PATHOLOGY DEPARTMENT

Salisbury District Hospital
Salisbury
Wiltshire
SP2 8BJ
United Kingdom

Telephone 01722 336262

The Pathology Department is situated in the main part of the hospital on levels 3 and 4. The department provides general pathology services to Salisbury District Hospital plus various community hospitals, clinics and surgeries in South Wiltshire, West Hampshire and East Dorset.

The Pathology Department is comprised of separate administrative disciplines encompassing the following services:

Contents

QUALITY STATEMENT

The Pathology Department is committed to providing the highest quality service by transitioning to United Kingdom Accreditation Service (UKAS) accreditation against the Medical Laboratory Standards ISO15189. This process involves external audit of the laboratories against the defined standards of practice, which is confirmed by peer review. In addition, the histopathology department is regulated and licensed under the Human Tissue Authority and Blood Transfusion is regulated by the Medicines and Healthcare Regulatory Authority (MHRA).

Pathology is accredited as a training laboratory with the Institute of Biomedical Scientists and all Biomedical Scientists are registered with The Health and Care Professions Council (HCPC).

Lee Phillips is the Pathology Services Manager and welcomes any comments or feedback on the services provided by Pathology or this handbook. He can also be contacted for information on the quality management systems and performance data for each department and for the departmental quality policies.

In order to help us improve our service, we may ask you to complete a questionnaire. We greatly value the information obtained from these surveys and we would like to thank you in anticipation of your feedback.

Laboratory policy on protection of personal information

All staff working the Pathology Department are subject to the Trust Information governance Policy and working within the Data Protection Act. Mandatory Trust training is provided to ensure staff are up to date to understand their responsibilities around information confidentiality and security.

Laboratory Complaint Procedure

The complaint procedure follows the Trust guidance Handling Comments, Concerns, Complaints and Compliments Policy. In the first instance you can contact Lee Phillips lee.phillips@nhs.net directly or come through customer care on their helpline number 0800 374208.

Consent

Consent is assumed as having been given by patients attending the Pathology Outpatient department or those who have attended their GP practice. Each request accepted by the laboratory for examination is considered to be an agreement between the requestor and the laboratory. In making the request, the requestor is

agreeing to meet the laboratory's requirements, including providing all the relevant information necessary to perform the investigation and the laboratory is agreeing to accept the request and ensure the appropriate investigation is carried out in a timely manner which meets clinical need in accordance with guidance contained in the Pathology Department User Handbook.

GENERAL LABORATORY INFORMATION

Requesting a Test

Electronic requesting is the preferred method of making a request both for GPs and Hospital staff. Requesting electronically uses tQuest for GPs and Lorenzo for hospital staff.

Where electronic requesting is not available, tests can be requested manually using a separate request form for each discipline. Each discipline has a separate request form, easily recognisable by colour.

Cellular Pathology	**Green form** for histology and non-gynae cytology
Laboratory Medicine	**Red form** for blood transfusion **Blue form** for general requests; biochemistry, haematology, coagulation and immunology **Green form** for urine testing, therapeutic drugs monitoring and dynamic function tests **Blue and Yellow form** for 1st Trimester Downs screening **Purple form** for 2nd Trimester Downs screening
Microbiology	**Black form** for bacteriology, parasites, serology, virology, antibiotic assays NOT done by Lab Medicine, Andrology

When taking a sample it is important to identify the patient from whom the sample is being collected. The Trust's guidance on how to do this is Patient Identification and can be found on Microguide.

Labelling is extremely important to match up the correct specimen, form and patient to ensure the right results, for the right patients, go to the right clinicians. Request forms and labels printed from the electronic ordering system will have patient demographics printed that must be confirmed when making the request and when taking the sample. They will also have adhesive sample labels printed with the unique sample barcode number, the request number, patient name and date of birth.

All requests made manually must have the request forms and specimen containers labelled legibly with all the following information:

Request Form

- Forename (or given name)
- Surname or family name
- Date of Birth
- Hospital/NHS number
- Address
- Gender
- Relevant clinical details
- Location for the report
- Location for copy reports
- Time & date of collection
- Name & signature of person collecting the sample
- Patient contact no. if GP request

Specimen container

- Forename or given name
- Surname or family name
- Date of Birth
- Hospital and/or NHS number
- Date/time of sampling
- Signature of person taking the sample

*Viral serology MUST include a date of onset for symptoms EXCEPT for pregnant contacts of chickenpox when the date of contact must be provided.

This information is essential, and samples must all be labelled correctly.

Failure to label forms or specimens correctly or supply adequate clinical details, could delay testing and the sample may be rejected.

SEE THE RELEVANT LABORATORY SECTION FOR FULL INFORMATION.

The Pathology Department Laboratory Information System is iLabTP (Telepath). This is used for all data handling and use of the correct source and clinician codes is essential for the receipt of reports. Regular users of our services are advised to ensure their forms use their codes whenever possible.

Urgent specimens – to request an urgent test it is imperative that you phone the relevant department or bleep the duty clinician/Biomedical scientist with details. This is critical outside of normal working hours so that the necessary steps may be taken to deal with urgent work.

Specimen transport

All specimens must be transported in a timely manner such that it preserves the integrity of the sample and allows for rapid testing in urgent situations. The appropriate time frame for requested examinations will vary depending on the nature of the specimen, the clinical details and the operational hours of the department concerned.

All specimens must be contained in a leak proof specimen container appropriate to the test requested. The specimen container must not be contaminated on the outside

and must be easily identified and appropriately labelled in order to transport and process the sample effectively and safely.

Leaking specimens cause a health hazard to everyone who comes into contact with them either through infectious material escaping or hazardous fixatives such as formalin. It is imperative that specimen containers are sealed and placed in specific specimen bags and transport containers correctly. Processing times will be increased when the laboratories receive leaking specimens and the validity of the results may be affected

High risk specimens

Samples from patients known or suspected to be infected with certain pathogens must be labelled “danger of infection” in order to protect staff who will be processing the specimens. This includes all diseases on the list below:

- Hepatitis B, C, D, E
- HIV
- Influenza
- Rabies
- SARS
- West Nile fever
- Dengue virus
- E-coli 0157
- HTLV1 + 2
- TSE associated agents, BSE, CJD, vCJD
- C diff - *Clostridium difficile*
- TB - *Mycobacterium tuberculosis*
- Malaria - *Plasmodium falciparum*
- *Rickettsia sp*
- Typhoid Fever - *Salmonella typhii or paratyphii*
- Dysentery - *Shigella dysenteriae*
- *Taenia solium*
- Plague - *Yersinia pestis*
- Viral Haemorrhagic Fever - Lassa fever & Ebola

The above list is not exhaustive and only covers those agents likely to be encountered in the general healthcare setting. If there is any doubt the sample must be labelled as ‘danger of infection’. Advice may be sought from the Consultant Microbiologists – 01722 429105

The specimen must be placed in an individual transparent plastic transport bag, which must be sealed and stuck to the back of the request form using the sticky strip. Request forms should not be placed in direct contact with the sample.

<u>On-site Transport</u>

Within the hospital environment it is preferable to use the pneumatic air-tube system for the delivery of urgent and routine samples, but not for CSFs, histology or blood gas samples. Samples must be protected with additional packaging when placed in the air tube pods, the lids must be firmly secured and the pods must not be overfilled. Specimens that cannot be placed in the air tube system are transported to pathology in a manner designed to contain any spillage i.e. boxes or deep sided trays from wards, purpose built enclosed trolley with deep tray from theatres.

Phlebotomists carry samples from the ward areas within their trolleys, which are disinfected regularly. Single specimens can be transported in sealed plastic bags.

Samples may be delivered in person or via the portering system direct to Laboratory Medicine specimen reception during core opening hours. This is between 08.00 and 20.00 Monday – Friday. Outside of these hours they may be left in the Blood Issue Room in the "urgent" box. When leaving samples in this unattended area ALWAYS contact the on-duty laboratory staff.

If the samples are urgent please press the bell which will alert staff in the laboratories.

Off-site Transport

The hospital couriers collect samples from external clinics, other outlying hospitals and GP surgeries. Pickups are arranged according to the courier schedules and samples are delivered directly to the laboratory.

Specimens may be sent direct to Pathology using private couriers or the postal system and must comply with the UN Model Regulations for the Transport of Dangerous Goods issued by the Department for Transport (DfT). Clinical specimens for diagnostic purposes are classified as UN3373 – Biological Substance Category B.
Further details can be obtained from:
http://www.dft.gov.uk/pgr/freight/dgt1/guidance/guidancenonclass7/infectioussubstances.pdf

Obtaining Results

Urgent results
Results for urgent samples and abnormal results of immediate clinical significance will be telephoned to the requesting source (wards or surgeries)

Reporting
Results for Pathology Specimens are reported in the following ways.

- GP's have access to electronic results through PMIP.
- Trust staff have access to electronic results via Review or Lorenzo.
- Specimens from external requesters not on electronic reporting are sent a paper copy report.

For turnaround time and specific information about urgent and out of hours specimens see the relevant laboratory section.

Specimen Containers and Where to Get Them

Specimen collection containers, blood collection bottles, specimen pots, swabs, request forms and other pathology supplies can be ordered directly from pathology stores:

- Telephone x4984 (Pathology Stores) and leave a message
- Use the FAX service on 01722 333933, fax back forms supplied on request from pathology stores

Histology

- Pre-filled (60ml) formalin pots are available from the laboratory stores x4984
- White buckets for larger specimens are ordered and stored in theatres.
- Please contact the laboratory on Ext 4096 if larger containers are required.

Gynaecological cytology

Liquid Based Cytology (LBC) consumables are delivered directly every 3 months to clinics and GP surgeries in the form of kits. If LBC consumables are required, please contact the laboratory on x4096

Non-gynaecological cytology

- Specimen pots available through the laboratory stores x4984
- CCF fluid filled containers through the laboratory stores x4984
- Saline for FNAs through the laboratory stores x4984

Date of Expiry – ALL Microbiology swabs

ALL Microbiology swabs (bacterial, viral, per-nasal, MRSA and Chlamydia have expiry dates on either the packaging and/ or the swab label. Please check the dates before use as the Microbiology/ reference laboratories will NOT process them (the accuracy of the results cannot be guaranteed). See Microbiology section 6 for more information.

PATHOLOGY RECEPTION

Pathology Reception is situated just off the main entrance to the Hospital on Level 3 – follow the signs for 'Blood Tests'.

Patients and visitors must report to the reception desk on arrival, where there is a waiting area with seating. Within the Pathology Reception area are phlebotomy cubicles and outpatient consulting rooms providing a range of outpatient services including phlebotomy.

Phlebotomy Services

The Pathology Department is responsible for the provision of an inpatient venesection service and an outpatient phlebotomy service.

In-patient Phlebotomy Service

This service is for hospital inpatients only and is available from:

7.00 am to -3.00 pm Monday – Friday
7.00 am to - 3.00 pm Saturday, Sunday and Public Holidays – for urgent/essential bloods only.
An urgent bloods and cannulation service is available from 8.00am – 8.00pm Monday – Friday, weekends and bank holidays. The multi-skilled phlebotomy service can be contacted by bleeping 1264 or 1449.

Out-patient Phlebotomy Service

This is provided at the Pathology Reception area, which is open from 8.00 am to 5.00 pm Monday – Friday ONLY. There is no service at weekends or during Public Holidays.

Patients will be seen on a 'first come – first served' basis with the exception of clinic and chemotherapy patients who will take priority. There may be significant delays with long waiting times during busy periods; therefore it is advisable that patients who cannot wait for long periods have phlebotomy booked at their GP surgery.

Phlebotomy Service	**Ext 4002**
Phlebotomy Team Leader Val Coombes	Ext 4017 (01722 429017)

Phlebotomy guidelines

Some tests will require a patient to fast, i.e. no food or drink for 10 - 12 hours although small sips of water are permitted. Patients are normally asked not to eat after 10 pm in the evening and will then have their blood taken after 9 am the following morning.

The multi-skilled phlebotomists will NOT take blood from inpatients that are without wristbands. All Phlebotomists will NOT take any bloods from a patient who cannot be correctly identified or those with incomplete request forms.

The address must be confirmed for outpatients attending to have Group & Save/Transfusion samples taken.

Request Forms/Sample Labelling

See page 3 General Information – Requesting a Test

Patient information leaflets for certain tests are available and updated regularly and are on Microguide, please contact the lab if you require further details and/or supplies of these.

Outpatient Services

ANTICOAGULANT SERVICE

The Anticoagulant Service at Salisbury Foundation Trust is run by Anticoagulant Nurse Practitioners (ANP), who provides education, monitoring and dosing to both in and outpatients. The service is available Mon-Fri 9:30 – 17:30 excluding Public Holidays. Please contact the ANPs on Ext 4006 or bleep 1413/1440 with any queries.

An oral anticoagulant referral form must be completed for all patients new to warfarin or the direct oral anticoagulants and sent to the Anticoagulant Service. It is essential that full clinical details are supplied i.e. indication for anticoagulation, duration of treatment, therapeutic range, any known risk factors as well as a full list of all current medication.

All inpatients on oral anticoagulation should be referred to the ANPs. Patients taking warfarin should have an anticoagulant chart completed – this functions as a referral form. There is a separate referral form for the direct oral anticoagulants. The ANP will visit each ward Mon-Fri and take the INR using the point of care (coag-U-chek) machine and dose the patient at the bedside. The dosing cards should be placed in the phlebotomy tray to alert the attention of the ANP that the INR is due and dosing required. The ANPs will also see any other patients requiring anticoagulation input, including patients with a new diagnosis of VTE

Please alert their attention whilst on the ward or bleeping 1440 for level 4 wards and 1413 for level 2 wards. There is also a ‘’COAG’ tag available on the Whiteboard to add a patient to the anticoagulation nurses team list. This list will be checked each morning and the patients will then be seen during the ward round. Please note: Patients requiring assessment the same day should be referred by bleeping the appropriate anticoagulation nurse.

Inpatients being discharged on warfarin must be given specific written instructions on daily dose of warfarin to be taken and the date of the next INR on a printed dosage leaflet and counselling prior to discharge. This will be provided by the ANP and will usually be sent to the ward via the air tube.

Outpatients on warfarin normally have the INR sample taken at their GP surgery, the sample and repeat testing slip are sent to the lab where the ANPs will process the result and advise on dosage. A new dosage leaflet is then posted back or emailed to the patient with the updated instructions. The ANPs will phone new patients and patients with very high/low results and send the dosage leaflet.

Patients commencing the new oral anticoagulants also require referral to the anticoagulation service, a Thrombin/ Factor Xa referral form can also be found on MICROGUIDE. It is important to complete all areas of the referral form and do a full set of base line bloods, including FBC, LFTs, U&Es and clotting screen so that the patient can be sufficiently assessed for their suitability to take one of the newer agents. These drugs should be avoided in patients with poor renal function. The ANPs will assess the patient for their suitability to take anticoagulation and also provide counselling.

There is an Anticoagulation Policy on MICROGUIDE (Clinical Management, Haematology) which gives further guidance on how to manage patients on oral anticoagulation.
The patients on IV Heparin require **daily** APTT studies. There is no need to monitor patients on low molecular weight Heparin. Low molecular weight Heparin should be avoided in patients with renal failure.

Bone marrow clinics

A clinic for routine bone marrow tests is in operation on Tuesday mornings in Pathology Outpatients. Referrals must be made to one of the Consultant Haematologists.

Clinical biochemistry outpatients

Patients are seen in the Pathology Department consulting rooms. Clinics include lipid clinics, renal calculi, adult phenylketonuria and dynamic endocrine testing.

Haematology outpatients

Patients are seen in the consulting rooms within the Pathology Department. The same waiting area serves both clinic and phlebotomy patients, ensuring immediate blood counts are available during clinic appointments. Patients with a complete range of haematological disorders are seen for diagnosis and treatment.

There are 4 regular haematology outpatient clinics per week held in Salisbury, in addition a new patient clinic is held each week. Pre-chemotherapy clinics for haematology patients on treatment are held three times per week in the Oncology Outpatient Department. Patients may also be seen in Shaftesbury (1st and 3rd Monday afternoons of every month) and Ringwood (2nd Tuesday morning of every month). An Outreach clinic is held at Westbury on 3rd Thursday of every month. An additional clinic for patients with polycythaemia and other myeloproliferative disorders is held every Thursday afternoon in Haematology Outpatients.

Thrombophilia clinics

A thrombophilia clinic is held in Salisbury every week, which runs on a Tuesday morning. There is a nurse led clinic and a consultant led clinic. Please note thrombophilia screening will be rejected by the laboratory if it has not been authorised by an ANP or Haematologist. Please see MICROGUIDE guidelines on Thrombophilia testing for further details.

Andrology sample clinic

Patients are seen in one of the consulting rooms within the Pathology Department. Clinics are held every Tuesday (except over Christmas/ New Year) between 8am and 9am. Patients providing semen samples for Fertility assessment attend with their samples and complete a questionnaire to ensure the Andrology service complies with UKAS quality requirements. Additional clinics may be run ad hoc according to demand. Clinic attendance is BY APPOINTMENT only. Patients can contact the laboratory via extension 4099 or 4105 Monday to Friday to make an appointment.

Requesting clinicians are asked to ensure that they inform the patient on how to collect the semen sample and to provide them with the Fertility clinic leaflet (available from the Andrology section of Pathology on the Salisbury NHS Foundation Trust MICROGUIDE web site) and a “non-toxic” sterile container (practices and clinics can order these from Microbiology). Samples received in alternative containers will NOT be processed. See Microbiology section for further information.

CELLULAR PATHOLOGY

Organisation & staff

The department of Cellular Pathology comprises Histopathology, Non-gynaecological Cytology and Mortuary and Bereavement Services.

Key Personnel:		
Laboratory Manager:	Jenny Baillie	**Ext: 2251**
Biomedical Scientist Team Manager:	Kate Chapman	**Ext: 2251**
Team Leader Mortuary and Bereavement	Helen Farley	**Ext: 2150**
Quality Lead	Faye Dear	**Ext. 4109**
Clinical Lead	Dr Matthew Flynn	**Ext. 4001**

Consultant Staff:	**Ext. 4108**
Dr I Cook	
Dr S Banerjee	
Dr M Flynn	
Dr M Khan	

Location:

Histology and non-gynae cytology are located in Pathology on level 4.
Mortuary and Bereavement Services are located on level 2 Salisbury North next to car park 8 and the tennis courts.

The department is part of the Clinical Support Directorate.

Report enquiries via department secretaries	**Ext: 4107** **Ext: 4108** **Ext: 4001**	**Monday – Friday 09.00-17.00**
Technical enquiries		
Histology	**Ext: 4096**	**Monday to Friday 08.00-17.30**
Cytology	**Ext: 4096**	**Monday to Friday 08.00-17.30**
Mortuary and Bereavement	**Ext: 2150**	**Monday to Friday 09.00-16.30**

Out of hours services

There is no routine out of hour's service for histopathology or non-gynae cytology. In an emergency, a Consultant Pathologist may be contacted via the hospital switchboard.
For information about out of hours services for mortuary and bereavement contact the hospital switchboard.

Use of the laboratory

Requesting procedures

The department uses one request form for both histology and non gynae cytology. Please indicate which is required.

Completing the request form

Request forms must be fully completed and then signed by the requesting clinician. The NHS number or the hospital number must be used as the primary identifier. See below for the laboratory data requirements. Check addressograph labels are correct and up to date, ensure requesting clinician and locations are filled in. Also complete date of collection, clinical details including relevant drug therapy, LMP where appropriate and requesters contact number if urgent.

Gynaecological cytology

The gynae cytology service is provided by Berkshire and Surrey Pathology service. If you have any result queries or want to request a test then they can be contacted directly on the BSPS Cervical Screening Helpline: 01932 726622. LBC samples are couriered to Poole hospital after they have been delivered to us. From here they are transferred to BSPS. Results are returned directly to the requester.

Specimen acceptance

Request Form

- Patient name
- Date of Birth
- Hospital/NHS number
- Address
- Location for the report
- Relevant clinical details
- Requesting Clinician
- Specimen type
- Specimen site
- Location for copy reports
- Time & date of collection
- Name & signature of person collecting the sample

Specimen container

- Forename or given name
- Surname or family name
- Date of Birth
- Hospital and/or NHS number
- Nature of specimen

WARNING

Stringent procedures for the receipt of samples are put into place to ensure the safety of the patient.

Laboratory staff must not endanger the patient by working outside of the standard.

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Urgent specimens (see also *turnaround times)*
Label urgent specimens as such with a contact number for telephoned result. Label the form, 'needed by' including a date.

High Risk Labelling ***please refer to high risk categories listed at the beginning of this handbook***
High risk specimens must be labelled as such. If there is any doubt then label as high risk or danger of infection to help protect staff.

HISTOLOGY SPECIMEN REQUESTS

Routine formalin fixed specimens

To allow adequate fixation, each specimen should be placed in ten times its own volume of formalin. The specimen should be put into formalin as soon as possible as a delay in fixation can have a significant effect on the tissue and subsequent tests.

Larger specimens need to be opened or sliced in the lab to allow the fixative to penetrate the tissue. It is therefore important that such specimens are received in the laboratory on the day of collection whenever possible.

Large limbs

The clinician is to contact the department and arrange the receipt of a large limb. The laboratory can provide a large limb container for transport.

Formalin is hazardous – in the event of a spillage, contact Histology x4096 for advice.

Frozen sections

To ensure availability of the service please pre book frozen sections wherever possible. **Book by phoning the laboratory office on ext. 4108** with the following details:

- Date of procedure
- Estimated time of arrival
- Patient details
- Specimen details
- Consultant Surgeon
- Theatre number and contact number

Frozen sections should not be performed on known high-risk specimen. This is because frozen sections carry an increased risk of inoculum injury to laboratory staff. If you have any concerns please speak with a consultant pathologist.

Products of conception

Appropriate consent is required for these specimens dependent on gestation. The Trust holds further information on consent requirements and the sensitive handling and disposal of these specimens Sensitive Disposal and Handling of pregnancy loss

Immunofluorescence specimens (dermatology)

Specimens from Dermatology are sent to St John's Institute of Dermatology for immunofluorescence testing. A request form should be completed by the requester and the specimen sent in Michel's fluid – NOT formalin.

Other immunofluorescence requests are sent to Southampton University Hospital to arrange immunofluorescence with Southampton, phone them directly on 02380 796443 before contacting us on ext 4096 to arrange a courier.

Osna service

OSNA is a service provided in the laboratory on Tuesday, Wednesday and Friday mornings. It **MUST** be pre booked. For more information, please contact the laboratory on ext 4096.

Referred investigations

University Hospitals Birmingham NHS Foundation Trust	EGFR, ALK, PD-L1, ROS, BRAF, KRAS, NRAS
Health Services Laboratories Advanced Diagnostics	HER2, FISH
Viapath	Wade Fite, Warthin Starry, Masson Trichrome
University Hospital Southampton	immunofluorescence testing for oral surgery, Muscle biopsies
Guy's and St Thomas' NHS Foundation Trust	Immunofluorescence for dermatology
UCL Institute of Ophthalmology	Routine histology of eye specimens
Hampshire scientific services	Toxicology testing for coronial purposes
CRY St George's	Hearts from PM
Department of Neuropathology Pathology Services Southmead Hospital	Brains from PM
Great Ormond Street Hospital	Paediatric PM

Other specialist investigations or expert opinions will occasionally be sought from a variety of other sources. Please contact the Clinical Lead for further information.

Muscle biopsies

Muscle biopsies are referred to the Neuropathology department in Southampton University Hospitals NHS Trust. The following protocol is provided by them.

Consultation: An initial notification should be made either to a Consultant Neuropathologist or a member of the Neuropathology laboratory staff by telephone prior to the biopsy. If the initial notification is to the laboratory staff, they will

recommend a consultation with a Consultant Neuropathologist. Consultation should be made at least 24 hours prior to the biopsy. Special instructions for more complex investigations, for example electron microscopy, can be identified at this stage.

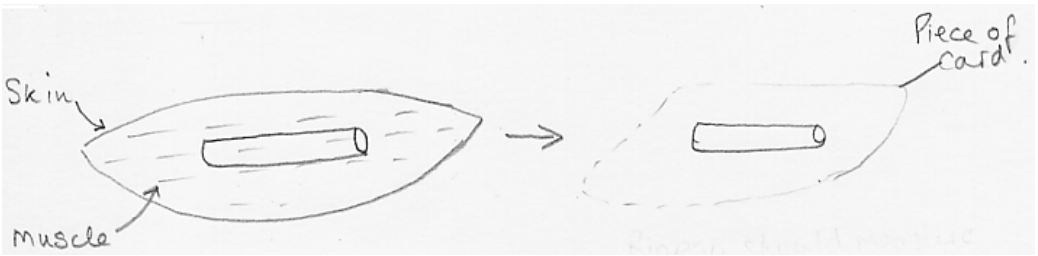
Samples of muscle biopsy should be submitted unfixed as soon as possible after excision. Samples should be placed on a piece of card and submitted in a **damp** environment – usually in a plastic universal container with a piece of **damp** gauze or paper tissue covering the specimen. To achieve the damp environment the gauze or paper tissue should be made wet with saline and then wrung out. Too much fluid on the gauze or paper tissue causes ice crystal artefact during the freezing process. No fixative or additives should be introduced into the container. Transit time should be kept to a minimum. Transit times of up to four hours are acceptable for samples originating outside Southampton.

The specimen container must be labelled and a clinical history provided.

Collection of the muscle biopsy: This may be performed as an open biopsy under local anaesthetic or as a needle biopsy. In either case the muscle should not be infiltrated with local anaesthetic as this interferes with the enzyme histochemistry performed in the laboratory.

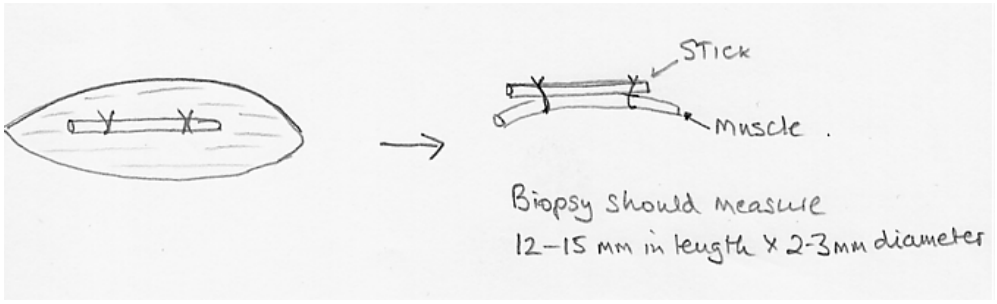
The procedure should be performed in the morning if possible to ensure safe arrival in Southampton during the working day. A full clinical history should accompany the biopsy.

Open Biopsy: – a piece of muscle should be taken parallel to the muscle fibres. The biopsy should measure 20x10x10mm if possible. Place the muscle onto a piece of card in a damp environment as described above.



Needle biopsies: are smaller but are placed in a damp environment as described

Muscle biopsy for Electron Microscopy: Muscle for electron microscopy should be attached to a 30mm length of swab stick by atraumatic silk suture to prevent contraction of the muscle fibres when placed in fixative in the laboratory. The stick should be laid parallel to the muscle fibres and the sutures inserted with a 1mm bite. A small piece of the muscle, 12-15mm in length and 2-3mm in diameter may then be excised attached to the stick.



Specimens are transported fresh on saline soaked gauze via Salisbury Histopathology department. Enzymes are labile. Please inform the Histology Department ext. 4096 in good time to allow arrangement of a Courier

Advising the laboratory: Inform the Neuropathology laboratory of the muscle biopsy, giving information if possible about the date and time of arrival in the Neuropathology laboratory.

The package should be addressed to

Neuropathology, Level E

South Pathology Block

Southampton General Hospital

Southampton SO16 6YD

Transportation: The muscle must be transported as soon as possible after excision. Specimens originating outside Southampton should be transported by taxi or express courier. To facilitate delivery of these specimens the driver may deliver the package to the main reception area at the entrance to the hospital. On arrival at the reception desk the driver should ask the receptionist to telephone the laboratory on extension **4882**. A member of the laboratory staff will collect the package from the driver at the reception area.

Informing the laboratory: If possible the laboratory should be informed

By telephone to 023 8079 4882 when the specimen begins it's journey.

Confirmation of receipt: Southampton laboratory will confirm receipt if a contact telephone number is provided.

NON GYNAE CYTOLOGY

Please label the specimen as described above and include

- date and time specimen taken
- clear clinical details
- Any non-gynae specimens sent with a histology specimen should be bagged separately.
- If specimen is high risk this must be clearly noted

Sputum cytology

The Royal College of Pathologists recommends that sputum samples should be requested by respiratory physicians and only from patients unfit for bronchoscopy. The patient should be asked to rinse out his or her mouth with water first then give a deep cough. Refrigerate specimen and send to lab as soon as possible.

(Specimens can be kept in a refrigerator for 48 hours if necessary.)

Urine cytology

The specimen should be taken mid-morning as a mid-stream urine and placed in cytospin fluid (CCF – blue fluid) before sending to lab.

- Urines – if no CCF pots available, please use the sterilin pot or the 50 ml silver top lids. Please do not use the yellow or green topped micro pots.

Pleural, ascitic and peritoneal fluid.

Send pleural and ascitic fluids to the laboratory as soon after obtaining the specimen as possible, if there is any chance of delay then the specimen should be refrigerated. This is because cells degenerate quickly if specimens are left standing at room temperature. A 60ml sample is sufficient in a sterile universal container.

Do not place in CCF.

Respiratory specimens: EBUS, Sputum, bronchial wash, brush and lavage.
Do not place in CCF

EBUS Free fluid and/or direct spreads (onto glass slides)

- Direct spreads which are prepared in the clinic should be spread thinly and process a good cellular yield, which is not obscured by poor spreading or crushing artefact. They should be air dried rapidly or fixed promptly by the clinic to produce specimen presentation for ease of diagnosis. These should be labelled A or F to clarify which method has been used.

Bronchial aspirates are collected by direct aspiration of material from the large airways of the respiratory tract by means of a flexible bronchoscope. The specimen is collected in a screw top sterile container.

Bronchial brushing uses a protected brush catheter in the bronchoscope to tease the material from the airways. This is then directly spread onto slides and fixed immediately with alcohol at the clinic.

- Direct spreads which are prepared in the clinic should be spread thinly and process a good cellular yield, which is not obscured by poor spreading or crushing artefact. They should be air dried rapidly or fixed promptly by the clinic to produce specimen presentation for ease of

diagnosis. These should be labelled A or F to clarify which method has been used.

