**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:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | |  | **Pages** |
| * **Pathology Reception** | | |  | 8- 11 |
|  |  | |  |  |
|  | Phlebotomy | | x4017 | 8 |
|  | Pathology Outpatients | | x4020 | 9-11 |
|  | | |  |  |
| * **Cellular Pathology** | | |  | 12 - 20 |
|  | * Histology | | x4001 | 15-17 |
|  | * Non-gynae Cytology | | x4001 | 18 |
|  | * Mortuary and Bereavement Services | | x2150 | 20 |
|  | | |  |  |
| * **Laboratory Medicine** | | |  | 21 - 108 |
| General Info | | |  |  |
|  | * Clinical Biochemistry | | x4033 | 24 |
|  | * Haematology | | x4033 | 25 |
|  | * Blood Transfusion | | x4022/4123 | 26 |
| Lists and guides | | |  |  |
|  | * Tests alphabetically | |  | 28-83 |
|  | * Profiles and test groups | |  | 89-99 |
|  | * Haematology test groups | |  | 100-102 |
|  | * Immunology test groups | |  | 103-104 |
|  | | |  |  |
| * **Microbiology** | | |  | 105- 144 |
|  | | * Bacteriology | x4099 | 117 |
|  | | * Serology/Virology * Antibiotic assays | x4122  x4099 | 125  139 |
|  | | * Andrology | x4105 | 142 |
| * **Specimen requirements and sample volume (vacutainer guide)** | | |  | 146 |

**Quality Statement**

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

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

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

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

**Laboratory policy on protection of personal information**

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

**Laboratory Complaint Procedure**

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

**Consent**

Consent is assumed as having been given by patients attending the Pathology Outpatient department or those who have attended their GP practice. Each request accepted by the laboratory for examination is considered to be an agreement between the requestor and the laboratory. In making the request, the requestor is agreeing to meet the laboratory’s requirements, including providing all the relevant information necessary to perform the investigation and the laboratory is agreeing to accept the request and ensure the appropriate investigation is carried out in a timely manner which meets clinical need in accordance with guidance contained in the Pathology Department User Handbook.

**GENERAL LABORATORY INFORMATION**

**Requesting a Test**

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

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

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

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

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

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

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

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.

On-site Transport

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

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

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

Off-site Transport

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

Specimens may be sent direct to Pathology using private couriers or the postal system and must comply with the UN Model Regulations for the Transport of Dangerous Goods issued by the Department for Transport (DfT). Clinical specimens for diagnostic purposes are classified as UN3373 – Biological Substance Category B.

Further details can be obtained from: http://www.dft.gov.uk/pgr/freight/dgt1/guidance/guidancenonclass7/infectioussubstances.pdf

**Obtaining Results**

Urgent results

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

Reporting

Results for Pathology Specimens are reported in the following ways.

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

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

**Specimen Containers and Where to Get Them**

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

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

**Histology**

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

**Gynaecological cytology**

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

**Non-gynaecological cytology**

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

**Date of Expiry – ALL Microbiology swabs**

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

**PATHOLOGY RECEPTION**

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

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

**Phlebotomy Services**

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

**In-patient Phlebotomy Service**

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

7.00 am to -3.00 pm Monday – Friday

7.00 am to - 3.00 pm Saturday, Sunday and Public Holidays – for urgent/essential bloods only.

An urgent bloods and cannulation service is available from 8.00am – 8.00pm Monday – Friday, weekends and bank holidays. The multi-skilled phlebotomy service can be contacted by bleeping 1264 or 1449.

**Out-patient Phlebotomy Service**

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

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

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

PHLEBOTOMY GUIDELINES

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

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

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

Request Forms/Sample Labelling

See page 3 General Information – Requesting a Test

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

**Outpatient Services**

ANTICOAGULANT SERVICE

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

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

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

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

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

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

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

There is an Anticoagulation Policy on MICROGUIDE (Clinical Management, Haematology) which gives further guidance on how to manage patients on oral anticoagulation.

The patients on IV Heparin require **daily** APTT studies. There is no need to monitor patients on low molecular weight Heparin. Low molecular weight Heparin should be avoided in patients with renal failure.

BONE MARROW CLINICS

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

CLINICAL BIOCHEMISTRY OUTPATIENTS

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

HAEMATOLOGY OUTPATIENTS

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

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

THROMBOPHILIA CLINICS

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

ANDROLOGY SAMPLE CLINIC

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

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

**CELLULAR PATHOLOGY**

1. ORGANISATION & STAFF

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

|  |  |  |
| --- | --- | --- |
| Key Personnel: | | |
| Technical Manager | Christine White | Ext. 2251 |
| Laboratory Manager: | Vacant Post | Ext: 4096 |
| Biomedical Scientist Team Manager: | Jenny Baillie | Ext: 4109 |
| Team Leader Mortuary and Bereavement | Helen Farley | Ext: 2150 |
| Quality Manager | Donna Hopkins | Ext. 4109 |
| Clinical Lead | Dr Matthew Flynn | Ext. 4001 |

|  |
| --- |
| Consultant Staff: Ext. 4001 |
| Dr I Cook |
| Dr S Banerjee |
| Dr M Flynn |
| Dr M Khan |

**Location:**

Histology and non-gynae cytology are located in Pathology on level 4.

Mortuary and Bereavement Services are located on level 2 Salisbury North next to car park 8 and the tennis courts.

The department is part of the Clinical Support Directorate.

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

1. 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.

**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 MICROGUIDE 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.

*Gynaecological cytology*

The gynae cytology service was transferred to Poole Hospital NHS Foundation Trust on 1st September 2008. If you have any result queries or want to request a test then they can be contacted directly 01202 442793. We courier cervical samples to Poole hospital after they have been delivered to us. Results are returned directly to the requester.

*Specimen acceptance*

**Table 2: Labelling requirements for request forms and specimen pots**

|  |  |  |
| --- | --- | --- |
| **Request FORM** | | **Specimen POT** |
|  |  |  |
| **Essential** | Desirable | **Essential** |
|  |  | 3 patient identifiers made up from |
| * Patient’s name * Date of birth **OR** hospital number * Patient’s location and destination for report * Requesting Clinician * Clinical information * Specimen Type * Specimen Site | * Hospital number * NHS number * Clinical history * Date of sample * Signature | * Surname * First name * Date of birth and/or * Hospital number   Nature of specimens if more than one pot submitted for the same patient |

**Specimen CANNOT be accepted** by the lab if any of these items are missing.

Result will be delayed while **sender** completes details.

**Specimen CANNOT be accepted** by the lab if any of these items are missing.

Result will be delayed while **sender** completes details.

If any of these items are missing, the specimen may be delayed while the information is gathered.

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 (see also *turnaround times)*

Label urgent specimens as such with a contact number for telephoned result. Label the form, ‘needed by’ including a date.

High Risk Labelling ***please refer to high risk categories listed at the beginning of this handbook***

High risk specimens must be labelled as such. If there is any doubt then label as high risk or danger of infection to help protect staff.

**Histology Specimen Requests**

ROUTINE FORMALIN FIXED SPECIMENS

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

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

***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. 4001** with the following details:

|  |  |
| --- | --- |
| * Date of procedure | * Specimen details |
| * Estimated time of arrival | * Consultant Surgeon |
| * Patient details | * 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.**

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.

***Michel’s fluid is highly Toxic. In the event of a spillage, contact Histology x4096 for advice.***

OSNA SERVICE

OSNA is a service provided in the laboratory. It must be pre booked to ensure staffing and equipment is in place before we can carry out the technique. For more information, please contact the laboratory on ext 4096.

REFERRED INVESTIGATIONS

Herceptin reporting is carried out at UCL Advanced Diagnostics, 1st floor Rockefeller Building, 21 University Street, London, WC1E 6JJ.

Specialist investigations for brain tissue is carried out at Frenchay Hospital, Frenchay Park Road, Bristol, BS16 1LE.

Specialist investigations for heart tissue is carried out at St George’s University of London, SW17 0RE

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

MUSCLE BIOPSIES

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

**Consultation:** An initial notification should be made either to a Consultant Neuropathologist or a member of the Neuropathology laboratory staff by telephone prior to the biopsy. If the initial notification is to the laboratory staff, they will recommend a consultation with a Consultant Neuropathologist. Consultation should be made at least 24 hours prior to the biopsy. Special instructions for more complex investigations, for example electron microscopy, can be identified at this stage.

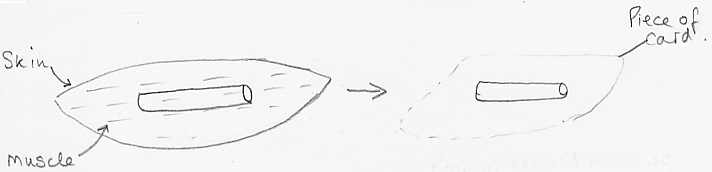
Samples of muscle biopsy should be submitted unfixed as soon as possible after excision. Samples should be placed on a piece of card and submitted in a **damp** environment – usually in a plastic universal container with a piece of **damp** gauze or paper tissue covering the specimen. To achieve the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

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

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

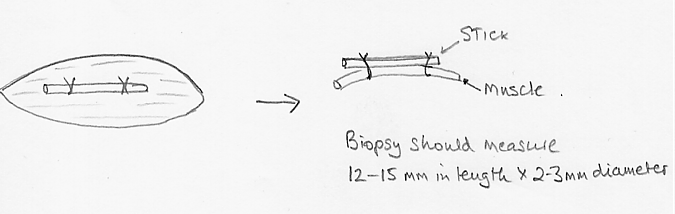
The procedure should be performed in the morning if possible to ensure safe arrival in Southampton during the working day. A full clinical history should accompany the biopsy.

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



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

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



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

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

The package should be addressed to

**Neuropathology, Level E**

**South Pathology Block**

**Southampton General Hospital**

**Southampton SO16 6YD**

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

**Informing the laboratory:** If possible the laboratory should be informed

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

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

**Non Gynae Cytology**

Please label the specimen as described above and include

* date and time specimen taken
* clear clinical details
* Any non-gynae specimens sent with a histology specimen should be bagged separately.

SPUTUM CYTOLOGY

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

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

URINE CYTOLOGY

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

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

PLEURAL AND ASCITIC FLUID, PERITONEAL AND BRONCHIAL WASHINGS

Send pleural and ascitic fluids to the laboratory as soon after obtaining the specimen as possible. This is because cells degenerate quickly if specimens are left standing at room temperature. A 20ml sample is sufficient in a sterile universal container.

**Do not place in CCF**.

Refrigerate specimens and send to the lab as soon as possible.

FINE NEEDLE ASPIRATES

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

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

Ensure these are dry before putting in the slide box.

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

**Do not place in CCF**

The Consultant Pathologists are pleased to offer advice.

**Health & Safety**

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

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

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

In the majority of cases, a histology report will be issued within four working days of receipt of the specimen. 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.

Non gynae cytology is reported within 4 days unless additional procedures such as immunocytochemistry are required.

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

**Mortuary and Bereavement Services**

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

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

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

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**

1. ORGANISATION & STAFF

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

|  |  |  |
| --- | --- | --- |
| Key Personnel: | | |
| Pathology Services Manager: | Lee Phillips | Ext. 4039 |
| Blood Sciences Technical Manager: | Sarah Scadden | Ext. 4025 |
| Haematology/Blood Transfusion Manager: | Caroline Mathews | Ext: 4048 |
| Biochemistry Manager: | Amanda Hawkins | Ext: 4048 |
| Quality Manager: | Sarah Muncaster | Ext. 4033 |
| POCT Co-ordinator: | Shaneela Perkins  poc.enquiries@salisbury.nhs.uk | Ext. 4050 |
| Anticoagulant Nurse: | Bleep 1413 | Ext. 4006 |
| Blood Transfusion Nurse Specialist: | Vacant Post | Ext 4539 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Consultant Staff: |  | Ext. | Secretary | Bleep |
| Consultant Haematologist: | Dr Jonathan Cullis | 4828 | 4043 | 07699 741464 |
| Consultant Haematologist: | Dr Louise Gamble | 4043 | 2043 |  |
| Consultant Haematologist: | Dr Effie Grand | 4539 | 2066 | 07699 644513 |
| Consultant Haematologist: | Dr Tracey Parker | 4043 | 4043 |  |
| Consultant  Chemical Pathologist: | Dr Niki Meston | 4303 |  |  |
| Associate Specialist in Chemical Pathology: | Dr Nuala O’Connell | 4047 | 4037 |  |

**Location:**

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

The department is part of the Clinical Support Directorate.

**Laboratory Opening Hours:**

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

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

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

|  |  |
| --- | --- |
| **Biochemistry** | **1621** |
| **Haematology and Transfusion** | **1626** |

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

All staff have nhs mail accounts.

**Requesting Work**

REQUEST FORMS

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

SPECIMEN BOTTLES

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

* **Blood Cultures**
* **Citrate -** **Light Blue top.** INR, APTT, Clotting screen or D-dimers (1 tube), Lupus or Thrombophilia screen (3 tubes + 1 gold). It is essential that these tubes are correctly filled.
* **ESR - Lavender top.** PMR, Temporal Arteritis or other criteria apply
* **Plain SST gel - Gold top.** Routine Biochemistry (except HbA1c, GP Glucoses, Lactate, NH3, Lead, Trace metals), B12, Ferritin, Autoimmune tests, serum Folate
* **Plain plastic - Red top**
* **Heparin - Green top**
* **EDTA crossmatch - Pink top.** Blood group & Cross match, Antibody screen - these tubes must **NOT** be used for FBCs
* **EDTA - Lavender top.** Routine Haematology, Haemoglobinopathies, Malarial parasites, Direct antiglobulin test, G6PD, Glandular fever screen, Sickle cell screen, HbA1c,lead, cell markers.
* **Fluoride - Grey top.** GP and dynamic test Glucoses, confirmation of suspected hypoglycaemia, Ethanol, Lactate
* **Royal Blue (EDTA).** Heavy metals, Trace metals (2 tubes), Zinc
* **White - non Vacutainer, Lithium heparin.** Ammonia, **paediatric** Zinc or Trace metals (2 tubes)
* **Pale Lilac (non-vacutainer) – citrate.** Paediatric clotting screen, INR, APTT.

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

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

ACCEPTANCE OF SPECIMENS FOR PROCESSING

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

• There is a paired specimen and request form

• The details on the specimen match the details on the request form

• **There are adequate points of identification on the specimen and request form\***

• Specimen integrity is appropriate - specimens containing clots are unsuitable for whole blood analysis (full blood counts, clotting studies) or plasma tests (fluoride oxalate glucose)

• There is a sufficient specimen fill volume or specimen size

• The date and time of specimen collection is indicated

• There are no contraindications that will limit test analysis e.g. correct specimen type (urine cannot be used for a serum request)

• The specimen is intact and not leaking – damaged specimen containers risk giving incorrect results due to contamination or incorrect specimen volume

• The specimen is received in the Laboratory within the correct time frame for analysis

• The correct specimen preservative/tube has been used for the test required

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

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

Below are acceptable points of ID

• Surname and First name of the patient (both names together count as one point of ID)

• Date of Birth

• Hospital Number

• NHS number

REJECTING SPECIMENS FOR PROCESSING

If the specimen does not meet the acceptance criteria the specimen will be rejected. The requesting clinician will be informed of any specimens that have been rejected, enabling them to organise a repeat if necessary. Rejected specimens will be dealt with on the day of receipt and the clinician will be informed the same day, when possible.

In all cases the patient and specimen details are entered into Telepath. This provides the laboratory with a full and accurate record of all specimens received in the laboratory, it is also used to track all specimens received, whether analysed or not.

Other reasons for specimen rejection specific to tests;

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

**Clinical Biochemistry**

All clinical enquiries can be made via e-mail to [shc-tr.bioenquiries@nhs.net](mailto:shc-tr.bioenquiries@nhs.net).

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

ICU (Radnor) Emergency Dept Whiteparish Ward Beatrice Labour Ward

NICU

DYNAMIC TEST PROTOCOLS

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

TPN

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

TDM – where possible please avoid sending these tests OOHs

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

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

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

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

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

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

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

ENZYMES

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

ADD-ON TESTS

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

**Clinical Haematology**

All clinical enquiries can be made via e-mail to

[shc-tr.haemenquiries@nhs.net](mailto:shc-tr.haemenquiries@nhs.net), where they will be directed to the appropriate Consultant Haematologist.

INPATIENT REFERRALS AND BONE MARROW EXAMINATIONS

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

OUTPATIENT SERVICES

Patients are seen in the consulting rooms within the Pathology Department.

See pages 8 – 9.

PEMBROKE SUITE

Patients are seen for diagnostic procedures and tests either in the Pathology Outpatient rooms or in the Pembroke Unit. Blood and platelet transfusions are normally administered here or on Nunton Unit. Chemotherapy is administered by Oncology-trained nurses. There are facilities for therapeutic plasma exchange.

There are also facilities for counselling, and staff work closely with other departments such as the Palliative Care Team.

INPATIENT FACILITIES – PEMBROKE WARD

Inpatients are nursed mostly on Pembroke Ward. Pembroke Ward is a combined 10 bedded haematology-oncology and medical ward. It has 6 side rooms prioritised for patients under the care of the Haematology or Oncology teams.

Patients are admitted to this ward for chemotherapy and the side effects of chemotherapy, for disease-related problems and for non-chemotherapy treatments.

ADD-ON TESTS

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

**Blood Transfusion**

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

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

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

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

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

Errors in patient identification and sampling labelling may lead to ABO incompatible transfusions. Evidence for this is well documented in the annual reports of the SHOT (Serious Hazards of Transfusion). There has been a number of wrong bloods in tube events documented.

As a result recommendations were made for hospitals to move to a zero tolerance policy for the labelling of Blood Transfusion samples and implementation of the Two Sample Rule. The **first sample** can be historical i.e. >7 days old or taken on the same day as the second sample. The **second sample** must be a separate venepuncture event with new patient ID checks performed. It must be sent to the Blood Transfusion Laboratory which will perform the blood issue. Preferably the second sample should be taken by a different member of staff whenever possible.

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

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

Lipaemic samples may be unsuitable for analysis.

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

Samples are stored refrigerated for 7 days.

