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 (HTA) 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	**Green TQuest forms** for all electronic requests in haematology and biochemistry **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 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		Specimen container
• 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	• 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. bos 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 – 6.00pm 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

Salisbury Anticoagulation and Thrombosis Service

The team are based in the pathology outpatient department, level 3, Salisbury District Hospital. Mon-Fri 09:30 – 17:30

Contact: 01722 429006 DD or Ext 4006 or
email: sft.anticoagulation.service@nhs.net

The anticoagulation and Thrombosis service is a nurse led team consisting of nurses from a variety of nursing backgrounds with a wealth of experience.
The main objective of the nursing team is to deliver evidence-based care in preventing, diagnosing and treating VTE and also anticoagulation management using a patient centred approach.

The team run nurse-led outpatient clinics;

- **Warfarin clinic:**
  - Managing the anticoagulation therapy of approximately 100 patients per day.
  - Walk in clinic for phlebotomy blood test in the pathology out-patient department 8am-4pm
  - Blood testing at GP surgery and blood couriered to the lab (am GP appointment)
  - The anticoagulation nurses aim to review all INRs and dose these patients regularly throughout the day but the majority will be reviewed between 4 - 5:30 pm (please avoid contacted the team between these hours).
- **VTE clinic:**
  - The DVT clinic sees patients directly from the vascular department following a positive doppler scan. The referrals are received from GP's, A&E, Consultant OPD.

- The patients are assessed, treated and given health education on the same day as their scan.
- Patients are also seen in clinic following the diagnosis of PE, who are medically fit and do not require hospital admission

- **Bridging clinic:**
  - Patients are referred from POAU, endoscopy, radiology or other departments performing procedures who require guidance on stopping anticoagulation and perioperative management.
  - Patients are provided with guidance, bridging plan and supply of LMWH if bridging is required
  - Patients bridging with LMWH, will then be seen in clinic until the INR is back in therapeutic range and the LMWH can be discontinued
- **Anticoagulation clinic:**
  - GP / OPD consultant / A+E referrals for patients with new AF, for assessment and initiation of anticoagulation either Warfarin or DOAC
  - Medication reviews;
    - switching from Warfarin to DOAC
    - switching to alternative DOAC
    - switching from LMWH to DOAC
    - assessment and guidance on poor warfarin control
  - New patients moving into the local area
  - Assessment of patients using self-testing point of care devices for INR monitoring.
  - patients requiring capillary sampling with point of care devices;
    - patients who are difficult to bleed
    - communication issues
    - learning difficulties
    - or other reasons for requiring face to face regular guidance

The team also run an in-patient service, Monday - Friday (excluding BH);

- **Daily ward visits to;**
  - Review and dose the patients taking warfarin, using point of care testing
  - Assess, provide treatment guidance, and health education / counselling to all patients diagnosed with a new VTE. Facilitating rapid discharge for medically fit patients.
  - Assess, provide guidance and health education / counselling for patients with a new diagnosis of AF, requiring anticoagulation.
  - Review all patients on admission taking any class of anticoagulation and provide guidance on changes if required.
  - Guidance with VTE prophylaxis

Referrals

The team are happy to accept referrals from all members of the MDT and this can be simply achieved by doing any of the following:

- Accessing the electronic white board and adding the COAG icon. If the icon is red, we will pick this patient up as a new referral. Please add details in the comments box to give us an indication for the referral.
- Calling the anticoagulation team:
  - Ext 4006 (please note this phone is likely to be answered by our admin support worker).
  - Bleep 1413 (use for L2 wards) / 1440 (use for L4 wards), (these bleeps are carried by the nurses attending the wards)
  - Email: sft.anticoagulation.service@nhs.net
  - Completing our referral form which is available on Microguide: All Referral Forms section

Team:

Name	Position	Contact
Nicola McQuaid	Lead Anticoagulation and Thrombosis Nurse - NMP prescriber	nicolamcquaid@nhs.net Ext 4006 / 5437
Siew-Ling Phuan	Anticoagulation and Thrombosis Nurse – NMP prescriber	Siew-Ling.phuan@nhs.net Ext 4006
Leah Pecson	Anticoagulation and Thrombosis Nurse – NMP prescriber	leah.pecson@nhs.net Ext 4006
Glaiza Contreras	Anticoagulation and Thrombosis Nurse – NMP prescriber	glaiza.contreras@nhs.net Ext 4006
Maddie Stephenson	Anticoagulation and Thrombosis Nurse	madeleine.stephenson1@nhs.net Ext 4006
Vicky Simpson	Trainee Anticoagulation and Thrombosis Nurse	Victoria.simpson12@nhs.net Ext 4006
Danielle Woolnough	Administrative Support Worker	Ext 4006 / 5436

Bone marrow clinics

A clinic for routine bone marrow tests is in operation on Monday afternoons 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 and Endocrine clinics.

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 twelve regular haematology outpatient clinics per week held in Salisbury. Pre-chemotherapy clinics for haematology patients on treatment are held five times per week in the Oncology Outpatient Department.

Thrombosis and haemostasis Clinic

A thrombosis and haemostasis clinic is held in Salisbury every week, which runs on a Monday afternoons. 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 Managers:	Kate Chapman	**Ext: 2251**
	Sarah Oliver	**Ext: 2251**
Mortuary and Bereavement Manager:	Keri-Ann McDonnell- Rabbetts	**Ext: 2150**
Quality Manager	Faye Dear	**Ext. 3672**
Clinical Lead	Dr Matthew Flynn	**Ext. 4001**

Consultant Staff:	**Ext. 4108**
Dr I Cook	
Dr M Flynn	
Dr A Panigrahi	
Clare Raubusch	

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.

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.
……..…
Urgent specimens
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 fix 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 Microguide holds further information on consent requirements and the sensitive handling and disposal of these specimens Sensitive Disposal and Handling of pregnancy loss
Where genetic testing is also required specimen must be transported fresh (not in formalin) and sent to the Genetics department prior to histological analysis, genetic testing cannot be performed on fixed specimens.

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

All tests performed in-house are UKAS accredited following in house validation, when new tests are introduced, there will a period of time before the test is accredited and listed on the laboratory scope. Our service users should be assured that no test is used without full in-house validation to ensure result safety.
Some tests have to be outsourced to specialist centres, the table below holds a list of tests performed elsewhere. All suppliers have been approved for use by ensuring they are UKAS accredited to ISO15189:2012 the suppliers are regularly reviewed to ensure the referred test is listed in their accredited scope.

Referral centre	UKAS number	Referred investigation
University Hospitals Birmingham NHS Foundation Trust	8759	Lung specimens only – EGFR, ALK, PD-L1, ROS, BRAF,
Health Services Laboratories Advanced Diagnostics	9007	HER2, FISH, IHC antibodies not available in-house
Synnovis	9323	Wade Fite, Warthin Starry, Masson Trichrome, Von Kossa
University Hospital Southampton – Cellular Pathology	8178	immunofluorescence testing for oral surgery PDL1
University Hospital Southampton – Molecular Pathology	9194	KRAS NRAS BRAF
University Hospital Southampton – Neuropathology	8178	Muscle biopsies
Guy's and St Thomas' NHS Foundation Trust	8126	Immunofluorescence for dermatology
UCL Institute of Ophthalmology	8609	Routine histology of eye specimens
Royal National Orthopedic hospital	8680	Sarcoma specimens
Birmingham's women's and	8176	Current hub for genetic requests

children Hospital Solid Cancer Genomics, West Midlands		
Source Bioscience	9571	External reporting of all specimen types
LDPath	Pending	External reporting of all specimen types
Poundbury Cancer Institute	9387	External reporting of all specimen types

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

Post Mortem reports include further investigations from external sources which have been selected by H.M Coroner:

NMS Labs	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

Muscle biopsies

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

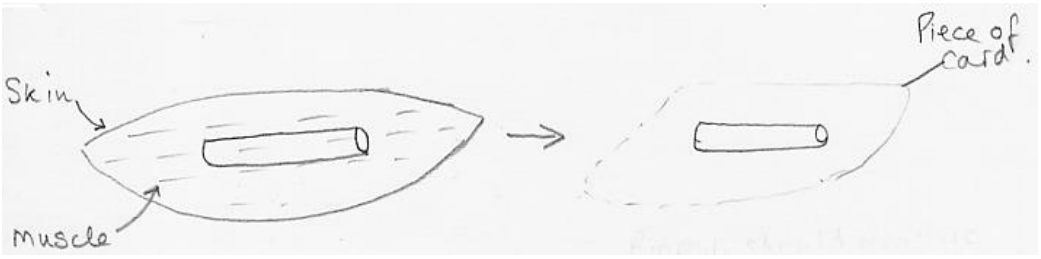
Consultation: An initial notification should be made either to a Consultant Neuropathologist or a member of the Neuropathology laboratory staff by telephone prior to the biopsy. If the initial notification is to the laboratory staff, they will recommend a consultation with a Consultant Neuropathologist.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

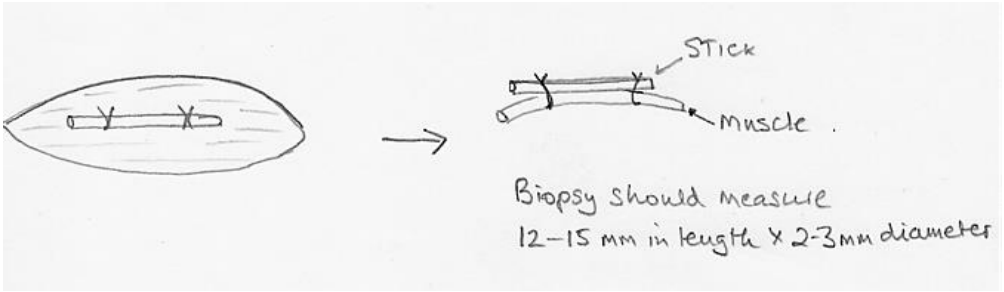
The procedure should be performed in the morning if possible to ensure safe arrival in Southampton during the working day. A full clinical history should accompany the biopsy.

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 (Cytolyt– clear fluid) before sending to lab.

- Urines – if no Cytolyt 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 Cytolyt.

Respiratory specimens: EBUS, Sputum, bronchial wash, brush and lavage.

Do not place in Cytolyt.
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 fid 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 fid 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 fid 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-fid 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 Cytolyt
The Consultant Pathologists are pleased to offer advice.
Health & Safety
Cytolyt 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 'whooshy' tube — DO NOT USE WHOOSHY TUBE FOR HISTOLOGY OR 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.". NHS England and NHS improvement (NHSEI) have also set similar benchmarks of 90% within 10 days for patients on a cancer pathway. The Cellular Pathology department formally audits specimen turnaround times against RCPath and NHSEI benchmarks on a monthly basis. When these benchmarks cannot be achieved the laboratory publishes locally agreed turnaround times (in line with NHSEI guidance of achievement of 95% of locally agreed targets) to ensure requesting Clinicians have defined expectations of results reporting for patient management. Whenever possible care is taken to provide timely diagnostic support to those patients on cancer pathways, this information should be noted by clinicians when requesting examination.

The Cellular Pathology department will continue to strive to deliver the RCPath and NHSEI benchmarks.

The department reports turnaround time directly to screening services such as NHSCSP and BCSP.

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.

Current published turnaround times to RCPath NHSEI benchmarks:

Specimen type	Turnaround time
All specimens	≥80% reported in 7 calendar days
All specimens	≥90% reported in 10 calendar days
Locally agreed turnaround time met	≥ 95%

Current published turnaround times for screening programmes:

Specimen type	Turnaround time
Bowel Cancer Screening Program (BCSP)	90% reported in 7 calendar days
	100% reported in 10 calendar days
Cervical Histology cases	80% reported in 7 calendar days
	90% reported in 10 calendar days

Current published turnaround time for outsourced reporting:

Supplier of diagnostic reporting	Turnaround time
Outsourced histology reporting - Bioscience	≥ 95% 21 calendar days
Outsourced Non-Gynae reporting - Bioscience	≥ 95% 21 calendar days
Outsourced histology reporting - LDPath	≥ 95% 21 calendar days

Current published locally agreed turnaround times:

Specimen type	Turnaround time
Non-Gynae cases	≥ 90% reported in 21 calendar days
Breast biopsy	≥ 90% reported in 14 calendar days
Urology biopsy (not template prostate)	≥ 90% reported in 14 calendar days
Lung biopsy	≥ 90% reported in 14 calendar days
Template Prostate	≥ 90% reported in 21 calendar days
Breast resections	≥ 90% in 21 calendar days
GI resections	≥ 90% in 21 calendar days
Cervical resections	≥ 90% in 21 calendar days
Urology resections	≥ 90% in 21 calendar days
SCC	≥ 90% in 21 calendar days
Melanoma	≥ 90% in 21 calendar days

If a report is required for a specific time (e.g. patient is on a cancer pathway,2 week wait, MDT meeting or outpatients appointment), please indicate this clearly on the request form and, where capacity allows, all effort will be made to ensure result is available.