Bronchial washings are collected in a similar fashion to bronchial aspirates, but the procedure involves the aspiration of small amounts of instilled saline from the large airways of the respiratory tract. Collected in a screw top sterile container.

Sputum samples (induced and expectorated) are collected into a sterile 50ml screw top lid.

Fine needle aspirates

Please note – this procedure is not appropriate in high risk cases such as TB.

Fine needle aspirates are best carried out by someone trained in both biopsy technique and in the technique of making smears. Maximum diagnostic value is obtained if some smears are immediately and quickly wet-fixed in alcohol or spray-fixative for Papanicolaou staining and the remainder are allowed to **rapidly** air dry for Giemsa staining.

- Please write on FNA slides which is fixed (F) and which is air-dried (A) as it is difficult for the laboratory to tell.

Ensure these are dry before putting in the slide box.

To prevent sample degeneration, transport to the laboratory must not be delayed.

Do not place in CCF

The Consultant Pathologists are pleased to offer advice.

Health & Safety

Cyto Centrifuge fluid is hazardous– in the event of a spillage, contact Histology x4096 for advice.

Transport to the Laboratory - Histology and Non-Gynae Cytology.

- Porters — **Theatres** deliver three times daily direct to level 4 in addition to urgent frozen specimens
  DSU delivers twice daily direct to level 4
  Other clinics deliver during the day to pathology specimen deposit level 3
  Urgent specimens can be delivered direct to the laboratory on level 4 by 4.30pm. Please telephone the Laboratory in good time if special arrangements are required.
- Pneumatic Air — DO NOT USE WHOOSHY TUBE FOR HISTOLOGY OR

'whooshy' tube	NON-GYNAE SPECIMENS
• Courier	A daily courier service is provided from most local GP surgeries
• Post	***Contact the Royal Mail for information about postal regulations for the transport of pathology specimens***
• In Person	Urgent specimens such as FNAs from breast clinic can be delivered by hand directly to Level 4. Any specimens can be delivered to the Pathology Reception on Level 3, Monday to Friday 09.00-17.00

RESULTS

Turnaround times

The Royal College of Pathologists, in their document "Key performance indicators - proposals for implementation - July 2013 " state "provisional expectations are that 80% of cases would be reported within seven calendar days and 90% of all cases are reported within ten calendar days." The Cellular Pathology department will continue to strive to deliver the RCPath proposal.

Larger specimens, such as breasts and colectomies, require longer fixation and often take an extra day or two. Additional procedures such as special stains and immunocytochemistry will also extend the time taken to produce a final report. If appropriate, a provisional report may be issued pending the results of further procedures.

The Cellular Pathology department formally audits specimen turnaround times against RCPath benchmarks on a monthly basis. When these benchmarks cannot be achieved the laboratory publishes locally agreed turnaround times to ensure requesting Clinicians have defined expectations for results reporting for patient management.

Current locally agreed turnaround times:

Specimen type	Calendar days
Non-Gynae cases	20
Breast biopsy	10
Breast Ca	14
Urology biopsy	10
Urology Ca	14
Template Prostate biopsy	21

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If a report is required for a specific time (e.g. MDT meeting, outpatients appointment or ward round), please indicate this clearly on the request form.

MORTUARY AND BEREAVEMENT SERVICES

The Mortuary and Bereavement Service is provided on site at Salisbury District Hospital serving HM Coroner for Wiltshire. The activities undertaken are licensed by the Human Tissue Authority and we are inspected to ensure we meet their standards.

Mortuary and Bereavement Services provide advice, support and assistance to bereaved relatives and carers by helping them through the procedures following a death. More information can be found in our booklet 'What to do When Someone Dies' in Hospital. This is available on the hospital wards and from the department, please give to relatives following bereavement to support them in the next steps.

Mortuary and Bereavement staff facilitate the completion and issue of medical certificates (Medical Certificate of the Cause of Death – MCCD) to the next of kin for bereaved relatives. This is a legal document that is required for the families to register the death and so doctors are requested to attend the bereavement office to complete the paperwork as soon as possible.

Requesting Post Mortems:

Post Mortems are carried out on behalf of HM Coroner and at the request of hospital medical staff, GPs and families of deceased patients.

If you are in any doubt about whether to report a case to the Coroner, contact HM Coroner's Officer, on Salisbury 01722 435293 for advice.

Non-Coroner's cases (hospital post mortems) require consent of the next-of-kin. Hospital post mortems can provide valuable opportunities for education, training, audit and research. It is essential that relatives of the deceased are provided with appropriate information to allow informed consent to be given and this information is available on the Trust ICID system. Any requests for hospital post mortems should be made to the Bereavement Services staff on ext. 2150 who will coordinate the consent taking process and ensure that families have all the information they need to provide informed consent.

Transportation of the deceased from outside the hospital to the mortuary can be arranged by contacting the Bereavement Service.

It is important that property from the deceased is labelled properly and all valuables are sealed in an envelope. A hospital property sheet must be completed for the property before it is brought to the department and items will be checked before being released to the families. It is the responsibility of the staff completing the property form to ensure it is correct.

Post mortems are carried out on site both for the Coroner and for the hospital. Where relatives or clinicians are interested in a hospital post mortem then contact the mortuary and bereavement staff to ensure that appropriate processes are put in place, including gaining informed consent from the next of kin.

LABORATORY MEDICINE

ORGANISATION & STAFF

Laboratory Medicine offers a full range of Biochemical and Haematological analyses on a wide variety of body fluids for the diagnosis and monitoring of Biochemical and Haematological disorders. In addition the following therapeutic, monitoring and screening services are provided; blood and blood components, including coagulation factors, blood transfusion, anticoagulant monitoring and control; therapeutic drug and toxicology service; a full range of biochemical dynamic function tests; pre-natal screening for Down's syndrome

Key Personnel:		
Pathology Services Manager:	Lee Phillips	**Ext. 4039**
Blood Sciences Technical Manager:	Sarah Scadden	**Ext. 4025**
Haematology/Blood Transfusion Manager:	Caroline Mathews	**Ext: 4048**
Biochemistry Manager:	Amanda Hawkins	**Ext: 4048**
Quality Manager:	Sarah Muncaster	**Ext. 4303**
POCT Co-ordinator:	Shaneela Perkins poc.enquiries@salisbury.nhs.uk	**Ext. 4050**
Anticoagulant Nurse:	Bleep 1413	**Ext. 4006**
Blood Transfusion Nurse Specialist:	Sarah Salisbury	**Ext 4539**

Consultant Staff:		**Ext.**	**Secretary**	**Bleep**
Consultant Haematologist:	Dr Jonathan Cullis	4828	4043	07699 741464
Consultant Haematologist:	Dr Louise Gamble	4043	5421	
Consultant Haematologist:	Dr Effie Grand	4539	2066	07699 644513
Consultant Haematologist:	Dr Tracey Parker	4043	5421	
Consultant Haematologist:	Dr James Milnthorpe	5420	5421	
Consultant Chemical Pathologist:	Dr Niki Meston	4047	4037	
Consultant Chemical Pathologist:	Dr Paul Downie	5427	4037	

Location:

Biochemistry, Haematology and Transfusion are located in Pathology on level 3.

The department is part of the Clinical Support Directorate.

Laboratory Opening Hours:

Core hours service	08.00 – 20.00, Monday to Friday
Out of hours service	AT ALL OTHER TIMES including public holidays

To contact the laboratory during CORE hours telephone **ext 4033 (01722 429033),** but PLEASE only phone for results when it is clinically vital.

For urgent attention and when sending an urgent sample during the out of hours service the duty Biomedical Scientist (BMS) must be bleeped using the following numbers:

Biochemistry	**1621**
Haematology and Transfusion	**1626**

Enquiries/Results/Add-on requests Biochemistry and Haematology URGENT SAMPLES	**Ext: 4033 (01722 429033)**	
Enquiries/Results Blood Transfusion URGENT SAMPLES	**Ext. 4022/4123**	**Please phone before sending sample**
Interpretation and advice Biochemistry	**Ext. 2142/4047**	**For non-urgent GP queries please email shc-tr.bioenquiries@nhs.net**
Interpretation and advice Haematology	**Ext. 4043/2066**	**For non-urgent GP queries please email shc-tr.haemenquiries@nhs.net**

All staff have nhs mail accounts.

REQUESTING WORK

Request forms

Request forms, whether relating to routine or emergency work, must be properly completed and signed by a qualified medical officer. Full details, including clinical details, should be given. Lack of adequate clinical information risks the samples being rejected. If manually requesting using request cards, check addressograph labels are correct and ensure Consultant/GP and destination are filled in. All types of Request forms MUST also show date and time of sample collection.

Specimen bottles

The Vacutainer system is used for almost all blood samples. ALWAYS follow the stated order of draw:

- **Blood Cultures**
- **Citrate - Light Blue top.** INR, APTT, Clotting screen or D-dimers (1 tube), Lupus or Thrombophilia screen (3 tubes + 1 gold). It is essential that these tubes are correctly filled.
- **ESR - Lavender top.** PMR, Temporal Arteritis or other criteria apply
- **Plain SST gel - Gold top.** Routine Biochemistry (except HbA_{1c}, GP Glucoses, Lactate, NH_3, Lead, Trace metals), B12, Ferritin, Autoimmune tests, serum Folate
- **Plain plastic - Red top**
- **Heparin - Green top**
- **EDTA crossmatch - Pink top.** Blood group & Cross match, Antibody screen - these tubes must **NOT** be used for FBCs
- **EDTA - Lavender top.** Routine Haematology, Haemoglobinopathies, Malarial parasites, Direct antiglobulin test, G6PD, Glandular fever screen, Sickle cell screen, $HbA1_c$, lead, cell markers.
- **Fluoride - Grey top.** GP and dynamic test Glucoses, confirmation of suspected hypoglycaemia, Ethanol, Lactate
- **Royal Blue (EDTA).** Heavy metals, Trace metals (2 tubes), Zinc
- **White - non Vacutainer, Lithium heparin.** Ammonia, **paediatric** Zinc or Trace metals (2 tubes)
- **Pale Lilac (non-vacutainer) – citrate.** Paediatric clotting screen, INR, APTT.

For more information and reference there is a tube guide at the end of this handbook.

For more specialised tests please contact the Laboratory before taking samples as other blood tubes, and/or rapid transfer to the laboratory, may be required.

Acceptance of specimens for processing

The Laboratory will only accept adequately labelled specimens. A specimen will only pass to the processing stage if it meets the acceptability criteria. Acceptability criteria that must be met are listed below:

- There is a paired specimen and request form
- The details on the specimen match the details on the request form
- **There are adequate points of identification on the specimen and request form***
- Specimen integrity is appropriate - specimens containing clots are unsuitable for whole blood analysis (full blood counts, clotting studies) or plasma tests (fluoride oxalate glucose)
- There is a sufficient specimen fill volume or specimen size
- The date and time of specimen collection is indicated

- There are no contraindications that will limit test analysis e.g. correct specimen type (urine cannot be used for a serum request)
- The specimen is intact and not leaking – damaged specimen containers risk giving incorrect results due to contamination or incorrect specimen volume
- The specimen is received in the Laboratory within the correct time frame for analysis
- The correct specimen preservative/tube has been used for the test required

If the above requirements are not met, the specimen will be rejected and analysis will not proceed.

***Specimens will be rejected if they are not adequately identifiable.** All specimens and requests must have 3 points of ID as a minimum. Blood Transfusion specimens require more (See Blood Transfusion)
Below are acceptable points of ID

- Surname and First name of the patient (both names together count as one point of ID)
- Date of Birth
- Hospital Number
- NHS number

Rejecting specimens for processing

If the specimen does not meet the acceptance criteria the specimen will be rejected. The requesting clinician will be informed of any specimens that have been rejected, enabling them to organise a repeat if necessary. Rejected specimens will be dealt with on the day of receipt and the clinician will be informed the same day, when possible.
In all cases the patient and specimen details are entered into Telepath. This provides the laboratory with a full and accurate record of all specimens received in the laboratory, it is also used to track all specimens received, whether analysed or not.

Other reasons for specimen rejection specific to tests;

- **Troponin** – Haemolysed specimens cannot be tested for Troponin, specimen will be rejected if any sign of haemolysis is present.
- **Clotting Screen** – under/over filled specimens cannot be tested.

CLINICAL BIOCHEMISTRY

All clinical enquiries can be made via e-mail to shc-tr.bioenquiries@nhs.net.

Blood gases are performed as a point of care test and only staff trained in the use of these analysers are permitted to use them. The analysers are situated in the following locations:

- ICU (Radnor)
- Emergency Dept
- Acute Medical Unit
- Beatrice Labour Ward
- NICU
- Farley Ward
- Respiratory Outpatients
- Laboratory Medicine

DYNAMIC TEST PROTOCOLS

Please liaise with Clinical Biochemist (ext **4047 / 5427**) or download from MICROGUIDE. Patient instruction sheets are available from Pathology Reception or can be downloaded from MICROGUIDE.

TPN

Dr Niki Meston and Consultant Gastroenterologists supervise the hospital **TPN Service** (with Pharmacy). There is a standard TPN regimen. For non-standard or complicated cases telephone the nutrition support team.

TDM – where possible please avoid sending these tests OOHs

All routine therapeutic drugs are analysed **daily.** Units are **mg/L** for all except Lithium (**mmol/L**). Please telephone if required urgently:

Serum **Digoxin (6 hours post dose)**

Serum **Gentamicin (pre dose only for once daily Gentamicins or pre- and 1 hour post dose for other regimes)** are done in Laboratory Medicine. Discussion/advice on dosage adjustment - contact Medical Microbiologists.

Serum **Lithium (12 hours post dose)**

Serum **Phenytoin/Phenobarbital/Carbamazepine (pre-dose ideally)**

Serum **Theophylline (post dose PEAK - time peak occurs dependent on immediate or slow release)**

Serum **Vancomycin (pre dose).** Discussion/advice on dosage adjustment - contact Medical Microbiologists.

ENZYMES

Different hospitals use different methods and may therefore have different referent ranges - especially AMYLASE, ALP, ALT, AST, GGT, LDH - check carefully if unsure.

ADD-ON TESTS
Additional Biochemistry tests can be requested in person or by telephone. The telephone number to call is Laboratory Medicine Specimen Reception 01722 429033.

CLINICAL HAEMATOLOGY

All clinical enquiries can be made via e-mail to shc-tr.haemenquiries@nhs.net, where they will be directed to the appropriate Consultant Haematologist.

Inpatient referrals and bone marrow examinations

Please refer via Consultant Lists or by bleeping the Haematology SpR via Switchboard.

Outpatient services

Patients are seen in the consulting rooms within the Pathology Department.
See pages 8 – 9.

Pembroke suite

Patients are seen for diagnostic procedures and tests either in the Pathology Outpatient rooms or in the Pembroke Unit. Blood and platelet transfusions are normally administered here or on Nunton Unit. Chemotherapy is administered by Oncology-trained nurses. There are facilities for therapeutic plasma exchange.
There are also facilities for counselling, and staff work closely with other departments such as the Palliative Care Team.

Inpatient facilities – Pembroke ward

Inpatients are nursed mostly on Pembroke Ward. Pembroke Ward is a combined 10 bedded haematology-oncology and medical ward. It has 6 side rooms prioritised for patients under the care of the Haematology or Oncology teams.
Patients are admitted to this ward for chemotherapy and the side effects of chemotherapy, for disease-related problems and for non-chemotherapy treatments.

Add-on tests

Additional Haematology tests can be requested in person or by telephone. The telephone number to call is Laboratory Medicine Specimen Reception 01722 429033.

BLOOD TRANSFUSION

Request forms and samples for blood transfusion tests MUST be labelled with 4 independent identifiers i.e. **FULL Surname/Forename (spelled correctly), DOB and Hospital Registration Number or NHS number**.

Samples must also be labelled with the patient's **gender and dated** and **signed by the person taking the sample(s).**

NB Use of addressograph / pre-printed labels on specimens for blood transfusion work is **NOT ACCEPTABLE** and will result in the rejection of the request.

Blood Transfusion samples must be taken by competency assessed personnel and the declaration of competency signed and dated on the request form. Please note Medical Students are not permitted to take transfusion requests or obtain samples for transfusion.

We follow the BSCH guidelines as regards 'group check' samples and where an additional sample is required, the laboratory will contact the clinical team to make that request.

Errors in patient identification and sampling labelling may lead to ABO incompatible transfusions. Evidence for this is well documented in the annual reports of the SHOT (Serious Hazards of Transfusion). There has been a number of wrong bloods in tube events documented.
As a result recommendations were made for hospitals to move to a zero tolerance policy for the labelling of Blood Transfusion samples and implementation of the Two Sample Rule. The **first sample** can be historical i.e. >7 days old or taken on the same day as the second sample. The **second sample** must be a separate venepuncture event with new patient ID checks performed. It must be sent to the Blood Transfusion Laboratory which will perform the blood issue. Preferably the second sample should be taken by a different member of staff whenever possible.

If a crossmatch is required the indication code for transfusion must be indicated on the request form and signed by the person authorising the transfusion.

Samples that are haemolysed are unsuitable for analysis and will be rejected by the laboratory.

Lipaemic samples may be unsuitable for analysis.

Laboratory staff will contact the clinical area if a sample is rejected and request a repeat sample.

Samples are stored refrigerated for 7 days.

Additional tests / requests may be made on suitable samples, please contact the Blood Transfusion Laboratory directly for more information (ext 4022/4123)

Cross-matched blood

Will be kept for a minimum of 24 hours after the time for which it was required. It will then be withdrawn unless the laboratory is asked to retain it.

NB Failure to specify the date and time for which blood is required will result in a Group and Save **only** being done.

Blood Components –

In the event of clinical evidence of ongoing uncontrolled bleeding please refer to the Massive Transfusion Protocol (MTP), Obstetric Haemorrhage and Paediatric Massive Transfusion Protocol, available on MICROGUIDE. All other requests for fresh frozen plasma, cryoprecipitate, platelets and clotting factor concentrates must be authorised by Haematology Medical Staff.

Guidelines for Maximum Surgical Blood Ordering Schedule can be found in the Post Graduate Education Department's "Doctors' Handbook"**.**

LABORATORY MEDICINE TESTS – ALPHABETICAL INDEX

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
17 Hydroxy Progesterone (Adults)	17OHP	Gold / serum	So 'ton - Chromatography	10 working days	No	9 am during menses	**Males** 0-6 month 0.8-7.9 nmol/L 6 months-18 years 0.2-3.2 nmol/L >18 years 1.2-7.6 nmol/L **Females** 0-6 months 0.8-7.9 nmol/L 6 months-6 years 0.1-3.4 nmol/L 6 -10 years 0.2-2.0 nmol/L 10-18 years 0.5-4.4 nmol/L >18 years (follicular phase) 0.4-3.6 nmol/L >18 years (luteal phase) 1.2-7.6 nmol/L
17 Hydroxy Progesterone (Neonates)	COM	Blood spots	So 'ton - Chromatography	11 working days	No		Term, well babies: - less than 20nmol/l Pre-term/Sick infants may have much higher levels (up to 200nmol/l) without having CAH. These infants would need repeat spots and back up tests. Monitoring - 8am level measurable (i.e. not suppressed) but less than 80nmol/l suggests reasonable control. NB: These values are derived from immunoassay not LCMSMS
3 Hydroxybutyrate (Beta Hydroxy Butyrate)	COM	Grey / fluoride plasma / (**on ice)**	B'Ham IEM lab	3 working days	No	Please state fasting status	See report or contact laboratory

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
5HIAA (Quantitative)	HIAA24	24 hr urine (glacial acetic acid)	So 'ton - Chromatography	11 working days	No	Mon – Fri. See patient information sheet for SPECIAL DIET instructions. Screen and monitoring Carcinoid Syndrome	5 – 35 µmol/24 hr
7-Dehydrocholesterol	COM	Green/ Lith Hep plasma	GOS Enzyme Lab,		No	Discuss with duty Biochemist first. Take blood Mon – Wed ONLY.	See report or contact laboratory
AAT						**See Alpha 1 Anti-Trypsin**	
ACE	SACE1	Gold / serum	SDH	1/2 day		See Angiotensin Converting Enzyme	
Acetyl Choline Antibody/ Motor End Plate Antibody	ACRAB	Gold / serum	Oxford Immunol	14 days	No		<5 x 10^{-10} mol/L
Acetyl Cholinesterase	AACHO	Amniotic Fluid (15-20 wks)	Sheffield - Immunology & PRU	2 days	No	Store refrigerated, DO NOT FREEZE Part of ONTD screen. Contact duty Biochemist	Negative - see report
ACT						**See Alpha 1 anti-Chymotrypsin**	
ACTH	ACTHB	Lavender / plasma – must be separated within 2 hrs	So 'ton - Specialist Biochemistry	5 working days	No	EDTA Plasma ONLY	<46 ng/L

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Activated Partial Thromboplastin Time (APTT)	APTT	Blue / citrate	SDH	4 hours	Yes	Up to the fill line on the blue top citrate tube.	0.8 – 1.2 Intravenous heparin therapy: 1.5 – 2.5
Acyl Carnitines	CARN	Blood spots	GOS Clin Biochem	1-2 weeks	No	Spot must completely fill circle & fully soak through card.	< 1 month 0 – 50.32 µmol/L <1 year 10.3 – 42.0 µmol/L 1 – 11 years 10.0 – 27.8 µmol/L 12 – 20 years 10.1 – 34.5 µmol/L
Adrenal Antibody	ADRAB	Gold / serum	So 'ton - Immunology	10 working days	No		Pos / Neg
Adult Autoimmune Neutropaenia	RAS	Yellow SST	H&I NHSBT Filton	14 working days	No	Neutrophil count MUST be <2 x 10^9/L	See report or contact laboratory
AFP (see Alpha-Feto Protein)						**See Alpha Feto Protein**	
AH50	AH50	Gold / serum	So 'ton - Immunology	20 working days	No	Sample must be frozen within 12 hours after being taken.	80 - 200 %
Alanine Transaminase	ALT	Gold / serum	SDH	1/2 day	Yes	In profiles: L4, LCAP4	F: 7 - 35 U/L M: 10 - 40 U/L
Albumin	ALB	Gold / serum	SDH	1/2 day	Yes	In profiles: BON, L4, RENA, LCAP4	35 – 50 g/L
Albumin / Creatinine Ratio	ACR	Early morning urine	SDH	1 day	No		F: < 3.5 mg/mmol M: < 2.5 mg/mmol
Alcohol (see Ethanol)						**See Ethanol**	
Aldosterone / Renin Ratio						**See Renin / Aldosterone Ratio**	
Alkaline Phosphatase	ALP	Gold / serum	SDH	1/2 day	Yes	In profiles: BON, L3, RENA, LCAP3	30 – 130 U/L a

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Alkaline Phosphatase Isoenzymes	ALPI	Gold / serum	So 'ton - Specialist Biochemistry	10 working days	No	Sent Mon - Fri Separated serum or plasma stored at 40°C. Haemolysed samples are unsuitable.	Qualitative / interpretive
Allergen Specific IgE (see IgG)						**See IgE**	
Allo-Antibody Identification Complicated	RAS	2 x Pink EDTA	RCI NHSBT Filton	14 working days	No		See report or contact laboratory
Allo-Antibody Identification routine	P	Pink / EDTA	SDH	1 day	Yes	If further investigation is required, TAT could be up to 5 days.	See report or contact laboratory
Allo-Antibody Screen routine	OS	Pink / EDTA	SDH	4 hours	Yes		See report or contact laboratory
ALP	ALP	Gold / serum	SDH	1 day	Yes	See alkaline phosphase	30 - 130 U/L a
Alpha 1 Anti-Trypsin - AAT	AATS	Gold / serum	SDH	1/2 day	Yes		1.10 – 2.10 g/L
Alpha 1 Anti-Trypsin *Genotyping*	COM	Lavender / EDTA / whole blood	SDH Wessex regional Genetics	4 weeks	No	**Send to Regional Genetics Salisbury**	Interpretive comment on report
Alpha 1 Anti-Trypsin *Phenotyping*	AATP	Gold / serum or purple EDTA plasma	King's London	14 working days	No	Confirmation by AAT genotyping also required Sent Mon – Thurs. 1st class post.	Interpretive comment on report

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Alpha Feto Protein - AFP ***(Maternal Serum)***	DOWNS (SAFP)	Gold / serum 15 – 21 wks	Portsmouth	3 days	No	Part of Downs / ONTD Screen Sent Mon – Thurs. Separated within 48 hours	Part of Downs 2nd Trimester
Alpha Feto Protein - AFP ***(Tumour Marker)***	AFPE	Gold / serum	SDH	1/2 day	No		0-9 kU/L a
Alpha Subunit	COM	Gold / serum	Bart's and the London NHS Trust	4 weeks	No		See report or contact laboratory
ALT	ALT	Gold / serum	SDH	1 day	Yes	See alanine transaminase	F: 7-35 U/L M: 10 - 40 U/L
Aluminium	ALS	Navy /Trace (k2EDTA)/ blood	So 'ton - trace	6 working days	No	Sent Mon – Fri	See report or contact laboratory
Amino Acids (serum)	PAAS	Gold / serum	So 'ton - Chromatography	10 working days	No	Telephone if required urgently Sent Mon – Fri. Samples are stored at below -70^{0}C until required for analysis	Interpretive comment on report

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Amino Acids (Urine)	UAAS	Random (children). 24 hr urine (adults)	So 'ton - Chromatography	10 working days	No	Can be sent urgently if discussed with duty Biochemist. Do serum amino acids also. Sent Mon – Fri. Samples are stored at below -70^{0}C until required for analysis	Interpretive comment on report
Amino Acids (CSF)	COM	CSF	So 'ton - Chromatography	10 working days	No	Done urgently - please discuss with duty Biochemist. Samples are stored at below -70^{0}C until required for analysis	Interpretive comment on report
Amiodarone	AMIO	Lavender / EDTA / plasma	Cardiff Toxicol	7 days	No	**Pre-dose** Sent Mon – Thur. Gel tubes must be avoided	0.15-2.0 mg/L
Amisulpride	COM	4 mL of ETDA whole blood preferred (pre-dose or 'trough' sample). Serum or plasma can be used, but avoid gel-separator tubes.	King's London	5 working days	No	Please refrigerate (if possible) if not sending immediately. Send by first class post.	100-400 µg/L

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Ammonia	AMM	Navy/Trace (k2EDTA) / plasma **/ ice, Green / lithium heparin**	SDH	1/2 day	Yes	Contact lab **before** taking samples. Immediate results	See guide to profiles and test groups
Amniotic Fluid OD	RAS	Amniotic fluid	So 'ton - NBS		No	Please contact Blood Transfusion, protect from light	See report or contact laboratory
Amphetamine L/D Isomer Ratio	AMPR	Urine	B'Ham City (incl toxicology)	7 working days	No	ONLY in patients prescribed dex-amphetamine Sent Mon – Thur. 1st class post	See report or contact laboratory
Amylase	AMY	Gold / serum	SDH	1/2 day	Yes		27 – 102 U/L
Amylase	AMYUR	Random urine	SDH	1 day	Yes	? Macro-amylasaemia	See report or contact laboratory
Amylase	AMYFL	Pleural / wound / drain fluids	SDH	1/2 day	Yes		See report or contact laboratory
Amyloid (free light chains for)						**See Free Light chains for Amyloid**	
Amyloid protein	COM	Gold / serum	Royal Free London	5 working days	No	1st class post	<10 mg/L
ANA, ANF (Anti-Nuclear Antibody Screen), (Connective Tissue Disease screen)	CANT	Gold / serum	So 'ton - Immunology	5 working days	No	See Anti-Nuclear Antibody	Pos / Neg

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
ANCA (Anti-Neutrophil Cytoplasmic Antibody)	ANCA - this test has been superseded by more specific tests, the MPO (myeloperoxidase) antibody and the PR3 (Proteinase 3) antibody. ANCA (perinuclear ANCA & Cytoplasmic ANCA) testing can be performed if required by contacting the Laboratory.						
Androstenedione	AND	Gold / serum	So 'ton - Chromatography	10 working days	No	Sent Mon – Fri. Store at -20^{0}C	Age and sex related ranges included in report. M: 18-40 years 1.2-4.7 nmol/L >40 years 0.8-3.1 nmol/L F: 18-29 years 1.6-7.5 nmol/L 30-39 years 1.2-6.0 nmol/L 40-49 years 0.9-4.8 nmol/L 50-59 years 0.7-3.8 nmol/L 60-69 years 0.5-3.0 nmol/L >69 years 0.5-2.5 nmol/L
Angiotensin Converting Enzyme (ACE)	SACE1	Gold / serum	SDH	1/2 day	No		8 – 52 U/L
Anion Gap	COM	Derived test	SDH	1/2 day	Yes	Phone duty Biochemist to discuss first	6 – 12 mmol/L calculated
Anti-Mullerian Hormone	AMH	Gold / serum	Plymouth	7 working days	No		See report or contact laboratory
Anti-Smith Antibodies	ENAF	Gold / serum	So 'ton - Immunology	5 working days	No	Anti Sm in ENAF	Pos / Neg
Anti–Amphiphysin antibodies	COM	Gold / serum	Oxford Immunol	14 days	No		See report or contact laboratory
Anti-Beta 2 Glycoprotein 1	AB2G1	Gold / serum	So 'ton - Immunology	10 working days	No		0-8.2 u/mL

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Antibody Investigation *(Red-cell)*	P	Pink / EDTA	SDH	up to 5 days	Yes	Initiated by lab. Complicated cases may require referral to specialist testing laboratories and take several days If further investigation is required, 2 x pink EDTA may be required for referral.	See report or contact laboratory
Antibody quantitation *(Red-cell)*	RAS	Pink / EDTA blood	NHSBT Filton	7 working days	Yes		See report or contact laboratory
Anti-Cardiolipin Antibody IgG (Anti-Phospholipid Antibody)	ACARG	Gold / serum	So 'ton - Immunology	15 working days	No	anti-phospholipid Ab.	0-10 U/mL
Anti-Cardiolipin Antibody IgM (Anti-Phospholipid Antibody)	ACARM	Gold / serum	So 'ton - Immunology	15 working days	No	anti-phospholipid Ab.	0-7 U/mL
Anti-Centromere Antibody	CENTRO	Gold / serum	So 'ton - Immunology	10 working days	No		Pos / Neg
Anti-D/c Quantification	RAS	2 x Pink EDTA	RCI NHSBT Filton	7 working days	No		See report or contact laboratory
Anti-DNA Antibody, Anti-Ds DNA, "DNA" Binding	ADNA	Gold / serum	So 'ton - Immunology	5 working days	No		0-15 IU/mL

