal specimens (liquid or semi-formed taking the shape of container) from all in-patients >2 years and all GP patients and out-patients >65 years of age or if there is a history to suggest *C. difficile* infection e.g. recent antibiotics.

Stool Routine Screening

Stools from all general practitioner patients and hospital out-patients as well as recently admitted adult in-patients (less than 3 days) are screened using DNA detection for screening for the main pathogens; *Salmonella species*, *Campylobacter species, Shigella species* and *Escherichia coli O157.* Other organisms may be looked for dependent on relevant clinical details.

Ova Cysts and parasites

All routine specimens are examined for *Cryptopsoridium species* and *Giardia species.*
If the history is suggestive of parasite infection ask for "concentration test" or O, C, P (ova, cysts, parasites) on the form. Please indicate if patient has travelled or not and include the country of travel in the clinical details. For maximum diagnostic yield, specimens should be collected on 3 different days when Ova cysts and parasites are suspected.

Enterobius vermicularis (Threadworm).

The rectal swab method is used in preference to sellotape slides
Sample requirements: a cotton bud dampened with physiological saline is wiped around the peri-anal area, and placed in a small bottle (urine pot can be used) of physiological saline. The bottle is sent to the laboratory for examination. Ideally the swab should be taken in the morning before washing the peri-anal area.

MRSA Broths

MRSA broths should be maintained at 2-8C prior to use.
If stocks are maintained on the wards, these should only be held for a short amount of time and stored at 2-8C. Due to the nature of the broths, they have very short expiry dates.
Prior to using any broth, the expiry date should be checked at the point of use.
Stocks of broth are available in the pathology fridges 24 hours/day.

Do NOT use the liquid Eswabs for MRSA broths – use either swabs provided with the broths or any local cost effective method. Liquid Eswabs are for general bacteriology only.
Check infection control policy for MRSA screening.

Take broth to laboratory as soon as possible. DO NOT leave on ward at room temperature – this will affect results and may delay reports.

Rapid MRSA PCR – Only by prior arrangement with the department. Special swabs are required to do this test and are only available from Pathology. Any routine swabs received for PCR will not be processed.

Screening Method for Glycopeptide resistant Enterococci (GRE)

For any queries on criteria for screening, patient management or isolation and for full details of which patients require GRE screening please check the Infection control policy on the Trust intranet.
Link . http://nww.esht.nhs.uk/wp-content/uploads/2018/08/00442_P.pdf
Alternatively contact your local Infection control team directly.

All patients being screened for GRE must have a rectal swab or a stool sample taken. Additional samples may include swabs from wound/skin break down and catheter urine sample (those who are already catheterised).

Rectal swab – we recommend using the current swabs used for MRSA screening , however any bacteriology transport swab is acceptable providing it is CE marked and meet the Clinical Laboratory Standard Institute approved standard M40.

A rectal swab is a specimen taken by gently inserting a swab inside the rectum 3-4cms beyond the anal sphincter, rotating gently and removing. Sodium chloride 0.9% can be used to moisten the swab prior to insertion. The swab should have visible faecal material to enable organism detection in the laboratory. A rectal swab should not be mistaken for a perineal swab.

OR
Collect a stool sample in a sterile, CE marked, leak-proof universal container, preferably with an integral spoon or scoop.

Note only a small sample (1 gram or 1 ml) is required.
Please do not fill the pot more than 1/4 full.

Please send swabs or stool samples as soon as possible to the laboratory labelled clearly for GRE testing – ensure that any relevant clinical details are included e.g. antibiotic therapy. Incomplete forms/swabs will not be tested.

Turnaround times
Negative result 2 days from receipt in laboratory, a minor number of negative reports may take up to 72 hours
Positive result – once laboratory has confirmed a positive result a Consultant Microbiologist or the infection control team will notify the relevant staff and a provisional report will be generated . This is normally 48 -72 hours.

Screening Method for Carbapenemase-producing Enterobacteriaceae (CPE)

For any queries on criteria for screening, patient management or isolation and for full details of which patients require CPE screening please check the Infection control policy on the Trust intranet.
http://nww.esht.nhs.uk/wp-content/uploads/2018/08/01531_P.pdf
Alternatively contact your local Infection control team directly.

All patients being screened for CPE must have a rectal swab or a stool sample taken. Additional samples may include swabs from wound/skin break down and catheter urine sample (those who are already catheterised).

Rectal swab – we recommend using the current swabs used for MRSA screening , however any bacteriology transport swab is acceptable providing it is CE marked and meet the Clinical Laboratory Standard Institute approved standard M40.

A rectal swab is a specimen taken by gently inserting a swab inside the rectum 3-4cms beyond the anal sphincter, rotating gently and removing. Sodium chloride 0.9% can be used to moisten the swab prior to insertion. The swab should have visible faecal material to enable organism detection in the laboratory. A rectal swab should not be mistaken for a perineal swab.

OR
Collect a stool sample in a sterile, CE marked,leak-proof universal container, preferably with
an integral spoon or scoop.

Note only a small sample (1 gram or 1 ml) is required.
Please do not fill the pot more than 1/4 full.

Please send swabs or stool samples as soon as possible to the laboratory labelled clearly for CPE testing – ensure that any relevant clinical details are included e.g. antibiotic therapy. Incomplete forms/swabs will not be tested.

Turnaround times
Negative result 2 days from receipt in laboratory, a minor number of negative reports may take up to 72 hours
Positive result – once laboratory has confirmed a positive result a Consultant Microbiologist or the infection control team will notify the relevant staff and a provisional report will be generated . This is normally 48 -72 hours.

Diagnosis of Pneumonia

The laboratory is able to provide rapid influenza testing for in-patients during normal working hours. Contact Consultant Microbiologist if case suspected unless known outbreak situation when specific instructions will be distributed. Full viral respiratory screens are relatively expensive and are only available for selected inpatients e.g. those with severe respiratory symptoms who are on ITU/HDU or neutropenic. Please discuss with the Consultant Microbiologist if required as all requests will be vetted.

Use green topped viral swabs which are available from the lab – this is the preferred method unless serological testing is required – see list of tests for sample to be collected.

Procedure for collecting green viral swabs:
The green swabs provided are “breakaway” swabs. After taking the swab, place the swab in the transport media. Bend the plastic shaft of the swab towards you and the top half of the shaft will snap away very easily. Discard the top half and replace the transport media tube (containing the swab tip) lid. There are pictures on the swab pack but these may not be very clear and there is no obvious indication on the swab shaft itself that it is breakaway.

Expectorated sputum samples

Sputum samples are known to have issues with contamination. Early-morning sputum samples should be obtained because they contain pooled overnight secretions in which pathogenic bacteria are more likely to be concentrated. Ventilator associated pneumonia carries a high mortality but is difficult to diagnose clinically and microbiologically. The criteria for diagnosis remain controversial. The poor sensitivity and specificity of sputum culture in the diagnosis of pneumonia in hospital ventilated patients has led to the development of a variety of techniques for obtaining lower respiratory tract specimens some involving the use of fibreoptic bronchoscopy.

Bronchoalveolar lavage (BAL)

A segment of lung is ‘washed’ with sterile saline after insertion of a flexible bronchoscope, thereby allowing recovery of both cellular and non-cellular components of the epithelial surface of the lower

respiratory tract. It is a reliable method for making a definitive aetiological diagnosis of pneumonia and other pulmonary infections.
Brush specimen results and bronchoalveolar lavage results are considered comparable by some authorities if a cut off of 10^4cfu/mL is used for the bronchoalveolar lavage although this is not recommended in the PHE SMI because it remains controversial.

Non-directed bronchoalveolar lavage (NBL)

Non-directed techniques have been found to give results comparable to bronchoscopic methods. A suction catheter, preferably a protected BAL catheter to minimise contamination, is passed down the endotracheal tube until resistance is met. An aliquot of sterile saline is injected and then aspirated. This method provides a lower respiratory tract sample without the need for bronchoscopy and without the attendant risks of transtracheal aspiration.

Meningococcal Disease

Suspected acute meningitis and suspected acute encephalitis are notifiable infections and the clinical team should contact the local Health Protection Team (0344 225 3861)

Once the samples have been collected, telephone the Microbiology AND Biochemistry departments to inform them that the sample is being sent. Out of hours you MUST BLEEP BOTH the Biochemistry and Microbiology Biomedical Scientists on call to inform them that the sample is being sent.

Arrange for the samples to be delivered **Immediately** to the laboratory. **Do not** send them in the pneumatic tube system. **Light must be excluded during transit to laboratory (return in black plastic bag).** CSF samples are urgent and should be processed as soon as possible after collection (maximum delay 2 hours) to prevent any lysing of cells that can occur with increased time delays.

Samples

Name of test	Specimen Container	Turnaround time	Comments
CSF culture and microscopy	Sterile universal	Routine samples - 72 hrs Surgical samples - 10 days: Surgical samples have extended anaerobic culture	Number tubes in order of collection 1. Most likely to be contaminated with blood and skin flora. Used for molecular testing 2 Used for biochemistry 3 Used for cell counts and culture 4 Used for xanthochromia if required
For best results the ESHT laboratories recommend 1 ml of CSF per universal tube from adult patients (smaller volumes are appropriate from paediatric patients). One drop of CSF is approximately 60 µl in volume; 16 drops is therefore around 1 ml of CSF.			
Standard additional tests			
Blood Glucose	Grey top tube	Order via biochemistry	
Serum bilirubin and total protein	Ochre top tube	Order via biochemistry if subarachnoid haemorrhage is suspected	
An adult CSF pack is available from pathology stores with the correct tubes for all standard investigations. This pack includes a leaflet giving advice on sample collection.			
Common referred tests			
Viral PCR	An aliquot of CSF (from universal tube 3 or 1 depending on sample volumes submitted) will be referred for HSV, VZV, Enterovirus, Parechovirus, and CMV PCR if requested		Frontier pathology, Royal Sussex County Hospital
Meningococcal /	An aliquot of CSF (from universal tube 3 or 1		PHE Meningococcal

Pneumococcal PCR	depending on sample volumes submitted) will be referred for Neisseria meningitidis and Streptococcus pneumoniae PCR if requested	Reference Laboratory, Manchester Royal Infirmary
Additional tests to consider: Must be ordered separately on ICE		
Blood cultures		
Meningococcal / Pneumococcal EDTA blood PCR		
Throat swab	Identification of meningococcal carriage; please take infection control precautions when collecting.	
Enterovirus faecal PCR	Detection of virus in faeces is suggestive, but not diagnostic, of the cause of illness	
Enterovirus throat swab PCR	Detection of virus in a throat swab is suggestive, but not diagnostic, of the cause of illness	
HIV testing	HIV testing is recommended for all adults with meningoencephalitis	
TB	If Mycobacterium culture is indicated (i.e. suspected tuberculous meningitis) please order this via the TB culture options (and select CSF as the sample type) rather than ordering as a CSF sample.	

Clinical information required

The following specimen descriptions are available:

- Lumbar Puncture (LP)
- Other (please specify in clinical details)

It is expected that the majority of CSF samples collected in ESHT will be LP samples; however a number of patients will be seen with, for example, VP shunts. If the sample has been collected from anything other than an LP please indicate the source in the clinical details.

A guide to performing an LP is available on the ESHT Extranet (titled “Lumbar Puncture Procedure (PDF)”) and can be found using the document search.

The following information is requested as a Yes/No response:
This patient has had recent neurosurgery
This patient has had a recent penetrating brain injury
This patient has prosthetic materials associated with their CNS (e.g. VP shunt)

This information is important as it affects the culture conditions set up in the laboratory and helps with the interpretation of potential contaminating organisms (for example, a coagulase-negative staphylococcus isolated from a patient without prosthetic materials is less likely to be significant than in a patient with prosthetics in-situ).

The requester is able to add CSF Viral PCR and CSF Meningococcal / Pneumococcal PCR by selecting the additional requests option. Other tests should be requested as indicated in the table above.