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

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

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

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

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

**Laboratory Medicine Tests – Alphabetical Index**

| **Test** | **SFT code** | **Sample Type** | **SDH or Sent Away** | **Turnaround time (indicative for non-urgent requests)** | **OOHs** | **Notes** | **Reference range  a=age related / F= female / M=male** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **17 Hydroxy Progesterone (Adults)** | 17OHP | Gold / serum | So ‘ton - Chromatography | 10 working days | No | 9 am during menses | **Males** 0-6 month 0.8-7.9 nmol/L 6 months-18 years 0.2-3.2 nmol/L >18 years 1.2-7.6 nmol/L **Females** 0-6 months 0.8-7.9 nmol/L 6 months-6 years 0.1-3.4 nmol/L 6 -10 years 0.2-2.0 nmol/L 10-18 years 0.5-4.4 nmol/L >18 years (follicular phase) 0.4-3.6 nmol/L >18 years (luteal phase) 1.2-7.6 nmol/L |
| **17 Hydroxy Progesterone (Neonates)** | COM | Blood spots | So ‘ton - Chromatography | 11 working days | No |  | Term, well babies: - less than 20nmol/l Pre-term/Sick infants may have much higher levels (up to 200nmol/l) without having CAH. These infants would need repeat spots and back up tests. Monitoring - 8am level measurable (i.e. not suppressed) but less than 80nmol/l suggests reasonable control. NB: These values are derived from immunoassay not LCMSMS |
| **3 Hydroxybutyrate (Beta Hydroxy Butyrate)** | COM | Grey / fluoride plasma / (**on ice)** | B’Ham IEM lab | 3 working days | No | Please state fasting status | See report or contact laboratory |
| **5HIAA (Quantitative)** | HIAA24 | 24 hr urine (glacial acetic acid) | So ‘ton - Chromatography | 11 working days | No | Mon – Fri. See patient information sheet for SPECIAL DIET instructions. Screen and monitoring Carcinoid Syndrome | 5 – 35 µmol/24 hr |
| **7-Dehydrocholesterol** | COM | Green/ Lith Hep plasma | GOS Enzyme Lab, |  | No | Discuss with duty Biochemist first. Take blood Mon – Wed ONLY. | See report or contact laboratory |
| **AAT** |  |  |  |  |  | **See Alpha 1 Anti-Trypsin** |  |
| **ACE** | SACE1 | Gold / serum | SDH | 1/2 day |  | See Angiotensin Converting Enzyme |  |
| **Acetyl Choline Antibody/ Motor End Plate Antibody** | ACRAB | Gold / serum | Oxford Immunol | 14 days | No |  | <5 x 10-10 mol/L |
| **Acetyl Cholinesterase** | AACHO | Amniotic Fluid (15-20 wks) | Sheffield - Immunology & PRU | 2 days | No | Store refrigerated, DO NOT FREEZE Part of ONTD screen. Contact duty Biochemist | Negative - see report |
| **ACT** |  |  |  |  |  | **See Alpha 1 anti-Chymotrypsin** |  |
| **ACTH** | ACTHB | Lavender / plasma – must be separated within 2 hrs | So ‘ton - Specialist Biochemistry | 5 working days | No | EDTA Plasma ONLY | <46 ng/L |
| **Activated Partial Thromboplastin Time (APTT)** | APTT | Blue / citrate | SDH | 4 hours | Yes | Up to the fill line on the blue top citrate tube. | 0.8 – 1.2  Intravenous heparin therapy: 1.5 – 2.5 |
| **Acyl Carnitines** | CARN | Blood spots | GOS Clin Biochem | 1-2 weeks | No | Spot must completely fill circle & fully soak through card. | < 1 month 0 – 50.32 μmol/L <1 year 10.3 – 42.0 μmol/L 1 – 11 years 10.0 – 27.8 μmol/L 12 – 20 years 10.1 – 34.5 μmol/L |
| **Adrenal Antibody** | ADRAB | Gold / serum | So ‘ton - Immunology | 10 working days | No |  | Pos / Neg |
| **Adult Autoimmune Neutropaenia** | RAS | Yellow SST | H&I NHSBT Filton | 14 working days | No | Neutrophil count MUST be <2 x 109/L | See report or contact laboratory |
| **AFP (see Alpha-Feto Protein)** |  |  |  |  |  | **See Alpha Feto Protein** |  |
| **AH50** | AH50 | Gold / serum | So ‘ton - Immunology | 20 working days | No | Sample must be frozen within 12 hours after being taken. | 80 - 200 % |
| **Alanine Transaminase** | ALT | Gold / serum | SDH | 1/2 day | Yes | In profiles: L4, LCAP4 | F: 7 - 35 U/L M: 10 - 40 U/L |
| **Albumin** | ALB | Gold / serum | SDH | 1/2 day | Yes | In profiles: BON, L4, RENA, LCAP4 | 35 – 50 g/L |
| **Albumin / Creatinine Ratio** | ACR | Early morning urine | SDH | 1 day | No |  | F: < 3.5 mg/mmol M: < 2.5 mg/mmol |
| **Alcohol (see Ethanol)** |  |  |  |  |  | **See Ethanol** |  |
| **Aldosterone / Renin Ratio** |  |  |  |  |  | **See Renin / Aldosterone Ratio** |  |
| **Alkaline Phosphatase** | ALP | Gold / serum | SDH | 1/2 day | Yes | In profiles: BON, L3, RENA, LCAP3 | 30 – 130 U/L a |
| **Alkaline Phosphatase Isoenzymes** | ALPI | Gold / serum | So ‘ton - Specialist Biochemistry | 10 working days | No | Sent Mon - Fri Separated serum or plasma stored at 40oC. Haemolysed samples are unsuitable. | Qualitative / interpretive |
| **Allergen Specific IgE (see IgG)** |  |  |  |  |  | **See IgE** |  |
| **Allo-Antibody Identification Complicated** | RAS | 2 x Pink EDTA | RCI NHSBT Filton | 14 working days | No |  | See report or contact laboratory |
| **Allo-Antibody Identification routine** | P | Pink / EDTA | SDH | 1 day | Yes | If further investigation is required, TAT could be up to 5 days. | See report or contact laboratory |
| **Allo-Antibody Screen routine** | OS | Pink / EDTA | SDH | 4 hours | Yes |  | See report or contact laboratory |
| **ALP** | ALP | Gold / serum | SDH | 1 day | Yes | See alkaline phosphase | 30 - 130 U/L a |
| **Alpha 1 Anti-Trypsin - AAT** | AATS | Gold / serum | SDH | 1/2 day | Yes |  | 1.10 – 2.10 g/L |
| **Alpha 1 Anti-Trypsin *Genotyping*** | COM | Lavender / EDTA / whole blood | SDH Wessex regional Genetics | 4 weeks | No | **Send to Regional Genetics Salisbury** | Interpretive comment on report |
| **Alpha 1 Anti-Trypsin *Phenotyping*** | AATP | Gold / serum or purple EDTA plasma | King’s London | 14 working days | No | Confirmation by AAT genotyping also required Sent Mon – Thurs. 1st class post. | Interpretive comment on report |
| **Alpha Feto Protein - AFP *(Maternal Serum)*** | DOWNS (SAFP) | Gold / serum 15 – 21 wks | Portsmouth | 3 days | No | Part of Downs / ONTD Screen Sent Mon – Thurs. Separated within 48 hours | Part of Downs 2nd Trimester |
| **Alpha Feto Protein -  AFP *(Tumour Marker)*** | AFPE | Gold / serum | SDH | 1/2 day | No |  | 0-9 kU/L a |
| **Alpha Subunit** | COM | Gold / serum | Bart’s and the London NHS Trust | 4 weeks | No |  | See report or contact laboratory |
| **ALT** | ALT | Gold / serum | SDH | 1 day | Yes | See alanine transaminase | F: 7-35 U/L M: 10 - 40 U/L |
| **Aluminium** | ALS | Navy /Trace (k2EDTA)/ blood | So ‘ton - trace | 6 working days | No | Sent Mon – Fri | See report or contact laboratory |
| **Amino Acids (serum)** | PAAS | Gold / serum | So ‘ton - Chromatography | 10 working days | No | Telephone if required urgently Sent Mon – Fri. Samples are stored at below -700C until required for analysis | Interpretive comment on report |
| **Amino Acids (Urine)** | UAAS | Random (children).  24 hr urine (adults) | So ‘ton - Chromatography | 10 working days | No | Can be sent urgently if discussed with duty Biochemist. Do serum amino acids also. Sent Mon – Fri. Samples are stored at below -700C until required for analysis | Interpretive comment on report |
| **Amino Acids (CSF)** | COM | CSF | So ‘ton - Chromatography | 10 working days | No | Done urgently - please discuss with duty Biochemist. Samples are stored at below -700C until required for analysis | Interpretive comment on report |
| **Amiodarone** | AMIO | Lavender / EDTA / plasma | Cardiff Toxicol | 7 days | No | **Pre-dose** Sent Mon – Thur. Gel tubes must be avoided | 0.15-2.0 mg/L |
| **Amisulpride** | COM | 4 mL of ETDA whole blood preferred (pre-dose or ‘trough’ sample). Serum or plasma can be used, but avoid gel-separator tubes. | King’s London | 5 working days | No | Please refrigerate (if possible) if not sending immediately. Send by first class post. | 100-400 µg/L |
| **Ammonia** | AMM | Navy/Trace (k2EDTA) / plasma **/ ice, Green / lithium heparin** | SDH | 1/2 day | Yes | Contact lab **before** taking samples. Immediate results | See guide to profiles and test groups |
| **Amniotic Fluid OD** | RAS | Amniotic fluid | So ‘ton - NBS |  | No | Please contact Blood Transfusion, protect from light | See report or contact laboratory |
| **Amphetamine L/D Isomer Ratio** | AMPR | Urine | B’Ham City (incl toxicology) | 7 working days | No | ONLY in patients prescribed dex-amphetamine Sent Mon – Thur. 1st class post | See report or contact laboratory |
| **Amylase** | AMY | Gold / serum | SDH | 1/2 day | Yes |  | 27 – 102 U/L |
| **Amylase** | AMYUR | Random urine | SDH | 1 day | Yes | ? Macro-amylasaemia | See report or contact laboratory |
| **Amylase** | AMYFL | Pleural / wound / drain fluids | SDH | 1/2 day | Yes |  | See report or contact laboratory |
| **Amyloid (free light chains for)** |  |  |  |  |  | **See Free Light chains for Amyloid** |  |
| **Amyloid protein** | COM | Gold / serum | Royal Free London | 5 working days | No | 1st class post | <10 mg/L |
| **ANA, ANF (Anti-Nuclear Antibody Screen), (Connective Tissue Disease screen)** | CANT | Gold / serum | So ‘ton - Immunology | 5 working days | No | See Anti-Nuclear Antibody | Pos / Neg |
| **ANCA (Anti-Neutrophil Cytoplasmic Antibody)** | ANCA - this test has been superseded by more specific tests, the MPO (myeloperoxidase) antibody and the PR3 (Proteinase 3) antibody. ANCA (perinuclear ANCA & Cytoplasmic ANCA) testing can be performed if required by contacting the Laboratory. | | | | | | |
| **Androstenedione** | AND | Gold / serum | So ‘ton - Chromatography | 10 working days | No | Sent Mon – Fri. Store at -200C | Age and sex related ranges included in report.  M: 18-40 years 1.2-4.7 nmol/L  >40 years 0.8-3.1 nmol/L F: 18-29 years 1.6-7.5 nmol/L  30-39 years 1.2-6.0 nmol/L  40-49 years 0.9-4.8 nmol/L   50-59 years 0.7-3.8 nmol/L  60-69 years 0.5-3.0 nmol/L  >69 years 0.5-2.5 nmol/L |
| **Angiotensin Converting Enzyme (ACE)** | SACE1 | Gold / serum | SDH | 1/2 day | No |  | 8 – 52 U/L |
| **Anion Gap** | COM | Derived test | SDH | 1/2 day | Yes | Phone duty Biochemist to discuss first | 6 – 12 mmol/L calculated |
| **Anti-Mullerian Hormone** | AMH | Gold / serum | Plymouth | 7 working days | No |  | See report or contact laboratory |
| **Anti-Smith Antibodies** | ENAF | Gold / serum | So ‘ton - Immunology | 5 working days | No | Anti Sm in ENAF | Pos / Neg |
| **Anti–Amphiphysin antibodies** | COM | Gold / serum | Oxford Immunol | 14 days | No |  | See report or contact laboratory |
| **Anti-Beta 2 Glycoprotein 1** | AB2G1 | Gold / serum | So ‘ton - Immunology | 10 working days | No |  | 0-8.2 u/mL |
| **Antibody Investigation *(Red-cell)*** | P | Pink / EDTA | SDH | up to 5 days | Yes | Initiated by lab. Complicated cases may require referral to specialist testing laboratories and take several days  If further investigation is required, 2 x pink EDTA may be required for referral. | See report or contact laboratory |
| **Antibody quantitation *(Red-cell)*** | RAS | Pink / EDTA blood | NHSBT Filton | 7 working days | Yes |  | See report or contact laboratory |
| **Anti-Cardiolipin Antibody IgG (Anti-Phospholipid Antibody)** | ACARG | Gold / serum | So ‘ton - Immunology | 15 working days | No | anti-phospholipid Ab. | 0-10 U/mL |
| **Anti-Cardiolipin Antibody IgM (Anti-Phospholipid Antibody)** | ACARM | Gold / serum | So ‘ton - Immunology | 15 working days | No | anti-phospholipid Ab. | 0-7 U/mL |
| **Anti-Centromere Antibody** | CENTRO | Gold / serum | So ‘ton - Immunology | 10 working days | No |  | Pos / Neg |
| **Anti-D/c Quantification** | RAS | 2 x Pink EDTA | RCI NHSBT Filton | 7 working days | No |  | See report or contact laboratory |
| **Anti-DNA Antibody, Anti-Ds DNA, “DNA” Binding** | ADNA | Gold / serum | So ‘ton - Immunology | 5 working days | No |  | 0-15 IU/mL |
| **Anti-Endomysial Antibody (IgA)** | AENDO | Gold / serum | So ‘ton - Immunology | 10 working days | No | First line test is TTGA. Endomysial ab (IgA) ONLY on borderline TTGA or special cases. | Pos / Neg |
| **Anti-Endomysial Antibody (IgG)** | MISC | Gold / serum | So ‘ton - Immunology | 10 working days | No | Endomysial ab (IgG) ONLY done on confirmed IgA deficiency. | Pos / Neg |
| **Anti-GABA +/- GABA B** | COM | Gold / serum | Oxford Immunol | 21 days | No |  | See report or contact laboratory |
| **Anti-Gad Antibody** | AGAD | Gold / serum | So ‘ton - Immunol | 20 working days | No |  | 0-5 U/mL |
| **Anti-Gastric Parietal Cell Antibody** | PCA | Gold / serum | So ‘ton - Immunology | 5 working days | No | See LAIP | Pos / Neg |
| **Anti-Glomerular Basement Membrane Antibody** | AGBMA1 | Gold / serum | So ‘ton - Immunology | 3 working days | No |  | Pos / Neg |
| **Anti-GQ And Anti-GM1** | MISC | Gold / serum | Oxford Immunol | 28 days | No |  | Normal result = negative |
| **Anti-HU (Paraneoplastic Abs)** | PNEO | Gold / serum | Oxford Immunol | 14 days | No | Part of Purkinje Cell Ab screen or Paraneoplastic Antibodies | See report or contact laboratory |
| **Anti-Islet Cell Antibody** | ICA | Gold / serum | So ‘ton - Immunology | 15 working days | No |  | Pos / Neg |
| **Anti-La** | ENAF | Gold / serum | So ‘ton - Immunology | 5 working days | No |  | Pos / Neg |
| **Anti-MAG (Myelin Associated Glycoprotein** | MAGAB | Gold / serum | Oxford Immunol | 14 days | No |  | 0-1000 |
| **Anti-Mitochondrial Antibody** | LAIP | Gold / serum | So ‘ton - Immunology | 5 working days | No | Part of Liver Autoimmune screen, positive results have M2 antibody test. | Pos / Neg |
| **Anti-MUSK Antibodies** | AMUSK | Gold / serum | Oxford Immunol | 14 days | No |  | See report or contact laboratory |
| **Anti-Ri (Paraneoplastic Abs)** | PNEO | Gold / serum | Oxford Immunol | 14 days | No | Part of Purkinje Cell Ab screen | See report or contact laboratory |
| **Anti-Ro Antibody** | ENAF | Gold / serum | So ‘ton - Immunology | 5 working days | No | Part of ENA screen | Pos / Neg |
| **Anti-Smooth Muscle Antibody** | LAIP | Gold / serum | So ‘ton - Immunology | 5 working days | NO | See LAIP | Pos / Neg |
| **Antithrombin** | AT | 3 x Blue / citrate | SDH | On request or 28 working days | No | Part of thrombophilia screen | 86-130 % |
| **Anti-Yo (Paraneoplastic Abs)** | PNEO | Gold / serum | Oxford Immunol | 14 days | No |  | See report or contact laboratory |
| **Apixaban** |  | 1 x 4.5ml Citrate | Basingstoke Coag | On request or 5 working days | No | No 'therapeutic range' has been established, therefore observed peak and trough concentrations are described. Can be dispatched fresh or as frozen aliquots | **Peak Trough**  ***(Dose - VTE Prophylaxis*** *- 2.5 mg bid)* 41-146 ng/ml 23-109 ng/ml  ***(Dose - VTE Treatment*** *- 2.5 mg bid)*  30-153 ng/ml 11-90 ng/ml  ***(Dose - VTE Treatment*** *- 5 mg bid)*  59-302 ng/ml 22-177 ng/ml  ***(Dose - VTE Treatment*** *- 10 mg bid)*  111-572 ng/ml 41-335 ng/ml ***(Dose - Stroke Prevention AF*** *- 2.5 mg bid)* 69-221 ng/ml 34-162 ng/ml  ***(Dose - Stroke Prevention AF*** *- 5 mg bid)*  91-321 ng/ml 41-230 ng/ml |
| **Aquaporin 4** | AQP4 | Gold / serum | Oxford Immunol | 14 days | No |  | See report or contact laboratory |
| **Asialo Transferrin (Beta2-transferrin)** | COM | Nasal or aural discharge fluid | Queens Sq. London | 6 working days | No | To identify CSF rhinorrhoea or otorrhoea. Phone duty Biochemist if required urgently | See report or contact laboratory |
| **Asialylated Transferrin Carbohydrate Deficient Transferrin** | CDT | Gold / serum | Sheffield - Immunology & PRU | 5 days | No |  | 0.0-2.6 % |
| **Aspartate Transaminase (AST)** | AST2 | Gold / serum | SDH | 1/2 day | Yes |  | 15 – 41 U/L F |
| **Autoimmune Profile (Liver autoantibody)** | CANT | Gold / serum | So ‘ton - Immunology | 5 working days | No |  | Pos / Neg |
| **Autoimmune Thrombocytopenia** | RAS | Yellow SST + 3 x Pink EDTA | H&I NHSBT Filton | 7 working days | No | Platelet count should be <100 x 109 DO NOT REFRIDERATE SAMPLES | See report or contact laboratory |
| **Azathioprine Sensitivity** | TPMTA | Lavender / EDTA / whole blood | B’Ham City (incl toxicology) | 10 working days | No | See Thiopurine Methyl Transferase (TPMT) 1st class post without cooling | See report or contact laboratory |
| **B12** | B12E | Gold / serum | SDH | 1/2 day | No | See Vitamin B12 | See report or contact laboratory |
| **Basal ganglia Abs** | COM | Gold / serum | Queens Sq. London | 10 working days | No | 1st class post, sample not haemolysed | See report or contact laboratory |
| **BCR-ABL** | BCRABL | 2 x Lavender / EDTA / whole blood | So ‘ton - Molecular Path | 14 days | No | **Avoid** taking sample on **Friday.** To arrive at the referral laboratory within 48 hours of sampling EDTA | See report or contact laboratory |
| **Bence-Jones Protein** | BJP | Early morning urine | SDH | 5 days | No | Serum for EP and Immunoglobulins also if first time | See report or contact laboratory |
| **Bence-Jones Protein *(Quantitation)*** | BJP24 | 24 hr Urine (plain) | St Georges | 3-5 days | No | Request from Consultant Haematologists only | see report or contact laboratory |
| **Beta 2 Microglobulin** | B2MS | Gold / serum | So ‘ton - Immunol | 5 working days | No | Mon – Fri. | 1.2-2.4 mg/L |
| **Beta Carotene** | COM | Gold / serum (on ice kept dark) | Glasgow | 10 days | No | Transport frozen, kept in dark | 90-310 µg/L |
| **Bicarbonate** | BIC RENA | Gold / serum | SDH | 1/2 day | Yes | FRESH sample / full tube | 22 – 29 mmol/L |
| **Bile Acids / Salts** | BILE | Gold / serum | SDH | 1/2 day | Yes | Useful if LFTs are NORMAL | 0 – 14 µmol/L 2nd/3rd Trimester |
| **Bilirubin** | UBIL | Random urine (**fresh and kept dark)** | SDH | 1 day | No |  | See report or contact laboratory |
| **Bilirubin – Direct** | BUBC | Gold / serum | SDH | 1/2 day | Yes |  | <3 µmol/L |
| **Bilirubin – Total** | BIL2 | Gold / serum | SDH | 1/2 day | Yes |  | < 21 µmol/L a |
| **Biopterins** | COM | Blood spots (screen) or green Lith. Hep / plasma | B’Ham Neonatal | 15 working days | No | Ideally collect when blood phenylalanine is increased | see report or contact laboratory |
| **Blood (urine)** | MULTI | Random urine | SDH | 1 day | Yes |  | See report or contact laboratory |
| **Blood Gases** | BGAS | **Hep syringe ice** | SDH | POCT | Yes | POCT devices ONLY | See report or contact laboratory |
| **Blood Group Adult routine** | OF / OC | Pink / EDTA | SDH | 4 hours | Yes |  | See report or contact laboratory |
| **Blood Group and Antibody Screen** | GO, OFS, OCS, OBC, OS | Pink / blood (6 ml) or Paed pink / blood (0-6 /12 babies) | SDH | 1 day | Yes |  | See report or contact laboratory |
| **Blood Group Complicated** | RAS | Pink EDTA | RCI NHSBT Filton | 7 working days | No |  | See report or contact laboratory |
| **Blood Group Neonate Routine** | OBC | Paed Pink / EDTA | SDH | 4 hours | Yes | Up to fill line, overfilled samples will clot | See report or contact laboratory |
| **BNP N terminal pro B type natriuretic peptide** | BNP | Gold / serum | SDH | 1/2 day | No | To rule out heart failure | <400 ng/L |
| **Bone Marrow And Trephine Biopsy** | BM | Bone marrow | SDH | 1 day | No | Discuss with Consultant Haematologist | See report or contact laboratory |
| **Bromide** | COM | Serum and urine | Sheffield - Biomedical Sciences | 20 working days | No |  | See report or contact laboratory |
| **Buprenorphine** | BUP | Urine | B’Ham City (incl toxicology) | 7 working days | No | Mon – Thur. ONLY in patients prescribed buprenorphine 1st class post | See report or contact laboratory |
| **C1 Esterase Inhibitor (Immunochemical)** | C1INH | Gold / serum | So ‘ton - Immunology | 20 working days | No | Not frozen | 0.11-0.36 g/L |
| **C1 Esterase Inhibitor (functional)** | C1ESTB | Gold / serum | So ‘ton - Immunology | 30 working days | No | Send frozen | 40-150 % |
| **C3** | C3C4 | Gold / serum | SDH | 1/2 day | Yes |  | 0.7 – 1.6 g/L |
| **C4** | C3C4 | Gold / serum | SDH | 1/2 day | Yes |  | 0.2 – 0.6 g/L |
| **CA 125** | CA125E | Gold / serum | SDH | 1/2 day | No |  | < 35 kU/L |
| **CA 15-3** | CA153E | Gold / serum | SDH | 1/2 day | No |  | 0-31 kU/L |
| **CA 19-9** | CA199E | Gold / serum | SDH | 1/2 day | No |  | 0-35 kU/L |
| **Caeruloplasmin** | CAER | Gold / serum | So ‘ton - Automated | 2 days | No | Mon – Fri. Plasma Copper also helpful | 150-320 mg/L (in-house reference range study 2016) |
| **Caffeine** | COM | Gold / serum | B’Ham City (incl toxicology) | 7 working days | No | Phone duty Biochemist if required urgently 1st class post | See report or contact laboratory |
| **Calcitonin** | CACIB | Gold / serum / **(on ice. Fasting)** | Charing X | 10 days | No | NO HAEMOLYSIS Rush to lab on ice - separate as quickly as possible (within 30 mins) cold spin and freeze. SEND FROZEN. | M: <11.8 ng/L F: <4.8 ng/L |
| **Calcium (adjusted)** | CAS, CAP, BON, LCAP3, RENA | Gold / serum | SDH | 1/2 day | Yes | Phlebotomy un-cuffed | 2.20 – 2.60 mmol/L a |
| **Calcium** | CAU24 | 24 hr urine | SDH | 1 day | No |  | 2.5 – 7.5 mmol/24h a |
| **Calcium / Creatinine Clearance Ratio** | CACL | 24 hr urine (fresh) + gold/serum | SDH | 1 day | No | Serum Calcium and Creatinine during or at end of collection | See guide to profiles and test groups |
| **Calcium / Creatinine Ratio** | CACR | Random urine (fresh) | SDH | 1 day | No | 1st random urine after overnight void ideally | < 0.75 at 1 year < 0.40 adults > 0.57 hypercalciuria |
| **Calprotectin** | CALP | Faeces | SDH | 5 days | No |  | Comment added to all results. |
| **Carbamazepine** | CARB | Gold / serum / (pre-dose) | SDH | 1/2 day | Yes | Telephone if required urgently | 4 – 12 mg/L Pre-dose  See BNF and Path Harmony for range. |
| **Carbohydrate – Deficient Transferrin** | CDT | Gold / serum | Sheffield - Immunology & PRU | 5 days | No |  | 0.0-2.6 % |
| **Carbon Monoxide** | COHB | Lavender / EDTA / whole blood | SDH | POCT | Yes | See Blood Gas POCT only | See guide to profiles and test groups |
| **Carboxy-Haemoglobin** | COHB | Lavender / EDTA / whole blood | SDH | POCT | Yes | See Blood Gas POCT only | See guide to profiles and test groups |
| **Cardiac Muscle Antibody** | MISC | Gold / serum | Sheffield - Immunology & PRU | 5 days | No |  | Normal result = negative |