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Anti-Endomysial Antibody (IgA)	AENDO	Gold / serum	So 'ton - Immunology	10 working days	No	First line test is TTGA. Endomysial ab (IgA) ONLY on borderline TTGA or special cases.	Pos / Neg
Anti-Endomysial Antibody (IgG)	MISC	Gold / serum	So 'ton - Immunology	10 working days	No	Endomysial ab (IgG) ONLY done on confirmed IgA deficiency.	Pos / Neg
Anti-GABA +/- GABA B	COM	Gold / serum	Oxford Immunol	21 days	No		See report or contact laboratory
Anti-Gad Antibody	AGAD	Gold / serum	So 'ton - Immunol	20 working days	No		0-5 U/mL
Anti-Gastric Parietal Cell Antibody	PCA	Gold / serum	So 'ton - Immunology	5 working days	No	See LAIP	Pos / Neg
Anti-Glomerular Basement Membrane Antibody	AGBMA1	Gold / serum	So 'ton - Immunology	3 working days	No		Pos / Neg
Anti-GQ And Anti-GM1	MISC	Gold / serum	Oxford Immunol	28 days	No		Normal result = negative
Anti-HU (Paraneoplastic Abs)	PNEO	Gold / serum	Oxford Immunol	14 days	No	Part of Purkinje Cell Ab screen or Paraneoplastic Antibodies	See report or contact laboratory
Anti-Islet Cell Antibody	ICA	Gold / serum	So 'ton - Immunology	15 working days	No		Pos / Neg
Anti-La	ENAF	Gold / serum	So 'ton - Immunology	5 working days	No		Pos / Neg

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Anti-MAG (Myelin Associated Glycoprotein	MAGAB	Gold / serum	Oxford Immunol	14 days	No		0-1000
Anti-Mitochondrial Antibody	LAIP	Gold / serum	So 'ton - Immunology	5 working days	No	Part of Liver Autoimmune screen, positive results have M2 antibody test.	Pos / Neg
Anti-MUSK Antibodies	AMUSK	Gold / serum	Oxford Immunol	14 days	No		See report or contact laboratory
Anti-Ri (Paraneoplastic Abs)	PNEO	Gold / serum	Oxford Immunol	14 days	No	Part of Purkinje Cell Ab screen	See report or contact laboratory
Anti-Ro Antibody	ENAF	Gold / serum	So 'ton - Immunology	5 working days	No	Part of ENA screen	Pos / Neg
Anti-Smooth Muscle Antibody	LAIP	Gold / serum	So 'ton - Immunology	5 working days	NO	See LAIP	Pos / Neg
Antithrombin	AT	3 x Blue / citrate	SDH	On request or 28 working days	No	Part of thrombophilia screen	86-130 %
Anti-Yo (Paraneoplastic Abs)	PNEO	Gold / serum	Oxford Immunol	14 days	No		See report or contact laboratory

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Apixaban		1 x 4.5ml Citrate	Basingstoke Coag	On request or 5 working days	No	No 'therapeutic range' has been established, therefore observed peak and trough concentrations are described. Can be dispatched fresh or as frozen aliquots	**Peak** **Trough** ***(Dose - VTE Prophylaxis*** *- 2.5 mg bid)* 41-146 ng/ml 23-109 ng/ml ***(Dose - VTE Treatment*** *- 2.5 mg bid)* 30-153 ng/ml 11-90 ng/ml ***(Dose - VTE Treatment*** *- 5 mg bid)* 59-302 ng/ml 22-177 ng/ml ***(Dose - VTE Treatment*** *- 10 mg bid)* 111-572 ng/ml 41-335 ng/ml ***(Dose - Stroke Prevention AF*** *- 2.5 mg bid)* 69-221 ng/ml 34-162 ng/ml ***(Dose - Stroke Prevention AF*** *- 5 mg bid)* 91-321 ng/ml 41-230 ng/ml
Aquaporin 4	AQP4	Gold / serum	Oxford Immunol	14 days	No		See report or contact laboratory
Asialo Transferrin (Beta2-transferrin)	COM	Nasal or aural discharge fluid	Queens Sq. London	6 working days	No	To identify CSF rhinorrhoea or otorrhoea. Phone duty Biochemist if required urgently	See report or contact laboratory

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Asialylated Transferrin Carbohydrate Deficient Transferrin	CDT	Gold / serum	Sheffield - Immunology & PRU	5 days	No		0.0-2.6 %
Aspartate Transaminase (AST)	AST2	Gold / serum	SDH	1/2 day	Yes		15 – 41 U/L F
Autoimmune Profile (Liver autoantibody)	CANT	Gold / serum	So 'ton - Immunology	5 working days	No		Pos / Neg
Autoimmune Thrombocytopenia	RAS	Yellow SST + 3 x Pink EDTA	H&I NHSBT Filton	7 working days	No	Platelet count should be <100 x 10^9 DO NOT REFRIDERATE SAMPLES	See report or contact laboratory
Azathioprine Sensitivity	TPMTA	Lavender / EDTA / whole blood	B'Ham City (incl toxicology)	10 working days	No	See Thiopurine Methyl Transferase (TPMT) 1st class post without cooling	See report or contact laboratory
B12	B12E	Gold / serum	SDH	1/2 day	No	See Vitamin B12	See report or contact laboratory
Basal ganglia Abs	COM	Gold / serum	Queens Sq. London	10 working days	No	1st class post, sample not haemolysed	See report or contact laboratory
BCR-ABL	BCRABL	2 x Lavender / EDTA / whole blood	So 'ton - Molecular Path	14 days	No	**Avoid** taking sample on **Friday.** To arrive at the referral laboratory within 48 hours of sampling EDTA	See report or contact laboratory

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Bence-Jones Protein	BJP	Early morning urine	SDH	5 days	No	Serum for EP and Immunoglobulins also if first time	See report or contact laboratory
Bence-Jones Protein *(Quantitation)*	BJP24	24 hr Urine (plain)	St Georges	3-5 days	No	Request from Consultant Haematologists only	see report or contact laboratory
Beta 2 Microglobulin	B2MS	Gold / serum	So 'ton - Immunol	5 working days	No	Mon – Fri.	1.2-2.4 mg/L
Beta Carotene	COM	Gold / serum (on ice kept dark)	Glasgow	10 days	No	Transport frozen, kept in dark	90-310 µg/L
Bicarbonate	BIC RENA	Gold / serum	SDH	1/2 day	Yes	FRESH sample / full tube	22 – 29 mmol/L
Bile Acids / Salts	BILE	Gold / serum	SDH	1/2 day	Yes	Useful if LFTs are NORMAL	0 – 14 µmol/L 2nd/3rd Trimester
Bilirubin	UBIL	Random urine (**fresh and kept dark)**	SDH	1 day	No		See report or contact laboratory
Bilirubin – Direct	BUBC	Gold / serum	SDH	1/2 day	Yes		<3 µmol/L
Bilirubin – Total	BIL2	Gold / serum	SDH	1/2 day	Yes		< 21 µmol/L a
Biopterins	COM	Blood spots (screen) or green Lith. Hep / plasma	B'Ham Neonatal	15 working days	No	Ideally collect when blood phenylalanine is increased	see report or contact laboratory
Blood (urine)	MULTI	Random urine	SDH	1 day	Yes		See report or contact laboratory
Blood Gases	BGAS	**Hep syringe ice**	SDH	POCT	Yes	POCT devices ONLY	See report or contact laboratory
Blood Group Adult	OF /	Pink / EDTA	SDH	4 hours	Yes		See report or contact laboratory

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
routine	OC						
Blood Group and Antibody Screen	GO, OFS, OCS, OBC, OS	Pink / blood (6 ml) or Paed pink / blood (0-6 /12 babies)	SDH	1 day	Yes		See report or contact laboratory
Blood Group Complicated	RAS	Pink EDTA	RCI NHSBT Filton	7 working days	No		See report or contact laboratory
Blood Group Neonate Routine	OBC	Paed Pink / EDTA	SDH	4 hours	Yes	Up to fill line, overfilled samples will clot	See report or contact laboratory
BNP N terminal pro B type natriuretic peptide	BNP	Gold / serum	SDH	1/2 day	No	To rule out heart failure	<400 ng/L
Bone Marrow And Trephine Biopsy	BM	Bone marrow	SDH	1 day	No	Discuss with Consultant Haematologist	See report or contact laboratory
Bromide	COM	Serum and urine	Sheffield - Biomedical Sciences	20 working days	No		See report or contact laboratory
Buprenorphine	BUP	Urine	B'Ham City (incl toxicology)	7 working days	No	Mon – Thur. ONLY in patients prescribed buprenorphine 1st class post	See report or contact laboratory
C1 Esterase Inhibitor (Immunochemical)	C1INH	Gold / serum	So 'ton - Immunology	20 working days	No	Not frozen	0.11-0.36 g/L
C1 Esterase Inhibitor	C1ESTB	Gold / serum	So 'ton - Immunology	30 working days	No	Send frozen	40-150 %

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
(functional)							
C3	C3C4	Gold / serum	SDH	1/2 day	Yes		0.7 – 1.6 g/L
C4	C3C4	Gold / serum	SDH	1/2 day	Yes		0.2 – 0.6 g/L
CA 125	CA125E	Gold / serum	SDH	1/2 day	No		< 35 kU/L
CA 15-3	CA153E	Gold / serum	SDH	1/2 day	No		0-31 kU/L
CA 19-9	CA199E	Gold / serum	SDH	1/2 day	No		0-35 kU/L
Caeruloplasmin	CAER	Gold / serum	So 'ton - Automated	2 days	No	Mon – Fri. Plasma Copper also helpful	150-320 mg/L (in-house reference range study 2016)
Caffeine	COM	Gold / serum	B'Ham City (incl toxicology)	7 working days	No	Phone duty Biochemist if required urgently 1st class post	See report or contact laboratory
Calcitonin	CACIB	Gold / serum / **(on ice. Fasting)**	Charing X	10 days	No	NO HAEMOLYSIS Rush to lab on ice - separate as quickly as possible (within 30 mins) cold spin and freeze. SEND FROZEN.	M: <11.8 ng/L F: <4.8 ng/L
Calcium (adjusted)	CAS, CAP, BON, LCAP3, RENA	Gold / serum	SDH	1/2 day	Yes	Phlebotomy un-cuffed	2.20 – 2.60 mmol/L a
Calcium	CAU24	24 hr urine	SDH	1 day	No		2.5 – 7.5 mmol/24h a

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Calcium / Creatinine Clearance Ratio	CACL	24 hr urine (fresh) + gold/serum	SDH	1 day	No	Serum Calcium and Creatinine during or at end of collection	See guide to profiles and test groups
Calcium / Creatinine Ratio	CACR	Random urine (fresh)	SDH	1 day	No	1st random urine after overnight void ideally	< 0.75 at 1 year < 0.40 adults > 0.57 hypercalciuria
Calprotectin	CALP	Faeces	SDH	5 days	No		Comment added to all results.
Carbamazepine	CARB	Gold / serum / (pre-dose)	SDH	1/2 day	Yes	Telephone if required urgently	4 – 12 mg/L Pre-dose See BNF and Path Harmony for range.
Carbohydrate – Deficient Transferrin	CDT	Gold / serum	Sheffield - Immunology & PRU	5 days	No		0.0-2.6 %
Carbon Monoxide	COHB	Lavender / EDTA / whole blood	SDH	POCT	Yes	See Blood Gas POCT only	See guide to profiles and test groups
Carboxy-Haemoglobin	COHB	Lavender / EDTA / whole blood	SDH	POCT	Yes	See Blood Gas POCT only	See guide to profiles and test groups
Cardiac Muscle Antibody	MISC	Gold / serum	Sheffield - Immunology & PRU	5 days	No		Normal result = negative
Carotene	CAROT	Gold / serum **(on ice kept dark)**	Glasgow	10 days	No	Mon – Thurs. FASTING plus Vitamin A Light sensitive, wrap in tin foil. Send 1st class post within 48 hours. If later than this separate	α: 14-60 µg/L β: 90-310 µg/L

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
						and freeze.	
CART (Gut Hormone)	GUT	Lavender / EDTA plasma / **(on ice)**	Charing X SAS Lab	21 days	No	Overnight fast EDTA plasma, spin sample within 15 minutes of venepuncture. Store and send frozen.	<85 pmol/L
Catecholamine's (Beta Carotene)	PCATS	Green / Lith. Hep. Plasma / Serum **to lab asap**	St. Helior	21 days	No	Separate immediately, keep in the dark and freeze Keep in the dark and frozen	0.19-0.58 µmol/L
Catecholamine's (Quantitative) = VMA – Children Under 10 Yrs.	COM	Random Urine **(fresh)**	So 'ton - Chromatography	6 working days (urgent by arrangement)	No	Mon – Fri. Paediatric samples can be sent urgently, refer to duty Biochemist. Fresh random urine	Expressed as µmol/mmol creatinine HMMA HVA 0-1 years 11 20 2-4 years 6 14 5-9 years 5 9 10-19 years 5 8
Catecholamine's (Quantitative) Adults / Children >10 yrs.	CAT24A	24 hr Urine **(25 ml Glacial Acetic acid)**	So 'ton - Chromatography	7 working days	No	Mon – Fri. Can be sent urgently if discussed with duty Biochemist.	Interpretive comment on report
CCP Antibody (Cyclic Citrullinated Peptide)						**See Cyclic Citrullinated Peptide**	

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
CEA	CEAE	Gold / serum	SDH	1/2 day	No		0-5 µg/L < 10 µg/L (smokers)
Cell Markers: Bone Marrow	BMCM	Bone marrow in orange, screw cap, heparin	So 'ton - Immunology	9 days	No	*Same day in urgent cases	See report or contact laboratory
Cell Markers: Immunodeficiency Screen CD4 Count	IS	Lavender / EDTA / whole blood	So 'ton - Immunology	9 days	No	Mon-Thurs only CD3+, CD4+, CD8+ Absolute counts and ratios	See report or contact laboratory
Cell Markers: Lymphocyte Markers	BCM	Lavender/ EDTA or Green/Lith Hep. Whole blood	So 'ton - Immunology	9 days	No	*Mon-Thurs unless for diagnosis of AML/ALL	See report or contact laboratory
Cell Markers: Other Specimen Types e.g. CSF	CM	Bone marrow in orange, screw cap, heparin	So 'ton - Immunology	9 days	No	Discuss with Consultant	See report or contact laboratory
CH 50	CH50	Gold / serum **/ (to lab urgent)**	So 'ton - Immunology	20 working days	No	Haemolytic complement Must be frozen and kept frozen within 12 hours of taking sample.	80-120 %
Chloride	CL	Gold / serum (Urine not avail)	SDH	1/2 day	Yes	Renal / Paeds or special requests only	95 – 108 mmol/L a

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Chloride	SWCL	Sweat	SDH	1 day	No	Sweat Test – Primary analyte. Contact laboratory to arrange.	< 40 mmol/L
Cholesterol *(Total)*	CHOL	Gold / serum	SDH	1/2 day	Yes		See NICE QRISK 2 calculator
Cholinesterase	CHOLI	Lavender / EDTA / whole blood	Bristol S'mead cholinesterase unit	3 weeks	No	Mon – Thurs. Urgents confirmed by sending to Bristol next working day	<5300 U/L
Cholinesterase *(Organo Phosphate Exposure)*	COM	Green / Lithium heparin / whole blood	Cardiff Toxicol	7 days	No		7524-13323 units/L
Cholinesterase *Genotyping*	COM	Lavender / EDTA / whole blood	Bristol S'mead	12 weeks	No	Sent Mon – Thurs. Done for confirmation / family studies Sample should not be taken during a suspected episode of suxamethonium prolonged apnoea, take once awake and breathing unaided.	<5300 U/L

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Cholinesterase *Phenotyping*	COM	Gold / serum	Bristol S'mead	3 weeks	No	Sent Mon – Thurs. Done if cholinesterase low or for family studies Sample should not be taken during a suspected episode of suxamethonium prolonged apnoea, take once awake and breathing unaided.	See report or contact laboratory
Chromium	CHRO	Navy / Trace / whole blood	So 'ton - trace	6 working days	No	Mon – Fri.	See report or contact laboratory
Chromogranin A	CGA	Lavender / EDTA plasma / **(on ice)**	Charing X SAS Lab	21 days	No	EDTA plasma, spin sample within 15 minutes of venepuncture. Store and send frozen.	< 60 pmol/L
Chromogranin B	CGB	Lavender / EDTA plasma / **(on ice)**	Charing X SAS Lab	21 days	No	EDTA plasma, spin sample within 15 minutes of venepuncture. Store and send frozen.	< 150 pmol/L
Ciclosporin	CYCLD	Lavender/EDTA/ whole blood usually 12 hr post dose. Rarely 2 hr post dose, peak also	Dorchester	3 working days	No	Sent Mon – Thurs. **MUST be 12 hr post-dose**. Avoid taking samples on Fridays 2 hr post dose peak samples may also be required	Interpretive comment on report

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
		required					
Ciclosporin	CYCLH	Lavender / EDTA / whole blood	Harefield	4 hours	No	Require pre-dose sample for 12 hour tough levels 1st class post to lab	**Heart (transplanted prior to 1st August 2007)** 0-3 months post TX 200-300 ng/ml 3-6 months post TX 175-225 ng/ml 6-12 months post TX 150-200 ng/ml >1 year post TX 100-150 ng/ml **Lung/Heart Lung (transplanted prior to 6th October 2010)** 0-3 months post TX 250-350 ng/ml 3-6 months post TX 200-300 ng/ml 6-12 months post TX 200-300 ng/ml >1 year post TX 150-250 ng/ml
Ciclosporin	CYCLK	EDTA Whole blood	King's London	Within 24 hr of receipt (Mon-Thurs 9-5.30)	No	Mon-Thurs 9-5.30 1st class post	>40 µg/L
Ciclosporin	CYCLR	Lavender / EDTA / whole blood	Portsmouth	48 hours	No	Cannot be shared with other tests	Enquires are referred to a clinical scientist

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Ciclosporin	CYCLSO	Lavender / EDTA or Green / Lithium heparin whole blood	So 'ton - Automated	1 day (excluding transport time)	No	Samples should be timed for a 12 hour trough level. Store samples at 4°C pre and post analysis.	The laboratory quotes a guideline 12 hour trough range of 100 - 250 µg/L but no firm therapeutic range exists for cyclosporin in whole blood. Individual cyclosporin values cannot be used as the sole indicator for making changes in the treatment regimen. Each patient should be thoroughly evaluated clinically before treatment adjustments are made.
Citrate	COM	24hr Urine	UCL London			1st Class Post	See report or contact laboratory
CK						**See Creatinine Kinase**	
CK Isoenzymes	COM	Gold / Serum	Royal Free London	1 month	No	1st class post	See report or contact laboratory
Clobazam	COM	Gold / serum, or Grey / plasma	Chalfont St. Peter	24 working hours	No	Discuss with Biochemistry	30-300 µg/L
Clonazepam	COM	Grey / fluoride plasma	Chalfont St. Peter	24 working hours	No		20-70 µg/L
Clonidine Stimulation (GH series)	COM	Serum taken at -30.0, 0, 30, 60, 90, 120 minutes i.e. 6 samples	So 'ton - Specialist Biochemistry	5 working days	No	Check times on samples and send FROZEN	See report or contact laboratory
Clotting Screen or Coagulation Screen	**CS** - INR + APTT (+ FIBA)	Blue / citrate	SDH	1/2 Day	Yes	Tube MUST be filled to line. FIBA only done if INR APTT abnormal or initially requested.	INR 0.8-1.2 APTT 0.8-1.2 FIBA 2.0-4.0 (Please note therapeutic ranges may vary)

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Clozapine	CLOZ	Lavender / EDTA / plasma	Cardiff Toxicol	7 days	No	Gel tubes must be avoided	350-600 µg/L
Cobalt	CO	Navy / Trace / whole blood	So 'ton - trace	6 working days	No	Mon-Fri, industrial screen or operative exposure	See report or contact laboratory
Collagen crosslinks C-terminal telopeptide	CTX	Lavender / EDTA / plasma	Norfolk & Norwich	2 weeks	No	Transport Frozen Separate and freeze plasma, send frozen.	See report or contact laboratory
Complement – C3 and C4	C3C4	Gold / serum	SDH	1/2 day	No	See C3, C4	See report or contact laboratory
Conn's Screen (Blood)						**See Renin / Aldosterone Ratio**	
Copper	COPS	Navy / Trace / plasma (adults) or Trace / plasma (paeds)	So 'ton - trace	4 working days	No	Sent Mon – Fri. See also TRACE METALS	See report or contact laboratory
Copper	COPU	24 hr Urine (plain)	So 'ton - trace	6 working days	No	Sent Mon – Fri.	See report or contact laboratory
Cortisol	CORE	Gold / serum / (0900 am ideally)	SDH	1/2 day	Yes*	*Telephone if required urgently. Phone duty Biochemist out of hour's dynamic test or day curve may be more useful.	185-624 nmol/L (09:00 hours)

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Cortisol (Urine Free)	UCOR	24 hr Urine **(thymol)**	So 'ton - Specialist Biochemistry	10 working days	No	Sent Mon – Fri. Screen for Cushing's / monitoring Cushing's A 24 hour urine collected into a bottle containing thymol is required.	F: up to 260 nmol/L M: up to 270 nmol/L
Cortisol Blood Spot Series	COM	Blood spots	So 'ton - Specialist Biochemistry	10 working days	No	Sent Mon – Fri. Store at room temperature	1. 0800hrs 90-650 nmol/l 2. 1200hrs <260 nmol/l 3. 1800hrs <165 nmol/l 4. 2300hrs <85 nmol/l
C-Peptide +/- Insulin	CPEP2	Gold / serum **/ (to lab urgent)**	So 'ton - Specialist Biochemistry	5 working days	No	Sample must be separated and frozen within 2 hours of venesection	Healthy fasting individual with a normal blood glucose: 350-1800pmol/L During a hypoglycaemic episode, a c-peptide concentration greater than 300pmol/L is inappropriately high (C-peptide is considered suppressed if less than 94pmol/L) Indeterminate values, i.e. 95-300pmol/L, require measurement of beta-hydroxybutyrate to help determine if hyperinsulinism is present
C-Reactive Protein	CRP	Gold / serum	SDH	1/2 day	Yes		< 5 mg/L
Creatinine	CREAT UEC RENA	Gold / serum	SDH	1/2 day	Yes		F: 53 – 97 µmol/L M: 80 – 115 µmol/L

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Creatinine	CREU	24 hr Urine (plain)	SDH	1 day	Yes		F: 5.3 – 15.9 mmol M: 7.1 – 17.7 mmol
Creatinine	CREUR	Random Urine	SDH	1 day	Yes		See report or contact laboratory
Creatinine	CREFL	Wound drain fluids	SDH	1/2 day	Yes		See report or contact laboratory
Creatinine Clearance	CRCL	24 hr Urine (plain) + Gold / serum	SDH	1 day	Yes	MUST send serum creatinine during or at end of collection	See guide to profiles and test groups
Creatinine Kinase	CK	Gold / serum	SDH	1/2 day	Yes		F: 25 – 200 U/L M: 40 – 320 U/L
Crossmatch	CTO	Pink / EDTA	SDH	1/2 day	Yes	MUST state date and time required plus clinical details.	See report or contact laboratory
CRP						**See C-Reactive Protein**	
Cryoglobulins	CRYO	3 x Gold / serum 2 x Lavender / EDTA / plasma	SDH	1 week	No	**Tubes MUST be pre-warmed and sent to lab warm**	See report or contact laboratory
CSF Cytospin, CSF Examination For Abnormal WBCs / Blast Cells	CSFX3	CSF (plain bottle). Do **NOT** send **via air tube**	SDH	1/2 day	No	DO NOT USE THE AIR TUBE, let the laboratory know it is being sent.	See report or contact laboratory
CSF Spectro-photometry (?SAH)						**See Xanthochromia**	
Cyanide	COM	Gold / serum grey/Fluoride/ whole blood	Sheffield - Toxicology		No		See report or contact laboratory

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Cyclic Citrullinated Peptide Antibody (CCP)	CCP1	Gold / serum	SDH	1/2 day	No		<7.0 u/mL
Cystine Quantitative (See Amino Acids URINE)	COM	24 hr Urine (acid)	So 'ton - Chem path	10 working days	No	Mon – Fri. Urine amino acids assayed	See report or contact laboratory
Cystine Screen (See Amino Acids URINE)	UCYS	Random urine	So 'ton - Chem path	10 working days	No		See report or contact laboratory
Cystinosis (Leucocyte Cysteine)	COM	Green/ Lith. hep blood, 2 ml **to lab ASAP**	GOS Enzyme Lab,	60 days	No	Discuss with duty Biochemist first. Take blood Mon – Wed ONLY.	See report or contact laboratory
Dabigatran	DABIG	3 x Blue / citrate	Basingstoke Coag	On request or 5 working days	No	Can be dispatched fresh or as frozen aliquots	Peak range 64-443 ng/ml
D-Dimer	DDIM3	Blue / citrate	SDH	½ day	Yes	To be used in conjunction with clinical scoring for exclusion of DVT.	< 230 µg/L considered Negative for DVT
Dexamethasone Suppression Test	DEXE	Gold / serum / **(0900 am)**	SDH	1 day	No	1 mg dexamethasone at 11 pm	See individual reports
DHEAS	DHEA1	Gold / serum	So 'ton - Chromatography	10 working days	No	Mon – Fri Store at -20^{0}C	Interpretive comment on report
Digoxin	DIG	Gold / serum / (6-12 hr post dose)	SDH	1/2 day	Yes	Telephone if required urgently	0.8 – 2.0 µg/L 6 – 12 hours post dose

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Dihydrotestosterone	COM	Gold / serum	Bart's and the London NHS Trust - Whitechapel	7 working days	No	1st class post	See report or contact laboratory
Direct Antiglobulin Test (DAT)	DAGML DAGMS	Pink / EDTA	SDH	4 hours	Yes		See report or contact laboratory
Downs 1st Trimester	DOWNFT	Gold / serum	Portsmouth	3 days	No	Mon – Thur. Counselling required Separated within 48 hours	Used in the pre-natal risk calculation for Down Syndrome affected pregnancies
Downs 2nd Trimester	DOWNPC	Gold / serum	Portsmouth	3 days	No	Mon - Thur. Counselling required. Separated within 48 hours	Used in the pre-natal risk calculation for Down Syndrome affected pregnancies, only in those women who missed 1st trimester screening.
Drug Induced Antibody Mediated Neutropaenia's	RAS	Yellow SST + Sample of implicated drug	H&I NHSBT Filton	20 working days	No		See report or contact laboratory
Drug Screen / Toxicology	TOXK	Random urine (30 ml minimum) + Gold / serum + Lavender / EDTA blood + grey / Fluoride plasma + Gastric aspirate, tissues, vomit	B'Ham City (incl toxicology)	up to 3 weeks	Yes*	3 If analysis is urgent discuss with duty Biochemist. Toxicology requests will be stored for 10 days, please send urine/gastric contents as necessary. If analysis IS required discuss with duty Biochemist.	See report or contact laboratory

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
						1st class post	
Drugs Of Abuse Screen *(Full)*	DAU	Random urine	B'Ham City (incl toxicology)	3 working days	No	Urgent paediatric samples refer to duty Biochemist 1st class post, courier if urgent	See report or contact laboratory
EGFR	EGFR	Gold / serum	SDH	½ day	Yes	Part of UEC	> 90 ml/min/1.73 m^2
Elastase (see Pancreatic Elastase)						**See Pancreatic Elastase**	
Electrolytes (Na + K)	NAU / KU	24 hr urine (plain)	SDH	1 day	No		See report or contact laboratory
Electrolytes (Na + K)	NAFL/ KFL	Pleural / wound / drain fluids	SDH	½ day	Yes		See report or contact laboratory
Electrophoresis	IG(EP)	Gold / serum	SDH	5 days	No		See report or contact laboratory
ELF (Enhanced Liver Fibrosis Test)	ELF	Gold / serum	So'ton Biochemistry	5 days	No		See report from reference laboratory
ENA (Extractable Nuclear Antigens)	ENA1	Gold / serum	So 'ton - Immunology	5 working days	No	Includes Ro, La, RNP, Scl70, Jo-1, Sm and	Pos / Neg

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Screen						centromere B antigens	
Enzymes of IEM	COM	Skin, liver biopsy, blood, urine	Varies*	Varies	No	***Arrange with duty Biochemist ONLY**	See report or contact laboratory
ESR	ESR1	Lavender / EDTA	SDH	1 day	Yes	Temp Arteritis, PMR, ?myeloma and Hodgkin's disease ONLY	M: < 15 F: <10
Ethanol	ALCOP	Grey / fluoride plasma	SDH	1/2 day	Yes		80 mg/dL legal driving limit >400 mg/dL fatalities reported
Ethosuximide	ETHO	Gold / serum	B'Ham City (incl toxicology)	10 working days	No	Mon – Thur. 1st class post	40 – 100 mg/L Pre-dose
Extended RBC Phenotype	RAS	Pink EDTA	RCI NHSBT Filton	7 working days	No		See report or contact laboratory
Factor II Assay	FAC2	2 x Blue / citrate	SDH	1 week	Yes	Discuss with Consultant Haematologist, can be done urgently if required	50-150 IU/dL
Factor V Assay	F5	2 x Blue / citrate	SDH	1 week	Yes	Discuss with Consultant Haematologist, can be done urgently if required	50-150 IU/dL
Factor V Leiden Genotype	LEID	Lavender / EDTA / whole blood	SDH Wessex regional Genetics	4 weeks	Yes	**Send to Regional Genetics Salisbury**.	See report or contact laboratory

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Factor VII Assay	F7	2 x Blue / citrate	SDH	1 week	Yes	Discuss with Consultant Haematologist, can be done urgently if required	50-150 IU/dL
Factor VIII Assay	F8C	2 x Blue / citrate	SDH	1 week	Yes	Discuss with Consultant Haematologist, can be done urgently if required	50-150 IU/dL
Factor VIII Inhibitor (and any other Clotting factor inhibitor)	F8I	2 x Blue citrate	SDH	1 week	Yes	Discuss with Consultant Haematologist, can be done urgently if required	See report or contact laboratory
Factor IX Assay	F9C	2 x Blue / citrate	SDH	1 week	Yes	Discuss with Consultant Haematologist, can be done urgently if required	50-150 IU/dL
Factor X Assay	F10	2 x Blue / citrate	SDH	1 week	Yes	Discuss with Consultant Haematologist, can be done urgently if required	50-150 IU/dL
Factor Xa (anti Xa) Heparin	F10a	2 x Blue / citrate	So 'ton - Coag	> 1 day	No	Monitoring of LMWH.	LMWH Treatment: 0.4-0.8 IU/ml LMWH Prophylaxis: 0.2-0.4 IU/ml UF Heparin: 0.3-0.7 IU/ml
Factor XI Assay	F11	2 x Blue / citrate	SDH	1 week	Yes	Discuss with Consultant	50-150 IU/dL