CSF samples may require processing in multiple laboratories depending on the clinical findings, e.g. meningococcal/pneumococcal PCR sent to the Public Health England laboratories in Manchester. Each test has an optimal sample volume to obtain the best quality results, and this should be considered when collecting the sample.

A blood sample taken at the same time as the CSF can be helpful when interpreting the results of molecular tests for bloodstained CSF samples. An EDTA blood should always be sent for Meningococcal/Pneumococcal PCR if bacterial meningitis is suspected.

Gonorrhoea and Chlamydia NAAT (Nucleic Acid Amplification Test)

Neisseria gonorrhoeae/Chlamydia trachomatis Nucleic Acid Amplification Test (NAAT) by PCR
The nucleic acid detection procedure known as NAAT for Chlamydia trachomatis and Neisseria gonorrhoeae is suitable for endocervical, high vaginal and male/female urine samples. Please note that vaginal swabs will be processed if an endocervical swab cannot be easily obtained. Samples will be batched for testing. If results are equivocal, further confirmation may be required and it may occasionally be necessary to recall patients for repeat testing.

N.gonorrhoeae/Chlamydia trachomatis PCR analysis

As C. trachomatis is an intracellular parasite it is important that all samples collected for Chlamydia testing contain as many epithelial cells as possible. Quality of sample is therefore critical.

There are two collection kits available, one for swab samples - including ophthalmic samples - (GREEN TOPPED BD tube) and the second for URINE samples (YELLOW TOPPED BD tube). Collection kits are available on request.

Endocervical Swab Specimen Collection

1. DO NOT collect specimen at the posterior fornix.
2. DO NOT use lubricants
3. Lukewarm water mat be used to warm the speculum.
4. Remove the swab from packaging.
5. Insert the collection swab into the cervical canal and rotate for 15 – 30 seconds.
6. Withdraw the swab carefully. Avoid contact with the vaginal mucosa.

SPECIMENS COLLECTED USING THE BD MOLECULAR COLLECTION SWAB MUST BE TRANSFERRED TO SAMPLE BUFFER TUBE (GREEN TOP) IMMEDIATELY AFTER COLLECTION.

7. Uncap the Swab buffer tube.
8. Fully insert the collection swab into the Swab buffer tube.
9. Break the shaft of the swab at the score mark (black line). Use care to avoid splashing of contents.
10. Tightly recap the tube.
11. Label the tube with patient information and date/time collected. DO NOT OBSCURE ANY BARCODES ESPECIALLY THOSE AT THE BOTTOM OF THE TUBE.
12. Transport to laboratory.

Urine specimen collection

1. The patient should not have urinated for at least 1 hour prior to specimen collection. Collect specimen in a sterile, plastic, preservative free specimen collection container. THE PATIENT SHOULD COLLECT THE FIRST 20-60ML OF VOIDED URINE (THE FIRST PART OF THE STREAM – NOT MIDSTREAM).
2. Have the patient securely place the cap on the collection pot.
3. Label the pot with patient information and date/time collected.

WEAR CLEAN GLOVES WHEN HANDLING BD MOLECULAR URINE TRANSPORT KIT COMPONENTS AND URINE SPECIMENS. IMMEDIATELY CHANGE GLOVES IF THEY COME INTO CONTACT WITH THE SPECIMEN.

4. Uncap the BD Molecular Urine buffer tube (YELLOW TOP) and the Urine sample pot. IMMEDIATELY AFTER COLLECTION, use the graduated transfer pipette to gently mix the urine sample. Then use the pipette to aspirate approximately 2ml of the urine pot.
5. Transfer the 2ml of urine to the BD urine buffer tube, using the graduations on the pipette as a guide. DO NOT OVERFILL or UNDERFILL the tube.

6. Tighten the cap securely on the buffer tube, and invert 3-4 times to ensure hat the specimen and reagent are well mixed.
7. Label the tube with patient information and date/time collected. DO NOT OBSCURE ANY BARCODES ESPECIALLY THOSE AT THE BOTTOM OF THE TUBE.
8. Transport to laboratory.

Ophthalmic Samples
Apply an appropriate topical anaesthetic to the eye or eyes. Using the swab from the GREEN TOPPED BD collection kit , thoroughly sample the inner surface of the lower, then the upper eyelid. If specimens are to be taken from both eyes, use separate swabs. Avoid touching the surrounding facial area.

Swab / Urine Storage and Transport

Store and transport swabs / urines to the laboratory at 15-28°C within 2 days of collection.

If swabs / urines cannot be transported to the laboratory immediately they may be stored at 2-8°C for 4-6 days.

Mycology

Mycology is the investigation of clinical samples for fungal infection. The most common fungal infections are those of the skin, nails and hair. These samples should be collected as below, and sent to the laboratory either in a dedicated “Mycotrans” packaging, or in a sterile specimen container. If other samples (such as swabs, fluids, tissues) require fungal culture, please request this on the form.

Skin
Patients’ skin and nails can be swabbed with 70% alcohol prior to collection of the specimen, this is especially important if creams, lotions or powders have been applied. The edges of skin lesions yield the greatest quantities of viable fungus. Lesions should be scraped with a blunt scalpel blade.

Nails
It should be specified whether the sample is from the fingernails or toenails. Material should be taken from any discoloured, dystrophic or brittle parts of the nail. The affected nail should be cut as far back as possible through the entire thickness and should include any crumbly material. Nail drills, scalpels and nail elevators may be helpful but must be sterilized between patients. When there is superficial involvement (as in white superficial onychomycosis) nail scrapings may be taken with a curette. If associated skin lesions are present samples from these are likely to be infected with the same organism and are more likely to give a positive culture.

Hair
Samples from the scalp should include skin scales and plucked hairs or hair stumps. Cut hairs are not suitable for direct examination as the infected area is usually close to the scalp surface. Plastic hairbrushes, scalp massage pads or plastic toothbrushes may be used to sample scalps for culture where there is little obvious scaling, but such samples do not replace a scraping for direct examination.

Quantity and number of specimens
Scrapings, clippings and plucked hairs should be plentiful and representative. Separate packets should be used for different sites.

Time between specimen collection and processing
Specimens should be kept at room temperature and transported and processed as soon as possible although, provided the samples are kept dry, the fungus will remain viable for several months.

Tuberculosis

Send sputum (if pulmonary) or aspirate (if extrapulmonary) in a “sputum” pot = wide-mouth 60ml pot.

For TB urine cultures, send in a special TB collection pot (obtained from Specimen Reception), this includes a sample collection instruction sheet. 3 complete early morning urine samples are required on

consecutive days. Send the whole urine sample i.e. the whole of the stream passed first thing in the morning. Collection pots are available from the laboratory. Ask for TB investigations. Mycobacteria often take weeks to grow. Specimens are sent to Brighton Microbiology who provide a rapid identification service on any positive results.

Mycobacteria "AFB" Microscopy
Urgent microscopy for AFB can be done on an unprocessed specimen. Microscopy is performed daily (Mon-Fri) and results will be available the next working day after the sample is received in the laboratory. Microscopy is not performed on urines for TB because commensal mycobacteria such as M. smegmatis may be seen and so mislead.
Mycobacteria tuberculosis Rapid DNA detection
The department rapid DNA detection for *Mycobacteria tuberculosis* this is only available by special request via a Consultant Microbiologist

T-Spot TB Test
T-Spot is an Interferon Gamma Release Assay (IGRA) for testing of tuberculosis infection.

Specimen Collection
T-spot requests require a special courier service which enables delivery of the sample to the reference laboratory within 24 hours.

Specimens MUST arrive in the Microbiology laboratory by 12 midday Monday-Thursday.
Please do NOT take samples in the afternoon (any day) or Friday/Saturday/Sunday/Bank Holiday – the sample cannot be delivered to the reference laboratory and the patient will need to be re-bled.
Blood may be collected up to 32 hours (maximum) previous to these times.

Please collect a minimum of 12 mls of lithium heparin blood (green top), either 2 x 6 mls, or 3 x 4mls, for adults and children 10 years old and over.

Send the blood sample with request form, directly to Specimen Reception.

Semen Analysis And Post Vasectomy Semen Analysis

Due to strict British Andrology Society standards for timing of samples, these tests are not provided by the laboratories. The examinations are only performed at the assisted Conception Unit, Esperance Hospital, Eastbourne. The patient will need to make an appointment (01323) 410333. The clinic will provide patient information.

Serology

Please note to state the relevant clinical details on the request form, including the date of the onset of symptoms.
A single sample is suitable for most tests. If a convalescent sample is required the laboratory will request a second sample.
If you do not think that the investigation is worth pursuing, ignore the reminder. For any viral investigation date of onset of illness is essential.

Antibiotic assays

Further details can be found in the Trust Policy for the use of antibiotics. This is available on the Trust intranet.

Gentamicin & vancomycin antibiotic assays are processed on site by the Biochemistry dept.

Please note: the following assays are not performed on site so there may be a delay before results are available:-
Amikacin/Tobramycin samples should be received in the laboratory before 10am Monday to Friday. The laboratory should be informed that these samples are being taken. Results should be available by

5pm on the same day. Policy change – plain clotted samples can now be used (lithium heparin samples no longer required). A separate request form and sample is required for Microbiology when Clinical Biochemistry tests are required also. Shared samples lead to a delay in sending the samples to the referral laboratory.

Other antibiotics – these results will not be available until at least 5pm of the following day if notified and received by 10am.

Viral Screening

Screening for viral infection – sample type is determined by the site of infection.
Please see the alphabetical section for sample type.
To collect a swab sample: please follow the instructions on the swab packaging to collect the sample

COVID (and other respiratory virus)Testing

Laboratory based Covid testing is currently available subject to changes in national and local clinical covid testing strategy. During the winter period it is available as a Multiplex test alongside Flu A and B and RSV. Criteria for testing for Covid Flu A and B and RSV are subject to seasonal changes, see communications for recent updates and criteria information when making a request.
Nasal and Nasopharyngeal swabs should be used.

Turnaround Times

Bacteriology, Mycology, Mycobacteriology and Parasitology Investigation

These are the times that it normally takes to generate a report for 90% of samples – excluding weekends and bank holidays - starting from the time that the specimen is received in the laboratory. Because organisms take a variable time to grow and further tests such as sensitivities may be necessary, positive results usually have longer turnaround times than negative ones. If a specimen is urgent or the result is needed as soon as possible it helps to tell the laboratory so that it can be given priority.

Investigation	Negative result	Positive result
AAFB (Mycobacteria) Culture	75 days	7 – 75 days
AAFB (Mycobacteria) Microscopy (routine)	1 day	0 – 1 day
Blood Culture	5 days	0 – 14 days
CSF	2 days	0 – 2 days
	CSF is always treated urgently by laboratory and initial microscopy results telephoned whether positive or negative. Any significant culture result is telephoned forthwith.	
Ear and Nose Culture	2 days	3 days
Throat Culture	1 day	2 days (Group A streptococci will be reported to the requester as soon as a result is available)
Faeces DNA screen and Culture	2 days	2 – 4 days
Faecal Microscopy	1 day	1 – 2 days (all significant pathogens will be reported to the requester as soon as available)
Fungal/Mycology Culture	2 - 3 weeks	2 - 6 weeks
Fungal/Mycology Microscopy	3 days	3 days
MRSA Screens	1 day	3 days
Bordetella/Whooping cough PCR	3 days	3 days
Rotavirus detection in children	1 day	1 day
Sputum Culture	1 day	2 - 3 days
Urine Culture	1 day	2 – 3 days
Uro-genital Culture	2 days	2 – 5 days
Wound Culture	2 days	2 – 5 days
C.Diff	1 day	1 day

Serological Investigations

Serology tests are almost always done in batches, the stated turnaround times for the tests listed below are the maximum number of days, including weekends, between test runs. Tests marked * may be tested as single samples and done urgently. If any results are needed more quickly than the stated turnaround times, please contact the laboratory to discuss.