| **Carotene** | CAROT | Gold / serum **(on ice kept dark)** | Glasgow | 10 days | No | Mon – Thurs. FASTING plus Vitamin A Light sensitive, wrap in tin foil. Send 1st class post within 48 hours. If later than this separate 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 |
| **Catecholamine’s (Beta Carotene)** | PCATS | Green / Lith. Hep. Plasma / Serum **to lab asap** | St. Helior | 21 days | No | Separate immediately, keep in the dark and freeze Keep in the dark and frozen | 0.19-0.58 µmol/L |
| **Catecholamine’s (Quantitative) = VMA – Children Under 10 Yrs.** | COM | Random Urine **(fresh)** | So ‘ton - Chromatography | 6 working days (urgent by arrangement) | No | Mon – Fri. Paediatric samples can be sent urgently, refer to duty Biochemist. Fresh random urine | Expressed as μmol/mmol creatinine  HMMA HVA 0-1 years 11 20 2-4 years 6 14 5-9 years 5 9 10-19 years 5 8 |
| **Catecholamine’s (Quantitative) Adults / Children >10 yrs.** | CAT24A | 24 hr Urine  **(25 ml Glacial Acetic acid)** | So ‘ton - Chromatography | 7 working days | No | Mon – Fri. Can be sent urgently if discussed with duty Biochemist. | Interpretive comment on report |
| **CCP Antibody (Cyclic Citrullinated Peptide)** |  |  |  |  |  | **See Cyclic Citrullinated Peptide** |  |
| **CEA** | CEAE | Gold / serum | SDH | 1/2 day | No |  | 0-5 µg/L < 10 µg/L (smokers) |
| **Cell Markers: Bone Marrow** | BMCM | Bone marrow in orange, screw cap, heparin | So ‘ton - Immunology | 9 days | No | \*Same day in urgent cases | See report or contact laboratory |
| **Cell Markers: Immunodeficiency Screen CD4 Count** | IS | Lavender / EDTA / whole blood | So ‘ton - Immunology | 9 days | No | Mon-Thurs only CD3+, CD4+, CD8+ Absolute counts and ratios | See report or contact laboratory |
| **Cell Markers: Lymphocyte Markers** | BCM | Lavender/ EDTA or Green/Lith Hep. Whole blood | So ‘ton - Immunology | 9 days | No | \*Mon-Thurs unless for diagnosis of AML/ALL | See report or contact laboratory |
| **Cell Markers: Other Specimen Types e.g. CSF** | CM | Bone marrow in orange, screw cap, heparin | So ‘ton - Immunology | 9 days | No | Discuss with Consultant | See report or contact laboratory |
| **CH 50** | CH50 | Gold / serum **/ (to lab urgent)** | So ‘ton - Immunology | 20 working days | No | Haemolytic complement Must be frozen and kept frozen within 12 hours of taking sample. | 80-120 % |
| **Chloride** | CL | Gold / serum (Urine not avail) | SDH | 1/2 day | Yes | Renal / Paeds or special requests only | 95 – 108 mmol/L a |
| **Chloride** | SWCL | Sweat | SDH | 1 day | No | Sweat Test – Primary analyte. Contact laboratory to arrange. | < 40 mmol/L |
| **Cholesterol *(Total)*** | CHOL | Gold / serum | SDH | 1/2 day | Yes |  | See NICE QRISK 2 calculator |
| **Cholinesterase** | CHOLI | Lavender / EDTA / whole blood | Bristol S'mead cholinesterase unit | 3 weeks | No | Mon – Thurs. Urgents confirmed by sending to Bristol next working day | <5300 U/L |
| **Cholinesterase *(Organo Phosphate Exposure)*** | COM | Green / Lithium heparin / whole blood | Cardiff Toxicol | 7 days | No |  | 7524-13323 units/L |
| **Cholinesterase *Genotyping*** | COM | Lavender / EDTA / whole blood | Bristol S’mead | 12 weeks | No | Sent Mon – Thurs. Done for confirmation / family studies Sample should not be taken during a suspected episode of suxamethonium prolonged apnoea, take once awake and breathing unaided. | <5300 U/L |
| **Cholinesterase *Phenotyping*** | COM | Gold / serum | Bristol S’mead | 3 weeks | No | Sent Mon – Thurs. Done if cholinesterase low or for family studies Sample should not be taken during a suspected episode of suxamethonium prolonged apnoea, take once awake and breathing unaided. | See report or contact laboratory |
| **Chromium** | CHRO | Navy / Trace / whole blood | So ‘ton - trace | 6 working days | No | Mon – Fri. | See report or contact laboratory |
| **Chromogranin A** | CGA | Lavender / EDTA plasma / **(on ice)** | Charing X SAS Lab | 21 days | No | EDTA plasma, spin sample within 15 minutes of venepuncture. Store and send frozen. | < 60 pmol/L |
| **Chromogranin B** | CGB | Lavender / EDTA plasma / **(on ice)** | Charing X SAS Lab | 21 days | No | EDTA plasma, spin sample within 15 minutes of venepuncture. Store and send frozen. | < 150 pmol/L |
| **Ciclosporin** | CYCLD | Lavender/EDTA/ whole blood usually 12 hr post dose. Rarely 2 hr post dose, peak also required | Dorchester | 3 working days | No | Sent Mon – Thurs. **MUST be 12 hr post-dose**. Avoid taking samples on Fridays 2 hr post dose peak samples may also be required | Interpretive comment on report |
| **Ciclosporin** | CYCLH | Lavender / EDTA / whole blood | Harefield | 4 hours | No | Require pre-dose sample for 12 hour tough levels 1st class post to lab | **Heart (transplanted prior to 1st August 2007)** 0-3 months post TX 200-300 ng/ml 3-6 months post TX 175-225 ng/ml 6-12 months post TX 150-200 ng/ml >1 year post TX 100-150 ng/ml **Lung/Heart Lung (transplanted prior to 6th October 2010)** 0-3 months post TX 250-350 ng/ml 3-6 months post TX 200-300 ng/ml 6-12 months post TX 200-300 ng/ml >1 year post TX 150-250 ng/ml |
| **Ciclosporin** | CYCLK | EDTA Whole blood | King’s London | Within 24 hr of receipt (Mon-Thurs 9-5.30) | No | Mon-Thurs 9-5.30 1st class post | >40 µg/L |
| **Ciclosporin** | CYCLR | Lavender / EDTA / whole blood | Portsmouth | 48 hours | No | Cannot be shared with other tests | Enquires are referred to a clinical scientist |
| **Ciclosporin** | CYCLSO | Lavender / EDTA or Green / Lithium heparin whole blood | So ‘ton - Automated | 1 day (excluding transport time) | No | Samples should be timed for a 12 hour trough level.  Store samples at 4°C pre and post analysis. | The laboratory quotes a guideline 12 hour trough range of 100 - 250 µg/L but no firm therapeutic range exists for cyclosporin in whole blood. Individual cyclosporin values cannot be used as the sole indicator for making changes in the treatment regimen. Each patient should be thoroughly evaluated clinically before treatment adjustments are made. |
| **Citrate** | COM | 24hr Urine | UCL London |  |  | 1st Class Post | See report or contact laboratory |
| **CK** |  |  |  |  |  | **See Creatinine Kinase** |  |
| **CK Isoenzymes** | COM | Gold / Serum | Royal Free London | 1 month | No | 1st class post | See report or contact laboratory |
| **Clobazam** | COM | Gold / serum, or Grey / plasma | Chalfont St. Peter | 24 working hours | No | Discuss with Biochemistry | 30-300 µg/L |
| **Clonazepam** | COM | Grey / fluoride plasma | Chalfont St. Peter | 24 working hours | No |  | 20-70 µg/L |
| **Clonidine Stimulation (GH series)** | COM | Serum taken at -30.0, 0, 30, 60, 90, 120 minutes i.e. 6 samples | So ‘ton - Specialist Biochemistry | 5 working days | No | Check times on samples and send FROZEN | See report or contact laboratory |
| **Clotting Screen or Coagulation Screen** | **CS** -  INR + APTT (+ FIBA) | Blue / citrate | SDH | 1/2 Day | Yes | Tube MUST be filled to line. FIBA only done if INR APTT abnormal or initially requested. | INR 0.8-1.2 APTT 0.8-1.2 FIBA 2.0-4.0 (Please note therapeutic ranges may vary) |
| **Clozapine** | CLOZ | Lavender / EDTA / plasma | Cardiff Toxicol | 7 days | No | Gel tubes must be avoided | 350-600 µg/L |
| **Cobalt** | CO | Navy / Trace / whole blood | So ‘ton - trace | 6 working days | No | Mon-Fri, industrial screen or operative exposure | See report or contact laboratory |
| **Collagen crosslinks C-terminal telopeptide** | CTX | Lavender / EDTA / plasma | Norfolk & Norwich | 2 weeks | No | Transport Frozen Separate and freeze plasma, send frozen. | See report or contact laboratory |
| **Complement – C3 and C4** | C3C4 | Gold / serum | SDH | 1/2 day | No | See C3, C4 | See report or contact laboratory |
| **Conn’s Screen (Blood)** |  |  |  |  |  | **See Renin / Aldosterone Ratio** |  |
| **Copper** | COPS | Navy / Trace / plasma (adults) or Trace / plasma (paeds) | So ‘ton - trace | 4 working days | No | Sent Mon – Fri. See also TRACE METALS | See report or contact laboratory |
| **Copper** | COPU | 24 hr Urine (plain) | So ‘ton - trace | 6 working days | No | Sent Mon – Fri. | See report or contact laboratory |
| **Cortisol** | CORE | Gold / serum / (0900 am ideally) | SDH | 1/2 day | Yes\* | \*Telephone if required urgently. Phone duty Biochemist out of hour’s dynamic test or day curve may be more useful. | 185-624 nmol/L (09:00 hours) |
| **Cortisol (Urine Free)** | UCOR | 24 hr Urine **(thymol)** | So ‘ton - Specialist Biochemistry | 10 working days | No | Sent Mon – Fri. Screen for Cushing’s / monitoring Cushing’s A 24 hour urine collected into a bottle containing thymol is required. | F: up to 260 nmol/L M: up to 270 nmol/L |
| **Cortisol Blood Spot Series** | COM | Blood spots | So ‘ton - Specialist Biochemistry | 10 working days | No | Sent Mon – Fri. Store at room temperature | 1. 0800hrs 90-650 nmol/l 2. 1200hrs <260 nmol/l 3. 1800hrs <165 nmol/l 4. 2300hrs <85 nmol/l |
| **C-Peptide +/- Insulin** | CPEP2 | Gold / serum **/ (to lab urgent)** | So ‘ton - Specialist Biochemistry | 5 working days | No | Sample must be separated and frozen within 2 hours of venesection | Healthy fasting individual with a normal blood glucose: 350-1800pmol/L During a hypoglycaemic episode, a c-peptide concentration greater than 300pmol/L is inappropriately high (C-peptide is considered suppressed if less than 94pmol/L) Indeterminate values, i.e. 95-300pmol/L, require measurement of beta-hydroxybutyrate to help determine if hyperinsulinism is present |
| **C-Reactive Protein** | CRP | Gold / serum | SDH | 1/2 day | Yes |  | < 5 mg/L |
| **Creatinine** | CREAT UEC RENA | Gold / serum | SDH | 1/2 day | Yes |  | F: 53 – 97 µmol/L M: 80 – 115 µmol/L |
| **Creatinine** | CREU | 24 hr Urine (plain) | SDH | 1 day | Yes |  | F: 5.3 – 15.9 mmol M: 7.1 – 17.7 mmol |
| **Creatinine** | CREUR | Random Urine | SDH | 1 day | Yes |  | See report or contact laboratory |
| **Creatinine** | CREFL | Wound drain fluids | SDH | 1/2 day | Yes |  | See report or contact laboratory |
| **Creatinine Clearance** | CRCL | 24 hr Urine (plain) + Gold / serum | SDH | 1 day | Yes | MUST send serum creatinine during or at end of collection | See guide to profiles and test groups |
| **Creatinine Kinase** | CK | Gold / serum | SDH | 1/2 day | Yes |  | F: 25 – 200 U/L M: 40 – 320 U/L |
| **Crossmatch** | CTO | Pink / EDTA | SDH | 1/2 day | Yes | MUST state date and time required plus clinical details. | See report or contact laboratory |
| **CRP** |  |  |  |  |  | **See C-Reactive Protein** |  |
| **Cryoglobulins** | CRYO | 3 x Gold / serum 2 x Lavender / EDTA / plasma | SDH | 1 week | No | **Tubes MUST be pre-warmed and sent to lab warm** | See report or contact laboratory |
| **CSF Cytospin, CSF Examination For Abnormal WBCs / Blast Cells** | CSFX3 | CSF (plain bottle). Do **NOT** send **via air tube** | SDH | 1/2 day | No | DO NOT USE THE AIR TUBE, let the laboratory know it is being sent. | See report or contact laboratory |
| **CSF Spectro-photometry (?SAH)** |  |  |  |  |  | **See Xanthochromia** |  |
| **Cyanide** | COM | Gold / serum grey/Fluoride/ whole blood | Sheffield - Toxicology |  | No |  | See report or contact laboratory |
| **Cyclic Citrullinated Peptide Antibody (CCP)** | CCP1 | Gold / serum | SDH | 1/2 day | No |  | <7.0 u/mL |
| **Cystine Quantitative (See Amino Acids URINE)** | COM | 24 hr Urine (acid) | So ‘ton - Chem path | 10 working days | No | Mon – Fri. Urine amino acids assayed | See report or contact laboratory |
| **Cystine Screen (See Amino Acids URINE)** | UCYS | Random urine | So ‘ton - Chem path | 10 working days | No |  | See report or contact laboratory |
| **Cystinosis (Leucocyte Cysteine)** | COM | Green/ Lith. hep blood, 2 ml **to lab ASAP** | GOS Enzyme Lab, | 60 days | No | Discuss with duty Biochemist first. Take blood Mon – Wed ONLY. | See report or contact laboratory |
| **Dabigatran** | DABIG | 3 x Blue / citrate | Basingstoke Coag | On request or 5 working days | No | Can be dispatched fresh or as frozen aliquots | Peak range 64-443 ng/ml |
| **D-Dimer** | DDIM3 | Blue / citrate | SDH | ½ day | Yes | To be used in conjunction with clinical scoring for exclusion of DVT. | < 230 µg/L considered Negative for DVT |
| **Dexamethasone Suppression Test** | DEXE | Gold / serum / **(0900 am)** | SDH | 1 day | No | 1 mg dexamethasone at 11 pm | See individual reports |
| **DHEAS** | DHEA1 | Gold / serum | So ‘ton - Chromatography | 10 working days | No | Mon – Fri Store at -200C | Interpretive comment on report |
| **Digoxin** | DIG | Gold / serum / (6-12 hr post dose) | SDH | 1/2 day | Yes | Telephone if required urgently | 0.8 – 2.0 µg/L 6 – 12 hours post dose |
| **Dihydrotestosterone** | COM | Gold / serum | Bart’s and the London NHS Trust - Whitechapel | 7 working days | No | 1st class post | See report or contact laboratory |
| **Direct Antiglobulin Test (DAT)** | DAGML DAGMS | Pink / EDTA | SDH | 4 hours | Yes |  | See report or contact laboratory |
| **Downs 1st Trimester** | DOWNFT | Gold / serum | Portsmouth | 3 days | No | Mon – Thur. Counselling required Separated within 48 hours | Used in the pre-natal risk calculation for Down Syndrome affected pregnancies |
| **Downs 2nd Trimester** | DOWNPC | Gold / serum | Portsmouth | 3 days | No | Mon - Thur. Counselling required. Separated within 48 hours | Used in the pre-natal risk calculation for Down Syndrome affected pregnancies, only in those women who missed 1st trimester screening. |
| **Drug Induced Antibody Mediated Neutropaenia’s** | RAS | Yellow SST + Sample of implicated drug | H&I NHSBT Filton | 20 working days | No |  | See report or contact laboratory |
| **Drug Screen / Toxicology** | TOXK | Random urine (30 ml minimum) + Gold / serum + Lavender / EDTA blood + grey / Fluoride plasma + Gastric aspirate, tissues, vomit | B’Ham City (incl toxicology) | up to 3 weeks | Yes\* | 3     If analysis is urgent discuss with duty Biochemist.  Toxicology requests will be stored for 10 days, please send urine/gastric contents as necessary. If analysis IS required discuss with duty Biochemist. 1st class post | See report or contact laboratory |
| **Drugs Of Abuse Screen *(Full)*** | DAU | Random urine | B’Ham City (incl toxicology) | 3 working days | No | Urgent paediatric samples refer to duty Biochemist 1st class post, courier if urgent | See report or contact laboratory |
| **EGFR** | EGFR | Gold / serum | SDH | ½ day | Yes | Part of UEC | > 90 ml/min/1.73 m2 |
| **Elastase (see Pancreatic Elastase)** |  |  |  |  |  | **See Pancreatic Elastase** |  |
| **Electrolytes (Na + K)** | NAU / KU | 24 hr urine (plain) | SDH | 1 day | No |  | See report or contact laboratory |
| **Electrolytes (Na + K)** | NAFL/ KFL | Pleural / wound / drain fluids | SDH | ½ day | Yes |  | See report or contact laboratory |
| **Electrophoresis** | IG(EP) | Gold / serum | SDH | 5 days | No |  | See report or contact laboratory |
| **ELF (Enhanced Liver Fibrosis Test)** | ELF | Gold / serum | So’ton Biochemistry | 5 days | No |  | See report from reference laboratory |
| **ENA (Extractable Nuclear Antigens) Screen** | ENA1 | Gold / serum | So ‘ton - Immunology | 5 working days | No | Includes Ro, La, RNP, Scl70, Jo-1, Sm and centromere B antigens | Pos / Neg |
| **Enzymes of IEM** | COM | Skin, liver biopsy, blood, urine | Varies\* | Varies | No | **\*Arrange with duty Biochemist ONLY** | See report or contact laboratory |
| **ESR** | ESR1 | Lavender / EDTA | SDH | 1 day | Yes | Temp Arteritis, PMR, ?myeloma and Hodgkin’s disease ONLY | M: < 15 F: <10 |
| **Ethanol** | ALCOP | Grey / fluoride plasma | SDH | 1/2 day | Yes |  | 80 mg/dL legal driving limit >400 mg/dL fatalities reported |
| **Ethosuximide** | ETHO | Gold / serum | B’Ham City (incl toxicology) | 10 working days | No | Mon – Thur. 1st class post | 40 – 100 mg/L Pre-dose |
| **Extended RBC Phenotype** | RAS | Pink EDTA | RCI NHSBT Filton | 7 working days | No |  | See report or contact laboratory |
| **Factor II Assay** | FAC2 | 2 x Blue / citrate | SDH | 1 week | Yes | Discuss with Consultant Haematologist, can be done urgently if required | 50-150 IU/dL |
| **Factor V Assay** | F5 | 2 x Blue / citrate | SDH | 1 week | Yes | Discuss with Consultant Haematologist, can be done urgently if required | 50-150 IU/dL |
| **Factor V Leiden Genotype** | LEID | Lavender / EDTA / whole blood | SDH Wessex regional Genetics | 4 weeks | Yes | **Send to Regional Genetics Salisbury**. | See report or contact laboratory |
| **Factor VII Assay** | F7 | 2 x Blue / citrate | SDH | 1 week | Yes | Discuss with Consultant Haematologist, can be done urgently if required | 50-150 IU/dL |
| **Factor VIII Assay** | F8C | 2 x Blue / citrate | SDH | 1 week | Yes | Discuss with Consultant Haematologist, can be done urgently if required | 50-150 IU/dL |
| **Factor VIII Inhibitor (and any other Clotting factor inhibitor)** | F8I | 2 x Blue citrate | SDH | 1 week | Yes | Discuss with Consultant Haematologist, can be done urgently if required | See report or contact laboratory |
| **Factor IX Assay** | F9C | 2 x Blue / citrate | SDH | 1 week | Yes | Discuss with Consultant Haematologist, can be done urgently if required | 50-150 IU/dL |
| **Factor X Assay** | F10 | 2 x Blue / citrate | SDH | 1 week | Yes | Discuss with Consultant Haematologist, can be done urgently if required | 50-150 IU/dL |
| **Factor Xa (anti Xa) Heparin** | F10a | 2 x Blue / citrate | So ‘ton - Coag | > 1 day | No | Monitoring of LMWH. | LMWH Treatment: 0.4-0.8 IU/ml LMWH Prophylaxis: 0.2-0.4 IU/ml UF Heparin: 0.3-0.7 IU/ml |
| **Factor XI Assay** | F11 | 2 x Blue / citrate | SDH | 1 week | Yes | Discuss with Consultant Haematologist, can be done urgently if required | 50-150 IU/dL |
| **Factor XII Assay** | F12 | 2 x Blue / citrate | SDH | 1 week | Yes | Discuss with Consultant Haematologist, can be done urgently if required | 50-150 IU/dL |
| **Faecal Elastase** |  |  |  |  |  | **See Pancreatic Elastase** |  |
| **FAI** |  |  |  |  |  | **See Free Androgen Index** |  |
| **Fe** |  |  |  |  |  | **See Iron** |  |
| **Ferritin** | FERE | Gold / serum | SDH | 1/2 day | Yes | Acute phase reactant | F: 13 – 150 µg/L a M: 30 – 400 µg/L a |
| **Foetal RhD Blood Group Screening** | RAS | Pink EDTA | IBGRL NHSBT Filton | 7 working days | No | From 11 weeks gestation | See report or contact laboratory |
| **Foetal/Neonatal alloimmune Thrombocytopenia (NAIT)** | RAS | Mother - Yellow SST + Pink EDTA  Father - Pink EDTA Baby - Paed Pink EDTA | H&I NHSBT Filton | 21 working days | No |  | See report or contact laboratory |
| **Fibrinogen** | FIBA | Blue / citrate | SDH | 1/2 day | Yes |  | 2.0 – 4.0 g/L |
| **FK506 (see Tacrolimus)** |  |  |  |  |  | **See Tacrolimus** |  |
| **Flecainide** | FLEC | Lavender / EDTA / 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 | 1 working day | No |  | See report or contact laboratory |
| **FMH Quantification** | RAS | Pink EDTA | RCI NHSBT Filton | 1 working day | No |  | See report or contact laboratory |
| **Folate (Serum)** | SFOL5 | Gold / serum | SDH | 1/2 day | No |  | 3.1 – 19.9 µg/L |
| **Follicle Stimulating Hormone - FSH** | FSHE | Gold / serum | SDH | 1/2 day | No |  | See guide to profiles and test groups |
| **Free Androgen Index (FAI)** | FAI | *Derived test* | SDH | 1/2 day | No | See Sex Hormone Binding Globulin | F: < 5.0 |
| **Free Beta HCG – Maternal** | DOWNS (BHCG) | Gold / serum | Portsmouth | 3 days | No | Sent Mon – Thur Separated within 48 hours | Part of Downs 1st Trimester |
| **Free Fatty Acids** | COM | Grey / fluoride plasma / (**on ice)** | B’Ham IEM lab | 3 working days | No | Please state fasting status Store frozen prior to shipment | See report or contact laboratory |
| **Free Light Chains (Serum)** | FLC3 | Gold / serum | SDH | 5 days | No | Discuss with Consultant Haematologist | See report or contact laboratory |
| **Free Light Chains for amyloid** | COM | Gold / serum | Royal Free London | 5 working days | No | 1st class post  **(for existing patients under joint care with National Amyloid Centre only)** | Kappa: 3.3-19.4 mg/L Lambda: 5.7-26.3 mg/L K/L Ratio: 0.26-1.65 |
| **Free PSA (see Prostate Specific Antigen)** |  |  |  |  |  | **See Prostate Specific Antigen** |  |
| **Free T3** | FT3E | Gold / serum | SDH | 1/2 day | Yes\* |  | a 3.9 – 6.8 pmol/L Up to 14 yrs: M/F: 4.0-6.2pmol/L 14-18yrs: M: 3.8-5.7pmol/L 14-18yrs: F: 3.5-5.3pmol/L 18-51yrs: M/F: 4.3-6.9pmol/L 51-110hrs: M/F: 3.5-6.2pmol/L |
| **Free T4** | FT4E | Gold / serum | SDH | 1/2 day | Yes\* |  | 8 – 16 pmol/L |
| **Free Testosterone (Calculated)** | CFT | Gold / serum | SDH | 1/2 day | Yes |  | See report or contact laboratory |
| **Free/Total PSA Ratio (see Prostate Specific Antigen)** |  |  |  |  |  | **See Prostate Specific Antigen** |  |
| **Fructosamine** | FRUCTA | Gold / serum | Bath | 7 days | No | Sent Mon – Thur | 205-285 µmol/L |
| **FSH** |  |  |  |  |  | See Follicle Stimulating Hormone |  |
| **Full Blood Count (FBC)** | FBC | Lavender / EDTA / whole blood | SDH | 1/2 day | Yes |  | See guide to profiles and test groups |
| **Functional C1 Esterase Inhibitor** | COM | Gold / serum + Purple / EDTA | Sheffield - Immunology & PRU | 2 - 5 days | No |  | Quantification 0.15-0.35 g/L Functional 70-150 % |
| **Galactosaemia Screen** | GALAC | Green /Lith Heparin Lavender EDTA whole blood or blood spots DBS | Bristol S’mead | 7 days | No | Must be sent on same day as sampling, avoid weekends. Lithium Heparin send as whole blood, stable for up to 5 days | See report or contact laboratory |
| **Gamma Glutamyl Transferase** | GGT3 L3 | Gold / serum | SDH | 1/2 day | Yes |  | F: 0-37 U/L M: 0-54 U/L |
| **Gastrin – Fasting** | GAST | Lavender / EDTA plasma / **(on ice)** | Charing X SAS Lab | 21 days | No | Sent as required. Overnight fast / NOT on PPI EDTA plasma, spin sample within 15 minutes of venepuncture. Store and send frozen. | < 40 pmol/L Fasting |
| **Gentamicin *(Once Daily)*** | GEN1B | Gold / serum 0-2 hr pre-dose, green / lithium heparin | SDH | 1/2 day | Yes\* | \*Avoid out of hours. State regime / dosing details on request form | Please refer to guidance on MICROGUIDE. Interpretive comments added to reported results. |