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
						Haematologist, can be done urgently if required	
Factor XII Assay	F12	2 x Blue / citrate	SDH	1 week	Yes	Discuss with Consultant Haematologist, can be done urgently if required	50-150 IU/dL
Faecal Elastase						**See Pancreatic Elastase**	
FAI						**See Free Androgen Index**	
Fe						**See Iron**	
Ferritin	FERE	Gold / serum	SDH	1/2 day	Yes	Acute phase reactant	F: 13 – 150 µg/L a M: 30 – 400 µg/L a
Foetal RhD Blood Group Screening	RAS	Pink EDTA	IBGRL NHSBT Filton	7 working days	No	From 11 weeks gestation	See report or contact laboratory
Foetal/Neonatal alloimmune Thrombocytopenia (NAIT)	RAS	Mother - Yellow SST + Pink EDTA Father - Pink EDTA Baby - Paed Pink EDTA	H&I NHSBT Filton	21 working days	No		See report or contact laboratory
Fibrinogen	FIBA	Blue / citrate	SDH	1/2 day	Yes		2.0 – 4.0 g/L
FK506 (see Tacrolimus)						**See Tacrolimus**	
Flecainide	FLEC	Lavender / EDTA /	Cardiff Toxicol	7 days	No	Pre-dose Gel tubes must be	0.15-0.9 mg/L

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
		plasma				avoided	
FMH Estimation	KLEI	Pink EDTA	RCI NHSBT Filton	1 working day	No		See report or contact laboratory
FMH Quantification	RAS	Pink EDTA	RCI NHSBT Filton	1 working day	No		See report or contact laboratory
Folate (Serum)	SFOL5	Gold / serum	SDH	1/2 day	No		3.1 – 19.9 µg/L
Follicle Stimulating Hormone - FSH	FSHE	Gold / serum	SDH	1/2 day	No		See guide to profiles and test groups
Free Androgen Index (FAI)	FAI	*Derived test*	SDH	1/2 day	No	See Sex Hormone Binding Globulin	F: < 5.0
Free Beta HCG – Maternal	DOWNS (BHCG)	Gold / serum	Portsmouth	3 days	No	Sent Mon – Thur Separated within 48 hours	Part of Downs 1st Trimester
Free Fatty Acids	COM	Grey / fluoride plasma / (**on ice)**	B'Ham IEM lab	3 working days	No	Please state fasting status Store frozen prior to shipment	See report or contact laboratory
Free Light Chains (Serum)	FLC3	Gold / serum	SDH	5 days	No	Discuss with Consultant Haematologist	See report or contact laboratory
Free Light Chains for amyloid	COM	Gold / serum	Royal Free London	5 working days	No	1st class post **(for existing patients under joint care with National Amyloid Centre only)**	Kappa: 3.3-19.4 mg/L Lambda: 5.7-26.3 mg/L K/L Ratio: 0.26-1.65
Free PSA (see Prostate Specific Antigen)						**See Prostate Specific Antigen**	

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Free T3	FT3E	Gold / serum	SDH	1/2 day	Yes*		a 3.9 – 6.8 pmol/L Up to 14 yrs: M/F: 4.0-6.2pmol/L 14-18yrs: M: 3.8-5.7pmol/L 14-18yrs: F: 3.5-5.3pmol/L 18-51yrs: M/F: 4.3-6.9pmol/L 51-110hrs: M/F: 3.5-6.2pmol/L
Free T4	FT4E	Gold / serum	SDH	1/2 day	Yes*		8 – 16 pmol/L
Free Testosterone (Calculated)	CFT	Gold / serum	SDH	1/2 day	Yes		See report or contact laboratory
Free/Total PSA Ratio (see Prostate Specific Antigen)						**See Prostate Specific Antigen**	
Fructosamine	FRUCTA	Gold / serum	Bath	7 days	No	Sent Mon – Thur	205-285 µmol/L
FSH						See Follicle Stimulating Hormone	
Full Blood Count (FBC)	FBC	Lavender / EDTA / whole blood	SDH	1/2 day	Yes		See guide to profiles and test groups
Functional C1 Esterase Inhibitor	COM	Gold / serum + Purple / EDTA	Sheffield - Immunology & PRU	2 - 5 days	No		Quantification 0.15-0.35 g/L Functional 70-150 %
Galactosaemia Screen	GALAC	Green /Lith Heparin Lavender EDTA whole blood or blood spots DBS	Bristol S'mead	7 days	No	Must be sent on same day as sampling, avoid weekends. Lithium Heparin send as whole blood, stable for up to 5 days	See report or contact laboratory

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Gamma Glutamyl Transferase	GGT3 L3	Gold / serum	SDH	1/2 day	Yes		F: 0-37 U/L M: 0-54 U/L
Gastrin – Fasting	GAST	Lavender / EDTA plasma / **(on ice)**	Charing X SAS Lab	21 days	No	Sent as required. Overnight fast / NOT on PPI EDTA plasma, spin sample within 15 minutes of venepuncture. Store and send frozen.	< 40 pmol/L Fasting
Gentamicin *(Once Daily)*	GEN1B	Gold / serum 0-2 hr pre-dose, green / lithium heparin	SDH	1/2 day	Yes*	*Avoid out of hours. State regime / dosing details on request form	Please refer to guidance on MICROGUIDE. Interpretive comments added to reported results.
Gentamicin *(Other Regimes)*	GENTB	Gold / serum pre and 1 hr post dose, green / lithium heparin	SDH	1/2 day	Yes*	*Avoid out of hours. State regime / dosing details on request form	Please refer to guidance on MICROGUIDE. Interpretive comments added to reported results.
Gentamicin *(Random Sample)*	GENTR	Gold / serum state time, green / lithium heparin	SDH	1/2 day	Yes*	*Avoid out of hours. State regime / dosing details on request form	Please refer to guidance on MICROGUIDE. Interpretive comments added to reported results.
GGT (see Gamma Glutamyl Transferase)						**See Gamma Glutamyl Transferase**	
GH (see Growth Hormone)						**See Growth Hormone**	

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Glandular Fever Test (see Infectious Mononucleosis)						**See Infectious Mononucleosis**	
Globulin	GLOB	*Derived test*	SDH	1/2 day	Yes		21 – 37 g/L a
Glucagon – Fasting	GLUG	Lavender / EDTA plasma / **(on ice)**	Charing X SAS Lab	21 days	No	Overnight fast **to lab ASAP** EDTA plasma, spin sample within 15 minutes of venepuncture. Store and send frozen.	< 50 pmol/L
Glucose (Body fluids - not CSF)	GLUFL	Pleural fluid / wound / drain / ascites / aqueous or vitreous humour (Post Mortem)	SDH	1/2 day	Yes	Fluoride preserved sample required	See report or contact laboratory
Glucose (CSF)	GLUCA	CSF	SDH	1/2 day	Yes	Fluoride preserved sample required	2.2-3.9 mmol/L a Approx. 60% plasma value
Glucose (urine)	UGLU	Random urine	SDH	1 day	Yes		See report or contact laboratory
Glucose – GPs or more than 4 hrs delay	GLFA GLFFA	Grey / fluoride plasma	SDH	1/2 day	Yes		Up to 6.0 mmol/L Fasting
Glucose – Hypoglycaemia	GLFA GLFFA	Grey / fluoride plasma + Gold / serum **(to lab ASAP)**	SDH	1/2 day	Yes	Telephone to alert laboratory take sample for insulin / C-peptide	See report or contact laboratory

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Glucose – Wards / less than 4 hrs delay	GLUA GLUFA	Gold / serum	SDH	1/2 day	Yes		Up to 6.0 mmol/L Fasting
Glucose Tolerance Test GTT	GTT2	Grey / fluoride plasma / fasting 0 + 2 hr	SDH	1/2 day	No	Done in Pathology Outpatients Tue / Wed / Thur	Interpretive comment on report
Glucose-6-Phosphate Dehydrogenase	G6PA	Lavender / EDTA / whole blood	Bath	7 days	No	Screening test only, but if deficient is quantified Contact laboratory before requesting	4.6-13.5 U/gHb
Glycosamino-Glycans (mucopolysaccharides)	MUCO	Random urine	BRI - metabolic, neuroendocrine and nutrition	3-4 weeks	No	Refrigerate after collection, send as soon as possible. If delay in sending advise to freeze.	See report or contact laboratory
Growth Hormone GH	GHA	**Gold / serum / (sample to lab ASAP)**	So 'ton - Specialist Biochemistry	5 working days	No	Store at -20^{0}C	Random growth hormone levels are, in general, uninterpretable. Suggest an IGF-1. Following hypoglycaemia growth hormone may not peak for 30 minutes
Gut Hormones– Fasting	GUT	Lavender / EDTA plasma / **(on ice)**	Charing X SAS Lab	21 days	No	Overnight fast / NOT on PPI EDTA plasma, spin sample within 15 minutes of venepuncture. Store and send frozen.	See guide to profiles and test groups
Haemochromatosis HFE Genotype	COM	2 x Lavender / EDTA / whole	SDH Wessex regional	4 weeks	No	**Send to Regional Genetics, Salisbury**	See guide to profiles and test groups

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
		blood	Genetics				
Haemoglobin (urine)	MULTI	Random urine	SDH	1 day	Yes		See report or contact laboratory
Haemoglobin A1c (HBA1c)	HBA1CA	Lavender / EDTA / whole blood	SDH	1 day	No		See guide to profiles and test groups
Haemoglobin Electrophoresis	HBEL	Lavender / EDTA / whole blood	SDH	1 week	No		See guide to profiles and test groups
Haemoglobin HPLC (Haemoglobinopathy screening)	HPLC	Lavender / EDTA / whole blood	SDH	1 week	No	Request FBC as well	See guide to profiles and test groups
Haemosiderin	HSID	Urine / EMU preferred	SDH	1 day	No		See report or contact laboratory
Haptoglobin	HAPT	Gold / serum	So 'ton - Automated	< 1 day	No		Adult M: 0.5-2.0 g/L Adult F: 0.4-1.6 g/L
HCG (Total) Ectopic Pregnancy	HCGE	Gold / serum	SDH	1/2 day	Yes*	*Phone duty biochemist out of hours	< 2.1 IU/L
HCG (Total) Tumour Marker	HCGE	Gold / serum	SDH	1/2 day	No		< 2.1 IU/L
HDL Cholesterol	CHOL	Gold / serum	SDH	1/2 day	No	Overnight fast	See NICE QRISK 2
Heavy Metal Screen	COM	Navy / Trace	So 'ton - trace	10 working days	No	Mon – Fri. 24 hour urine also required	See report or contact laboratory
Heinz Bodies	HEINZ	Lavender / EDTA / whole blood	SDH		No		See report or contact laboratory

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Heparin Induced Thrombocytopenia (HIT)	RAS	Yellow SST	H&I NHSBT Filton	7 working days	No		See report or contact laboratory
HFE Genotype	COM	2 x Lavender / EDTA / whole blood	SDH Wessex regional Genetics	4 weeks	No	See Haemochromatosis	See report or contact laboratory
Histone Antibodies	HIST	Gold / serum	So 'ton - Immunology	10 working days	No		0-5 U/mL
HLA B*57:01	COM	Lavender / EDTA / whole blood	So 'ton - Molecular Path	7 days	No		See report or contact laboratory
HLA B27	HLAB27	Lavender / EDTA / whole blood	So 'ton - Immunology	9 days	No	Mon – Thur	Pos / Neg
HLA DQ2: DQ8 (HLA DQA1 & B1)	HLADQ	Lavender / EDTA / whole blood	So 'ton - Molecular Path	7 days	No	Coeliac disease Mon – Thur	See report or contact laboratory
HLA DR2	HLADR2	Lavender / EDTA / whole blood	NHSBT Filton	7 working days	No	Mon – Thur Samples must be labelled by hand	See report or contact laboratory
HLA Specific antibody testing	RAS	Yellow SST	H&I NHSBT Filton	7 working days	No		See report or contact laboratory
HLA typing Class I	RAS	Pink EDTA	H&I NHSBT Filton	5 working days	No		See report or contact laboratory
HLA Typing Class II	RAS	Pink EDTA	H&I NHSBT Filton	5 working days	No		See report or contact laboratory
HLA-Coeliac	RAS	Pink EDTA	H&I NHSBT Filton	5 working days	No		See report or contact laboratory
HLA-HFE	RAS	Pink EDTA	H&I NHSBT	5 working days	No		See report or contact laboratory

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
			Filton				
HLA-Narcolepsy	RAS	Pink EDTA	H&I NHSBT Filton	5 working days	No		See report or contact laboratory
Homocysteine	HOMO 1	Lavender / EDTA plasma / **(on ice)**	BRI - chem path	1 week	No	Samples collected onto crushed ice and then separated within 30 minutes.	M: <14.3 µmol/L F: <11.3 µmol/L
Hyaluronic acid	HYAL	Gold / serum	So 'ton - Specialist Biochemistry	5 working days	No	Store at -20^{0}C	<42ug/L Green-safe 42 to 107ug/L Amber-warning >108ug/L Red-action
IgA Deficiency/Antibodies	RAS	2 x Pink EDTA	RCI NHSBT Filton	7 working days	No		See report or contact laboratory
IgE (Allergen Specific) RAST	RAST	Gold / serum	So 'ton - Immunology	5 working days	No	Specify allergens	> 0.35 KUA/L
IgE *(TOTAL)*	IGE	Gold / serum	So 'ton - Immunology	5 working days	No		adults 0-81 KU/L
IGF-Binding Protein 3 (IGF-BP3)	IGFBP	Gold / serum **(sample to lab ASAP)**	Guildford	7 days	No	Do IGF 1 also First class post	See report or contact laboratory
IGF1	IGF1A	Gold / serum	So 'ton - Specialist Biochemistry	5 working days	No	Mon – Fri. 9 am preferred Haemolysed samples are unsuitable for analysis	Interpretive comment on report
IgG Subclasses (IgG4 only)	IGG4	Gold / serum	So 'ton - Immunology	5 working days	No	Mon – Thur.	0.1-1.3 g/L
Immunofixation	IFS	Gold / serum	SDH	5 days	No		See guide to profiles and test groups

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Serum							
Immunofixation Serum (D,E)	COM	Gold / serum	St Georges	2-4 days	No	Mon – Fri.	See report or contact laboratory
Immunofixation Urine (D,E)	COM	EMU or random urine	St Georges	3-5 days	No	Mon – Fri. Investigation of proteinuria / myeloma	See report or contact laboratory
Immunofixation *Urine*	IFU	EMU or random urine	SDH	5 days	No	Investigation of proteinuria / myeloma	See report or contact laboratory
Immunoglobulins (G, A, M)	IG	Gold / serum	SDH	1/2 day	No		IGG: 6.0 – 16.0 g/L > 14 years IGA: 0.8 – 2.8 g/L 15-45 years, 0.8 – 4.0 g/L >45 years IGM: 0.5 – 1.9 g/L 15-45 years, 0.5 – 2.0 g/L >45 years
Infant Autoimmune Neutropenia	RAS	Yellow SST + Pink EDTA	H&I NHSBT Filton	14 working days	No	Neutrophil count MUST be <2 x 10^9/L	See report or contact laboratory
Infectious Mononucleosis	MONS	Lavender / EDTA / plasma	SDH	1 day	Yes		Pos / Neg
Infliximab	COM	Gold / Serum	Via Path, St. Thomas' London	10 working days	No	Used in treatment for IBD. Arrival time to lab needs to be <5 days from sample collection.	1-2 µg/ml Intermediate >2 µg/ml Therapeutic <1 µg/ml Sub-therapeutic
Inhibin	COM	Gold / serum	Charing X Med Oncology	7 working days	No	Ist Class Post	See report or contact laboratory
INR	INR	Blue / citrate	SDH	4 hours	Yes		0.8-1.2 (non-therapeutic)

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Insulin (Fasting)	INS	**Gold / serum / (sample to lab ASAP)**	So 'ton - Specialist Biochemistry	5 working days	No	Separate and freeze within 2 hrs. Fasting / fluoride glucose also required Within 2 hours of being drawn , 500µl of sample should be separated and frozen at -20^{0}C	For a healthy fasting individual with a normal blood glucose: <20mU/L During a hypoglycaemic episode: >5mU/L is inappropriately high (insulin is considered suppressed if <1.6mU/L) Indeterminate values, i.e. 1.6-5mU/L, require measurement of c-peptide and if inconclusive beta-hydroxybutyrate to help determine if hyperinsulinism is present
Insulin Antibodies	COM	**Gold / serum / (on ice)**	Guildford	14 days	No	Send Mon – Thur First class post	See report or contact laboratory
Intrinsic Factor Antibody	IFA	Gold / serum	So 'ton - Immunology	15 working days	No		<6 U/mL
Iron	FES	Gold / serum	SDH	1/2 day	Yes	Only done if renal failure on dialysis or ?iron overload	F: 11 – 32 µmol/L M: 13 – 32 µmol/L
IRT						**See Immunoreactive Trypsin**	
JAK2		2 x Lavender / EDTA / whole blood	SDH Wessex regional Genetics	3 weeks	No	**Send to Regional Genetics Salisbury**	See report or contact laboratory
Jo-1 Antibody	ENAF	Gold / serum	So 'ton - Immunology	5 working days	No	Part of ENA full screen	Pos / Neg
Ketones	KETU	Random urine (during GTT)	SDH	1 day	Yes		See report or contact laboratory
L/D Amphetamine Isomer Ratio (see Amphetamine L/D Isomer ratio)						**See Amphetamine L/D Isomer ratio**	

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Kleihauer	KLEI	Pink / EDTA	SDH	1/2 day	Yes	500 IU prophylactic anti-D covers up to 4 ml bleed. >2 ml bleed referred to RCI	See report or contact laboratory
Lactate	LACT	Grey / fluoride plasma / (**on ice)**	SDH	1/2 day	Yes	Contact lab **before** taking sample. Immediate results.	0.5 – 2.2 mmol/L
Lactate (CSF)	LACTC	Grey / CSF / **(on ice)**	SDH	1/2 day	Yes	Contact lab **before** taking sample.	See report or contact laboratory
Lactate Dehydrogenase – LDH (Total)	LDH2	Gold / serum	SDH	1/2 day	Yes	Tumour marker. Marker of haemolysis	208 – 378 U/L
Lamotrigine	LAMO	Lavender / EDTA / whole blood	B'Ham City (incl toxicology)	10 working days	No	Mon – Thur. Therapeutic range unclear Transport at ambient temperature	1 – 15 mg/L, pre-dose, guide.
LDH - Total						**See Lactate Dehydrogenase**	
LDL	LDL	*Derived test*	SDH	1/2 day	No		See NICE QRISK 2
Lead	LEAD	Navy/Trace or Lavender/EDTA blood	So 'ton - trace	6 working days	No	Phone duty Biochemist if urgent	See report or contact laboratory
Leptin	COM	Serum	Cambridge	28 days	No	Dry Ice Courier	Dependant on Sex & BMI
Levitiracetam	COM	Lavender / EDTA / plasma	Cardiff Toxicol	7 days	No	Gel tubes must be avoided	10-37 mg/L
LH (see Luteinising						**See Luteinising**	

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Hormone)						**Hormone**	
Lipids (fasting) 12 hr fast	LIP2A	Gold / serum + grey / fluoride	SDH	1/2 day	No	Full profile Inc. HDL / LDL / Glucose	See report or contact laboratory
Lithium	LI	Gold / serum (12 hr post dose)	SDH	1/2 day	Yes	Telephone if required urgently	0.4 – 1.0 mmol/L 12 hrs post dose
LKM Antibody (Liver, Kidney Microsomal)	LAIP	Gold / serum	So 'ton - Immunology	5 working days	No		Pos / Neg
Lupus Anticoagulant Screen	LUP1	2 x Blue / citrate + 1 x Gold / serum	SDH	3 days	No	Dilute Russell's Viper Venom Time + Silica Clotting time Samples to be spun and plasma frozen ASAP if not testing the same day.	Positive Result = dRVVT TR >1.16 SCT TR >1.20
Luteinising Hormone - LH	LHE	Gold / serum	SDH	1/2 day	No		See guide to profiles and test groups
M2 Antibody	M2	Gold / serum	So 'ton - Immunology	5 working days	No		<6 U/mL
Macroprolactin Confirmation	MPROL	Gold / serum	Southend	10 working days	No	Usually lab initiated 1st class post	See report or contact laboratory
Macroprolactin Screen	MPROL	Gold / serum	SDH	2 days	No	All consistently increased Prolactin's are screened	See report or contact laboratory
Magnesium	MG/BON	Gold / serum	SDH	1/2 day	Yes	Telephone if urgently required	0.7 – 1.0 mmol/L
Magnesium	MAGU2	24 hr urine	SDH	1 day	No		2.4 – 6.5 mmol/24 hr a

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
	4	(plain)					
Malarial Parasite Rapid Test	RMT	Lavender / EDTA / whole blood	SDH	4 hours	Yes	To be processed urgently Blood film and Malarial parasites to be requested alongside, URGENT. High risk specimen	See report or contact laboratory
Malarial Parasites	BPARA	Lavender / EDTA / whole blood	SDH	4 hours	Yes	Positives are confirmed at London School of Tropical Med To be processed urgently High risk specimen	See report or contact laboratory
Manganese	MNB	Navy/Trace (adults) or Trace (paeds) whole blood	So 'ton - trace	6 working days	No	Mon – Fri. See also TRACE METALS. Whole blood preferred.	See report or contact laboratory
Mastocytosis (Tryptase)	TRYP	Gold / serum when well and unwell	Sheffield - Immunology & PRU	5 days	No	Mon – Fri. Matched pair of sera – baseline and during acute attack. Must discuss with duty Biochemist	Basal levels are in the range of 2-14 ug/L with peak levels of more than 40 ug/L being associated with anaphylaxis
Mercury	MERCB	Navy / Trace / whole blood	So 'ton - trace	10 working days	No	Mon – Fri. **Keep in dark**. Urine Hg also required	See report or contact laboratory
Mercury	MERCR	EMU + navy / Trace / w.blood	So 'ton - trace	10 working days	No	Mon – Fri. **Keep in dark**.	See report or contact laboratory
Mercury	MERC	Random urine	So 'ton - trace	10 working	No	Mon – Fri. **Keep in**	See report or contact laboratory

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
	UR			days		**dark**.	
Methotrexate (High Dose)	MTX	Gold / serum	So 'ton - Automated	4 hours (excludes transport time)	No	Phone duty Biochemist to discuss	Timing and protocol dependant
MS Screen						**See Multiple Sclerosis Screen**	
Mucopoly Saccharides (MPS screen)	MUCO	Random urine	BRI - metabolic, neuroendocrine and nutrition	1-2 weeks	No	Mon – Thur Refrigerate after collection, send as soon as possible. If delay in sending advise to freeze.	See report or contact laboratory
Multiple Sclerosis Screen	COM	CSF (plain) + matched serum	Queens Sq. London	STAT	No	Send matched gold top serum 1st class post, sample not haemolysed	CSF Glucose: 202-4.2 mmol/L Plasma glucose (fasting): 3.8-5.8 mmol/L CSF IgG: 10-40 mg/L Serum IgG: 7-16 g/L CSF Albumin: 90-360 mg/L Serum Albumin: 34-50 g/L IgG index: 0.3-0.7 QAlb: <7.2 White cell count: <5 Cells/µL Red cell count: <5 Cells/µL CSF Total Protein: 0.13-0.45 g/L
Myeloperoxidase antibody	MPOP RMPO	Gold / serum	So 'ton - Immunology	5 working days	No		0.0 – 5.0 iU/mL

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Neonatal Allo-immune Neutropenia (NAIN)	RAS	Mother - Yellow SST + Pink EDTA Father - Yellow SST + Pink EDTA Baby - Paed EDTA	H&I NHSBT Filton	14 working days	No		See report or contact laboratory
Neuronal antibodies						**See Paraneoplastic Antibodies**	
Neutrophil Function Test	MISC	Green /Lithium heparin / whole blood	So 'ton - Immunology	9 days	No		Normal burst / Abnormal burst
NMDA receptor Antibodies (Fixed)	NMDA	Gold / serum	Oxford Immunol	7 days	No	Please send paired CSF and Serum samples	See report or contact laboratory
Noradrenaline						**See catecholamines**	
Nucleosome antibodies	NUCLEO	Gold / serum	So 'ton - Immunology	10 working days	No		Pos / Neg
Occult Blood	OB1-3	Random faeces (marble size, collected on 3 days)	SDH	3 days	No		See report or contact laboratory
Oestradiol	E2E	Gold / serum	SDH	1/2 day	No		See guide to profiles and test groups
Olanzapine	COM	Lavender / EDTA / plasma	Cardiff Toxicol	7 days	No	Gel tubes must be avoided	20-40 µg/L

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Oligoclonal Bands	OLIGO	CSF (plain) + matched serum	Queens Sq. London	7 working days	No	Send matched gold top serum 1st class post, sample not haemolysed	See report or contact laboratory
Oligosaccharides	COM	Random urine	BRI - metabolic, neuroendocrine and nutrition	3-4 weeks	No	Refrigerate after collection, send as soon as possible. If delay in sending advise to freeze.	Qualitative / interpretive
Organic Acids	UOAS	Random urine	So 'ton - Chromatography	10 working days (urgent by arrangement)	No	Mon – Fri. Phone duty Biochemist if urgent. Usually also do serum + urine amino acids Samples taken at the time of an acute illness are the most helpful.	Qualitative / interpretive
Osmolality (serum)	OSM	Gold / serum	SDH	1 day	Yes		275-295 mmol/kg
Osmolality (urine)	OSMU	Random urine	SDH	1 day	Yes	Usually plus matched serum	See report or contact laboratory
Osmolality – Calculated	COM	Derived test	SDH	1 day	Yes	See Serum osmolality	275-295 mmol/kg
Osteocalcin	COM	Gold / serum **(on ice)**	Liverpool	3 weeks	No	Send frozen	See report or contact laboratory
Oxalate Excretion	OXALU	24 hr urine (acid)	UCL London	2 weeks	No	Send Mon – Thur 1st Class Post.	F: <0.32 µmol/24 hr M: <0.42 µmol/24 hr
Oxalate Excretion (Paediatrics)	OXALR	Random Urine	UCL London	2 weeks	No	Send Mon – Thur	Interpretive comment on report
P3NP						**See Procollagen 3N**	

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
						Terminal Peptide	
Pancreatic Elastase	PE1	Faeces	So 'ton - Specialist Biochemistry	10 working days	No	Mon – Fri A random formed stool specimen is required. E1 concentrations are lower in watery stool samples.	Normal: > 200 µg/g stool Mild to moderate exocrine pancreatic insufficiency: 100 – 200 µg/g stool Severe exocrine pancreatic insufficiency: <100 µg/g stool
Pancreatic Polypeptide – Fasting	PP	Lavender / EDTA plasma / **(on ice)**	Charing X SAS Lab	21 days	No	Overnight fast mandatory EDTA plasma, spin sample within 15 minutes of venepuncture. Store and send frozen.	<300 pmol/L
Paracetamol	OD	Gold / serum	SDH	1/2 day	Yes	Emergency assay	See chart for guidance on treatment of OD in BNF
Paraneoplastic Antibodies (Hu, Ri, Yo)	NMDA	Gold / serum	Oxford Immunol	14 days	No		See report or contact laboratory
Paraquat Qualitative	PQUATU	Random urine	So 'ton - Specialist Biochemistry	1 day (excluding transport time) but aim for 2 hour analytical TAT, result to be telephoned)	Yes	Emergency qualitative assay only. (Quantitative assay not available). Clear natural gastric contents can also be used.	Toxic concentration: 0.08-64mg/L Occupational concentration: 0.03mg/L

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Parathyroid Hormone	PTHE	Gold / serum, lithium heparin, (Paed small green)	SDH	1/2 day	No	BONPTH profile also required	1.6 – 6.9 pmol/L. Requires serum Ca
Paroxysmal Nocturnal Haemoglobinuria (PNH)	PNH1	Lavender / EDTA / whole blood	So 'ton - Immunology	9 days	No	Flow cytometry for CD55, CD59	Clone / No clone
Paternal Phenotyping	RAS	Pink EDTA	RCI NHSBT Filton	7 working days	No		See report or contact laboratory
Porphobilinogen (PBG)	PBG	Random urine **(Protect from light and keep in the refrigerator)** Do not centrifuge.	So 'ton - Specialist Biochemistry	1 day (excluding transport time)	Yes	Can be done urgently if discussed with duty Biochemist	Porphobilinogen: <10umol/l Porphobilinogen/creatinine ratio: <1.5umol/mmol creatinine
PCP						**See Procollagen Peptide**	
PCR (Protein / Creatinine Ratio)	PCR	Random urine	SDH	1 day	Yes		See report or contact laboratory
Pemphigoid Antibody	PEMPH	Gold / serum	So 'ton - Immunology	10 working days	No		Pos / Neg
Pemphigus Antibody	PEMPH	Gold / serum	So 'ton - Immunology	10 working days	No		Pos / Neg
Perampanel (Fycompa)	PERAM	Gold / serum	Chalfont St. Peter	24 working hours	No	None	200-1000 µg/L
pH	UPH	Random urine **(fresh)**	SDH	1 day	No	Fresh sample	4.5 – 8.0