ALL other serological tests are referred to outside laboratories, usually in batches, and may take up to 14 days or longer for reports to be returned.

Investigation	Turnaround time
Antibiotic assays	
Tobramycin	1 day (if received before 10am)
Amikacin	1 day (if received before 10am)
Others	2 days (if received before 10am day one)
Viral serology	
Ante-natal Screens	2 days
CMV IgM *	4 days
Hepatitis A IgM *	4 days
Hepatitis A total	2 days
Hepatitis C antibody	2 days
HBsAg *	2 days
Anti–HBs *	2 days
Hepatitis B core (total) *	2 days
HIV 1 & 2 (including P24 antigen)	2 days
Rubella IgG	2 days
Rubella IgM	7 – 14 days
Varicella IgG *	2 days – Urgent test on same day but contact laboratory with details ASAP
Other serology	
Lyme disease (total) *	3 - 4 days
Syphilis serology (screen)	2 days
Anti–streptolysin O titre (ASO)	2 days (Mon-Fri only)
Other tests	
Pneumococcal antigen detection in urine	1 day
Legionella antigen detection in urine	1 day
Chlamydia and Neisseria gonorrhoeae DNA detection	3 days
C. difficile toxin detection in faeces	Daily
Helicobacter antigen test detection in faeces	2 days (Mon-Fri only)
Measles IgG	2 days
Mumps IgG	2 days
Epstein Barr Virus IgM	2 days
β-D-Glucan	2 days (Mon-Fri only)
Other serology	Other serology tests may be sent to other laboratories and can take between 7 - 14 days for a result.

Microbiology Referral Laboratories

Colindale Public Health England (PHE)
Centre for Infections, 61 Colindale Avenue, London. NW9 5EQ
-Laboratory of HealthCare Associated Infection (LHCAI)
-ERNVL- Enteric/ Respiratory
-Virus Reference Department (VRD)
-Laboratory of Enteric Pathogens (LEP)
-Food safety laboratory
-Respiratory and systemic infections
-Sexually transmitted bacteria laboratory
-Antibiotic ARMRL

Other PHE labs
Anaerobic reference lab, Anaerobe Reference Laboratory, NPHS Microbiology Cardiff, University Hospital of Wales, Cardiff
Brucella laboratory, Clinical Microbiology and PHE Collaborating Laboratory Brucella Reference Unit (BRU), University Hospital Aintree, Lower Lane, Liverpool
Cryptococcus /Toxoplama laboratory, Singleton Hospital, Sketty, Swansea
Lymes, Leptospira Rare and Imported Pathogens, Microbiology Services, PHE, Porton Down, Salisbury, Wiltshire SP4 0JG.
Mycology, SouthWest HPA Laboratory, Myrtle Road, Kingsdown, Bristol
Manchester medical microbiology, Clinical Science Building, Manchester Royal Infirmary, Oxford Road, Manchester
Special pathogens CAMR, Centre for Emergency Preparedness and Response, Porton Down, Salisbury
South London HPA Kings College, King's College Hospital NHS Trust, Rayne Institute (3rd floor), 123 Coldharbour Lane, London
Mycobacteria reference unit Barts & London, HPA Mycobacterium Reference Unit, Clinical Sciences Research Centre, Centre for Infectious Disease (CID), Institute of Cell and Molecular Science (ICMS), London
Parasites reference laboratory, Department of Clinical Parasitology, Hospital for Tropical Diseases, Mortimer Market, London WC1E 6AU

Other Laboratories
Brighton Royal Sussex County, Eastern Road, Brighton BN2 5BE
Birmingham Heart of England (Heartlands) (HBV DNA), Bordesley Green East, Birmingham B9 5SS
Antibiotic reference unit laboratory- Southmead, Southmead Hospital, Westbury-on-Trym, Bristol
Epsom - West park, Horton Lane, Epsom KT19 8PB
St Hellier-Immunology, St Helier Hospital, Wrythe Lane, Carshalton
Guildford Immunology, Royal Surrey County Hospital, Egerton Road, Guildford GU2 7XX
Leeds General infirmary, Great George Street, Leeds LS1 3EX

Cellular Pathology

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Consultants and Senior Staff

Availability of Clinical Advice

Consultant advice is available during laboratory working hours only (Mon-Fri 8.30 – 17.00). There is no on call service provided.

General information

Services provided – Histopathology, Cytology and Mortuary including Post Mortems
Laboratory working hours (not including Mortuary)

Mon	Tue	Wed	Thurs	Fri
← 8.30am – 5pm →				
Out of hours service currently unavailable (not including Mortuary).				

Histopathology

Submission of Diagnostic Surgical Histopathology Specimens

Information to be supplied to the Laboratory
Accurate patient details and salient points of history are essential. Requirements for the completion of the request form are listed in the Requests and Results section of this handbook.

Treatment of Routine Histology Specimens

Immediate fixation with 10% Neutral Buffered Formalin (NBF) is essential to preserve the cellular morphological detail of the tissue requiring histology. To achieve this, the specimen must be free floating in 10% NBF that is approximately 10 times the volume of the specimen. Without the optimal amount of 10% NBF the specimen may dry out resulting in poor cellular morphology causing an undiagnostic specimen that will be unreportable for the consultant and unrepeatable for the patient.
When sending certain specimens, orientation is paramount for the reporting consultant pathologist. For this reason, where possible, please do not incise histology specimens.

Frozen Sections – Non-routine Histology Specimen

(Please Note this service cannot be carried out on high risk specimens)

Prior to sending a fresh tissue specimen requiring frozen sections (including for immunofluorescence) please give as much notice as possible and book by ringing the histology main lab on

This will ensure the specimen is immediately dealt with by the laboratory on the date and time given. It will also ensure that specialised laboratory staff and reporting consultant pathologist are available. In the event that the pre-booked frozen sample is no longer required please contact the laboratory to inform them as soon as possible as staff will be waiting and prepared to receive the specimen.

It is also important to ensure the following;
-Provide contact details, bleep or extension number on the request form
-The tissue must be fresh and not fixed (i.e. 10% NBF must not be used)
-The tissue must be immediately taken to the laboratory. Any delay may cause the tissue to dry out
-Results will only be available to medically qualified staff
-Do not send fresh samples, requiring frozen sections, after 4pm as this may not allow enough time for the specialised laboratory staff and reporting consultant pathologist to provide a result.

Additionally, specimens requiring **immunofluorescence** should be sent as follows:-

A fresh sample of unaffected perilesional skin (or mucosa) and a second lesional sample sent in 10% NBF.

For urgent Frozen Sections-

On occasions a frozen section may be required urgently which has not been booked with the laboratory. Please note the laboratory opening and closing times (see above). It is requested that fresh specimens are sent to the laboratory no later than 4.00pm.
The specimen must be sent with a completed request form as normal and inform the laboratory immediately using the contact numbers above. In these circumstances as specialised staff work cross site, the specimen may require transporting to either Conquest or EDGH for frozen sectioning and or reporting. This may affect TAT for the frozen section results.

Transportation of specimens

There are a variety of container sizes for histology samples available from the Pathology stores (EDGH). Please ensure the correct size container is selected to ensure optimal fixation of the specimen and the lid has been securely fitted onto the specimen container. For larger containers this also includes 'clicking' the seal of the lid around the full circumference of the histology container.
At this stage the container must be kept upright, especially whilst being transported, to the histology laboratory. The labelled container and corresponding form should be placed into a plastic bag and must not become separated. If transporting from within the hospital the correct transport method must be used, which depends on the size and weight of the specimen container(s) – use a trolley for larger specimen containers. Do not rely on the handles alone when carrying larger specimens. The specimen containers must be directly transported to Pathology.
For smaller samples, such as cores, regular transport from within the hospital to Pathology throughout the day may potentially provide a quicker TAT.

On transporting histology samples externally specific transport regulations must be followed. Please refer to page 15 for further guidance and information.

Note
An immunofluorescence service for skin samples remains available at ESHT but is no longer a UKAS accredited activity (ISO15189). An accredited service is available at the Immunodermatology Laboratory, St John's institute of Dermatology, St Thomas' Hospital.

Turnaround time for reporting

Histopathological processing and reporting takes variable time depending on the type and size of specimen and the need for extra special stains. Copies of authorized reports are sent to the Consultant, and are available through E-Searcher. Any enquiries about current cases should be made to the medical staff reporting the case through the histopathology office or histopathology lab.

Histology and Cytology

Dependant on the type of sample:

Clinical unit/Pathway	Specimen Type	TAT (80%) from receipt to report
Gynaecology	*Endometrial biopsy*	14 days
	Ovary / Peritoneal	14 days
	Cervical	14 days
	Vaginal & Vulval	14 days
	Resection specimens	21 days
Breast - Conquest	*Breast Biopsy*	7 days
	Resection Specimens	14 days
Breast - Eastbourne	*Breast Biopsy*	7 days
	Resection Specimens	14 days
Colorectal	*Colonic biopsy*	7 days
	Resection Specimens	21 days
	All non-cancer outcome	21 days
Head, neck & thyroid	*FNA*	14 days
	All biopsies with non-cancer outcome	21 days
Lung	*Lung needle core / Bronchial Biopsy*	7 days
Urology	*Renal and bladder Biopsy*	7 days
	Prostate	7 days
	Resection specimens	14 days
	All non-cancer outcome	21 days
Skin	*Punch Biopsy*	7 days
	Specimens with malignant outcome	14 days
	Specimens with benign outcome	21 days
Upper GI	*OGD Biopsy*	7 days
	All non-cancer outcome	14 days
GP	*Specimens with malignant outcome*	7 days
	Specimens with benign outcome	21 days
Haematology	*Lymphomas (quarterly)*	7 days
Bowel cancer screening		7 days (100%)

Please note that TATs will be increased if a second opinion needs to be sought or if additional molecular testing needs to be performed.

Post Mortems (hospital)	80% in 10 days (including 80% of those with Histology) from the date of consent approval.

Specialist Referral Laboratories and Consultants

Bone Pathology:
(Prof Adrienne **Flanagan)**, Royal National Orthopaedic Hospital

Breast Pathology:
(Prof E Rakha**),** Department of Histopathology, Nottingham City Hospital

Brighton Referrals:
Department of Histopathology, Royal Sussex County Hospital,

Brighton (Case reviews):
Department of Histopathology, Royal Sussex County Hospital

Connective Tissue Tumours And Unusual Malignancies:
(Prof Cyril **Fisher)** at Department of Histopathology, Royal Marsden Hospital

GI Pathology:
(Prof N **Shepherd),** Cheltenham General Hospital

Head and Neck (including Thyroid):
Department of Histopathology, Royal Sussex County Hospital

HER-2 Testing:
(Mrs Gill **Donald)**. Molecular Pathology Department, Maidstone

Lung Pathology:
(Prof Andrew **Nicholson)**, Royal Brompton Hospital

Liver Pathology:
Institute of Liver Studies, Kings College Hospital

Lymphomas:
Consultant Histopathologists, GF, Bessemer Wing, Kings College Hospital,

Muscle Biopsy:
Department of Clinical Neuropathology, King's College Hospital

Skins:
(Dr E **Calonje)** at St Johns Institute of Dermatology, St Thomas' Hospital

Skin And Other Lymphomas:
(Dr **Goodlad)**, Department of Pathology, Southern General Hospital

Testicular Tumours:
(Dr Steve Hazell**)**, Histopathologist, Royal Marsden Hospital

Trophoblastic Diseases:
Trophoblastic Tumour Screening and Treatment Centre, Charing Cross Hospital,

Urology/Renal Pathology:
(Dr A **Chandra)**, Histology Dept. Guy's and St Thomas' Hospital NHS Trust

Urological Pathology:
(Dr M Varma**)**, University Hospital of Wales, Cardiff

South East Genomics (Genomic Laboratory Hub)
Guy's Hospital

Outsourcing Centres

The Histopathology department is currently experiencing a level of workload beyond our ability to report cases in house. We therefore send a number of cases to outsourcing centres as follows:
LDPath
Gynae reporting, and some diagnostic cytology
SBS
Wet tissue
Diagnexia
Excess general cases

Cytology

Services Provided

Cervical Cytology
This service is run by Berkshire and Surrey Pathology services and all samples are processed there. The laboratory uses the ThinPrep version of liquid based cytology (LBC). Sample takers must have attended an approved LBC training course and received a sample taker number. In accordance with national guidelines the laboratory will not process samples that are collected by unqualified sample takers. Please write your sample taker number on the request form as evidence of qualification. Only Cervical cytology samples must be placed in the green cervical cytology sample bags.