| **Gentamicin *(Other Regimes)*** | GENTB | Gold / serum pre and 1 hr post dose, green / lithium heparin | SDH | 1/2 day | Yes\* | \*Avoid out of hours. State regime / dosing details on request form | Please refer to guidance on MICROGUIDE. Interpretive comments added to reported results. |
| **Gentamicin *(Random Sample)*** | GENTR | Gold / serum state time, green / lithium heparin | SDH | 1/2 day | Yes\* | \*Avoid out of hours. State regime / dosing details on request form | Please refer to guidance on MICROGUIDE. Interpretive comments added to reported results. |
| **GGT (see Gamma Glutamyl Transferase)** |  |  |  |  |  | **See Gamma Glutamyl Transferase** |  |
| **GH (see Growth Hormone)** |  |  |  |  |  | **See Growth Hormone** |  |
| **Glandular Fever Test (see Infectious Mononucleosis)** |  |  |  |  |  | **See Infectious Mononucleosis** |  |
| **Globulin** | GLOB | *Derived test* | SDH | 1/2 day | Yes |  | 21 – 37 g/L a |
| **Glucagon – Fasting** | GLUG | Lavender / EDTA plasma / **(on ice)** | Charing X SAS Lab | 21 days | No | Overnight fast **to lab ASAP** EDTA plasma, spin sample within 15 minutes of venepuncture. Store and send frozen. | < 50 pmol/L |
| **Glucose (Body fluids - not CSF)** | GLUFL | Pleural fluid / wound / drain / ascites / aqueous or vitreous humour (Post Mortem) | SDH | 1/2 day | Yes | Fluoride preserved sample required | See report or contact laboratory |
| **Glucose (CSF)** | GLUCA | CSF | SDH | 1/2 day | Yes | Fluoride preserved sample required | 2.2-3.9 mmol/L a Approx. 60% plasma value |
| **Glucose (urine)** | UGLU | Random urine | SDH | 1 day | Yes |  | See report or contact laboratory |
| **Glucose – GPs or more than 4 hrs delay** | GLFA GLFFA | Grey / fluoride plasma | SDH | 1/2 day | Yes |  | Up to 6.0 mmol/L Fasting |
| **Glucose – Hypoglycaemia** | GLFA GLFFA | Grey / fluoride plasma + Gold / serum **(to lab ASAP)** | SDH | 1/2 day | Yes | Telephone to alert laboratory take sample for insulin / C-peptide | See report or contact laboratory |
| **Glucose – Wards / less than 4 hrs delay** | GLUA GLUFA | Gold / serum | SDH | 1/2 day | Yes |  | Up to 6.0 mmol/L Fasting |
| **Glucose Tolerance Test GTT** | GTT2 | Grey / fluoride plasma / fasting 0 + 2 hr | SDH | 1/2 day | No | Done in Pathology Outpatients Tue / Wed / Thur | Interpretive comment on report |
| **Glucose-6-Phosphate Dehydrogenase** | G6PA | Lavender / EDTA / whole blood | Bath | 7 days | No | Screening test only, but if deficient is quantified Contact laboratory before requesting | 4.6-13.5 U/gHb |
| **Glycosamino-Glycans (mucopolysaccharides)** | MUCO | Random urine | BRI - metabolic, neuroendocrine and nutrition | 3-4 weeks | No | Refrigerate after collection, send as soon as possible. If delay in sending advise to freeze. | See report or contact laboratory |
| **Growth Hormone GH** | GHA | **Gold / serum / (sample to lab ASAP)** | So ‘ton - Specialist Biochemistry | 5 working days | No | Store at -200C | Random growth hormone levels are, in general, uninterpretable. Suggest an IGF-1. Following hypoglycaemia growth hormone may not peak for 30 minutes |
| **Gut Hormones– Fasting** | GUT | Lavender / EDTA plasma / **(on ice)** | Charing X SAS Lab | 21 days | No | Overnight fast / NOT on PPI EDTA plasma, spin sample within 15 minutes of venepuncture. Store and send frozen. | See guide to profiles and test groups |
| **Haemochromatosis HFE Genotype** | COM | 2 x Lavender / EDTA / whole blood | SDH Wessex regional Genetics | 4 weeks | No | **Send to Regional Genetics, Salisbury** | See guide to profiles and test groups |
| **Haemoglobin (urine)** | MULTI | Random urine | SDH | 1 day | Yes |  | See report or contact laboratory |
| **Haemoglobin A1c (HBA1c)** | HBA1CA | Lavender / EDTA / whole blood | SDH | 1 day | No |  | See guide to profiles and test groups |
| **Haemoglobin Electrophoresis** | HBEL | Lavender / EDTA / whole blood | SDH | 1 week | No |  | See guide to profiles and test groups |
| **Haemoglobin HPLC (Haemoglobinopathy screening)** | HPLC | Lavender / EDTA / whole blood | SDH | 1 week | No | Request FBC as well | See guide to profiles and test groups |
| **Haemosiderin** | HSID | Urine / EMU preferred | SDH | 1 day | No |  | See report or contact laboratory |
| **Haptoglobin** | HAPT | Gold / serum | So ‘ton - Automated | < 1 day | No |  | Adult M: 0.5-2.0 g/L Adult F: 0.4-1.6 g/L |
| **HCG (Total) Ectopic Pregnancy** | HCGE | Gold / serum | SDH | 1/2 day | Yes\* | \*Phone duty biochemist out of hours | < 2.1 IU/L |
| **HCG (Total) Tumour Marker** | HCGE | Gold / serum | SDH | 1/2 day | No |  | < 2.1 IU/L |
| **HDL Cholesterol** | CHOL | Gold / serum | SDH | 1/2 day | No | Overnight fast | See NICE QRISK 2 |
| **Heavy Metal Screen** | COM | Navy / Trace | So ‘ton - trace | 10 working days | No | Mon – Fri. 24 hour urine also required | See report or contact laboratory |
| **Heinz Bodies** | HEINZ | Lavender / EDTA / whole blood | SDH |  | No |  | See report or contact laboratory |
| **Heparin Induced Thrombocytopenia (HIT)** | RAS | Yellow SST | H&I NHSBT Filton | 7 working days | No |  | See report or contact laboratory |
| **HFE Genotype** | COM | 2 x Lavender / EDTA / whole blood | SDH Wessex regional Genetics | 4 weeks | No | See Haemochromatosis | See report or contact laboratory |
| **Histone Antibodies** | HIST | Gold / serum | So ‘ton - Immunology | 10 working days | No |  | 0-5 U/mL |
| **HLA B\*57:01** | COM | Lavender / EDTA / whole blood | So ‘ton - Molecular Path | 7 days | No |  | See report or contact laboratory |
| **HLA B27** | HLAB27 | Lavender / EDTA / whole blood | So ‘ton - Immunology | 9 days | No | Mon – Thur | Pos / Neg |
| **HLA DQ2: DQ8 (HLA DQA1 & B1)** | HLADQ | Lavender / EDTA / whole blood | So ‘ton - Molecular Path | 7 days | No | Coeliac disease Mon – Thur | See report or contact laboratory |
| **HLA DR2** | HLADR2 | Lavender / EDTA / whole blood | NHSBT Filton | 7 working days | No | Mon – Thur Samples must be labelled by hand | See report or contact laboratory |
| **HLA Specific antibody testing** | RAS | Yellow SST | H&I NHSBT Filton | 7 working days | No |  | See report or contact laboratory |
| **HLA typing Class I** | RAS | Pink EDTA | H&I NHSBT Filton | 5 working days | No |  | See report or contact laboratory |
| **HLA Typing Class II** | RAS | Pink EDTA | H&I NHSBT Filton | 5 working days | No |  | See report or contact laboratory |
| **HLA-Coeliac** | RAS | Pink EDTA | H&I NHSBT Filton | 5 working days | No |  | See report or contact laboratory |
| **HLA-HFE** | RAS | Pink EDTA | H&I NHSBT 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** | HOMO1 | Lavender / EDTA plasma / **(on ice)** | BRI - chem path | 1 week | No | Samples collected onto crushed ice and then separated within 30 minutes. | M: <14.3 µmol/L F: <11.3 µmol/L |
| **Hyaluronic acid** | HYAL | Gold / serum | So ‘ton - Specialist Biochemistry | 5 working days | No | Store at -200C | <42ug/L Green-safe  42 to 107ug/L Amber-warning  >108ug/L Red-action |
| **IgA Deficiency/Antibodies** | RAS | 2 x Pink EDTA | RCI NHSBT Filton | 7 working days | No |  | See report or contact laboratory |
| **IgE (Allergen Specific) RAST** | RAST | Gold / serum | So ‘ton - Immunology | 5 working days | No | Specify allergens | > 0.35 KUA/L |
| **IgE *(TOTAL)*** | IGE | Gold / serum | So ‘ton - Immunology | 5 working days | No |  | adults 0-81 KU/L |
| **IGF-Binding Protein 3  (IGF-BP3)** | IGFBP | Gold / serum **(sample to lab ASAP)** | Guildford | 7 days | No | Do IGF 1 also First class post | See report or contact laboratory |
| **IGF1** | IGF1A | Gold / serum | So ‘ton - Specialist Biochemistry | 5 working days | No | Mon – Fri. 9 am preferred Haemolysed samples are unsuitable for analysis | Interpretive comment on report |
| **IgG Subclasses (IgG4 only)** | IGG4 | Gold / serum | So ‘ton - Immunology | 5 working days | No | Mon – Thur. | 0.1-1.3 g/L |
| **Immunofixation *Serum*** | IFS | Gold / serum | SDH | 5 days | No |  | See guide to profiles and test groups |
| **Immunofixation Serum (D,E)** | COM | Gold / serum | St Georges | 2-4 days | No | Mon – Fri. | See report or contact laboratory |
| **Immunofixation Urine (D,E)** | COM | EMU or random urine | St Georges | 3-5 days | No | Mon – Fri. Investigation of proteinuria / myeloma | See report or contact laboratory |
| **Immunofixation *Urine*** | IFU | EMU or random urine | SDH | 5 days | No | Investigation of proteinuria / myeloma | See report or contact laboratory |
| **Immunoglobulins (G, A, M)** | IG | Gold / serum | SDH | 1/2 day | No |  | IGG: 6.0 – 16.0 g/L > 14 years IGA: 0.8 – 2.8 g/L 15-45 years, 0.8 – 4.0 g/L >45 years IGM: 0.5 – 1.9 g/L 15-45 years, 0.5 – 2.0 g/L >45 years |
| **Infant Autoimmune Neutropenia** | RAS | Yellow SST + Pink EDTA | H&I NHSBT Filton | 14 working days | No | Neutrophil count MUST be <2 x 109/L | See report or contact laboratory |
| **Infectious Mononucleosis** | MONS | Lavender / EDTA / plasma | SDH | 1 day | Yes |  | Pos / Neg |
| **Infliximab** | COM | Gold / Serum | Via Path, St. Thomas’ London | 10 working days | No | Used in treatment for IBD. Arrival time to lab needs to be <5 days from sample collection. | 1-2 µg/ml Intermediate >2 µg/ml Therapeutic <1 µg/ml Sub-therapeutic |
| **Inhibin** | COM | Gold / serum | Charing X Med Oncology | 7 working days | No | Ist Class Post | See report or contact laboratory |
| **INR** | INR | Blue / citrate | SDH | 4 hours | Yes |  | 0.8-1.2 (non-therapeutic) |
| **Insulin (Fasting)** | INS | **Gold / serum / (sample to lab ASAP)** | So ‘ton - Specialist Biochemistry | 5 working days | No | Separate and freeze within 2 hrs. Fasting / fluoride glucose also required Within 2 hours of being drawn , 500µl of sample should be separated and frozen at -200C | For a healthy fasting individual with a normal blood glucose: <20mU/L During a hypoglycaemic episode: >5mU/L is inappropriately high (insulin is considered suppressed if <1.6mU/L) Indeterminate values, i.e. 1.6-5mU/L, require measurement of c-peptide and if inconclusive beta-hydroxybutyrate to help determine if hyperinsulinism is present |
| **Insulin Antibodies** | COM | **Gold / serum / (on ice)** | Guildford | 14 days | No | Send Mon – Thur First class post | See report or contact laboratory |
| **Intrinsic Factor Antibody** | IFA | Gold / serum | So ‘ton - Immunology | 15 working days | No |  | <6 U/mL |
| **Iron** | FES | Gold / serum | SDH | 1/2 day | Yes | Only done if renal failure on dialysis or ?iron overload | F: 11 – 32 µmol/L M: 13 – 32 µmol/L |
| **IRT** |  |  |  |  |  | **See Immunoreactive Trypsin** |  |
| **JAK2** |  | 2 x Lavender / EDTA / whole blood | SDH Wessex regional Genetics | 3 weeks | No | **Send to Regional Genetics Salisbury** | See report or contact laboratory |
| **Jo-1 Antibody** | ENAF | Gold / serum | So ‘ton - Immunology | 5 working days | No | Part of ENA full screen | Pos / Neg |
| **Ketones** | KETU | Random urine (during GTT) | SDH | 1 day | Yes |  | See report or contact laboratory |
| **L/D Amphetamine Isomer Ratio (see Amphetamine L/D Isomer ratio)** |  |  |  |  |  | **See Amphetamine L/D Isomer ratio** |  |
| **Kleihauer** | KLEI | Pink / EDTA | SDH | 1/2 day | Yes | 500 IU prophylactic anti-D covers up to 4 ml bleed. >2 ml bleed referred to RCI | See report or contact laboratory |
| **Lactate** | LACT | Grey / fluoride plasma / (**on ice)** | SDH | 1/2 day | Yes | Contact lab **before** taking sample. Immediate results. | 0.5 – 2.2 mmol/L |
| **Lactate (CSF)** | LACTC | Grey / CSF / **(on ice)** | SDH | 1/2 day | Yes | Contact lab **before** taking sample. | See report or contact laboratory |
| **Lactate Dehydrogenase – LDH (Total)** | LDH2 | Gold / serum | SDH | 1/2 day | Yes | Tumour marker. Marker of haemolysis | 208 – 378 U/L |
| **Lamotrigine** | LAMO | Lavender / EDTA / whole blood | B’Ham City (incl toxicology) | 10 working days | No | Mon – Thur. Therapeutic range unclear Transport at ambient temperature | 1 – 15 mg/L, pre-dose, guide. |
| **LDH - Total** |  |  |  |  |  | **See Lactate Dehydrogenase** |  |
| **LDL** | LDL | *Derived test* | SDH | 1/2 day | No |  | See NICE QRISK 2 |
| **Lead** | LEAD | Navy/Trace or Lavender/EDTA blood | So ‘ton - trace | 6 working days | No | Phone duty Biochemist if urgent | See report or contact laboratory |
| **Leptin** | COM | Serum | Cambridge | 28 days | No | Dry Ice Courier | Dependant on Sex & BMI |
| **Levitiracetam** | COM | Lavender / EDTA / plasma | Cardiff Toxicol | 7 days | No | Gel tubes must be avoided | 10-37 mg/L |
| **LH (see Luteinising Hormone)** |  |  |  |  |  | **See Luteinising Hormone** |  |
| **Lipids (fasting) 12 hr fast** | LIP2A | Gold / serum + grey / fluoride | SDH | 1/2 day | No | Full profile Inc. HDL / LDL / Glucose | See report or contact laboratory |
| **Lithium** | LI | Gold / serum (12 hr post dose) | SDH | 1/2 day | Yes | Telephone if required urgently | 0.4 – 1.0 mmol/L 12 hrs post dose |
| **LKM Antibody (Liver, Kidney Microsomal)** | LAIP | Gold / serum | So ‘ton - Immunology | 5 working days | No |  | Pos / Neg |
| **Lupus Anticoagulant Screen** | LUP1 | 2 x Blue / citrate + 1 x Gold / serum | SDH | 3 days | No | Dilute Russell’s Viper Venom Time + Silica Clotting time Samples to be spun and plasma frozen ASAP if not testing the same day. | Positive Result = dRVVT TR >1.16 SCT TR >1.20 |
| **Luteinising Hormone - LH** | LHE | Gold / serum | SDH | 1/2 day | No |  | See guide to profiles and test groups |
| **M2 Antibody** | M2 | Gold / serum | So ‘ton - Immunology | 5 working days | No |  | <6 U/mL |
| **Macroprolactin Confirmation** | MPROL | Gold / serum | Southend | 10 working days | No | Usually lab initiated 1st class post | See report or contact laboratory |
| **Macroprolactin Screen** | MPROL | Gold / serum | SDH | 2 days | No | All consistently increased Prolactin’s are screened | See report or contact laboratory |
| **Magnesium** | MG/BON | Gold / serum | SDH | 1/2 day | Yes | Telephone if urgently required | 0.7 – 1.0 mmol/L |
| **Magnesium** | MAGU24 | 24 hr urine (plain) | SDH | 1 day | No |  | 2.4 – 6.5 mmol/24 hr a |
| **Malarial Parasite Rapid Test** | RMT | Lavender / EDTA / whole blood | SDH | 4 hours | Yes | To be processed urgently Blood film and Malarial parasites to be requested alongside, URGENT. High risk specimen | See report or contact laboratory |
| **Malarial Parasites** | BPARA | Lavender / EDTA / whole blood | SDH | 4 hours | Yes | Positives are confirmed at London School of Tropical Med To be processed urgently  High risk specimen | See report or contact laboratory |
| **Manganese** | MNB | Navy/Trace (adults) or Trace (paeds) whole blood | So ‘ton - trace | 6 working days | No | Mon – Fri. See also TRACE METALS. Whole blood preferred. | See report or contact laboratory |
| **Mastocytosis (Tryptase)** | TRYP | Gold / serum when well and unwell | Sheffield - Immunology & PRU | 5 days | No | Mon – Fri. Matched pair of sera – baseline and during acute attack. Must discuss with duty Biochemist | Basal levels are in the range of 2-14 ug/L with peak levels of more than 40 ug/L being associated with anaphylaxis |
| **Mercury** | MERCB | Navy / Trace / whole blood | So ‘ton - trace | 10 working days | No | Mon – Fri. **Keep in dark**. Urine Hg also required | See report or contact laboratory |
| **Mercury** | MERCR | EMU + navy / Trace / w.blood | So ‘ton - trace | 10 working days | No | Mon – Fri. **Keep in dark**. | See report or contact laboratory |
| **Mercury** | MERCUR | Random urine | So ‘ton - trace | 10 working days | No | Mon – Fri. **Keep in dark**. | See report or contact laboratory |
| **Methotrexate (High Dose)** | MTX | Gold / serum | So ‘ton - Automated | 4 hours (excludes transport time) | No | Phone duty Biochemist to discuss | Timing and protocol dependant |
| **MS Screen** |  |  |  |  |  | **See Multiple Sclerosis Screen** |  |
| **Mucopoly Saccharides (MPS screen)** | MUCO | Random urine | BRI - metabolic, neuroendocrine and nutrition | 1-2 weeks | No | Mon – Thur Refrigerate after collection, send as soon as possible. If delay in sending advise to freeze. | See report or contact laboratory |
| **Multiple Sclerosis Screen** | COM | CSF (plain) + matched serum | Queens Sq. London | STAT | No | Send matched gold top serum 1st class post, sample not haemolysed | CSF Glucose: 202-4.2 mmol/L Plasma glucose (fasting): 3.8-5.8 mmol/L CSF IgG: 10-40 mg/L Serum IgG: 7-16 g/L CSF Albumin: 90-360 mg/L Serum Albumin: 34-50 g/L IgG index: 0.3-0.7 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** | MPOPRMPO | Gold / serum | So ‘ton - Immunology | 5 working days | No |  | 0.0 – 5.0 iU/mL |
| **Neonatal Allo-immune Neutropenia (NAIN)** | RAS | Mother - Yellow SST + Pink EDTA  Father - Yellow SST + Pink EDTA  Baby - Paed EDTA | H&I NHSBT Filton | 14 working days | No |  | See report or contact laboratory |
| **Neuronal antibodies** |  |  |  |  |  | **See Paraneoplastic Antibodies** |  |
| **Neutrophil Function Test** | MISC | Green /Lithium heparin / whole blood | So ‘ton - Immunology | 9 days | No |  | Normal burst / Abnormal burst |
| **NMDA receptor Antibodies (Fixed)** | NMDA | Gold / serum | Oxford Immunol | 7 days | No | Please send paired CSF and Serum samples | See report or contact laboratory |
| **Noradrenaline** |  |  |  |  |  | **See catecholamines** |  |
| **Nucleosome antibodies** | NUCLEO | Gold / serum | So ‘ton - Immunology | 10 working days | No |  | Pos / Neg |
| **Occult Blood** | OB1-3 | Random faeces (marble size, collected on 3 days) | SDH | 3 days | No |  | See report or contact laboratory |
| **Oestradiol** | E2E | Gold / serum | SDH | 1/2 day | No |  | See guide to profiles and test groups |
| **Olanzapine** | COM | Lavender / EDTA / plasma | Cardiff Toxicol | 7 days | No | Gel tubes must be avoided | 20-40 µg/L |
| **Oligoclonal Bands** | OLIGO | CSF (plain) + matched serum | Queens Sq. London | 7 working days | No | Send matched gold top serum 1st class post, sample not haemolysed | See report or contact laboratory |
| **Oligosaccharides** | COM | Random urine | BRI - metabolic, neuroendocrine and nutrition | 3-4 weeks | No | Refrigerate after collection, send as soon as possible. If delay in sending advise to freeze. | Qualitative / interpretive |
| **Organic Acids** | UOAS | Random urine | So ‘ton - Chromatography | 10 working days (urgent by arrangement) | No | Mon – Fri. Phone duty Biochemist if urgent. Usually also do serum + urine amino acids Samples taken at the time of an acute illness are the most helpful. | Qualitative / interpretive |
| **Osmolality (serum)** | OSM | Gold / serum | SDH | 1 day | Yes |  | 275-295 mmol/kg |
| **Osmolality (urine)** | OSMU | Random urine | SDH | 1 day | Yes | Usually plus matched serum | See report or contact laboratory |
| **Osmolality – Calculated** | COM | Derived test | SDH | 1 day | Yes | See Serum osmolality | 275-295 mmol/kg |
| **Osteocalcin** | COM | Gold / serum **(on ice)** | Liverpool | 3 weeks | No | Send frozen | See report or contact laboratory |
| **Oxalate Excretion** | OXALU | 24 hr urine (acid) | UCL London | 2 weeks | No | Send Mon – Thur 1st Class Post. | F: <0.32 µmol/24 hr M: <0.42 µmol/24 hr |
| **Oxalate Excretion (Paediatrics)** | OXALR | Random Urine | UCL London | 2 weeks | No | Send Mon – Thur | Interpretive comment on report |
| **P3NP** |  |  |  |  |  | **See Procollagen 3N Terminal Peptide** |  |
| **Pancreatic Elastase** | PE1 | Faeces | So ‘ton - Specialist Biochemistry | 10 working days | No | Mon – Fri A random formed stool specimen is required. E1 concentrations are lower in watery stool samples. | Normal: > 200 µg/g stool Mild to moderate exocrine pancreatic insufficiency: 100 – 200 µg/g stool Severe exocrine pancreatic insufficiency: <100 µg/g stool |
| **Pancreatic Polypeptide – Fasting** | PP | Lavender / EDTA plasma / **(on ice)** | Charing X SAS Lab | 21 days | No | Overnight fast mandatory EDTA plasma, spin sample within 15 minutes of venepuncture. Store and send frozen. | <300 pmol/L |
| **Paracetamol** | OD | Gold / serum | SDH | 1/2 day | Yes | Emergency assay | See chart for guidance on treatment of OD in BNF |
| **Paraneoplastic Antibodies (Hu, Ri, Yo)** | NMDA | Gold / serum | Oxford Immunol | 14 days | No |  | See report or contact laboratory |
| **Paraquat Qualitative** | PQUATU | Random urine | So ‘ton - Specialist Biochemistry | 1 day (excluding transport time) but aim for 2 hour analytical TAT, result to be telephoned) | Yes | Emergency qualitative assay only.  (Quantitative assay not available). Clear natural gastric contents can also be used. | Toxic concentration: 0.08-64mg/L  Occupational concentration: 0.03mg/L |
| **Parathyroid Hormone** | PTHE | Gold / serum, lithium heparin, (Paed small green) | SDH | 1/2 day | No | BONPTH profile also required | 1.6 – 6.9 pmol/L. Requires serum Ca |
| **Paroxysmal Nocturnal Haemoglobinuria (PNH)** | PNH1 | Lavender / EDTA / whole blood | So ‘ton - Immunology | 9 days | No | Flow cytometry for CD55, CD59 | Clone / No clone |
| **Paternal Phenotyping** | RAS | Pink EDTA | RCI NHSBT Filton | 7 working days | No |  | See report or contact laboratory |
| **Porphobilinogen (PBG)** | PBG | Random urine **(Protect from light and keep in the refrigerator)** Do not centrifuge. | So ‘ton - Specialist Biochemistry | 1 day (excluding transport time) | Yes | Can be done urgently if discussed with duty Biochemist | Porphobilinogen: <10umol/l Porphobilinogen/creatinine ratio: <1.5umol/mmol creatinine |
| **PCP** |  |  |  |  |  | **See Procollagen Peptide** |  |
| **PCR (Protein / Creatinine Ratio)** | PCR | Random urine | SDH | 1 day | Yes |  | See report or contact laboratory |
| **Pemphigoid Antibody** | PEMPH | Gold / serum | So ‘ton - Immunology | 10 working days | No |  | Pos / Neg |
| **Pemphigus Antibody** | PEMPH | Gold / serum | So ‘ton - Immunology | 10 working days | No |  | Pos / Neg |
| **Perampanel (Fycompa)** | PERAM | Gold / serum | Chalfont St. Peter | 24 working hours | No | None | 200-1000 µg/L |
| **pH** | UPH | Random urine **(fresh)** | SDH | 1 day | No | Fresh sample | 4.5 – 8.0 |
| **pH** | PHF | Random faeces **(fresh)** | SDH | 1 day | No | Fresh sample | 7.0 – 7.5 |
| **Phenobarbital** | PHENO | Gold / serum / (pre-dose) | SDH | 1/2 day | Yes |  | 10 – 40 mg/L |