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
pH	PHF	Random faeces **(fresh)**	SDH	1 day	No	Fresh sample	7.0 – 7.5
Phenobarbital	PHENO	Gold / serum / (pre-dose)	SDH	1/2 day	Yes		10 – 40 mg/L
Phenylalanine (See amino acids SERUM)	PHE	Gold / serum	So 'ton - Chem path	10 working days	No	Monitoring PKU patients	See report or contact laboratory
Phenylalanine *on Blood Spots*	PHEO1	National heel prick card 4 spots blood	Portsmouth	48 hours	No	Monitoring PKU patients (neonates / pregnancy) Collected between 5-8 days old	Part of Neonatal screening service
Phenytoin	PHENY	Gold / serum / (pre-dose)	SDH	1/2 day	Yes	Telephone if required urgently	10 – 20 mg/L (BNF range)
Phosphate	PHO, BON, LCAP4, RENA	Gold / serum	SDH	1/2 day	Yes		0.8 – 1.5 mmol/L a
Phosphate	PHOU24	24 hr urine	SDH	1 day	Yes		15 – 50 mmol/24 hr a
Phosphate / Creatinine Clearance Ratio	COM	Random urine (fresh + matched serum)	SDH	1 day	No		See report or contact laboratory
PKU Neonatal Screen	PKU	Blood spots	Portsmouth	3 days	No	Collected between 5-8 days old	Results reported as either positive or negative. Hb abnormalities will first be confirmed by IEF
Placental Alkaline Phosphatase (PLAP)	PLAP	Gold / serum	Charing X Med Oncology	4-5 weeks	No	Mon – Thur. Seminomas / other germ cell tumours	See report or contact laboratory

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
						ONLY	
Plasma Viscosity	PV	Lavender / EDTA / plasma	Bath	3 days	No	Waldenstroms Macroglobulinaemia only.	Adult: 1.5-1.72 mpas < 3 years: 1.25-1.47 mpas
Platelet Function Analysis	PFA100	2 x Blue / citrate	SDH	1 day	No	Discuss with Consultant Haematologist Take samples straight to Coag DO NOT SPIN	CADP: 61-104 secs CEPI: 74-146 secs
Platelet Nucleotides	COM	Blue / citrate	St Thomas' - centre for haemophilia & thrombosis	2 months	No	To be received within 2 hours of venepuncture with minimal agitation	ATP: 2.4-15.3 nmol x 10^8 plt ADP: 1.4-9.5 nmol x 108 plt AA: 1.1-2.6
Platelet Transfusion Refractoriness	RAS	Yellow SST + Pink EDTA	H&I NHSBT Filton	7 working days	No		See report or contact laboratory
PNH screen	PNH1	Lavender / EDTA	So 'ton - Immunology	5 working days	No	<72 hrs old Monday – Friday 12:00 pm	See report or contact laboratory
Porphyrins ***(Quantitative)***	COM	Random urine **(kept dark)** preferably early morning sample	Cardiff Heath Park	10 working days	No	Mon – Thur. Confirmation and monitoring. Usually also lavender blood. PROTECT FROM LIGHT	<40 nm/mmol creat

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Porphyrins *(Quantitative)*	COM	Faeces / **(kept dark)**	Cardiff Heath Park	15 working days	No	Mon – Thur. Usually also random urine and lavender blood. PROTECT FROM LIGHT	<200 nmol/g dry weight
Porphyrins *(Quantitative)*	COM	Lavender/ EDTA/ plasma / **(kept dark)**	Cardiff Heath Park	10 working days	No	Mon – Thur. Blood / urine required. PROTECT FROM LIGHT.	Not increased
Post-transfusion Purpura (PTP)	RAS	Yellow SST + Pink EDTA	H&I NHSBT Filton	7 working days	No		See report or contact laboratory
Potassium	K, UEC	Gold / serum	SDH	1/2 day	Yes		3.5 – 5.3 mmol/L a
Potassium	KU24	24 hr Urine	SDH	1 day	Yes		25 – 125 mmol/24 hr
Potassium	KUR	Random Urine	SDH	1 day	Yes		See report or contact laboratory
Potassium	KFL	Pleural / wound / drain fluids	SDH	1/2 day	Yes		See report or contact laboratory
PP – Fasting	GUT	EDTA / plasma / **ice**	Charing X SAS Lab	21 days	No	Overnight fast EDTA plasma, spin sample within 15 minutes of venepuncture. Store and send frozen.	< 300 pmol/L

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Procollagen 3N Terminal Peptide (P3NP)	P3NP	Gold / serum	So 'ton - Specialist Biochemistry	5 working days	No		Adults on Methotrexate: 3.3-9.6µg/L Paediatric reference range for <18 years. Children will have much higher concentrations of P3NP during periods of growth, see report or contact laboratory. Liver traffic light system: <10.4 µg/L: Green – safe 10.4-12.9µg/L : Amber – warning 12.9µg/L and over: Red – action
Progesterone	PRGE	Gold / serum	SDH	1/2 day	No		See report or contact laboratory
Prolactin	PRLE	Gold / serum	SDH	1/2 day	Yes*	*Phone duty Biochemist if required urgently or out of hours	See guide to profiles and test groups
Prostate Specific Antigen *(Total)*	PSAE	Gold / serum	SDH	1/2 day	No		See guide to profiles and test groups
Protein	PROTU	24 hr urine (plain)	SDH	1 day	Yes	Contact lab if required urgently	< 0.15 g/24 hr
Protein screen (Urine)	MULTI	Random urine	SDH	1 day	Yes		See report or contact laboratory
Protein / Creatinine Ratio (PCR)	PCR	Random urine	SDH	1 day	No	*Urgent requests from labour ward processed immediately	< 23 mg/mmol

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Protein C	PROC1	3 x Blue / citrate	SDH	1 week	No	Part of thrombophilia screen. Levels reduced by warfarin. Can be dispatched fresh or as frozen aliquots	82.1 -161.7 iu/dL
Protein S (Free Protein S)	PROSF 1	3 x Blue / citrate	SDH	1 week	No	Part of thrombophilia screen. Levels reduced by warfarin, pregnancy, OCP. Can be dispatched fresh or as frozen aliquots	80.0- 140.0 iu/dL
Protein (Body fluids - not CSF)	TPFL	Pleural / wound / drain fluids /ascites	SDH	1/2 day	Yes		See report or contact laboratory
Protein (CSF)	TPCSF B	CSF	SDH	1/2 day	Yes		<1mth new-born: 0.15-1.3g/L Adult: 0.15-0.45 g/L
Proteinase 3 (Pr3) Antibody	PR31 MPOP R3	Gold / serum	So 'ton - Immunology	5 working days	No		0.0 – 3.0 iU/dL
Prothrombin Gene Variant	PTGV	Lavender / EDTA / whole blood	SDH Wessex regional Genetics	4 weeks	No	Usually tested at the same time as Factor V Leiden and can use the same EDTA sample.	See report or contact laboratory
PSA						**See Prostate Specific Antigen.**	

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
PSA (Free / Total Ratio)						**See Prostate Specific Antigen.**	
Pseudo Cholinesterase	CHOLI	Gold / serum	SDH* Bristol		Yes*	*Urgent confirmed by sending to Bristol next working day (Mon – Thur). Phone duty Biochemist if required urgently or out of hours	See report or contact laboratory
PTH						**See Parathyroid hormone**	
PTH-Related Peptide	COM	**Special tube, on ice**	Liverpool	2-3 weeks	No	Phone duty Biochemist to discuss.	Advised from reference laboratory
Purine Screen (urine)	COM	Spot urine (a few crystals of thymol) if unavailable, plain urine tube	Via Path - Purine research lab, St. Thomas'	3 weeks	No		Please discuss with the laboratory
Purine Screen (blood)	COM	Lavender / EDTA / whole blood	Via Path - Purine research lab, St. Thomas'	3 weeks	No		Please discuss with the laboratory
Purine Studies	COM	EDTA + Li Hep whole blood + plasma + 24 hr urine	Via Path - Purine research lab, St. Thomas'	3 weeks	No		Please discuss with the laboratory
Rapamune (Sirolimus)						**See Sirolimus**	
Reducing Substances	REDU2	Random urine (fresh or	So 'ton - Chem path			No longer tested at SDH, please speak to	

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
		frozen)				duty biochemist for further information	
Reducing Substances	TESTF	Random faeces (fresh or frozen)	So 'ton - Chem path			No longer tested at SDH, please speak to duty biochemist for further information	
Renin	REN1	Lavender / EDTA / plasma **(to lab ASAP)**	So 'ton - Specialist Biochemistry	N/A	No	DO NOT put on ice	**Male** >18 - <54 years: 4.9-56.3 mU/L >55 - <74 years: 4.0-47.4 mU/L **Female** >18 - <54 years: 4.0-43.6 mU/L >55 - <74 years: 4.0-48.9 mU/L
Renin / Aldosterone Ratio (Conns Screen)	ALDREN	2 x Lavender / plasma + gold / serum To lab ASAP	So 'ton - Specialist Biochemistry	5 working days	No	Aldosterone renin ratio <91pmol/mU: Effectively excludes Conn's	M: >18 - ≤54 years: 43.6 - 417.8pmol/L M: >55 - ≤74 years: 26.1-338.9pmol/l F: >18 - ≤54 years: 23.2-414.9pmol/L F: >55 - ≤74 years: 23.2-388.6pmol/L **Aldosterone to renin ratio** M: >18 - ≤54 years: 1.4-14.2 pmol/mIU M: > 55- ≤74 years: 0.9-22.4 pmol/mIU **F:** > 18 - ≤54years: 0.9-20.3 pmol/mIU F: > 55 - ≤74 years: 0.7-25.5 pmol/mIU
Reticulocytes	FBCR / RET	Lavender / EDTA / whole blood	SDH	1/2 day	Yes	Set RET to be requested if FBC already performed	Adults: 50-100 x10^9/L Neonates: <1 week old 50-150 x10^9/L
Rh/Kell Phenotype	ORK	Pink / EDTA	SDH	4 hours	Yes		See report or contact laboratory

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Rheumatoid Factor	RF	Gold / serum	SDH	1/2 day	No		<12 kU/L
Rivaroxaban		3 x Blue / citrate	Basingstoke Coag	On request or 5 working days	No	Can be dispatched fresh or as frozen aliquots	**Peak** **Trough** ***(Dose - AF 20 mg daily)*** 160-360 ng/ml 4-96 ng/ml ***(Dose - VTE Tx 20 mg)*** 175-360 ng/ml 91-196 ng/ml ***(Dose - VTE Px 10 mg)*** 91-196 ng/ml 1.3-38 ng/ml
RNP Antibody	ENAF	Gold / serum	So 'ton - Immunology	5 working days	No	Part of ENA full screen	Pos / Neg
SACE	SACE	Gold / serum	SDH	1/2 day	Yes		See report or contact laboratory
Salicylate	OD	Gold / serum	SDH	1/2 day	Yes	Emergency assay	Therapeutic range <350mg/L (see guidance in BNF for treatment of OD)
Salivary Gland Antibody	AHSGA	Gold / serum	Sheffield - Immunology & PRU	10 days	No		Normal range = negative
Scl70 Antibody	ENAF	Gold / serum	So 'ton - Immunology	5 working days	No	Part of ENA full screen	Pos / Neg
Selectivity Of Proteinuria	COM	Random urine **(fresh must send matched serum)**	St Georges	3-5 days	No	IgG / Albumin ratio and EP	See report or contact laboratory
Selenium	SE	Navy / Trace (adults) or Trace (paeds)	So 'ton - trace	6 working days	No	Mon – Fri. See also TRACE METALS	See report or contact laboratory

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
		plasma					
Sex Hormone Binding Globulin (SHBG)	SHBGE	Gold / serum	SDH	1/2 day	No		See guide to profiles and test groups
Sickle Cell And Thalassaemia Screening (Antenatal)	FOQ2	Lavender / EDTA / whole blood	SDH	3 days	No	Must have completed Family Origin Questionnaire	See report or contact laboratory
Sickle Screen	SICK	Lavender / EDTA / whole blood	SDH	1 week	Yes	Can be done urgently if required	See report or contact laboratory
Sirolimus (Rapamune)	SIRO	Lavender / EDTA / blood **(pre-dose)**	Bart's and the London NHS Trust		No	Mon – Thur. **MUST be pre-dose.** Avoid taking samples on Fridays	Target 4 – 12 µg/L <2 months (local protocols vary)
Sodium	NA, UEC	Gold / serum	SDH	1/2 day	Yes		133 – 146 mmol/L
Sodium	NAU24	24 hr urine (plain)	SDH	1 day	Yes		40 – 220 mmol/24 hr
Soluble Transferrin Receptor	TRANR	Gold / serum	So 'ton - Haem	< 1 month	No	Discuss with Consultant Haematologist	12-44 nmol/L
Somatomedin C (IGF-1)						**See IGF-1**	
SS-A (Anti-Ro)	ENAF	Gold / serum	So 'ton - Immunology	5 working days	No	Part of ENA full screen	Pos / Neg
SS-B (Anti-La)	ENAF	Gold / serum	So 'ton - Immunology	5 working days	No	Part of ENA full screen	Pos / Neg
Stone Analysis	STON	Renal / other	UCL London	3 weeks	No	Mon – Thur	See report or contact laboratory

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
		calculi					
Sulphonyl Urea	COM	Lavender / EDTA / plasma	Cardiff Toxicol	7 days	No	Gel tubes must be avoided	See report or contact laboratory
Synacthen Test	SSYN	2x Gold / serum 0, 30 min after 250 ug im Synacthen	SDH	1/2 day	Yes*	Telephone if required urgently. *Phone duty Biochemist out of hours	> 445 nmol/L and a rise of > 200 nmol/L post Synacthen
T and B cell Lymphocyte Subsets	BCM	Lavender / EDTA / whole blood	So 'ton - Immunology	9 days	No	Mon-Thurs. Discuss with Consultant Haematologist. **DO NOT TAKE BLOOD ON FRIDAY**	Varies with age
Tacrolimus (Fk506)	FK	Lavender / EDTA/ blood **(12 hr post dose)**	Portsmouth	48 hours	No	Mon – Thur. Must be 12 hr post dose. Avoid taking samples on Fridays Sample not viable after 7 days. Clotted samples cannot be tested	Therapeutic range 5-15 µg/L
Testosterone (Total – Female)	TESTEF	Gold / serum	SDH	1/2 day	No	Females and children < 16 yrs.	See guide to profiles and test groups
Testosterone (Total – Male)	TESTEM	Gold / serum	SDH	1/2 day	No	Adult males. 9 am preferred	See guide to profiles and test groups
Tetrahydro Biopterins	COM	Blood spots or Green Li Hep / plasma	B'Ham Neonatal	15 working days	No	Discuss with duty Biochemist first. Take before PKU diet starts.	see report or contact laboratory

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Theophylline	THEO	Gold / serum	SDH	1/2 day	Yes	Telephone if required urgently	10 – 20 mg/L adults Peak post dose
Thiamine (Vit B1)						**See Vitamin B1**	
Thiopurine Methyl Transferase (TPMT)	TPMTB	Lavender / EDTA / whole blood	B'Ham City (incl toxicology)	10 working days	No	For Azathioprine sensitivity	See guide to profiles and test groups
Thrombin Time Ratio	TCT	Blue / citrate	SDH	1 day	Yes		14-17 secs
Thrombophilia Screen	HCOAG1	4 x Blue / citrate + 1 x Gold / serum	SDH	2 weeks	No	Only done after referral to Thrombophilia clinic, see guidelines on MICROGUIDE	see report or contact laboratory
Thyroglobulin	THYRO	Gold / serum	So 'ton - Immunology	6 working days	No	Mon – Fri. Also request thyroglobulin antibodies	<1 µg/L
Thyroglobulin Antibodies	THYAB	Gold / serum	So 'ton - Immunology	6 working days	No		<20 KU/L
Thyroid Antibodies	ATPO	Gold / serum	SDH	1/2 day	No	Anti-TPO antibodies	See report or contact laboratory
Tissue Trans-Glutaminase Antibody (IgG)	TTGG	Gold / serum	So 'ton - Immunology	10 working days	No	Only done if IgA deficient	0-9 U/mL
Tissue Trans-Glutaminase Antibody (IgA)	TTGA	Gold / serum	So 'ton - Immunology	5 working days	No	First line test for coeliac, anti-endomysial (IgA) only on borderline TTGA or special cases	0-4 U/mL
Tissue Type	COM	Various	NHSBT Filton	1 month or more	No	Discuss with laboratory prior to	See report or contact laboratory

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
						sending	
Tobramycin	TOBR	Gold / serum	SDH	1/2 day	Yes		For interpretation of Tobramycin results please refer to the BNF
Total Protein	TP/L4 LCAP4	Gold / serum	SDH	1/2 day	Yes		a: 60 – 80 g/L
TPMT						**See Thiopurine Methyl Transferase**	
Trace Metals Screen (Mn, Cu, Se, Zn)	TRACE	Navy/Trace x 2 (adult), Trace x 2 (paeds) Whole blood AND plasma	So 'ton - trace	10 working days	No	Mon – Fri	see report or contact laboratory
Transferrin	TRAN	Gold / serum	SDH	1/2 day	No	Only done for renal failure on dialysis or ?iron overload	2.0 – 3.6 g/L
Transferrin Receptor (Soluble)						**See Soluble Transferrin Receptor**	
Transferrin Saturation	FES	Gold / serum	SDH	1/2 day	Yes	Only done for iron overload, haemochromotosis on treatment and assessing IV Fe in CRF.	See report or contact laboratory
Triglycerides	TRIG	Gold / serum	SDH	1/2 day	Yes	Part of lipid profile	See report or contact laboratory
Trimethylamine	COM	24 hr urine (HCl)	Sheffield - Children's' Hosp	8 weeks	No	24 hour urine collected into acid. pH adjust to < pH 2.	Given on report.

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Troponin T	TROPTA	Gold / serum send separate sample if poss.	SDH	1/2 day	Yes	**Follow acute coronary syndrome protocol ONLY**	< 15 ng/L
Tryptase	TRYP	Gold / serum	Sheffield - Immunology & PRU	5 days	No	Mon – Fri. Follow anaphylaxis protocol	Basal levels are in the range of 2-14 ug/L with peak levels of more than 40 ug/L being associated with anaphylaxis
Tryptase (Systemic Mastocytosis)	TRYP	Gold / serum When well and unwell	Sheffield - Immunology & PRU	5 days	No	Mon – Fri. Matched pair of sera – baseline and during acute attack	Basal levels are in the range of 2-14 ug/L with peak levels of more than 40 ug/L being associated with anaphylaxis
Tryptase Anaphylaxis Protocol	TRYP	Gold / serum immediately and then 1-2 hrs later	Sheffield - Immunology & PRU	5 days	No	Mon – Fri. Matched pair of sera: Immediately and 1-2 hours post EVENT. Do total IgE RAST on one serum also	Basal levels are in the range of 2-14 ug/L with peak levels of more than 40 ug/L being associated with anaphylaxis
TSH	TSHE	Gold / serum	SDH	1/2 day	Yes		0.38-5.33 mU/L
TSH – Neonatal	NTSH	Blood spots	Portsmouth	3 days	No	Collected between 5-8 days old	Part of Neonatal screening service
TSH Receptor Antibody	TSHRA	Gold / serum	Sheffield - Immunology & PRU	5 days	No		Normal range: 0-0.9 IU/L Equivocal: 1.0-1.5 IU/L Positive: >1.5 IU/L
TTG (or TTGA)						**See Tissue Transglutaminase Ab**	
Urate	URAT	Gold / serum	SDH	1/2 day	Yes		F: 140 – 360umol/L M: 200 – 430umol/L
Urate	URAT24	24 hr urine (plain)	SDH	1 day	No		1.5 – 4.5 mmol/24 hr

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Urea	UREA UES,U EC RENA	Gold / serum	SDH	1/2 day	Yes		2.5 – 7.8 mmol/L a
Urea	UREU	24 hr urine (plain)	SDH	1 day	Yes		250 – 570 mmol/24 hr
Urea	UREFL	Wound drain fluids	SDH	1/2 day	Yes		See report or contact laboratory
Urobilinogen	UBILO	Random urine **(fresh and kept dark)**	SDH	1/2 day	Yes		See report or contact laboratory
Valproate	VALP	Gold / serum / (2 hours post dose)	Poole	2 days (can be done urgently if required)	No	NOT routinely available, phone duty Biochemist to discuss	50-100 mg/L
Vancomycin	VPRE	Gold / serum, Green Li Hep (pre-dose)	SDH	1/2 day	Yes	Occasional post or random dose (VPOST, VRAND) at discretion of Cons Microbiologist.	See report or contact laboratory
Vascular Endothelial Growth Factor (VEGF)	MISC	Gold / Serum	Queens Sq. London	21 working days	No	Sample not haemolysed	<771 pg/mL
Very Long Chain Fatty Acids	VLCFA	Gold / serum or plasma	Bristol S'mead	21 days	No	Mon – Thur	See report or contact laboratory
Vigabatrin	VIG	Gold / serum / (pre-dose)	B'Ham City (incl toxicology)	10 working days	No	Rarely helpful	See report or contact laboratory
VIP – Fasting	VIP	EDTA / plasma / **ice**	Charing X SAS Lab	21 days	No	Overnight fast	<40 pmol/L

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Vitamin A – Fasting	VITA	Gold / serum **(kept dark)**	So 'ton - Chromatography	7 working days	No	Overnight fast / no alcohol 24 hours. PROTECT FROM LIGHT	Children : 1 - ≤ 7 years: 0.7 - 1.5 mmol/l > 7 - ≤ 13 years: 0.9 - 1.7 mmol/l > 13 - ≤ 19 years: 0.9 - 2.5 mmol/l Adults: 1.07-3.55 µmol/L
Vitamin B1	COM	Green /Lithium heparin / whole blood	Glasgow	10 days	No	Light sensitive, wrap in tin foil. Contact lab if delivery is outside 72 hours from collection.	275-675 ng/g Hb
Vitamin B12	B12	Gold / serum	SDH	1/2 day	No		147 – 840 ng/L
Vitamin B2	COM	Green /Lithium heparin / whole blood	Glasgow	10 days	No	Light sensitive, wrap in tin foil. Contact lab if delivery is outside 72 hours from collection.	1.0-3.4 nmol/g Hb
Vitamin B6	COM	Green /Lithium heparin / whole blood	Glasgow	10 days	No	Light sensitive, wrap in tin foil. Contact lab if delivery is outside 72 hours from collection.	250-680 pmol/g Hb
Vitamin C	COM	**Special collection tubes**	Glasgow	10 days	No	Contact duty Biochemist to discuss	15-90 µmol/L
Vitamin D – 1,25 Di-OH	VITDDI	Gold / serum / (on ice)	So'ton	4 weeks	No	Phone duty biochemist to discuss	55-139 pmol/L

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
Vitamin D – 25 OH	VITDA	Gold serum / lithium heparin / (Paed small green)	SDH	1/2 day	No	Test within 8 hours	NOP guidelines April 2013 <30 nmol/L - deficient 30-50 nmol/L - may be inadequate in some people >50 nmol/L - sufficient for most people
Vitamin E – Fasting	VITE	Gold / serum **(kept dark)**	So 'ton - Chromatography	7 working days	No	Overnight fast. PROTECT FROM LIGHT	Children: 1 - ≤ 7 years: 7 – 21 mmol/l > 7 - ≤ 13 years: 10 – 21 mmol/l > 13 - ≤ 19 years: 13 – 24 mmol/l Adults: 13.2-46.4 µmol/L
Volted Gated Calcium Channel Antibody	VGCCA	Gold / serum	Oxford Immunol	21 days	No		0-45 pmol/L – Negative 45-100 pmol/L – Low Positive >100 pmol/L – Positive
Volted Gated Potassium Channel Antibody	VGKCA	Gold / serum	Oxford Immunol	14 days	No		0-69 pmol/L - Negative
Von Willebrand's Activity	VWFAC	3 x Blue / citrate	SDH	1 week	No	Discuss with Consultant Haematologist. Part of Von Willebrand screen.	See report or contact laboratory
Von Willebrand's Factor Antigen	F8RA	3 x Blue / citrate	SDH	1 week	No	Discuss with Consultant Haematologist	See report or contact laboratory
Von Willebrand's Screen	F8C F8RA VWFAC	3 x Blue / citrate	SDH	1 week	No	Discuss with Consultant Haematologist	See report or contact laboratory

Test	SFT code	Sample Type	SDH or Sent Away	Turnaround time (indicative for non-urgent requests)	OOHs	Notes	Reference range a=age related / F= female / M=male
WBC Enzymes	WBCENZ	Lavender/EDTA (3.0ml)	BRI - metabolic, neuroendocrine and nutrition	3-4 weeks	No	Phone duty Biochemist to discuss. PLEASE MARK PACKAGE "URGENT - WHITE CELL ENZYMES To reach lab within 24 hours from collection	See report or contact laboratory
Xanthochromia Screen CSF Spectro-photometry (?SAH)	CSFX3	CSF (plain bottle) – **PROTECT FROM LIGHT**. Do NOT send via air tube	SDH	1/2 day	Yes	Consultant request only – EXTRA CSF BOTTLE NEEDED, 4 in total.	Interpretive comment on report
Zinc	ZINC	Navy / Trace / plasma (adults) or Trace / plasma (paeds)	So 'ton - trace	4 working days	No	No haemolysis. See also trace metals	See report or contact laboratory

REFERRAL LABORATORIES

LIST OF REFERAL LABORATORIES	
Laboratory	**Address and Telephone**
ST BARTHOLOMEW'S LONDON Clinical Biochemistry	Clinical Biochemistry, 4th Floor Pathology & Pharmacy Building, 80 Newark Street, Whitechapel, London, E1 2ES Tel 02073777000 x61038

LIST OF REFERAL LABORATORIES	
BASINGSTOKE Coagulation	Haemophilia Haemostasis & Thrombosis Lab, Pathology Department, North Hampshire Hospital Basingstoke, Hants, RG24 9NA Tel 01256 313296 / 313304
BATH Clinical Biochemistry Haematology	Area Central Laboratory, Royal United Hospital, Coombe Park, Bath, BA1 3NG Tel 01225 824714 (Laboratory/results) Tel 01225 824728 (Haematology Laboratory/results)
BIRMINGHAM City hospital	Dr Jonathan Berg, Clinical Chemistry Department, Birmingham City Hospital, Dudley Road, Birmingham, B18 7QH Tel 0121 507 5353 Fax 0121 507 5290
BIRMINGHAM Inborn Metabolic Lab	Department Newborn Screening & Biochemical Genetics, Paediatric Laboratory Medicine, The Birmingham Children's Hospital NHS Trust, Steelhouse Lane, Birmingham, B4 6NH Tel 0121 333 9942
BIRMINGHAM Neonatal Lab	Department Newborn Screening & Biochemical Genetics, Paediatric Laboratory Medicine, The Birmingham Children's Hospital NHS Trust, Steelhouse Lane, Birmingham, B4 6NH Tel 0121 333 9942
BIRMINGHAM Toxicology Lab	Drugs of Abuse Section (or Toxicology Section), Regional Lab for Toxicology, City Hospital NHS Trust, Dudley Road, BIRMINGHAM, B18 7QH Tel 0121 507 5588/9 (Poisons Advice Service)
BRISTOL (Southmead) Cholinesterase Unit	Cholinesterase Unit, Southmead Hospital, North Bristol NHS Trust, Westbury-on-Trym, Bristol, BS10 5NB Tel 0117 414 8415
BRISTOL (Southmead) Biochemical Genetics Clinical Chemistry	Blood Sciences and Bristol Genetics, Southmead Hospital, North Bristol NHS Trust, Westbury-on-Trym, Bristol, BS10 5NB Tel 0117 414 8346 (Biochem Genetics Lab)

LIST OF REFERAL LABORATORIES	
BRISTOL (BRI) Chemical Pathology Biochemical Genetics	Department of Clinical Biochemistry, Bristol Royal Infirmary, Queens Building, Level 8, Marlborough Street, Bristol, BS2 8HW Tel 0117 3422040 Metabolic, Neuorendocrine & Nutrition laboratory, Dept of Clinical Biochemistry, Level 8, Queens Building, Bristol Royal Infirmary, Upper Maudlin Street, Bristol, BS2 8HW Tel 0117 3422590 (for WBC enzyme enquiries)
CAMBRIDGE Immunology	Immunology Department, Box 232, Level 4, Addenbrooke's Hospital, Hills Road, Cambridge, CB2 0QQ Tel 01223 256656
CARDIFF Analytical Toxicology Lab	Cardiff Toxicology Laboratories, 4th Floor, Academic Centre, University Hospital Llandough, Penlan Road, Llandough, Vale of Glamorgan, CF64 2XX Tel 02920 716894
CARDIFF Medical Biochemistry	Department of Medical Biochemistry & Immunology, University Hospital of Wales, Heath Park, Cardiff, CF14 4XW Tel 029 2074 6255
CHALFONT ST PETER Centre for Epilepsy	Theurapeutic Drug Monitoring Unit, Chalfont Centre for Epilepsy, Chesham Lane, Chalfont St Peter, Buckinghamshire, SL9 0RJ Tel 01494 601355
CHARING CROSS Medical Oncology Department	The SAS Laboratories, Clinical Biochemistry and Medical Oncology, Charing Cross Hospital, London, W6 8RF Tel 0208 383 3949
DORCHESTER Chemical Pathology	Dorset County Hospital, Williams Avenue, DORCHESTER, DT1 2JY Tel 01305 254331 (Results/Enquiries)
GLASGOW Dept of Clinical Biochemistry	Department of Clinical Biochemistry, Macewen Building, Glasgow Royal Infirmary, Glasgow, G4 0SF Tel 0141 211 4003 / 4

LIST OF REFERAL LABORATORIES	
GREAT ORMOND STREET, LONDON	Chemical Pathology Reception, Level 1, Camelia Botnar Building, Great Ormond Street Hospital, Great Ormond Street, London WC1N 3JH Tel 020 7405 9200 ex 8319
GUILDFORD Clinical Biochemistry	SAS Peptide Hormone Section, Clinical Laboratory, Royal Surrey County Hospital, Egerton Road Guildford, GU2 7XX Tel 01483 406715
HAREFIELD Immunology Department	Immunosuppression Monitoring Service, Heart Science Centre, Harefield Hospital, Hill End Road Harefield, Middlesex, UB9 6JH Tel 01895 828570
INSTITUTE OF CHILD HEALTH LONDON	Biochem/Endo/Metabolism Unit, Institute of Child Health, 30 Guilford Street, LONDON, WC1N 1EH Tel 020 7905 2159
KING'S COLLEGE HOSPITAL, LONDON	Kings College Hospital, IDM Service, Liver Studies, Denmark Hill, London, SE5 9RS Tel 020 7346 3147
KING'S COLLEGE HOSPITAL, LONDON	Dept of Clinical Biochemistry, King's College Hospital, Bessemer Road, LONDON SE5 9RS Tel 020 7346 3726 (AAT), 020 7346 4131 (Steroids), 020 7346 3856 (Porphyrins)
LIVERPOOL Dept of Clinical Chemistry	Department of Clinical Chemistry, Royal Liverpool University Hospital, Prescot Street, Liverpool L7 8XP Tel 0151 706 4247
NHSBT Histocompatibility and immunogenetics	NHSBT – Bristol Centre 500 North Bristol Park, Northway, Filton, Bristol, BS34 7QH Tel 0117 9217372