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 information is available on the hospital wards and from the

department, please provide this 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. 2066
Blood Transfusion Laboratory Manager:	Caroline Mathews	Ext: 4048
Haematology Laboratory Manager:	Anushka Natarajan	Ext. 4048
Biochemistry Laboratory 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:	Bleep1492	Ext 4482

Consultant Staff:		**Ext.**	**Secretary**	**Bleep**
Consultant Haematologist:	Dr Jonathan Cullis	4828	5197/5421	
Consultant Haematologist:	Dr Louise Gamble	5424	5197/5421	
Consultant Haematologist:	Dr Effie Grand	4539	5197/5421	
Consultant Haematologist:	Dr Tracey Parker	5194	5197/5421	
Consultant Haematologist:	Dr James Milnthorpe	5420	5197/5421	
Consultant Haematologist:	Dr Lee Grimes	3807		
Consultant Haematologist:	Dr Alister Smith	3788		
Haematology Specialist Registrar	Dr Sally Bugg	3787		1015
Speciality Doctor	Dr Angela Clarke	2895		
Consultant Chemical Pathologist:	Dr Niki Meston	4047	4037	
Consultant Chemical Pathologist:	Dr Paul Downie	5427	4037	

Location:
Biochemistry, Haematology and Blood 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. 5427/4047**	**For non-urgent GP queries please email shc-tr.bioenquiries@nhs.net**
Interpretation and advice Haematology	**Ext. 5197/5421**	**For non-urgent GP queries please email shc-tr.haemenquiries@nhs.net**

EMAIL

All staff have nhs.net 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 to prevent cross contamination of preservatives affecting analysis.

- **Blood Culture**
- **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.
- **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.
- **Fluoride - Grey top.** GP and dynamic test Glucoses, confirmation of suspected hypoglycaemia, Ethanol and Lactate.
- **Royal Blue (EDTA).** Heavy metals, Trace metals (2 tubes), Zinc
- **White - non Vacutainer, Lithium heparin.** paediatric Zinc or Trace metals (2 tubes)
- **Navy blue (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, 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 – haemolysis, lipaemia and / or icterus will have an effect on some of the assays performed in Laboratory Medicine. If the sample integrity is not appropriate for the test requested, the laboratory will inform the requesting source.
- 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 source will not be telephoned for specimens that are rejected by the laboratory (unsuitable, mislabelled, insufficient or sample not received). The report will be issued electronically and the reason for rejection will be included.
The requesting source will still be telephoned for inpatient and urgent GP requests.

For Blood Transfusion, the requesting source will be telephoned for all rejected samples.

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 and clotted specimens cannot be tested.
- **Biochemistry** – grossly haemolysed samples cannot be tested.
- **Laboratory Medicine** – contaminated samples, for example TPN / drip arm contamination, cannot be tested.

Measurement Uncertainty

Measurement uncertainty is determined for each measurement procedure in the laboratory and these estimates are available to users on request. Please contact the

appropriate Laboratory Manager if information on measurement uncertainty is required.
For qualitative tests, factors affecting the final result are considered and steps taken to minimise the effect of any variables to ensure a standardised, consistent approach is maintained.

Reference Ranges

The source of our reference ranges are available upon request from the appropriate Laboratory Manager

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:

Radnor ward,
ED Resus
Labour ward
AMU
NICU
Laverstock ward,
Respiratory OPD
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 / Parenteral Nutrition

Dr Niki Meston and Consultant Gastroenterologists contribute to the hospital **TPN / Parenteral Nutrition Service** in conjunction with the Nutrition Support Team and Pharmacy. Please refer through the Nutrition Support Team on **ext. 4333.**

TDM – where possible please avoid sending these tests OOHs

All routine therapeutic drugs are analysed **daily.**

Serum **Digoxin**	6 hours post dose
Serum **Gentamicin** (pre dose only for once daily Gentamicin or pre- and 1 hour post dose for other regimes	Gentamicin is analysed 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**	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. Outside of routine hours (20.00 – 08.00), the bleep service should be used.

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.

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. Outside of routine hours (20.00 – 08.00), the bleep service should be used.

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 Students, including 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.

Sample Integrity

- 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.

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, except in the case of paediatric / ICU consultants requesting platelets.

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

ADD-ON TESTS

Can be made on suitable samples, please contact the Blood Transfusion Laboratory directly for more information (ext. 4022/4123). Outside of routine hours (20.00 – 08.00), the bleep service should be used.

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)	17OHP1	Gold / serum	So'ton - Clinical Biochemistry	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 - Clinical Biochemistry	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

5HIAA (Quantitative)	HIAA24	24 hr urine (glacial acetic acid)	So'ton - Clinical Biochemistry	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 or Gold / serum	B'Ham IEM lab	15 days	No	Discuss with duty Biochemist first. Take blood Mon – Wed ONLY.	
ACE	SACE1	Gold / serum	Southampton	< 1 day		See Angiotensin Converting Enzyme	20-95 U/L
Acetyl Choline Antibody/ Motor End Plate Antibody	ACRAB	Gold / serum	Oxford Immunol	14 days	No	Haemolysed, lipaemic or samples that contain high levels of RhF can	$<5 \times 10^{-10}$ mol/L

Acetyl Cholinesterase	AACHO	Amniotic Fluid (15-20 wks)	Sheffield - Immunology & PRU	2 days	No	produce false results. Microbial contaminated samples.	Negative - see report
ACT						See Alpha 1 anti-Chymotrypsin	
ACTH	ACTH2	Lavender / plasma – must be separated within 2 hrs	So'ton - Clinical Biochemistry	5 working days	No	EDTA Plasma ONLY spun and plasma frozen within 24 hours	<46 ng/L
Activated Partial Thromboplastin Time (APTT)	APTT	Blue / citrate	SDH	4 hours	Yes	Up to the fill line on the blue top citrate tube.	0.7 – 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
Adalimumab	ADALI	Gold / serum	Exeter	10 working days	No		Total Antibody concentration >/= 10 AU/mL is positive
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 (CH50)	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)	ALT	Gold / serum	SDH	1/2 day	Yes	In profiles: L4, LCAP4	M: 10-50 U/L F: 10-35 U/L
Albumin	ALB	Gold / serum	SDH	1/2 day	Yes	In profiles: BON, L4, RENA, LCAP4	Adults: 35-50 g/L <1 yr: 30-45 g/L 1-16 yrs: 30-50 g/L
Albumin / Creatinine Ratio	ACR	Early morning urine	SDH	1 day	Yes	N/A	0 - 3 mg/mmol
Alcohol (see Ethanol)						See Ethanol	
Aldosterone / Renin Ratio						See Renin / Aldosterone Ratio	

Alkaline Phosphatase (ALP)	ALP	Gold / serum	SDH	1/2 day	Yes	In profiles: BON, L3, RENA, LCAP3	Males 0-14 d 83-248 U/L 15d-<1yr 122-469 U/L 1yr - <10yr 142-335 U/L 10-<13yrs 129-417 U/L 13-<15yrs 116-468 U/L 15-<17yrs 83-331 U/L 17-<19yrs 55-149 U/L 19-110yrs 40-129 U/L Females 0-14 d 83-248 U/L 15d-<1yr 122-469 U/L 1yr - <10yr 142-335 U/L 10-<13yrs 129-417 U/L 13-<15yrs 57-254 U/L 15-<17yrs 50-117 U/L 17-<19yrs 45-87 U/L 19-110yrs 35-104 U/L

Alkaline Phosphatase Isoenzymes	ALPIA	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	7 working days	No		See report or contact laboratory
Antibody Panel	P	Pink / EDTA	SDH	1 day	Yes	If further investigation is required, TAT could be up to 5 days.	N/A
Antibody Screen	OS	Pink / EDTA	SDH	4 hours	Yes		N/A
Alpha 1 Anti-Trypsin - AAT	AATS	Gold / serum	SDH	1/2 day	Yes	N/A	0.9-2.0 g/L

Alpha 1 Anti-Trypsin *Genotyping*	-	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
Alpha Feto Protein - AFP *(Tumour Marker)*	AFPE	Gold / serum	SDH	1/2 day	Yes	N/A	0 - 6 kU/L
Alpha Galactosidase	COM	Blood Spot	Glasgow QE	3 working days			
Alpha Subunit	COM	Gold / serum	Barts and the London NHS Trust	4 weeks	No		See report or contact laboratory

Aluminium	ALS	Navy /Trace (k2EDTA)/ blood	So'ton - Clinical Biochemistry	6 working days	No	Sent Mon – Fri	See report or contact laboratory
Amino Acids (serum)	COM	Gold / serum	So'ton - Clinical Biochemistry	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
Amino Acids (Urine)	UAAS	Random (children). 24 hr urine (adults)	So'ton - Clinical Biochemistry	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 - Clinical Biochemistry	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	0.5-2.0 mg/L
Amisulpride	COM	4 mL of ETDA whole blood is preferred (pre-dose or 'trough' sample). Serum or	King's London	5 working days	No	Please refrigerate (if possible) if not sending immediately. Send by first class post.	100-400 µg/L

		plasma can be used if required, but please avoid gel-separator tubes.					
Ammonia	AMM	Purple / EDTA	SDH	1/2 day	Yes	Contact lab **before** taking samples. Immediate results	Up to 4 weeks: <100 umol/L 4 weeks - 110 yrs: <50 umol/L
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	N/A	28-100 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	N/A	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

ANCA (Anti-Neutrophil Cytoplasmic Antibody)	VASC (MPO1 and PR31)	Gold / serum	So'ton - Immunology	5 working days	No	Urgent positive results may be confirmed by telephone	Pos / Neg
Androstenedione	AND1	Gold / serum	So'ton - Clinical Biochemistry	10 working days	No	Sent Mon – Fri. Store at -20^{0}C	Males 0-1 week 0.1-1.2 nmol/L 1 week-3 months 0.4-3.3 nmol/L 3-6 months 0.1-1.9 nmol/L 6-24 months 0.1-0.5 nmol/L 2-3 years 0-0.4 nmol/L 4-5 years 0.1-0.6 nmol/L 6-7 years 0-1.0 nmol/L 7-9 years 0.1-1.1 nmol/L 10-11 years 0.2-1.4 nmol/L 12-13 years 0.4-2.2 nmol/L 14-15 years 0.6-3.3 nmol/L 16-17 years 1.1-4.0 nmol/L 18-40 years 1.2-4.7 nmol/L >40 years 0.8-3.1 nmol/L Females 0-1 week 0.1-4.4 nmol/L 1 week-3 months 0.2-2.4 nmol/L 3-6 months 0.1-1.7 nmol/L 6-24 months 0-0.5 nmol/L 2-3 years 0-0.6 nmol/L 4-5 years 0.1-0.7 nmol/L

							6-7 years 0.1-1.0 nmol/L 7-9 years 0.1-1.5 nmol/L 10-11 years 0.3-4.3 nmol/L 12-13 years 0.8-6.1 nmol/L 14-15 years 1.4-7.0 nmol/L 16-17 years 1.2-7.4 nmol/L 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	Southampton	< 1 day		See Angiotensin Converting Enzyme	20-95 U/L

Anti-Mullerin Hormone (AMH)	AMH	Gold / serum	Plymouth	2 weeks	No		F >18 years ref range: <3 pmol/L Very Low, 3-8 pmol/L Low, 9-25 pmol/L Satisfactory, 26-40 pmol/L Optimal, >40 pmol/L High. M >18years ref range: 5 - 115 pmol/L
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		N/A
Anti-B2 Glycoprotein (B2GP1)	AB2G1	Gold / serum	So'ton - Immunology	10 working days	No		0-20 u/mL

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)	ACAR1 (ACARG)	Gold / serum	So'ton - Immunology	15 working days	No	º anti-phospholipid Ab.	0-20 u/mL
Anti-Cardiolipin Antibody IgM (Anti-Phospholipid Antibody)	ACAR1 (ACARM)	Gold / serum	So'ton - Immunology	15 working days	No	º 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	DNA1	Gold / serum	So'ton - Immunology	5 working days	No		0-15 IU/mL
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	14 days	No		N/A
Anti-Gad (glutamic acid decarboxylase) Antibody	TICS (GADAB)	Gold / serum	Royal Devon and Exeter Hospital	2 weeks	No	Anti GAD is now part of Triple Islet cell antibody Screen.	GAD Positive: >/= 11 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	AGBM A1	Gold / serum	So'ton - Immunology	3 working days	No		0-1 AI NB AI stands for Antibody Index
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	21 days	No	Part of Purkinje Cell Ab screen or Paraneoplastic Antibodies	N/A
Anti-Islet Cell Antibody	TICS (IA2AB)	Gold / serum	Royal Devon and Exeter Hospital	2 weeks	No	Anti-Islet Cell Antibody is now part of Triple Islet cell antibody Screen.	