| **Phenylalanine (See amino acids SERUM)** | PHE | Gold / serum | So ‘ton - Chem path | 10 working days | No | Monitoring PKU patients | See report or contact laboratory |
| **Phenylalanine *on Blood Spots*** | PHEO1 | National heel prick card 4 spots blood | Portsmouth | 48 hours | No | Monitoring PKU patients (neonates / pregnancy) Collected between 5-8 days old | Part of Neonatal screening service |
| **Phenytoin** | PHENY | Gold / serum / (pre-dose) | SDH | 1/2 day | Yes | Telephone if required urgently | 10 – 20 mg/L (BNF range) |
| **Phosphate** | PHO, BON, LCAP4, RENA | Gold / serum | SDH | 1/2 day | Yes |  | 0.8 – 1.5 mmol/L a |
| **Phosphate** | PHOU24 | 24 hr urine | SDH | 1 day | Yes |  | 15 – 50 mmol/24 hr a |
| **Phosphate / Creatinine Clearance Ratio** | COM | Random urine (fresh + matched serum) | SDH | 1 day | No |  | See report or contact laboratory |
| **PKU Neonatal Screen** | PKU | Blood spots | Portsmouth | 3 days | No | Collected between 5-8 days old | Results reported as either positive or negative. Hb abnormalities will first be confirmed by IEF |
| **Placental Alkaline Phosphatase (PLAP)** | PLAP | Gold / serum | Charing X Med Oncology | 4-5 weeks | No | Mon – Thur. Seminomas / other germ cell tumours ONLY | See report or contact laboratory |
| **Plasma Viscosity** | PV | Lavender / EDTA / plasma | Bath | 3 days | No | Waldenstroms Macroglobulinaemia only. | Adult: 1.5-1.72 mpas < 3 years: 1.25-1.47 mpas |
| **Platelet Function Analysis** | PFA100 | 2 x Blue / citrate | SDH | 1 day | No | Discuss with Consultant Haematologist Take samples straight to Coag DO NOT SPIN | CADP: 61-104 secs CEPI: 74-146 secs |
| **Platelet Nucleotides** | COM | Blue / citrate | St Thomas' - centre for haemophilia & thrombosis | 2 months | No | To be received within 2 hours of venepuncture with minimal agitation | ATP: 2.4-15.3 nmol x 108 plt ADP: 1.4-9.5 nmol x 108 plt AA: 1.1-2.6 |
| **Platelet Transfusion Refractoriness** | RAS | Yellow SST + Pink EDTA | H&I NHSBT Filton | 7 working days | No |  | See report or contact laboratory |
| **PNH screen** | PNH1 | Lavender / EDTA | So ‘ton - Immunology | 5 working days | No | <72 hrs old Monday – Friday 12:00 pm | See report or contact laboratory |
| **Porphyrins *(Quantitative)*** | COM | Random urine **(kept dark)** preferably early morning sample | Cardiff Heath Park | 10 working days | No | Mon – Thur. Confirmation and monitoring. Usually also lavender blood. PROTECT FROM LIGHT | <40 nm/mmol creat |
| **Porphyrins *(Quantitative)*** | COM | Faeces / **(kept dark)** | Cardiff Heath Park | 15 working days | No | Mon – Thur. Usually also random urine and lavender blood. PROTECT FROM LIGHT | <200 nmol/g dry weight |
| **Porphyrins *(Quantitative)*** | COM | Lavender/ EDTA/ plasma / **(kept dark)** | Cardiff Heath Park | 10 working days | No | Mon – Thur. Blood / urine required. PROTECT FROM LIGHT. | Not increased |
| **Post-transfusion Purpura (PTP)** | RAS | Yellow SST + Pink EDTA | H&I NHSBT Filton | 7 working days | No |  | See report or contact laboratory |
| **Potassium** | K, UEC | Gold / serum | SDH | 1/2 day | Yes |  | 3.5 – 5.3 mmol/L a |
| **Potassium** | KU24 | 24 hr Urine | SDH | 1 day | Yes |  | 25 – 125 mmol/24 hr |
| **Potassium** | KUR | Random Urine | SDH | 1 day | Yes |  | See report or contact laboratory |
| **Potassium** | KFL | Pleural / wound / drain fluids | SDH | 1/2 day | Yes |  | See report or contact laboratory |
| **PP – Fasting** | GUT | EDTA / plasma / **ice** | Charing X SAS Lab | 21 days | No | Overnight fast EDTA plasma, spin sample within 15 minutes of venepuncture. Store and send frozen. | < 300 pmol/L |
| **Procollagen 3N Terminal Peptide (P3NP)** | P3NP | Gold / serum | So ‘ton - Specialist Biochemistry | 5 working days | No |  | Adults on Methotrexate: 3.3-9.6µg/L Paediatric reference range for <18 years. Children will have much higher concentrations of P3NP during periods of growth, see report or contact laboratory. Liver traffic light system: <10.4 µg/L: Green – safe 10.4-12.9µg/L : Amber – warning 12.9g/L and over: Red – action |
| **Progesterone** | PRGE | Gold / serum | SDH | 1/2 day | No |  | See report or contact laboratory |
| **Prolactin** | PRLE | Gold / serum | SDH | 1/2 day | Yes\* | \*Phone duty Biochemist if required urgently or out of hours | See guide to profiles and test groups |
| **Prostate Specific Antigen *(Total)*** | PSAE | Gold / serum | SDH | 1/2 day | No |  | See guide to profiles and test groups |
| **Protein** | PROTU | 24 hr urine (plain) | SDH | 1 day | Yes | Contact lab if required urgently | < 0.15 g/24 hr |
| **Protein screen (Urine)** | MULTI | Random urine | SDH | 1 day | Yes |  | See report or contact laboratory |
| **Protein / Creatinine Ratio (PCR)** | PCR | Random urine | SDH | 1 day | No | \*Urgent requests from labour ward processed immediately | < 23 mg/mmol |
| **Protein C** | PROC1 | 3 x Blue / citrate | SDH | 1 week | No | Part of thrombophilia screen. Levels reduced by warfarin. Can be dispatched fresh or as frozen aliquots | 82.1 -161.7 iu/dL |
| **Protein S (Free Protein S)** | PROSF1 | 3 x Blue / citrate | SDH | 1 week | No | Part of thrombophilia screen. Levels reduced by warfarin, pregnancy, OCP. Can be dispatched fresh or as frozen aliquots | 80.0- 140.0 iu/dL |
| **Protein (Body fluids - not CSF*)*** | TPFL | Pleural / wound / drain fluids /ascites | SDH | 1/2 day | Yes |  | See report or contact laboratory |
| **Protein (CSF)** | TPCSFB | CSF | SDH | 1/2 day | Yes |  | <1mth new-born: 0.15-1.3g/L Adult: 0.15-0.45 g/L |
| **Proteinase 3 (Pr3) Antibody** | PR31 MPOPR3 | Gold / serum | So ‘ton - Immunology | 5 working days | No |  | 0.0 – 3.0 iU/dL |
| **Prothrombin Gene Variant** | PTGV | Lavender / EDTA / whole blood | SDH Wessex regional Genetics | 4 weeks | No | Usually tested at the same time as Factor V Leiden and can use the same EDTA sample. | See report or contact laboratory |
| **PSA** |  |  |  |  |  | **See Prostate Specific Antigen.** |  |
| **PSA (Free / Total Ratio)** |  |  |  |  |  | **See Prostate Specific Antigen.** |  |
| **Pseudo Cholinesterase** | CHOLI | Gold / serum | SDH\* Bristol |  | Yes\* | \*Urgent confirmed by sending to Bristol next working day (Mon – Thur). Phone duty Biochemist if required urgently or out of hours | See report or contact laboratory |
| **PTH** |  |  |  |  |  | **See Parathyroid hormone** |  |
| **PTH-Related Peptide** | COM | **Special tube, on ice** | Liverpool | 2-3 weeks | No | Phone duty Biochemist to discuss. | Advised from reference laboratory |
| **Purine Screen (urine)** | COM | Spot urine (a few crystals of thymol) if unavailable, plain urine tube | Via Path - Purine research lab, St. Thomas’ | 3 weeks | No |  | Please discuss with the laboratory |
| **Purine Screen (blood)** | COM | Lavender / EDTA / whole blood | Via Path - Purine research lab, St. Thomas’ | 3 weeks | No |  | Please discuss with the laboratory |
| **Purine Studies** | COM | EDTA + Li Hep whole blood + plasma + 24 hr urine | Via Path - Purine research lab, St. Thomas’ | 3 weeks | No |  | Please discuss with the laboratory |
| **Rapamune (Sirolimus)** |  |  |  |  |  | **See Sirolimus** |  |
| **Reducing Substances** | REDU2 | Random urine (fresh or frozen) | So ‘ton - Chem path |  |  | No longer tested at SDH, please speak to duty biochemist for further information |  |
| **Reducing Substances** | TESTF | Random faeces (fresh or frozen) | So ‘ton - Chem path |  |  | No longer tested at SDH, please speak to duty biochemist for further information |  |
| **Renin** | REN1 | Lavender / EDTA / plasma **(to lab ASAP)** | So ‘ton - Specialist Biochemistry | N/A | No | DO NOT put on ice | **Male** >18 - <54 years: 4.9-56.3 mU/L >55 - <74 years: 4.0-47.4 mU/L **Female** >18 - <54 years: 4.0-43.6 mU/L >55 - <74 years: 4.0-48.9 mU/L |
| **Renin / Aldosterone Ratio (Conns Screen)** | ALDREN | 2 x Lavender / plasma + gold / serum  To lab ASAP | So ‘ton - Specialist Biochemistry | 5 working days | No | Aldosterone renin ratio <91pmol/mU: Effectively excludes Conn’s | M: >18 - ≤54 years: 43.6 -417.8pmol/L M: >55 - ≤74 years: 26.1-338.9pmol/l F: >18 - ≤54 years: 23.2-414.9pmol/L F: >55 - ≤74 years: 23.2-388.6pmol/L **Aldosterone to renin ratio** M: >18 - ≤54 years: 1.4-14.2 pmol/mIU M: > 55- ≤74 years: 0.9-22.4 pmol/mIU **F:** > 18 - ≤54years: 0.9-20.3 pmol/mIU F: > 55 - ≤74 years: 0.7-25.5 pmol/mIU |
| **Reticulocytes** | FBCR / RET | Lavender / EDTA / whole blood | SDH | 1/2 day | Yes | Set RET to be requested if FBC already performed | Adults: 50-100 x109/L Neonates: <1 week old 50-150 x109/L |
| **Rh/Kell Phenotype** | ORK | Pink / EDTA | SDH | 4 hours | Yes |  | See report or contact laboratory |
| **Rheumatoid Factor** | RF | Gold / serum | SDH | 1/2 day | No |  | <12 kU/L |
| **Rivaroxaban** |  | 3 x Blue / citrate | Basingstoke Coag | On request or 5 working days | No | Can be dispatched fresh or as frozen aliquots | **Peak Trough *(Dose - AF 20 mg daily)***  160-360 ng/ml 4-96 ng/ml ***(Dose - VTE Tx 20 mg)***  175-360 ng/ml 91-196 ng/ml ***(Dose - VTE Px 10 mg)***  91-196 ng/ml 1.3-38 ng/ml |
| **RNP Antibody** | ENAF | Gold / serum | So ‘ton - Immunology | 5 working days | No | Part of ENA full screen | Pos / Neg |
| **SACE** | SACE | Gold / serum | SDH | 1/2 day | Yes |  | See report or contact laboratory |
| **Salicylate** | OD | Gold / serum | SDH | 1/2 day | Yes | Emergency assay | Therapeutic range <350mg/L (see guidance in BNF for treatment of OD) |
| **Salivary Gland Antibody** | AHSGA | Gold / serum | Sheffield - Immunology & PRU | 10 days | No |  | Normal range = negative |
| **Scl70 Antibody** | ENAF | Gold / serum | So ‘ton - Immunology | 5 working days | No | Part of ENA full screen | Pos / Neg |
| **Selectivity Of Proteinuria** | COM | Random urine **(fresh must send matched serum)** | St Georges | 3-5 days | No | IgG / Albumin ratio and EP | See report or contact laboratory |
| **Selenium** | SE | Navy / Trace (adults) or Trace (paeds) plasma | So ‘ton - trace | 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 | No |  | See guide to profiles and test groups |
| **Sickle Cell And Thalassaemia Screening (Antenatal)** | FOQ2 | Lavender / EDTA / whole blood | SDH | 3 days | No | Must have completed Family Origin Questionnaire | See report or contact laboratory |
| **Sickle Screen** | SICK | Lavender / EDTA / whole blood | SDH | 1 week | Yes | Can be done urgently if required | See report or contact laboratory |
| **Sirolimus (Rapamune)** | SIRO | Lavender / EDTA / blood **(pre-dose)** | Bart’s and the London NHS Trust |  | No | Mon – Thur. **MUST be pre-dose.** Avoid taking samples on Fridays | Target 4 – 12 µg/L <2 months (local protocols vary) |
| **Sodium** | NA, UEC | Gold / serum | SDH | 1/2 day | Yes |  | 133 – 146 mmol/L |
| **Sodium** | NAU24 | 24 hr urine (plain) | SDH | 1 day | Yes |  | 40 – 220 mmol/24 hr |
| **Soluble Transferrin Receptor** | TRANR | Gold / serum | So ‘ton - Haem | < 1 month | No | Discuss with Consultant Haematologist | 12-44 nmol/L |
| **Somatomedin C (IGF-1)** |  |  |  |  |  | **See IGF-1** |  |
| **SS-A (Anti-Ro)** | ENAF | Gold / serum | So ‘ton - Immunology | 5 working days | No | Part of ENA full screen | Pos / Neg |
| **SS-B (Anti-La)** | ENAF | Gold / serum | So ‘ton - Immunology | 5 working days | No | Part of ENA full screen | Pos / Neg |
| **Stone Analysis** | STON | Renal / other calculi | UCL London | 3 weeks | No | Mon – Thur | See report or contact laboratory |
| **Sulphonyl Urea** | COM | Lavender / EDTA / plasma | Cardiff Toxicol | 7 days | No | Gel tubes must be avoided | See report or contact laboratory |
| **Synacthen Test** | SSYN | 2x Gold / serum 0, 30 min after 250 ug im Synacthen | SDH | 1/2 day | Yes\* | Telephone if required urgently. \*Phone duty Biochemist out of hours | > 445 nmol/L and a rise of > 200 nmol/L post Synacthen |
| **T and B cell Lymphocyte Subsets** | BCM | Lavender / EDTA / whole blood | So ‘ton - Immunology | 9 days | No | Mon-Thurs. Discuss with Consultant Haematologist. **DO NOT TAKE BLOOD ON FRIDAY** | Varies with age |
| **Tacrolimus (Fk506)** | FK | Lavender / EDTA/ blood **(12 hr post dose)** | Portsmouth | 48 hours | No | Mon – Thur. Must be 12 hr post dose. Avoid taking samples on Fridays Sample not viable after 7 days. Clotted samples cannot be tested | Therapeutic range 5-15 µg/L |
| **Testosterone (Total – Female)** | TESTEF | Gold / serum | SDH | 1/2 day | No | Females and children < 16 yrs. | See guide to profiles and test groups |
| **Testosterone (Total – Male)** | TESTEM | Gold / serum | SDH | 1/2 day | No | Adult males. 9 am preferred | See guide to profiles and test groups |
| **Tetrahydro Biopterins** | COM | Blood spots or Green Li Hep / plasma | B’Ham Neonatal | 15 working days | No | Discuss with duty Biochemist first. Take before PKU diet starts. | see report or contact laboratory |
| **Theophylline** | THEO | Gold / serum | SDH | 1/2 day | Yes | Telephone if required urgently | 10 – 20 mg/L adults Peak post dose |
| **Thiamine (Vit B1)** |  |  |  |  |  | **See Vitamin B1** |  |
| **Thiopurine Methyl Transferase (TPMT)** | TPMTB | Lavender / EDTA / whole blood | B’Ham City (incl toxicology) | 10 working days | No | For Azathioprine sensitivity | See guide to profiles and test groups |
| **Thrombin Time Ratio** | TCT | Blue / citrate | SDH | 1 day | Yes |  | 14-17 secs |
| **Thrombophilia Screen** | HCOAG1 | 4 x Blue / citrate + 1 x Gold / serum | SDH | 2 weeks | No | Only done after referral to Thrombophilia clinic, see guidelines on MICROGUIDE | see report or contact laboratory |
| **Thyroglobulin** | THYRO | Gold / serum | So ‘ton - Immunology | 6 working days | No | Mon – Fri. Also request thyroglobulin antibodies | <1 µg/L |
| **Thyroglobulin Antibodies** | THYAB | Gold / serum | So ‘ton - Immunology | 6 working days | No |  | <20 KU/L |
| **Thyroid Antibodies** | ATPO | Gold / serum | SDH | 1/2 day | No | Anti-TPO antibodies | See report or contact laboratory |
| **Tissue Trans-Glutaminase Antibody (IgG)** | TTGG | Gold / serum | So ‘ton - Immunology | 10 working days | No | Only done if IgA deficient | 0-9 U/mL |
| **Tissue Trans-Glutaminase Antibody (IgA)** | TTGA | Gold / serum | So ‘ton - Immunology | 5 working days | No | First line test for coeliac, anti-endomysial (IgA) only on borderline TTGA or special cases | 0-4 U/mL |
| **Tissue Type** | COM | Various | NHSBT Filton | 1 month or more | No | Discuss with laboratory prior to sending | See report or contact laboratory |
| **Tobramycin** | TOBR | Gold / serum | SDH | 1/2 day | Yes |  | For interpretation of Tobramycin results please refer to the BNF |
| **Total Protein** | TP/L4 LCAP4 | Gold / serum | SDH | 1/2 day | Yes |  | a: 60 – 80 g/L |
| **TPMT** |  |  |  |  |  | **See Thiopurine Methyl Transferase** |  |
| **Trace Metals Screen (Mn, Cu, Se, Zn)** | TRACE | Navy/Trace x 2(adult), Trace x 2 (paeds) Whole blood AND plasma | So ‘ton - trace | 10 working days | No | Mon – Fri | see report or contact laboratory |
| **Transferrin** | TRAN | Gold / serum | SDH | 1/2 day | No | Only done for renal failure on dialysis or ?iron overload | 2.0 – 3.6 g/L |
| **Transferrin Receptor (Soluble)** |  |  |  |  |  | **See Soluble Transferrin Receptor** |  |
| **Transferrin Saturation** | FES | Gold / serum | SDH | 1/2 day | Yes | Only done for iron overload, haemochromotosis on treatment and assessing IV Fe in CRF. | See report or contact laboratory |
| **Triglycerides** | TRIG | Gold / serum | SDH | 1/2 day | Yes | Part of lipid profile | See report or contact laboratory |
| **Trimethylamine** | COM | 24 hr urine (HCl) | Sheffield - Children’s' Hosp | 8 weeks | No | 24 hour urine collected into acid. pH adjust to < pH 2. | Given on report. |
| **Troponin T** | TROPTA | Gold / serum send separate sample if poss. | SDH | 1/2 day | Yes | **Follow acute coronary syndrome protocol ONLY** | < 15 ng/L |
| **Tryptase** | TRYP | Gold / serum | Sheffield - Immunology & PRU | 5 days | No | Mon – Fri. Follow anaphylaxis protocol | Basal levels are in the range of 2-14 ug/L with peak levels of more than 40 ug/L being associated with anaphylaxis |
| **Tryptase (Systemic Mastocytosis)** | TRYP | Gold / serum When well and unwell | Sheffield - Immunology & PRU | 5 days | No | Mon – Fri. Matched pair of sera – baseline and during acute attack | Basal levels are in the range of 2-14 ug/L with peak levels of more than 40 ug/L being associated with anaphylaxis |
| **Tryptase Anaphylaxis Protocol** | TRYP | Gold / serum immediately and then 1-2 hrs later | Sheffield - Immunology & PRU | 5 days | No | Mon – Fri. Matched pair of sera: Immediately and 1-2 hours post EVENT. Do total IgE RAST on one serum also | Basal levels are in the range of 2-14 ug/L with peak levels of more than 40 ug/L being associated with anaphylaxis |
| **TSH** | TSHE | Gold / serum | SDH | 1/2 day | Yes |  | 0.38-5.33 mU/L |
| **TSH – Neonatal** | NTSH | Blood spots | Portsmouth | 3 days | No | Collected between 5-8 days old | Part of Neonatal screening service |
| **TSH Receptor Antibody** | TSHRA | Gold / serum | Sheffield - Immunology & PRU | 5 days | No |  | Normal range: 0-0.9 IU/L Equivocal: 1.0-1.5 IU/L Positive: >1.5 IU/L |
| **TTG (or TTGA)** |  |  |  |  |  | **See Tissue Transglutaminase Ab** |  |
| **Urate** | URAT | Gold / serum | SDH | 1/2 day | Yes |  | F: 140 – 360umol/L M: 200 – 430umol/L |
| **Urate** | URAT24 | 24 hr urine (plain) | SDH | 1 day | No |  | 1.5 – 4.5 mmol/24 hr |
| **Urea** | UREA UES,UEC RENA | Gold / serum | SDH | 1/2 day | Yes |  | 2.5 – 7.8 mmol/L a |
| **Urea** | UREU | 24 hr urine (plain) | SDH | 1 day | Yes |  | 250 – 570 mmol/24 hr |
| **Urea** | UREFL | Wound drain fluids | SDH | 1/2 day | Yes |  | See report or contact laboratory |
| **Urobilinogen** | UBILO | Random urine **(fresh and kept dark)** | SDH | 1/2 day | Yes |  | See report or contact laboratory |
| **Valproate** | VALP | Gold / serum / (2 hours post dose) | Poole | 2 days (can be done urgently if required) | No | NOT routinely available, phone duty Biochemist to discuss | 50-100 mg/L |
| **Vancomycin** | VPRE | Gold / serum, Green Li Hep  (pre-dose) | SDH | 1/2 day | Yes | Occasional post or random dose (VPOST, VRAND) at discretion of Cons Microbiologist. | See report or contact laboratory |
| **Vascular Endothelial Growth Factor (VEGF)** | MISC | Gold / Serum | Queens Sq. London | 21 working days | No | Sample not haemolysed | <771 pg/mL |
| **Very Long Chain Fatty Acids** | VLCFA | Gold / serum or plasma | Bristol S’mead | 21 days | No | Mon – Thur | See report or contact laboratory |
| **Vigabatrin** | VIG | Gold / serum / (pre-dose) | B’Ham City (incl toxicology) | 10 working days | No | Rarely helpful | See report or contact laboratory |
| **VIP – Fasting** | VIP | EDTA / plasma / **ice** | Charing X SAS Lab | 21 days | No | Overnight fast | <40 pmol/L |
| **Vitamin A – Fasting** | VITA | Gold / serum **(kept dark)** | So ‘ton - Chromatography | 7 working days | No | Overnight fast / no alcohol 24 hours. PROTECT FROM LIGHT | Children : 1 - ≤ 7 years: 0.7 - 1.5 mmol/l > 7 - ≤ 13 years: 0.9 - 1.7 mmol/l > 13 - ≤ 19 years: 0.9 - 2.5 mmol/l Adults: 1.07-3.55 µmol/L |
| **Vitamin B1** | COM | Green /Lithium heparin / whole blood | Glasgow | 10 days | No | Light sensitive, wrap in tin foil. Contact lab if delivery is outside 72 hours from collection. | 275-675 ng/g Hb |
| **Vitamin B12** | B12 | Gold / serum | SDH | 1/2 day | No |  | 147 – 840 ng/L |
| **Vitamin B2** | COM | Green /Lithium heparin / whole blood | Glasgow | 10 days | No | Light sensitive, wrap in tin foil. Contact lab if delivery is outside 72 hours from collection. | 1.0-3.4 nmol/g Hb |
| **Vitamin B6** | COM | Green /Lithium heparin / whole blood | Glasgow | 10 days | No | Light sensitive, wrap in tin foil. Contact lab if delivery is outside 72 hours from collection. | 250-680 pmol/g Hb |
| **Vitamin C** | COM | **Special collection tubes** | Glasgow | 10 days | No | Contact duty Biochemist to discuss | 15-90 µmol/L |
| **Vitamin D – 1,25 Di-OH** | VITDDI | Gold / serum / (on ice) | So’ton | 4 weeks | No | Phone duty biochemist to discuss | 55-139 pmol/L |
| **Vitamin D – 25 OH** | VITDA | Gold serum / lithium heparin / (Paed small green) | SDH | 1/2 day | No | Test within 8 hours | NOP guidelines April 2013 <30 nmol/L - deficient 30-50 nmol/L - may be inadequate in some people >50 nmol/L - sufficient for most people |
| **Vitamin E – Fasting** | VITE | Gold / serum **(kept dark)** | So ‘ton - Chromatography | 7 working days | No | Overnight fast. PROTECT FROM LIGHT | Children: 1 - ≤ 7 years: 7 – 21 mmol/l > 7 - ≤ 13 years: 10 – 21 mmol/l > 13 - ≤ 19 years: 13 – 24 mmol/l Adults: 13.2-46.4 µmol/L |
| **Volted Gated Calcium Channel Antibody** | VGCCA | Gold / serum | Oxford Immunol | 21 days | No |  | 0-45 pmol/L – Negative  45-100 pmol/L – Low Positive  >100 pmol/L – Positive |
| **Volted Gated Potassium Channel Antibody** | VGKCA | Gold / serum | Oxford Immunol | 14 days | No |  | 0-69 pmol/L - Negative |
| **Von Willebrand’s Activity** | VWFAC | 3 x Blue / citrate | SDH | 1 week | No | Discuss with Consultant Haematologist. Part of Von Willebrand screen. | See report or contact laboratory |
| **Von Willebrand’s Factor Antigen** | F8RA | 3 x Blue / citrate | SDH | 1 week | No | Discuss with Consultant Haematologist | See report or contact laboratory |
| **Von Willebrand’s Screen** | F8C F8RA VWFAC | 3 x Blue / citrate | SDH | 1 week | No | Discuss with Consultant Haematologist | See report or contact laboratory |
| **WBC Enzymes** | WBCENZ | Lavender/EDTA (3.0ml) | BRI - metabolic, neuroendocrine and nutrition | 3-4 weeks | No | Phone duty Biochemist to discuss. PLEASE MARK PACKAGE “URGENT - WHITE CELL ENZYMES To reach lab within 24 hours from collection | See report or contact laboratory |
| **Xanthochromia Screen CSF Spectro-photometry (?SAH)** | CSFX3 | CSF (plain bottle) – **PROTECT FROM LIGHT**. Do NOT send via air tube | SDH | 1/2 day | Yes | Consultant request only – EXTRA CSF BOTTLE NEEDED, 4 in total. | Interpretive comment on report |
| **Zinc** | ZINC | Navy / Trace / plasma (adults) or Trace / plasma (paeds) | So ‘ton - trace | 4 working days | No | No haemolysis. See also trace metals | See report or contact laboratory |