Key Points to Remember for LBC
- Note expiry date on the vial. Do not use expired vials.
- Label vial with patients' full name and date of birth at least.
- Use ball point pen, not felt pen.
- If you are using a printed patient label for the vial, initial it to show that you have checked that the details match your patient.
- Keep the unlabelled portion of the sample vial free of labels so that the contents can be seen.
- Include your sample taker code on the form.
- The Cervix visualised/360° box must be completed otherwise the sample will be reported as inadequate.
- Use a green Cervex Brush only.
- Rotate the brush five times in a clockwise direction, even if you are left handed.
- Immediately transfer the cells to the vial fluid (do not leave the broom sitting in the vial).
- Remove the cells from the brush by pushing the head into the bottom of the vial 10 times.
- Vigorously swirl the brush in the fluid prior to removing from the vial.
- Inspect the brush to ensure no material remains attached, then discard.
- Close the lid so the black torque line on the cap passes the black torque line on the vial. Do not over tighten.
- An endocervical brush must never be used alone. It may be used in addition to the Cervex Brush in the flowing circumstances only:
  a) There is difficulty inserting the Cervex Brush into a stenosed os.
  b) The woman is being followed up for borderline changes in endocervical cells.
  c) The woman is being followed up for treated glandular abnormality (CGIN) and a previous sample was inadequate due to the absence of endocervical cells.
- Place both samples in a single vial.

Diagnostic Cytology
A service is provided for diagnostic cytopathology of body fluids, endoscopic mucosal brushings, bronchial washings, fine needle aspirates and other samples.
Specimens can be reported urgently provided the request is first phoned to the laboratory.

Labelling of 'risk of infection' samples
Please see 'Handling and Labelling Danger of Infection Specimens' section within this handbook for details.

Diagnostic Cytology Specimens

If there is an anticipated delay in transport to the laboratory, unfixed specimens should be kept refrigerated at 4 °C. Slides and samples in fixative are kept at room temperature.

Serous fluids (no fixative/ preservative added) – decant sample into a plain universal container or a 50ml pot. The laboratory will not accept collection/drainage bags.

Cyst fluids (no fixative/ preservative added) - decant sample into a plain universal container or a 50ml pot.

CSF (no fixative/ preservative added) – collect into a universal container. Specimens should be transported to the laboratory urgently. Note that total cell count and differential counts are done by the microbiology department and should be sent there.

Urine (no fixative/ preservative added**)** – the minimum volume required is 100ml in a plain container without preservative. The sample should be collected midstream. (available from the laboratory specimen reception).

Ureteric urine and ureteric washings (no fixative/ preservative added) – any volume is acceptable in a plain container.

Bronchial aspirates/washings (no fixative/ preservative added) – in a plain universal container or a 50ml pot.

Sputum (no fixative/ preservative added) – in a 50ml pot

Endoscopic mucosal brushings – collected into CytoLyte fixative available from the cytology laboratory. A detailed SOP on the handling of brushings is held in each endoscopy suite and is available from the cytology laboratory.

Fine needle aspiration (FNA) – The sample is spread thinly onto labelled microscope slides and allowed to air dry **before** placing into a plastic slide box. Do not apply fixative. Do not allow the slides to come into contact with formalin or its vapour as this will make the slides unreadable. The slide box is placed alone in a clear bag for transport to the laboratory. If biopsies are collected at the same time the formalin pot should be placed in a **separate** bag.

The Diagnostic Cytology laboratory now accepts **TBFNA (Transbronchial fine needle aspiration) specimens**. These are needle aspirates of the mediastinal lymph nodes performed via endobronchial ultrasound (EBUS). The specimens must be sent in cytolyt filled vials provided by the laboratory. These specimens are often from multiple sites and must be labelled with the site (or station) denoted.

Delivery of Reports
Cervical cytology reports are returned to both the sample taker and the patient's GP, electronically via the GP links and via paper copies on a daily basis. Results are also sent electronically to the PCSS who are responsible for call and recall.

There is a 'direct referral to colposcopy' system (organised by the cytology laboratory at University Hospitals Sussex NHS Trust) whereby the colposcopy department is directly informed of women recommended for referral because of abnormal cytology. The colposcopy clinic will then arrange for an appointment to be made. This includes a failsafe system to monitor the attendance of women referred for colposcopy.

Mortuary

The mortuary holds a Human Tissue Authority (HTA) license which covers all activities carried out in the mortuary.
The mortuary provides a safe and secure environment for the provision and continuation of care once a person dies. Deceased persons can be admitted from the wards and local communities at all times via the porters or Coroners contracted funeral service.
A post mortem examination service is provided on both sites.
The mortuary is staffed by Anatomical Pathology Technologists (APTs). The core hours are 07.30-15.30.
The opening times for service users vary. **All** visits are by appointment only and must be pre-booked.
As this is a restricted area, anyone attending the mortuary must have identification prior to being permitted entry. A visitor's form will be completed and the visitor will be required to sign in and comply with visitors rules.

Admission

All deceased persons being admitted to the mortuary will have an admission form completed by the ward or funeral directors. Each deceased person **MUST** be wearing an identification band which contains three clear identifiers. Once registered in the mortuary a unique reference number (URN) will be allocated which will be used throughout the deceased persons stay.

Death Certification

A registered or pre-registered medical practitioner may issue a medical certificate of cause of death (MCCD) when he/she knows the cause of death, knows it to be natural, has attended the patient within 14 days of death and has no reason to refer the death to the Coroner. Doctors are permitted to carry out external examinations in the mortuary prior to completing documentation needed for the registration and/or the funeral. The APTs will assist the doctors during their visit to the mortuary. The documentation is usually completed in the bereavement office however GPs may complete this in the mortuary.
GPs are required to call the mortuary prior to arriving, to arrange a convenient time for both parties.

Coroners Referrals

Any death which falls into one of the categories below must be referred to the Coroner.

- Sudden and unexpected deaths in adults and infants
- Deaths involving accidents, violence, neglect or poisoning
- A death in theatre or, before the patient has regained consciousness after anaesthesia.
- Death which might have been caused by an industrial injury or disease
- H.M. prisoners
- Maternal deaths (Adult)
- Hospital deaths within 24 hours of admission
- Baby deaths including stillbirth 24< weeks gestation
- Any baby with independent existence outside of the mother regardless of gestational age
- Complaints of treatment/care
- If in doubt or unable to write the MCCD

To contact the Coroner's office: 0330 222 3599
The bereavement office will assist with advice and information.

Hospital Consented Post Mortem Examinations

Consent

Written consent is required from the person in the highest qualifying relationship for a hospital (also known as consented) post mortem examination. If the medical team or family are interested in a hospital post mortem examination this is discussed between both parties. The Clinician in charge should contact the Pathologist and/or mortuary APT before discussing the post mortem examination with the family, in order to clarify any points of interest and/or limitations, establish timelines and to clarify the cause of death to ensure there is no need to involve the Coroner. If the person in the qualifying relationship agrees to the request, a post mortem examination consent form must be completed. The person taking consent MUST have had specific 'Post Mortem Examination Consent Taking' training in the last two

years. The APTs in the mortuary can be contacted to discuss post mortems examination options and assist with or those that have been trained can take informed consent. Consent forms are available from the mortuary.
A hospital post mortem examination cannot be carried out in place of a Coroners post mortem examination but can be carried out simultaneously with the Coroners permission.

Paediatric and Perinatal Post Mortems

All hospital consented baby post mortem examinations are carried out at Great Ormond Street Hospital (GOSH), The GOSH Consent form must be used. The person taking consent MUST have had specific 'Post Mortem Examination Consent Taking' training in the last two years. The forms are available from the labour ward or by contacting the mortuary. The mother is the person in the highest qualifying relationship for all babies.
A 'London Perinatal Pathology Network' form must also be completed in full and copies of any scans will be required by GOSH.
For any enquiries or advice contact the ESHT deputy mortuary manager.

Viewing

All viewings are by appointment only and will be facilitated during working hours. Requests to see deceased persons from family members will be discussed with Bereavement services. The person in the highest qualifying relationship is the lead for all communication. If facilitating a request is possible, an appointment will be made between the bereavement service officers and APTs. The bereavement service officers will accompany the family throughout their visit with assistance from the APTs as required. There may be occasions where the APT will accompany the family; this will be agreed at the time of booking. The family will need to bring identification and complete a security check prior to visiting their relative.
All viewings take place in the mortuary viewing rooms and are only prepared and completed by the APTs.
Out of hours viewings are not provided. In extreme circumstances the ward will contact the CSM who will discuss the situation. There are set criteria which are checked if a request is made. If an out of hours viewing is approved the on call APT will be contacted to make arrangements. There will be minimum 3 hour attendance time. The ward will need to release a member of staff to accompany the family throughout their visit if the viewing is permitted.
Formal identifications will take place during working hours. The Coroners officers may require formal identifications out of hours. These will be arranged with the on call APT directly.

Releases

To enable the release of a deceased person from the mortuary a release form must be presented at the time of transfer. This will include a number of identifiers including the mortuary URN. Unless other arrangements have been made, no release will take place unless the company/family member collecting the deceased person has this document.
Family's who choose to conduct their own funeral will contact the mortuary for advice and guidance. Assistance will be given by the APTs to the families choosing this method.

Appendix 1: Alphabetic test container guide

Tube colour	Type
Ochre (Yellow) top tube	Plain tube
Red top tube	Plain serum
Lavender top tube	EDTA tube
Light blue top tube (Adult: must be filled to above the minimum fill indicator Paediatric: Filled to top of label)	Citrate tube
Grey top tube	Fluoride Oxalate
Pink top tube (Do not use pre-printed labels on blood tubes - patient details must be handwritten. Please refer to 'Minimum Labelling for Specimen and Request Forms' within this document for full details.)	Transfusion tube
Royal blue top tube	Sodium Heparin
Green top tube	Lithium Heparin
Red capped tube with yellow ring	Clot
Brown top	Gel Serum tube

Swabs	Used for
Blue top, twisted wire swab	Pernasal and Ear
Pink Top Liquid Eswab	Routine bacteriology (NOT MRSA)
Red top, single swab distributed with MRSA broths	MRSA broth inoculation only (DO NOT USE ESWAB)
Green top swab	Viral PCR
Red top, double swab (only available directly from Microbiology)	MRSA PCR only
Other containers	
White cap universal container 20ml	Fluids, etc Plastic Tips
Silver cap container 60ml	Sputum
Blue cap with spoon 30ml (For FIT testing special pickers required, contact laboratory)	Stools
Red top 10ml MSU primary tube container (contains boric acid)	Urine (community)
Yellow vacutest kit 10ml MSU primary tube container (contains boric acid)	Urine (Hospital/ community)

C = Biochemistry Cy = Cytology H = Haematology
Hi = Histology M = Microbiology I = Immunology

Code	Dept Test	Bottle/Colour of label or cap	Minimum Amount
C	17 alpha OH Progesterone	Ochre	1ml
C	1,25 OH Vitamin D	Ochre	1ml
C	A1 Galactosidase (Alpha 1)	Lithium Heparin/Green x1 + Lavender x1	Full tube
C	ACTH By hospital appointment only, to be collected around 9am only	E EDTA/ Lavender x2 - Send on frozen ice to Biochemistry and inform lab	4ml each tube