Anti-La	ENAF	Gold / serum	So'ton - Immunology	5 working days	No		Pos / Neg
Anti-MAG (Myelin Associated Glycoprotein	MAGAB	Gold / serum	Oxford Immunol	14 days	No		0-1000
Anti-Mitochondrial (M2) 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		N/A
Anti-Ri (Paraneoplastic Abs)	PNEO	Gold / serum	Oxford Immunol	21 days	No	Part of Purkinje Cell Ab screen	N/A

Anti-Ro Antibody	ENAF	Gold / serum	So'ton - Immunology	5 working days	No	Part of ENA screen	Pos / Neg
Anti-Smooth Muscle Antibody (SMA)	LAIP	Gold / serum	So'ton - Immunology	5 working days	NO	See LAIP	Pos / Neg
Antithrombin	AT	3 x Blue / citrate	Basingstoke Coag	14 days	Consultant Request		81.4 – 126.6 iu/dL
Anti-Yo (Paraneoplastic Abs)	PNEO	Gold / serum	Oxford Immunol	21 days	No		N/A

Apixaban		1 x 4.5ml Citrate	Basingstoke Coag	On request or 5 working days	Consultant Request	No 'therapeutic range' has been established, therefore observed peak and trough concentrations are described.	
Apolipoprotein A-I and B	COM	Gold / serum	Sheffield PRU	7 working days	No		Apolipoprotein A-I Male | 1.10 – 2.05 g/L Female | 1.25 – 2.15 g/L Apolipoprotein B Male | 0.55 – 1.40 g/L Female | 0.55 – 1.25 g/L Apo B/Apo A-I ratio Male | 0.35 – 1.00 Female | 0.30 - 0.90
Aquaporin 4	AQP4	Gold / serum	Oxford Immunol	14 days	No		N/A

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	N/A
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	N/A	M: 10-50 U/L F: 10-35 U/L
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
Azathioprine metabolites(6-TGN & 6-MMPN	COM	Lavender / EDTA / whole blood	Guy's and St Thomas's Hospital	5 working days	No		235 - 450 pmol/8x10e8rbc
Basal ganglia Abs	COM	Gold / serum	Queens Sq London	10 working days	No	1st class post, sample not haemolysed	N/A
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 laboratory within 48 hours of sampling EDTA	N/A

Bence-Jones Protein	BJP	Early morning urine	SDH	1 day	Yes	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	B2MS1	Gold / serum	So'ton - Immunology	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	Adult : 22 – 29 mmol/L Paed : 19-28 mmol/L
Bile Acids / Salts	BILE	Gold / serum	SDH	1/2 day	Yes	Useful if LFTs are NORMAL	0-10umol/L
Total Bilirubin	BIL2	Gold / serum	SDH	1/2 day	Yes	N/A	14d - 110yrs: < 21 umol/L
Direct Bilirubin	PBIL (Paed) DBIL (Adult)	Lith. Hep / plasma (Paed) Gold / serum (Adult)	SDH	1/2 day	Yes	N/A	<7 umol/L

Biopterins	COM	Blood spots (screen) or green Lith.Hep / plasma	B'Ham Neonatal	15 working days	No	Ideally collect when blood phenylalanine is increased Store frozen prior to shipment	see report or contact laboratory
Biotinidase	COM	Lith. Hep / plasma	Sheffield Children's Hospital	14 working days			
Blood Film	F	Lavender / EDTA / whole blood	SDH	1 day	Yes		N/A
Blood Gases	BGAS	**Hep syringe ice**	SDH	POCT	Yes	POCT devices ONLY	See report or contact laboratory

Blood Group Adult routine	OF / OC	Pink / EDTA	SDH	4 hours	Yes		N/A
Blood Group and Antibody Screen	GO, OFS, OCS, OBC	Pink / blood (6 ml) or paed pink / blood (0-6 /12 babies)	SDH	1 day	Yes		N/A
Blood Group Complicated	RAS	Pink EDTA	RCI NHSBT Filton	7 working days	No		See report or contact laboratory
Blood Group Neonate	OBC	Paed Pink / EDTA	SDH	4 hours	Yes	Up to fill line, overfilled samples will clot	N/A

BNP **N terminal pro B type natriuretic peptide**	BNP	Gold / serum	SDH	1/2 day	Yes	To rule out heart failure	<400 ng/L
Bone Marrow (Aspirate) Iron	BMAFE	Bone Marrow	SDH	2 days	Yes		Interpretive comment on report
Bone Marrow (Aspirate) & Trephine Biopsy	BM	Bone marrow	SDH	7 days	No	Discuss with Consultant Haematologist. Can be performed urgently if required within 1 day.	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
Complement - C3	C3C4	Gold / serum	SDH	1/2 day	Yes	N/A	0.9-1.8 g/L
Complement - C4	C3C4	Gold / serum	SDH	1/2 day	Yes	N/A	0.1-0.4 g/L
CA 125	CA125 E	Gold / serum	SDH	1/2 day	Yes	N/A	< 35 kU/L
CA 15-3	CA153 E	Gold / serum	SDH	1/2 day	Yes	N/A	0-29 kU/L

CA 19-9	CA199 E	Gold / serum	SDH	1/2 day	Yes	N/A	0-34 kU/L
Caeruloplasmin	CAER	Gold / serum	So'ton - Clinical Biochemistry	2 days	No	Mon – Fri. Plasma Copper also helpful	150-320 mg/L (in-house reference range study 2016)
Caffeine	COM	Gold / serum	Heartlands - Birmingham	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 uncuffed	Adult: 2.20 – 2.60 mmol/L Neonate < 6d: 1.95 - 2.75 mmol/L Paediatric 6d -1y: 2.15 - 2.75 mmol/L Paediatric >1y - 4 y: 2.15 - 2.60 mmol/L
Calcium	CAU24	24 hr urine	SDH	1 day	Yes	N/A	2.5 – 7.5 mmol/24h
Calcium / Creatinine Clearance Ratio	CACL	24 hr urine (fresh) + gold/serum	SDH	1 day	Yes	Serum Calcium and Creatinine during or at end of collection	See report or contact laboratory
Calcium / Creatinine Ratio	CACR	Random urine (fresh)	SDH	1 day	Yes	1st random urine after overnight void ideally	See report or contact laboratory

Calprotectin	CALP	Faeces	SDH	5 days	Yes	N/A	Comment added to all results.
Carbamazepine	CARBB	Gold / serum / (pre-dose)	SDH	1/2 day	Yes	N/A	4 – 12 mg/L Pre-dose
Carbohydrate – Deficient Transferrin	CDT	Gold / serum	Sheffield - Immunology & PRU	5 days	No		0.0-2.6 %
Carbon Monoxide	COHB	Green / Lith. Hep. / Whole Blood	SDH	POCT	Yes	See Blood Gas POCT only	See guide to profiles and test groups
Carboxy-Haemoglobin	COHB	Green / Lith. Hep. / 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 and Carotenoids	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 and freeze.	α 14-60 µg/L β 90-310 µg/L
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
CCP Antibody (Cyclic Citrullinated Peptide)						See Cyclic Citrullinated Peptide	

Soluble CD25	COM	Gold / serum	GOS Immunology				
CEA	CEAE	Gold / serum	SDH	1/2 day	Yes	N/A	<5 µg/L
Cell Markers: Bone Marrow	BMCM	Bone marrow in orange, screw cap, heparin	So'ton - Immunology	9 days	No	*Same day in urgent cases	N/A
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	N/A

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	N/A
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	N/A
Chloride	CL	Gold / serum (Urine not avail)	SDH	1/2 day	Yes	Renal / Paeds or special requests only	Adult: 95 – 108 mmol/L <22d: 95 - 110mmol/L

Chloride	SWCL	Sweat	SDH	1 day	Yes	Sweat Test – Primary analyte. Contact laboratory to arrange.	< 40 mmol/L (children/adults 6 months and older) <30 mmol/L (under 6 months)
Cholesterol ***(Total)***	CHOL	Gold / serum	SDH	1/2 day	Yes	NICE guidelines CG181. Cardiovascular disease: risk assessment & reduction including lipid modification.	NICE guidelines CG181. Cardiovascular disease: risk assessment & reduction including lipid modification.
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	10 weeks	No	Sent Mon – Thurs. Done for confirmation / family studies 1st class post ASAP Sample should not be taken during a suspected episode of suxamethonium prolonged apnoea, take once awake and breathing unaided.	<5300 U/L
Cholinesterase *Phenotyping*	COM	Gold / serum	Bristol S'mead	3 weeks	No	Sent Mon – Thurs. Done if cholinesterase low or for family studies 2nd class post ASAP Sample should not be taken during a suspected episode of suxamethonium prolonged apnoea, take once awake and breathing unaided.	N/A

Chromium	CHRO	Navy / Trace / whole blood	So'ton - Clinical Biochemistry	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	CYCLR	Lavender / EDTA / whole blood	Portsmouth	48 hours	No	Cannot be shared with other tests	Enquires are referred to a clinical scientist

Ciclosporin	CYCSO 1	Lavender / EDTA or Green / Lithium heparing whole blood	So'ton - Clinical Biochemistry	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 mg/L but no firm therapeutic range exists for cyclosporin in whole blood. The complexity of the clinical state, individual differences in sensitivity to immunosuppressive and nephrotoxic effects of cyclosporin, coadministration of other immunosuppressants, type of transplant, time post transplant, and a number of other factors contribute to different requirements for optimal blood levels of cyclosporin. 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, and each assay user must establish ranges based on clinical experience

Citrate	COM	Random urine / 24hr urine	UCL London	5 days	No	1st Class Post Methodology Citrate lyase Metrological traceability Limited data available from manufacturer Reportable range 0.1-4.0 mmol/L (to 20mmol/L on dilution) Measurement uncertainty For a nominal concentration of 0.37 mmol/L MU is ±13.4% (i.e. 0.32 – 0.42 mmol/L). For a nominal concentration of 1.31 mmol/L MU is ±8.4% (i.e. 1.20 – 1.42 mmol/L	24 hour excretion Males: 0.6 - 4.8 mmol/24h Females: 1.3 - 6.0 mmol/24h Citrate/creatinine ratio Males: 0.04 - 0.33 mmol/mmol Females: 0.11 - 0.55 mmol/mmol
CK (see Creatinine Kinase)						See Creatinine Kinase	

CK Isoenzymes	COM	Gold / Serum	Royal Free London	1 month	No	1st class post	In a healthy individual, CK-MM should account for 97-100% of CK present. CK-MB makes up the remaining 0-3%.
Clobazam	COM	Gold / serum	Chalfont St. Peter	3 working days	No	Discuss with Biochemistry	Clobazam: 30-300 Desmethylclobazam: 300-3000
Clonazepam	COM	Gold / serum	Chalfont St. Peter	3 working days	No		20-70
Clonidine Stimulation (GH series)	COM	Serum taken at -30.0, 0, 30, 60, 90, 120 minutes	So'ton - Specialist Biochemistry	5 working days	No	Check times on samples and send FROZEN	N/A

		i.e. 6 samples					
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.	INR 0.8-1.2 APTT 0.8-1.2 FIBA 2.0-4.0 (Please note therapeutic ranges may vary)
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 - Clinical Biochemistry	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
Copper	COPS	Navy / Trace / plasma (adults) or Trace / plasma (paeds)	So'ton - Clinical Biochemistry	4 working days	No	Sent Mon – Fri. See also TRACE METALS	See report or contact laboratory
Copper	COPU	24 hr Urine (plain)	So'ton - Clinical Biochemistry	6 working days	No	Sent Mon – Fri.	See report or contact laboratory
Cortisol	CORE	Gold / serum / (0900 am ideally)	SDH	1/2 day	Yes	Phone duty Biochemist out of hours dynamic test or day curve may be more useful.	See laboratory report for interpretive comments or contact laboratory.