LIST OF REFERAL LABORATORIES	
NHSBT Histocompatibility and immunogenetics	NHSBT – South Thames 75 Cramer Terrace, Tooting, SW17 0RB Tel 020 3123 8347
NHSBT Red Cell Immunohaematology	NHSBT – Bristol Centre 500 North Bristol Park, Northway, Filton, Bristol, BS34 7QH Tel 0117 9217380 OOH - 0117 9693927
Norfolk & norwich Dept of Clinical Chemistry	SAAS Calcium & Metabolic Bone Assays, NNUH, Colney Lane, Norwich, NR4 7UY Tel 01603 287945
OXFORD Immunology	Oxford University Hospitals NHS Foundation Trust, Department of Immunology, Churchill Hospital, Old Road, Headington, Oxford, OX3 7LE Tel 01865 225995
PLYMOUTH Combined Laboratory	Derriford Combined Laboratory, Derriford Hospital, Plymouth, PL6 8DH Tel 01752 792296
POOLE Biochemistry Department	Poole NHS Foundation Trust, Longfleet Road, Poole, Dorset, BH15 2JB Tel 01202 448048
PORTSMOUTH Chemical Pathology	Portsmouth Hospitals NHS Trust, Queen Alexandra Hospital, Southwick Hill Road, Portsmouth, Hants, PO6 3LY Tel 02392 286000 Ex 6271
QUEEN'S SQUARE, LONDON Neuroimmunology	Neuroimmunology & CSF Laboratory, Institute of Neurology (NHNN Box 76), Queen Square, London, WC1N 3BG Tel 020 3448 3814
ROYAL FREE, LONDON Chemical Pathology	Clinical Biochemistry, Royal Free Hospital, Pond Street, London, NW3 2QG Tel 0207 830 2081

LIST OF REFERAL LABORATORIES	
SHEFFIELD (PRU) Department of Immunology	Department of Immunology, PO Box 894, Sheffield, S5 7YT Tel 0114 226 9196
SHEFFIELD Biomedical Sciences Group	Health & Safety Laboratory, Harpur Hill, Buxton, SK17 9JN Tel 01298 218099
SHEFFIELD Dept Chemical Pathology	Sheffield Childrens Hospital, Western Bank, SHEFFIELD, S10 2TH Tel 0114 271 7404
SHEFFIELD Dept Toxicology	Royal Hallamshire Hospital, Glossop Road, SHEFFIELD, S10 2JF Tel 0114 271 2214
SOUTHAMPTON Chemical Pathology, Endocrine, Trace Metals	D Level, South Block, Southampton General Hospital, Tremona Road, SOUTHAMPTON, SO16 6YD. Tel 023 8120 6464 (results etc), 023 8120 6709 (Biochemists), 023 8120 6237 (Trace Lab)
SOUTHAMPTON Immunology	Wessex Immunology, Mailpoint 8, Level C, South Block, Southampton General Hospital, Tremona Road, SOUTHAMPTON, SO16 6YD. Tel 023 8120 6615 (Autoimmune), Tel 023 8120 6640 (Flow Cytometry), Tel 023 8120 6638 (Molecular)
SOUTHEND Department of Clinical Chemistry	Department of Clinical Chemistry, Southend University Hospital, Prittlewell Chase, Westcliff-on-Sea, Essex, SS0 0RY Tel 01702 385438 / 385194
ST BARTHOLOMEWS – LONDON	Dept Clinical Biochemistry, St Bartholomews Hospital, LONDON, EC1A 7BE Tel 020 3456 7890 ext 83814 or direct line 0203 4483814

LIST OF REFERAL LABORATORIES	
ST HELIER'S HOSPITAL Chemical Pathology	Epson & St Heliers University Hospital, Chemical Pathology, Wrythe Lane, St Helier, Sutton, Carshalton, SM5 1AA Tel 0208 296 2432
ST GEORGES, LONDON Protein Reference Unit	SWLP Immunology, Ground Floor, Jenner wing, St George's University Hospitals, NHS Foundation Trust, Blackshaw Road, London, SW17 0RE Tel/Fax 0208 725 0025
ST THOMAS'S, LONDON Haemophilia & Thrombosis	Diagnostic Haemostasis @ ViaPath, 4th Floor, North Wing, St. Thomas Hospital, London, SE1 7EH Tel 020 71882797
ST THOMAS'S, LONDON Purine Research Lab	Purine Research Laboratory, 4th Floor, North Wing, St. Thomas Hospital, Westminster Bridge Road, London, SE1 7EH Tel 0207 188 1266
UCL, LONDON Department of Biochemistry	Dept of Biochemistry, UCL Medical School, 3rd Floor, 60 Whitfield Street, London, W1T 4EW Tel 0203 447 9405

GUIDE TO PROFILES AND TEST GROUPS

NB - Please note that in all reference range data **'a'** indicates an age variation in reference ranges and **'s'** indicates a sex related variation in reference range.

Tests of renal function

UEC Profile = Urea, Sodium and Potassium and Creatinine.
Chloride and Bicarbonate should be requested specifically when indicated clinically.

Analyte	Reference Range	
Sodium	133-146 mmol/L	
Potassium	3.5-5.3 mmol/L	**a**
Chloride	95-108 mmol/L	**a**
Bicarbonate	22-29 mmol/L	**a**
Urea	2.5-7.8 mmol/L	**a**
Creatinine	Male 80-115 umol/L, Female 53-97 umol/L	**a s**
EGFR	>90 ml/min1.73 m^2	

- Delayed separation, haemolysis, and use of incorrect tubes or misuse of Vacutainer tubes leads to falsely high potassium levels.
- Potassium values are often lower in fit young adults.
- Bicarbonate values are lower in children.
- Urea value is much affected by hydration state and protein intake. It is higher in the elderly.
- Creatinine is related to muscle mass and tends to be lower in children and the elderly and higher in males than in females. It also affected by recent meat intake.
- Assay of serum osmolality +/- urine osmolality is important in acute renal failure, hyperglycaemic diabetic states and hyponatraemic states.
- Chloride and Bicarbonate should be requested in assessment of acidosis/alkalosis and when chloride rich fluids are given IV over many days.
- EGFR calculated using the MDRD formula in adults.

Blood gas analysis

Samples for Blood gas analysis should be taken into pre-heparinised syringes.

When the sample has been taken please ensure the following:

- Any air bubbles in the samples are excluded.
- The needle is disposed of in a safe manner and replaced with the cap provided in syringe kit.
- The patient's temperature and FIO_2 are recorded.
- If necessary transport sample on ice and take directly to nearest analyser: Beatrice Labour Ward, Radnor, A/E, NICU, Whiteparish

Analyte	Reference range
pH	7.35-7.42
H+	35-45
pCO_2	4.5-6.1 kPa
pO_2	12.0-15.0 kPa
Base excess	+/-2.0 mmol/L
Standard bicarbonate	22-26 mmol/L

Carbon monoxide

Carboxyhaemoglobin estimation is performed using a blood gas sample, or EDTA.

Probable clinical condition	Level of Carboxyhaemoglobin
Non-smoker	0.5-1.5 % saturation
Smokers 10 - 20 /day	Up to 5 % saturation
Smokers above 40/day	Up to 9 % saturation
TOXIC	MULTI-FACTORIAL – ALWAYS SEEK ADVICE

Bone profile

Fasting samples taken without venestasis are preferred.
As 50% of calcium is bound to albumin, an "adjustment" for albumin level is also reported

Analyte	Reference range	
Calcium	2.20-2.60 mmol/L	**a**
Phosphate	0.80-1.50 mmol/L	**a**
Alkaline Phosphatase	30-130 U/L	**a**
Albumin	35-50 g/L	**a**
Total Protein	60-80 g/L	**a**

- Alkaline phosphatase levels are age-related as they depend on bone growth.
- Values are higher in pregnancy due to placental alkaline phosphatase.
- Haemolysis causes falsely high phosphate and falsely low calcium levels.

Liver profile

Analyte	Reference range	
Bilirubin	<21 µmol/L	
ALT	7-35 U/L (female) 10-40 U/L (male)	
Alkaline phosphatase	30-130 U/L	**a**
Gamma GT	0-37 U/L (female) 0-54 U/L (male)	
Albumin	35-50 g/L	
Total Protein	60-80g/L	**a**

- Elevated bilirubin levels may be due to re-absorption of haematomata and haematological disorders as well as liver disease. High bilirubin with normal values for other "liver function" tests may indicate Gilbert's Syndrome when the bilirubin is unconjugated. In neonates Gamma GT levels are higher than in adults.
- Alkaline phosphatase levels are age-related as they depend on bone growth. Values are higher in pregnancy due to placental alkaline phosphatase.
- Gamma GT values are higher in males than females. This enzyme is induced by biliary obstruction, alcohol and certain drugs e.g.: phenytoin.

Cardiac profile

- Following myocardial infarction CK activity peaks at 24 h. There is no value in the assay of CK until 6 hours after the onset of pain due to myocardial infarction.
- CK is a sensitive indicator of damage to any muscle from whatever cause.
- Following myocardial infarction Troponin T concentration peaks at 12-24 hr and remains raised for up to 14 days.
- Troponin T should NOT be used to assess further cardiac events within 14 days.

Lipid profile

LIP1: Random cholesterol.
LIP2: Fasting lipids: total cholesterol, triglycerides, HDL, calculated LDL and total cholesterol/HDL ratio (TC/HDL).
For interpretation see Joint British Societies Coronary Risk Prediction Charts at back of current British National Formulary.

- To assess lipid status samples should be taken no less than 3 months after Myocardial Infarction or serious illness.
- High levels of cholesterol and triglycerides may be associated with liver disease, hypothyroidism, renal failure or diabetes mellitus.

Glucose/diabetes

If samples for blood glucose estimation are received by the laboratory within 4 hours of collection then no preservative is necessary. However if it is anticipated that there will be a delay in receipt of greater than 4 hours then a Fluoride/oxalate tube (grey top) should be used for the collection of sample.

Oral glucose tolerance test

Oral Glucose Tolerance Tests can be arranged in the laboratory out-patient section by writing the request on a standard blue request form.

Definition	**Fasting Glucose (mmol/L)**		**2 hr Glucose (mmol/L)**
Normal	up to 6.0	AND	up to 7.7
Impaired Fasting Glycaemia	6.1 to 6.9	AND	up to 7.7
Impaired Glucose Tolerance	up to 6.9	AND	7.8-11.0
Diabetes Mellitus	7.0 or higher *plus symptoms	AND/OR	11.1 or higher *plus symptoms

* Symptoms = polyuria, polydipsia, unexplained weight loss

- Formal OGTT is not indicated if a random glucose is above 12.0 mmol/L.
- Atypical patterns may be due to inadequate carbohydrate intake prior to test or recent severe illness etc.
- Glucose Tolerance Tests for hypoglycaemia, lag storage etc. are best arranged with the duty Biochemist as there are other tests for hypoglycaemia.

Haemoglobin a1c

Method used is Tosoh G8 HLC 723 (HPLC) and is DCCT adjusted.

	IFCC Aligned HbA1c mmol/mol
Normal	20 – 42 mmol/mol
Good control	48 – 59 mmol/mol
Moderate control	60 – 69 mmol/mol
Rather poor control	70 – 80 mmol/mol
Poor control	> 80 mmol/mol

Endocrine

Thyroid

Appropriate thyroid function tests will be undertaken based on the information given by the "tick box" system found on the blue request form and adequate clinical information.

- Free T3 values are age dependant.
- Remember that intercurrent illness may cause very low levels of TSH, even as low as <0.05 mU/L.
- Thyroid function is best assessed when patients have recovered from acute illness.
- Thyroiditis, usually of viral origin, may give results similar to those found in mild thyrotoxicosis.
- TRH tests are rarely justified and should only be requested following discussion in cases where marked symptoms do not match the biochemical results.

Adrenal Function

Dynamic tests of adrenal function yield **far** more information than random measurements.

Growth Hormone

Please liaise with the laboratory before taking samples. Screening for abnormalities of Growth hormone is done by a serum sample for IGF1. Further tests will be advised on the basis of these results.

Reference ranges are age and sex related, an interpretive comment is provided with the result.

Sex hormones

Please state date of LMP, cycle length & day in cycle together with full clinical details, including drug therapies such as type of Hormone Replacement Therapy. Appropriate tests will be undertaken based on the clinical details supplied and appropriate reference ranges given on reports.

Analyte	Sex/ovarian cycle	Reference range
FSH	Pre-pubertal (0-3 yrs) F/M Pre-pubertal (4-8 yrs) F/M Follicular F Mid-cycle F Luteal F Post Menopause F Male	0 – 10.0 IU/L 0 – 1.8 IU/L 3.5 – 12.5 IU/ L 4.7 – 21.5 IU/L 1.7 – 7.7 IU/L 25 –135 IU/L 1.5-12.4 IU/L
LH	Pre-pubertal (0-8 yrs) F/M Follicular F Mid-cycle F Luteal F Post menopause F Male	0 – 3.7 IU/L 2.4 – 12.6 IU/L 14 – 95.6 IU/L 1.0 – 11.4 IU/L 7.7 – 58.5 IU/L 1.7-8.6 IU/L
Oestradiol	Pre-pubertal F/M Follicular F Mid-cycle F Luteal F Post Menopause F Male	< 50 pmol/L 46 – 607 pmol/L 315 – 1828 pmol/L 161 – 774 pmol/L < 200 pmol/L 28 – 156 pmol/L
Progesterone (day 21)	Mid Luteal Adequate	5 – 86 pmol/L > 35 pmol/L
Prolactin	Pre-pubertal (1-8 yrs) F/M Higher mid-cycle F Male	20 – 850 mU/L 102 – 496 mU/L 86 – 324 mU/L
Testosterone	Female Male	0.5 – 2.6 nmol/L 9.9 – 27.8 nmol/L
SHBG	Female Male	26-110 (to age 50) nmol/L 15-50 nmol/L
Free Androgen Index	Female	<5.0

- Samples to determine menopause in menstruating women are best taken DURING MENSES.
- Samples for Progesterone should be taken 7 days before anticipated next menstruation viz day 21 in a 28 day cycle, day 28 in a 35 day cycle.
- Raised prolactin values may be due to stress/hypothyroidism/certain drugs e.g. phenothiazines.
  The laboratory screens all high Prolactins for macroprolactin.

- A comprehensive list of drugs causing raised prolactin can be obtained from the laboratory.
- Prolactin concentration is generally greater than 1000 mU/L in prolactinomas.

Gut hormones

Analysis of FASTING Gut Hormones is available by arrangement with the laboratory (ext 2142/4047).

	Analyte	Reference Range
Gut Hormones (fasting)	Chromogranin A	< 60 pmol/L
	Chromogranin B	< 150 pmol/L
	Gastrin	< 40 pmol/L
	Glucagon	< 50 pmol/L
	CART	< 85 pmol/L
	PP	< 300 pmol/L
	Somatostatin	< 150 pmol/L
	VIP	< 40 pmol/L

Metals

- Iron levels show diurnal variation.
- Special precautions in skin cleaning are required when collecting samples for Blood lead
- Data interpretation in lead workers uses different reference ranges.

Serum proteins

- Transferrin levels rise in iron deficiency and in response to oestrogens. Values are low in debilitating conditions whether malignant or inflammatory in origin.
- Alpha-1-antitrypsin values are lower in infants. Values rise in response to inflammation.
- C - reactive protein is useful in monitoring inflammatory conditions and detection of sepsis e.g. post-operatively

Immunoglobulins

	Age	Referent Range
IgG	15-45 years	6.0-16.0 g/L
IgA		0.8-2.8 g/L
IgM		0.5-1.9 g/L
IgG	>45 years	6.0-16.0 g/L
IgA		0.8-4.0 g/L
IgM		0.5-2.0 g/L

Analyte		Referent Range
IgG subclasses Adult range	IgG4	0.1 – 1.3 g/L

- Serum protein electrophoresis is always performed in conjunction with serum immunoglobulins. When investigating suspected myeloma please send BOTH serum for immunoglobulins and an early morning urine specimen for Bence Jones Protein
- See MICROGUIDE guidelines on referral of patients with paraprotein bands.

IgE

Age	IgE Referent Range
< 4 weeks	0-5 KU/L
< 3 months	0-11 KU/L
<1 year	0-29 KU/L
< 5 years	0-52 KU/L
< 10 years	0-63 KU/L
<14 years	0- 75 KU/L
15 – 110 years	0- 81 KU/L

- IgE values vary markedly with age. High levels are associated with allergic conditions and clinically relevant allergen-specific IgE may also be assessed, if **skin-prick testing** has not been possible. Please clearly specify suspected allergens.

Therapeutic drug levels

Information giving time of dose and time of sample together with details of any other drugs therapy is essential for data interpretation.

Drug	Sample time	Therapeutic range
Amiodarone	Pre-dose	0.5 – 2.0 mg/L
Carbamazepine	Pre-dose	4 – 12 mg/L
Ciclosporin	12 hr post-dose trough	depends on TXT/assay method etc
Digoxin	6-12 hr post dose Toxicity very likely	0.8 – 2.0 μg/L >3.2 μg/L
Gentamicin (Once daily)	0-2 hr pre-dose	<1.0 mg/L
Gentamicin (Conventional multi-dosing)	Pre-dose 1 hr post dose	<2 mg/L 5 – 10 mg/L
Lithium	12 hr post pm dose	0.4 – 1.0 mmol/L
Phenobarbital	Pre-dose*	10 – 40 mg/L
Phenytoin	Pre-dose*	10 – 20 mg/L
Salicylate		Therapeutic range <350 mg/L
Sirolimus (Rapamune)	Pre-dose	Target (from day 5-2 months) 4 – 12 μg/L (Local Protocols vary)
Tacrolimus (FK506)	12 hr post-dose trough	5 – 15 μg/L
Theophylline	3 hr post dose (peak**)	10 – 20 mg/L
Vancomycin	Pre-dose	Refer to MICROGUIDE

Lithium therapeutic range stated is appropriate for maintenance and in older patients. Acute mania MAY require higher concentrations and therefore close monitoring.

* Pre-dose samples are not vital for Phenobarbital and Phenytoin levels due to prolonged half-life in steady state.

** Theophylline levels should be taken at peak - usually 2-4 hours, or 4-6 hours if slow-release preparation.

- Toxicity associated with Digoxin is also dependent on serum potassium and calcium concentrations.
- Assays of the major Drugs of Abuse can be arranged as can Ethanol measurements (not for legal purposes).
- See Gentamicin guidance on MICROGUIDE at: http://Microguide/MedicinesManagement/Guidance/Pages/IndexPage.aspx
- See Vancomycin guidance on MICROGUIDE at: http://Microguide/MedicinesManagement/Guidance/Pages/IndexPage.aspx

Tumour markers

PSA

Reasons for PSA request should be given using the "tick box" system and supplying adequate clinical details to aid interpretation of results. Free/Total PSA is only available after discussion with the duty Clinical Biochemist (4047)

Analyte	Normal	Age ranges	
PSA	<2.1 µg/L	30-39 yr (males)	
	<2.6 µg/L	40-49 yr (males)	
	<3.0 µg/L	50-59 yr (males)	New national guidelines for referral from 01.11.02 for 50-110 yr old men
	<4.0 µg/L	60-69 yr (males)	
	<5.0 µg/L	70-110 yr (males)	

Haematinics

SFOL Serum folate (Gold top tube)
B12 Serum vitamin B12 (Gold top tube)
FER Serum ferritin (Gold top tube)

Guidelines for the use of B12 and folate assays are on MICROGUIDE. Please ensure that samples for vitamin B12 and folate assays are taken before specific treatment or blood transfusion is commenced.

Other analytes with complex reference ranges

Analyte	Reference Range	
Ammonia (fasting) Venous blood	Prem infant	< 200 µmol/L
	Term infant	< 100 µmol/L
	Child > 1 month	<40 µmol/L
	Adult	<40 µmol/L
DHEAS	Pre-puberty (<8 yrs) F/M	See age and sex related ranges on report.
	Puberty (8-16 yrs) M	
	Puberty (8-14 yrs) F	
	Post Puberty (>16 yrs) M	
	Post Puberty (>14 yrs) F	
Thiopurine Methyl Transferase (TPMT)	Deficient	< 10 mU/L
	Low	20 – 67 mU/L
	Normal	68 – 150 mU/L
	High	> 150 mU/L
Urate	Male	200-430 µmol/L
	Female	140-360 µmol/L

Prenatal screening

Down's Syndrome and ONTD Screening

Maternal serum screening for Down's Syndrome is done at 11 - 21 weeks gestation. Record CRL OR BPD, and hence U/S gestation, and maternal weight in kg (to nearest 0.5 kg). Serum markers and maternal age at EDD are used to predict the risk of Down's Syndrome. A Down's risk cut-off of 1:150 at term is used to classify results as low or high risk. Full interpretation of results is given on the report. NB - These tests are optional and counselling is required. Blood sample must reach the laboratory same day.

Urine and miscellaneous analysis

Analyte	Reference Range	Notes
Calcium / Creatinine Clearance Ratio	< 0.010 0.10 – 0.015 > 0.015	Fam benign hypercalcaemia likely FBH/Primary hyper PTH - grey zone / both conditions Primary hyper PTH likely
Catecholamines	0.00 – 3.00 µmol/24 hr 0.00 – 1.40 µmol/24 hr 0.57 - 2.39 µmol/24 hr	Normetanephrine Metanephrine 3-methoxytyramine
Creatinine Clearance *	90-130 ml/min	ml/min x 1.44 = L/24 hr
	80-110 L/24h/m^2SA	
Pancreatic Elastase	> 200 µg/g stool 100 – 200 µg/g stool < 100 µg/g stool	Normal Mild to moderate exocrine pancreatic insufficiency Severe exocrine pancreatic insufficiency

* If creatinine clearance correction for body surface area is required please state patient's height and weight.

Urine Preservatives

Special preservation of urine samples is required for 5HIAA and Catecholamines/VMA. Containers with the appropriate preservatives can be obtained from the laboratory, along with instruction sheets. Instruction sheets can also be downloaded from MICROGUIDE.

Special Diets

5HIAA - please ensure that the following foods and drugs are excluded from the diet for 2 days before and during the test: aubergines, avocado pears, bananas, pineapple, plums, tomatoes, walnuts, and paracetamol, salicylate and cough syrups.

Semi-Quantitative Urine Screens

Samples for Bence Jones Protein must be **fresh early morning** samples.
Screening tests for Urine Bile pigments and Urine porphyrins are also available. Protect samples from light and arrange for rapid transfer to the laboratory (must arrive within 4 hours).

CSF analysis

Please send both a plain and a fluoride sample for the routine investigation of meningitis.
Please send a matched clotted blood sample (gold top tube) and plain CSF sample for investigation of suspected Multiple Sclerosis.

For the investigation of sub-arachnoid haemorrhage: Take an EXTRA PLAIN BOTTLE (200 ul minimum CSF) and protect from light (foil or black plastic). DO NOT use the air tube system – take to lab by hand. Request CSF spectrophotometry on the Blue Laboratory Medicine form.

Reducing substances

When requesting Reducing substances in urine and faeces it is necessary to ensure rapid delivery of samples to the laboratory and that adequate warning is given of their arrival.

Dynamic test protocols

Protocols for the following tests are available and can also be downloaded from MICROGUIDE:-

Conn's Syndrome SCREEN (Aldosterone/Renin Ratio)

Conn's Syndrome FULL STUDIES (Aldosterone/Renin/ Supine and Ambulant or Fludrocortisone Suppression test)

Cryoproteins *

Dexamethasone Suppression (Overnight) *

Dexamethasone Suppression (Prolonged)

Dexamethasone Suppression/Synacthen Stimulation Test *

Dumping Test (Post Gastrectomy) *

Glucose Tolerance Test (Standard Oral) *

Glucose Tolerance Test (Prolonged) *

Growth Hormone Suppression Test (Oral GTT) *

HCG Stimulation Test (pre-pubertal children)

LHRH Test *

Orthostatic Proteinuria *

Renal Calculus Screen *

Synacthen Test (Short) *

Synacthen Test (Long)

Synacthen Test (17 OH Progesterones for CAH)*

Water Deprivation Test *

* However, some tests are undertaken in the laboratory for outpatients. Please send a referral form for the test to be arranged.

GUIDE TO SPECIFIC HAEMATOLOGY TEST GROUPS

NB - Please note that in all reference range data **'a'** indicates an age variation in referent ranges and **'s'** indicates a gender-related variation in referent range.

Full blood count

Blood films will be made where clinically indicated. Please request film examination for parasites (e.g. malaria) and reticulocyte count separately, although these can be performed on the same sample as the FBC.

Test	Adults		Children			
	Male	Female	10 yrs	1 yr	1 wk	1 day
Hb (g/L)	130 - 178	120 - 160	115 - 145	105 - 135	130 - 200	140 - 200
RBC ($x10^{12}$/L)	3.01 - 6.79	2.81 - 6.49	4.01 - 5.49	3.41 - 5.29	3.91 - 6.49	4.01 - 6.19
HCT	0.40 - 0.51	0.37 - 0.47	0.35 - 0.41	0.35 - 0.41	0.47 - 0.65	0.53 - 0.67
MCV (fL)	80 - 100	80 – 100	77 - 95	72 - 84	88 - 126	100 - 120
MCH (pg)	27.0 - 32.2	27.0 - 32.2	27.0 - 32.0	27.0 - 32.0	27.0 - 32.0	27.0 - 32.0
RDW (%)	8 - 14	8 - 14	8 - 14	8 - 14	8 - 14	8 - 14
Platelets ($x10^9$/L)	150 - 400	150 - 400	150 - 400	150 - 400	150 - 400	150 - 400
MPV (fL)	8 - 12	8 - 12	8 - 12	8 - 12	8 - 12	8 - 12
WBC ($x10^9$/L)	4.0 - 11.0	4.0 - 11.0	4.5 - 13.5	6.0 - 15.0	5.0 - 21.0	10.0 - 30.0
Neutrophils ($x10^9$/L)	2.2 - 8.0	2.2 - 8.0	2.5 - 7.4	1.5 - 7.4	2.0 - 10.9	4.1 - 14.9
Lymphocytes ($x10^9$/L)	0.5 - 4.0	0.5 - 4.0	1.4 - 5.4	3.1 - 10.4	2.0 - 17.9	2.3 - 12.0
Monocytes ($x10^9$/L)	0.1 - 1.1	0.1 - 1.1	0.1 - 1.1	0.1 - 1.5	0.1 - 2.7	0.1 - 3.0
Eosinophils ($x10^9$/L)	0 - 0.4	0 - 0.4	0 - 0.7	0 - 0.7	0 - 1.5	0 - 2.5
Basophils ($x10^9$/L)	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Reticulocytes ($x10^9$/L)	50 - 100	50 - 100	50 - 100	50 - 100	50 - 150	50 - 150

Coagulation

It is **critically** important that sample tubes for clotting studies are properly filled to the line.

A coagulation screen will have the following tests:

- INR – International normalised ratio
- APTT – Activated partial thromboplastin time (expressed as test:control ratio)

- FIBRINOGEN

Further clotting tests such as thrombin time, D-dimer tests, thrombophilia screen, lupus anticoagulant screen and specific clotting factor assays can be specifically requested if indicated clinically. Clinical interpretation comments will be added to reports where necessary. Clotting times are often prolonged in neonates, especially if premature.

Thrombophilia screen

Who should have Thrombophilia Screening?
Thrombophilia screens (which include Antithrombin, Protein C and Free Protein S) are expensive and seldom alter patient management. Patients for whom thrombophilia screens may be indicated must be referred to the Thrombophilia Clinic or discussed with a Consultant Haematologist. Full guidance is provided on MICROGUIDE. If detection of Factor V Leiden or the Prothrombin gene variant is required, an EDTA (lavender top) sample can be sent to the Wessex Regional Genetics Laboratory.

D Dimers

D-dimers have a high **negative** predictive value in the exclusion of DVT or PE **in outpatients** when used **in conjunction** with other testing modalities, such as Doppler ultrasound, or with formalised clinical scoring systems.
A negative D-dimer test in conjunction with either a negative Doppler study or Q scan, or in a patient with a **low** probability score for venous thromboembolism (VTE), effectively excludes the diagnosis.
D-dimer assays should **not** be used in patients at high clinical probability for VTE, nor should they be used in **existing inpatients** who develop possible VTE while in hospital.

Lupus anticoagulant

Lupus anticoagulant will be detected using two phospholipid dependent clotting tests, the Dilute Russell's viper venom time and the Silica clotting time. Please note that the results of these tests can be influenced if the patient is tested while on anticoagulant therapy. Interpretation of the results will be provided on the report.

A serum sample (gold top tube) should be also sent for Anticardiolipin antibodies.

Cell marker tests

Immunophenotyping, and T-cell subset analysis for HIV-positive patients, are sent to the Regional Immunology Laboratory in Southampton. Please liaise with the consultant Haematologists so that an appropriate panel of markers is tested, depending on clinical history. Interpretation is always provided on the report.

Please avoid sending samples on a Friday to the laboratory unless they are clinically urgent.

Erythrocyte sedimentation rate (ESR)

The ESR is only indicated in patients with suspected temporal arteritis or polymyalgia rheumatica, and in patients with Hodgkin's lymphoma.

Haemoglobinopathy investigations

1. Sickle Cell Screening will be reported as Positive or Negative.
2. HPLC and the red cell indices taken from the Full Blood Count will be used to investigate possible thalassaemia or a Haemoglobin variant. HPLC will identify many, but not all, haemoglobin variants and the levels of HbA_2 and HbF will be used in the diagnosis of Thalassaemia. Interpretation of the results will be provided in the report.

Test	Reference Range
Haemoglobin A_2	$\leq$ 3.5%
Haemoglobin F	< 1.1%

A sickle screen will be reported as Positive or Negative. Haemoglobin variants and the likelihood of Thalassaemia will be detected by HPLC (and electrophoresis in some cases) and interpretation will be provided in the report.

3. Antenatal Sickle Cell and Thalassaemia Screening

A completed Family Origin Questionnaire (FOQ) must be sent to the laboratory with an EDTA (lavender top) sample. The screening sample should be taken by 10 weeks gestation. FOQ forms are supplied by the Maternity Services.

Screening will be based on information provided on the FOQ form together with the MCH taken from the Full Blood Count and will follow the algorithm specified by the National Screening programme for low prevalence areas.