I	Acetyl Choline Receptor Abs	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
H	Activated Protein C Resistance	Citrate/Blue x2	Fill to the black arrow
C	Acylcarnitine (Blood Spot)	Guthrie Card	-
I	ADAMTS13	Blue x2 Send to lab immediately	Fille to the black arrow
I	Adalimumab (Serum)	Ochre	Full tube
M	Adenovirus Antibodies	Red top	Full tube
M	Adenovirus PCR/DNA Mon to Thurs before 12 noon	EDTA/ Lavender	4ml
M	Adeno, CMV, EPV, PCR Mon to Thurs before 12 noon	EDTA/ Lavender	4ml
C	Albumin	Ochre (Part of Liver or Bone Profile)	1ml
C	Albumin/Creatinine Ratio	Small random urine sample	-
C	Aldosterone/Renin ratio	EDTA/ Lavender	4ml
C	Alanine Amniotransferase (ALT)	Ochre	1ml
C	Alkaline Phosphatase	Ochre (Part of Liver or Bone Profile)	3ml
C	Alkaline Phos Iso Enzymes	Ochre	Full tube
I	Allergen specific IgE	Ochre Brown (paediatric use only)	Full tube 1.1ml
I	Allergy Screen	Ochre (State allergens) Brown (paediatric use only)	Full tube 1.1ml
C	ALP Isoenzymes bone/liver	Ochre	Full tube
C	Alpha 1 Antitrypsin	Ochre	3ml
C	Alpha Fetoprotein	Ochre	Full tube
C	Alpha Galactosidase level (Fabrys)	EDTA/ Lavender	All tubes full
C	Aluminium	Dark Blue	2ml
M	Amikacin levels By 10am (Only by pre-arrangement with Microbiology)	Red	Full tube
C	Amiodarone	EDTA/ Lavender	Full tube
C	Amino Acid Chromatography	Lithium Heparin/Green	2ml
C	Amitryptyline	EDTA/ Lavender	1ml
C	Ammonia (NH3) By hospital appointment only	EDTA/ Lavender Send to lab immediately- must be on ice	4ml
M	Amoebic Antibodies	Red top	Full tube
M	Amoebic Serology	Red capped tube with yellow ring	Full tube
C	Amylase	Ochre	1ml
C	Amylase Isoenzyme	Ochre	1ml
I	ANCA	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
C	Androgen Profile	Ochre x2	Each tube full
C	Androstenedione	Ochre	Full tube
I	ANF (ANA)	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
C	Angiotensin Converting Enzyme (ACE)	Ochre	Full tube
C	Ante mullerian hormone	Ochre	Full tube

H	Ante Natal screen	EDTA/ Pink* + EDTA/ Lavender *do not use pre-printed labels on blood tubes – patient details must be handwritten. Please refer to 'Minimum Labelling for Specimen and Request Forms' within this document for full details.	All tubes full
M	Antenatal screen (Syphilis) (HIV/HepB with consent)	Red capped tube with yellow ring	Full tube
H	Anthony Nolan Trust screen	Patient will have pack of samples bottles to use.	
I	Anti 68kD Antibody	Ochre	Full tube
H	Antibody identification (Blood Bank) Antibody identification/titre	EDTA/ Pink* x3 (Blood Group System – Cannot use Haematology EDTA bottles) *do not use pre-printed labels on blood tubes – patient details must be handwritten. Please refer to 'Minimum Labelling for Specimen and Request Forms' within this document for full details.	6ml each tube
I	Anti Avian PPT Antibodies	Red top (Can share with other antibodies) Please specify. Bird, Parrot & Cockatiel no longer available. Brown (paediatric use only)	Full tube 1.1ml
I	Anti Cardioipin antibodies	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
I	Anti CCP (Cyclic Citrullinated Peptide)	Ochre Brown (paediatric use only)	Full tube 1.1ml
C	Anti Diuretic Hormone (ADH)	Please Contact Laboratory	
I	Anti DNA antibodies	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
I	Anti ENA antibodies	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
I	Anti Endomysial antibodies	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
I	Anti Gad antibody AGAD	Ochre Brown (paediatric use only)	Full tube
I	Anti Glomerular Basement Abs	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
H	Anti Insulin (AIA)	Ochre Brown (paediatric use only)	Full tube 1.1ml
I	Anti Intrinsic factor antibodies	Ochre top (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
M	Antimicrobial assay- General (i.e. Antibiotic / Antifungal) (excluding Vancomycin & Gentamicin)	Red top - Clotted blood *For urgent requests please contact the Microbiology Dept.	1ml

I	Anti Mitochondrial antibodies	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
I	Anti Nuclear antibody (factor)	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
I	Anti Parietal cell antibodies	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
I	Anti Ovarian Antibody	Ochre Brown (paediatric use only)	Full tube
I	Anti Phospholipid antibodies	Ochre Brown (paediatric use only)	Full tube 1.1ml
I	Anti S-100 Abs	Ochre Brown (paediatric use only)	Full tube 1.1ml
I	Anti Smooth muscle antibodies	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
I	Anti Sperm antibodies	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
I	Anti SSB/SSA	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
M	Anti-staph antibodies	Red capped tube with yellow ring	Full tube
H	Anti Thrombin III	Citrate/Blue	Fill to the black arrow
C	Antitrypsin (AAT) deficiency	Ochre	Full tube
C	Apoe Genotype	EDTA	4ml
C	Apolipoprotein A1 & B1	Ochre	Full tube
C	Apolipoprotein E Genotyping	EDTA/ Lavender	4ml
C	Apolipoprotein Electrophoresis	Ochre or Lithium Heparin/Green	Full tube
H	APTT	Citrate/Blue	Fill to the black arrow
C	Arsenic	EDTA/Lavender+ 20ml urine	Full tube + 20ml urine
M	ASO and Anti-Dnase B	Red capped tube with yellow ring	Full tube
C	Aspartate Transferase (AST)	Ochre	Full tube
I	Aspergillus IgG	Red capped tube with yellow ring Brown (paediatric use only)	Full tube 1.1ml
H	Atypical Mononuclear cells	EDTA/ Lavender (Part of FBC screen)	4ml
I	Auto Immune Profile	Red x1 + Ochre x1 Brown (paediatric use only)	Each tube full 1.1ml
M	Bartonella	Red top	Full tube
H	BCR / ABL	EDTA Mon-Thur only (must be less than 3 days old when received by referral lab)	5 x 4ml tubes
C	Beta-Glucosidase	2x Green/Lithium Heparin	Full tubes
C	Beta 2 Microglobulin	Ochre	3ml
C	17 Beta Oestradial	Ochre	Full tube
C	BHCG	Ochre (Indicate whether early pregnancy or tumour marker)	1ml
C	Bicarbonate/TCO2	Ochre	1ml
C	Bile Acids / Salts	Ochre	3ml
C	Bilirubin (Neonatal)	Brown top (PoCT machines on wards only)	1.3ml

C	Bilirubin (Total)	Ochre (Part of Liver Profile)	1ml
C	Biotinidase activity	Lithium Heparin/Green Send to Biochemistry immediately	4ml
C	B12 and Serum Folate	Ochre	3ml
C	B2 Transferrin (Nasal Fluid)	-	-
H	Blood film	EDTA/ Lavender	4ml
C	Blood Gases (pH, pO2, pCO2, Base excess, Bicarbonate)	(Not available in Chemistry. Instruments on ICU, A&E & MAU at Eastbourne. ICU, A&E, Delivery Suite, SCBU & Tressell at Conquest.	
C	BNP (Pro-BNP) – Probrain Naturetic Peptide	Ochre	Full tube
C	Bone Profile	Ochre (T.Prot, Alb, Calcium, Phos, Alk Phos)	3ml
M	Bordetella culture / PCR	Blue top, twisted wire swab	-
M	Borrelia (Lyme) Serology	Red capped tube with yellow ring	Full tube
M	Bordetella Serology	Red capped tube with yellow ring	Full tube
M	Brucella antibodies	Red capped tube with yellow ring	Full tube
I	C1 Esterase (inhibitor)	Ochre Brown (paediatric use only)	Full tube 1.1ml
C	C2H50H (alcohol)	Ochre	Full tube
C	C3d	EDTA/ Lavender	2ml
C	CA-125	Ochre	1ml
C	CA-153	Ochre	Full tube
C	CA-199	Ochre	Full tube
C	C-Reactive protein (CRP)	Ochre	2ml
C	Cadmium	EDTA/ Lavender	4ml
I	Coeliac screen	Ochre Brown (paediatric use only)	Full tube 1.1ml
C	Caeruloplasmin	Ochre	Full tube
C	Caffeine	Red Top **do not** use Ochre tubes	Full tube
C	Calcitonin	Ochre Store on frozen ice – Inform lab and send within 10 minutes.	Full tube
C	Calcium	Ochre – if isolated request do not use tourniquet if practicable	1ml
C	Calcium (Fasting)	Ochre (Fast from 10pm. Blood to be taken between 8am and 10am)	3ml
C	Calprotectin (Faeces)	Plastic Universal container	1-5gm
C	Corrected Calcium	Ochre	1ml
C	Carbamazepine (ACD/AED)	Ochre	1ml
C	Carbohydrate deficient Transferrin	Ochre	Full tube
C	Carbon Monoxide	Lithium Heparin/Green	4ml
C	Carboxyhaemoglobin	Lithium Heparin/Green	4ml
C	Carcino Embryonic Antigen (CEA)	Ochre	Full tube
C	Cardiac enzymes (CPK)	Ochre	2ml
I	Cardiolipin Antibodies	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
C	Carnitine (Total and Free)	Lithium Heparin/Green	1ml
C	Carotene	Lithium Heparin/Green or Ochre Keep in dark, wrap in black polythene Sample should be fasting	Fill to line
C	Catecholamines	EDTA	2x Full tubes
I	C3/C4/Complement	Ochre Brown (paediatric use only)	Full tube 1.1ml

H	CD4 / CD8 counts Monday-Thursday only	EDTA/ Lavender x2 Send to lab the same day	4ml each tube
C	Carbohydrate Deficient Transferrin	Ochre	Full tube
H	Cell Marker studies (Eastbourne)	EDTA/ Lavender Send to Haematology special lab immediately	4ml
H	Cell Marker studies (Conquest)	Lithium Heparin/Green x3 Send to Haematology special lab immediately	All tubes full
C	Cerebrospinal fluid (CSF) Glucose	CSF glucose sample in Fluoride Oxalate / Grey Tube.	Full tube
C	Ceruloplasmin	Ochre	Full tube
Cy	Cervical Cytology	Only approved sample collectors. Must use method as described under 'Cervical Cytology' within this document. ThinPrep PAP Test container (20ml) and Green Cervex brush	20ml
H	Chimerism	3x EDTA/Lavender	Full tubes
M	Chlamydia Serology	Red capped tube with yellow ring For genital chlamydia, please send appropriate specimens for chlamydia PCR. For other sites please discuss with Consultant Microbiologist.	Full tube
C	Chloride	Ochre	Full tube
C	Cholesterol	Ochre (also see lipids)	1ml
C	Cholinesterase Dibucaine + fluoride numbers	Ochre	Full tube
C	Red Cell Cholinesterase	Special arrangement **(Phone Biochemistry)**	-
C	Chromium & Cobolt	EDTA/ Lavender x2	4ml each tube
C	Chromogranin A&B (EDTA) No beta blockers for 72 hours	2x EDTA/ Lavender + x1 Ochre Send on frozen ice to lab immediately (Fasting)	All tubes full
C	Chromogranin – Gut Hormone	2x EDTA/Lavender + x1 Ochre Send on frozen ice to lab immediately	All tubes full
H	Chromosome Studies (Blood) (Eastbourne)	Lithium Heparin/Green x2 + EDTA/ Lavender For general chromosome requests – see also Cytogenetics or Fragile X	All tubes full
C	Chromosome Studies (Blood) (Conquest)	Lithium Heparin/Green x2 **Must reach lab before 1pm** For general chromosome requests – see also Cytogenetics or Fragile X (Monday to Thursday only). Must have completed genetics form and consent form if Paediatric.	4ml each tube
C	Clobazam	EDTA/ Lavender	Fill to line
C	Clonazepam	Ochre Must be a fresh sample, KEEP IN THE DARK	4ml
H	Clozaril monitoring	EDTA/ Lavender	4ml
M	CMV antibody status	Red capped tube with yellow ring	Full tube
M	CMV/PCR/DNA Blood sample	EDTA	4ml
M	CMV DNA in urine	30ml white top universal pot	5ml