Cortisol (Urine Free)	UCOR	24 hr Urine	So'ton - Clinical 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. Store at -20^{0}C	Adult reference ranges (nmol/24 hours) Females (≥18 y 0 days) 0 – 118 Males (≥18 y 0 days) 0 – 165 Paediatric reference ranges (nmol/24 hours) 3 y 0 days – 8 y 364 days 0 – 55 9 y 0 days – 12 y 364 days 0 – 102 13 y 0 days – 17 y 364 days 0 – 154
Cortisol Blood Spot Series	COM	Blood spots	So'ton - Clinical 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	CPEP3	Gold / serum **/ (to lab urgent)**	So'ton - Clinical 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, ie 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	N/A	< 5 mg/L
Creatinine	CREAT UEC RENA	Gold / serum	SDH	1/2 day	Yes	N/A	Adult M: 59-104 umol/L Adult F: 45-84 umol/L 2-12m: 14-34 umol/L 1-<3y: 15-31 umol/L 3-<5y: 23-37 umol/L 5-<7y: 25-42 umol/L 7-<9y: 30-47 umol/L 9-<11y: 29-56 umol/L 11-<13y: 39-60 umol/L 13-<15y: 40-68 umol/L

Creatinine	CREU24	24 hr Urine (plain)	SDH	1 day	Yes	N/A	F: 6.0 - 13 mmol/24h M: 9 - 19 mmol/24h
Creatinine	CREUR	Random Urine	SDH	1 day	Yes	N/A	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 report or contact laboratory
Creatinine Kinase	CK	Gold / serum	SDH	1/2 day	Yes	N/A	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.	N/A
CRP (see C-Reactive Protein)						See C-Reactive Protein	
Cryoglobulins	CRYO	3 x Gold / serum 2 x Lavender / EDTA / plasma	SDH	1 week	Yes	**Laboratory MUST be contacted in advance of this test being performed Tubes MUST be pre-warmed and sent to lab warm**	See report or contact laboratory
CSF Cytospin, CSF Examination For Abnormal WBCs / Blast Cells	CSF	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	

(see Xanthochromia)							
Cyanide							
Cyclic Citrullinated Peptide Antibody (CCP)	CCP1	Gold / serum	SDH	1/2 day	Yes	N/A	<17 u/mL
Cystatin C	COM	Gold / serum	Synnovis - King's College London	1 working day			
Cystine Quantitative (See Amino Acids URINE)	COM	24 hr Urine (acid)	So'ton - Clinical Biochemistry	10 working days	No	Mon – Fri. Urine amino acids assayed	See report or contact laboratory

Cystine Screen (See Amino Acids URINE)	UCYSN	Random urine	So'ton - Clinical Biochemistry	10 working days	No		See report or contact laboratory
Cystinosis (Leucocyte Cystine)	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
Cytochemistry Stains	CYTOCH	Lavender / EDTA / whole blood	SDH	2 working days	No	Discuss with Consultant Haematologist	See report or contact laboratory
Dabigatran	DABIG	3 x Blue / citrate	Basingstoke Coag	On request or 5 working days	Consultant Request		Peak range 64-443 ng/ml

D-Dimer	DDIM3	Blue / citrate	SDH	1 hour	Yes	To be used in conjunction with clinical scoring for exclusion of DVT.	0.0-0.5 µg/mL
Dexamethasone Suppression Test	DEXE	Gold / serum / **(0900 am)**	SDH	1 day	Yes	N/A	See report or contact laboratory
DHEAS	DHEA1	Gold / serum	So'ton - Clinical Biochemistry	10 working days	No	Mon – Fri Store at -20^{0}C	Interpretive comment on report
Digoxin	DIGC	Gold / serum / (6-12 hr post dose)	SDH	1/2 day	Yes	N/A	0.8 – 2.0 µg/L 6 – 12 hours post dose

Dihydrotestosterone	COM	Gold / serum	Barts and the London NHS Trust	21 days	No	1st class post	See report or contact laboratory
Direct Antiglobulin Test (DAT)	ODAT / MODAT	Pink / EDTA	SDH	4 hours	Yes		N/A
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	Oxford University Hospital (via Portsmouth)	3 days	No	Mon - Thur. Counselling required. Separated within 48 hours	Results are given as a chance >1/150 is considered higher chance and referred for further testing

Drug Induced Antibody Mediated Neutropenias	RAS	Yellow SSt + Sample of implicated drug	H&I NHSBT Filton	20 working days	No		See report or contact laboratory
Drug Screen / Toxicology	COM	Random urine (30 ml minimum) + Gold / serum + Lavender / EDTA blood + grey / Fluoride plasma + Gastric	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. 1st class post	See report or contact laboratory

		aspirate, tissues, vomit					
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	1/2 day	Yes	Part of UEC CKD-EPI formula in adults.	Contact laboratory for interpretive advice if required
Elastase (see Pancreatic Elastase)						See Pancreatic Elastase	
Electrolytes (Na + K)	NAU / KU	24 hr urine (plain)	SDH	1 day	Yes	N/A	Contact laboratory for interpretive advice if required

Electrolytes (Na + K)	NAFL/ KFL	Pleural / wound / drain fluids	SDH	1/2 day	Yes	N/A	Contact laboratory for interpretive advice if required
Electrophoresis	IG (EPS)	Gold / serum	SDH	5 days	Yes	N/A	See report or contact laboratory
ENA (Extractable Nuclear Antigens) Screen	ENAF	Gold / serum	So'ton - Immunology	5 working days	No	Includes Ro, La, RNP, Scl70, Jo-1, Sm and centromere B antigens	Pos / Neg
ESR	ESR1	Lavender / EDTA	SDH	1 day	Yes	Temp Arteritis, PMR, ?myeloma, Paediatric ME, Rheumatology and Hodgkin's disease ONLY	Male Female 17-50yrs: 0-10 0-12 51-60yrs: 0-12 0-19 61-70yrs: 0-14 0-20 >70yrs: 0-30 0-35
Ethanol	ALCOP	Grey / fluoride plasma	SDH	1/2 day	Yes	N/A	Contact laboratory for interpretive advice if required

Erythropoietin	EPOA	Gold / serum	So'ton - Clinical Biochemistry	1 working day	No	Serum is the sample of choice although lithium heparin plasma can be used if serum is not available. Please note EDTA plasma is not acceptable.	Flushing, slowing of reflexes,
Ethosuximide	ETHO	Gold / serum	B'Ham City (incl toxicology)	10 working days	No	Mon – Thur. 1st class post	impaired visual acuity
Extended RBC Phenotype	RAS	Pink EDTA	RCI NHSBT Filton	7 working days	No		> 100 mg/dL Depression of CNS
Factor II Assay	FAC2	2 x Blue / citrate	SDH	1 week	Yes	Discuss with Consultant Haematologist Sample separated and	> 400 mg/dL Fatalities reported

						plasma frozen until analysis	
Factor V Assay	F5	2 x Blue / citrate	SDH	1 week	Yes	Discuss with Consultant Haematologist Sample separated and plasma frozen until analysis	50-150%
Factor V Leiden Genotype	LEID	Lavender / EDTA / whole blood	SDH Wessex regional Genetics	4 weeks	Yes	**Send to Regional Genetics Salisbury**.	N/A
Factor VII Assay	F7	2 x Blue / citrate	SDH	1 week	Yes	Discuss with Consultant Haematologist Sample separated and plasma frozen until analysis	50-150%
Factor VIII Assay	F8C	2 x Blue / citrate	SDH	1 week	Yes	Discuss with Consultant Haematologist Sample separated and plasma frozen until	50-150%

						analysis	
Factor VIII Inhibitor (and any other Clotting factor inhibitor)	F8I	2 x Blue citrate	SDH	1 week	Yes	Discuss with Consultant Haematologist Sample separated and plasma frozen until analysis	N/A
Factor IX Assay	F9C	2 x Blue / citrate	SDH	1 week	Yes	Discuss with Consultant Haematologist Sample separated and plasma frozen until analysis	50-150%
Factor X Assay	F10	2 x Blue / citrate	SDH	1 week	Yes	Discuss with Consultant Haematologist Sample separated and plasma frozen until analysis	50-150%
Factor Xa (anti Xa) Heparin (LMWH)	LMWH XA	1 x Blue / citrate	SDH	1 day	Yes	Monitoring of LMWH At least 1 ml plasma from citrate separated and frozen if not tested same	LMWH Treatment: 0.5-1.0 IU/ml LMWH Prophylaxis: 0.4-0.8 IU/ml

						day.	
Factor Xa (anti Xa) Heparin (UFH)	UFHXA	1 x Blue / citrate	SDH	1 day	Yes	Monitoring of UFH At least 1 ml plasma from citrate separated and frozen if not tested same day.	UF Heparin: 0.3-0.7 IU/ml
Factor Xa (anti Xa) (DOAC)	F10A	2 x Blue / citrate	Basingstoke Coag	1 day		Notes - Monitoring of DOAC	Reference range not reported - clinical interpretation.
Factor XI Assay	F11	2 x Blue / citrate	SDH	1 week	Yes	Discuss with Consultant Haematologist Sample separated and plasma frozen until analysis	50-150%
Factor XII Assay	F12	2 x Blue / citrate	SDH	1 week	Yes	Discuss with Consultant Haematologist Sample separated and plasma frozen until analysis	50-150%
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 >17y: 13-150 µg/L M >20y : 30– 400 µg/L
Fetal/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 / plasma	Cardiff Toxicol	7 days	No	Pre-dose Gel tubes must be avoided	0.15-0.9 mg/L
FMH Estimation	KLEI	Pink EDTA	RCI NHSBT Filton	Verbal result within 60 hours post sensitising event	No		See report or contact laboratory

FMH Quantification	RAS	Pink EDTA	RCI NHSBT Filton	Verbal result within 60 hours post sensitising event	No		See report or contact laboratory
Folate (Serum)	SFOL5	Gold / serum	SDH	1/2 day	Yes	N/A	3.9- 26.8 µg/L
Follicle Stimulating Hormone - FSH	FSHE	Gold / serum	SDH	1/2 day	Yes	N/A	See report or contact laboratory
Free Androgen Index (FAI)	FAI	*Derived test*	SDH	1/2 day	Yes	See Sex Hormone Binding Globulin	Male 20y - 49y: 35.0 - 92.6 Male >50: 24.3 - 72.1 Female 20y - 49y: 0.3 - 5.6 Female >50: 0.2 - 3.6

Free Fatty Acids	COM	Grey / fluoride plasma / (**on ice)**	B'Ham - Newborn Screening & Biochemical Genetics	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	Yes	Discuss with Consultant Haematologist	Free Kappa: 3.3 - 19.4 Free Lambda: 5.7 - 26.3
Free Light Chains for amyloid	COM	Gold / serum	Royal Free London	5 working days	No	1st class post	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)	FPSA	Gold / serum	Charing X SAS Lab		No	See Prostate Specific Antigen	

Free T3	FT3E	Gold / serum	SDH	1/2 day	Yes	N/A	0d - 6d: 2.7 - 9.7 pmol/L 7d - 14d: 3.0 - 9.3 pmol/L >14d: 3.1 - 6.8 pmol/L
Free T4	FT4E	Gold / serum	SDH	1/2 day	Yes	N/A	0d - 6d: 11.0 - 32.0 pmol/L 7d - 14d: 11.5 - 28.3 pmol/L >14d: 12.0 - 22.0 pmol/L
Free Testosterone (Calculated)	CFT	Gold / serum	SDH	1/2 day	Yes	N/A	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)	FBC3	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 day of sampling Lithium Heparin send as whole blood, stable for up to 5 days	Qualitative report provided

Gamma Glutamyl Transferase	GGT3	Gold / serum	SDH	1/2 day	Yes	N/A	M: <60 U/L F: <40 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	SDH	1/2 day	Yes	N/A	Please refer to guidance on Microguide. Interpretive comments added to reported results
Gentamicin ***(Other Regimes)***	GENTB	Gold / serum pre and 1 hr post dose,	SDH	1/2 day	Yes	N/A	Please refer to guidance on Microguide. Interpretive comments added to reported results

Gentamicin *(Random Sample)*	GENTRB	Gold / serum state time	SDH	1/2 day	Yes	N/A	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	
Glandular Fever Test (see Infectious Mononucleosis)						See Infectious Mononucleosis	
Globulin	GLOB	*Derived test*	SDH	1/2 day	Yes	N/A	>18y: 21 – 37 g/L
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 Morte m)	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	Children up to 16yrs : 3.3 - 4.4 mmol/L Adults over 16 yrs : 2.2 - 3.9 mmol/L
Glucose – GPs or more than 4 hrs delay	GLUF GLFF	Grey / fluorid e plasma	SDH	1/2 day	Yes	N/A	Non fasting: 3.3-7.7 mmol/L Fasting 3.3 - 6.0 mmol/L

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
Glucose – Wards / less than 4 hrs delay	GLU GLF	Gold / serum	SDH	1/2 day	Yes	N/A	Non fasting: 3.3-7.7 mmol/L Fasting 3.3 - 6.0 mmol/L
Glucose Tolerance Test GTT	GTT2	Grey / fluoride plasma / fasting 0 + 2 hr	SDH	1/2 day	Yes	Done in Pathology Outpatients Tue / Wed / Thur	Interpretive comment on report
Glucose-6-Phosphate Dehydrogenase	G6PA	Lavender / EDTA / whole blood	Heartlands - Birmingham	2 days	No		8.8-12.8 (adult) lU/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.	
Growth Hormone GH	GHA	**Gold / serum / (sample to lab ASAP)**	So'ton - Clinical 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	GUT2	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

Haemo-Chromatosis HFE Genotype	COM	2 x Lavender / EDTA / whole blood	SDH Wessex regional Genetics	4 weeks	No	**Send to Regional Genetics, Salisbury**	See guide to profiles and test groups
Haemoglobin A1c (HBA1c)	HBA1CC	Lavender / EDTA / whole blood	SDH	1 day	Yes	N/A	20-41 mmol/mol
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

Haptoglobin	HAPT	Gold / serum	So'ton - Immunology	< 1 day	No		Adult M: 0.5-2.0 g/L Adult F: 0.4-1.6 g/L
HCG (Total)	HCGE	Gold / serum	SDH	1/2 day	Yes	N/A	< 1 IU/L
HDL Cholesterol	CHDL	Gold / serum	SDH	1/2 day	Yes	NICE guidelines CG181. Cardiovascular disease: risk assessment & reduction including lipid modification.	NICE guidelines CG181. Cardiovascular disease: risk assessment & reduction including lipid modification.
Heavy Metal Screen	COM	Navy / Trace	So'ton - Clinical Biochemistry	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
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	N/A
Histone Antibodies	HIST	Gold / serum	So'ton - Immunology	10 working days	No		0-5 U/mL