| LIST OF REFERAL LABORATORIES | |
| --- | --- |
| **Laboratory** | **Address and Telephone** |
| **St Bartholomew’s London**  Clinical Biochemistry | Clinical Biochemistry, 4th Floor Pathology & Pharmacy Building, 80 Newark Street, Whitechapel,  London, E1 2ES  Tel 02073777000 x61038 |
| **Basingstoke**  Coagulation | Haemophilia Haemostasis & Thrombosis Lab, Pathology Department, North Hampshire Hospital  Basingstoke, Hants, RG24 9NA  Tel 01256 313296 / 313304 |
| **Bath** Clinical Biochemistry  Haematology | Area Central Laboratory, Royal United Hospital, Coombe Park, Bath, BA1 3NG  Tel 01225 824714 (Laboratory/results)  Tel 01225 824728 (Haematology Laboratory/results) |
| **BIRMINGHAM** City hospital | Dr Jonathan Berg, Clinical Chemistry Department, Birmingham City Hospital, Dudley Road, Birmingham, B18 7QH Tel 0121 507 5353 Fax 0121 507 5290 |
| **BIRMINGHAM** Inborn Metabolic Lab | Department Newborn Screening & Biochemical Genetics, Paediatric Laboratory Medicine, The Birmingham Children's Hospital NHS Trust, Steelhouse Lane, Birmingham, B4 6NH  Tel 0121 333 9942 |
| **BIRMINGHAM**  Neonatal Lab | Department Newborn Screening & Biochemical Genetics, Paediatric Laboratory Medicine, The Birmingham Children's Hospital NHS Trust, Steelhouse Lane, Birmingham, B4 6NH  Tel 0121 333 9942 |
| **BIRMINGHAM**  Toxicology Lab | Drugs of Abuse Section(or Toxicology Section), Regional Lab for Toxicology, City Hospital NHS Trust, Dudley Road, BIRMINGHAM, B18 7QH Tel 0121 507 5588/9 (Poisons Advice Service) |
| **BRISTOL (Southmead)** Cholinesterase Unit | Cholinesterase Unit, Southmead Hospital, North Bristol NHS Trust, Westbury-on-Trym, Bristol,  BS10 5NB Tel 0117 414 8415 |
| **Bristol (Southmead)** Biochemical Genetics  Clinical Chemistry | Blood Sciences and Bristol Genetics, Southmead Hospital, North Bristol NHS Trust, Westbury-on-Trym, Bristol, BS10 5NB  Tel 0117 414 8346 (Biochem Genetics Lab) |
| **Bristol (BRI)**  Chemical Pathology  Biochemical Genetics | Department of Clinical Biochemistry, Bristol Royal Infirmary, Queens Building, Level 8, Marlborough Street, Bristol, BS2 8HW  Tel 0117 3422040  Metabolic, Neuorendocrine & Nutrition laboratory, Dept of Clinical Biochemistry, Level 8, Queens Building, Bristol Royal Infirmary, Upper Maudlin Street, Bristol, BS2 8HW  Tel 0117 3422590 (for WBC enzyme enquiries) |
| **Cambridge**  Immunology | Immunology Department, Box 232, Level 4, Addenbrooke's Hospital, Hills Road, Cambridge,  CB2 0QQ  Tel 01223 256656 |
| **CARDIFF**  Analytical Toxicology Lab | Cardiff Toxicology Laboratories, 4th Floor, Academic Centre, University Hospital Llandough, Penlan Road, Llandough, Vale of Glamorgan, CF64 2XX Tel 02920 716894 |
| **CARDIFF**  Medical Biochemistry | Department of Medical Biochemistry & Immunology, University Hospital of Wales, Heath Park,  Cardiff, CF14 4XW  Tel 029 2074 6255 |
| **CHALFONT ST PETER**  Centre for Epilepsy | Theurapeutic Drug Monitoring Unit, Chalfont Centre for Epilepsy, Chesham Lane, Chalfont St Peter, Buckinghamshire, SL9 0RJ  Tel 01494 601355 |
| **Charing Cross** Medical Oncology Department | The SAS Laboratories, Clinical Biochemistry and Medical Oncology, Charing Cross Hospital,  London, W6 8RF  Tel 0208 383 3949 |
| **DORCHESTER** Chemical Pathology | Dorset County Hospital, Williams Avenue, DORCHESTER, DT1 2JY Tel 01305 254331 (Results/Enquiries) |
| **GLASGOW** Dept of Clinical Biochemistry | Department of Clinical Biochemistry, Macewen Building, Glasgow Royal Infirmary, Glasgow,  G4 0SF Tel 0141 211 4003 / 4 |
| **GREAT ORMOND STREET, LONDON** | Chemical Pathology Reception, Level 1, Camelia Botnar Building, Great Ormond Street Hospital,  Great Ormond Street, London  WC1N 3JH Tel 020 7405 9200 ex 8319 |
| **Guildford** Clinical Biochemistry | SAS Peptide Hormone Section, Clinical Laboratory, Royal Surrey County Hospital, Egerton Road  Guildford, GU2 7XX  Tel 01483 406715 |
| **Harefield** Immunology Department | Immunosuppression Monitoring Service, Heart Science Centre, Harefield Hospital, Hill End Road  Harefield, Middlesex, UB9 6JH  Tel 01895 828570 |
| **INSTITUTE OF CHILD HEALTH**  **LONDON** | Biochem/Endo/Metabolism Unit, Institute of Child Health, 30 Guilford Street, LONDON, WC1N 1EH  Tel 020 7905 2159 |
| **KING’S COLLEGE HOSPITAL, LONDON** | Kings College Hospital, IDM Service, Liver Studies, Denmark Hill, London, SE5 9RS  Tel 020 7346 3147 |
| **KING’S COLLEGE HOSPITAL, LONDON** | Dept of Clinical Biochemistry, King’s College Hospital, Bessemer Road, LONDON SE5 9RS  Tel 020 7346 3726 (AAT), 020 7346 4131 (Steroids), 020 7346 3856 (Porphyrins) |
| **LIVERPOOL**  Dept of Clinical Chemistry | Department of Clinical Chemistry, Royal Liverpool University Hospital, Prescot Street, Liverpool  L7 8XP  Tel 0151 706 4247 |
| **NHSBT**  Histocompatibility and immunogenetics | NHSBT – Bristol Centre 500 North Bristol Park, Northway, Filton, Bristol, BS34 7QH  Tel 0117 9217372 |
| **NHSBT**  Histocompatibility and immunogenetics | NHSBT – South Thames 75 Cramer Terrace, Tooting, SW17 0RB  Tel 020 3123 8347 |
| **NHSBT** Red Cell Immunohaematology | NHSBT – Bristol Centre 500 North Bristol Park, Northway, Filton, Bristol, BS34 7QH Tel 0117 9217380 OOH - 0117 9693927 |
| **Norfolk & norwich**  Dept of Clinical Chemistry | SAAS Calcium & Metabolic Bone Assays, NNUH, Colney Lane, Norwich, NR4 7UY  Tel 01603 287945 |
| **OXFORD**  Immunology | Oxford University Hospitals NHS Foundation Trust, Department of Immunology, Churchill Hospital, Old Road, Headington, Oxford, OX3 7LE  Tel 01865 225995 |
| **PLYMOUTH** Combined Laboratory | Derriford Combined Laboratory, Derriford Hospital, Plymouth, PL6 8DH  Tel 01752 792296 |
| **POOLE** Biochemistry Department | Poole NHS Foundation Trust, Longfleet Road, Poole, Dorset, BH15 2JB  Tel 01202 448048 |
| **PORTSMOUTH** Chemical Pathology | Portsmouth Hospitals NHS Trust, Queen Alexandra Hospital, Southwick Hill Road, Portsmouth,  Hants, PO6 3LY  Tel 02392 286000 Ex 6271 |
| **Queen’s Square, LONDON**  Neuroimmunology | Neuroimmunology & CSF Laboratory, Institute of Neurology (NHNN Box 76), Queen Square,  London, WC1N 3BG  Tel 020 3448 3814 |
| **ROYAL FREE, LONDON**  Chemical Pathology | Clinical Biochemistry, Royal Free Hospital, Pond Street, London, NW3 2QG  Tel 0207 830 2081 |
| **SHEFFIELD (PRU)** Department of Immunology | Department of Immunology, PO Box 894, Sheffield, S5 7YT  Tel 0114 226 9196 |
| **SHEFFIELD** Biomedical Sciences Group | Health & Safety Laboratory, Harpur Hill, Buxton, SK17 9JN  Tel 01298 218099 |
| **SHEFFIELD**  Dept Chemical Pathology | Sheffield Childrens Hospital, Western Bank, SHEFFIELD, S10 2TH  Tel 0114 271 7404 |
| **SHEFFIELD**  Dept Toxicology | Royal Hallamshire Hospital, Glossop Road, SHEFFIELD, S10 2JF  Tel 0114 271 2214 |
| **SOUTHAMPTON** Chemical Pathology, Endocrine, Trace Metals | D Level, South Block, Southampton General Hospital, Tremona Road, SOUTHAMPTON,  SO16 6YD.  Tel 023 8120 6464 (results etc), 023 8120 6709 (Biochemists), 023 8120 6237 (Trace Lab) |
| **SOUTHAMPTON** Immunology | Wessex Immunology, Mailpoint 8, Level C, South Block, Southampton General Hospital, Tremona Road, SOUTHAMPTON, SO16 6YD.  Tel 023 8120 6615 (Autoimmune), Tel 023 8120 6640 (Flow Cytometry),  Tel 023 8120 6638 (Molecular) |
| **SOUTHEND**  Department of Clinical Chemistry | Department of Clinical Chemistry, Southend University Hospital, Prittlewell Chase, Westcliff-on-Sea, Essex, SS0 0RY  Tel 01702 385438 / 385194 |
| **ST BARTHOLOMEWS – LONDON** | Dept Clinical Biochemistry, St Bartholomews Hospital, LONDON, EC1A 7BE  Tel 020 3456 7890 ext 83814 or direct line 0203 4483814 |
| **ST HELIER’S HOSPITAL**  Chemical Pathology | Epson & St Heliers University Hospital, Chemical Pathology, Wrythe Lane, St Helier, Sutton,  Carshalton, SM5 1AA  Tel 0208 296 2432 |
| **ST GEORGES, LONDON**  Protein Reference Unit | SWLP Immunology, Ground Floor, Jenner wing, St George’s University Hospitals, NHS Foundation Trust, Blackshaw Road, London, SW17 0RE Tel/Fax 0208 725 0025 |
| **ST THOMAS’S, LONDON**  Haemophilia & Thrombosis | Diagnostic Haemostasis @ ViaPath, 4th Floor, North Wing, St. Thomas Hospital, London,  SE1 7EH  Tel 020 71882797 |
| **ST THOMAS’S, LONDON**  Purine Research Lab | Purine Research Laboratory, 4th Floor, North Wing, St. Thomas Hospital, Westminster Bridge Road, London, SE1 7EH  Tel 0207 188 1266 |
| **UCL, LONDON**  Department of Biochemistry | Dept of Biochemistry, UCL Medical School, 3rd Floor, 60 Whitfield Street, London, W1T 4EW  Tel 0203 447 9405 |