M	CMV DNA in any other site (i.e gastro CMV/ respiratory CMV etc)	Discuss with microbiology	
H	Coagulation screen	Citrate/Blue	Filled to the black arrow
H	Coagulation factor assays	Citrate/Blue x2	Filled to the black arrow
H	Coagulopathy Investigation	Citrate/Blue x3	Filled to the black arrow
I	Coeliac screen (Eastbourne)	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
I	Coeliac screen (Conquest)	Ochre Brown (paediatric use only)	Full tube 1.1ml
H	Cold Agglutinins	If cold agglutinin testing required, please discuss with NHSBT reference centre	
H	Collagen Vascular disease	Ochre x2	All tubes full
H	Complement C4/C5 (Eastbourne)	Ochre	Full tube
H	Complement C3/C4	Ochre/ Gold top Send to lab the same day	Full tube
H	Coombe's test (Eastbourne)	Ochre *Do not use pre-printed labels on blood tubes – patient details must be handwritten. Please refer to 'Minimum Labelling for Specimen and Request Forms' within this document for full details.	Full tube
H	Coombe's test (Conquest)	EDTA/ Lavender *Do not use pre-printed labels on blood tubes – patient details must be handwritten. Please refer to 'Minimum Labelling for Specimen and Request Forms' within this document for full details.	Fill to line
C	Copper	Royal blue	Full tube
C	Cortisol	Ochre	2ml
C	Cortisol (Collected at 9am for diurnal studies and dynamic tests – special arrangements)	Ochre	2ml
M	Coxiella (Q-fever) Serology	Red capped tube with yellow ring	Full tube
M	Coxsackie (Enterovirus)	Red capped tube with yellow ring	Full tube
C	C-Peptide Mon to Thurs only	Ochre + Fluoride Oxalate/Grey (Fasting dependant on clinical advice) (On Ice)	Both tubes full
C	CPK or CK	Ochre	1ml
C	Creatine Kinase (CPK)	Ochre (Part of Cardiac Profile)	1ml
C	Creatinine	Ochre (Part of Renal Profile)	1ml
C	Creatinine clearance	Ochre + 24 hour urine (Blood to be taken at beginning, during or end of collection)	1ml of blood
M	Cryptococcal antigen	Red capped tube with yellow ring	Full tube
C	C-Terminal Telopeptide (CTX)	EDTA/Lavender Plasma must be frozen within 4 hours	Full tube
M	Culture and Sensitivity	Refer to Test Container Guide (depends on requirement)	

H	Cross Match	EDTA/ Pink* (sample must be fully labelled) – *Do not use pre-printed labels on blood tubes – patient details must be handwritten. Please refer to 'Minimum Labelling for Specimen and Request Forms' within this document for full details.	6ml
M	Culture (Blood)	2 bottles of culture medium (Do not place PAS labels over Barcode)	-
C	Cyclosporins	EDTA/ Lavender (If on a 'HAREFIELD' form check the back of the form for other tests)	4ml
C	Cystic Fibrosis Genetics (CFS) Mon to Thurs only	EDTA/ Lavender x2 (Family history required)	5-10mls
C	Cytochrome P-450, CYP2D6 Genotype	EDTA/ Lavender	1ml
H	Cytogenetics (Miscarriages) Mon to Thurs only	Lithium Heparin/Green x3 + Ochre x2 (Maternal) EDTA/ Pink* x4 (Maternal) Lithium Heparin/Green x2 (Paternal) EDTA/ Pink* x4 (Paternal) *Do not use pre-printed labels on blood tubes – patient details must be handwritten. Please refer to 'Minimum Labelling for Specimen and Request Forms' within this document for full details.	All tubes full
H	D-Dimer	Citrate/Blue	Above min level indicator
C	Dehydroepiandrosterone DHEAS	Ochre	Full tube
M	Dengue	Red top	Full tube
C	7 Dehydro Cholesterol	Lithium Heparin/Green	0.2ml
C	Deoxycortisol	Ochre	2ml
Cy	Diagnostic Cytology	CSF in sterile universal containers	-
C	Deoxycortisol	Serous fluid in sterile white top universal container	-
Cy C H	Diagnostic Cytology Diazepam Differential	Urine in 250ml container	100ml
		Sputa in MSU pot	-
		Mucosal brushings *(bronchial, bile duct, gastric, oesophageal)* in universal containers containing 15ml CytoLyte	-
		Fine Needle Aspirates (FNAs) received on slides prepared by specimen taker	-
		Breast cyst fluid in white top universal container	-
		Ochre or Lithium Heparin/Green	1ml
		EDTA/ Lavender **(Part of FBC)**	4ml
C	Digoxin	Ochre (Collect 6-8 hrs after last dose, state time of dose and time of collection)	2ml
C	Dihydropyrimidine Dehydrogenase	EDTA/ Lavender	3ml
C	5a Dihydrotestosterone (5 & DHT)	Ochre	2ml
H	Direct Coombs' Test	EDTA/ Lavender	4ml
I	DNA (Anti DNA antibodies)	Ochre Brown (paediatric use only)	Full tube 1.1ml
C	Downs Screen	Ochre	Full tube

C	Drug Abuse Screen	EDTA/ Lavender	2ml
C	Drug Abuse Screen (Urine)	30ml universal container	Full
H	DRVVT (Lupus)	Citrate/Blue x2	Filled to the black arrow
M	EBV Abs	Red top	Full tube
M	EBV PCR/DNA Mon to Thurs before 12 noon	EDTA/ Lavender	4ml
C	EGFR (not blood) – calculation	Ochre	Full tube
C	Electrolytes (Renal)	Ochre (Sodium/Potassium/Urea/Creatinine) Note: Primary care renal profile consists of Sodium/Potassium/Creatinine only	2ml
H	Electrophoresis (Hb)	See Haemoglobin Electrophoresis	4ml
C	Electrophoresis (Protein)	Ochre	Full tube
I	ENA antibodies	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
I	Endomysial antibodies	See Coeliac screen	
M	Enterovirus	Red capped tube with yellow ring	Full tube
C	Epanutin (ACD/AED)	Ochre	1ml
C	Epilim (ACD/AED)	Ochre	1ml
H	EPO	Ochre (taken before 3pm – send away sample)	Full tube
M	Epstein Barr Virus	Red capped tube with yellow ring	Full tube
C	Ethambutol	EDTA / Lavender (include dose, other drugs and clinical history)	Full tube
H	ESR	EDTA/ Lavender (Can combine with FBC)	4ml Fill to line
C	Ethanol (Alcohol, C2H5OH)	Ochre Send to lab immediately	Full tube
C	Ethosuximide (ACD/AED)	Ochre	Full tube
C	Ethylene Glycol	Lithium Heparin/Green The lab must be contacted prior to request	Full tube
H	Factor V Leiden	see Thrombophilia screen	Filled to the black arrow
H	Factor VII	Citrate/Blue x2 Send to lab immediately	Filled to the black arrow
H	Factor VIII	Citrate/Blue x2 Send to lab immediately	Filled to the black arrow
H	Factor IX	Citrate/Blue x2 Send to lab immediately	Filled to the black arrow
H	Factor XI / XII	Citrate/Blue x2 Send to lab immediately	Filled to the black arrow
H	Factor Xa	Citrate/Blue Send to lab immediately	Filled to the black arrow
C	Faecal Elastase	Stool specimen Send to lab immediately	-
C	FAI (Free Antigen Index)	Ochre	Full tube
I	Farmer's lung antibody	Red capped tube with yellow ring Brown (paediatric use only)	Full tube 1.1ml
C	Fatty Acid (Very long chain)	EDTA/ Lavender Send to lab immediately	4ml
H	FDP	See D-Dimer	-
C	Ferritin	Ochre	2ml

H	Fibrinogen	Citrate/Blue	Filled to the black arrow
C	Flecaincide	Ochre	1ml
C	FIT (Faecal Occult Blood Immunochemical test)	Special pickers required, contact laboratory	
C	Flouxetine level	Ochre x1 + urine sample	All tubes full
C	Fluoride Number	See Cholinesterase	-
H	Fragile X (Karyotype) (Eastbourne) Mon to Thurs only	Ochre + EDTA/ Lavender + Lithium Heparin/Green (Must have completed genetics form and consent form if Paediatric)	2ml each tube
C	Free T3	Ochre	2ml
C	Free T4	Ochre	2ml
C	Free Light Chains	Ochre	1ml
Hi	Frozen Sections (Non-routine Histology Specimen) By 4.30pm latest	Phone lab to book a frozen section Eastbourne (13) 3057 Conquest (14) 8023	
C	Fructosamine	Ochre (on ice)	2ml
C	FSH	Ochre	2ml
C	FT4, TSH Interferences	Ochre	0.5ml
H	Full Blood Count	EDTA/ Lavender (CANNOT BE SHARED WITH BLOOD BANK)	4ml
I	Functional Antibodies (H. influenzae, S. pneumoniae, Tetanus)	Red top Brown (paediatric use only)	Full tube 1.1ml
M	Fungal Serology PCR and Serology to Aspergillus/Candida, β-D-glucan	EDTA/ Lavender x1 (PCR), Red top x2 (1 for serology and 1 for β-D-glucan)	All tubes full
H	G6PD-H	EDTA/ Lavender	4ml
C	Galactose By hospital appointment only	Phone Biochemistry for tests	-
C	Galactose-I-Phosphate	Lithium Heparin/Green	2ml
C	Galactose-I-Phosphate Uridyl Transferase	Lithium Heparin/Green	1ml
C	Gamma GT (GGT)	Ochre	1ml
C	Gastrin (Gut Hormone) (Fasting)	EDTA/Lavender x2 and Ochre x1 Fast overnight (10hr), recommended that blood is taken between 8am-10am for convenience of fasting. H2 blockers should be stopped for 72h and Omeprazole for 2 weeks before blood is taken. Send on ice to lab immediately.	All tubes full
H	Genetic Fragile X	EDTA/ Lavender	4ml
C	Gentamicin Assay (Antibiotic) Pre Bloods Post Bloods	 Ochre (5-30 minutes before dose) Ochre (1 hour after dose)	 1ml 1ml
I	Glomerular Basement Membrane	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
C	Glucose	Fluoride Oxalate/Grey (state time)	1ml
C	Glucose (Fasting)	Fluoride Oxalate/Grey (state time) FAST from 10pm. Blood must be collected between 8am – 10am.	2ml