HLA B*57:01	HLAB57	Lavender / EDTA / whole blood	So'ton - Molecular Path	7 days	No		N/A
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	N/A
HLA DR2	HLADR2	Lavender / EDTA / whole blood	NHSBT Filton	7 working days	No	Mon – Thur Samples must be labelled by hand	

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 Filton	5 working days	No		See report or contact laboratory

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
HVA/VMA	COM	Random Urine	So'ton Chromatography	5 days	No		HMMA HVA 0-1 years = 11 20 2-4 years = 6 14 5-9 years = 5 9 10-19 years =5 8

Hyaluronic acid	HYAL	Gold / serum	So'ton - Clinical 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	5 days	No	Do IGF 1 also First class post	
IGF1 (Insulin like growth factor)	IGF1A	Gold / serum	So'ton - Clinical 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 ***Serum***	IFS	Gold / serum	SDH	5 days	Yes	N/A	See report or contact laboratory

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	Yes	Investigation of proteinuria / myeloma	See report or contact laboratory
Immunoglobulins (G, A, M)	IGS	Gold / serum	SDH	1/2 day	Yes	N/A	See report or contact laboratory

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 Slide Test	MONS	Lavender / EDTA / plasma	SDH	1 day	Yes		N/A
Infliximab	INFLIX	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. Separate and send an aliquot	Therapeutic drug level >=2.5 ug/mL; Intermediate drug levels 1.2 - 2.4 ug/mL; Sub-therapeutic <1.2 ug/mL
Inhibin	COM	Gold / serum	Charing X Med Onc	7 working days	No	Ist Class Post	See report or contact laboratory

INR	INR	Blue / citrate	SDH	4 hours	Yes		0.8-1.2
Insulin (Fasting)	INS1	**Gold / serum / (sample to lab ASAP)**	So'ton - Clinical 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, the insulin reference range is <20mU/L During a hypoglycaemic episode, an insulin concentration >5mU/L is inappropriately high (insulin is considered suppressed if <1.6mU/L) Indeterminate values, ie 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	1 week	No	Send Mon – Thur First class post	Qualitative

Intrinsic Factor Antibody	IFA1	Gold / serum	So'ton - Immunology	15 working days	No		0 - 8.5u/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	JAK2	2 x Lavender / EDTA / whole blood	SDH Wessex regional Genetics	3 weeks	No	**Send to Regional Genetics Salisbury**	N/A
Jo-1 Antibody	ENAF	Gold / serum	So'ton - Immunology	5 working days	No	Part of ENA full screen	Pos / Neg
L/D Amphetamine Isomer Ratio (see						See Amphetamine L/D Isomer ratio	

Amphetamine L/D Isomer ratio)							
Kleihauer(screen only)	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.	0.6-2.5 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	4-20d: 225-600 U/L 20d -15y: 120-300 U/L M & F > 15yrs: 135-225 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	1-4 mg/L. Therapeutic range (epilepsy) 1-4 Maximum drug efficacy (Bipolar Disorder) 3-14 (trough specimen taken pre-dose or minimum 6hrs post dose)
LDH - Total (see Lactate Dehydrogenase)						See Lactate Dehydrogenase	
LDL	LDL	*Derived test*	SDH	1/2 day	Yes	NICE guidelines CG181. Cardiovascular disease: risk assessment & reduction including lipid modification.	NICE guidelines CG181. Cardiovascular disease: risk assessment & reduction including lipid modification
Lead	LEAD	Navy/Trace or Lavender/EDTA blood	So'ton - Clinical Biochemistry	6 working days	No	Phone duty Biochemist if urgent	See report or contact laboratory

Leptin	COM	Lith. Hep / plasma Gold / serum	Cambridge	28 days	No	Dry Ice Courier	Dependant on Sex & BMI
Levetiracetam	LEVET	Lavender / EDTA / plasma	Cardiff Toxicol	7 days	No	Gel tubes must be avoided. The following automatic comments added to all results: Please note that brivaracetam interferes in this assay. This assay should not be used in patients undergoing a switch in drug therapy involving levetiracetam and brivaracetam.	12.0 - 46.0 mg/L

Lipase	COM	Gold / serum	Synnovis - King's College London	1 working day			
Lipoprotein (a)	LIPOPA	Gold / serum	Bristol Royal Infirmary	7 days from receipt of sample	No	Notes: Samples may be stored at 2-8°C for up to 14 days, for prolonged storage sample should be frozen at -20° or below. Frozen samples are stable for up to 3 months. Repeated freeze/thaw cycles should be avoided. Samples that are lipaemia, haemolysed or with circulating immune complexes and/or cryoglobulin should be avoided.	<75 nmol/L
LH (see Luteinising						See Luteinising	

Hormone)						Hormone	
Full lipid profile	LIP2B	Gold / serum + grey / fluoride	SDH	1/2 day	Yes	NICE guidelines CG181. Cardiovascular disease: risk assessment & reduction including lipid modification.	NICE guidelines CG181. Cardiovascular disease: risk assessment & reduction including lipid modification
Lithium	LIA	Gold / serum (12 hr post dose)	SDH	1/2 day	Yes	N/A	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	LUP2	2 x Blue / citrate + 1 x Gold / serum	SDH	3 days	No	Dilute Russell's Viper Venom Time Samples to be spun and plasma frozen ASAP if not testing the same day. Patient testing whilst on a DOAC is	Positive Result = dRVVT TR >1.16

						contraindicated and needs to be referred to shc-tr.haemenquiries@nhs.net.	
Luteinising Hormone - LH	LHE	Gold / serum	SDH	1/2 day	Yes	N/A	See report or contact laboratory
Macroprolactin Screen	MPROL	Gold / serum	SDH	2 days	Yes	All increased Prolactins are screened	Contact laboratory for interpretive advice if required
Magnesium	MG/BON	Gold / serum	SDH	1/2 day	Yes	N/A	Adult : 0.7 – 1.0 mmol/L Neonate (< 4wks) : 0.6-1.0 mmol/L Infant ie 4wks - 16yrs : 0.7-1.0
Magnesium	MAGU24	24 hr urine (plain)	SDH	1 day	Yes	N/A	3.5 - 5.0 mmol/24h

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	N/A
Malarial Parasites	BPARA	Lavender / EDTA / whole blood	SDH	1 day	Yes	Positives are confirmed at London School of Tropical Med To be processed urgently	N/A
Manganese	MNB	Navy/Trace (adults) or Trace (paeds) whole blood	So'ton - Clinical Biochemistry	6 working days	No	Mon – Fri. See also TRACE METALS. Whole blood preferred.	See report or contact laboratory
Mannose Binding Lectin	COM	Gold / serum	Sheffield PRU	7 working days			

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	MERC B	Navy / Trace / whole blood	So'ton - Clinical Biochemistry	10 working days	No	Mon – Fri. **Keep in dark**. Urine Hg also required	See report or contact laboratory
Mercury	MERC R	EMU + navy / Trace / w.blood	So'ton - Clinical Biochemistry	10 working days	No	Mon – Fri. **Keep in dark**.	See report or contact laboratory
Mercury	MERC UR	Random urine	So'ton - Clinical Biochemistry	10 working days	No	Mon – Fri. **Keep in dark**.	See report or contact laboratory

Metadrenalines	COM	Purple / plasma	Synnovis - King's College London	8 working days			

Plasma metanephrines	COM	EDTA / whole blood	Newcastle	Within 2 weeks			Metanephrines: Paediatric: No ranges available. Adult: <510 pmol/L Normetanephrine: Paediatric: No ranges available. Adult: <1180 pmol/L 3-methoxytyramine: Paediatric: No ranges available. Adult: <180 pmol/L These reference ranges are based on a seated population. Ranges for samples taken in the supine posture are also now included on all reports. For a discussion of the issue of posture and relevant reference ranges please see our Plasma Metanephrines User Guide

24 hour urine metanephrines	COM	24 hr urine acidified with glacial acetic acid	So'ton - Clinical Biochemistry	5 working days excl. Bank Holidays	No		24 hour collections: Urine normetanephrine output (3-8 years) 0.07-1.38 umol/24h8 Urine normetanephrine output (9-12 years) 0.18-1.89 umol/24h8 Urine normetanephrine output (13-17 years) 0.34-2.2 umol/24h8 Urine normetanephrine output (>17 years) 0-3.0 umol/24h* Urine metanephrine output (3-8 years) 0.02-0.51 umol/24h8 Urine metanephrine output (9-12 years) 0.11-0.78 umol/24h8 Urine metanephrine output (13-17 years) 0.16-0.85 umol/24h8 Urine metanephrine output (>17 years) 0-1.40 umol/24h* Urine 3-methoxytyramine output (0-4 years) 0-0.62 umol/24h9 Urine 3-methoxytyramine output (5-14 years) 0-1.26 umol/24h9 Urine 3-methoxytyramine output (>14 years) 0.57-2.39 umol/24h1

							*These reference ranges were determined from 70 adult patients from the Renal Calculi Clinic. Random collections: Urine normetanephrine/creat ratio (0-3 months) 0-0.2.73 umol/mmol10 Urine normetanephrine/creat ratio (3-6 months) 0-1.68 umol/mmol10 Urine normetanephrine/creat ratio (6-12 months) 0-1.16 umol/mmol10 Urine normetanephrine/creat ratio (1-2 years) 0-0.59 umol/mmol10 Urine normetanephrine/creat ratio (2-5 years) 0-0.46 umol/mmol10 Urine normetanephrine/creat ratio (5-10 years) 0-0.29 umol/mmol10 Urine normetanephrine/creat ratio (10-15 years) 0-0.21 umol/mmol10

							Urine metanephrine/creat ratio (0-3 months) 0-0.50 umol/mmol10 Urine metanephrine/creat ratio (3-6 months) 0-0.39 umol/mmol10 Urine metanephrine/creat ratio (6-12 months) 0-0.27 umol/mmol10 Urine metanephrine/creat ratio (1-2 years) 0-0.22 umol/mmol10 Urine metanephrine/creat ratio (2-5 years) 0-0.21 umol/mmol10 Urine metanephrine/creat ratio (5-10 years) 0-0.18 umol/mmol10 Urine metanephrine/creat ratio (10-15 years) 0-0.13 umol/mmol10 Urine 3-methoxytyramine/creat ratio No reference range available No reference ranges are available for metanephrine/creatinine ratios in adults.

Methotrexate (High Dose)	MTX	Gold / serum	So'ton - Clinical Biochemistry	4 hours (excludes transport time)	No	Phone duty Biochemist to discuss Note to add with each sample sent ***Please telephone laboratory on 02381 206427 before sending a specimen for urgent analysis to SUHT. Please identify all urgent samples with label stating:*** ***URGENT SPECIMEN for Methotrexate.*** ***PLEASE OPEN IMMEDIATELY*** ***DATE SENT.....***	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 QAIb: <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	MPO1	Gold / serum	So'ton - Immunology	5 working days	No		0-1 AI NB AI stands for Antibody Index
Myositis Screen	MYOSC	Gold / serum	So'ton - Immunology				
Neonatal Allo-immune Neutropenia (NAIN)	RAS	Mother - Yellow SST + Pink EDTA Father - Yellow SST + Pink EDTA Baby - Paed Pink EDTA	H&I NHSBT Filton	14 working days	No		See report or contact laboratory

Neuronal antibodies						See Paraneoplastic Antibodies	
Neutrophil Function Test (Neutrophil Oxidative Burst)	MISC	Green /Lithium heparin / whole blood	So'ton - Immunology	9 days	No		Normal burst / Abnormal burst
NIPT Rh D Screening	NIPTD	Pink / EDTA	IBGRL NHSBT Filton	10 working days	No	Fetal RhD typing was inconclusive. Manage this pregnancy as if this foetus is RhD positive. Rejected sample, please send a repeat sample before 25 weeks gestation. Rejected sample, inappropriate test request (reason will be given)	Predicted D positive Negative Inconclusive

NMDA receptor Antibodies (Fixed)	NMDA	Gold / serum	Oxford Immunol	7 days	No	Please send paired CSF and Serum samples	N/A
Noradrenaline						See metanephrines	
Nucleosome antibodies	NUCLEO	Gold / serum	So'ton - Immunology	10 working days	No		Pos / Neg
Occult Blood						This service is no longer available and that it has been replaced by Quantitative Faecal Immunochemical Test (qFIT).	
Oestradiol	E2E	Gold / serum	SDH	1/2 day	Yes	N/A	See report or contact laboratory

Olanzepine	COM	Lavender / EDTA / plasma	Cardiff Toxicol	7 days	No	Gel tubes must be avoided	20-40 µg/L
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	N/A
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 - Clinical Biochemistry	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	N/A	275-295 mmol/kg
Osmolality (urine)	OSMU	Random urine	SDH	1 day	Yes	Paired serum - Interpret in relation to serum osmolality.	See report or contact laboratory
Osteocalcin	COM	**Gold / serum / (on ice)**	Liverpool	3 weeks	No	Send frozen	