**Guide to Profiles and Test Groups**

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

TESTS OF RENAL FUNCTION

UEC Profile = Urea, Sodium and Potassium and Creatinine.

Chloride and Bicarbonate should be requested specifically when indicated clinically.

|  |  |  |
| --- | --- | --- |
| **Analyte** | **Reference Range** |  |
| Sodium | 133-146 mmol/L |  |
| Potassium | 3.5-5.3 mmol/L | **a** |
| Chloride | 95-108 mmol/L | **a** |
| Bicarbonate | 22-29 mmol/L | **a** |
| Urea | 2.5-7.8 mmol/L | **a** |
| Creatinine | Male 80-115 umol/L,  Female 53-97 umol/L | **a s** |
| EGFR | >90 ml/min1.73 m2 |  |

1. Delayed separation, haemolysis, and use of incorrect tubes or misuse of Vacutainer tubes leads to falsely high potassium levels.
2. Potassium values are often lower in fit young adults.
3. Bicarbonate values are lower in children.
4. Urea value is much affected by hydration state and protein intake. It is higher in the elderly.
5. 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.
6. Assay of serum osmolality +/- urine osmolality is important in acute renal failure, hyperglycaemic diabetic states and hyponatraemic states.
7. Chloride and Bicarbonate should be requested in assessment of acidosis/alkalosis and when chloride rich fluids are given IV over many days.
8. EGFR calculated using the MDRD formula in adults.

BLOOD GAS ANALYSIS

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

When the sample has been taken please ensure the following:

1. Any air bubbles in the samples are excluded.
2. The needle is disposed of in a safe manner and replaced with the cap provided in syringe kit.
3. The patient's temperature and FIO2 are recorded.
4. If necessary transport sample on ice and take directly to nearest analyser: Beatrice Labour Ward, Radnor, A/E, NICU, Whiteparish

|  |  |
| --- | --- |
| **Analyte** | **Reference range** |
| pH | 7.35-7.42 |
| H+ | 35-45 |
| pCO2 | 4.5-6.1 kPa |
| pO2 | 12.0-15.0 kPa |
| Base excess | +/-2.0 mmol/L |
| Standard bicarbonate | 22-26 mmol/L |

**Carbon Monoxide**

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

|  |  |
| --- | --- |
| **Probable clinical condition** | **Level of Carboxyhaemoglobin** |
| Non-smoker | 0.5-1.5 % saturation |
| Smokers 10 - 20 /day | Up to 5 % saturation |
| Smokers above 40/day | Up to 9 % saturation |
| TOXIC | multi-factorial – ALWAYS seek advice |

BONE PROFILE

Fasting samples taken without venestasis are preferred.

As 50% of calcium is bound to albumin, an "adjustment" for albumin level is also reported

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

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

LIVER PROFILE

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

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

CARDIAC PROFILE

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

LIPID PROFILE

LIP1: Random cholesterol.

LIP2: Fasting lipids: total cholesterol, triglycerides, HDL, calculated LDL and total cholesterol/HDL ratio (TC/HDL).

For interpretation see Joint British Societies Coronary Risk Prediction Charts at back of current British National Formulary.

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

GLUCOSE/DIABETES

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

**Oral Glucose Tolerance Test**

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

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

\* Symptoms = polyuria, polydipsia, unexplained weight loss

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

**Haemoglobin A1c**

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

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

ENDOCRINE

**Thyroid**

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

* Free T3 values are age dependant.
* Remember that intercurrent illness may cause very low levels of TSH, even as low as <0.05 mU/L.
* Thyroid function is best assessed when patients have recovered from acute illness.

1. Thyroiditis, usually of viral origin, may give results similar to those found in mild thyrotoxicosis.
2. TRH tests are rarely justified and should only be requested following discussion in cases where marked symptoms do not match the biochemical results.

**Adrenal Function**

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

**Growth Hormone**

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

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

**Sex Hormones**

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

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

1. Samples to determine menopause in menstruating women are best taken during menses.
2. Samples for Progesterone should be taken 7 days before anticipated next menstruation viz day 21 in a 28 day cycle, day 28 in a 35 day cycle.
3. Raised prolactin values may be due to stress/hypothyroidism/certain drugs e.g. phenothiazines.  
   The laboratory screens all high Prolactins for macroprolactin.
4. A comprehensive list of drugs causing raised prolactin can be obtained from the laboratory.
5. Prolactin concentration is generally greater than 1000 mU/L in prolactinomas.

**Gut Hormones**

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

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

METALS

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

SERUM PROTEINS

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

IMMUNOGLOBULINS

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

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

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

**IgE**

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

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

THERAPEUTIC DRUG LEVELS

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

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

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

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

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

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

TUMOUR MARKERS

**PSA**

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

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

HAEMATINICS

SFOL Serum folate (Gold top tube)

B12 Serum vitamin B12 (Gold top tube)

FER Serum ferritin (Gold top tube)

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

OTHER ANALYTES WITH COMPLEX REFERENCE RANGES

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

PRENATAL SCREENING

**Down’s Syndrome and ONTD Screening**

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

URINE AND MISCELLANEOUS ANALYSIS

|  |  |  |
| --- | --- | --- |
| **Analyte** | **Reference Range** | **Notes** |
| Calcium / Creatinine Clearance Ratio | < 0.010  0.10 – 0.015  > 0.015 | Fam benign hypercalcaemia likely  FBH/Primary hyper PTH - grey zone / both conditions  Primary hyper PTH likely |
| Catecholamines | 0.00 – 3.00 µmol/24 hr  0.00 – 1.40 µmol/24 hr  0.57 - 2.39 µmol/24 hr | Normetanephrine  Metanephrine  3-methoxytyramine |
| Creatinine Clearance \* | 90-130 ml/min | ml/min x 1.44 = L/24 hr |
| 80-110 L/24h/m2SA |  |
| Pancreatic Elastase | > 200 µg/g stool  100 – 200 µg/g stool  < 100 µg/g stool | Normal  Mild to moderate exocrine pancreatic insufficiency  Severe exocrine pancreatic insufficiency |

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

**Urine Preservatives**

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

**Special Diets**

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

**Semi-Quantitative Urine Screens**

Samples for Bence Jones Protein must be **fresh early morning** samples.

Screening tests for Urine Bile pigments and Urine porphyrins are also available. Protect samples from light and arrange for rapid transfer to the laboratory (must arrive within 4 hours).

CSF ANALYSIS

Please send both a plain and a fluoride sample for the routine investigation of meningitis.