H	Glucose 6 Phosphate dehydrogenase	EDTA/ Lavender	4ml
C	Glucose Tolerance Test By hospital appointment only	-	-
C	Gonadotrophins (FSH/LH)	Ochre (Include LMP)	Full tube
H	Group and Crossmatch	EDTA/ Pink* (essential – full name, unit number, DoB, ward) - Inadequately or incorrectly labelled samples will be disposed of in line with BCSH guidelines and the requestor informed. Cannot use Haematology FBC samples for these tests. *Do not use pre-printed labels on blood tubes – patient details must be handwritten. Please refer to 'Minimum Labelling for Specimen and Request Forms' within this document for full details.	6ml
H	Group and Save Serum	EDTA/ Pink* (essential – full name, unit number, DoB, ward) – Inadequately labelled samples will be returned to requestor. Cannot use Haematology FBC samples for these tests. *Do not use pre-printed labels on blood tubes – patient details must be handwritten. Please refer to 'Minimum Labelling for Specimen and Request Forms' within this document for full details.	6ml
C	Growth Hormone	Ochre Send to lab immediately	Full tube
C	Gut Hormone	EDTA/Lavender x2 and Ochre x1 Fast from 10:00pm. Blood must be collected between 08:00am and 10:00am. Send on ice to lab immediately.	All tubes full
C	Haematinics (B12/Fol/Fer)	Ochre	Full tube
H	Haemoglobin	See FBC	-
H	Haemoglobin Electrophoresis (Haemoglobinopathies)	EDTA/ Lavender x1	4ml each tube
H	Haemophilia screen	Citrate/Blue x3	Above min level indicator
H	Haemochromatosis gene (screen)	EDTA/ Lavender x1	4ml each tube
H	Haemoglobin A2	EDTA/ Lavender x1	4ml each tube
H	Haemoglobin F	EDTA/ Lavender x1 – can combine with Haemoglobin A2	4ml each tube
H	Haptoglobin Discuss with Haematology Consultant before collecting sample.	Ochre	3ml
C	HbA1c (GHb)	EDTA / Lavender	Fill to line
M	Hepatitis A serology / immunity	Red capped tube with yellow ring	Full tube
M	Hepatitis B antigen	Red capped tube with yellow ring	Full tube
M	Hepatitis B antibody	Red top	Full tube
M	Hepatitis B DNA PCR (quantitative testing)	EDTA / Lavender 2x4ml tubes	All tubes full 8ml minimum
M	Hepatitis C antibody	Red top	Full tube

M	Hepatitis C RNA PCR (quantitative testing)	EDTA / Lavender 1x4ml tube	Full tube 4ml minimum
M	HCV RNA titre	EDTA Lavender top	Full tube
M	HCV genotype	EDTA Lavender top	Full tube
M	Hepatitis D virus (Delta agent)	Red capped tube with yellow ring	Full tube
M	Hepatitis E virus	Red capped tube with yellow ring	Full tube
C	HCG (Beta subunit)	Ochre	2ml
C	HCO3 (Bicarb)	Ochre	2ml
C	HDL Cholesterol	Ochre (Part of Lipid Profile)	2ml
I	HEGF	Ochre	Full tube
M	Helicobacter Pylori Antigen (Antibody no longer provided)	Stool Specimen (minimum of 2ml required)	-
M	Herpes simplex (HSV) PCR/DNA (site)	Green top swab from lesion or vesicle fluid	Leave the swab in the tube
M	Herpes simplex (HSV) PCR/DNA (blood)	EDTA/ Lavender	4ml
M	Herpes simplex serology	Red capped tube with yellow ring	Full tube
M	Herpes simplex in urine	30ml white top universal pot	5ml
M	Herpes zoster virus serology	Red capped tube with yellow ring	Full tube
H	HFE gene	1x EDTA/ Lavender	4ml
Hi	Histology specimens (Routine)	Specimen covered in minimum of 10X neutral buffered formalin to the volume of the specimen. Fixation must be done immediately with minimum handling.	-
Hi	Histology specimens (Non-routine) By 4.30pm latest	Phone lab to book a frozen section Eastbourne (13) 3057 Conquest (14) 8023	-
M	HIV proviral DNA	EDTA/ Lavender	4ml
M	HIV status	Red capped tube with yellow ring	Full tube
M	HIV Viral Load Mon to Thurs by 12 noon	EDTA/ Lavender Send to lab immediately as plasma must be taken off within 4 hours	4ml
H	HLA typing	EDTA/ Lavender	4ml
H	HLA A29	2x EDTA/Lavender	4ml
H	HLA B27 Collect Monday- Thursday	EDTA x2 (Minimum of 3 patient identifiers on the specimen container and the request form required)	Full tubes
H	HLA B51	2x EDTA	
H	HLA Chromosome (Genetic) studies By arrangement with Reception	-	-
H	HLA DQ2 & DQ8	2x EDTA	
H	HLA Miscarriages	5x EDTA/ Lavender, 1x Heparin	All tubes full
C	HMBS	EDTA/ Lavender	0.5ml
C	Homocysteine Mon to Thurs only	EDTA/ Lavender (on ice) Send to Biochemistry immediately and inform lab	4ml
M	HTLV serology	Red capped tube with yellow ring	Full tube
M	Hydatid (Echinococcus) serology	Red capped tube with yellow ring	Full tube
C	Hydroxyprogesterone (17alpha)	Ochre	2ml
C	17 Hydroxyprogesterone Profile Blood Spot	Guthrie Card	5 blood spots
C	IgFBP3	Ochre	1ml
C	IGF1 (Insulin like growth factor)	Ochre	3ml

C	IGF2	Ochre	Full tube
C	Immune Reactive Trypsin	Guthrie Card	Blood Spot
Hi	Immunofluorescence (Non-routine) By 4.30pm latest	Phone lab to book Notify lab that specimen is on its way. Half the specimen (usually skin) in a closed dry sterile pot without formalin.	-
C	Immunoglobulins (IgA,G,M)	Ochre	2ml
I	Immunoglobulin E (IgE)	Ochre	Full tube
H	Immunophentyping	EDTAx4	4ml
H	Infectious Mononucleosis Test	Ochre	Full tube
C	Inhibin B	Ochre	Full tube
H	INR	Citrate/blue	Above min level indicator
I	Intrinsic factor antibody	Ochre Brown (paediatric use only)	Full tube 1.1ml
C	Insulin C – peptide	Fluoride Oxalate/Grey + Ochre – **Send to lab immediately**	All tubes full
C	Insulin & Glucose	Special arrangement	-
C	Iron overdose (Paediatric)	Ochre	2ml
C	Iron/TIBC	Ochre	3ml
I	GAD, IA2 and ZnT8	Ochre Brown (paediatric use only)	Full tube 1.1ml
C	Itraconazole	Ochre	1ml
H	JAK 2	4x EDTA/ Lavender (Mon-Thur)	4 x 4ml
C	Karyotyping Mon to Thurs only (Must have completed genetics form and consent form if Paediatric)	Ochre x2 (Maternal) EDTA/ Lavender x4 (Maternal) Lithium Heparin/Green x2 (Maternal) EDTA/ Lavender x4 (Paternal) Lithium Heparin/Green x2 (Paternal)	All tubes full
H	Kleihauer	EDTA/ lavender *Do not use pre-printed labels on blood tubes – patient details must be handwritten. Please refer to 'Minimum Labelling for Specimen and Request Forms' within this document for full details.	4ml
C	Lactate	Fluoride Oxalate/Grey Inform Clinical Biochemistry as soon as possible. Take to laboratory immediately	1ml
C	Lamotrigine	Ochre	2ml
C	LDH	Ochre	1ml
C	Lead (Pb)	EDTA/ Lavender	4ml
M	Legionella Antibodies	Red capped tube with yellow ring	-
M	Legionella Antigen	Urine sample	-
M	Leptospira Antibodies	Red capped tube with yellow ring	-
C	Lipase	Ochre	2ml
C	Lipids	Ochre (Cholesterol,Triglyceride,HDL, LDL – **(Random)**	3ml
C	Lipids (Fasting)	Ochre – FAST for 14 hours. FAST for 10 hours if diabetic controlled by insulin (with dried bread or porridge if necessary).	3ml
C	Lipoprotein (LPA)	Ochre	Full tube
C	LH	Ochre	2ml

C	Lithium	Ochre	2ml
C	LRP-4	1x Ochre	Full tube
C	Liver Function Tests (LFT)	Ochre (Alb.Bili,ALT,Alk Phos)	3ml
H	Lupus Anticoagulant tube	2x Citrate/Blue	Filled to the black arrow
M	Lyme Disease (Borrelia)	Red top	Full tube
H	Lymphocyte Marker Studies	EDTA/ Lavender x2	4ml each tube
C	Lysosomal Enzymes Mon to Thurs only	Lithium Heparin/Green x2 + random urine	All tubes full
C	Macroprolactin	Ochre	2ml
C	Macro CK-MB/CK Isoenzymes	Ochre	2ml
C	Magnesium	Ochre	1ml
C	Manganese	EDTA/ Lavender	4ml
H	Malarial Parasites	EDTA/ Lavender	4ml
H	MCV	EDTA/ Lavender **(Part of FBC)**	Full tube
M	Measles Antibodies	Red capped tube with yellow ring	Full tube
M	Measles PCR	Salivary swab – available from HPU in the community / available from microbiology for in-patients	-
M	Meningococcal PCR / DNA	EDTA/ Lavender	4ml
C	Mercury	EDTA/ Lavender (Recent exposure – few days for organic mercury compounds)	4ml
C	Metachromatic Leucodystrophy Mon to Thurs only	Lithium Heparin/Green + random urine	4ml
C	Metanephrins (Plasma)	EDTA/ Lavender Send on frozen ice to lab immediately Patient must lie down for 30 mins prior to blood being taken	2ml
C	Metanephrins (Urine)	24hr urine container	-
C	Methanol (plasma)	Fluoride Oxalate/ Grey	Full tube
H	Methotrexate	Ochre (Must ask patient when last dose was, consultant request only)	Full tube
C	Methylmalonic Acid (MMA)	Ochre	Each tube full
C	Methyl Mercaptopurine	EDTA/ Lavender	5ml
M	Microbial Serology (General)	Red capped tube with yellow ring	Full tube
C	Microglobins B2	Ochre	Full tube
I	Mitochondrial Antibodies	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
C	Moclobemide	EDTA/ Lavender	4ml
H	Molecular Genetic Testing	EDTA/ Lavender x2	4ml each tube
H	Monospot (infectious)	1x Ochre and 1x EDTA/ Lavender (FBC)	All tubes full
C	Morphine	Discuss with lab	-
M	Mumps Antibodies	Red capped tube with yellow ring	Full tube
C	Mycophenolate	EDTA/ Lavender	4ml
C	Myloma Screen	1x Ochre	Full tube
C	Mysoline (ACD/AED)	Ochre	Full tube
I	Mytosis Panel	4x Ochre (am only)	Full tubes
C	Neuroendocrine Screen (Fasting)	EDTA/Lavender x2 and Ochre x1 **Send to lab immediately**	All tubes full
C	Neurone Specific Enolase	Ochre	2ml

M	Norovirus PCR	Stool specimen	-
C	NT Pro BNP	Ochre	Full tube
I	Neuronal Antibodies (Hu,Ri,Yo)	Ochre Brown (paediatric use only)	Full tube 1.1ml
C	Oestradiol 17B	Ochre	Full tube
C	17 OHP	Ochre	Full tube
C	Oligoclonal bands	Ochre + CSF (IgG / Alb Ratio)	Full tube
C	Osmolality	Ochre	1ml
H	Osmotic Fragility By arrangement	Lithium Heparin/Green x2	4ml each tube
C	Osteocalcin	Ochre (2ml) + urine (20ml)	2ml + 20ml
C	Overdose screen	Ochre (Paracetamol & Salicylate)	2ml
C	P1NP (Type 1 procollagen N-Terminal peptide	Ochre	Full
C	PLAP (Placental Alkaline Phosphalase)	Ochre	Full tube
H	Paediatric suspected non-accidental injury (STNAI)	Blue citrate x3	Filled to the black arrow
C	Paracetamol	Ochre	2ml
C	Paraprotein Typing	Ochre x2	Each tube full + 10ml urine
C	Parathyroid Hormone (PTH)	EDTA/ Lavender Ochre	3ml each tube
I	Parietal cell antibodies	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
H	Partial thromboplastin time	Citrate/Blue	Filled to the black arrow
M	ParvoVirus B19 Immune Status	Red capped tube with yellow ring	Full tube
H	Paul Bunnell	EDTA/ Lavender (Always include a FBC – EDTA/ Lavender) (AkA- Monospot)	2ml
M	Pertussis (Bordetella)	Red capped tube with yellow ring	Full tube
M	Pertussis (Bordetella) PCR	Blue top, twisted wire pernasal swab	-
C	PET testing SFLT/PLGF ratio	Ochre	Full tube
C	Pb (lead)	EDTA/ Lavender	4ml
C	Phenobarbitone (ACD/AED)	Ochre	3ml
C	Phenylalanine	Plasma: Lithium Heparin/Green Blood Spot: Guthrie card	5ml
C	Phenylketonuria	Guthrie Card	Blood Spot
C	Phenytoin (ACD/AED)	Ochre	1ml
C	Phosphate (P04)	Ochre (Part of Bone Profile)	1ml
C	Phytanic Acid	EDTA/ Lavender	4ml
C	Pituitary test	Ochre x3	Each tube full
C	Plasma metadrenaline/ normadrenaline	EDTA/ Lavender	Full tube
H	Platelet count	EDTA/ Lavender **(Part of FBC)**	4ml
H	Platelet antibodies Mon to Thurs by 11am	3x EDTA + Red top	
M	Pneumocystis antigen	Bronchial washing	20ml
M	S. Pneumoniae antigen	Urine	Tube full
H	PNH test	EDTA/ Lavender x2	4ml each tube
C	Porphyria screen	EDTA/ Lavender (normally collected on delivery of urine and faeces)	4ml