Ovarian Cell Antibodies	COM	Gold / Serum	Oxford Immunol	14 days	No		Interpretive comment on report
Oxalate Excretion	OXALU	24 hr urine (acid)	UCL London	5 days	No	Send Mon – Thur Methodology Oxalate oxidase Metrological traceability NIST certified oxalate standard Reportable range <50-2000 µmol/L (to 4000 on dilution) Measurement uncertainty +/-5.8% at a mean of 244 µmol/L +/-4.2% at mean of 1030 µmol/L	≤460 µmol/24 hour (adults, correct to 1.73m2 for children) Age related ref ranges for oxalate:creatinine ratio: 0-6 months <291 µmol/mmol 7-23 months <220 µmol/mmol 2-4 years <143 µmol/mmol 5-11 years <76 µmol/mmol 12 -17 years <44 µmol/mmol 18+ female <45 µmol/mmol 18+ male <33 µmol/mmol

Oxalate Excretion (Paediatrics)	OXALR	Random Urine	UCL London	5 days	No	Send Mon – Thur Methodology Oxalate oxidase Metrological traceability NIST certified oxalate standard Reportable range <50-2000 µmol/L (to 4000 on dilution) Measurement uncertainty +/-5.8% at a mean of 244 µmol/L +/-4.2% at mean of 1030 µmol/L	≤460 µmol/24 hour (adults, correct to 1.73m2 for children) Age related ref ranges for oxalate:creatinine ratio: 0-6 months <291 µmol/mmol 7-23 months <220 µmol/mmol 2-4 years <143 µmol/mmol 5-11 years <76 µmol/mmol 12 -17 years <44 µmol/mmol 18+ female <45 µmol/mmol 18+ male <33 µmol/mmol
P3NP						See Procollagen 3N Terminal Peptide	
Faecal (Pancreatic) Elastase	PE1	Faeces	So'ton - Clinical Biochemistry	10 working days	No	Mon – Fri A random formed stool specimen is required. E1 concentrations are lower in watery stool samples.	Normal: > 200 ug/g stool Mild to moderate exocrine pancreatic insufficiency: 100 – 200 ug/g stool Severe exocrine pancreatic insufficiency: <100 ug/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 pmo/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)	PNEO	Gold / serum	Oxford Immunol	21 days	No		N/A
Paraquat Qualitative	PQUATU	Random urine (clear natural gastric	So'ton - Specialist Biochemistry	1 day (excluding transport time) but aim for 2 hour	Yes	Emergency qualitative assay only. (Quantitative assay not available). A random urine sample collected into	Reference range: Urine Toxic concentration: 0.08-64mg/L Occupational concentration: 0.03mg/L

		contents can also be used).		analytical TAT, result to be telephoned)		a plastic universal container is used for the detection of paraquat (clear natural gastric contents can also be used).	
Parathyroid Hormone	PTHE	Gold / serum, lithium heparin, (paed small green)	SDH	1/2 day	Yes	BONPTH profile also required	1.6 – 6.9 pmol/L. Requires serum Ca
Paroxysmal Nocturnal Haematuria (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)	COM	Random urine **(Protect from light and keep in the refrigerator)** Do not centrifuge.	So'ton - Clinical 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	

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	3 working days	No	None	200-1000 µg/L
Phenobarbital	PHENO	Gold / serum / (pre-dose)	So'ton - Clinical Biochemistry	1/2 day	Yes		10 – 40 mg/L

Phenobarbitone	PHENO	Gold / serum or Lith Hep / plasma	So'ton - Clinical Biochemistry	1 working day			10 - 40 mg/L
Phenylalanine (See amino acids SERUM)	PHE2	Gold / serum	So'ton - Clinical Biochemistry	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	PHENYB	Gold / serum / (pre-dose)	SDH	1/2 day	Yes	N/A	10 – 20 mg/L

Phosphate	PHO, BON, LCAP4, RENA	Gold / serum	SDH	1/2 day	Yes	N/A	Adult : 0.8 – 1.5 mmol/L Neonate (< 4wks) : 1.3-2.6 mmol/L Infant (4wks-1 yr) : 1.3-2.4 mmol/L 1-16yrs: 0.9-1.8 mmol/L
Phosphate	PHOU 24	24 hr urine	SDH	1 day	Yes	N/A	15 – 50 mmol/24 hr
Phosphate / Creatinine Clearance Ratio	COM	Random urine **(fresh must send matched serum)**	SDH	1 day	Yes	N/A	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 Onc	4-5 weeks	No	Mon – Thur. Seminomas / other germ cell tumours ONLY	
Plasma Viscosity	PV	Lavender / EDTA / plasma	Bath	1 day	No	Waldenstroms Macroglobulinaemia only.	Adult: 1.5-1.72 mpas < 3 years: 1.25-1.47 mpas
Platelet Function Analysis (PFA)	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 Nucleotide Analysis	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 and faeces (5g). PROTECT FROM LIGHT	<40 nm/mmol creat
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 / faeces 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	N/A	Adult : 3.5 – 5.3 mmol/L Neonate (< 4wks) : 3.4 - 6.0 mmol/L Infant (4wks-1 yr) : 3.5 -5.7 mmol/L 1-16yrs: 3.5-5.0 mmol/L
Potassium	KU24	24 hr Urine	SDH	1 day	Yes	N/A	25 – 125 mmol/24 hr

Potassium	KUR	Random Urine	SDH	1 day	Yes	N/A	See report or contact laboratory
Potassium	KFL	Pleural / wound / drain fluids	SDH	1/2 day	Yes	N/A	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
Procalcitonin	COM	Gold / serum or Lith Hep / plasma	Basingstoke	1 working day	Yes		PCT >2.0ng/ml: APCT level above 2.0ng/ml on the 1st day of ICU admission is associated with a high risk for progression to severe sepsis and/or septic shock. PCT <0.5ng/ml: APCT level below 0.5ng/ml on the 1st day of ICU admission is associated with a low risk for progression to severe sepsis and/or septic shock.

							Note: PCT levels <0.5ng/ml do not exclude an infection.
Procollagen 3N Terminal Peptide (P3NP)	P3NP	Gold / serum	So'ton - Clinical Biochemistry	5 working days	No		Reference range for adults on Methotrexate: 3.3-9.6ug/L Paediatric reference range for<18 years Children will have much higher concentrations of P3NP during periods of growth MALE Age 4-11 11.9-29.4ug/L Age 12-16 11.9-51.8ug/L Age 17-18 6.6-42.1ug/L FEMALE Age 4-10 12.7-33.5ug/L Age 11-12 13.7-52.5ug/L Age 13-14 10.1-37.3ug/L Age 15-18 6.6-18.8ug/L Reference range for Liver traffic light system: <10.4 ug/L: Green – safe

							10.4-12.9ug/L : Amber – warning 12.9ug/L and over: Red – action
Progesterone	PRGE	Gold / serum	SDH	1/2 day	Yes	N/A	See report or contact laboratory
Prolactin	PRLE	Gold / serum	SDH	1/2 day	Yes		Male: 86 - 324 mU/L Female (not pregnant): 102 - 496 mU/L
Prostate Specific Antigen ***(Total)***	PSAE	Gold / serum	SDH	1/2 day	Yes		40y - 49y: 0 - 2.5 ug/L 50y - 59y: 0 - 3.5 ug/L 60y - 69y: 0 - 4.5 ug/L 70y - 79y: 0 - 6.5 ug/L For patients aged <40y and >79y please use clinical judgement
Protein	PROTUB	24 hr urine (plain)	SDH	1 day	Yes		< 0.14 g/24 hr

Protein / Creatinine Ratio (PCR)	PCR	Random urine	SDH	1 day	Yes		< 23 mg/mmol
Protein C	PROC1 HCOAG	3 x Blue / citrate	SDH	On request or 28 working days	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)	PROSF1 HCOAG	3 x Blue / citrate	SDH	On request or 28 working days	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		Adult: 0.15-0.45 g/L
Proteinase 3 (Pr3) Antibody	PR31 MPOP R3	Gold / serum	So'ton - Immunology	5 working days	No		0-1 AI NB AI stands for Antibody Index
Prothrombin Gene Variant	PTGV	Lavend er / 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.	
PSA						See Prostate Specific Antigen.	
PSA (Free / Total Ratio)						See Prostate Specific Antigen.	
PTH						See Parathyroid hormone	

PTH-Related Peptide	COM	**Special tube, ice**	Liverpool	2-3 weeks	No	Phone duty Biochemist to discuss Send frozen with large ice pack by 1st Class Post.	1.6 – 6.9 pmol/L
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 whole blood + 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	
Renin	REN	Lavender / EDTA / plasma / **(to lab ASAP)**	So'ton - Clinical 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 to lab ASAP+ gold / serum	So'ton - Clinical Biochemistry	5 working days	No	Aldosterone renin ratio <91pmol/mU: Effectively excludes Conn's	**Males** >18 - ≤54 years: 43.6 - 417.8pmol/L >55 - ≤74 years: 26.1-338.9pmol/l **Females** >18 - ≤54 years: 23.2-414.9pmol/L >55 - ≤74 years: 23.2-388.6pmol/L **Aldosterone to renin ratio** **Males** >18 - ≤54 years: 1.4-14.2 pmol/mIU > 55- ≤74 years: 0.9-22.4 pmol/mIU **Females** > 18 - ≤54years: 0.9-20.3 pmol/mIU > 55 - ≤74 years: 0.7-25.5 pmol/mIU
Reticulocytes	FBCR / RET	Lavender / EDTA / whole	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

		blood					
Rh/Kell Phenotype	ORK	Pink / EDTA	SDH	4 hours	Yes		N/A
Rheumatoid Factor	RF	Gold / serum	SDH	1/2 day	Yes		<12 kU/L
Rivaroxaban		3 x Blue / citrate	Basingstoke Coag	On request or 5 working days	Consultant Request		
RN Antibody	ENAF	Gold / serum	So'ton - Immunology	5 working days	No	Part of ENA full screen	Pos / Neg

Salicylate	OD	Gold / serum	SDH	1/2 day	Yes		Contact laboratory for interpretive advice if required
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
Scleroderma screen	SCLER	Gold / serum	So'ton - Immunology				

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) plasma	So'ton - Clinical Biochemistry	6 working days	No	Mon – Fri. See also TRACE METALS	See report or contact laboratory
Sex Hormone Binding Globulin (SHBG)	SHBGE	Gold / serum	SDH	1/2 day	Yes		Male 20y - 49y: 18.3 - 54.1 nmol/L Male >50y: 20.6 - 76.7 nmol/L Female 20y - 49y: 32.4 - 128 nmol/L Female >50y: 27.1 - 128 nmol/L

Sickle Cell And Thalassaemia Screening (Antenatal)	FOQ2	Lavender / EDTA / whole blood	SDH	1 week	No	Must have completed Family Origin Questionnaire	N/A
Sickle Screen	SICK	Lavender / EDTA / whole blood	SDH	1 week	Yes		N/A
Sirolimus (Rapamune)	SIRO	Lavender / EDTA / blood **(pre-dose)**	Barts and the London NHS Trust		No	Mon – Thur. **MUST be pre-dose.** Avoid taking samples on Fridays	Target 4 – 12 µg/L <2 mths (local protocols vary)
Sodium	NA/UEC	Gold / serum	SDH	1/2 day	Yes		Adult & Paed: 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 - Clinical Biochemistry	< 1 month	No	Discuss with Consultant Haematologist	12-44 nmol/L
Somatomedin C (IGF-1)	SOMAC					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

Steroid Profile	COM	24 Hour urine / Random urine	Synnovis - King's College London	21 Days			
Stone Analysis	STON	Calculus (renal, salivary, biliary)	UCL London	3 days	No	Mon – Thur Methodology Fourier transform infra-red (FTIR) Metrological traceability The standard polystyrene sample (IR STND 01) has been certified against a NIST wavelength traceable standard (S/N 1045) certified against NIST SRM-1921b Reportable range Reported as % (10-100%) Measurement uncertainty Based on	Not applicable. Report gives weight of stone (mg) and composition (%)

						QC data the MU for the following stone compositions: Calcium oxalate 83% ± 12% Calcium phosphate 17% ± 12% Uric acid 19% ± 6% Calcium oxalate 81% ± 6% Cystine 51% ± 5% Calcium phosphate 49% ± 5% MAP 51% ± 8% Calcium phosphate 4 Ammonium urate 34% ± 6% MAP 66% ±4%	

Sulphonyl Urea	COM	Lavender / EDTA / plasma	Cardiff Toxicol	7 days	No	Gel tubes must be avoided	N/A
Synacthen Test	SSYN	2x Gold / serum 0, 30 min after 250 ug im Synacthen	SDH	1/2 day	Yes		See report or contact laboratory
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	Yes		20y - 49y: 0.3 - 1.7 nmol/L >50: 0.1 - 1.4 nmol/L
Testosterone (Total – Male)	TESTEM	Gold / serum	SDH	1/2 day	Yes		20y - 49y: 8.4 - 29.0 nmol/L > 50: 6.7 - 25.7 nmol/L