The laboratory works in close association with the Trust's Antenatal Screening co-ordinator(s) to identify women who may be deemed at risk following screening.

4. Glucose-6-phosphate Dehydrogenase (G6-PD) deficiency

Please note that G6-PD levels may be falsely elevated during acute haemolytic episodes.

Test	Reference Range
G6-PD	4.6 – 13.5 U/g Hb

BLOOD TRANSFUSION TESTS

The following tests are available from the Blood Transfusion Laboratory:

- Blood group
- Red cell antibody screen
- Antibody identification
- Compatibility testing
- Kleihauer test
- Direct antiglobulin test

Results will be interpreted on the report form where clinically indicated.

GUIDE TO SPECIFIC IMMUNOLOGY TEST GROUPS

All tests are performed at Wessex Immunology Lab in Southampton General Hospital.

Connective Tissue (ANA) Screen

Reported as Positive or Negative. If positive, testing for ENA and DNA antibodies will be carried out.

Presence of DNA antibodies reported in units.

ENA positivity will initiate a Full ENA Screen against the following individual antigens:
Sm, Ro, La, RNP, Scl 70, Jo-1 and centromere.
Clinical comments are included on the report to assist in the interpretation of the results.

Liver Autoantibody Screen

This screen includes:

Anti-smooth muscle antibodies
Anti-microsomal antibodies
Anti-liver, kidney microsomal antibodies
Anti-mitochondrial antibodies
Anti-parietal cell antibodies – only reported if positive

If anti-mitochondrial antibodies are detected then further testing for anti-M2 antibodies will be carried out.

Tissue Transglutaminase Antibody

Routinely, this test involves the measurement of IgA antibodies to Tissue Transglutaminase, but where IgA deficiency is present IgG antibodies will be measured.

Vasculitis screen

This includes tests for Myeloperoxidase antibody (MPO) and Proteinase 3 antibody (PR3). In exceptional circumstances an Anti-Nuclear Cytoplasmic antibody (ANCA) test can be performed, but this requires discussion with the Laboratory.

REQUESTS FOR ADDITION OF TESTS TO AN EXISTING SAMPLE

TIME LIMIT	BIOCHEMISTRY TESTS		HAEMATOLOGY TESTS
DO NOT ADD – refer to Clinical Staff	ANY TEST NOT ON THIS LIST!		ANY TEST NOT ON THIS LIST!
SAME DAY ONLY as original request – 24 hours stability or less	Ammonia – 3 hrs @ 2-4° if collection on ice and immediate separation Bicarbonate – several hours at 2-8° CK PSA PTH – 8hrs if separated in < 4 hrs Troponin T Vit B12		APTT Blood Film D Dimer ESR Fibrinogen INR Malarial Parasites Reticulocytes FBC
48 HOURS after original request – if separated within 8 hours and refrigerated	αFP CA125, CA153, CA199, CEA CCP (3 days) Cortisol DBili/conj bili (3 days protected from light) E2/oestradiol fT3, fT4 ferritin folate FSH hCG	LDH LH MacroPRL Phosphate (4 days) Prolactin Progesterone SHBG Testosterone TPO Ab's TSH	B12 Folate (Red Cell) Monospot
WITHIN 5 DAYS of original request – if separated within 8 hours and refrigerated	A1AT ACE Albumin ALP ALT Amylase AST Bile acids BNP Bone profile C3, C4 Calcium Carbamazepine Cholesterol Chloride Creatinine CRP Digoxin Electrophoresis Free light chains Gentamicin GGT/gammaGT Glucose (if F/O) HDL IgA, IgG, IgM	Iron Lipid profile/fasting lipids Lithium Liver profile Magnesium Paracetamol Phenytoin Potassium Renal profile Rh factor Salicylate (if spun in < 2hrs) Sodium Tbili Theophylline Tobramycin Total protein Transferring Triglycerides U&E's Urate Urea Vancomycin Vitamin D	Folate (serum) G6PD Hb Electrophoresis Hb A2 HbF Serum Folate Sickle Screen

THE DEPARTMENT OF MICROBIOLOGY

Microbiology is located in pathology on level 4 of the main hospital. The department provides an analytical and interpretative service on a wide-range of clinical specimens and clinical and infection control advice to hospital and community health care services. The laboratory also provides microbiological support to the local Health Protection Units and Environmental Health departments.

We receive over 220,000 specimens each year, many requiring multiple investigations. Our ability to process requests in a timely fashion relies heavily on receiving correctly completed request forms from our users. Your compliance with the guidelines concerning safety, specimen identification and transport will help us to deliver a safe, efficient and legally defensible service.

It is anticipated that this handbook will provide the information you require to use our service.

Organisation & staff

Contact details

Key Personnel:		
Laboratory Manager:	Jo Harris	**Ext. 4104**
Laboratory administrator:	Julie Wilson	**Ext. 4105**
Quality Manager:	Katie Griffiths	**Ext. 4104**

Consultant Staff:		**Ext.**	
Consultant Microbiologist Lead Clinician Infection Control Doctor	Dr Julian Hemming	4110	(01722 429105)
Consultant Microbiologist Dep Infection Control Doctor:	Dr Layth Alsaffar Dr Paul Flannagan	4102 4102	(01722 429105)
Consultant Microbiologist Antimicrobial Lead:	Dr Paul Russell	4101	(01722 429105)

Service hours

Laboratory opening hours:

Monday – Friday	**0900 – 1700 hrs**	Normal service
	1700 – 0900 hrs	On call service
Saturday, Sunday & Bank Holidays	**0900 – 1200hrs**	Restricted service
Saturday, Sunday & Bank Holidays	**1200 – 0900 (Mon)**	On call service

Results Microbiology	**Ext: 4099 (01722 429099)**	
Clinical Advice	**Bleep 1967**	**Mon-Fri 9am- 5pm**
Out of normal service hours	**01722 336262 switchboard**	**Ask the operator to page the duty Microbiology BMS (samples) or duty Consultant Microbiologist (Clinical/ Infection Control)**

During normal hours, all in-patient or clinic samples may be sent using the hospital pneumatic tube system. Urgent requests, such as CSF, should be telephoned to the laboratory before dispatch in order that the laboratory can prepare for the sample's arrival.

Outside of normal hours an on-call technical and clinical service is available. The use of the technical service should be restricted to those samples where results are essential before the next routine period. Before sending urgent samples, please contact the duty Microbiology Biomedical Scientist (BMS) via switchboard to discuss requirements and arrange delivery to the laboratory.

Non-urgent samples (except blood cultures) dispatched out of hours can be placed in the microbiology refrigerator in the blood-bank room in Pathology on level 3, North Block. Blood cultures taken out of hours should be left at room-temperature in the 'Microbiology' box in the same area.

Out of hours requests - guidelines

Not all samples will be accepted for out of hours & on-call processing. The guide below sets out what are deemed to be acceptable requests.

Cerebral spinal fluid (CSFs), joint fluid, fluid from normally sterile sites, and pus specimens from non-sterile sites as well as tissue samples from theatre are the main sample types which will be accepted after 17:00 (5pm).

Samples should be taken to the Blood Issue room (Blood bank) on level 3 and placed in the urgent sample box (microbiology), or placed in the urgent sample box at the reception in Laboratory Medicine.

NB: The Microbiology BMS may ask that you or a senior colleague contact the on-call Microbiology Consultant before accepting an out of hours request.

Out-of-hours Requests (hours of service)

The following shows the agreed out of hours availability for the duty Biomedical Scientist to put up/ perform microscopy on specimens:

At any time: CSF

Monday to Sunday and Bank Holidays:

17.00 – 22.00hrs: the following specimens will be processed without referral to the consultant microbiologist when requested by SHO/ SpR/ SAS/ consultant grade:

1. **Joint aspirates**
2. **Tissue (including bone)**
3. **Samples taken during removal of infected prosthesis**
4. **Abdominal pus**
5. **ITU - if early result will affect patient management**
6. **Neonatal Unit - if early result will affect patient management**
7. **Viral swabs for Influenza A and B - by agreement of the consultant Microbiologists during periods of increased incidence.**

22.00 – 00.00hrs: the following specimens will be processed without referral to a consultant microbiologist when requested by SpR/ SAS/ consultant, and patient management decision relies on a microscopy result (e.g. microscopy to show the presence of pus cells and determine whether patient is referred to operating theatre). If these criteria are not fulfilled, the clinician will be advised to discuss their request with the duty consultant microbiologist:

1. **Joint aspirates**
2. **Tissue (including bone)**
3. **Abdominal pus**

After midnight: CSF only

Other samples & requests not listed above will be dealt with on the next working day. If this is likely to causes an unacceptable clinical delay, the consultant concerned should contact the duty Consultant Microbiologist to discuss need for specific out-of-hours investigation.

REQUESTING TESTS

A list of routine tests provided by the microbiology laboratory is provided in Sections 9 and 10. All tests should be requested at the time of submitting the specimen to the laboratory.

Amendments and additions to requests can still be discussed with the laboratory after processing has started. In general, additional tests must be requested within 48 hours of sample receipt by the laboratory. In some instances, additional tests may not be possible and a fresh specimen will be required. Further advice can be obtained from the laboratory. Occasionally, it may be possible to add additional tests unto a saved (frozen) serum sample.

Before sending specimens to the laboratory for investigation, please ensure that you are not duplicating a sample that has already been sent for the same investigation.

Viral and bacterial serology requests

As a general guide, a 4mL yellow top vacutainer tube is adequate for up to three viral serology screening tests plus provide sufficient sample to be used for referral to the reference laboratory if the screening test is positive.

For four or more tests, two 4mL samples are advised. For unusual or “send away” tests not performed at SDH, an additional sample is advised to speed up handling and packaging.

Requests received on Laboratory Medicine (blue) request forms will NOT be accepted. Please use only the appropriate request on T-quest the OR Microbiology (black) request forms for viral & bacterial serology tests.

Guidance on sending samples

There are some general principles that should be considered before sending a sample to the laboratory for microbiology culture.

Microbiology swab expiry dates

ALL Microbiology swabs carry an expiry date either on the packaging and/ or the swab label. Please check the expiry date **BEFORE** use as expired swabs will be automatically rejected by the laboratory, requiring repeat samples using non-expired swabs.

Managers responsible for clinical areas in both the Hospital and the Community are advised to monitor the dates of all swab types held and to ensure ones with shorter "use-by" dates are used first. Infrequently used swab types may be kept for some time before next being used, and we request that staff only order quantities they feel reflect the pattern of use locally.

Two swab types are particularly important:

Virology Swabs (Green top, Virocult)

As part of the improvement in the performance and accuracy of testing for viruses using the Polymerase Chain Reaction (PCR) test the Virology Department at the Bristol Public Health Laboratory now reject any green topped viral swab that are "date-expired".

Please check that the swabs used by medical/ nursing/ midwifery staff are "within-date". The "use-by-date" is given as the month and year, eg, JUN 11. The date can be found in two places:

1. On the back of the swab pack, at the top, underneath the "PEEL HERE" line
2. At the top of the swab transport tube label

CHLAMYDIA Cobas PCR SWABS

Chlamydia swabs will have TWO separate expiry dates: one for the swab and one for the transport media contained in the pack. Note that the expiry date of the chlamydia swab may differ by some months to that of the transport media. It is usually the media which has the shortest expiry date.

On the cobas PCR chlamydia swab, the expiry date can be found at the bottom of the blister pack, below the Lot number on the pack. The date is printed in the reverse order to that we normally use in the UK, i.e., YEAR/ MONTH, so March 2011 would appear as 2011/03. Please return any out of date swabs to the Microbiology Laboratory at Salisbury District Hospital and request replacements as required.

Please could staff ensure that the lid of the cobas PCR tubes are securely tightened, as we have had a number of leaking samples arrive which we have had to reject.

The following guidance relates to specific samples:

Urine

please give sample site and method of collection. E.g. Mid-stream urine (MSU), bag urine (child) or catheter urine (CSU). This is essential information for interpretation of culture results.

Please note: Pneumococcal and legionella antigen testing: Urine sent for Legionella and/ or Pneumococcal antigen testing should NOT be put into a urine container which contains boric acid as this will neutralise the test. Please send in a sterile container such as that used for sputum samples.

DO NOT USE DIPSTICKS TO SCREEN CATHETER SAMPLES. Catheters will invariably be colonised with bacteria and the presence of a catheter may induce pyuria without the presence of infection. Therefore dipstick testing should **not** be used as an aid to the diagnosis of UTI in catheterised patients. Clinical criteria in this instance should be used to judge whether a patient has an infection.

Please give relevant clinical information which suggests why UTI is suspected. Listing of dipstick tests alone does **not** count as adequate clinical details since the tests may be positive for other reasons, e.g., blood during menstruation, urethritis, etc.

Routine urine culture is not required to manage uncomplicated lower UTI in women, but should be reserved for those women with recurrent urinary tract infection, complicated UTI or those who have not responded to empirical therapy (usually trimethoprim or nitrofurantoin).

Please use green top tubes (with boric acid) for urine cultures and yellow tubes for legionella and pneumococcal antigen tests.

For more detail guidance, please refer to:
https://www.gov.uk/government/publications/urinary-tract-infection-uti-diagnosis

For guidance on interpretation of sterile pyuria, see MICROGUIDE > Clinical Management> Diagnostics> Pages> Sterile Pyuria at:
http://Microguide/ClinicalManagement/Diagnostics/Pages/SterilePyuria.aspx

Wounds/ ulcers –

please note that chronic wounds and ulcers will invariably be colonised with organisms and the presence of bacterial growth does not necessarily indicate infection is present.

Leg ulcers: Please only send swabs if there is clear evidence of infection, eg, spreading erythema around the ulcer, new pus, cellulitis, increasing pain. Before sampling remove colonising organisms by washing with sterile saline. Use swab to get deep to the ulcer base and under any over-hanging edges. Provide description of any clinical signs to aid interpretation of results.

Please refer to the PHE guidance on when it is appropriate to take and submit swabs from leg ulcers at:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/345798/Leg_ulcer_diagnosis_quick_reference_guide.pdf

Vaginal swabs –

please refer to guidance on PHE website as to when and how to send a swab to the laboratory. Essentially, in uncomplicated cases of vaginal discharge a diagnosis can be reached using clinical history, characteristic appearance and the pH of the discharge.
Please note that routine culture for Neisseria gonorrhoeae is no longer conducted. The laboratory now provides PCR for the detection of gonorrhoea. For gonorrhoeae testing please send a Cobas PCR Chlamydia swab and make it clear that gonorrhoea is required. One Cobas swab can be used to test for both Chlamydia and gonorrhoea if requested.

For more detailed guidance, Please refer to:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/345793/Vaginal_Discharge_treatment_guidance.pdf

(d) Faeces (Stool) samples – How to collect a stool sample at home (Patients/ Carers) leaflet:
http://www.documents.hps.scot.nhs.uk/hai/infection-control/diarrhoea/information-patients-v1-2009-02.pdf

Chlamydia/ Gonococcal

Public Heath England produces a useful guide on who and when to offer chlamydia NAATs screening/ testing in General Practice and when to refer to GUM clinics. Recommended treatment options are also provided.
Please note: urine testing for chlamydia in women has been known to produce false results. Please contact the Microbiology Laboratory to discuss before submitting urine samples from women.
The laboratory now screens for Neisseria gonorrhoeae both on swabs from both sexes and urine samples submitted from male patients for both hospital and community patients. IF you do NOT wish to have N gonorrhoeae tested on individual patients, please make this clear on the request form (in the clinical details box).

For more detailed guidance, please refer to:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/345381/Chlamydia_guidelines_treatment_and_diagnosis.pdf

Fungal skin and nail infections

Public Health England produces a useful guide on when and how to submit samples for mycology (fungal) tests. There is also guidance on recommended treatment options.

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/345389/Fungal_infection_quick_reference_guide.pdf

Helicobacter pylori

Salisbury now have available H pylori stool antigen testing which is more specific and allows post treatment testing or re-testing if symptoms re-occur despite therapy. We longer test for serology at Salisbury Microbiology in line with other laboratories in the UK.

The alternative test (if faeces is unacceptable to the patient) is the Urea Breathe Test. This should be arranged through the Gastroenterology Department at Salisbury NHS Foundation Trust or via Community prescription at the local pharmacy.

These are the two tests which are now promoted for H pylori screening as the serology test will only tell you if the patient has seroconverted after exposure. Serology cannot be used for post treatment testing or for testing if symptoms re-occur. Urea Breathe Tests should be arranged through the Gastroenterology Department at Salisbury NHS Foundation Trust.

Public Health England produces a useful guide on who and when to test for Helicobacter pylori. NOTE: Proton Pump Inhibitors (PPIs) are recognised as serious contributors to Clostridium difficile toxin disease in at-risk patients. Please use with caution and consider testing for Clostridium difficile toxin if the patient develops unexpected diarrhoea, especially whilst on broad spectrum antibiotics.

https://www.gov.uk/government/publications/helicobacter-pylori-diagnosis-and-treatment

For more guidance on the management of common infection related problems and the appropriateness of sending a specimen to the laboratory for investigation, please visit the PHE website at https://www.gov.uk/government/organisations/public-health-england OR https://www.gov.uk/topic/health-protection/infectious-diseases and search for ‘quick reference guides’. This will produce a number of documents primarily aimed at primary care practitioners which have been produced in collaboration with GPs and the Association of Medical Microbiologists (AMM).

Andrology (Seminal samples)

Post vasectomy samples can by submitted any week day (Monday – Friday) except bank holidays. Patients are asked to bring their samples to the pathology reception desk on level 3. No appointment is required.

Fertility samples: The department runs a weekly andrology clinic on Tuesday mornings in the Pathology Reception, by appointment ONLY. Currently we have 6 appointment slots available per week except for days where bank holidays occur. These become full very quickly, but we attempt to provide the earliest date and time as is possible according to demand. Please ring the laboratory on extension 4099 or 4105 to make an appointment prior to sample collection. Patients providing semen samples for Fertility assessment attend with their samples and complete a questionnaire to ensure the Andrology service complies with UKAS quality requirements.

If patients are aware that they may be unable to attend their appointment, we would be grateful if they could notify the laboratory as soon as possible so that the appointment slot can be offered to other patients where possible.

IMPORTANT:
Please ensure that patients attending for Fertility tests or submitting samples for post-vasectomy testing are provided with a completed black Microbiology form PLUS a suitable non-toxic wide-mouthed sterile container to permit the complete semen sample to be captured by the patient. The laboratory provides assembled “collection packs” for Fertility patients which are available at all surgeries/ clinics. If replacement packs are required, please ring (01722) 429105 to request replacements. **We advise that the requesting clinician goes through the process with the patient at the time the form and container are supplied to ensure the patient understands when and how to collect the sample.** This will help to ensure complete semen sample collection and therefore improve the accuracy of the test.

Samples received in alternative containers to the issued sterile non-toxin containers will **NOT** be processed.

Patient leaflets with instructions on how to take samples for sub-fertility (seminal analysis) and post vasectomy samples are available on Salisbury NHS Foundation Trust MICROGUIDE website: http://Microguide/Diagnostics/Pages/IndexPage.aspx

Fertility is a multi-factorial state and it is advised that the semen test result should be read whilst taking into account other physical and physiological factors affecting a couple’s fertility.

Specimen transport

Specimen Containers

All patient specimen containers must be clearly labelled with the patient's NHS number, name, date of birth, the date of collection and the type of specimen. The hospital number should be included where possible.

The laboratory will reject any unlabelled samples. The laboratory cannot accept any legal responsibility for testing or reporting results on a sample which is not clearly identified to have been obtained from a named patient.

Shelf life of swabs (Expiry date)

Users are reminded to only retain sufficient stock for normal usage and to check the expiry date of stock on a regular basis. For further detail, see section 6 above.

Request Forms

PLEASE request microbiology tests using only the T-quest system OR the appropriate Salisbury Microbiology form.

Adding microbiology tests, (e.g., viral serology), to Laboratory Medicine forms may cause serious delays in the sample arriving at the laboratory AND result in insufficient sample for testing.

All samples must be accompanied by a properly completed request form, giving relevant clinical information, including antibiotics (used or proposed), patient location and detailing the investigation required (e.g. "Viral titres" is not an acceptable request).

All serology requests should include onset date of symptoms as this has relevance to interpretation of results OR to the sample being held until a second sample is received (atypical viral/ pneumonia serology requests especially).
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Please note that faecal samples from inpatients will not be cultured if the date of admission is not present.

Please note that inadequately labelled specimens and those unaccompanied by adequately completed request forms may not be processed. The laboratory assumes that patient consent has been obtained for the investigations requested, especially when HIV testing is required.

All requests for investigations must include the requesting physician's signature on the request form. All unsigned forms may be returned to the requestor before testing is commenced.

Sample Rejection policy

Samples and request form must be received with all required details completed and matched for the patient, the right sample for the right request and in a safe condition (i.e., NOT leaking/ stained with bodily fluids or tissue or toxic chemicals) causing a health risk to transport staff, vacuum tube (Whooshy) and laboratory staff alike. The Microbiology Laboratory holds the right to reject any sample received if it is:

- in such a condition that there is a health and safety risk to staff
- the ability to process the sample adequately or safely is in doubt
- or the laboratory receives the wrong sample for the test(s) requested
- There is inadequate or inappropriate information on the form to indicate specific tests required OR helps towards interpreting test results.

Where possible the requester will be contacted by telephone and advised of the reason for the sample being rejected (and a repeat where possible being sent). A rejected sample will result in a report indicating the key reasons for rejection, with a request for a repeat sample being included where appropriate.

The test tables include a column indicating key criteria resulting in the rejection of that sample/ test request

OBTAINING RESULTS

Please note that before giving results over the telephone the caller's identity needs to be fully established. For reasons of confidentiality (Caldicott) and Clinical Governance we are not permitted to give results directly to patients or their relatives.

We advise all healthcare workers NOT to ask for results pertaining to themselves, but to obtain test results from the requesting physician, their doctor or from Occupational Health as appropriate.

Authorised results are available on the Hospital Review system or via GP computer systems. In general, results are not available to view on either of these systems until they have been authorised.

Please NOTE: We request that users do not phone the lab to confirm whether samples have been sent or not, as this takes up much valuable time and prevents lab staff from completing culture and other diagnostic work in a timely fashion. We recommend that patient notes are annotated to confirm samples requested and taken.

Quiet time

At all times during the day, and on Saturday and Sunday mornings, preliminary results may be available direct from the laboratory via extension 4099.

Please be aware however that requests for results will invariably delay the processing of other specimens. We strongly advise that the computer system be checked for results before telephoning.

Clinical advice

Clinical advice is available from 0900hrs via extension 4105 or Bleep 1967, and may be relevant if a clinician wishes to discuss a patient before an authorised result is available, or follow up of treatment.

Notifiable infections

Following the new Health Protection (Notification) Regulations 2010 there are some changes to the list of notifiable conditions and diseases and more detailed information on the responsibilities of GPs and Hospital doctors including timing of reporting to Public Health England.

Information about notification of infectious diseases can be found on the PHE web site at: https://www.gov.uk/guidance/notifiable-diseases-and-causative-organisms-how-to-report#list-of-notifiable-organisms-causative-agents

Notifiable infections require telephone PLUS either paper on online notifications as follows:

NOTE As of August 2016 Dorset has now returned to the PHE centre for the South-west, and is no longer part of the Hampshire PHE Centre remit:

- For Wiltshire patients contact the duty person for PHE C Avon, Gloucester and Wiltshire (HPU South West North)*
- For Dorset patients contact the duty person at PHE C for Cornwall, Devon, Somerset and Dorset (HPU South-west South)*

  * Both locations can be contacted via 0300 303 8162 then on answer follow the verbal instructions provided
- For Dorset and Hampshire patients contact the duty person for PHE C Hampshire, Isle of Wight and Dorset (HPU Southampton and Isle of Wight) tel: 0344 225 3861

Alternatively, please contact the Salisbury Hospital switchboard for details on the relevant contact numbers

CLINICAL ADVICE

Monday to Friday 0900 – 1700hrs

Contact the duty consultant on ext 4099 or Bleep 1967.

Out of hours:

Monday to Thursday and Bank Holiday Weekends (17:00 Friday to 09:00 of next normal working day)

Contact the duty consultant via switchboard. **NOTE:** Hospital staff – do NOT use the internal bleep 1967 outside Monday to Friday (ie, out-of-hours, weekends and bank holidays) as this will NOT be answered!!

Friday 17:00hrs to Monday 09:00hrs (non-Bank holiday weekends):

There is a rota with cross-cover provision with Microbiology colleagues from Dorchester. One of the following will be available via pager or other contact number via switchboard: Dr Cotterill, Dr Hemming, Dr Russell (Salisbury); Dr Groom, Dr Clements, Dr Jeppesen (Dorchester).

HIGH RISK SPECIMENS

Please refer to the Policy for the Transport of Pathology Specimens. ***"Danger of Infection"*** labels are available from the laboratory, and should be attached to the specimen container and request form for all qualifying specimens (**Including** biochemistry and haematology requests). This is a necessary procedure, in order to protect the portering and laboratory staff from the risk of infection.

NB: The Consultant Microbiologist **MUST** be contacted **BEFORE** collecting specimens from a patient suspected of having a viral haemorrhagic fever, human avian flu, SARS or CJD. Samples thought to constitute a risk to staff because of inadequate packing or warning may be rejected.

Vacuum Transport Tube (Whooshy): ALERTS!

Please do not use the whooshy to transport samples where there is a high-grade infectious risk or valuable, during laboratory closure (ie, out-of-hours) and one-off sample which cannot be repeated, eg, CSF, pre-antibiotic joint aspirate. Always send appropriately packed via portering service.

Out-of-hours (from 17:00 until 09:00 Monday to Friday and from 12:00 on Saturdays and Bank Holidays; All day Sunday) the vacuum tube to the Microbiology reception is switched off, and any samples sent may be randomly sent to locations other than the laboratory!

BACTERIOLOGY TESTS							
Investigation	**Test**	**Sample**	**Container**	**TAT**	**Limitations**	**Out-of-Hours**	**Rejection Criteria**
ALL SPECIMENS							Form/sample labelling error; leaking specimen container. Expired expiry date of swab
Ascitic Fluid Culture *Note: Inoculating sample into Blood Culture bottles may increase yield of fastidious organisms*	Gram stain & Culture	Ascitic fluid	Universal (white top)	4 days	Ideally samples should be collected before antibiotic treatment	Yes, by arrangement- See on call availability	
Blood Cultures (Adults)	Gram stain, if positive & Culture	5-10mls blood per bottle	Adult blood culture set – Aerobic(blue) and Anaerobic (purple) bottles	1 – 6 days, depending on positivity	Samples should be collected before antibiotic treatment	Bottles should be left at room temperature in blood-issue room	Exterior surfaces grossly contaminated with blood

Blood Cultures (Children)	Gram stain, if positive & Culture	3-4mls blood	Paediatric blood culture bottle – yellow top	1 – 6 days, depending on positivity	Samples should be collected before antibiotic treatment	Bottles should be left at room temperature in blood-issue room	Exterior surfaces grossly contaminated with blood
Broncho-alveolar lavage Culture	Gram Stain & Culture	Broncho-alveolar lavage	Universal (white top)	4 days	Contact Consultant Micro-biologist if Pneumocystis testing is required	Contact duty Consultant Microbiologist	
Clostridium difficile Toxin	Toxin Detec-tion	Faeces	Universal with spoon (blue top)	1 day	Only performed on liquid / semi-formed stools (Bristol stool scale 5-7), please state 3 months antibiotic history	Saturday/ Sunday/ Bank holiday mornings	Do not request if a positive result within previous 28 days
Corneal Scrape Culture	Gram stain & Culture	Corneal scrape	Direct inoculation onto plates and slide	2 hours for microscopy 2 – 5 days for culture	Requires good amount of cellular material. For *Acanthamoeba* culture contact laboratory before taking sample	Yes, by arrangement- See on-call availability	

CSF Culture	Cell count, Gram stain, if required, & Culture	1–2ml CSF. State if TB culture or Cryptococcal culture / antigen required	2 sterile glass bijoux containers. Send 1st and 3rd samples, appropriately labelled	2 hours for microscopy 3 days for culture	Cell counts cannot be performed on clotted samples – only culture	Yes, by arrangement 24 hours a day	
Ear Swab Culture	Culture	Ear swab	Transport swab (black top)	4 days	None	No	Swab past expiry date
Eye Swab Culture	Culture	Eye swab	Transport swab (black top)	4 days	None	No	Swab past expiry date
Faeces Culture	Micro-scopy & Culture	Faeces	Universal with spoon (blue top) See HPS guide link, page 93	4 days	Clinical details are essential for processing Shigella culture may be less effective if sample arrives more than 4 hours after sample taken	No	Sample less than "size of the top of the thumb" Container more than 50% filled
Fungal Culture	Micro-scopy & Culture	Skin, hair, nails	Fungal culture kit/universal (white top)	7 – 10 days for microscopy 3-4 weeks for culture	None	No	

Gonococcal Culture GUM clinic only	Culture	Endo-cervical swab and Urethral swab	Transport swab (black top)	4 days	Transport delay may reduce sensitivity of test Any positive GUM slides should be sent to the lab with the specimen for culture	No	Swab past expiry date
Gynae-cological Culture	Micro-scopy & Culture	Vaginal and / or Endo-cervical swab depending on clinical scenario	Transport swab (black top), one per site	4 days	Clinical details are essential for processing See HPA guide link for vaginal swabs, page 93	No	Swab past expiry date
IV Cannula Culture, e.g., CVP line tip	Culture	End of cannula tip (end 4 cm) Note: blood culture is preferable	Universal (white top)	4 days	None.	No	
Joint Fluid Culture	Gram stain, Culture and crystals	Joint fluid	Universal (white top)	4 days	None	Yes, by arrangement - see on-call availability	

Leg Ulcer Swab	Culture	Leg ulcer swab	Transport swab (black top)	4 days	Routine swabbing is unnecessary, unless there is clinical indication of infection. See HPA guide link, page 93	No	No clinical details consistent with active infection Swab past expiry date
Mouth Swab Culture	Culture	Mouth swab	Transport swab (black top)	4 days	Culture directed to Candida sp. (for herpes simplex please refer to virology section)	No	Swab past expiry date
MRSA Culture	Culture	Swab Urine Sputum	Transport swab (Black topped) Universal (White top)	Negative: 1 – 2 days Positive: 2-4 days	Culture directed to MRSA only See Trust MRSA Policy	No	Axilla & throat swabs are not accepted. Swab past expiry date
Neonatal Screen Culture	Culture	a) Swabs b) gastric aspirate	a)Transport swab (black top)/ b)universal container	4 days	a) Swabs from umbilicus and ear	No	Swab past expiry date
Nose Swab Culture	Culture for *Staph. aureus* only	Nose swab	Transport swab (black top)	4 days	Pernasal swabs are required for the isolation of *Bordetella pertussis*.	No	Swab past expiry date

Parasitology	Microscopy	Faeces	Universal with spoon (blue top)	6 days	Please contact Laboratory if 'hot-stool' examination is required	No	
Parasitology	Microscopy	Sellotape slide	Collections kits available from Laboratory	6 days	None	No	
Pertussis Culture	Culture	Pernasal swab	Pernasal swab (blue top)	7 days	Samples taken >2 weeks after onset of symptoms may not yield a positive result.	No	Swab past expiry date. Wrong swab type used
Pleural Fluid Culture *Note: Inoculating sample into Blood Culture bottles may increase yield of fastidious organisms*	Gram stain & Culture	Pleural fluid	Universal (white top)	4 days	None	Yes, by arrangement - see on-call availability	
Pus Culture	Gram stain & Culture	Pus	Universal (white top)	4 days	None	Yes, by arrangement - see on-call availability	
Skin Swab Culture	Culture	Skin swab	Transport swab (black top)	4 days	Impetigo, cellulitis (broken skin)	No	Swab past expiry date.