C	Porphyrins (Blood) Mon to Thurs only	EDTA/ Lavender (normally collected on delivery of urine) – Keep samples in the dark	4ml
M	Posaconazole	Red capped tube with yellow ring	Full tube
C	Potassium	Ochre (Part of Renal Profile)	2ml
C	Primidone (ACD/AED)	Ochre or Lithium Heparin/Green	2ml
C	Procalcitonin	Ochre	2ml
C	Procollagen III	Ochre Send to lab within 1 hour	Full tube
C	Procollagen III Peptide level	Ochre	Full tube
C	Progesterone	Ochre (indicate date of LMP on form)	Full tube
C	Proinsulin	Ochre + Fluoride Oxalate/Grey	2ml each tube
C	Prolactin	Ochre	Full tube
C	Prostatic specific antigen (PSA)	Ochre	Full tube
C	Protein electrophoresis	Ochre	3ml
C	Protein (Total)	Ochre	3ml
C	Protein Strip	Ochre	Full tube
H	Protein C	Citrate/Blue x3 (part of thrombophilia screen)	Filled to the black arrow
H	Protein S	Citrate/Blue x3 (part of thrombophilia screen)	Filled to the black arrow
H	Prothrombin time	Citrate/Blue x3	Filled to the black arrow
C	Pseudocholinesterase	Ochre	Full tube
C	Quetiapine	Ochre	1ml
C	Quinine	EDTA/ Lavender	1ml
H	Red cell fragility (Special arrangement)	Lithium Heparin/Green x2	All tubes full
C	Red cell transketolase	EDTA/ Lavender (See Thiamine Vit B1)	4ml
C	Reducing substances	Urine or stool specimen Send to lab within 40 minutes	-
C	Renal Function Tests	Ochre (U&E, Creatinine)	Full tube
C	Renin	EDTA x2 – discuss with Biochemistry before taking blood Send to lab immediately on ice	All tubes full
H	Reticulocytes	EDTA/ Lavender (Can be done off FBC)	4ml
M	Respiratory PCR(Viral)	Appropriate respiratory samples: Bronchial washings, sputum, throat swab. Note- testing is not provided for self-limiting URT infections (Sore throat etc). Testing only provided for inpatients.	-
C	Risperidone	EDTA/ Lavender	2ml
I	RO/LA	See ENA screen	
M	Rotovirus antigen	Stool specimen	-
C	Rheumatoid factor	Ochre	Full tube
M	RSV antigen	Naso pharyngeal aspirate – 30ml white cap universal container	-
M	Rubella antibodies	Red capped tube with yellow ring	Full tube
M	Rubella serology	Red capped tube with yellow ring	Full tube
C	SACE sarcoid	Ochre	Full tube
C	Salicylates	Ochre	2ml
C	Salivary cortisol	Salivette tube – Available from lab	-
C	SARS-CoV-2 antibody	Ochre	Full tube

M	Schistosoma parasites	x3 stool specimens or 24hr terminal urine (depending on source of infection)	-
M	Schistosomiasis serology	Red capped tube with yellow ring	Full tube
C	Selenium	Royal Blue Top	Tube full
C	Sex hormone binding globulin SHBG	Ochre	1ml
H	Sickle cell screen	EDTA/ Lavender	4ml
I	Sjogrens Screen	Ochre	Full tube
C	Sirolimus	EDTA	5ml
H	SLE (Lupus) Screen	Ochre	Full tube
C	S. Levetiracetam S. Lacosamide S. Oxicarbasine	} } Ochre }	Full tube
I	Smooth muscle antibodies	Red top (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
C	Sodium	Ochre (part of Renal Profile)	2ml
C	Sodium valproate (ACD/AED)	Ochre	2ml
C	SPE/EPS	Ochre	Full tube
I	Sperm antibodies (Conquest)	Red top Brown (paediatric use only)	Full tube 1.1ml
M	Staphylococcus Antibodies	Red top	Full tube
C	Sterols	EDTA/Lavender or Lithium Heparin/Green	1ml
M	Strongyloidiasis	Red top	Full tube
C	Sugar	Fluoride Oxalate/Grey **(state time sampled)**	2ml
C	Sulfapyridine	Ochre	2ml
C	Synacthen Test (Short) Special arrangement – contact laboratory	Ochre	Full tube
M	Syphilis Serology	Red capped tube with yellow ring	Full tube
C	Tacrolinus (FK-506)	EDTA/ Lavender (If on a 'Harefield' form check the back of the form for other tests)	4ml
M	TB blood test (T-Spot) Before 12 noon Monday-Thursday only	Lithium Heparin/Green x2	All tubes full 2 x 6ml tubes
C	TCO2 (Bicarbonate)	Ochre	2ml
C	Tegretol (ACD/AED)	Ochre	2ml
M	Teicoplania levels	Red capped tube with yellow ring	Full tube
C	Testosterone	Ochre	1ml
C	6 TGN red blood cell	1x EDTA/ Lavender	Full tube
H	Thalassaemia Screen	EDTA/ Lavender	4ml
C	Theophylline	Ochre	2ml
C	Thiamine B1	EDTA/ Lavender Sample to be kept on ice and in the dark	4ml
C	Thiopurine Methyl Transferase (TPMT)	1x EDTA/ Lavender	Full tube
H	Thrombophilia screen	Citrate/blue x3	Filled to the black arrow
H	Requests for Factor V Leiden (FVL) alone	Citrate/blue x3	Filled to the black arrow
C	Thyroglobulin	Ochre (for monitoring Ca thyroid only) Brown (paediatric use only)	3ml 1.1ml

C	Thyroid Binding Globulin	Ochre	2ml
C	Thyroid Function Tests	Ochre	2ml
C	Thyroid Peroxidase (TPO)	Ochre	2ml
C	Thyrotrophic Binding Inhibiting Immunoglobulin	Ochre	Full tube
C	TIBC	Ochre	1ml
H	Tissue Screen	Ochre (Can share with other antibodies) Brown (paediatric use only)	Full tube 1.1ml
H	Tissue Typing (Not HLA B27)	EDTA/ Lavender x5	All tubes full
M	Tobramycin levels Before 10am (Only by pre-arrangement at weekends)	Red top	2ml
C	Topiramate	EDTA / Lavender	1ml
C	Total CK	Ochre	2ml
M	Toxocara antibodies	Red capped tube with yellow ring	Full tube
M	Toxoplasma antibodies	Red capped tube with yellow ring	Full tube
C	TP-53	4x EDTA / Lavender	Full tube
C	Trace Elements	Sodium Heparin/Royal blue	Tube full
C	Transferrin	Ochre	2ml
C	Transferrin Glycoforms	Ochre or Lithium Heparin/Green	1ml
C	Triglycerides	Ochre (Must be fasting)	2ml
C	Triiodothyronine (Free T3)	Ochre	2ml
C	Troponin	Ochre	2ml
C	TRSAT	Ochre	Full tube
C	Tryptase	Ochre	4ml
C	TSH	Ochre	2ml
H	TSVT	Blue/citrate x2	Full tubes
C	Urate (Uric acid)	Ochre	1ml
C	Urea	Ochre	2ml
C	Urinary C-Peptide	Red top MSU container containing boric acid (this must not be discarded)	25ml
C	Urinary C-Peptide Creatinine Ratio	Red top MSU container containing boric acid **(this must not be discarded)**	25ml
C	Valproate (ACD/AED)	Ochre	1ml
C	Vancomycin (Antibiotic) Pre Bloods Post Bloods	 Ochre (5-30 minutes before dose) Ochre (2 hours after dose)	 Full tube Full tube
M	Varicella	Red capped tube with yellow ring	Full tube
M	Variconazole	Red capped tube with yellow ring	Full tube
H	Vasculitis screen	Ochre Brown (paediatric use only)	Full tube 1.1ml
C	Vasoactive Intestinal Polypeptide (VIP)	EDTA x2 and Ochre x1 FAST from 10pm. Blood must be collected between 8am – 10am.	All tubes full
C	Vasopressin	Lithium Heparin/Green + Urine **(Phone lab)**	2ml + Urine
M	VDRL	Red capped tube with yellow ring	Full tube
I	VEGF	1x Ochre On ice, to lab immediately	Full tube
C	Very Long Chain Fatty Acid	EDTA/ Lavender Paediatric EDTA Lavender tubes x 2	Tube full Tubes full
I	VGCC	Ochre Brown (paediatric use only)	Full tube 1.1ml

I	VGPC	Ochre Brown (paediatric use only)	Full tube 1.1ml
C	Vigabatrin (SABIL)	Ochre	2ml
M	Viral PCR	Green topped swab	
M	Virus serology	Red top	Full tube
C	Vitamin A	Lithium heparin/Green Keep sample in the dark	Full tube
C	Vitamin B6	EDTA/ Lavender Keep sample in the dark and on Ice	4ml
C	Vitamin D	Ochre	Full tube
C	Vitamin E	Lithium heparin/Green Keep sample in the dark	Full tube
C	Vitamin K	Red Top Tube Protect sample from light	1ml
H	von Willebrands	Citrate/Blue x4 Send to lab immediately	Above min level indicator
H	WBC	See FBC	-
C	White Cell Enzyme	Lithium Heparin/Green x2	5-10ml
H	White Cell Marker	EDTA/ Lavender	4ml
C	Wilson's Disease (Genotyping)	EDTA/ Lavender x2	5-10ml
H	Xa levels	Citrate/Blue	Above min level indicator
M	Yersinia antibodies	Red top	Full tube
C	Zarontin (Ethosuximide)	Ochre	Full tube
M	Zika Virus	Red capped tube with yellow ring EDTA lavender top	Full tube Full tube
C	Zinc	Sodium Heparin/Royal blue	5ml

Appendix 2: Unlabelled Specimen Policy

This policy sets out the action to be taken by the Central Reception staff in the event of receipt of unlabelled specimens or forms.

Unlabelled specimens

Unlabelled specimens are not processed unless they are unrepeatable, e.g., Histology/Cytology specimen or CSF. In the case of these samples, the Reception Supervisor should bring the sample to the attention of a senior member of the lab staff as soon as it is received. The senior BMS receiving this sample should endeavour to arrange for the sample to be labelled at the earliest convenient time, and ensure that the requester realises that the final results of this sample will be withheld until such time that the sample is labelled and compliant with the Pathology Specimen Reception policies.

All other samples will be rejected and the originator notified accordingly. If marked urgent, or if the request was generated by a department for which much of the work is urgent (A/E, ITU, SCBU, etc), the requester must be informed immediately.