Tetrahydro Biopterins	COM	Blood spots (screen) or green Lith.Hep / plasma	B'Ham Neonatal	15 working days	No	Discuss with duty Biochemist first. Take before PKU diet starts. Ideally collect when blood phenylalanine is increased. Bloodspots made from anti-coagulated blood are NOT acceptable. Exposure of dried blood spot samples to sunlight should be avoided. Dried blood spots must be stored in the freezer in a sealed plastic bag to minimise deterioration.	See report or contact laboratory
Theophylline	THEOB	Gold / serum	SDH	1/2 day	Yes		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 Thrombosis and Haemostasis 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	Yes	Anti-TPO antibodies	0 - 33 IU/mL
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)	TTGA1	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		Various	NHSBT Filton	1 month or more	No		
Tobramycin	TOBR	Gold / serum	So'ton - Clinical Biochemistry	1 working day	Yes		For interpretation of Tobramycin results please refer to the BNF

Total Protein	TP/L4 LCAP4	Gold / serum	SDH	1/2 day	Yes	N/A	Adult: 60 – 80 g/L
TPMT						See Thiopurine Methyl Transferase	
Trace Metals Screen (Mn, Cu, Se, Zn)	TRACE	**Navy/Trace x 2** (adults) Trace x 2 (paeds) whole blood AND plasma	So'ton - Clinical Biochemistry	10 working days	No	Mon – Fri	see report or contact laboratory
Transferrin	TRAN	Gold / serum	SDH	1/2 day	Yes	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 (including Iron)	FES	Gold / serum	SDH	1/2 day	Yes	Only done for iron overload, haemochromotosis on treatment and assessing IV Fe in CRF.	Iron: 6 - 35 umol/L Transferrin Saturation: 20 - 40% for Females; 20 - 50% for Males
Triglycerides	TRIG	Gold / serum	SDH	1/2 day	Yes	NICE guidelines CG181. Cardiovascular disease: risk assessment & reduction including lipid modification.	NICE guidelines CG181. Cardiovascular disease: risk assessment & reduction including lipid modification
Trimethylamine	COM	24 hr urine (HCl)	Sheffield - Childrens' Hosp	8 weeks	No	24 hour urine collected into acid. pH adjust to < pH 2.	Given on report.
Triple Islet cell Antibody Screen	TICS	Gold / serum	Royal Devon and Exeter Hospital	2 weeks	No	Anti GAD, Anti Islet cell and Zinc Transporter 8 antibodies are included in the Triple Islet cell antibody Screen.	

Troponin T	TROPT A	Gold / serum send separat e sample if possibl e.	SDH	1/2 day	Yes	**Follow acute coronary syndrome protocol ONLY**	< 15 ng/L If Troponin T >14ng/L please refer to ACS guidance / guidelines
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 - 6d: 0.70 - 15.20 mU/L 7d - 14d: 0.70 - 11.00 mU/L >14d: 0.27 - 4.20 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 Antibody	
Urate	URAT	Gold / serum	SDH	1/2 day	Yes		Adult F: 140 – 360 umol/L Adult M: 200 – 430 umol/L
Urate	URAT24	24 hr urine (plain)	SDH	1 day	Yes		1.5 – 4.5 mmol/24 hr
Urea	UREA UES UEC RENA	Gold / serum	SDH	1/2 day	Yes		0-27d: 0.8 - 5.5 mmol/L 28d - 51w: 1.0 - 5.5 mmol/L >51w- 16y: 2.5 - 6.5 mmol/L >16y: 2.5 - 7.8 mmol/L
Urea	UREU UREA24	24 hr urine (plain)	SDH	1 day	Yes		428 - 714 mmol/24 hr
Urea	UREFL	Wound drain fluids	SDH	1/2 day	Yes		See report or contact laboratory

Valproate (Valproic Acid)	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, VRAND, VPOST	Gold / serum, green / lithium heparin pre-dose, post dose and random sample.	SDH	1/2 day	Yes	Occasional post or random dose (VPOST, VRAND) at discretion of Consultant Microbiologist	Discuss with Consultant Microbiologist.
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	Lith. Hep plasma (gold / serum or EDTA plasma also acceptable)	Bristol S'mead	21 days	No	Fasting/preprandial sample preferable	C26:0 0.33 - 1.39 umol/L, C26:0/C22:0 ratio 0 - 0.030, C24:0/C22:0 ratio 0.32 - 1.07, Pristanic acid 0.0 - 3.0 umol/L, Phytanic acid 0 - 16.0
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

Vitamin A – Fasting	VITA	Gold / serum **(kept dark)**	So'ton - Clinical Biochemistry	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 150 - 275 ng/g Hb (Subclinical Deficiency) <150 ng/g Hb (Clinical Deficiency)
Vitamin B12	B12	Gold / serum	SDH	1/2 day	Yes		197 - 771 ng/L
Vitamin B2	COM	Green /Lithium hepari	Glasgow	10 days	No	Light sensitive, wrap in tin foil. Contact lab if delivery is outside 72 hours from	Red Cell FAD: 1.0-3.4 nmol/g Hb

		n / whole blood				collection.	
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 <200 pmol/g Hb (At Risk of Deficiency) >2000 pmol/g Hb (Over Supplementation) >4000 pmol/g Hb (Risk of Toxicity)
Vitamin C	COM	**Special collection tubes**	Glasgow	10 days	No	Contact duty Biochemist	15-90 µmol/L
Vitamin D – 1,25 Di-OH	VITDDI	Gold / serum / (on ice)	Norfolk & Norwich	4 weeks	No	Phone duty biochemist to discuss	55-139 pmol/L

Vitamin D – 25 OH	VITDA	Gold serum / lithium heparin / (Paed small green)	SDH	1/2 day	Yes		See report or contact laboratory Vitamin D >50 nmol/L is sufficient for most people.
Vitamin E – Fasting	VITE1	Gold / serum **(kept dark)**	So'ton - Clinical Biochemistry	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
Vitamin K	COM	Gold / serum	Glasgow	2 weeks			0.2-2.2 nmol/mmol Triglyceride. <0.2 nmol/mmol Triglyceride (At Risk of Deficiency).

Volted Gated Calcium Channel Antibody	AVGCC	Gold / serum	Oxford Immunol	21 days	No		0-45 pM
Volted Gated Potassium Channel Antibody	AVGKC	Gold / serum	Oxford Immunol	14 days	No		0-69 pML
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 VWFA C	3 x Blue / citrate	SDH	1 week	No	Discuss with Consultant Haematologist	See report or contact laboratory
	WBCE NZ	Lavender / EDTA	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	Lumbar puncture must be performed a minimum of 12 hours post onset of symptoms. EXTRA CSF BOTTLE NEEDED, 4 in total.	Interpretive comment on report

Zinc	ZINC	Navy / Trace / plasma (adults) or Trace / plasma (paeds)	So'ton - Clinical Biochemistry	4 working days	No	No haemolysis. See also trace metals	See report or contact laboratory
Zinc Transporter 8 antibody	TICS (ZT8A B)	Gold / serum	Royal Devon and Exeter Hospital	2 weeks	No	Zinc Transporter 8 antibody is now part of Triple Islet cell antibody Screen.	

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/General Enquiries 02073 777000 x6 1038 Bleep x6 1611 Duty Biochemist
BASINGSTOKE Coagulation	Haemophilia Haemostasis & Thrombosis Lab, Pathology Department, North Hampshire Hospital Basingstoke, Hants, RG24 9NA Haem Secretary 01256 313296 / 313304 Anticoag Clinic 01256313415 Coag Dept. 01256313294 Special Coagulation 01256 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) Clinical Advice Line 01225 824050
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 Duty Biochemist 0779 5828617
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 5074138

LIST OF REFERAL LABORATORIES	
BRISTOL (Southmead) Cholinesterase Unit	Cholinesterase Unit, Southmead Hospital, North Bristol NHS Trust, Westbury-on-Trym, Bristol, BS10 5NB Tel 0117 414 8414
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)
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 (On call Biochemist direct advice only)
CAMBRIDGE Immunology	Immunology Department, Box 232, Level 4, Addenbrooke's Hospital, Hills Road, Cambridge, CB2 0QQ Tel 0333 1032220 (Help Desk)
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 or Tel 02920 725349
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 601424 or 601423
CHARING CROSS Medical Oncology Department	The SAS Laboratories, Clinical Biochemistry and Medical Oncology, Charing Cross Hospital, London, W6 8RF Tel 0208 383 3949 General Enquiries/Results 020 3313 5353

LIST OF REFERAL LABORATORIES	
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
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 (Switchboard) Metabolic Lab x 5225 Enzyme Lab x 6751/1785 Biochemistry x 0415
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 32993147
KING'S COLLEGE HOSPITAL, LONDON	Dept of Clinical Biochemistry, King's College Hospital, Bessemer Road, LONDON SE5 9RS Biochemistry 02032 994126 Steroids 02032 994131 Porphyrins 02032 993856 Main Enquiries 02071 888008 Option 1
LIVERPOOL Dept of Clinical Chemistry	Department of Clinical Chemistry, Royal Liverpool University Hospital, Prescot Street, Liverpool L7 8XP Tel 0151 706 4230

LIST OF REFERAL LABORATORIES	
NHSBT Histocompatibility and immunogenetics	NHSBT – Bristol Centre 500 North Bristol Park, Northway, Filton, Bristol, BS34 7QH Tel 0117 9217372
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 or 01603 286929 (Blood Sciences/Enquiries)
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 433217 (Lab Reception/Enquires)
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 (General Enquiries Haem/Biochem) Ex 6348 OOH
QUEEN'S SQUARE, LONDON Neuroimmunology	Neuroimmunology & CSF Laboratory, Institute of Neurology (NHNN Box 76), Queen Square, London, WC1N 3BG Tel 020 3448 3814
Royal Devon and Exeter	Royal Devon & Exeter NHS Trust Tel: 01392 402936 rde-tr.bsaddon@nhs.net

LIST OF REFERAL LABORATORIES	
ROYAL FREE, LONDON Chemical Pathology	Clinical Biochemistry, Royal Free Hospital, Pond Street, London, NW3 2QG Tel 0207 830 2081
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 2267240
SOUTHAMPTON Chemical Pathology, Endocrine, Trace Metals	D Level, South Block, Southampton General Hospital, Tremona Road, SOUTHAMPTON, SO16 6YD. Tel 023 8120 6464 (Results), 023 8120 6675 (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 385194

LIST OF REFERAL LABORATORIES	
ST BARTHOLOMEWS – LONDON	Dept Clinical Biochemistry, St Bartholomews Hospital, LONDON, EC1A 7BE Tel 020 73777000 x 55362 Biochem
ST HELIER'S HOSPITAL Chemical Pathology	Epson & St Heliers University Hospital, Chemical Pathology, Wrythe Lane, St Helier, Sutton, Carshalton, SM5 1AA Tel 0208 296 2825 (General Enquiries)
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 @ Synnovis, 4th Floor, North Wing, St. Thomas Hospital, London, SE1 7EH Tel 020 71882799
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 7188
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

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	Adult: 3.5 – 5.3 mmol/L Neonate (< 4wks): 3.4 - 6.0 mmol/L Infant (4wks-1 yr): 3.5 -5.7 mmol/L 1-16yrs: 3.5-5.0 mmol/L
Chloride	Adult: 95 – 108 mmol/L <22d: 95 - 110mmol/L
Bicarbonate	Adult : 22 – 29 mmol/L Paed : 19-28 mmol/L
Urea	0-27d: 0.8 - 5.5 mmol/L 28d - 51w: 1.0 - 5.5 mmol/L >51w- 16y: 2.5 - 6.5 mmol/L >16y: 2.5 - 7.8 mmol/L
Creatinine	Adult M: 59-104 umol/L Adult F: 45-84 umol/L 2-12m: 14-34 umol/L 1-<3y: 15-31 umol/L 3-<5y: 23-37 umol/L 5-<7y: 25-42 umol/L 7-<9y: 30-47 umol/L 9-<11y: 29-56 umol/L 11-<13y: 39-60 umol/L 13-<15y: 40-68 umol/L

- Delayed separation, haemolysis, and use of incorrect tubes or misuse of Vacutainer tubes leads to falsely high potassium levels.
- 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 CKD-EPI 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: Radnor ward, ED Resus, Labour ward, AMU, NICU, Laverstock ward, Respiratory OPD.
- Reference ranges for Blood Gas Analysis can be found on the printed results report.