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

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

REDUCING SUBSTANCES

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

DYNAMIC TEST PROTOCOLS

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

Conn’s Syndrome SCREEN (Aldosterone/Renin Ratio)

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

Cryoproteins \*

Dexamethasone Suppression (Overnight) \*

Dexamethasone Suppression (Prolonged)

Dexamethasone Suppression/Synacthen Stimulation Test \*

Dumping Test (Post Gastrectomy) \*

Glucose Tolerance Test (Standard Oral) \*

Glucose Tolerance Test (Prolonged) \*

Growth Hormone Suppression Test (Oral GTT) \*

HCG Stimulation Test (pre-pubertal children)

LHRH Test \*

Orthostatic Proteinuria \*

Renal Calculus Screen \*

Synacthen Test (Short) \*

Synacthen Test (Long)

Synacthen Test (17 OH Progesterones for CAH)\*

Water Deprivation Test \*

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

**Guide to Specific Haematology Test Groups**

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

FULL BLOOD COUNT

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Test** | **Adults** | | **Children** | | | |
|  | Male | Female | 10 yrs | 1 yr | 1 wk | 1 day |
| Hb (g/L) | 130 - 178 | 120 - 160 | 115 - 145 | 105 - 135 | 130 - 200 | 140 - 200 |
| RBC (x1012/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 (x109/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 (x109/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 (x109/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 (x109/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 (x109/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 (x109/L) | 0 - 0.4 | 0 - 0.4 | 0 - 0.7 | 0 - 0.7 | 0 - 1.5 | 0 - 2.5 |
| Basophils (x109/L) | 0 - 0.5 | 0 - 0.5 | 0 - 0.5 | 0 - 0.5 | 0 - 0.5 | 0 - 0.5 |
| Reticulocytes (x109/L) | 50 - 100 | 50 - 100 | 50 - 100 | 50 - 100 | 50 - 150 | 50 - 150 |

COAGULATION

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

A coagulation screen will have the following tests:

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

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

THROMBOPHILIA SCREEN

**Who should have Thrombophilia Screening?**

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

D DIMERS

D-dimers have a high **negative** predictive value in the exclusion of DVT or PE **in outpatients** when used **in conjunction** with other testing modalities, such as Doppler ultrasound, or with formalised clinical scoring systems.

A negative D-dimer test in conjunction with either a negative Doppler study or Q scan, or in a patient with a **low** probability score for venous thromboembolism (VTE), effectively excludes the diagnosis.

D-dimer assays should **not** be used in patients at high clinical probability for VTE, nor should they be used in **existing inpatients** who develop possible VTE while in hospital.

LUPUS ANTICOAGULANT

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

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

CELL MARKER TESTS

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

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

ERYTHROCYTE SEDIMENTATION RATE (ESR)

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

HAEMOGLOBINOPATHY INVESTIGATIONS

1. Sickle Cell Screening will be reported as Positive or Negative.
2. HPLC and the red cell indices taken from the Full Blood Count will be used to investigate possible thalassaemia or a Haemoglobin variant. HPLC will identify many, but not all, haemoglobin variants and the levels of HbA2 and HbF will be used in the diagnosis of Thalassaemia. Interpretation of the results will be provided in the report.

|  |  |
| --- | --- |
| Test | Reference Range |
| Haemoglobin A2 | ≤ 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.

1. 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.

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

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

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

BLOOD TRANSFUSION TESTS

The following tests are available from the Blood Transfusion Laboratory:

1. Blood group
2. Red cell antibody screen
3. Antibody identification
4. Compatibility testing
5. Kleihauer test
6. Direct antiglobulin test

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

**Guide To Specific Immunology Test Groups**

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

Connective Tissue (ANA) Screen

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

Presence of DNA antibodies reported in units.

ENA positivity will initiate a Full ENA Screen against the following individual antigens:

Sm, Ro, La, RNP, Scl 70, Jo-1 and centromere.

Clinical comments are included on the report to assist in the interpretation of the results.

Liver Autoantibody Screen

This screen includes:

Anti-smooth muscle antibodies

Anti-microsomal antibodies

Anti-liver, kidney microsomal antibodies

Anti-mitochondrial antibodies

Anti-parietal cell antibodies – only reported if positive

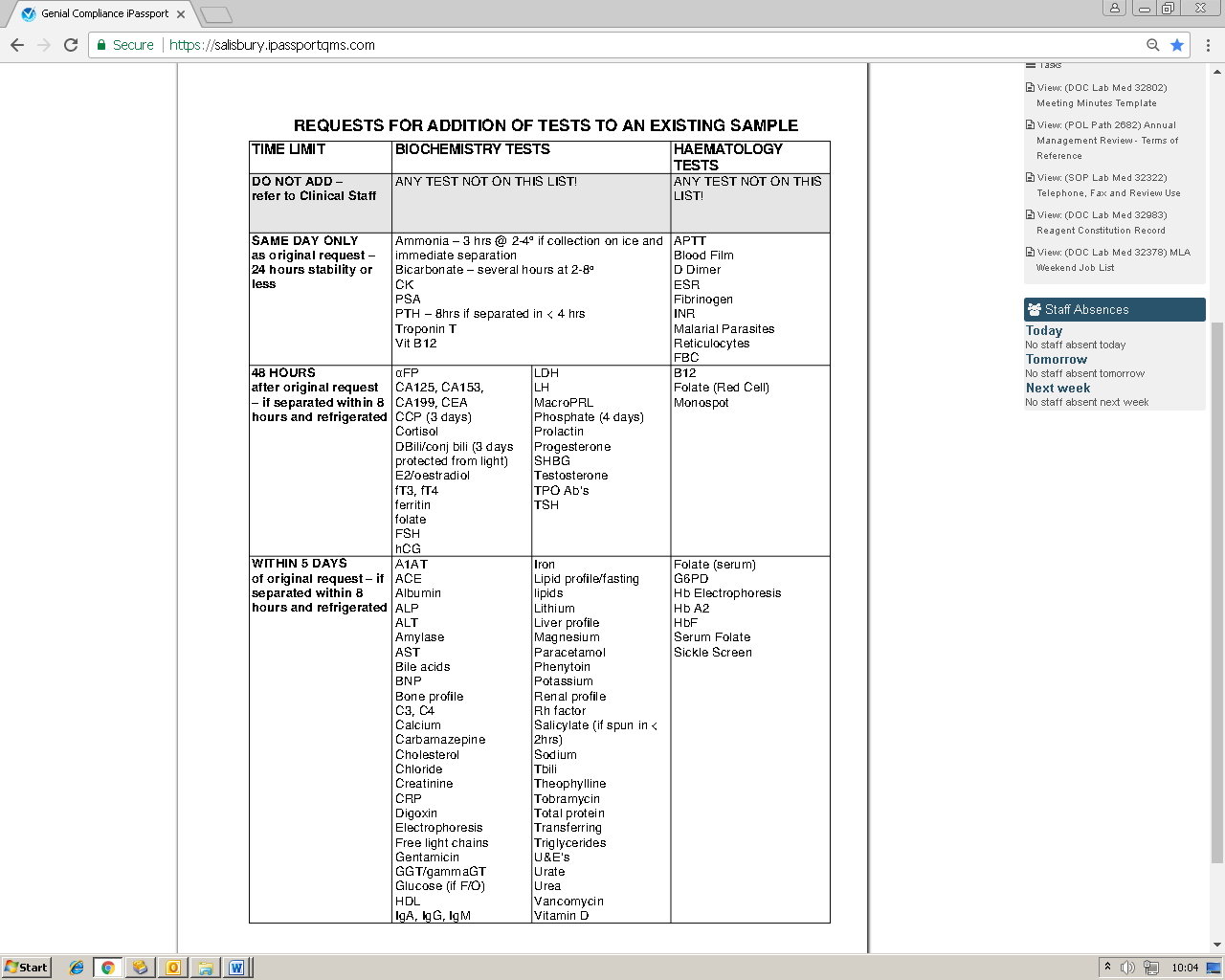
If anti-mitochondrial antibodies are detected then further testing for anti-M2 antibodies will be carried out.

Tissue Transglutaminase Antibody

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

Vasculitis screen

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



|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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.  **1. Contact details**   |  |  |  | | --- | --- | --- | | Key Personnel: | | | | Laboratory Manager: | Jo Harris  Collette Allen | Ext. 4102 | | Laboratory administrator: | Wendy Thornton | Ext. 4105 | | Quality Manager: | Donna Hopkins | Ext. 4109 |  |  |  |  |  | | --- | --- | --- | --- | | Consultant Staff: |  | Ext. |  | | Consultant Microbiologist  Lead Clinician  Infection Control Doctor | Dr Julian Hemming | 4110 | (01722 429105) | | Consultant Microbiologist  Dep Infection Control Doctor: | Dr Stephen Cotterill | 4104 | (01722 429105) | | Consultant Microbiologist  Antimicrobial Lead: | Dr Paul Russell | 4101 | (01722 429105) |   **2. 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.

**3. Out of hours requests - guidelines**

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

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

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

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

**4. Out-of-hours Requests (hours of service)**

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

**At any time: CSF**

**Monday to Sunday and Bank Holidays:**

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

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

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

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

**After midnight:** **CSF only**

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

**5. 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.

**6. 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:

**(i) Virology Swabs (Green top, Virocult)**

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

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

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

**(ii) 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:

**(a) 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](http://icid/ClinicalManagement/Diagnostics/Pages/SterilePyuria.aspx)

**(b) 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>

**(c) 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>

**(e)** **Chlamydia/ Gonococcal**

Public Heath England produces a useful guide on who and when to offer chlamydia NAATs screening/ testing in General Practice and when to refer to GUM clinics. Recommended treatment options are also provided.

Please note: urine testing for chlamydia in women has been known to produce false results. Please contact the Microbiology Laboratory to discuss before submitting urine samples from women.

The laboratory now screens for Neisseria gonorrhoeae both on swabs from both sexes and urine samples submitted from male patients for both hospital and community patients. IF you do NOT wish to have N gonorrhoeae tested on individual patients, please make this clear on the request form (in the clinical details box).

For more detailed guidance, please refer to:

<https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/345381/Chlamydia_guidelines_treatment_and_diagnosis.pdf>

**(f)** **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>

g) **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).

**(h) 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](http://icid/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.

**7. 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

**8. 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

**9. Clinical Advice**

**Monday to Friday 0900 – 1700hrs**

Contact the duty consultant on ext 4099 or Bleep 1967.

**Out of hours**:

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

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

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

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

**10. High Risk Specimens**

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

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

**Vacuum Transport Tube (Whooshy): ALERTS!**

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

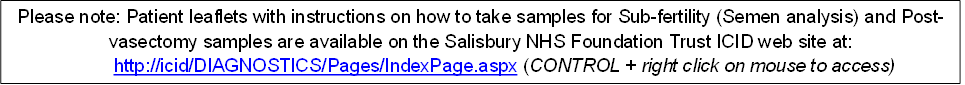
Out-of-hours (from 17:00 until 09:00 Monday to Friday and from 12:00 on Saturdays and Bank Holidays; All day Sunday) the vacuum tube to the Microbiology reception is switched off, and any samples sent may be randomly sent to locations other than the laboratory!

| **11 BACTERIOLOGY TESTS** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Investigation** | **Test** | **Sample** | **Container** | **TAT** | **Limitations** | **Out-of-Hours** | **Rejection Criteria** |
| ALL SPECIMENS |  |  |  |  |  |  | Form/sample labelling error; leaking specimen container. Expired expiry date of swab |
| Ascitic Fluid Culture  *Note: Inoculating sample into Blood Culture bottles may increase yield of fastidious organisms* | Gram stain & Culture | Ascitic fluid | Universal (white top) | 4 days | Ideally samples should be collected before antibiotic treatment | Yes, by arrangement-  See on call availability |  |
| Blood Cultures  (Adults) | Gram stain, if positive & Culture | 5-10mls blood per bottle | Adult blood culture set – Aerobic(blue) and Anaerobic (purple) bottles | 1 – 6 days, depending on positivity | Samples should be collected before antibiotic treatment | Bottles should be left at room temperature in blood-issue room | Exterior surfaces grossly contaminated with blood |
| Blood Cultures  (Children) | Gram stain, if positive & Culture | 3-4mls blood | Paediatric blood culture bottle – yellow top | 1 – 6 days, depending on positivity | Samples should be collected before antibiotic treatment | Bottles should be left at room temperature in blood-issue room | Exterior surfaces grossly contaminated with blood |
| Broncho-alveolar lavage Culture | Gram Stain & Culture | Broncho-alveolar lavage | Universal (white top) | 4 days | Contact Consultant Micro-biologist if Pneumocystis testing is required | Contact duty Consultant Microbiologist |  |
| *Clostridium difficile* Toxin | Toxin Detec-tion | Faeces | Universal with spoon (blue top) | 1 day | Only performed on liquid / semi-formed stools (Bristol stool scale 5-7), please state 3 months antibiotic history | Saturday/ Sunday/ Bank holiday mornings | Do not request if a positive result within previous 28 days |
| Corneal Scrape Culture | Gram stain & Culture | Corneal scrape | Direct inoculation onto plates and slide | 2 hours for microscopy  2 – 5 days for culture | Requires good amount of cellular material. For *Acanthamoeba* culture contact laboratory before taking sample | Yes, by arrangement-  See on-call availability |  |
| CSF Culture | Cell count, Gram stain, if required, & Culture | 1–2ml CSF.  State if TB culture or Cryptococcal culture / antigen required | 2 sterile glass bijoux containers.  Send 1st and 3rd samples, appropriately labelled | 2 hours for microscopy  3 days for culture | Cell counts cannot be performed on clotted samples – only culture | Yes, by arrangement 24 hours a day |  |
| Ear Swab Culture | Culture | Ear swab | Transport swab (black top) | 4 days | None | No | Swab past expiry date |
| Eye Swab Culture | Culture | Eye swab | Transport swab (black top) | 4 days | None | No | Swab past expiry date |
| Faeces Culture | Micro-scopy & Culture | Faeces | Universal with spoon (blue top)  See HPS guide link, page 93 | 4 days | Clinical details are essential for processing  Shigella culture may be less effective if sample arrives more than 4 hours after sample taken | No | Sample less than “size of the top of the thumb”  Container more than 50% filled |
| Fungal Culture | Micro-scopy & Culture | Skin, hair, nails | Fungal culture kit/universal (white top) | 7 – 10 days for microscopy 3-4 weeks for culture | None | No |  |
| Gonococcal Culture  GUM clinic only | Culture | Endo-cervical swab  and  Urethral swab | Transport swab (black top) | 4 days | Transport delay may reduce sensitivity of test  Any positive GUM slides should be sent to the lab with the specimen for culture | No | Swab past expiry date |
| Gynae-cological Culture | Micro-scopy & Culture | Vaginal and / or Endo-cervical swab depending on clinical scenario | Transport swab (black top), one per site | 4 days | Clinical details are essential for processing  See HPA guide link for vaginal swabs, page 93 | No | Swab past expiry date |
| IV Cannula Culture, e.g., CVP line tip | Culture | End of cannula tip (end 4 cm)  Note: blood culture is preferable | Universal (white top) | 4 days | None. | No |  |
| Joint Fluid Culture | Gram stain, Culture and crystals | Joint fluid | Universal (white top) | 4 days | None | Yes, by arrangement - see on-call availability |  |
| Leg Ulcer Swab | Culture | Leg ulcer swab | Transport swab (black top) | 4 days | Routine swabbing is unnecessary, unless there is clinical indication of infection.  See HPA guide link, page 93 | No | No clinical details consistent with active infection  Swab past expiry date |
| Mouth Swab Culture | Culture | Mouth swab | Transport swab (black top) | 4 days | Culture directed to Candida sp. (for herpes simplex please refer to virology section) | No | Swab past expiry date |
| MRSA Culture | Culture | Swab  Urine  Sputum | Transport swab (Black topped)  Universal (White top) | Negative: 1 – 2 days  Positive: 2-4 days | Culture directed to MRSA only  See Trust MRSA Policy | No | Axilla & throat swabs are not accepted.  Swab past expiry date |
| Neonatal Screen Culture | Culture | a) Swabs  b) gastric aspirate | a)Transport swab (black top)/  b)universal container | 4 days | a) Swabs from umbilicus and ear | No | Swab past expiry date |
| Nose Swab Culture | Culture for *Staph. aureus* only | Nose swab | Transport swab (black top) | 4 days | Pernasal swabs are required for the isolation of *Bordetella pertussis*. | No | Swab past expiry date |
| Parasitology | Microscopy | Faeces | Universal with spoon (blue top) | 6 days | Please contact Laboratory if ‘hot-stool’ examination is required | No |  |
| Parasitology | Microscopy | Sellotape slide | Collections kits available from Laboratory | 6 days | None | No |  |
| Pertussis Culture | Culture | Pernasal swab | Pernasal swab (blue top) | 7 days | Samples taken >2 weeks after onset of symptoms may not yield a positive result. | No | Swab past expiry date.  Wrong swab type used |
| Pleural Fluid Culture  *Note: Inoculating sample into Blood Culture bottles may increase yield of fastidious organisms* | Gram stain & Culture | Pleural fluid | Universal (white top) | 4 days | None | Yes, by arrangement - see on-call availability |  |
| Pus Culture | Gram stain & Culture | Pus | Universal (white top) | 4 days | None | Yes, by arrangement - see on-call availability |  |
| Skin Swab Culture | Culture | Skin swab | Transport swab  (black top) | 4 days | Impetigo, cellulitis (broken skin) | No | Swab past expiry date. |
| Sputum Culture | Culture | Sputum | Universal (60ml wide-mouth, metal top) | 4 days | If fungal culture required e.g. in an immuno-compromised patient, please indicate on request form | No | Salivary or non-purulent sample |
| TB Culture (Urine)  This test is currently provided by Poole | Culture | First-pass early morning urine (from 3 consecutive days) | Universal (60ml wide-mouth, metal top) | 6 weeks | No microscopy performed on urine TB samples | No | Incorrect container |
| TB Culture  (Sputum/ BAL/ Tissue/ Pus)  This test is currently provided by Poole | Microscopy & Culture | Sputum/  BAL/  Tissue/Pus | Universal (60ml wide-mouth, metal top) | 2 days for microscopy  6 weeks for culture | Sputum samples should be collected early morning  Please do not send in formalin | Urgent microscopy, only after consultation with duty Consultant Micro-biologist |  |
| Throat Swab Culture | Culture | Throat swab | Transport swab  (black top) | 4 days | Isolation of *Neisseria* spp. only on request | No | Swab past expiry date. |
| Tissue for Culture | Gram stain & Culture | Tissue | Universal (white top) | 7 days | Please do not send samples in formalin | Yes, by arrangement - see on-call availability | None |
| Urine Culture  Urine culture (continued) | Microscopy & Culture | Urine | Green top tube with boric acid.  See PHE guide link, page 93 | 3 days | Please state whether sample is MSU/ CSU/ SPA/ Bag/ Ileal conduit sample.  Antibiotic use (recent and/or intended) : helps with interpretation of results and guides further work up | No | Hospital samples > 4 hours old will be rejected  GP/ community samples >24 hours old will be rejected.  Samples in non boric acid will be rejected. |
| Urinary Parasitology (Schistosomiasis) | Microscopy | Urine | Universal (white top) | 5 days | Collection of terminal specimen of urine around 12 noon after 15 minutes of light exercise | No |  |
| Wound Swab Culture | Culture | Wound swab | Transport swab  (black top) | 4 days | Pus sample should be sent ideally (in a white topped Universal)  Do not take routine ulcer wound swabs unless clinically infected & results will alter management, as these are non-sterile sites | No | Swab past expiry date. |

| **12 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 arrangement 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:   1. Pneumococcal 2. 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 | |  |

| **13 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 |

| **14 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](http://icid/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 |

****

| **15 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** |
| bottlefamily10 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 topLight Blue | Sodium Citrate | Coagulation Studies, Anti-coagulant Control, INR, APTT, Thrombophilia Screen, Lupus Anticoagulant Screen, Factor assays. |
| 3.5 ml | gold topGold | 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 topGreen | Lithium heparin | Limited Cell Markers and Genetic Tests, T-Spot |
| 4 ml | purple topLavender | 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 | grey toppink topPink | Crossmatch | Blood Group, Crossmatch, Direct Antiglobulin Test (DAT). |
| 2 ml | Grey | Fluoride Oxalate | Fasting / Random Glucose, GTT, Alcohol Lactate on ice.  Insulin on ice |
| 7 ml | royal blue topNavy | Trace Elements | Trace elements.  Chromium, cobalt  Mercury to be kept dark |

**Paediatric Sample Tubes**



1

8

7

6

5

2

3

4

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