Sputum Culture	Culture	Sputum	Universal (60ml wide-mouth, metal top)	4 days	If fungal culture required e.g. in an immuno-compromised patient, please indicate on request form	No	Salivary or non-purulent sample
TB Culture (Urine) This test is currently provided by Poole	Culture	First-pass early morning urine (from 3 consecutive days)	Universal (60ml wide-mouth, metal top)	6 weeks	No microscopy performed on urine TB samples	No	Incorrect container
TB Culture (Sputum/ BAL/ Tissue/ Pus) This test is currently provided by Poole	Microscopy & Culture	Sputum/ BAL/ Tissue/Pus	Universal (60ml wide-mouth, metal top)	2 days for microscopy 6 weeks for culture	Sputum samples should be collected early morning Please do not send in formalin	Urgent microscopy, only after consultation with duty Consultant Micro-biologist	
Throat Swab Culture	Culture	Throat swab	Transport swab (black top)	4 days	Isolation of *Neisseria* spp. only on request	No	Swab past expiry date.

Tissue for Culture	Gram stain & Culture	Tissue	Universal (white top)	7 days	Please do not send samples in formalin	Yes, by arrangement - see on-call availability	None
Urine Culture Urine culture (continued)	Microscopy & Culture	Urine	Green top tube with boric acid. See PHE guide link, page 93	3 days	Please state whether sample is MSU/ CSU/ SPA/ Bag/ Ileal conduit sample. Antibiotic use (recent and/or intended) : helps with interpretation of results and guides further work up	No	Hospital samples > 4 hours old will be rejected GP/ community samples >24 hours old will be rejected. Samples in non boric acid will be rejected.
Urinary Parasitology (Schistosomiasis)	Microscopy	Urine	Universal (white top)	5 days	Collection of terminal specimen of urine around 12 noon after 15 minutes of light exercise	No	

Wound Swab Culture	Culture	Wound swab	Transport swab (black top)	4 days	Pus sample should be sent ideally (in a white topped Universal) Do not take routine ulcer wound swabs unless clinically infected & results will alter management, as these are non-sterile sites	No	Swab past expiry date.

VIROLOGY / SEROLOGY TESTS							
Investigation	**Test**	**Sample**	**Container**	**TAT**	**Limitations**	**Out-of-Hours**	**Rejection Criteria**
ALL SPECIMENS					Please ensure all request forms are signed, especially when requesting blood borne virus tests, e.g., HIV, hep B and Hep C. Separate samples MUST be sent to Microbiology/ Virology 'Add-on' tests will not be excepted unless an appropriate request form is received and the original sample is viable and/or sufficient		Form or sample labelling error Inappropriate sample type/assay requests Insufficient clinical details and/or assay requests Haemolysed samples Samples that have been processed via Laboratory Medicine

Antenatal (booking blood) Serology (Syphilis, HBsAg, HIV)	Antibody/ Antigen detection	SST	Yellow top	5 days	Please clearly indicate ALL tests required Please indicate clearly in the clinical details that sample is antenatal screening or booking blood. Please indicate if patient is a 'late booker'	No	Form or sample labelling error
Anti-streptolysin titre (ASO Titre) and Anti-DNase B	Toxin Antibody detection	SST	Yellow top	7 days	Clinical details are essential for processing	No	Insufficient clinical details
Atypical Pneumonia CFTs Includes Influenza A, Influenza B, RSV, *Chlamydia* sp. & *Mycoplasma pneumoniae*, Q Fever Phase 2, Adenovirus This test is sent to PHE Bristol	The timing of the onset of patient symptoms and the blood sample(s) received is critical. PLEASE ensure that an onset date for symptoms is given within the clinical details of the electronic or hand-written request form. Failure to do so WILL incur an unnecessary delay in processing. Samples taken less than 10 days after onset of symptoms is considered an ACUTE sample and will be stored pending arrival of a CONVALESCENT sample (taken 10 to 14 days after the date of the ACUTE sample). A four-fold or more increase in complement fixation test (CFT) antibody titre between acute and convalescent samples is indicative of a recent infection. Samples taken MORE than 10 days AFTER the onset of symptoms are treated as a CONVALESCENT sample and will be sent for testing.						
	CFT	SST	Yellow top	10 days	Acute sample will be saved (not processed) until a convalescent sample is received.	No	Acute sample will be discarded within 3 months if no convalescent sample is received.

Brucella serology This test is sent to Brucella Reference Lab., Liverpool	Antibody detection	SST	Yellow top	10 - 14 days	Please state date of onset, risk factors (including occupation if appropriate), travel abroad over past six months	No	Insufficient clinical details
Chickenpox IgG Varicella zoster	When requesting Varicella zoster antibody following contact with chickenpox in both pregnant women or immunocompromised patients it is essential that the date the patient was in contact with the chickenpox case is stated in the clinical details as well as the onset date of the chickenpox case's rash as these are used to assess the value of Varicella Zoster Immunoglobulin (VZIG) in every case. Please contact the laboratory in such cases so that the samples can be tested urgently on arrival. This is particularly important on Fridays, weekends and Bank Holidays when staffing is reduced. Always include a the person to contact with either a bleep or reliable phone number as it is always frustrating when we have a significant result but no-one answers the phone OR we only get an answer machine telling us no-one is available until after the weekend. For non-immune contacts, VZIG is only available if the result is known less than 10 days after contact, otherwise other therapeutic options may be required.						
	Antibody detection	Clotted blood	Yellow top	5 days normal 1 day (urgent)	Please contact Laboratory if urgent processing is required Give date of contact	Sat/ Sun/ Bank holiday morning (by arrange ment only)	
CMV IgG and/or CMV IgM	Antibody detection	SST	Yellow top	6 days	Clinical details are essential for processing. Clearly state whether screen or suspected infection	No	Insufficient clinical details

CMV PCR This test is sent to Bristol PHE	PCR	EDTA sample Urine	Purple top Universal (white top) or yellow top	10 days	Clinical details are essential for processing	No	Insufficient clinical details Inappropriate assay request
Enterovirus IgM (e.g. Coxsackie, Echo virus) This test sent to Epsom	Antibody detection	Clotted blood	Yellow top	10 days	Clinical details are essential for processing	No	Insufficient clinical details Inappropriate assay request
EBV Serology	Antibody detection	Clotted blood	Yellow top	5 days	Clinical details are essential for processing	No	
EBV PCR This test is sent to Bristol PHE	PCR	EDTA sample	Purple top	7-10 days	Clinical details are essential for processing	No	
Fungal precipitins This test is sent to Bristol PHE	Antibody detection	Clotted blood	Yellow top	10 days	Clinical details are essential for processing	No	
Genital Chlamydia Infection	PCR	Urine	Cobas PCR urine tube (Yellow Top)	7 days	Clinical details are essential for processing Sample received in boric acid	No	

Genital Chlamydia Infection	PCR	Endo-cervical swab, HVS, vulvo-vaginal swabs	Cobas PCR female swab kit (Yellow Top)	7 days	Clinical details are essential for processing	No	Incorrect swab, Swab past expiry date.
Non Genital Chlamydia infection (Eye,Throat,Rectum)	PCR	Swab from appropriate site	Cobas PCR female swab sample pack (Yellow Top)	7 days	Clinical details are essential for processing. Assay not validated for testing samples from non-genital sites.	No	Incorrect swab. Swab past expiry date.
Helicobacter Stool Antigen	H.pylori antigen	Fresh or frozen stool samples (no preservatives)	Universal with spoon (blue top)	1 day	The test is a qualitative assay for H.pylori antigen in stool and does not indicate the quantity of the antigens. A negative result does preclude the possibility of infection with H.pylori.	No	Samples collected into transport medium or other preservative media. Incorrectly stored samples.
Hepatitis A Serology IgM, IgG	Antibody detection	Clotted blood	Yellow top	5 days	Clinical details are essential for processing, especially onset date	No	

Hepatitis B surface Antibody	Antibody detection (for post vaccination)	Clotted blood	Yellow top	5 days	Vaccination history required for full interpretation of result	No	Insufficient clinical details
Hepatitis B Core Total Antibody	Antibody detection (acute infection/ evidence of natural immunity)	SST	Yellow top	5 days	Clinical details are essential for processing	No	
Hepatitis B Surface Antigen	Antigen detection (acute infection screen / chronic carrier status)	Clotted blood	Yellow top	5 days 5-7 days	Requests must be clearly indicated	No	

Hepatitis B e Antigen and Antibody and Hepatitis B core IgM	Antibody detection (assess infective risk level in acute & chronic infection)	Clotted blood	Yellow top	5 days	Requests must be clearly indicated Patient should be HbsAg +ve and/or Hepatitis B core total +ve	No	
Hepatitis B DNA Viral load This test is sent to PHE, Bristol	PCR	EDTA sample	Purple top	7-10 days	Requests must be clearly indicated Patient must be Hepatitis B positive	No	Incorrect sample type Insufficient clinical details Insufficient sample
Hepatitis C Ab Confirmation of positive results sent to Bristol PHE	Antibody detection	Clotted blood	Yellow top	5 days 7-10 days	Requests must be clearly indicated	No	
Hepatitis C PCR Qualitative This test is sent to Bristol PHE	RNA detection by PCR (evidence of active infection)	2 x Clotted blood	Yellow top	10 days	Requests must be clearly indicated	No	Insufficient sample

Hepatitis C Genotype This test is sent to Bristol PHE	Genotype detection by PCR	2 x EDTA sample	Purple top	7-10 days	Requests must be clearly indicated Patient must be HCV positive with active infection	No	Incorrect sample type Insufficient sample
Hepatitis C Viral Load This test is sent to Bristol PHE	PCR	2 x EDTA sample	Purple top	7-10 days	Requests must be clearly indicated. Use Salisbury Microbiology request form only	No	Incorrect sample type
Hepatitis D (Delta agent) This test is sent to Virus Reference Laboratory, Colindale	Antibody detection, PCR	Clotted sample	Yellow top	7-10 days	Request must be clearly indicated Must be Hepatitis B positive	No	Patient Hepatitis B Negative
Hepatitis E IgM and IgG This test is sent to Virus Reference Laboraory Colindale	Antibody detection, PCR	Clotted sample	Yellow top	7-10 days	Request must be clearly indicated	No	
Herpes PCR This test sent to PHE Bristol.	Viral culture	Viral swab	Green topped swab	10-14 days		No	Swab past expiry date

HIV 1/2 Ab/Ag Confirmation of positive results sent to Bristol PHE (May take longer if confirmation required)	Antibody/ Antigen detection	Clotted blood	Yellow top	4 days		No	
HIV Pro-Viral DNA Load This test is sent to London PHE, Colindale	DNA detection in Infants <1 year old	2 x EDTA blood	Peach Pink top (paediatric EDTA sample tube)	10 days	Requests for HIV must be clearly indicated and the request form signed Sample must be sent with EDTA sample from HIV positive mother	No	Wrong sample tubes
HIV 1 RNA Viral Load This test is sent to PHE Bristol.	RNA detection in adults and children >1 year old	2 x EDTA sample	Purple top	10 days	Requests for HIV must be clearly indicated and the request form signed Patient MUST be HIV 1 positive	No	
HIV Genotypic Resistance Test This test is sent to the Royal Free Viral Laboratory, London	HIV resistance to anti-retroviral therapy	10ml EDTA sample	Purple top	10-14 days	Request from GUM clinic ONLY Submit with both a completed specific Royal Free HIV gentotypic resistance test form PLUS Salisbury Microbiology request form	No	No Royal Free HIV request form Incorrect sample

Influenza A/B	PCR	Naso-pharyngeal swab in VTM	Green topped swab	1 day	Requests must be clearly indicated	No	Repeat swabs will not be tested
Leptospiral serology IgM Leptospiral PCR This test is sent to PHE Porton	Antibody detection PCR	Clotted blood EDTA	Yellow top Purple Top	10 days	Requests must be clearly indicated	No	
Lyme (Borrelia burgdorferi) IgG and IgM Reactive results from Salisbury are sent to PHE Porton Down for Immunoblotting	Antibody detection	Clotted blood	Yellow top	4 days	Requests must be clearly indicated Other samples (e.g., CSF, joint fluid) by arrangement with Consultant only	No	
Measles Serology IgG	Antibody detection (evidence of immunity).	Clotted blood	Yellow top	5 days	Requests must be clearly indicated For acute infection contact local Health Protection Unit (HPU) for oral swab test kit	No	

Meningococcal PCR Sent to Meningococcal Ref Lab, Manchester PHE Older children/ adults Young children	DNA detection DNA detection	CSF Blood: EDTA EDTA	Universal container (white top) Purple top Pink top	10 days (Positive result will be phoned earlier)	Requests must be clearly indicated	No	
Mumps Serology IgG	Antibody detection (evidence of immunity)	Clotted blood	Yellow top	10 days	Requests must be clearly indicated For acute infection contact local Health Protection Unit (HPU)) for oral swab test kit	No	
Parasite disease serology Various including Schistosoma, Amoebic (abscess), Toxocara, etc Sent to London School of Tropical Diseases	Antibody detection	Clotted blood	Yellow top	7-14 days	Clinical details including countries visited & dates are essential Contact duty Consultant Microbiologist if required	No	
Parvovirus Serology This test is sent to Bristol PHE	Antibody detection	Clotted blood	Yellow top	10 days	Clinical details are essential for processing	No	

Pertussis serology This test is sent to PHE Colindale	Anti-toxin antibody screening test	Clotted blood	Yellow top	10-14 days	Single sample taken >2 weeks after onset for any individuals with a history of prolonged cough Give date of onset of symptoms	No	No date of onset Sample sent < 2 weeks after onset of cough
Pneumococcal PCR This test is sent to PHE Manchester reference laboratory	DNA detection	EDTA blood and/or CSF	Purple top for blood Universal container (white top) for CSF	10 days (positive result will be phoned earlier)	Requests must be clearly indicated	No	Incorrect sample type
Rotavirus EIA	Antigen detection	Faeces	Universal with spoon (blue top)	1 day	Limited to children <5 years	No	
RSV Detection	PCR	Nasopharyngeal aspirate	Trap bottle	1 day	Clinical details are essential for processing	Saturday / Sunday morning, by arrange-ment only	
Rubella Serology IgG	Antibody detection	Clotted blood	Yellow top	5 days	Clinical details are essential for processing	No	

Rubella Serology IgM	Antibody detection	Clotted blood	Yellow top	5 days	Clinical details are essential for processing	No	
Syphilis Serology Confirmation for acute infection (IgM) are sent to Bristol PHE	Antibody detection	Clotted	Yellow top	4 days 7-10 days	Clinical details are essential for processing	No	
Toxoplasma Serology Confirmation of positive results sent to Swansea Hospital	Antibody detection	Clotted blood	Yellow top	10 days	Clinical details are essential for processing	No	
Tropical Disease serology Various including Dengue, Viral haemorrhagic fevers, etc Sent to PHE Porton Down	Antibody test	Clotted blood	Yellow top	7-14 days	Clinical details including countries visited & dates are essential Vaccinations & antibiotics given are essential as may affect test results Contact duty Consultant Microbiologist if required	No	

TB (Mycobacterium tuberculosis) T-SPOT Sent to Oxford Diagnostic Laboratories Ltd, Oxford	Gamma interferon test	Lithium blood (x2)	Green top	24-48 hrs	On agreement by Consultant Microbiologist only. Clinical details are essential for processing Monday to Friday ONLY Must be accompanied by Oxford Diagnostic Laboratories request form.	No Samples must arrive in lab by 1300 hrs and have been taken that morning	Received in lab on Saturday/ Sunday Correct form not completed
Urine Antigen Tests: **a)** Pneumococcal **b)** Legionella	Antigen detection	Urine	Universal (white top)	1 day	Please contact Laboratory if urgent processing required	Saturday / Sunday morning, by arrange-ment only	
Viral detection (PCR) Throat, vesicle	Viral PCR	Viral swab	Green topped swab	10-14 days	Throat swab: Send if suspected viral meningitis or viral pharyngitis Best results when taken within 48 hours of onset of symptoms	No	Swab past expiry date

Viral detection (PCR) Faeces (viral meningitis e.g. enterovirus)	Viral PCR	Faeces	Universal with spoon (blue top)	10-14 days	Send if suspected viral meningitis.	No	
Viral detection (PCR) CSF	Viral PCR	CSF	2 sterile glass bijoux containers. Send 1st and 3rd samples, appropriately labelled	10-14 days	Send if suspected viral meningitis. Lab may send if CSF cell count and CSF biochemistry suggests likely viral meningitis	No	

ANTIBIOTIC ASSAYS							
Investigation	**Test**	**Sample**	**Container**	**TAT**	**Limitations**	**Out of hours**	**Rejection criteria**
ALL SPECIMENS							Form or sample labelling error
Gentamicin Levels This test is sent to and performed by Laboratory Medicine	Antibiotic assay	Clotted blood **Send on green Biochem form**	Yellow top	1 day	Timing of sample, and drug dose and timing regimen essential for interpretation of result Refer to gentamicin guidelines on MICROGUIDE	Yes (must be arranged with on call biomedical scientist in Laboratory Medicine)	Incomplete form and dosing details
Tobramycin Levels This test is sent to Bristol Southmead	Antibiotic assay	Clotted blood **Send on black Micro form**	Yellow top	2-3 days for verbal result, 7 – 10 days for electronic report	Timing of sample, and drug dose and timing regimen essential for interpretation of result	No	Incomplete form and dosing details
Amikacin Levels This test is currently sent to Southmead Bristol	Antibiotic assay	Clotted blood **Send on black Micro form**	Yellow top	2-3 days for verbal result, 7 – 10 days for electronic report	Timing of sample, and drug dose and timing regimen essential for interpretation of result	No	Incomplete form and dosing details

Vancomycin Levels (Pre dose only unless requested by Microbiologist) This test is sent to and performed by Laboratory Medicine.	Antibiotic assay	Clotted blood **Send on green Biochem form**	Yellow top	1 day	Timing of sample, and drug dose and timing regimen essential for interpretation of result Refer to vancomycin guidelines on MICROGUIDE	Yes - during daytime at weekends (must be arranged with on call biomedical scientist in Laboratory Medicine)	Incomplete form and dosing details
Teicoplanin level (Pre dose only as advised by Microbiologist) This test is sent to Bristol Southmead	Antibiotic assay	Clotted blood Send on black Micro form	Yellow top	2-3 days for verbal result, 7 – 10 days for electronic report	Timing of sample, and drug dose and timing regimen essential for interpretation of result	No – unless agreed previous to weekend with Consultant Microbiologist	Incomplete form and dosing details
Other antibiotic level, e.g., Co-trimoxazole These tests are done at Bristol Southmead	Antibiotic assay	Clotted blood Send on black Micro form	Yellow top	2-3 days for verbal result, 7 – 10 days for electronic report	Timing of sample, and drug dose and timing regimen essential for interpretation of result Pre-arrangement with Consultant Microbiologist ONLY	No	Incomplete form and dosing details

Anti-fungal drug level These tests are done at Bristol HPA Mycology Laboratory	Anti-fungal assay	Clotted blood Send on black Micro form	Yellow top	2-3 days for verbal result, 7 – 10 days for electronic report	Timing of sample, and drug dose and timing regimen essential for interpretation of result Pre-arrangement with Consultant Microbiologist ONLY	No	Incomplete form and dosing details

Family Planning (including Sub-Fertility)							
Investigation	**Test**	**Sample**	**Container**	**TAT**	**Limitations**	**Out of hours**	**Rejection criteria**
ALL SPECIMENS							Form or sample labelling error
Sub-fertility semen (Andrology)	Please note: Patient leaflets with instructions on how to take samples for Sub-fertility (Semen analysis) and Post-vasectomy samples are available on the Salisbury NHS Foundation Trust MICROGUIDE web site at: http://Microguide/DIAGNOSTICS/Pages/IndexPage.aspx (*CONTROL + right click on mouse to access)*						
	Microscopy (analysis of cells and cell count)	Semen sample	Universal (Non-Toxic specimen container-contact laboratory)	7 days	Samples by appointment only (patient to contact laboratory) Fresh sample taken on day of submission To arrive within 1 hour of being taken	No	No appointment made Sample more than 2 hours old Sample received in a non-toxin tested specimen container.

Post vasectomy semen analysis	Microscopy	Semen sample	Universal (Non-Toxic specimen container-contact laboratory)	3-4 days	Fresh sample taken on day of submission. To arrive in Lab between 0900 and 1200 First sample taken 16 weeks post vasectomy and after 24 ejaculations Second sample 2-4 weeks after first sample	No	Unlabelled sample or form Sample arriving after 12 noon Mon - Fri

Please note: Patient leaflets with instructions on how to take samples for Sub-fertility (Semen analysis) and Post-vasectomy samples are available on the Salisbury NHS Foundation Trust ICID web site at:
http://icid/DIAGNOSTICS/Pages/IndexPage.aspx (*CONTROL + right click on mouse to access*)

REFERENCE LABORATORIES		
Laboratory	**Tests**	**Address & telephone**
Atypical Pneumonia Unit	Uncommon serology tests that are not routinely performed at Bristol	Atypical Pneumonia Unit, RSIL, 61 Colindale Avenue, London NW9 5EQ. Tel: 020 8327 7331
Bristol PHE Regional Mycology Laboratory	Fungal culture identification, antifungal sensitivity testing, antifungal levels	Bristol PHE Regional Mycology Laboratory, HPA South West Laboratory, Myrtle Road, Bristol, BS2 8EL Tel: 0117 342 5028
Bristol PHE Regional Virology Laboratory	Many serology tests, HSV, Hepatitis C viral load & genotyping, HIV viral load.	Bristol PHE (PHE South West), Bristol Royal Infirmary, Myrtle Rd, Kingsdown, Bristol BS2 8EL Tel: 0117 9282514 (Bact), Tel: 0117 9285012 (Virol)
Brucella Reference Unit	Brucella serology	Liverpool Clinical Laboratories, Virology Department, Royal Liverpool and Broadgreen University Hospital NHS Trust, Prescott Street, Liverpool, L9 8XP Tel:0151 7064404/4782
Epsom (Surrey)	Enterovirus (e.g. Coxsackie, Echo Ab)	Department of Medical Microbiology,St Hellier Hospital, Wrythe Lane, Carshalton, SM5 1AA Tel: 020 8296 2468
Hospital for Tropical Diseases (UCLH Trust)	Parasite (e.g. schistosomiasis) serology	Department of Parasitology, Hospital for Tropical Diseases (UCLH Trust), Mortimer Market, Capper Street, Tottenham Court Road, London WC1E6AU. Tel: 0845 155500 x5968
Manchester PHE	CSF bacterial screen e.g. Meningococcal and Pneumococcal PCR	Meningococcal Reference Unit, Clinical Sciences Building 2, Manchester Royal Infirmary, Oxford Road, Manchester M13 9WL Tel: 0161 276 6757

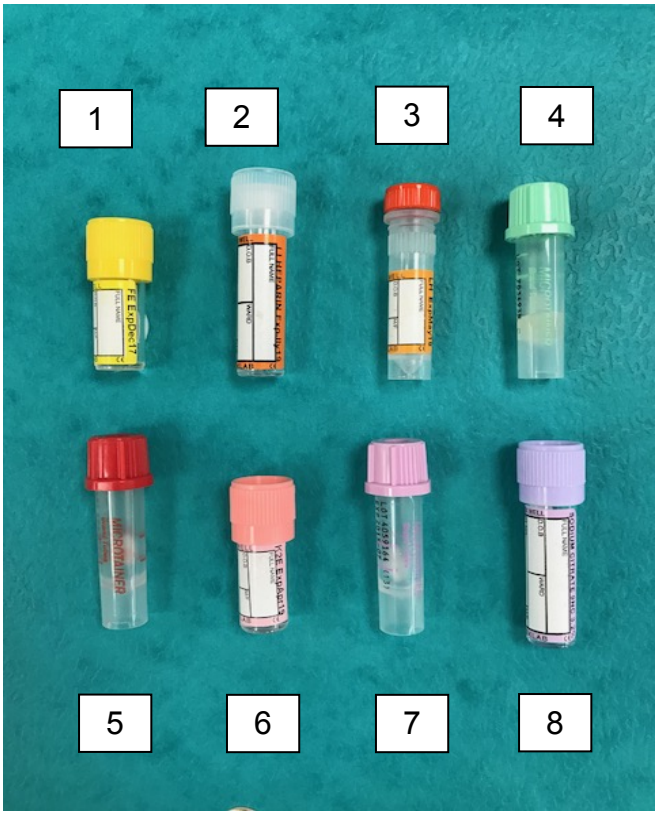
Mycobacterium Reference Unit	Fastrack TB PCR, TB blood cultures	Mycobacterium Reference Unit, South London PHE Lab, Bart's & the London, Queen Mary School of Medicine & Dentistry, 2 Newark Street, Whitechapel, London E1 2AT Tel: 020 73775895
Oxford Diagnostic Laboratories	TB T-spot	Oxford Diagnostic Laboratories, 94C Innovation Drive Milton Park, Abingdon, Tel:01235 433164
Poole Hospital NHS Foundation Trust Microbiology Laboratory	Mycobacterium culture (Liquid and solid culture media)	Poole Microbiology Laboratory, Poole Hospital NHS Foundation Trust, Longfleet Road, Poole, Dorset BH15 2JB Tel: 01202 442281
Porton Down	Tropical virus serology	Centre for Emergency Preparedness & Response, Porton Down, Salisbury, Wiltshire SP4 0JG Tel: 01980 612224
Royal Free Hospital Pond Street, London	HIV Genotypic Resistance Testing	Department of Virology, The Royal Free Hospital, Pond Street, London NW3 2QG Tel**:** 0207 7940500 ext 31626 / 36295 / 34951
Southmead Bristol	Amikacin, Teicoplanin, other antibacterials	Antimicrobial Reference Laboratory, Department of Microbiology, Southmead Hospital, Westbury-on-Trym, Bristol BS10 5NB. Tel: 01179595653
Toxoplasma Reference Laboratory	Toxoplasma confirmation after positive Salisbury IgM/IgG screening test	Toxoplasma Reference Laboratory, Singleton Hospital, Sgeti, Swansea SA2 8QA. Tel: 01792 285058
Virus Reference Department	HTLV, Hep D, Hep E RNA PCR/serology, HIV Proviral RNA PCR (children < 3 months), Hep. B DNA viral load.	Virus Reference Department, PHE Colindale, 61 Colindale Avenue, London NW9 5EQ. Tel: 020 8327 6017/6266

SPECIMEN REQUIREMENTS AND SAMPLE VOLUMES

This is the Vacutainer tube guide currently in use at Salisbury NHS Foundation Trust. This is also the order in which tubes should be drawn.

Draw Volume	Colour Code	Tube Type	Test / Special Instructions
10 ml Adults, 5ml Paediatrics		Blood Culture Bottles	Aerobic followed by anaerobic - if insufficient blood for both culture bottles, use aerobic bottle only. Use the Paediatric blood culture bottle for all paediatric cases (<5 yrs).
2.7 ml	Light Blue 	Sodium Citrate	Coagulation Studies, Anti-coagulant Control, INR, APTT, Thrombophilia Screen, Lupus Anticoagulant Screen, Factor assays.
3.5 ml	Gold 	SST™ II	All Routine Biochemistry Tests, Sex Hormones, PSA, Thyroid Function, Microbiology Serology Tests, HCV viral load & Qualitative/Quantitative HCV PCR, Growth Hormone on ice. Insulin on ice
5 ml	Green 	Lithium heparin	Limited Cell Markers and Genetic Tests, T-Spot
4 ml	Lavender 	EDTA	Full Blood Count, Monospot, Sickle Cell, Reticulocytes, Kleihauer, Direct antiglobulin test (if hand written demographics on bottle), HbA1c, Some Genetic Tests, Renin and Aldosterone, **Viral load**, Meningococcal & Pneumococcal PCR, some Cell Markers, ESR ACTH on ice.
6 ml	Pink 	Crossmatch	Blood Group, Crossmatch, Direct Antiglobulin Test (DAT).
2 ml	Grey 	Fluoride Oxalate	Fasting / Random Glucose, GTT, Alcohol Lactate on ice. Insulin on ice
7 ml	Navy 	Trace Elements	Trace elements. Chromium, cobalt Mercury to be kept dark

PAEDIATRIC SAMPLE TUBES



	Tube Type	Tube Contains	Use for
1	Yellow cap – Teklab 1.0 ml	Fluoride oxalate	Blood glucose (samples taken in GP surgeries) & plasma lactate CSF lactate & CSF glucose
2	Plain cap – Teklab 2.0 ml	Lithium heparin	Trace metals
3	Orange cap – Teklab 1.0 ml	Lithium heparin	Genetics
4	Green cap – with gel 0.6 ml	Lithium heparin	General biochemistry & plasma ammonia
5	Red cap – 0.5 ml	Plain	Serum Tobramycin
6	Pink cap – Teklab 0.5 ml	EDTA	All transfusion requests, FBC & other haematology, Paediatric HIV Pro-viral RNA load.
7	Lilac pink cap – 0.5ml	EDTA	HBA1c from Children's Diabetic Unit only
8	Lilac top – Teklab 1.0 ml	Sodium Citrate	Coagulation (stock tubes must be kept refrigerated prior to use)