Bone profile

Fasting samples taken without use of torniquet are preferred.
Approximately 50% of calcium is bound to albumin, so an adjusted calcium concentration for albumin is also reported

Analyte	Reference range
Calcium (adjusted)	Adult: 2.20 – 2.60 mmol/L Neonate < 6d: 1.95 - 2.75 mmol/L Paediatric 6d -1y: 2.15 - 2.75 mmol/L Paediatric >1y - 4 y: 2.15 - 2.60 mmol/L
Phosphate	Adult : 0.8 – 1.5 mmol/L Neonate (< 4wks) : 1.3-2.6 mmol/L Infant (4wks-1 yr) : 1.3-2.4 mmol/L 1-16yrs: 0.9-1.8 mmol/L
Alkaline Phosphatase	Males 0-14 d 83-248 U/L 15d-<1yr 122-469 U/L 1yr - <10yr 142-335 U/L 10-<13yrs 129-417 U/L 13-<15yrs 116-468 U/L 15-<17yrs 83-331 U/L 17-<19yrs 55-149 U/L 19-110yrs 40-129 U/L Females 0-14 d 83-248 U/L 15d-<1yr 122-469 U/L 1yr - <10yr 142-335 U/L 10-<13yrs 129-417 U/L 13-<15yrs 57-254 U/L 15-<17yrs 50-117 U/L 17-<19yrs 45-87 U/L 19-110yrs 35-104 U/L
Albumin	Adults: 35-50 g/L <1 yr: 30-45 g/L 1-16 yrs: 30-50 g/L
Total Protein	60-80 g/L

- 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

Liver profile

Analyte	Reference range
Total Bilirubin	14d - 110yrs: < 21 umol/L
ALT	Male: 10-50 U/L Female: 10-35 U/L
Alkaline phosphatase	See above.
Gamma GT	Male: <60 U/L Female: <40 U/L
Albumin	See above.
Total Protein	See above.

- Elevated bilirubin levels may be due to haematological disorders (haemolysis) as well as liver disease. High bilirubin with normal values for other "liver function" tests may indicate Gilbert's Syndrome.
- 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. In neonates Gamma GT levels are higher than in adults.

Cardiac profile

- Please see ACS guideline on Microguide: Suspected Acute Coronary Syndrome (ACS) Guideline and Pathway

Lipid profile

LIP2: Full lipid profile (NB DOES NOT NEED TO BE FASTED): total cholesterol, triglycerides, HDL-cholesterol, calculated LDL-cholesterol (Friedwald formula) and non-HDL-Cholesterol. NB LDL-C can't be calculated when triglycerides are >4mmol/L.

Measuring total cholesterol and HDL-C only is of limited value and should be discouraged.

Please see following links for advice/interpretation

https://www.nice.org.uk/guidance/cg181

https://www.england.nhs.uk/aac/publication/summary-of-national-guidance-for-lipid-management/

https://www.england.nhs.uk/aac/publication/statin-intolerance-pathway/

- Please take a full lipid profile on admission in a patient presenting with a suspected cardiovascular event.

- Consider biochemical secondary causes of dyslipidaemia which includes liver disease, hypothyroidism, renal failure, proteinuria (nephrotic syndrome) or diabetes mellitus.
- Please contact the Lipidologists (ext. 5427 or 4047) if clinical/management advice needed.

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.

Haemoglobin a1c

Method used is Tosoh G11 HLC 723 (HPLC) and is DCCT adjusted.
Target HbA1c should be individualised balancing risk of vascular disease against risk of Hypoglycaemia.

Endocrine

Thyroid

Appropriate thyroid function tests will be undertaken based on the information provided by the requestor on tQUEST

- Abnormal thyroid function in hospitalised patients is more likely to be due to non-thyroidal illness as opposed to thyroid disease per se. Please consider whether assessing TFTs in a hospitalised patient is REALLY necessary. Thyroid function is best assessed when patients have recovered from acute illness.

TSH mU/L	M/F	All ages	0.27 - 4.2
	F	1st Trimester	0.33 - 4.6
		2nd Trimester	0.35 - 4.1
		3rd Trimester	0.21 - 3.15
FT4 pmol/L	M/F	All ages	12– 22
	F	1st Trimester	12.1 - 19.6
		2nd Trimester	9.6 - 17.0
		3rd Trimester	8.4 - 16.0
FT3 pmol/L	M/F	All ages	3.1 - 6.8
	F	1st Trimester	3.8 - 6.0
		2nd Trimester	3.2 - 5.5
		3rd Trimester	3.1 - 5.0

Adrenal Function

Adrenal insufficiency: Measure cortisol in any patient with suspected adrenal insufficiency. Ideally take sample at 9am but this may not always be possible. **Do not delay treatment pending cortisol result being available.** A cortisol >350nmol/L (at any time) usually

excludes adrenal insufficiency in most cases BUT CAUTION is required with this cut-off in sick patients.

Please note certain steroids may cross react with the assay. Please contact the laboratory to discuss.

If adrenal insufficiency cannot be excluded please arrange a short synacthen test.

The short synacthen test and how do perform it correctly.

Principle:

- Synacthen (tetracosactrin) is a synthetic ACTH which stimulates the production of cortisol from the adrenal cortex. Tetracosactrin consists of the first 24 amino acids of ACTH and displays similar physiological properties. *(Resuscitation facilities and medical staff should be available when this test is carried out although do not need to be present. Local or systemic reactions tend to occur within 30 min of injection, therefore the patient must be kept under observation for this time.*

Indications:

- The investigation of suspected adrenal insufficiency.

Contra-indications:

- In patients with a baseline cortisol of >350nmol/L a Synacthen test is not indicated unless the clinical suspicion of adrenal insufficiency is compelling, please discuss with the laboratory.
- A history of hypersensitivity to ACTH or Synacthen. Use with caution if hypersensitivity to other drugs.
- Synacthen should be used with caution in patients with allergic disorders (e.g. asthma).

Side effects:

- Hypersensitivity reactions to Synacthen have been reported.

Precautions:

- If adrenal insufficiency is strongly suspected treatment with glucocorticoids should not be withheld pending a Synacthen test. This will not influence the outcome of the test in the short term. Certain steroids may interfere with the laboratory measurement of cortisol (check with laboratory). If a patient is taking glucocorticoids the morning dose should be omitted and then given immediately after the test has been completed.

Preparation:

No dietary restrictions; ideally perform test in the morning.

Procedure:

1. Take blood for basal cortisol estimation.
2. Inject Synacthen 250 µg i.m or i.v.
3. Take a further blood sample at 30 mins for cortisol estimation. Send both the

baseline and 30 minute sample to the lab **TOGETHER**. Please do not send separately.

Interpretation:
Normal response to a short Synacthen test is defined as a cortisol result >420nmol/L (at 30 minutes) in men and women. However, different cut-offs apply to women on the OCP or HRT and please contact the lab to discuss.

Suspected Cushing's: Measurement of 9am or random cortisol plays no role in confirming or excluding Cushing's. Please contact the laboratory if clinical advice needed.

PTH

PTH can ONLY be interpretated against a paired serum sample for calcium. Measurement of PTH alone has limited if any value. PTH should only be requested in cases with abnormal calcium homeostasis and should not generally be requested in patients with normal calcium.

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.

- For advice on determining menopause status biochemically please see https://www.nice.org.uk/guidance/ng23

- Samples for Progesterone should be taken 7 days before anticipated next menstruation i.e. 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 high Prolactins for interference from biologically inactive macroprolactin.
- A comprehensive list of drugs causing raised prolactin can be obtained from the laboratory.

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. A1AT <1.1g/L will be sent for phenotyping.

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.

- Reference ranges and where applicable interpretive comments will be provided on the laboratory report.

IgE

- 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	When to take Sample	Therapeutic Range
Carbamazepine	Serum	Pre-dose (ideally)	4 - 12mg/L
Digoxin	Serum	6-24 hours Post-dose NB Samples taken before 6 hours post dose will give spuriously high results	0.8 - 2.0 ug/L
Gentamicin **(once daily)**	Serum	Pre-dose (1-2 hours)	Please refer to guidance on Microguide. Interpretive comments added to reported results
Gentamicin **(standard tds or bd regime)**	Serum	Pre-dose & 1 hour Post-dose	Please refer to guidance on Microguide. Interpretive comments added to reported results
Lithium	Serum	12 hours Post pm dose	0.4 - 1.0 mmol/L (including the elderly)
Phenytoin	Serum	Pre-dose (ideally) - Not vital due to long half life	10 - 20 mg/L
Theophylline	Serum	PEAK post-dose Immediate-release 2 hr Slow-release 4-6 hr Aminophylline (iv loading) pre-dose & 30 min post Results needed **urgently** Aminophylline (iv continuous) 4-6 hr & 12-18 hr then every 24 hours.	10 - 20 mg/L (adults)

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).
- For interpretation of Gentamicin results please contact microbiology or see MICROGUIDE at: http://Microguide/MedicinesManagement/Guidance/Pages/IndexPage.aspx
- For interpretation of Vancomycin results please contact microbiology or see 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.

Please see https://www.nice.org.uk/guidance/ng131

40y - 49y	0 - 2.5 ug/
50y - 59y	0 - 3.5 ug/L
60y - 69y	0 - 4.5 ug/L
70y - 79y	0 - 6.5 ug/L

For patients aged <40y and >79y please use clinical judgement.

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.

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 **(NB please send 24hr urine sample for calcium and creatinine and paired serum sample for calcium and creatinine).**	See laboratory report	Fam benign hypercalcaemia likely FBH/Primary hyper PTH grey zone / both conditions Primary hyper PTH likely
Creatinine Clearance	See laboratory report	

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

Urine
The correct test for investigation of suspected phaeochromocytoma is to send a 24hr urine sample for Metanephrines or to send plasma Metanephrines. In paediatric cases with suspected neuroblastoma a spot urine sample should be sent for HVA/VMA.

Please contact the laboratory if uncertain what test to send and what sample type is needed.

Special preservation of urine samples is required for 5HIAA and urinary Metanephrines.

Containers with the appropriate preservatives can be obtained from the laboratory, along with instruction sheets. Instruction sheets can also be downloaded from MICROGUIDE.

Plasma metanephrines
Samples for plasma Metanephrines should be sent immediately to the lab and transported on ice.

Certain drugs can interfere with results. Please contact the laboratory if advice needed.

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.

Porphyria
Please see link below (or contact the laboratory) for advice on sample choice. NB Protect samples from light and arrange for rapid transfer to the laboratory (must arrive within 4 hours).

https://cavuhb.nhs.wales/our-services/laboratory-medicine/medical-biochemistry-and-immunology/porphyria-service-cardiff/

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 (200ul 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.

Dynamic test protocols

Advice regarding dynamic function tests can be sought from biochemistry, the endocrine consultants or the endocrine nurse specialists.

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 *

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, Dilute Russell's Viper Venom Time and the Lupus Sensitive APTT.

Samples to be spun and plasma frozen ASAP if not testing the same day.

Patient testing whilst on a DOAC is contraindicated and needs to be referred to shc-tr.haemenquiries@nhs.net.

A serum sample (gold top tube) should be also sent for Anticardiolipin and Anti-beta2-glycoprotein1 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	≤ 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.

BLOOD TRANSFUSION TESTS

The following tests are available from the Blood Transfusion Laboratory:

- Blood group
- Antibody screen
- Antibody identification
- Compatibility testing
- Screening for fetomaternal haemorrhage (RhD Neg maternal only)
- Direct antiglobulin test
- Rh and Kell phenotype

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 Additional Tests

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!
24 hours stability or as stated	Bicarbonate CK ***(<12 hours)*** PSA PTH – (***4hrs if separated in <2 hours)*** Troponin T Vit B12 Osmolality (serum and urine)		APTT ***(<8 hours)*** Blood Film D Dimer ***(<8 hours)*** ESR Fibrinogen ***(<8 hours)*** INR***(<8 hours)*** Malarial Parasites ***(screen - classification <6hours)*** 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 Phosphate ***(4 days)*** Progesterone SHBG Testosterone TPO Ab's TSH	Monospot
WITHIN 5 DAYS of original request – if separated within 8 hours and refrigerated and if the sample is still available.	A1AT ACE Albumin ALP ALT Amylase AST Bile acids BNP 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 lipids Lithium MacroPRL Magnesium Paracetamol Phenytoin Potassium Prolactin Rh factor Salicylate Sodium Tbili Theophylline Tobramycin Total protein Transferring Triglycerides U&E's Urate Urea Vancomycin Vitamin D	G6PD Hb Electrophoresis Hb A2 HbF 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

Cerebral spinal fluid (CSFs) will be processed out of hours by the on-call Microbiology BMS. Other samples & requests 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.

Once the sample has been taken, please contact the on-call BMS via the switchboard to give them details of the sample to be tested. 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.

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, e.g., 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 ses 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).

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 (i.e., 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 (i.e., 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 excise	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 	EDTA (Crossmatch)	Blood Group, Crossmatch, Direct Antiglobulin Test (DAT), Kleihauer.
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*	*For specialist tests only (not routinely used in ED)*
3	*Orange cap – Teklab 1.0 ml*	*Lithium heparin*	*For specialist tests only (not routinely used in ED)*
4	Green cap – with gel 0.6 ml	Lithium heparin	General biochemistry & plasma ammonia
5	*Red cap – 0.5 ml*	*Plain*	*For specialist tests only (not routinely used in ED)*
6	Pink cap – Teklab 0.5 ml	EDTA	All transfusion requests, FBC & other haematology, Paediatric HIV Pro-viral RNA load.
7	Navy cap – Greiner 1.3 ml	Sodium Citrate	Coagulation